45241

Amateur Radio

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

COMMUNICATIONS & TECHNOLOGY

AUGUST 2006

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On the Cover: Steve Flood, KK7UV, of Missoula, Montana. Story on page 70.

KENWOOD

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Straight Out of the Box!

- The perfect internet base transceiver - straight out of the box!
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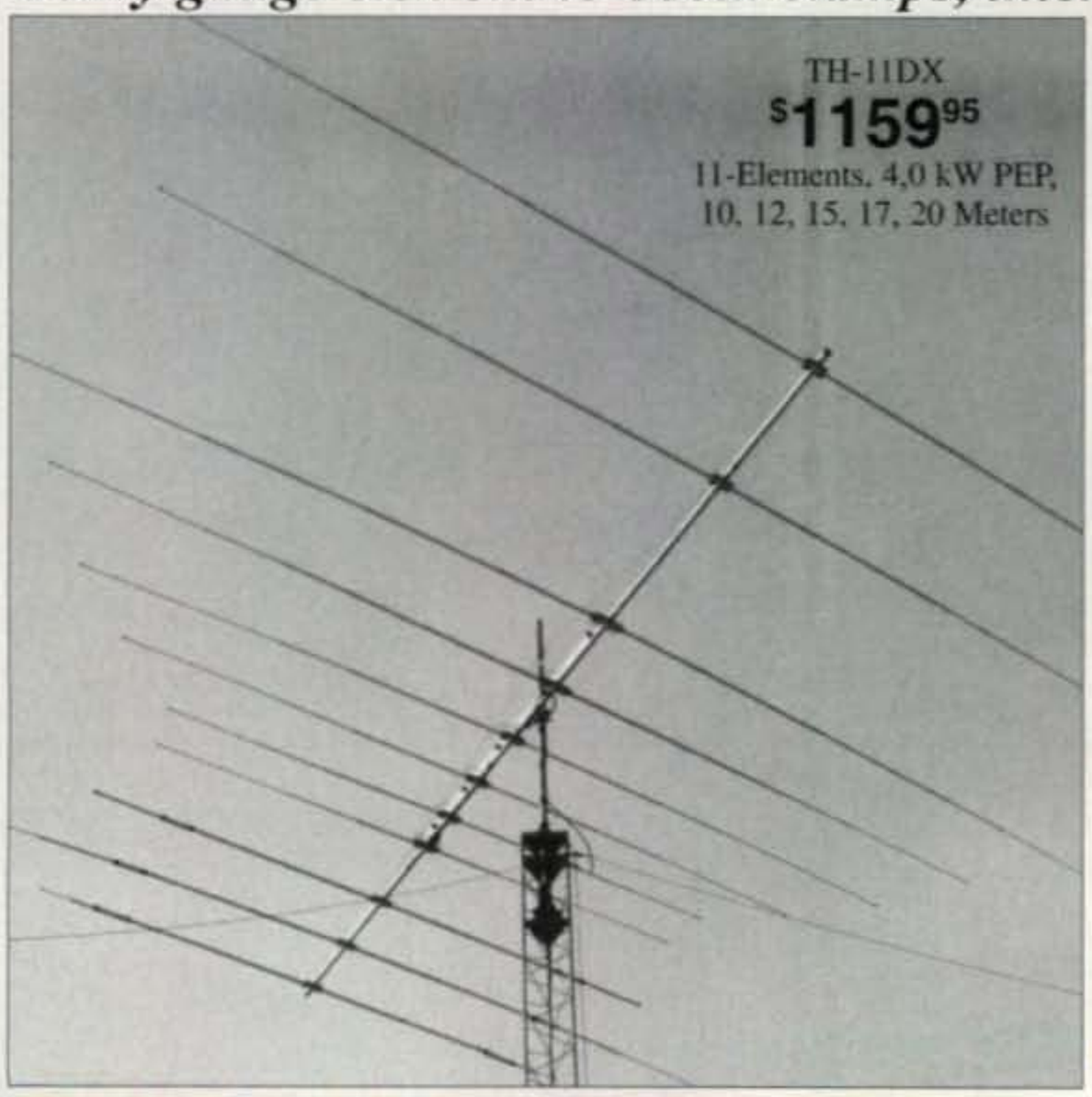
hy-gain® HF BEAMS...

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



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

The choice of top DXers.

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

Handles 2000 Watts continuous, 4000 Watts PEP.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

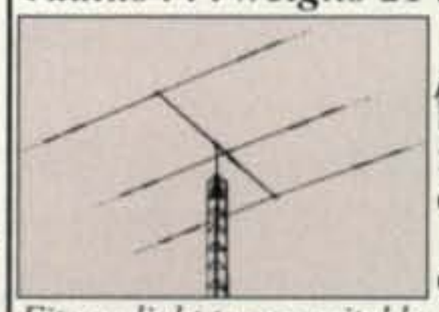
BetaMATCH™ provides DC ground to eliminate static. Includes BN-86 balun. Easily assembled.

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

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

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

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



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

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

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

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

Model No.	No. of elements	avg gain dBd	avg F/B dB	MaxPwr watts PEP	Bands Covered	Wind sq.ft. area	Wind (mph) Survival	boom feet	Longest Elem. (ft)	Turning radius(ft)	Weight (lbs.)	Mast dia O.D.(in.)	Recom. Rotator	Sugg. Retail
TH-11DX	11	*For Gain and F/B ratio--See...*		4000	10,12,15,17,20	12.5	100	24	37	22	88	1.9-2.5	T2X	$1159.95
TH-7DX	7			**1500**	**10, 15, 20**	**9.4**	**100**	**24**	**31**	**20**	**75**	**1.5-2.5**	**HAM-IV**	**$869.95**
TH-5MK2	5			1500	10, 15, 20	7.4	100	19	31.5	18.42	57	1.5-2.5	HAM-IV	$759.95
TH-3MK4	3			**1500**	**10, 15, 20**	**4.6**	**95**	**14**	**27.42**	**15.33**	**35**	**1.9-2.5**	**CD-45II**	**$469.95**
TH-3JRS	3			600	10, 15, 20	3.35	80	12	27.25	14.75	21	1.25-2.0	CD-45II	$359.95
TH-2MK3	2			**1500**	**10, 15, 20**	**3.25**	**80**	**6**	**27.3**	**14.25**	**20**	**1.9-2.5**	**CD-45II**	**$369.95**
EXP-14	4			1500	10,15,20 (30/40)	7.5	100	14	31.5	17.25	45	1.9-2.5	HAM IV	$599.95

- www.hy-gain.com
- Hy-Gain catalog
- Call toll-free 800-973-6572

Tooled Manufacturing . . . Highest Quality Materials

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

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

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

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

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

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

Durable precision injection molded parts.

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

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departments

MFJ Small, high efficiency *Loop Tuners*™

Turns any wire loop into small, high efficiency multi-band transmitting loop antenna

Mount for PVC Cross Loop

MFJ-933 **$179.95**

MFJ-935B **$199.95**

MFJ-936B **$249.95**

New!

You'll radiate a low angle DX signal that literally rivals full size dipoles and work incredible DX!

It's a very quiet receiving antenna -- you'll hardly notice static crashes. Its high-Q reduces QRM, overloading, harmonics.

It's perfect for apartments, antenna restricted areas and portable operation -- *it really gets out!*

A 13 foot wire formed into a loop operates 30-20 Meters (4 foot for 17-10 M; 7 foot for 20-15 M; 28 foot for 60-40 M).

You can tune *any* shape loop -- circle, square, rectangle, *any* odd shape. A quarter wavelength wire shaped as a *circle* is the most efficient.

A given wire length covers about 1.5 to 1 frequency range (i.e. 7-10/18-28 MHz, etc.). Exact frequency coverage depends on wire length, loop shape, surroundings and height above ground.

Has MFJ low loss *Butterfly* loop tuning capacitor, no rotating contacts. *Easy-Carry* handle. Mount for PVC Cross on cover.

See June, 1986, *QST* or recent *ARRL Antenna Handbook* for more details on small, high efficiency loops.

MFJ-936B, $249.95. For home/portable stations. Has relative RF antenna current meter with sensitivity control and 30/300 Watts Cross-Needle SWR/Wattmeter. 9¼Wx5½Hx9½D inches.

MFJ-935B, $199.95. For portable/home stations. Smaller, lighter. Relative RF current meter with sensitivity control. 6¼Wx5½Hx9½D inches.

MFJ-933, $179.95. Same as MFJ-935B less RF current meter. 6¼Wx5½Hx9½D in.

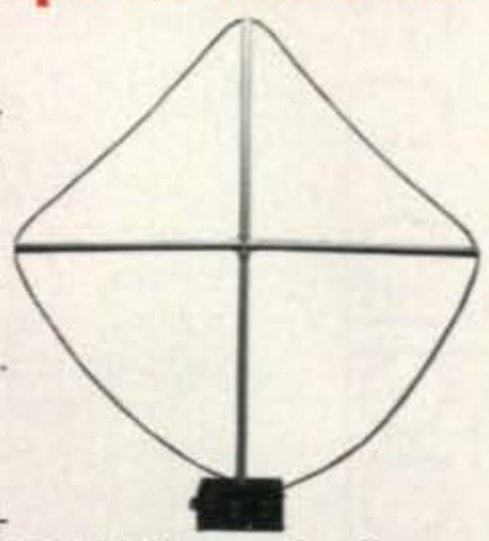
Drape a wire around a bookcase or window and attach both ends to this new *MFJ Small Loop Tuner*™.

***It** instantly turns into a small, high efficiency multi-band transmitting loop antenna!*

You can operate 5.3 to 30 MHz with a full 150 Watts. No ground, radials or counterpoises needed.

The excellent performance of a high-efficiency small loop antenna is legendary and well proven by users all over the world.

Wire Loops and Mounts



MFJ-57B, $29.95. Has PVC Cross for mounting loop on cover, 20-15M insulated 10-gauge flexible loop, low resistance lugs.

MFJ-58B, $49.95. Has MFJ-57B above, plus 60-40 M, 20-15 M, 17-10 M loops; wire clips.

Butterfly loop Tuning Capacitors

The heart of the *MFJ Loop Tuners* is an extremely *low loss butterfly tuning capacitor* with no rotating contacts. 4200 Volts RMS. ¼"dia.x2½" long shaft.

A. MFJ-19, $69.95. 12 to 67 pF. 6Dx3Wx3½H in.

B. MFJ-23, $89.95. 18 to 136 pF. 10Dx3Wx3½H in.

A. B.

Mini high-efficiency Loop Tuner™

New!

MFJ-932 **$129.95**

Tiny 50-Watt version of MFJ-933, *Small High-Efficiency Loop Tuner*™. Makes portable operation *really portable and fun*! Ultra low loss butterfly capacitor. Covers 80-10 Meters with appropriate wire loop. Tiny 3Wx4Hx1½D inches.

Whip Tuner/Artificial Ground gives *instant* 80-10M, 150 Watt Antenna

Just add short whip and counterpoise wire and *instantly* get an effective portable 150 Watt all band 3.5-30 MHz antenna.

It's effective, compact and simple to use for portable, fixed station and emergencies. **New!**

High power, hi-Q 3-core variable loading coil efficiently resonates short whip or random wire. Identical inductor tunes counterpoise. Operates 30-10 Meters with included 4½ foot telescoping whip antenna and counterpoise assembly.

Add longer whip/random wire and external loading coil for more efficient operation especially on 80-30M. 12 foot whip, hamstick, Hustler antennas all work great.

Tune for low SWR with built-in reversible L-network. *Current balun* decouples radiating elements.

Tune for maximum current on *RF Current Meter* to give you maximum radiated power and minimum SWR. Sensitivity control lets you use QRP to 150 Watts QRO.

Ultra low capacitance fiberglass antenna/counterpoise insulator minimizes shunting antenna current to ground for maximum radiated power.

Standard 3/8x24 female connector for whip antennas and wing-nut for counterpoise. SO-239. 7¼Wx2¼HX2½D inches.

MFJ-1642, $119.95. Like MFJ-1644 but less *RF Current Meter*.

MFJ-1644 **$149.95**

Window/Balcony 80-6 Meter Antenna, built-in *Tuner*

MFJ-1625 **$199.95**

New!

Complete antenna system mounts on window frame, balcony or railing. Perfect for apartment, condo. 80-6 Meters, 200 Watts. Universal mount/clamp, built-in antenna tuner with RF isolator, extra long 12 foot telescoping whip (22.5 inches collapsed), high efficiency loading coil for 40/80 Meters, counterpoise wires, safety rope. **MFJ-1623, $179.95.** Like MFJ-1625, but 6-30 Meters.

Telescoping Whips

10 and 12 foot long, standard 3/8x24 threaded stud. **MFJ-1954, $22.95.** 10 foot, 19" collapsed. **MFJ-1956, $29.95.** 12 foot, 22.5" collapsed.

Ruggedized flat Mobile/ portable SWR/Wattmeter

New!

MFJ-818 **$69.95**

MFJ's new flat, compact SWR/Wattmeter is *plenty rugged* to take the abuse of *brutal* mobile and portable operation.

Meter fully enclosed in strong aluminum case with just the scales and two small switches exposed -- there's little to break.

Simultaneously read SWR/forward/reflected power on full size 3-inch lighted *Cross-Needle* Meter. 30/300 Watt ranges, 1.8-30 MHz, SO-239 connectors. 5Wx3H x2D". Use 12 VDC for meter lamp or plug into cigarette lighter with **MFJ-5510, $9.95**.

Dealer/Catalog/Manuals

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

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

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

MFJ . . . The World Leader in Ham Radio Accessories!

ham radio news

FCC Katrina Panel Recognizes Hams' Contributions

The contributions of amateur radio operators in the response to Hurricane Katrina was recognized by the FCC's "Independent Panel Reviewing the Impact of Hurricane Katrina on Communications Networks" in its final report, issued June 12. A paragraph on ham radio noted that like other services, "amateur radio stations were also adversely affected by Katrina," but that once called into help, "amateur radio operators volunteered to support many agencies ... provided wireless communications in many locations where there was no other means of communicating and also provided other technical aid to the communities affected by Katrina."

The report was included in an 82-page Notice of Proposed Rule Making issued by the FCC on June 19, requesting public comments on the panel's many recommendations, including one that, in a disaster, any restrictive amateur radio rules be waived in order to permit any "transmissions necessary to meet essential communications needs."

EB Docket No. 06-119 may be accessed on the FCC website at <http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-06-83A1.pdf>. Comments will be due 60 days after publication of the Notice in the *Federal Register*.

McDowell Confirmed for FCC

Robert McDowell, whose nomination to the FCC was among several non-judicial appointments blocked for months by Louisiana Senator Mary Landrieu as a protest of slow federal help after Hurricane Katrina, was finally confirmed by the Senate and sworn in as a Commissioner. McDowell, an attorney and former top official of the Competitive Telecommunications Association, fills one of the Republican seats on the Commission and brings the FCC to full strength for the first time since the departure of former Commissioner Kathleen Abernathy. McDowell's term runs through June, 2009.

CubeSat Launch Postponed

There's been a delay of at least a month in the planned launch of a constellation of tiny "cubesats," each measuring 10 cubic centimeters and weighing just one kilogram. A total of 14 cubesats—13 of them carrying amateur band transmitters—were scheduled to be launched together in late June from Russia's Baikonur Cosmodrome in Kazakhstan, but according to the *ARRL Letter*, "a technical issue during launch vehicle preparation" caused the launch to be delayed until July 26 (UTC) at the earliest. The amateur satellites were each designed and built by university students around the world; 12 of them will transmit on the 70-centimeter band, one on 2 meters. According to the AMSAT News Service, the launch will represent the largest-ever deployment of amateur radio satellites. Updated information is available online at <http://showcase.netins.net/web/wallio/ CubeSat.htm>.

AMSAT-UK Sees Threat from Wireless Broadband

The British amateur satellite organization is warning that a proposal in the United Kingdom to permit significantly higher power for unlicensed wireless broadband services in rural areas could pose a serious threat to amateur radio and amateur satellites. The *ARRL Letter* reports that British regulators are considering permitting wireless broadband transmitters to operate with up to 80 watts effective radiated power in the 2.4 GHz band and as much as 200 watts ERP at 5 GHz. Current permitted levels are 100 milliwatts and 2 watts, respectively. The bands are shared by amateurs, who by virtue of being licensed, are supposed to have priority over unlicensed services.

FCC Getting Tough with Manassas BPL Provider

The FCC's Enforcement Bureau, which has taken over responsibility for responding to complaints of interference from Broadband over Power Lines (BPL) systems, has told the operator of a controversial system in Manassas, Virginia, to resolve the problems or face the possibility of being shut down. In a June 16 letter to the City of Manassas and to BPL operator COMTek, Enforcement Bureau Chief Joseph Casey says the Commission's preliminary review of an April report on interference complaints suggests that "the BPL system is not in compliance with the Commission's emission requirements at several frequencies." While noting that those frequencies are not within amateur bands, they are nonetheless "directed to take immediate steps to eliminate all excessive emissions." Casey also said the report did not include any indication that the tests "included steps to specifically address" the amateur complaints and directed them to do so and to either resolve the problem or bring signals on the frequencies in question to at least 20 dB below the Part 15 limit.

In addition, Casey said that "in light of the apparent ongoing interference ... and the insufficiency of data reported to the Commission, you are requested to provide a description of what steps you will take to inform customers of a cessation of services ... should you be directed to cease operations, either in part or system-wide." The Commission also forwarded to Manassas and COMTek similar complaints from four additional amateurs.

Meanwhile, the full House of Representatives has approved a telecommunications bill (HR 5252, the Communications Opportunity, Promotion and Enhancement Act of 2006) which includes a provision requiring the FCC to study and report to Congress the potential for interference from BPL systems. A companion bill is still in committee in the Senate.

Two Hams Killed in Foxhunt Accident

Two California amateurs on a hidden transmitter hunt ("foxhunt") were killed May 27 when the Jeep in which they were riding apparently went out of control and plunged off a 900-foot cliff. According to the *ARRL Letter*, 46-year-old Michael Obermeier, K6SNE, of Anaheim, and 35-year-old David Gordon-Ross, N6IDF, of Yucaipa, were both expert transmitter hunters, each with hundreds of hunts completed. The 147.435 Amateur Radio Repeater System is collecting donations to help Gordon-Ross's wife, Melanie, KF6GWV, and their one-year old child. More information is available at <http://www.435online.com>.

CEPT Proposes Foundation Licenses Across Europe

Looking at the apparent success of "Foundation" licenses in the United Kingdom and Australia, the European Conference of Postal and Telecommunications Administrations (CEPT) is proposing that all member nations adopt similar entry-level amateur licenses. According to *Newsline*, the proposed standard would include both theoretical and practical exam modules, and would permit limited access to HF ham bands. The United States and CEPT recognize each others' licenses, but the U.S. is not a member of CEPT, so this proposal would have no impact on the FCC's licensing structure.

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.

hy-gain® ROTATORS

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

HAM-IV

HAM-IV
$559.95

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

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

TAILTWISTER SERIES II

T-2X
$649.95

T-2XD
$1029.95
with DCU-1

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

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

CD-45II

CD-45II
$389.95

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

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

HAM-V

HAM-V
$949.95
with DCU-1

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

ROTATOR OPTIONS

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

AR-40

AR-40
$289.95

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

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

HDR-300A

HDR-300A
$1379.95

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

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

Digital Automatic Controller

DCU-1
$649.95

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

AR-35 Rotator/Controller

AR-35
$69.95

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

RBD-5
$34.95

NEW! Automatic Rotator Brake Delay

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

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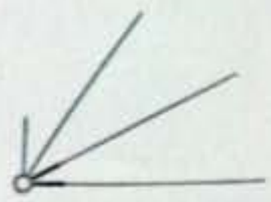

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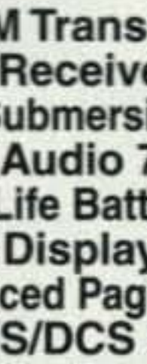

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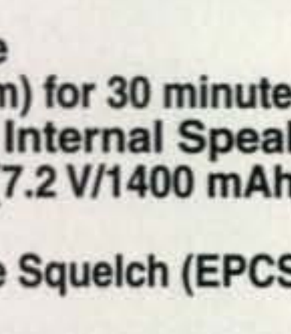

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a CQ editorial

zero bias —

BY RICH MOSESON,* W2VU

Turn On That Radio!

If you're sitting around waiting for the next sunspot cycle to bring back the good DX, then you're missing out on a lot of good DX. I wrote here in May about great band openings on 15 meters the weekend before NASA officially announced that we'd reached the bottom of the current cycle. Now, as I write this in mid-June, six meters has been going wild with propagation the likes of which we've come to expect only at the *peak* of the sunspot cycle, not the bottom. N6CL's VHF-Plus column this month (page 82) details some of the biggest openings—from the U.S. West Coast to Europe and from the Midwest to Japan!

I'd been hearing about these openings but hadn't had time to get on the air, until this morning, when I was scratching my head about something to write for this column. I have a foolproof approach to writer's block when it concerns *CQ* editorials: get on the radio! It never fails. So this morning, I turned on six meters and in short order, worked VP2MRT in Montserrat, CT1HZE in Portugal (on CW), and FM5JC in Martinique! Now, double-hop sporadic-*E* will get my signals to the Caribbean from New Jersey (although this is the first time I'd worked either on the "Magic Band"), but I'd need either triple-hop *E*-skip or *F*-layer propagation to get "across the pond" to Europe on six ... unless it's something different.

The conventional wisdom among most of the folks whose reports Joe quotes in his column is that we're seeing greatly enhanced sporadic-*E*, but I'm with Dave Bernhardt, N7DB, who wrote, "OK, why don't we just throw out conventional wisdom this season?" I think that's a great idea, because my guess is that something other than the conventional wisdom is at play here, such as a combination of *E*-skip and tropospheric ducting. I took a look at some current weather maps for the Atlantic Ocean and, lo and behold, there's a big fat high pressure system sitting out over the central Atlantic. If you start in New Jersey and go south along the western edge of that high, you end up—guess where?—in the Caribbean. Now, follow the northern edge up and over the top and you reach land in, that's right, Portugal. So I'm guessing that my contacts today had a lot more to do with tropospheric ducting than sporadic-*E*. These openings have most likely been there before but haven't been noticed until recently because six meters has become a ham band in Europe only over the course of the past ten years, and gradually at that. The population of VHF-active hams in the Caribbean is still pretty sparse, but growing (Cuba is the most active). But what about those really long-distance paths? Try taking some single-or double-hop sporadic-*E* and drop one end of the path into the duct and you've got stations on the west coast talking to Europe or hams in the Midwest working Japan.

I hope some of our resident propagation gurus will take a close look at the patterns of these contacts and, throwing out conventional wisdom, analyze the most likely way(s) that all of these various signals got from point A to point B ..... on a band that's not supposed to see any real DX for another five or six years!

But the real point here, for all of us—reinforcing what I wrote in May—is that even though we're at the bottom of the sunspot cycle, there's plenty of great DX to be worked, and sometimes where you'd least expect to find it. So throw out the conventional wisdom, turn on the radio, tune in bands that are "supposed to" be dead, and see who you can work. You might have to work a little harder and have a little more patience than you did four or five years ago, but you might be very pleasantly surprised.

By the way, my son, Dan, KC2OOM, joined me on six meters this morning and made his first contact—with FM5AA! *My* first QSO was in Pennsylvania (from New York); my first DX contact was in Canada. But Dan? Nooo.... Martinique .... on six meters ... at the bottom of the sunspot cycle ... and no, I didn't work the guy. He went QRT before I had a chance ... figures... gotta outdo the old man (grumble, grumble ... smile, smile).

Speaking of Young Hams...

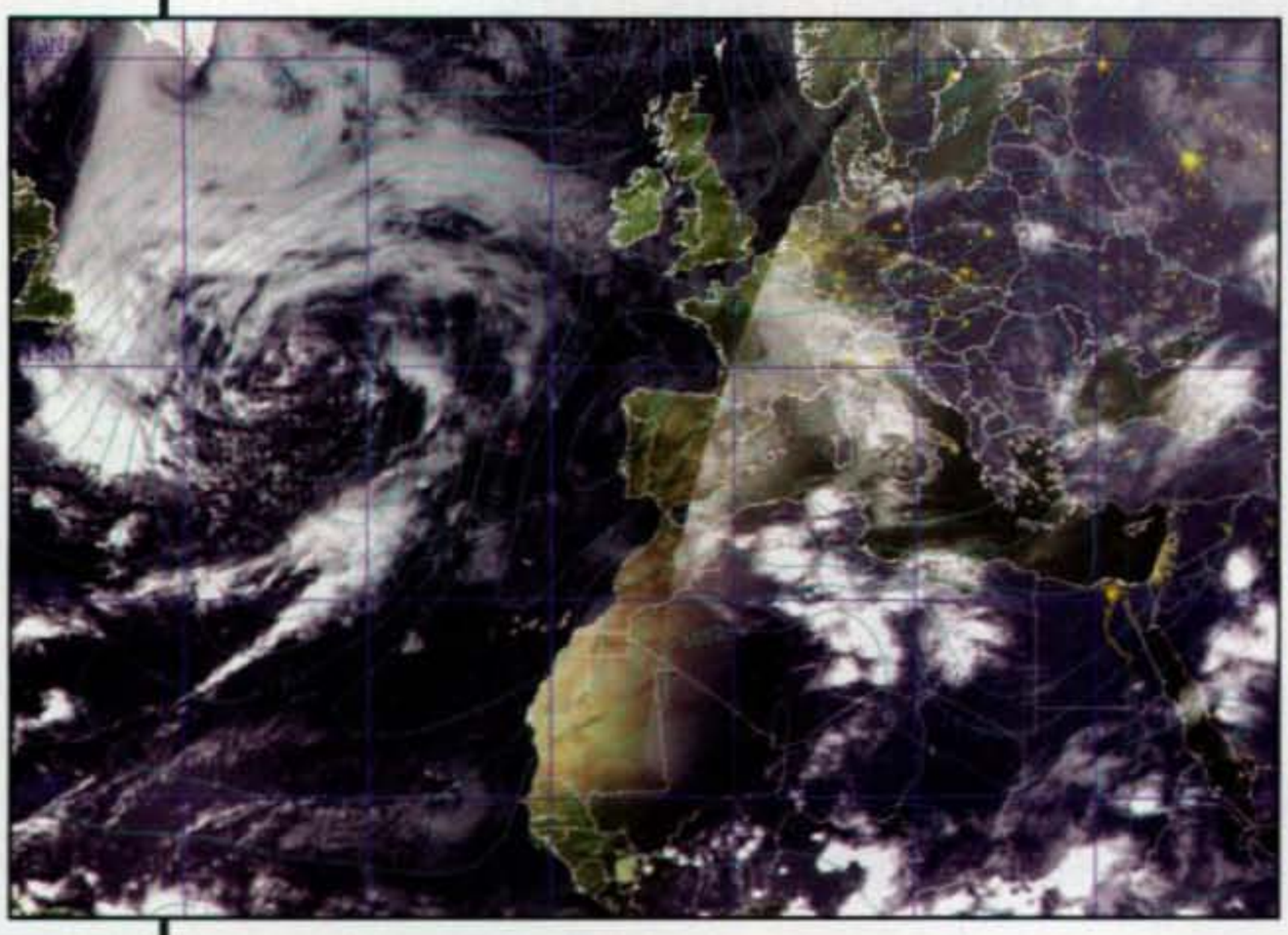
A trend I've been noticing at recent hamfests, particularly so at Dayton and Dallas this year, is the presence of more and more young hams. I'm seeing more kids—pre-teens and teenagers—with callsign tags and HTs, and perhaps of equal importance, more 20- and 30-something hams, often with spouses (sometimes with calls of their own) and little kids in tow. So, perhaps the conventional wisdom about our not getting under-50s into ham radio is about as valid as the conventional wisdom that says you can't work DX on six meters unless we're at the peak of the sunspot cycle. Maybe, like some band openings, they've been there all along but we just haven't noticed them until now.

And speaking of hamfests, another trend that's been pretty obvious of late has been that there's less and less "good stuff" at most flea markets, as well as fewer flea market vendors. This is a bad trend, as flea markets "drive" the hamfests. As flea markets shrink so does overall hamfest attendance. As attendance shrinks, so does participation by commercial vendors and manufacturers. It's a vicious cycle. Hamfests are an important part of the "glue" that holds our hobby together, and it's important not to let that glue get dry and cracked. You can do your part by supporting your local hamfest and flea market, whether as a seller or a buyer, or even just a browser.

The most important way to keep ham radio healthy, though, is by getting on the air and making contacts. They *are* out there to be made, regardless of conventional wisdom. So fire up that rig, hook up that antenna and *get on the air*!

73, W2VU

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



Are high pressure systems over the Atlantic at least partially responsible for this spring's great DX on 6 meters? (US Navy photo courtesy Naval Research Lab, Monterey, CA)

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announcements

The following Special Event stations are scheduled for the month of August:

N4J, from 200th anniversary of the building of President Thomas Jefferson's Retreat Home, Poplar Forest, Virginia; 1200Z August 25 to 2400Z August 27 on SSB all General class bands; WARC bands and 6 meters; Tech/Novice portion of 10 meters, and local repeaters. For a QSL send QSL and SASE to Ed Narwid, W4OAF, 1799 Otter Hill Rd., Bedford, VA 24523.

WA5DTK, from Galveston, Texas area lighthouses; August 4–10, including national Lightship/Lighthouse Weekend; SSB 3.990, 7.260, 14.270, 21.360 MHz; CW 7.030, 14.030. QSL to barry Brewer, 603 Broken Bow Drive, Round Rock, TX 78681-7401.

N7C, from Navejo Code Talkers Day, Window Rock, Arizona; August 13 and 14 from 1400–2400Z each day; on 14.265, 7.265, 21.305 MHz ±. QSL with SASE to N7HG, P.O. Box 3611, Window Rock, AZ 86515.

K9R, from 200th birthday of Richmond, Indiana; 11 AM to 7 PM EDT August 17–20; on or around 7.265 and 14.265 MHz. For QSL send QSL and SASE to Whitewater ARC, 1417 North A Street, Richmond, IN 47374.

The following hamfests, etc., are slated for August and early September:

Aug. 5, **Western Illinois Ham Radio & Computer Swapfest,** Eagles Alps Grounds, Quincy, Illinois. For information go to <www.w9awe.org/Swapfest2006.pdf>. (Talk-in 147.030+ w/103.5 PL; exams 12:30 PM, info and reservations <na9q@arrl.net>)

Aug. 12, **Northwest Ohio ARC Hamfest 2006,** the grounds of Fair Radio Sales, Lima, Ohio. Contact Gary Clements, KCØJDT, 419-227-6573, e-mail: <FAIRRADIO@fairradio.com>.

Aug. 13, **Hamfesters Radio Club Hamfest,** Will County Fairgrounds, Peotone, Illinois. Contact Christine Mack, K9RFY, 630-993-0249, e-mail: <christine1500@comcast.net>; <www.hamfesters.org>. (Talk-in 146.52 simplex; exams 8:00–10:30 AM)

Aug. 20, **NoBARC Fleamarket**, Bowe Field, Adams Agricultural Fair Grounds, Adams, Massachusetts. Contact George Bourassa, KB2SAE, 413-443-7539, e-mail: <kb2sae@amsat.org>; <http://www.nobarc.org>.

Aug. 26, **Owen County Hamfest**, Owen County Fairgrounds, Spencer, Indiana. Contact Katie Smith, K9INU, 812-829-2140, e-mail: <rasacres@ccrtc.com>. (Talk-in 146.985 [–600 kHz]; exams 2 PM)

Aug. 26–27, **Boxboro 2006,** Holiday Inn Boxborough Woods Hotel, Boxboro, Massachusetts. E-mail: <boxboro2006@gmail.com>; <www.boxboro.org>. ***See us at the CQ booth.***

Aug. 27, **Lapeer County ARA Ham & Computer Swap,** Lapeer Center Building, Lapeer, Michigan. Contact Bill Miller, KD8VP, 810-797-5329, e-mail: <kd8vp@arrl.net>; <www.w8lap.com>. (Talk-in 146.620 –100 Hz)

Sept. 2, **Uniontown ARC Gabfest,** club grounds at Old Pittsburgh Rd. Contact Carl, WA3HQK, 304-594-3779; <www.w3pie.org>. ((Talk-in 147.045+)

our readers say

Foxhunting and Security Issues

Editor, *CQ*:

A photograph that accompanied the article "It's Radio Foxhunting Season" (April *CQ*) shows an old ammunition box being used as an enclosure for a transmitter. I could not help wonder that such a sight would set in action a series of events here in New York such as a police response, closing of a park, and the unnecessary deployment of dozens of police officers to respond to what appears to be a "suspicious device." I assure you that it would result in the arrest of the control operator of the transmitter!

We in the ham radio community owe it to our neighbors to use our good judgment when sharing parks or public places. Notifications to the authorities so that our activities are not misunderstood are of the first order. Unfortunately, these troubled times make us all take certain precautions we normally should not have to.

Efrem Acosta, W2CZ

Author KØOV replies:

W2CZ makes a good point. I have written about it in other articles, but it bears repeating. A mention in the photo caption for this article would have been a good idea. The topic of security comes up regularly on the internet mailing lists for foxhunters. I can assure everyone that most foxhunters take this very seriously. They are in general agreement on these unwritten rules:

1. MARK YOUR FOXBOX. In the article photo, you can see two labels atop my box. They explain that this is a radio beacon, placed temporarily and to be removed within 24 hours. One lists both my cell phone and pager

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numbers. The other warns that tampering with a radio transmitter is a federal offense.

2. PICK LOCATIONS CAREFULLY. Ten years ago, it was common to find a foxbox chained to the base of a high-voltage power transmission line tower. Not anymore! Unless you will be very close and watching your foxbox throughout the hunt, avoid locations near "assets" or crowds of people. A foxbox next to a tree in a wilderness park will be considered much less threatening than one in a school playground.

3. SECURE YOUR FOXBOX. Radio foxes can get stolen. (It has happened to me!) Make it hard for a thief without tools to grab your box and run. It's hard to see, but my foxbox in the photo has a bicycle chain (painted green) securing it to the bushes.

4. NOTIFY WHERE APPROPRIATE. The foxbox in the photo is near the entrance of a hospital, but there was no problem because the hospital's director of security had been in on the hunt planning. He was quite willing to support the hunt because the Orange County Hospital Disaster Support Communications System (an ARES group headed by my wife April, WA6OPS, see <www.hdscs.org>) has provided emergency communications for his facility. He even came out that evening to watch the fun! Many of our in-the-park on-foot hunts are cooperative events with the Los Angeles Orienteering club, which obtains permits where necessary. For other park events, we make a point to notify the rangers that they may see green boxes and not to be alarmed.

With a little care and common sense, foxhunting can coexist with today's heightened security concerns. Thanks for the opportunity to point this out.

Pile-up Behavior

Editor, *CQ*:

I read your comments about the bad ops working Peter I (sidebar, 3YØX article, June 2006 *CQ*). I am one of those who could not break through the pile-ups. I looked at some of the stations in the online log that I heard and saw all the dupes. 3YØX never made an effort to work weak stations, as far as I could tell, except the last night on 40 CW, they called for EU only. That was really tough to listen to. I have 100 watts and a low folded dipole (antenna restrictions). It was good enough to work Kure and Kerguelen last year, but each time it was when the pileups had subsided and the ops were listening on specific frequencies for weak stations. KK6EK pretty much told me only the advanced RX in the ICOM they were using allowed them to pull out the weak ones. I thought the actions of my fellow hams were pretty disgusting. It takes a lot of the fun out of DXing. I spent many, many hours calling 3YØX.

Thanks for telling it like it is.

73, Mike, K8IW

W2VU replies:

My guess is that it would have been useless for the 3YØX ops to ask for weak stations (if indeed they did not), knowing the request would be ignored by those few selfish hams who took the fun out of this DXpedition for many others. Your strategy would have been correct in other circumstances. I remember asking K4UEE before the DXpedition if it was worth it for someone with 100 watts and a vertical (me) to even try contacting them, and if so, how to maximize my chances for success. He said I should definitely try, but to wait until the latter days of the operation when all the big guns will already have worked them. But when some of those big guns stayed in there, working the DXpedition over and over, for reasons known only to them, they made it impossible for the rest of us.

Alphabet Soup

Editor, *CQ*:

Is it lack of imagination which makes people pirate acronyms? CERT stands for Computer Emergency Readiness Team, an institution founded in 2003 to fight cyber attacks. OEM means Original Equipment Manufacturer, nothing else. Google exists—i.e., there is no pleading ignorance when attaching a new meaning to an already established acronym.

Eddi Ramm, DK3UZ

Eddi – You are correct as far as the world of computers goes. But in the world of emergency management, CERT and OEM have different meanings—specifically Community Emergency Response Team and Office of Emergency Management. There are only 26 letters in the English alphabet and a limited number of combinations that work well as acronyms, so some duplication is unavoidable. That's why it's a good idea to use plain language whenever possible, to minimize confusion.

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Results of the 2005 CQ WW DX SSB Contest

BY BOB COX,* K3EST

Expanded CQ WW Contest Results on the Web

A few additional elements of our contest reporting are on the CQ website, including **Station Operators** of Multi-Op stations and **Zone Leaders/Single Op**. In addition, there is expanded **QRM** on the web.

To view these additional and expanded elements of the 2005 CQ WW SSB results, go to <http://www.cq-amateur-radio.com/cqwwhome.html>, then click on "Expanded Results, 2005 CQ WW SSB" and select the category you want to see. You may also get there by going to our home page at <http://www.cq-amateur-radio.com>, clicking on "Contest Rules & Info," then clicking on "CQ World Wide DX Contest" and selecting "Expanded Results, 2005 CQ WW SSB."

In 2005 the CQ WW DX SSB Contest occurred about as late as you can get and still be in October. The second to third week of October usually has some of the best conditions of the year, but solar activity was predicted not to cooperate for the 2005 contest. However, this did not stop a record number (4430) of SSB operators from entering the world's largest international radio event. Days before the CQ WW you could hear stations from around the world getting ready for the competition. With solar conditions on the decline, contesters of all ages from every corner of the world turned on their radios and were surprised when the bands sprang to life. Once again, the CQ WW made its own propagation.

The CQ WW is a fantastic competition, but it is also much more than that. It is a celebration of ham radio skill and effort. Over the years thousands of hams throughout the world have received their first ham radio thrill in the CQ WW. Many new and experienced hams who try the CQ WW become addicted. If you want to know *exactly* how long it is until the next CQ WW SSB test, check out the website of OT5A: <http://www.on7lr.org>. It has a countdown to the second!

Below is a summary of the results of the 2005 contest. Read on to see how you and your friends ended up. Everyone who operated the CQ WW last year was a winner.

High Power All Band

A few years ago it would have difficult to think that a station from a two-point area would win for the world. Not only has it happened several times, but Tom, W2SC, has done it again. Place a great operator in an ideal QTH and anything is possible. Tom traveled down to 8P to activate 8P1A. After he finished, his score stood on top of the world! It is not an easy task to win from a two-point area. Tom showed that with more QSOs it can be done. Finishing in second place was perennial top finisher John, P40W (W2GD), and third place went to Scott, W4PA, who operated from VY2PA. All three operators exemplify the ideal contester, exhibiting motivation and detailed planning. The top three positions in Europe went to three stations located more or less at its corners. Breaking the 6-million point barrier is a real accomplishment and the first and second place finishers did just that. First place in Europe was Tonno, ES5TV. Conditions seemed to favor his location, plus he put his operating skills and super station to their best use (http://www.lhv.ee/images/files/es5tv.htm). Second position was taken by Steve, GW4BLE, and third place went to Tine, S50A, with his FB station in the countryside near Ljubjana.

In the U.S. Dave, KM3T, drove over to the K5ZD/1 QTH and proceeded to take top honors. Ken, K4ZW, located in Virginia near Washington, D.C., took position #2 (http://pvrc.org/k4zw/), and the third spot went to Alex, LZ4AX, operating the Penn State contest station, K3CR. Special mention should be made of Steve, N2IC/5, the highest scoring U.S. entrant from the far west.

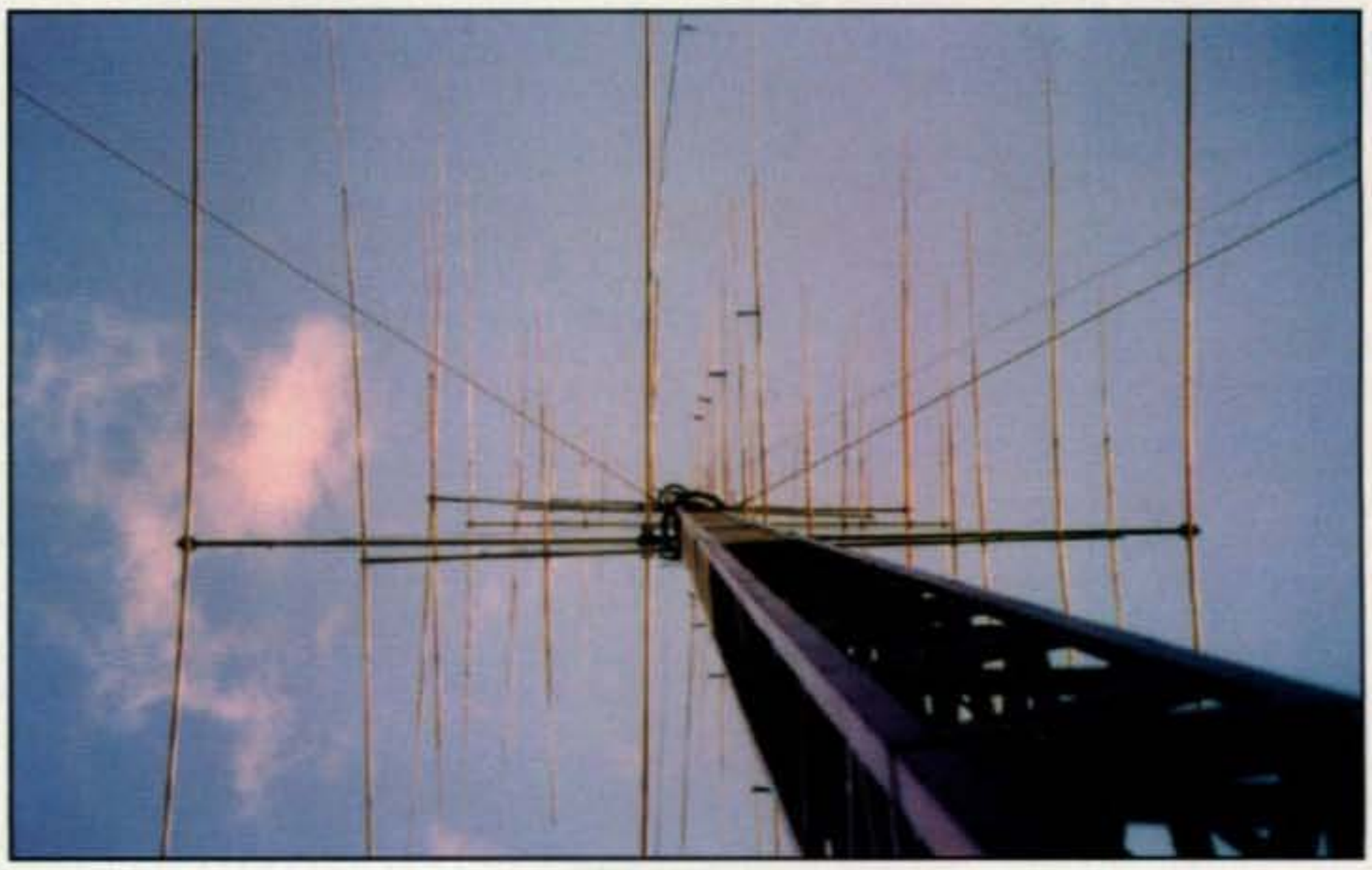
Again three Canadian stations made the World Top 10 box: VY2PA, VE2IM, and VC3O. The continental winners were: North America 8P1A, Africa ZD8Z, Asia UPØL, Europe ES5TV, Oceania AH7C, South America P40W, Japan JH4UYB, and U.S. K5ZD/1.

Low Power All Band

The various low power categories have by far the greatest number of participants. To win any low power category really is an achievement. The top three world positions were from three different continents. It means that at least three continents had a chance to finish near the top.

Taking the # 1 position in the world was John, KK9A, operating from Aruba as P40A (http://www.qrz.com/p40A). Second place went to Mike as FG/K9NW, who keeps moving towards the top slot, and third went to CT7T operated by CT1CJJ, Filipe, who finished as #1 in Europe. The number two 100 watts or less entrant in Europe was Kresimir, 9A5K. The number three scorer in Europe was LY9A operated by LY3BA, Gediminas. Here in the U.S., Ed, N1UR, who reprised his win from last year, was the winner in the barefoot category. Taking second place was Ann, WA1S (http://home.tiac.net/~wa1s/), who is always on the move to a DX location when she is not operating from home. Third place went to John, N1PGA.

The continental winners were: North America FG/K9NW, Africa CN8SG, Asia 7Z1SJ,



Tonno, ES5TV's QTH in Estonia.

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

The world champion Multi-Multi team, CT3YA.

Ken, K4ZW, #2 USA Single Op, All Band.

PX5E operated by Sergio, PP5JR.

Europe CT7T, Oceania VK2KPP, South America P40A, Japan JF2QNM, and U.S. N1UR.

QRP

QRP in the CQ WW is a great way to have fun and increase your DXCC totals. There are so many stations active in the contest from rare locations that with a little patience a QRP station make a lot of Qs. The CQ WW offers a challenge to all entrants, especially QRPers.

Gerard, F5BEG, was able to work more stations than any other QRPer—almost 1000 QSOs! Only 5400 points behind was John, KO1H, with the #1 score in North America. Third place in the world went to another contester from New England, Chris, KA1LMR (http://hometown.aol.com/ka1lmrusa/myhomepage/index.html). Third place in the U.S. was taken again by Anthony, K8ZT, in Ohio. The #2 score in Europe came from Simone, IK5RUN, and third place was Juergen, DF1DX. Special mention is made of the top QRP Asia score of JR4DAH. He is a long way from any population center. Working contesters with 5 watts is exciting and may bring back long-forgotten contest skills.

The continental winners were: North America KO1H, Africa EA8IK, Asia JR4DAH, Europe F5BEG, Oceania YB5AQB, South America LU1VK, Japan JR4DAH, and U.S. KO1H.

Assisted

The Assisted category offers a way for DXers and contesters to contribute to their clubs' score. Remember, QSOs are the name of the game. Try not to chase the band map too much and you may end up with a better score. Remember, too, when a single op receives QSO/multiplier spotting assistance from any source, in any form, he or she is operating in the Assisted category.

A hard-fought battle took place for the world top position. Winning by a million points was Christian, F6HLC, operating FM5BH (http://www.fm5bh.com/). He was followed by Wanderley, PY2MNL, at ZX2B, who took second place. RG9A (UA9AM), Yuri, was #3 world and #1 Asia. In the U.S. first place went to Ray, W2RE (http://www.hamsonline.net/w2re). Second place went to Noah, K2NG, operating from central New Jersey, while third place went to John, K1AR. In Europe, the #1 spot was teken by Philippe, LX2AJ, at LX7I (http://www.qslnet.de/member/lx2aj/). Farther east, in second place was Paul, RK4FD. Manfred, DJ5MW, put the new German club call DRØW to good use by taking third place Europe (http://www.dj5mw.de/).

The continental winners were: North America FM5BH, Africa EA8/DL5AXX, Asia RG9A, Europe LX7I, Oceania ZL1ANH, South America ZX2B, Japan JF2SKV, U.S. W2RE.

Multi-Single

Multi-Op Single Transmitter is the popular, and therefore the most competitive, of the three multi categories. It takes months of planning coupled with assembling a team of operators. Each year many contesters band together and travel to compete in this category.

In 2005 a real battle occurred in Multi-Single. Two zone 9 stations went at it, and after the dust settled the world winner was FY5KE (http://www.fy5ke.org/). This international team from Kourou took full advantage of their location. In second place was the four-man team from Austria and Germany, PJ4W. Located on a mountain in central Bonaire made their take-off angle FB. Taking third place in the world and #1 in Europe was OM8A (http://www.qsl.net/om8a/). Second place went to the Irish and English team of EI7M. You can see their station at <http://www.lral.lv/exped/ei7m/index.html>. Third place in Europe went to 9A1P (http://www.9A1P.com/).

A battle took place in the U.S. for top MS honors. The winner was Tom's K8AZ station. K8AZ is located in northeast Ohio and has a seasoned crew. Second place went to K3EST/4 operating from the all-wire station of KT3Y. Trees hold up everything! Third place went to Chuck's station, KØRF, out in Colorado. That three-man crew rocked! A special mention of AH2R must be made, too. For many years this Japanese team has put zone 27 in many logs.

The continental winners were: North America J7DM, Africa IG9R, Asia 9K2HN, Europe OM8A, Oceania AH2R, South America FY7KE, Japan JA7YAA, USA K8AZ.

Multi-Two

Every year the Multi-Op Two Transmitter category continues to grow in popularity. Having two transmitters on the air for 48 hours requires a real strategy. You have to have both good operators and stamina if you want to try for the top spot.

The Rhein-Ruhr DX Association put together a team and travelled to the Madeira Islands to put CT9L on the air. They took top prize in this difficult category. About a half hour from the Canadian Niagra Falls is the super station of John, VE3EJ. His crew took full claim to the world #2 position, quite a fantastic job from a two-point area. Third place went to the Caribbean Contesting Consortium, PJ2T (http://www.pj2t.org). Once again the station with the highest score in Europe was IR4X (ne IQ4A), located on a mountain overlooking the plains of central Italy (http://www.ari-bo.it/iq4a.htm). Second place again went to 9A7A (http://www.qsl.net/9a7a) located in beautiful Croatia, and third went to RU1A (http://ru1a.ru/eng/).

In the U.S., Frankford Radio Club's N3RS team decided to try for top honors and they took it (http://n3rs.com)! Second place went to K3NA/1. Eric's team located in Massachusetts is a team to watch out for in the future. Third place in the U.S. went to KI1G. A special mention must be made of the fine effort of K5NA to finish U.S. high west of zone 5.

The continental winners were: North America VE3EJ, Africa CT9L, Asia EKØB, Europe

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Multi-Multi

Placing first in the Multi-Op Multi-Transmitter category requires months, if not years, of preparation. With over 50% CT3 operators, the CT3YA multi-national crew arrived at their location and prepared to give their best effort to take the world crown. All the hard work paid off. The CT3YA gang took home the coveted Multi-Multi crown (http://www.madeirateam.com/). They were followed by the 2004 winner moving to Jamaica's north shore, 6Y2Z. Using verticals on and near the beach, they showed you can have fun with antennas carried in golf bags. Third place in the world was V26B (http://n3oc.dindns.org/v26b/). The V26B crew has been active for many years.

Breaking into the top six world was Tim's crew at K3LR (#4 world, #1 U.S.). Being away from the East Coast did not hurt this fine station. They took full advantage of Asian and European openings. (http://www.k3lr.com/). Second place in the U.S. went to Matt's team at KC1XX in New Hampshire. The October CQ WW is great time at Matt's. Not only is the event fun, in addition the trees have beautiful colors (http://www.kc1xx.com). Third place U.S. went to Frank's team at W3LPL, located in the rolling hills of central Maryland.

First place in Europe went to the DFØCG crew (http://www.df0cg.de/en/). Introducing new hams to contesting and gathering together a large crew is what OT5A is all about, and these second-place European winners continued their party at OT5A (http://www.on7lr.be/). Third place in Europe went to DQØQ of DFØHQ fame (http://www.df0hq.de).

The continental winners were: North America 6Y2Z, Africa CT3YA, Asia JA3YBK, Europe DFØCG, Oceania DX1DBT, South America YV4A, Japan JA3YBK, U.S. K3LR.

Team Contesting

When team contesting was first formulated back in 1990, it was hoped that the new competition would be a different addition to a small club competition. Five contesters from anywhere can form a team, register their team before the contest, and enter the Team Contesting category. As you can see below, the teams can be formed with members from anywhere in the world (also note that if there are les than five operators listed, the remaining ops of the team did not submit their scores). In 2005 we saw Neiger's Tigers Team #1 return to the top slot. They led the pack of 27 entries.

1. **Neiger's Tigers Team #1**: GW4BLE, 8P1A (W2SC), P40W (W2GD), ZD8Z (N6TJ): 34,753,807.
2. **Team DX**: FS/AH8DX, P40A (KK9A), VY2PA (W4PA), DRØW (DJ5MW): 23,800,535.
3. **PVRC Strike Team Alpha**: NN3W, W3LL, K4ZW, N8II: 8,576,373.
4. **WWYC – Last Heroes**: CT7T (CT1CJJ), 9A5K, S59CDE, 9A8MM: 6,202,244.
5. **CCF Team Mannerheim**: OH6KN (OH6UM), OH5Z (OH5KS), OH6NIO, SMØW (SMØWKA): 4,790,751.
6. **DXXE-1:** XE2K, XE1YJS, XE2AC, XE1CQ, XE2AUB: 4,639,939.
7. **CCF Team Finlandia**: CU2A (OH2UA), EA8/OH4NL, EA8AH (OH1RY), EA8EA (OH2MM): 4,122,278.
8. **VKCC – Australis**: VK7GN, VK4CZ, PAØMIR, VK9XD (VK2CZ): 4,097,593.
9. **MNWA Team #1**: ACØW, KH6FI, NØFP, NØIJ/9, TF/NØHJZ: 3,915,293.
10. **FCG – Survivors**: AI4MK, K4PV, NA4CW, N4WW, K4XS: 3,520,504.
11. **VKCC – Koalas**: 9M2CNC, VK6DXI, VK4AN, VK4DX: 2,279,232.
12. **Stafford DXA – The Federal DX Pigs**: K2PT/4, N4NW, K4HR: 2,179,309.
13. **FCG – CQing Worldwiders**: CX7TT (K6CT), HSØZCW (K4VLD), KG4WW (KX4WW): 1,809,120.
14. **CTRI Team #1**: KO1H, AJ1M/8, K1JN. KA1VMG, N3KCJ/1: 1,754,522.
15. **PVRC Strike Team Omega**: K3SV, W3BP/4, K4GM, W4EE/3: 1,045,249.
16. **DXXE-2**: XE1ZVO, XE3WAO, XE1CT, XE1CL, 4A1UN: 983,264.
17. **DX Hounds**: KB4FWN, KG4RTA, VA2SG, KB4QLZ: 796,024.
18. **CCF Team Sauna**: OH1MM, OH5DX, OH2LU, OH6OS, OH1ØA (OH3WW): 587,515.
19. **FCG Team 4**: K9OM/4, K1UM/4: 457,544.
20. **Team EA1**: EA1DOU, EA1WXD, EA1IGZ, EA1USB, EA1DWE: 404,854.
21. **DXXE-3**: XE1KK, XE1NW, XE1CWJ, XE1BY: 373,966.
22. **FCG – Fun in the Sunners**: N4EK, K4CC, KB4ET: 291,443.
23. **MNWA Team #2**: WGØM, KØKX, WØQQJ: 269,471.
24. **Multi-Multi QRM Contest Club:** YU1LA, YTØT (YU1EA): 202,047.
25. **MNWA Part Timers**: NØEO (AAØAW), KØAD, KØPYK, NØKK, NØIM: 195,110.
26. **VKCC Cockatoos**: VK4BAA, VK3KE, VK6HZ: 95,879.
27. **SP5PSL Team**: SP5COR, SP5COF, SP5WLO, SP5WLV: 31,449.

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
8P1A	224/10/28	521/20/65	1190/26/98	2205/32/104	2791/33/116	877/14/20
P4ØW	140/10/30	425/18/68	951/25/94	1787/29/99	2338/30/99	761/14/25
VY2PA	481/12/63	676/20/79	804/26/96	2081/27/108	1600/25/97	30/6/22
ZD8Z	8/7/7	183/17/47	312/20/64	1182/32/103	2019/32/119	1321/31/110
ES5TV	433/12/61	501/23/76	882/29/92	2322/38/124	895/34/109	309/19/56
GW4BLE	120/8/48	599/14/75	806/20/84	1691/31/102	1464/30/87	128/16/34
VE2IM	181/8/23	643/17/60	421/20/77	1914/30/113	1596/25/99	49/7/21
EA9LZ	107/9/40	295/17/68	1006/20/91	761/25/82	1223/31/100	513/16/58
VC3O	239/9/19	609/19/66	333/20/67	1816/35/122	1500/31/111	49/12/29
K5ZD/1	61/10/33	329/18/66	468/26/91	1242/35/131	1216/29/105	86/13/44

USA TOP SINGLE OPERATOR ALL BAND

Station	160	80	40	20	15	10
K5ZD/1	61/10/33	329/18/66	468/26/91	1242/35/131	1216/29/105	86/13/44
K4ZW	61/12/36	277/18/65	424/24/85	928/36/116	1221/29/105	103/17/42
K3CR	60/11/33	332/22/72	356/22/82	962/35/117	1102/31/108	64/9/24
W9RE	67/12/31	254/21/72	322/23/87	1038/35/123	950/29/107	76/10/30
AA1K/3	90/12/40	234/15/62	192/20/74	1375/34/122	759/33/103	79/16/40
WB9Z	65/11/36	379/21/76	157/22/73	805/37/116	826/31/105	81/12/33
N2IC/5	24/7/13	120/23/51	334/28/73	635/33/100	1357/34/103	77/10/24
W3BGN	77/12/41	190/19/65	285/22/81	888/31/104	727/26/94	70/10/27
NN3W	46/10/18	147/15/61	198/22/80	807/32/110	857/31/107	116/14/43
K3ZO	15/5/11	218/19/63	126/20/67	721/29/105	685/26/98	103/14/40

WORLD MULTI-OPERATOR SINGLE TRANSMITTER

FY5KE	162/12/51	597/25/92	936/28/105	2074/39/152	3364/38/148	1050/25/104
PJ4W	49/8/20	444/22/80	1265/27/106	1420/35/125	3337/33/126	652/16/28
OM8A	257/10/60	570/25/94	1185/34/129	1559/37/148	1653/38/143	289/26/83
EI7M	377/11/55	984/18/84	677/22/101	2177/34/120	1876/35/121	186/19/58
9A1P	140/12/62	663/20/81	1043/34/124	1511/36/129	1408/39/135	146/25/73
OM7M	269/12/64	645/24/86	930/37/129	1428/38/140	1136/38/146	170/25/82

USA MULTI-OPERATOR SINGLE TRANSMITTER

K8AZ	52/12/40	139/23/77	246/30/106	965/37/136	963/32/125	84/14/42
K3EST/4	46/9/28	149/16/52	301/22/81	874/35/115	1175/33/114	37/14/28
KØRF	46/11/23	97/22/62	441/34/108	1055/36/135	524/33/114	71/12/32
K5TR	26/11/23	116/23/74	327/30/104	572/37/129	1106/37/129	87/9/31
W3UA/1	15/6/9	139/15/57	321/20/81	865/32/111	1049/26/97	39/14/35
W4WS	19/7/15	159/18/70	281/26/93	851/37/128	662/31/118	82/15/40

WORLD MULTI-OPERATOR TWO TRANSMITTER

CT9L	316/13/62	834/20/92	1504/26/107	2337/35/128	3132/36/130	872/24/87
VE3EJ	401/15/65	1024/26/92	1277/33/130	2975/38/162	2661/33/139	209/17/46
PJ2T	374/14/37	594/20/83	1608/28/103	2554/36/120	2727/31/111	866/14/32
3V5A	191/8/52	1675/18/87	1697/23/96	2440/34/109	1910/33/105	684/22/73
IR4X	94/11/58	1264/29/101	1635/34/125	1937/38/146	2188/38/150	427/27/93
PS2T	7/4/5	139/20/53	743/26/92	2275/38/145	3446/40/146	598/24/80

USA MULTI-OPERATOR TWO TRANSMITTER

N3RS	56/10/40	649/25/91	730/31/116	1773/39/154	1756/34/132	184/18/62
K3NA/1	123/13/56	600/24/89	526/28/104	1091/32/135	1564/34/125	230/18/59
KI1G	76/12/46	333/22/80	506/25/104	1346/35/139	1533/32/130	175/16/59
WE3C	85/13/51	495/25/91	513/32/108	1103/37/138	1245/32/128	212/19/64
KØTV/1	28/9/16	305/19/71	323/28/94	694/30/119	1170/31/126	139/14/31
W4RM	51/11/31	360/19/71	541/20/78	1134/28/108	833/28/104	51/12/29

WORLD MULTI-OPERATOR MULTI-TRANSMITTER

CT3YA	279/13/65	1151/26/103	2222/32/127	3119/38/146	3724/38/138	1332/31/120
6Y2Z	957/16/63	1699/26/93	2342/29/108	3352/31/117	4070/31/105	419/10/15
V26B	496/14/37	812/24/93	2330/30/116	3269/34/124	3277/37/122	1054/17/41
K3LR	346/18/66	921/27/95	1162/35/125	3167/40/169	2031/34/137	293/18/48
DFØOCG	917/15/70	1825/27/108	2253/35/134	2566/38/143	1703/38/148	413/27/88
KC1XX	255/17/66	1015/28/101	922/33/123	1803/38/151	2339/35/144	339/21/77

USA MULTI-OPERATOR MULTI-TRANSMITTER

K3LR	346/18/66	921/27/95	1162/35/125	3167/40/169	2031/34/137	293/18/48
KC1XX	255/17/66	1015/28/101	922/33/123	1803/38/151	2339/35/144	339/21/77
W3LPL	321/15/70	795/27/97	1077/34/124	2001/39/159	1719/35/141	381/21/79
K1TTT	180/12/49	476/21/81	643/29/111	1991/38/148	1756/32/129	230/18/56
NQ4I	231/12/39	368/25/85	781/34/114	1698/39/142	1312/34/129	278/19/48
K1RX	93/12/41	519/24/86	496/28/102	1546/38/144	976/33/122	196/18/49

EUROPE TOP SINGLE OPERATOR ALL BAND

Station	160	80	40	20	15	10
ES5TV	433/12/61	501/23/76	882/29/92	2322/38/124	895/34/109	309/19/56
GW4BLE	120/8/48	599/14/75	806/20/84	1691/31/102	1464/30/87	128/16/34
S5ØA	128/9/49	385/16/60	1068/28/98	1048/33/101	1079/32/99	159/21/46
M6T	163/8/52	452/13/70	667/22/84	1385/32/100	1087/35/103	144/17/42
EA4KR	58/6/39	396/15/77	362/19/76	1044/32/103	1305/31/103	233/14/48
DJ4PT	184/12/50	435/18/67	502/23/77	958/33/85	841/34/91	74/13/42
LB8IB	407/10/58	812/17/75	475/24/87	997/30/97	904/32/92	36/9/32
OZ7X	323/9/47	654/15/63	163/18/63	1387/33/102	877/29/82	21/7/12
US5D	116/5/36	401/11/54	239/16/62	1067/29/91	925/35/103	131/15/36
IR4T	79/6/40	287/17/72	671/26/88	174/21/47	777/36/114	178/16/41

EUROPE MULTI-OPERATOR SINGLE TRANSMITTER

OM8A	257/10/60	570/25/94	1185/34/129	1559/37/148	1653/38/143	289/26/83
EI7M	377/11/55	984/18/84	677/22/101	2177/34/120	1876/35/121	186/19/58
9A1P	140/12/62	663/20/81	1043/34/124	1511/36/129	1408/39/135	146/25/73
OM7M	269/12/64	645/24/86	930/37/129	1428/38/140	1136/38/146	170/25/82
G5W	222/9/59	653/18/85	778/27/108	1775/36/137	1407/35/127	58/18/58
OK5W	172/10/57	738/23/89	1093/35/129	1101/36/143	1144/37/124	163/27/82

EUROPE MULTI-OPERATOR TWO TRANSMITTER

IR4X	94/11/58	1264/29/101	1635/34/125	1937/38/146	2188/38/150	427/27/93
9A7A	629/9/60	1479/22/95	1664/33/123	2281/37/141	1703/38/141	396/25/82
RU1A	402/12/58	934/26/98	1806/35/122	2383/38/135	1861/38/145	403/24/82
HG6N	497/12/59	1014/19/81	1121/33/127	1652/37/132	1937/39/144	263/20/64
DQ4W	200/8/50	1057/20/89	1124/32/113	1249/36/130	1592/38/142	279/25/73
LY7Z	464/10/55	845/20/78	882/33/117	2070/37/127	1227/38/118	250/20/50

EUROPE MULTI-OPERATOR MULTI-TRANSMITTER

DFØCG	917/15/70	1825/27/108	2253/35/134	2566/38/143	1703/38/148	413/27/88
OT5A	858/13/64	1492/21/90	2601/33/127	2474/38/145	1362/38/127	609/25/92
DQØQ	957/11/64	1565/25/93	2604/36/137	2381/38/156	1467/38/144	431/28/94
RW2F	1121/18/81	1500/22/90	2124/34/134	2223/37/143	1631/38/142	419/25/88
LZ9W	684/10/66	1189/25/94	1856/31/121	2732/38/145	2206/37/140	625/27/96
MD4K	945/12/67	1509/18/89	2314/31/120	2062/34/130	1519/36/134	595/17/80

Records

On the CQWW.com web page there are the all-time records for each continent and every country for every mode. Check out your country or call area. Trying to best an existing record or your prior year's score is a worthy goal.

Congratulations to the following stations who set new world and continental records.

World: 7 CN2R (W7EJ), L3.7 TA3D, L1.8 YMØT (TA2RC), Q1.8 KP4KE, A3.7 SP8BRQ, A1.8 ON4WW.

Africa: 7 CN2R (W7EJ), L3.7 7XØRY, A21 EA8URL (EC8AUA).

Asia: 7 UA9AYA (UA9BA), L3.7 TA3D, L1.8 YMØT (TA2RC).

Europe: 3.7 SMØW (SMØWKA), 1.8 OZ1DD, L7 T94DO, A3.7 SP8BRQ, A1.8 ON4WW.

Japan: Q3.7 JE1LFX.

USA: L1.8 K9RO, Q1.8 K3BU, A7 N4CC, A1.8 W2MF.

North America: L1.8 VE3MGY, Q1.8 KP4KE, A7 N4CC.

Oceania: 14 KH7X, A21 KG6DX, A14 9M6DXX, A7 AH6RF.

South America: A7 PX8C(PY8AZT).

Special Mention

The CQ WW is famous for encouraging contesters to put on their travel shoes and go to a DX location for the contest. Every year hundreds of contesters travel to exotic locations. Thank you to the many DXpeditions and the efforts of hundreds of contesters who made the contest experience more interesting for all of us. Here are some calls you probably worked: VP2EAZ, VP2EWX, VP2ECM, 8P1A, V31MQ, VY2PA, J3/SP9PT, J3/SP9BQJ, FG/K9NW, HQ9R, V47KP, V49A, FS/AH8DX, VP5KE, VP5DX, IH9P, ZD8Z, EA8AH, EA8EA, D44TD, CN2R, ST2T, 5H3EE, T6X, A47RS, OHØJFP, CU2A, CU2B, CU2/OH2PM, CU2/OH1VR, T96Q, SV9/OH4FR, J48NL, J48PL, J43J, ISØ/WHØQ, ISØ/K7QB, VK9XD, VK9XG, 9M8YY, 9M6/G3OKK, KH6/NØCO, KH6/ WØCN, P40W, P49Y, P40A, VP9I, FM5BH, EA8/DL5AXX, TF/NØHJZ, LX/ON4ACA, YBØ/ HA2VR, ZL3TE, J7DM, V47NS, FS/AA4V, IG9R, 9G5A, 3V8SF, TI8M, OHØZ, J49Z, GD6IA, GJ2A, AH2R, PJ4W, FY5KE, V31MD, TI5N, CT9L, 3V5A, 8Q7EA, SX5P, PJ2T, V26B, J3A, 6Y2Z, VP5T, WP2Z, CT3YA, MD4K, HBØ/HB9AON, ISØ/DL3EW. Check out the full results for many more exotic callsigns.

Once again there were many intra-country competitions. Two ops or more try their best to see who will come out on top. By looking careful-

TROPHY WINNERS AND DONORS

SINGLE OPERATOR
World All Band
8P1A (Opr. Tom Georgens, W2SC)
Donor: Dave Rosen, K2GM
WA2RAU and W2SKE Memorial

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

World QRP
Gerard Gendron, F5BEG
Donor: Jeff Steinman, N5TJ

World Assisted
FM5BH (Opr. Christian Pidancier, F6HLC)
Donor: CQ magazine

U.S.A
K5ZD/1 (Opr. Dave Pascoe, KM3T)
Donor: Potomac Valley R.C. – KC8C Memorial

U.S.A Low Power
Edward Sawyer, N1UR
Donor: North Coast Contesters

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

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

Canada
VY2PA (Opr. Scott Robbins, W4PA)
Donor: Niagara Frontier Int'l DX Assoc.
VE3WT Memorial

Caribbean/C.A.
Jose Hector Garcia M., XE2K
Donor: Alex M. Kasevich, VP2MM

Europe
Tonno Vahk, ES5TV
Donor: Potomac Valley R.C. – W4BVV Memorial

Europe Low Power
CT7T (Opr. Jose Manuel Farto Lopes, CT1CJJ)
Donor: Scott Jones, N3RA & Tim Duffy, K3LR

Russia
Igor Burykh, UA3QDX
Donor: Roman Thomas, RZ3AA

Africa
ZD8Z (Opr. James Neiger, N6TJ)
Donor: Gordon Marshall, W6RR

Asia
UPSSL (Opr. Vladimir Vinichenko, UN9LW)
Donor: 2 AM Dayton Pizza Gang

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

Japan Low Power
Takeda Hideto, JF2QNM
Donor: Western Washington DX Club

Oceania
Tetsuo Tanaka, AH7C
Donor: Northern California DX Club

South America
P40W (Opr. John Crovelli, W2GD)
Donor: Yankee Clipper Contest Club

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

World – 21 MHz
PX5E (Opr. Sergio Almeida, PP5JR)
Donor: Robert Naumann, N5NJ

World – 14 MHz
D44TD (Opr. Alberto Annesi, IV3TAN)
Donor: North Jersey DX Assn. – K2HLB Memorial

World – 7 MHz
CN2R (Opr: James Sullivan, W7EJ)
Donor: Fred Laun, K3ZO – K7ZZ Memorial

World – 3.7 MHz
Mauri Leppala, EA8/OH4NL
Donor: Fred Capossela, K6SSS

World – 1.8 MHz
Jens Rohme, OZ1DD
Donor: Robert Wruble, W7GG

USA – 28 MHz
Charles Dietz, W5PR
Donor: Donald Thomas, N6DT

USA – 21 MHz
Neal Sulmeyer, K4EA
Donor: WorldRadio

USA – 14 MHz
Daniel Handa, W7WA
Donor: Southern California DX Club

USA – 7 MHz
Bill Kollenbaum, K4XS
Donor: Stanley Cohen, W8QDQ

USA – 3.7 MHz
James Eppright, K5RX
Donor: Alex Jozsa, KG1E

USA – 1.8 MHz
Bill Tippett II, W4ZV
Donor: CQ magazine

Carib./C.A. (21 MHz)
VP5DX (James Iori, NU4Y)
Donor: Nate Moreschi, N4YDU

Europe – 28 MHz
Zdravko "Emil" Balen, 9A9A
Donor: CQ magazine

Europe – 21 MHz
T96Q (Opr: Slobodan Kojic, YZ1AU)
Donor: Tine Brajnik, S50A

Europe – 14 MHz
Veijo Kontas, OH6KN
Donor: CQ magazine

Europe – 7 MHz
Jiri Sanda, OK1RI
Donor: John Warren, NT5C

Europe – 3.7 MHz
Teemu Korhonen, SMØW
Donor: Ted Demopoulos, KT1V

Europe – 1.8 MHz
Dragan Djordjevic, YT6Y*
Donor: Robert Kasca, S53R

Oceania (14 MHz)
KH7X (Opr: Mike Gibson, KH6ND)
Donor: Bruce D. Lee, KD6WW

Asia –14 MHz
Vakhtang Mumladze, 4L8A
Donor: Al Teimurazov, 4L5A – JA4FWM Memorial

Japan – 21 MHz
Ooshika Tarou, JI2UNR
Donor: DX Family Foundation

Japan – 14 MHz
Akira Minagawa, JAßJHA
Donor: Take Yokoyama, JL1BLW

MULTI-OPERATOR, SINGLE TRANSMITTER
World
FY5YE (Oprs: F1HAR, F5HRY, F5LND, F5MZN, F6FGZ, I4UFH)
Donor: So. Calif. DX Club – W6AM Memorial

U.S.A.
K8AZ (Oprs: K8AZ, K8BL, K8MR, N8AA, ND8L, W8CAR, W8KIC, WB8K, WT8C)
Donor: Carolina DX Association

Carib./C.A.
J7DM (Oprs: AD4J, K2DM, K3ZM, W4GKA)
Donor: Eric Scace, K3NA

Africa
IG9R (Oprs: IK8HCG, IZ8DFO, IZ8FBU, IV3OWC, IV3JVJ, IV3TDM)
Donor: Tikirriki Contest Club – IH9P

Asia
9K2HN (Oprs: 9K2HN, 9K2YM, 9K2RR, 9K2ID, 9K2CQ, 9K2HS)
Donor: Edward L. Campbell, NT4TT
AA6BB and KA6V Memorial

Japan
JA7YAA (Oprs: JI5RPT, JE7HLZ, JG7PSJ, JO7DJT, JHØNZN)
Donor: CQ magazine

Europe
OM8A (Oprs: OM2KW, OM2VL, OM3BH, OM3GI, OM3LA, OM3NA, OM3RG, OM3RM)
Donor: Bob Cox, K3EST

Oceania
AH2R (Oprs: JI3ERV/NH2C, JR7OMD/WI3O, JE8KKX/AH2K, JO1DFG/KH2XC, KH2/JH7QXJ)
Donor: Junichi Tanaka, JH4RHF

South America
PJ4W (Oprs: DK1MM, OE2GEN, OE2VEL, OE9MON)*
Donor: Victor Burns, KI6IM –
The Cuba Libra Contest Club

MULTI-OPERATOR, TWO TRANSMITTERS
World
CT9L (Oprs: DL1YD, DL1QW, DL1YFF, DL8OBQ, DK3DM, DK5QN, DF8AE, DB7QJ, DJ8OG, DJ6QT, SV8CS, IK2QEI)
Donor: CQ magazine

U.S.A.
N3RS (Oprs: N3NA, N3RD, N3RS, W8FJ, WA3LRO, K9RS, N2SR)
Donor: Kimo Chun, KH7U
Dan Robbins, KL7Y Memorial

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

Oceania
VK6ANC (Oprs: VK6NU, VK6XH, VK6ZN, VK6ZAA, VK6ANC)
Donor: Japan CQ Ham Radio

MULTI-OPERATOR, MULTI-TRANSMITTER
World
CT3YA (Oprs: CT3BD, CT3DL, CT3DZ, CT3EE, CT3EN, CT3HK, CT3IA, CT3IQ, CT3KU, CT3KY, CT1BOH, CT1BOP, CT1DIZ, CT4NH, W6NV, N6MJ, P43E, OH2KI)
Donor: Dave, W6NL and Barb, K6BL Leeson

U.S.A.
K3LR (Oprs: K3LR, N2NC, K5GO, W9ZRX, K8GL, W2RQ, W8JV, N2NT, N9RV, K3UA, N5DX, N3SD, N3GJ, VE2DWA)
Donor: CQ magazine

Europe
DFØCG (Oprs: DB6JG, DF3KV, DG3FK, DH1NFL, DH5HV, DJ7EO, DK6WL, DL1EJA, DL1MGB, DL2AA, DL2YL, DL3DXX, DL5SDK, DL6FBL, DL6LAU, DO1ET, DO2WW)
Donor: Finnish Amateur Radio League

Japan
JA3YBK (Oprs: JG3KIV, JI3OPA, JO3LDN, JP3PZD, JH3PRR, JH4NMT, JR4ISF, JF4FUF)
Donor: Ryozo Goto, JH3JYS

CONTEST EXPEDITIONS
World Single Operator
Michael Tessmer, FG/K9NW
Donor: National Capitol DX Assn.
Stuart Meyer, W2GHK Memorial

World Multi-Single
J49Z (Oprs: I2WIJ, IK8UND, IZ4DPV))
Donor: Gail Schieber, K2RED

World Multi-Multi
6Y2Z (Ops: AB6BH, K5OT, K6AM, K6JL, K6MC, N5ZO, N6AA, N6VI, N6ZZ, W6XD))
Donor: Tachio Yuasa, JA9VDA

**Second place*

ly at the results, you can see many such competitions. Noticed the three XE teams in the Team Contesting category. What a great way to increase activity in a rare zone. A very special thanks is due to the team of HBØ/HB9AON (DJ2YE and crew). Over the years they have provided the rare HBØ multiplier to thousands of contesters.

Comments

As the opening comments indicated, the 2005 CQ WW SSB was a case where the contest makes the conditions. We received about 4430 SSB contest logs, of which about 4200 were electronic! Thanks to all the contesters around the world who sent in a log. *Please send in your log no matter how small.*

Your submission of an electronic log allows for a fairer adjudication process. Submitting an electronic log is easy. Send your SSB log to <ssb@cqww.com> (CW logs go to <cw@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. The messages are presented in numerous languages. If you don't see your language and you would be willing to help out by translating for your fellow countrymen, or for any inquery, please send a message to <questions@cqww.com> for more information.

Each year everyone who submitted an electronic log receives a UBN report of how their log was judged. You can learn more about the UBN report by going to the CQWW.com website and scrolling down to the end, where it is explained. The CQ WW Contest Committee 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, a logs-received list with your category and your UBN list is posted on the CQ WW site. Look over these lists to find out if your information is accurate.

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

Packet and other help. If you plan to try to make the Top Scores box, you can count on your log being carefully scrutinized. The CQ WW CC is looking to confirm that you are really in the category you claim and that your score entry is true. In a perfect world we would not have to spend this extra effort to check potential problem logs; 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. 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, all are in violation of the CQ WW rules. The CQ WW has at its disposal years of data, category averages for packet and non-packet scores, statistical aids to verify winners, URL tracing, packet clusters, and reverse log time/band checking (the stations an entrant works can be electronically queried for frequencies and times; therefore an entrant's log without frequencies is not necessary to discover a violation of the rules) are just some of the tools we have available. In addition, we frequently confer with excellent operators in the SO2R and other categories to help confirm what is possible.

Several problems have arisen through the use of packet. If you are a single operator in ***any*** single operator category, you ***cannot receive help in any way from another person or any DX spotting network.*** Every year we receive reports of someone allegedly having another operator spot or work QSOs for him, or the unclaimed use of packet. This is cheating, and we will crack down on such cases. The use of packet to self-spot is against the rules, and anyone trying to hide the fact that he is doing it by using other callsigns is obvious to the CQ WW CC. There is nothing wrong with coming across a station and spotting it, but self-spotting is against the rules.

The clever use of packet to add multipliers to your score will not be tolerated. If you do this, you will be ***disqualified.*** A fair competition means that everyone follows the same written rules. There is no problem with using a DX spotting network: ***just submit your entry as Assisted.***

Thanks

Every year the CQ WW Contest Committee devotes a great deal of effort to make the results as complete and accurate as possible. Creating the line scores is just the final product. Thanks to the committee, entrant log submission problems, incomplete logs, forgotten band changes not in log, incorrect call indicated for the contest, and a myriad of other subtle problems are sorted out behind the scenes. Using an armatorium of log-checking tools and data sources, the CQ WW Contest Committee has done its best to certify the winners. The members of the committee who provided insight into many contesting topics are: K1DG, K3WW, K3ZO, KR2Q, N2AA, N2NC, N3ED, N6ZZ, N9RV, W3ZZ, K1AR, KM3T, KT3Y, N5TJ, W5OV, N5KO, K6AW, N6ZZ, N6AA, and N8BJQ. The DX advisors who offered advice and sorted out potential problems are: CT1BOH, EA3DU, F6BEE, G3SXW, I2UIY, JE1CKA, OH2KI, OH2MM, PY5EG, S50A, UA9BA, VA7RR, VE3EJ, RA3AUU, and E21EIC. A special thanks to Dick, N6AA, and Larry, N6TW, who once again spent countless hours to make the CQ WW database the best in contesting. The CQ WW uses the software developed by Tree, N6TR. Additional software provided by WT4I was used. The CQ WW records are maintained by John, N2NC, and K3EST. Phil, N6ZZ, put in lots of hours beta testing the callsign the database and UBN reports. Thanks as always to John, K1AR, and Tim, K3LR, for their advice.

Congratulations to all the winners and entrants! CU in the '06 test!

73, Bob, K3EST

DX QRM

Logging all those Caribbean mults is easy, I always thought. Not located in their main direction, it's been a tricky game from East Africa (15m low power) . . . **5H3EE.** Thanks to Langkah Syabas Beach Resort

(Continued on page 101)

Three New HAM Accessories

All With a Two-Year Warranty

Your Power Problems— Solved!

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

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

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

LDG ELECTRONICS 2 YEAR WARRANTY

List Price $49

"The Forward Power is 112 Watts"

The "Talking" Watt Meter

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

List Price $149

Your Eye Strain Problems — Solved!

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

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

LDG ELECTRONICS 2 YEAR WARRANTY

Each function is selectable from the radio's menu. Easily visible from anywhere on your desk or dash, the FT-Meter is illuminated by any external 12 vdc source.

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

List Price $49

Your Cable Problems— Solved!

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

The RCA-14 comes with a DIN 13 cable, a mini DIN 6 and a mini Din 8. The DIN 13 cable breaks out the functions to RCA jacks 1 - 13, while the mini DIN 6 goes to RCA 1 - 6, and the mini DIN 8 goes to RCA 7 - 14. You can use the DIN 13 or the mini DIN 6 and/or 8, depending on your radio.

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

List price $59

The DTS Series

Antenna Switches

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

LDG ELECTRONICS 2 YEAR WARRANTY

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

AT-897 for the Yaesu FT-897

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

List Price $199

Baluns and Cables

- **RBA-4:1** Remote 4:1 Balun — **List $30**
- **RBA-1:1** Remote 1:1 Balun — **List $30**
- **Y-ACC** FT-897, FT-857 Interface — **List $12**
- **IC-1** Icom Interface, 10 foot — **List $20**
- **IC-2** Icom Interface, 1 foot — **List $8**

Two New Autotuners This Year

All Tuners With a Two-Year Warranty and 6 Meter Coverage

Z-11Pro

The Return of a Legend.

The original portable Z-11 was one of LDG's most popular tuners, accompanying adventurous hams to their backyards, or to the ends of the earth. Now meet the Z-11Pro, everything you always wanted in a small, portable tuner designed from the ground up for battery operation.

Only 5" x 7.7" x 1.5", and weighing only 1.5 pounds, it handles 0.1 to 125 watts, making it ideal for both QRP and standard 100 watt transceivers from 160 - 6 meters.

With 8,000 memories in LDG's exclusive "3-D Memory" array, the Z-11Pro uses LDG's state-of-the-art processor-controlled Switched-L tuning network. It will match dipoles, verticals, inverted-Vs or virtually any coax-fed antenna. With an optional LDG balun, it will also match longwires or antennas fed with ladder-line.

List Price $179

AT-200Pro

The first auto tuner specifically designed for today's high-powered transceivers.

The AT-200 features LDG's new "3-D memory system" allowing up to eight antenna settings to be stored for each frequency. Handles up to 250 watts SSB or CW on 1.8 – 30 MHz, and 100 watts on 54 MH **(including 6 meters)**.

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.

List Price $249

AT-100Pro

Automatic Antenna Tuner

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

List Price $219

AT-7000

The Hottest Radio in the Industry! Now with It's Own Autotuner!

The AT-7000 is the ideal tuner for IC-7000 & other ICOM Radios: Covers all frequencies from 1.8–54 MHz **(including 6 meters),** and will automatically match your antenna in a flash. Requires just 0.1 W for operation, but will handle up to 125 W (100 W on 6 m), making it suitable for everything from QRP (IC- 703Plus) to a typical 100 W ICOM transceiver.

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

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

List Price $169

AT-200PC

The First Automatic Tuner Designed Specifically for PC Rig Control

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

List Price $259

LDG ELECTRONICS 2 YEAR WARRANTY

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

AT-1000

An Autotuner for use with your amplifier!

No more knob spinning or inductor rolling. Tunes your antenna in 1 to 8 seconds when you QSY either in the same band or to a different band! Easy installation and use make this the choice for any Amateur Radio Operator with an amplifier. Power rating HF (1.8 to 30 MHz): 1000 Watts Single Side Band, 750 Watts CW, 500 Watts Digital (RTTY, Packet, etc.) **including 6 meters**. Just about any antenna can be tuned with the AT-1000. The antenna must be between 6 to 800 ohms (approximately 10:1 SWR) in-order to bring the SWR down to 1.5:1.

List Price $599

Z-100

The definitive low cost automatic antenna tuner!

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

The Z-100 will tune with 0.1 to 125 watts (50 watts on 6 meters), making it an excellent choice for almost any radio or operating style. Backpackers and QRP operators will appreciate the latching relays. Power can be removed from the tuner once you have tuned. Additionally, when the tuner is not tuning, it draws nearly zero amps.

Additionally, the Z-100 features 200 fast memories which will decrease tuning time up to 95%! **List Price $149**

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

Visit our new Web site:
www.ldgelectronics.com
LDG Electronics, Inc.
ldg@ldgelectronics.com
410-586-2177
Contact Your Favorite Dealer to Purchase

As the world's largest hamfest, the Dayton Hamvention® has long been seen by manufacturers as the perfect place to introduce new products ... and what isn't ready in time for Dayton often shows up a few weeks later at Ham-Com® in Dallas.

Hot Stuff at Hamvention® (& Ham-Com®)

Photo by Dan Moseson, KC2OOM

BY RICH MOSESON,* W2VU

More than 30 new amateur radio products made their debuts at this year's Dayton Hamvention®, ranging from a few new radios to a host of new accessories. As usual in this annual feature, we'll divide these products into three broad groups: devices that transmit and/or receive RF energy, including amplifiers; antennas and related accessories, such as SWR analyzers; and general station accessories.

Before we get into the new products, though, we'd like to introduce two new owners of companies that make amateur products. Bruce Wood is now at the helm of SGC, whose ultra-rugged SG-2020 HF transceiver has long been a staple for both amateur and non-amateur use in harsh conditions. In addition, we learned in Dallas that Ramsey Electronics has been purchased by Mike Leo, a longtime employee and associate of company founder John Ramsey, N2HWA, who had quietly sold the firm a few years ago to a group of investors. Finally, Alinco Electronics has a new U.S. distributor, Ham Distributors, Inc., of Conroe, Texas. Now, on to the goodies...

Radios, etc.

The newest high-end HF radio is the Yaesu FT-2000 from Vertex Standard (photo A). This HF+6-meter transceiver is billed as the successor to the FT-1000 series and the next generation of the "FT-DX 9000 concept." Features include a parametric equalizer—which permits you to separately adjust the parameters of each of the high-, mid-, and low-frequency equalization ranges of transmit audio—"contour tuning," which allows similar audio shaping on receive, and a block diagram display

Photo A– Yaesu's new FT-2000 will replace the FT-1000 line. (Photo courtesy of Vertex Standard)

*Editor, CQ

Photo B– The ICOM IC-7000 is the likely successor to the IC-706 series.

Photo D– The AOR AR-Alpha receiver covers 10 kHz to 3.3 GHz and will even function as a TV.

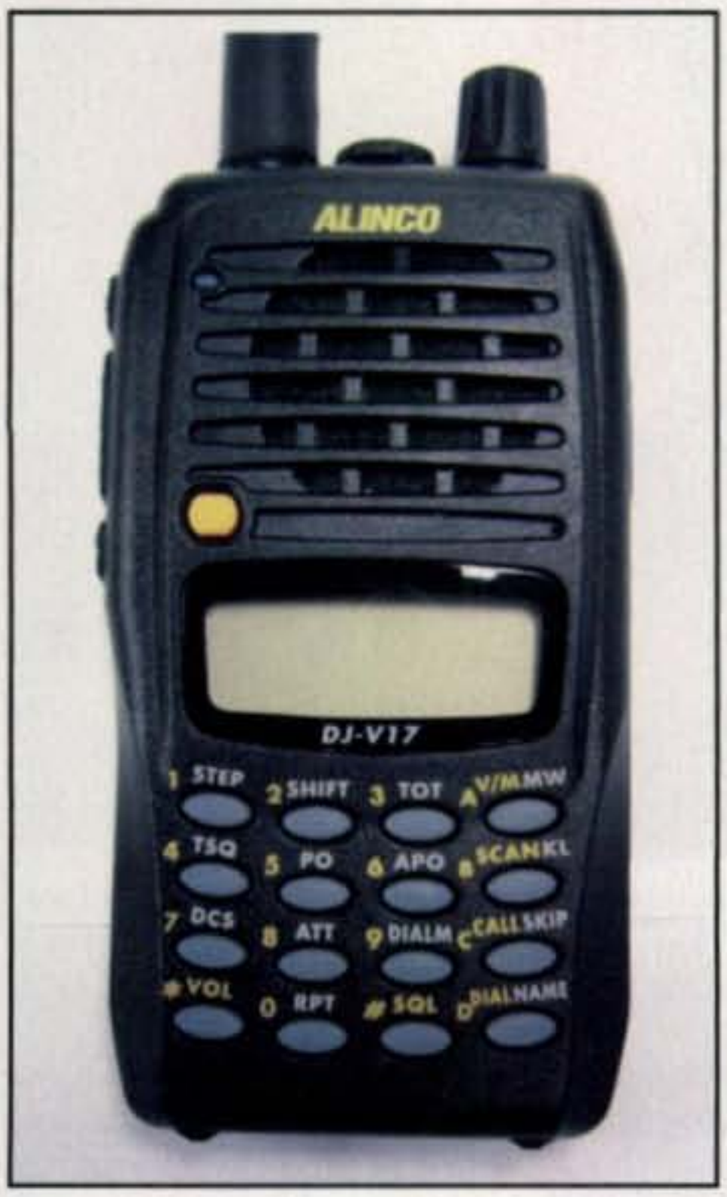


Photo C– Alinco's new DJ-V17 handheld. (Photo courtesy of Alinco)

that shows you at a glance your current selections for antenna, attenuator, preselector, preamp, roofing filter, and AGC recovery time. As Yaesu's Chip Margelli, K7JA, explains, "(i)t really helps you figure out, at four o'clock in the morning, what you might have set wrong."

ICOM America has introduced one new radio—the IC-7000—and, in the words of Sales Manager Ray Novak, N9JA, "a new system"—D-Star—which has truly come together in the past year with several D-Star repeaters coming online, allowing users to take advantage of the digital voice and data features of D-Star equipped transceivers such as the 1.2-GHz ID-1, the IC-82 for 2 meters, and the brand-new dual-band IC-91AD for both 2 meters and 70 centimeters. Some of the repeaters offer crossband linking, while others include internet links between repeaters. At Ham-Com in Dallas, Rich Painter, ABØVO, introduced his µSmartDigi D-Gate, which will translate D-Star position data into the format used by APRS (Automatic Position Reporting System).

The IC-7000 (photo B) is a likely successor to the venerable IC-706, covering HF, 6 meters, 2 meters, and 70 centimeters in a compact case that's easy to fit into most cars. It includes digital signal processing (DSP) features borrowed from its bigger and more expensive cousins, plus a built-in digital voice recorder and a built-in RTTY demodulator/decoder.

Alinco's new DJ-V17T (photo C) is a 5-watt 2-meter handheld featuring 200 memories, wideband receive, two-touch repeater access, and a "battery drain" function designed to avoid the "memory effect" from repeated recharges of only partially-discharged NiCd batteries.

DZ-Kit, whose Heathkit-clone manuals we featured here last year, was reported to be working on modifications to its Sierra transceiver kit, but a release date was not available at Dayton.

On the receive-only side of things, AOR introduced its nearly-DC-to-light AR-Alpha communications receiver (photo D). Covering 10 kHz to 3.3 GHz,

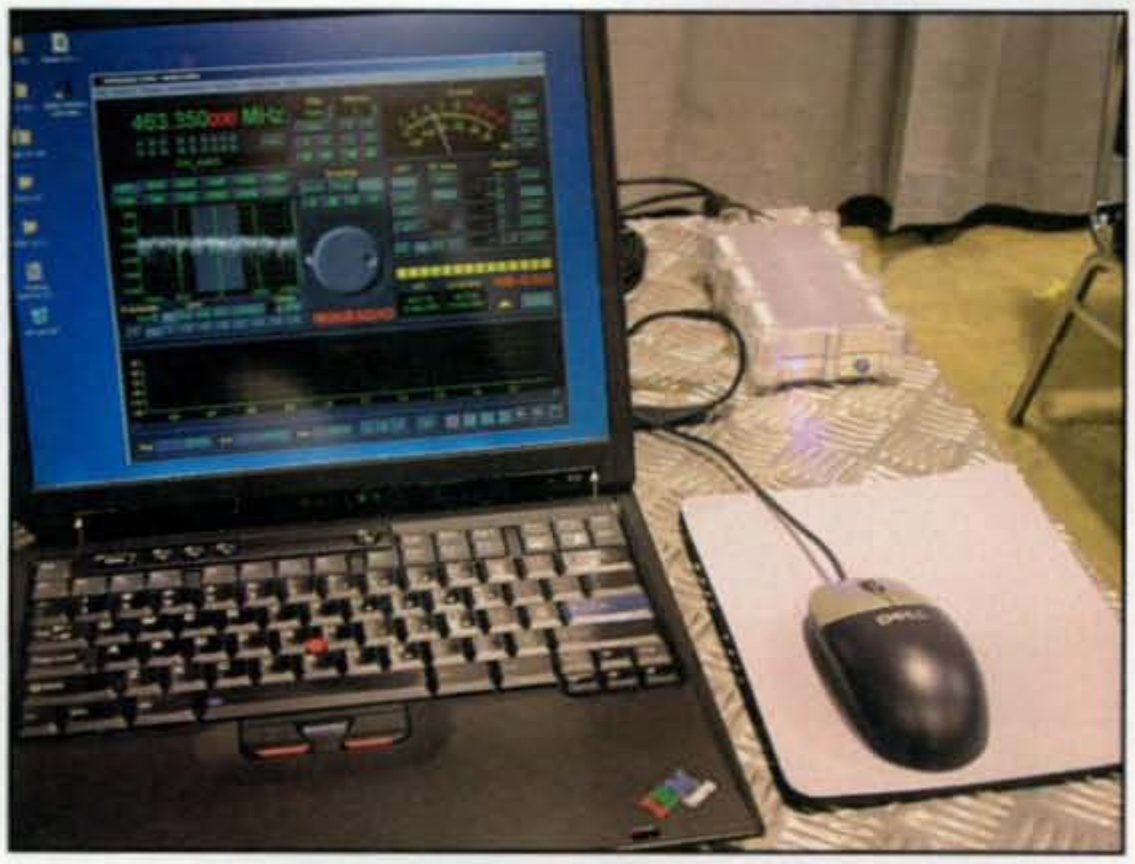


Photo E– WinRadio's new WR-G305 software-defined radio is available either as an external unit (seen here at right rear) or built onto a PCI card that installs inside a computer.

Photo F– The solid-state KPA-1500 amplifier puts Elecraft into the world of high power for the first time.

Photo G– Alpha's new 8100 amplifier continues to rely on tubes in the final, a pair of 4CX800 tetrodes.

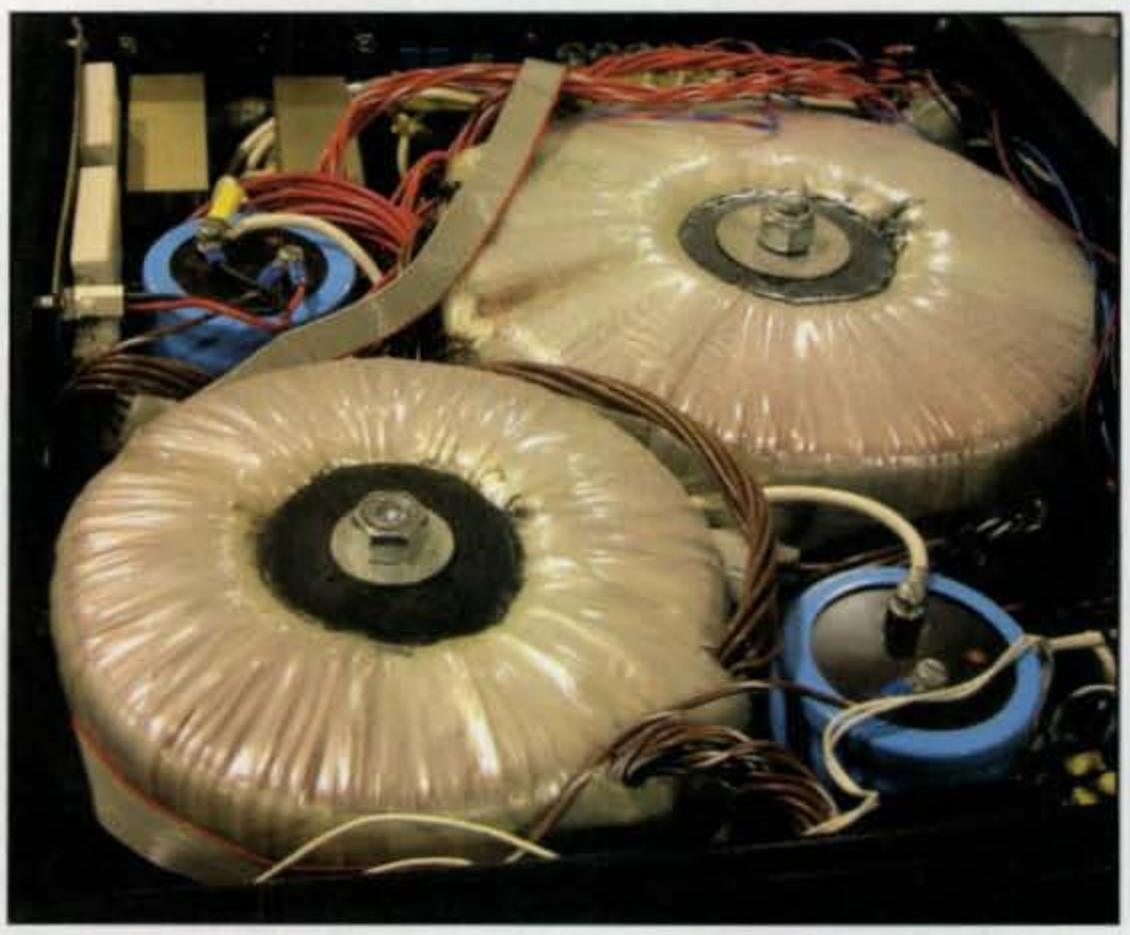


Photo H– Talk about heavy-duty components … take a look inside the new Dishtronix DWM-2400 amplifier!

the Alpha features IF DSP, I/Q digital output, and multimode receive, including P25 and a mode we've never heard of, RZSSB. Plus, its 6-inch color TFT display will even function as a TV screen to monitor commercial or amateur television signals.

WinRadio has brought out the new WR-G305 software-defined scanning receiver (photo E). It's being promoted as a VHF/UHF receiver, but its spec sheet says it tunes from 9 kHz to 1800 MHz. There are two versions, the G305e, which is built into a computer-noise resistant metal case and connects to the host computer via a USB cable, and the G305i, which is built onto a PCI card and installs inside your desktop computer! The only external connection is for the antenna.

Finally, from the "life's too short for QRP" department, we have three new RF amplifiers, including a surprise entry from a company that made its name in the world of QRP, producing high-quality, low-power transceiver kits. Elecraft has joined the QRO (high power) crowd with its all solid-state KPA-1500 legal-limit amplifier (photo F). Features include 1500 watts out on 160–10 meters with just 60 watts of drive, plus operation at lower power on 6 meters; a built-in automatic tuner; RF-sensing automatic band switching; two rig inputs; and two antenna outputs. Elecraft notes that this could permit a contest station operating SO2R (single operator, two radios) to operate both rigs with just one amplifier!

Alpha, a name long associated with high power, has introduced its model 8100 manual-tune amplifier (photo G), putting out 1500 watts (minimum) on all amateur bands from 160–10 meters, with drive power as low as 50 watts. Unlike Elecraft's all solid-state amp, the Alpha 8100 is a little more traditional, using two Svetlana 4CX800 tetrodes to produce its amplification.

This year's third amp is the Dishtronix DWM-2400L1 (photo H). This all solid-state 1500-watt amplifier covers 160 to 15 meters, along with the capability for authorized users to operate on 12 and 10 meters as well. This amp was introduced last year as a prototype but is now in production.

(*A note on amplifiers operating on 12 and 10 meters:* FCC rules currently prohibit the commercial sale in the U.S. of amps capable of operating between 25 and 30 MHz in an effort to keep CBers from using illegally high power. However, a ruling is expected any day now on an FCC proposal to rescind that rule. Clearly, all three of these manufacturers are anticipating

Photo I– Comet's new Super Beam will handle up to 150 watts on 2 meters or 70 centimeters. (Photo courtesy of NCG Company)

positive FCC action, and a ruling in the near future.)

Antennas

Now all that RF energy won't do you any good unless you have a way to get yours into the air and pull other people's out of the air. For that, of course, you need an antenna. There were two new options on display in Dayton this year, one for HF and the other for VHF/UHF. Comet's new CSB7700 Super Beam (photo I) will handle up to 150 watts on 2 meters and 70 centimeters.

On HF, SteppIR is offering a 40-20 meter dipole option as an add-on to its well-known Yagi with elements that change lengths for different bands (photo J). The 40-20 meter dipole does the same thing and can be retrofitted to an existing SteppIR Yagi without disturbing its radiation pattern, and included with a new Yagi at the time of purchase. SteppIR has also introduced an 80-meter vertical rotary loading coil for its BigIR multiband vertical. Adding the coil provides continuous coverage from 80–6 meters, and the coil is automatically switched out above 7 MHz to avoid degrading the antenna's HF performance.

Of course, an antenna system isn't complete without some antenna accessories, such as tuners and SWR meters. Palstar has introduced the AT-200AUTO automatic 200-watt tuner (photo K), with a built-in power and SWR meter and provision for two different antennas. The high-power AT-AUTO tuner, which was shown last year as a prototype and is now in production, handles up to 1500 watts on 160–10 meters and features a two-line LCD display showing the status of the antenna feed, frequency, and memory.

Alpha is offering a companion dummy load for its new 8100 amplifier. The model 2100 will dissipate up to 6 kilowatts for two to three minutes, and 1500 watts virtually forever. It features a full bypass shunt, so it can be kept in line with the amplifier and antenna, and just switched in as needed.

N8LP's Telepost host introduced two antenna accessories, the LP-200 digital dummy load and wattmeter kit (100 watts max) and the LP-100 digital vector wattmeter (2500 watts max; photo L), which displays not only RF power, but also SWR, impedance, resistance, reactance, and phase angle. It can be controlled by computer, and firmware upgrades will be downloadable from the internet.

MFJ has introduced over 130 new products since Dayton 2005, but we only have space to cover a few of them here. Among antenna accessories, we have the MFJ-868 giant SWR/wattmeter, which the company claims is the world's largest, and which may be just what the optician ordered for those of us whose eyesight just ain't what it used to be. Getting feedlines into and out of the house is a perennial challenge, and MFJ has come up with an antenna feedthrough panel mounted on a piece of painted pressure-treated wood

Photo J– The loop element on this SteppIR Yagi is the company's new 40-20 meter dipole.

Photo K– The Palstar AT-200 AUTO is, as its name suggests, a 200-watt automatic antenna tuner. It has a built-in SWR meter and provision for two antennas.

Photo L– Telepost's LP-100 digital vector wattmeter displays not only power and SWR but impedance (Z), resistance (R), reactance (X), and phase angle (P).

(photo M) that sits in your windowsill (you cut it to size) and is held in place by the window itself. Weatherstripping is included.

The M² RH0900 SWR analyzer (photo N) is a specialized unit for 850– 950 MHz with commercial as well as amateur applications. It not only measures the SWR of an antenna or

Photo M– MFJ's window feedthrough will let you run several feedlines between your shack and your antenna without drilling holes in your house. (Photo courtesy of MFJ)

Photo N– The RH0900 SWR analyzer from M² is a specialized unit for 850–950 MHz, useful for the 900 MHz amateur band as well as cellphone antennas.

Photo O– Putting up a wire antenna? The new EZ-Hang toolkit comes with everything you'll need, except the antenna wire and feedline.

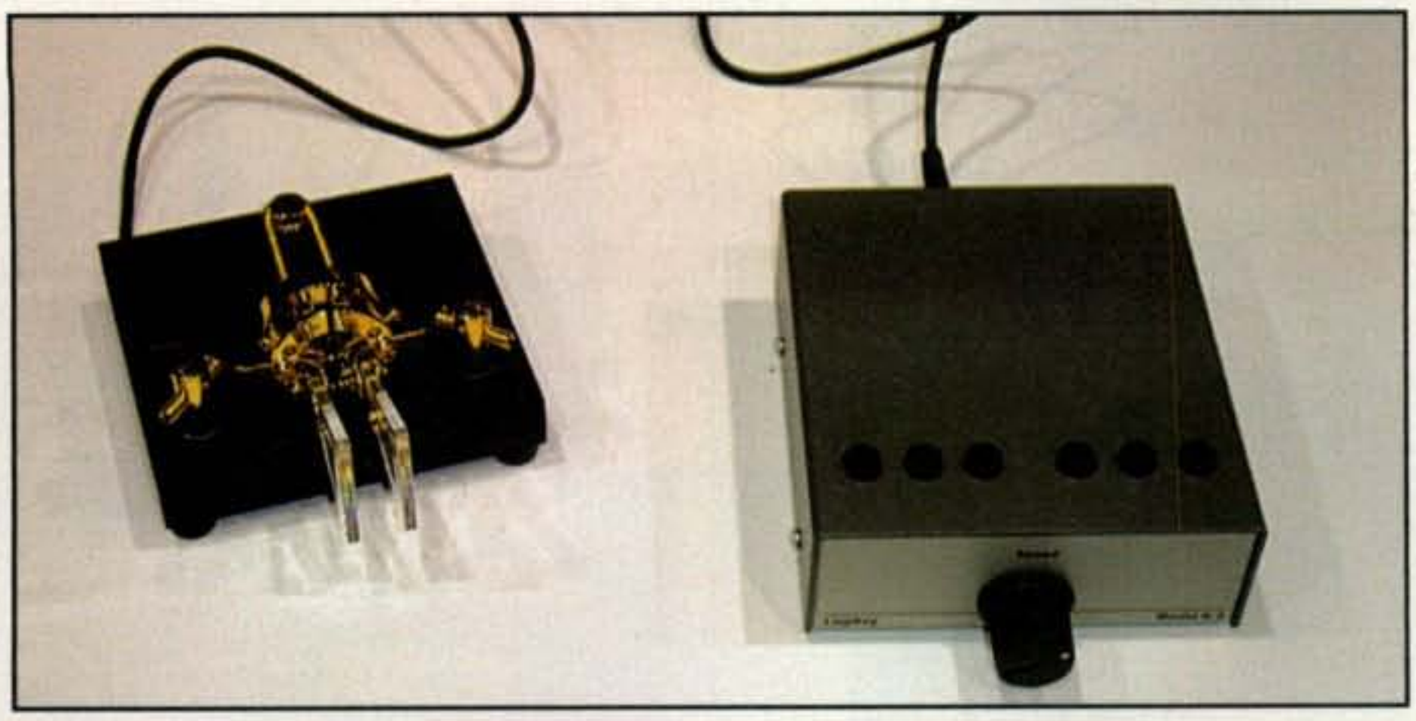


Photo P– The Logikey K-5 keyer from Idiom Press lets you store up to 18 prerecorded messages and will run off batteries or 12 volts DC.

antenna system, but also has an interference test mode that listens for other strong signals on or near the operating frequency of the antenna being tested.

Finally among our antenna accessories is the EZ-Hang Deluxe Tool Case. How is a tool case an antenna accessory? When it's packed with all the tools you need to put up a wire antenna using the well-known EZ-Hang slingshot. The toolkit (photo O) includes an EZ-Hang slingshot with fishing reel attached, two spools of fishing line, a variety of pliers, wire-cutters and screwdrivers, cable ties, a digital multimeter, electrical tape, and more. It's a true all-in-one package for putting up wire antennas.

Accessory Accessories

Our final segment is general station accessories, which this year includes over a dozen products, from keyers to frequency counters, that can make your station more efficient and/or more effective.

If your computer's serial ports all are occupied with other accessories (or you don't have a serial port on your computer) and you have no output for your rig control software, West Mountain Radio's new RIGtalk provides a USB connection for a CAT/CI-V interface to control your radio from your computer.

Another accessory that's particularly useful for the SO2R contester is the microHAM microKeyer 2R+, which gives you complete audio input and output control for two radios, letting you separately adjust and switch between each one. It includes a built-in CW keyer and digital voice recorder.

On the topic of CW keyers, the Logikey K-5 (photo P) is the latest in the Logikey line from Idiom Press. It replaces the classic K-3 keyer, with all of the K-3's features plus a smaller cabinet, circuit refinements, a built-in battery holder, and the ability to run off 12 volts DC. It can store up to 18 prerecorded messages, six of which may be active at any time.

Moving from CW to phone, MFJ has introduced the MFJ-655 HamProAudio equalizer and conditioner. Features include an 8-band equalizer; both 8-pin and modular mic inputs; separately controllable input, output, and compression levels; and a "downward expansion" noise gate.

Now moving from phone to the digital modes, West Mountain Radio has introduced a new, just-the-basics, version of its standard-setting RIGblaster, the RIGblaster Plug & Play (photo Q). It works only with USB-equipped computers and includes cables needed for sound-card operation. It also provides for computerized rig control (on rigs with that option), and is compatible with EchoLink and will automatically detect EchoLink signals. It works with every digital mode currently supported by the other products in the RIGblaster line.

A different approach to digital modes comes from microHAM, which introduced its USB Digi Keyer (photo R) at Dayton this year. It includes a rig con-

Photo Q– The RIGblaster Plug & Play from West Mountain Radio will let you run digital modes with a minimum of fuss, using your USB-equipped computer and just about any transceiver.

Photo R– The microHAM DigiKeyer contains its own sound chip, so you can operate digital modes without relying on your computer sound card.

Photo S– The Rig Expert SD is another digital-mode interface with its own sound card built in, and runs everything on a single USB line to your computer and the line-in on your rig.

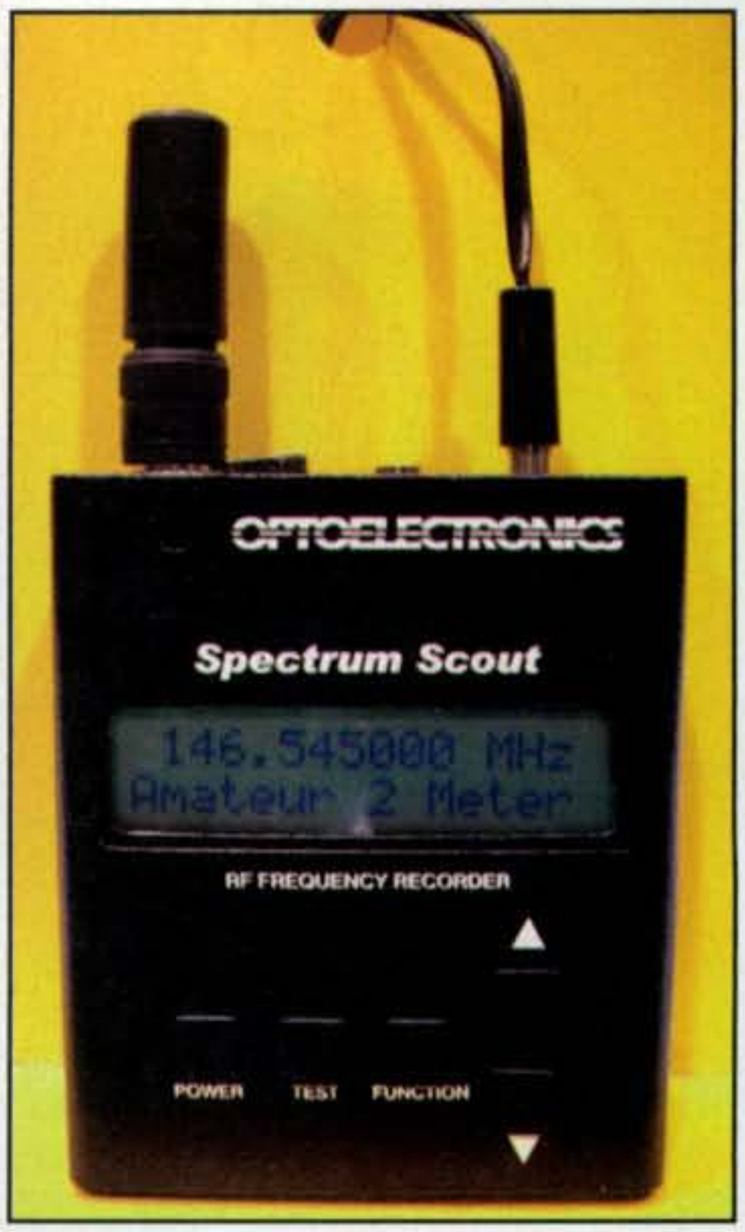


Photo T– The Spectrum Scout from Optoelectronics is a frequency meter covering 10 MHz to 2.6 GHz, and it includes a database of FCC service assignments for whatever frequency is picked up.

trol interface and contains its own sound chip, so it's not necessary to use a computer to operate digital modes with the Digi Keyer.

Another new digital modes interface is the Rig Expert SD (photo S), which runs everything over a single USB cable and connects to the line input on the back of most rigs, rather than going in through the mic jack. It has its own sound card, meaning no sound card, IRQ, or com-port conflicts on your computer, and it has a very low power draw.

One problem people sometimes encounter with digital modes such as PSK-31 is incorrect audio level settings that result in intermodulation distortion, or IMD. Being able to measure IMD levels can help you adjust those settings for the best signal. The KK7UQ IMD Meter, available through Rig Expert, does just that, reading IMD levels off the air for PSK 31 or 63 signals. It also doubles as a relative HF field strength meter.

Measuring the frequency of a signal is something with a variety of applications, from seeing whether your transmitter is transmitting where it says it is to finding the frequency of a station that may be causing interference or hooking up with your scanner to jump on active

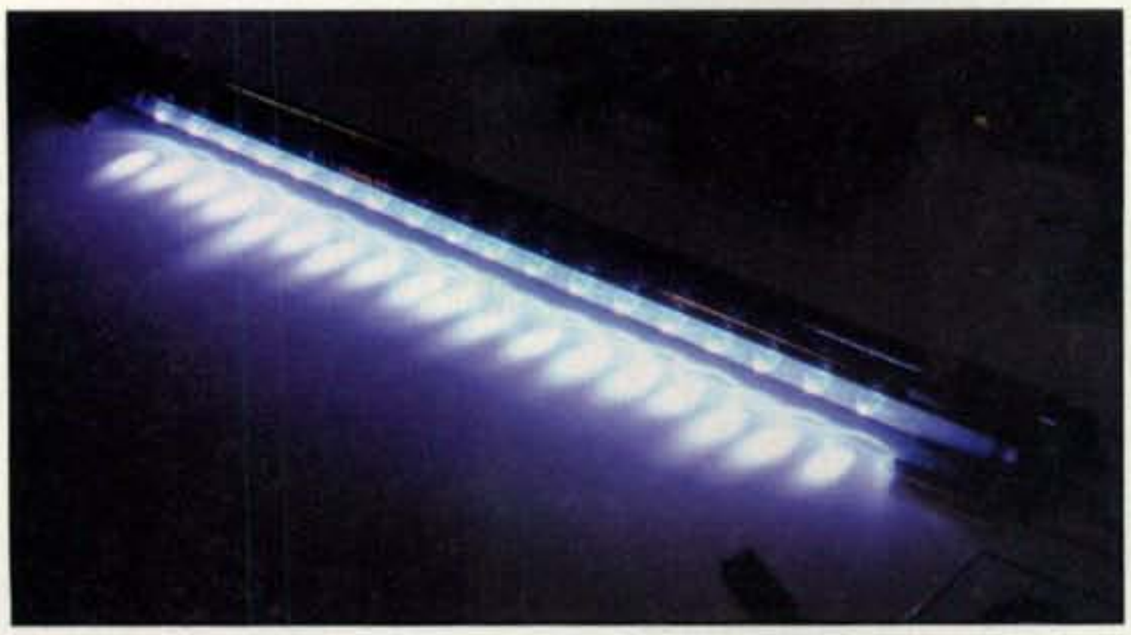


Photo U– West Mountain Radio's PWRbrite light uses bright white LEDs and can be rotate in its mounting clips for maximum flexibility.

be rotated in or removed from its mounting clips for maximum flexibility.

That's our wrapup of this year's new products seen at the Dayton Hamvention® and at Ham-Com® in Texas. You can find more information on each manufacturer's website. Those who are *CQ* advertisers have their websites listed in our monthly ad index at the back of the magazine. A quick web search should turn up the others in practically no time.

frequencies in a new area. The new Spectrum Scout from Optoelectronics (photo T) does all this for frequencies between 10 MHz and 2.6 GHz, and can store up to 1000 captured frequencies. In addition, it comes with the FCC bandplan database built in, and displays the service to which a frequency is allocated along with a signal's frequency and signal strength. You can also develop and upload your own database. The Spectrum Scout is compatible with many scanning receivers and is surprisingly affordable, listing for just $399.

So far, we've massaged the audio coming into and out of your radio, but what about electrical power? We have three new accessories to help keep your power up and running whenever you need it. First is the MFJ-4403 transceiver voltage conditioner, which provides protection against reverse polarity, overvoltage, transients in the power lines, and short circuits. Plus, its huge capacitors will even let you run a 100-watt HF rig off your car's cigarette lighter!

Providing 12-volt DC power to a variety of radios and accessories was always a thorny problem until West Mountain Radio introduced its RIGrunner DC power strips a few years back. The latest addition to that line is the heavy-duty RIGrunner 8012, which can handle a total load of up to 80 amps at 12 VDC for powering those high-current-draw rigs. Another power-related accessory from West Mountain is the new 500-watt CBA Amplifier, which permits the use of West Mountain's Computerized Battery Analyzer (CBA) with high-current power sources, such as car batteries. It will test power sources running up to 160 amps or 500 watts.

Finally, West Mountain has developed the PWRbrite LED light (photo U), which can be mounted to any flat surface. More like a small fluorescent tube than a flashlight, the PWRbrite can be used to illuminate a small area in the event of a power outage, or can even

When we published "The License ~~Conspiracy~~ Experiment," in last November's CQ, we hoped it would encourage other ham-family members to follow its example. WA4ILO shares his story.

Merry Christmas, Dad!

Another Ham Radio Family Story

BY JIMMY WALKER,* WA4ILO

Naturally, a ham radio operator is always eager to talk about the hobby in response to questions from a curious friend. We love to talk about our favorite activities, such as repeaters, Morse Code, satellite work, public service, technical projects, or DX work. However, in offering our elaborate explanations, we all have seen the glaze that quickly comes over the eyes of the listener who regrets having asked the question.

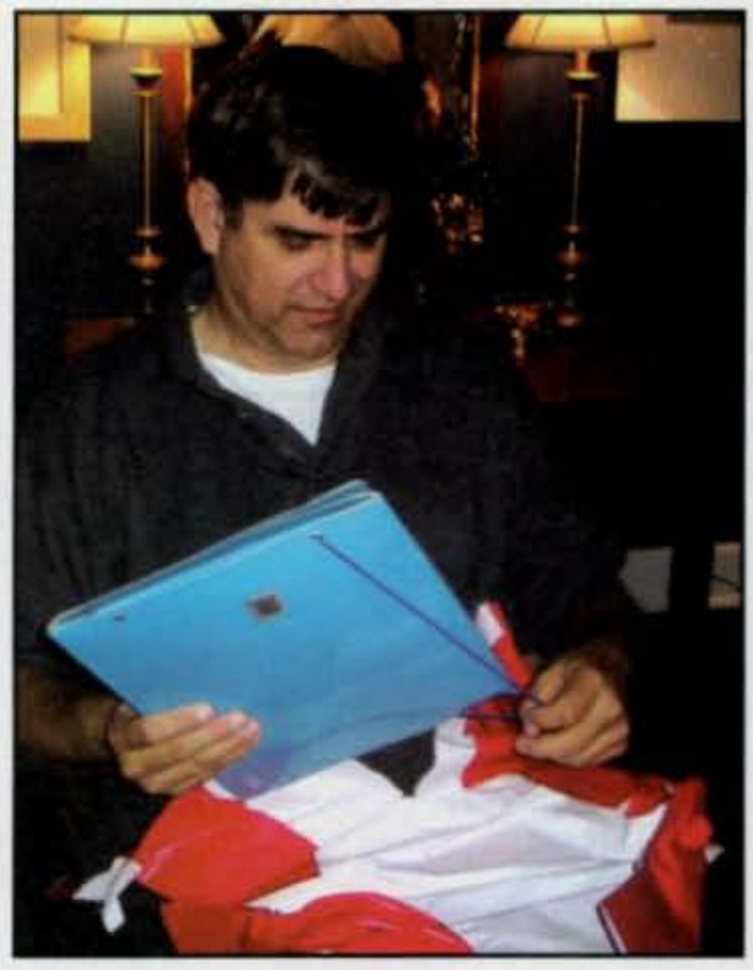
Shifting to another, hopefully more interesting, line of inquiry, our friend may ask, "How did you get interested in ham radio?" Our answers to that question are as varied as our experiences. Often, a family member inspires our interest in ham radio. With no disrespect to my loving family, I can say without reservation that not one of them has expressed any interest in my ham radio hobby except as a courtesy to me.

When my wife tries to engage me in activities about which I have absolutely no interest, I explain my unwillingness by reminding her of ham radio and how much she would not enjoy spending a few hours with me at a hamfest. She always understands. My two children, while they have been willing to spend time with me in my radio room-office, were never inspired to participate in ham radio.

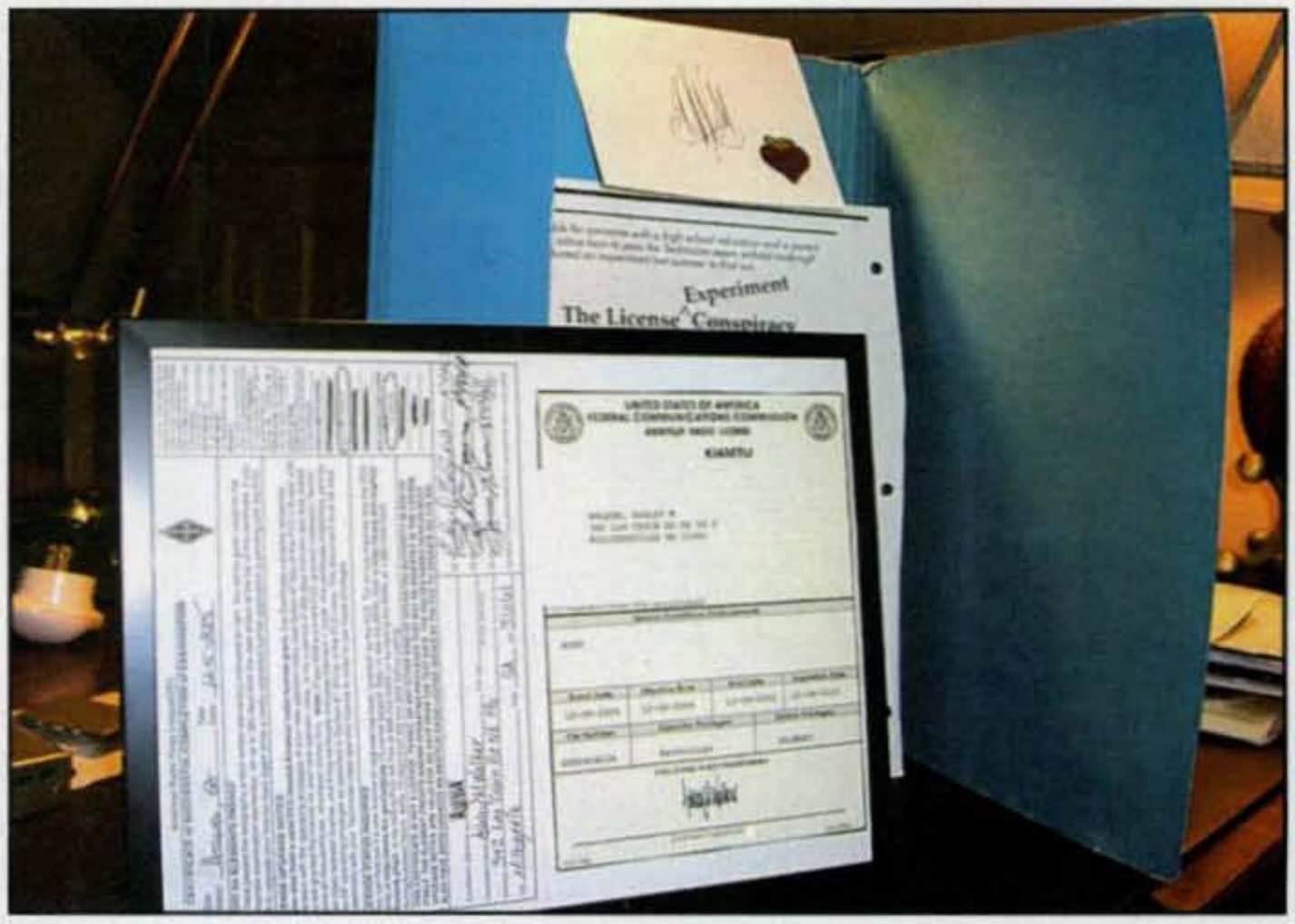
Having always dreamed of a ham radio family, I was amused by the story by Rich Moseson, W2VU, and his son, who tried to find out how hard it would be to get a ham radio license with practically no preparation ("The License ~~Conspiracy~~ Experiment," *CQ*, November 2005). The story offers the conclusion that it takes some preparation, but not very much, to get a beginning ham radio license.

I had always suspected that our licensing barrier was lowered sufficiently to allow anyone who was willing to learn (or memorize) a few rules and technical concepts to become a ham *(Actually, it used to be that way, too. See KH6HU's "Op Ed" in the April 2006 issue.—ed.)*. I had said as much to my family for years and recently shared a copy of Rich's story with them to fortify my continuing encouragement. However, beyond the courteous responses of "ho hum" and "that's interesting," there was no further discussion of the subject.

Consoling myself, I thought, "Who would want to share a ham shack with another member of the family anyway?" Imagine this exchange: "How much longer will you be using the radio for the contest, Dad?" Or how about this? "Hey Dad, I wired a modification to our new transceiver to increase our power output." Perhaps it is best to be the boss and only operator of the family ham radio station.



The author opens his mystery gift on Christmas morning. (Photos courtesy of the author)



Contents of the mystery package: Daughter Ashley's framed ham license and Certificate of Successful Completion of Examination, as well as a copy of the CQ article that inspired her to get her license.

*118 Troon Way, Macon, GA 31210
e-mail: <JDWalkerJr@aol.com>

Ashley's Story

I became a ham over the Christmas holidays in 2005. My father has been a ham since 1962. My father and I have been best friends for my whole life, 25 years. He is the reason I am a ham; I wanted to be a part of his passion. I had never attempted the ham test, though, because I always thought it would be too difficult. I never *really* thought I would join my dad on the air.

But in the fall of 2005, my dad gave me an article about someone's son, who passed the Technician test without doing much studying. The article asked the questions, "Can the child of a ham pass the test without studying? Does being the child of a ham give you the tools you need to pass the ham test?" In early December, I drove to Athens, Georgia from my home in Macon to find out, and learned that the answer to that question is yes. I, too, passed the license exam without doing much studying.

I anxiously waited until Christmas Day to give my license to my father. Christmas morning, he opened the present and, to my surprise, didn't jump for joy. Rather, he looked more like he was in shock. He wore this face of disbelief for the rest of the morning. Once the shock wore off, my dad started shopping for a new radio, a radio for me. So, as a late Christmas present, my dad bought me the ICOM 2200. I didn't have a big part in choosing it, but now that I have it, I use it every day.

I had my first QSO toward the end of January 2006. I hang out on the AA4RI repeater in Macon, Georgia. I love all of my new friends. Everyone who hangs out on the repeater got together to have lunch a couple of weeks ago. All of my new friends are really welcoming me to into ham radio. I know I will have to break out the book for my Amateur Extra license, but I am looking forward to it! I will be attending the 2006 Dayton hamfest. It will be my first hamfest, and I am totally looking forward to that! *(Ashley did indeed attend the Dayton Hamvention® ... and brought the story full-circle. See "Postscript: The Dayton Connection" later in this article.—ed.)*

— Ashley Walker, KI4MTU

It's hard to tell who is happier here, "old" ham Jimmy, WA4ILO, or new ham Ashley, KI4MTU.

My two children are now in their mid-20s, living in their own homes in other cities, but within easy range of my 75-meter transceiver and several VHF repeaters. Of course, like so many families we communicate mostly via cell phone. There is e-mail, too, and IMing (instant messaging) for the quick question, report on some activity, or for the sharing of pictures. Still, wouldn't it be fun to have a ham radio contact with one of the children? Such are the daydreams of an aging ham radio father. If you are a ham radio parent, you cannot honestly say that you have never had this daydream.

A Christmas Present Like No Other

Fast forward now to Christmas morning 2005. Picture me, a ham radio operator of baby-boomer vintage, licensed for over 40 years, watching the loved ones of my life exchange gifts around our Christmas tree. Our family is not always together on Christmas day, since our two children have merged with other families. As families typically do, we find ourselves in competition for attendance at these special occasions. This was our year to have the children, the daughter-in-law, the brother and sister-in-law, the two nieces, and five rather large dogs in our home, which is ordinarily occupied by two adult persons (no dog).

It was the very best of Christmas mornings, confusing, loud, and glorious. There were dogs and people and wrapping paper and thank yous and laughter, and . . . what's this? A gift for Dad? "Thank you," I said, always glad to receive another tie, or shirt, or book. This package, though, oddly shaped as it was, seemed to be something different. It was something in a frame.

More curious than the shape of the package was my daughter's call for the attention of the family. "Everybody," she said, "let's see what this gift is," referring to the package in my hands. The room grew solemnly and oddly quiet. Cameras began to point my way. I became, for the moment, the center of attention, a most unlikely circumstance for a father on Christmas morning.

"What is this?" I said out loud, and to myself, in earnest. As the content of the package was revealed under the wrapping paper, I saw the familiar logo of the Federal Communications Commission. "How odd," I thought. Someone had framed my ham radio license. "This is a nice present," I said, still thinking to

myself that there was something very peculiar about it.

Where my name should have been there was another name, a Walker, like me, but not me. The call was not mine, WA4ILO, but a strange one, KI4MTU. It was one of those moments you read about when they say time begins to move in slow motion. I read the license class, not Extra Class like my own, but Technician, a beginner's license. I touched the letters of the name and slowly recognized them to be my daughter, Ashley M. Walker.

It was one of those times where you realize you don't know very much about how your brain works. I could feel tears forming in my eyes before I knew why. The next step in the slow wave of realization was the glow of pride in my daughter's eyes. The reality of what had happened slowly bubbled to the surface of my consciousness; I realized that my daughter had become a licensed ham radio operator.

"This can't be true," I said to myself. "Why," I thought, "does this make me want to cry?" When my paralysis began to seem a bit awkward, even to me, I realized that I had to make some verbal response. I said something like, "Wow!" "Amazing!" I was not feeling my most articulate self.

Fortunately, my daughter's hugs concealed my continuing emotion and gave me a chance to gather my thoughts sufficiently for coherent conversation. I asked, "What made you decide to do this?" My daughter replied, "It was the magazine article about the son of the man who took the test without seriously studying for it."

I instantly remembered Rich's article and having shared a copy of it with her. I wanted to hear more details, but with Christmas morning being the madhouse it always is, everyone's attention began to be distracted to other presents and activities. My daughter agreed to tell me the complete story later.

... the Rest of the Story

The next day, when the two of us went for an errand in the car, my daughter shared the details of her preparation and test-taking experience. Like Rich's son, she did very little preparation. She studied the practice questions on the internet and took the practice exam several times, failing it as often as she passed it, always by narrow margins.

She consulted a very helpful ham operator in her community and found the test would not be available in her home town soon enough for the license to be issued in time for Christmas. Consulting an internet listing, she presented herself for testing at a city about 80 miles from her home and learned the test was not being given on that night.

Consulting the internet further, and this time calling in advance, she located another testing location in a city about as far in the other direction and presented herself for that testing session. As one might expect, she failed the test the first time. After paying another fee and taking the test again later in the day, she passed.

Having told the Volunteer Examiners her story about trying to get the license issued as a Christmas present to her father, they shared her happiness when she passed the second test. The exam results were processed at the FCC and a license was issued in time to be framed, wrapped, and presented to a proud father as evidence of the respect and affection of a daughter for a father's lifetime hobby.

I wish Rich's story and mine could be heard by ham radio families everywhere. I believe there are a few more prospective hams who would be encouraged by these reports to give the license test a try. Mostly, though, my story is reported here as thanks to a family that has lovingly supported my ham radio hobby for all the years they have known me.

WA4ILO calling KI4MTU. Ashley, are you listening? 88s! ■

Postscript: The Dayton Connection

By Rich Moseson, W2VU

What happens in Vegas stays in Vegas ... but what happens in Dayton, we tend to share with the rest of the world! It was Friday morning of the 2006 Dayton Hamvention®. I was in my usual spot at the CQ booth, chatting with readers and hawking subscriptions. My son Dan, KC2OOM, the subject of the article that inspired Ashley to get her license, was with me, filling in for a CQ staffer who couldn't make it. At one point, I looked up and saw a man and a young woman approaching, and I immediately recognized both of them.

"I haven't forgotten your story," I told Jimmy, WA4ILO. "We just haven't had space for it yet, but it's ready to roll as soon as we do."

"Well, I just wanted to meet you and introduce you to Ashley," he replied. "This is KI4MTU."

"It's so nice to meet you," said Ashley, "and I wanted to thank you so much for writing that article and inspiring me to get my license."

"Well, all I did was write about it," I said. "Your real inspiration is right over there." I pointed to my left. "Dan, come here, there's somebody you need to meet!"

Ashley broke into a huge smile, while Dan was completely mystified, since I'd conveniently neglected to tell him about the article, wanting him to see it for the first time in print. Interestingly, while Ashley knew her father was writing an article about their experience, she hadn't seen what he'd written either (and as far as I know, still hasn't, until now).

They both seemed kind of awed by the whole thing, Ashley at meeting the person responsible for her deciding she really could get her ham license, and Dan at the realization that he'd been that person, even though he, himself, hadn't yet been on the air. Truly, it was one of those "only in Dayton" experiences that you can't wait to tell the whole world about. So I am...

CQ Editor Rich Moseson, W2VU; Ashley Walker, KI4MTU; Dan Moseson, KC2OOM, and Jimmy Walker, WA4ILO, outside the CQ booth at the 2006 Dayton Hamvention®.

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BY BOB JOSUWEIT,* WA3PZO

News from All Over

We have a variety of significant reports this month, literally from all over the globe, all focused on ham radio emergency communications. The Atlantic hurricane season began on June 1, and "Right on Schedule..." the first tropical storm formed before the month was two weeks old. On the other side of the world, we have reports of hams helping provide communications after the massive earthquake in Indonesia and flooding in Thailand. We also have an update on the changing mission of MARS (the Military Affiliate Radio System), on which we first reported in June.

Besides those hams listed in each segment, we would like to thank Bill Sexton, N1IN, for supplying some of this month's information. I look forward to meeting some of you at the Maryland State Convention in Hagerstown, Maryland on July 29.

Have a story to tell? Drop us a note and let us know what you are doing in the world of amateur radio public service. Until next time...

73, Bob, WA3PZO

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

Right on Schedule....

Just 12 days into the 2006 hurricane season, Tropical Storm Alberto had already started to dump heavy rain over Florida and was threatening to become a hurricane. Early reports from the National Hurricane Center indicated that 10 to 20 inches of rain had fallen over western Cuba, which could cause "devastating flash floods and mud slides." Grand Cayman Island had reported 22.72 inches of rain in just 24 hours and 4 to 8 inches of rain were possible over the Florida Keys and western Florida. Major damage from the storm was not expected in the U.S., but officials were hoping it would serve as a wake-up call all along the Atlantic and Gulf coasts that hurricane season is back and preparedness is essential.

Along those lines, preparations and testing continued at key points along the Atlantic and Gulf Coasts of the United States. In early June, operators at the National Hurricane Center conducted their annual test. Julio Ripoll, WD4R, Assistant Coordinator, said the purpose of this annual station test is to "test all of our radio equipment, computers, and antennas using as many modes and frequencies as possible." He also indicated that RFI monitoring would be done on NHC equipment.

Ripoll reminded amateurs in the affected area of any hurricane that "your safety comes first!" He commented that Max Mayfield, NHC Director, repeatedly reminds everyone,"Don't just look at the thin black line," meaning that dangerous conditions may exist for hundreds of miles on either side of a storm's center path as shown on most maps.

Numerous state hurricane drills took place along the Atlantic and Gulf coasts. In the New York City area, Bronx County ARES® participated in an exercise called "The Bronx Storm Rehearsal." The drill, sponsored by the American Red Cross in Greater New York, was "designed to prepare volunteers by giving a hands-on experience in emergency shelter operations."

The drill activated the amateur radio station at the Red Cross Headquarters in Manhattan and at a shelter set up at a local high school for the purpose of passing emergency traffic between the shelter and Red Cross headquarters. According to Mike Lisenco, N2YBB, ARRL District Emergency Coordinator for New York City, "ARES is relied upon by our clients, like the Red Cross, to be able to quickly, adequately, and professionally set up and run a portable communications system to help those affected by a disaster. In order to provide that service, ARES members participate in drills such as this to hone our skills."

New York amateurs Carl Glovinsky, WA2IAF, Joe Nieves, N2TEE (Staten Island ARRL Emergency Coordinator), Chris Kilpert, KC2OBN, and Gabe Cheng, N2GAB, test emergency preparedness. (Photo courtesy of Laura Rudin, KB2VDV)

"The drill provided the opportunity to test our readiness," said Joe Nieves, N2TEE, ARRL Emergency Coordinator for Staten Island. "We need to be prepared at all times should we be called upon to support our community."

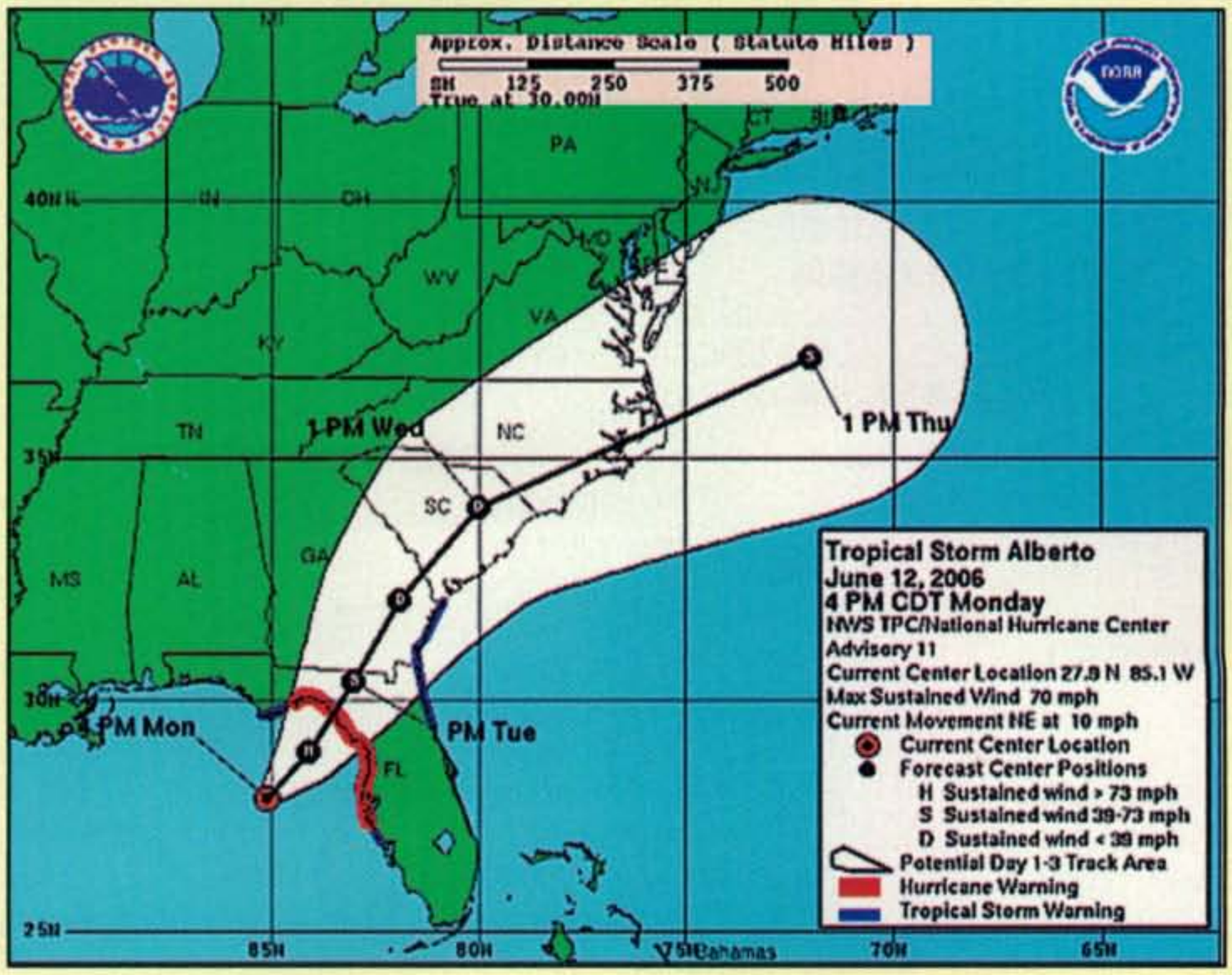
Laura Rudin, KB2VDV, said "many 'monkey-wrenches' were incorporated into the drill scenario. To that end, ARES volunteers needed to be on their toes at all times. During the drill, the script changed the situation to ensure a complete breakdown in 'conventional' forms of communication such as cell phones. From that point on, the ARES team provided the only communications from the shelter to the EOC in Manhattan." When a blackout scenario occurred, the hams were able to provide a seamless transition to battery-backup power.

Getting the Word Out

This year's hurricane season could provide a good opportunity to promote amateur radio even if you are not in a hurricane prone area. As a hurricane heads for the coastline, you need to understand what the news story is, and what it is will depend on where you are located.

If you are in the path of the storm, the local story before landfall will be the preparations being made in case it hits, and the ham radio "angle" is that hams are preparing to assist local agencies in case there is a communications failure or overload. If you are in an area that has been hit by a hurricane, the story is about the destruction in the area, saving lives, and protecting property. Amateur radio will not be the story for several days (unless, of course, it is the only source of information. Even then, the "message" will be more important than the "messenger."). As the immediate threat passes, however, and stories of agencies and volunteers helping out begin to appear, there is an opportunity to tell our story.

If you are completely out of the path of the hurricane, then there are other opportunities to tell our story. It might be a story of local hams monitoring emergency nets in case they can help out or it could be about local hams traveling to the disaster area. There are also other opportunities to say that if a hurricane or other bad storm were to hit the local area, the local amateur radio group would be there to support emergency response agencies and that local hams train to respond to communications failures.



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16-60'/80'	$1529/3529
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23-30'/40'	$1029/1509
35-40'	$1739

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HPTG6700I	$1.29/ft
PLP2755 Big Grip (6700)	$13.50
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TMM541SS	$1939
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TX455, 55' Crankup Tower	$1899
TX472, 72' Crankup Tower	$3139
TX489MDPL, 89' Motorized HD	$8239
HDX538, 38' Extra Heavy Duty	$1649
HDX555, 55' Extra Heavy Duty	$2889
HDX572MDPL 72' Motorized	$7549

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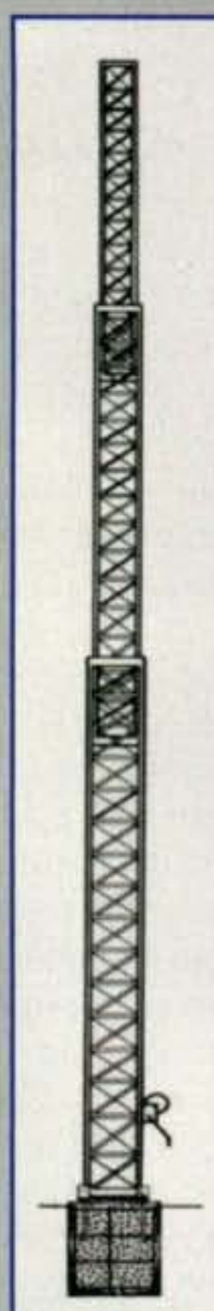
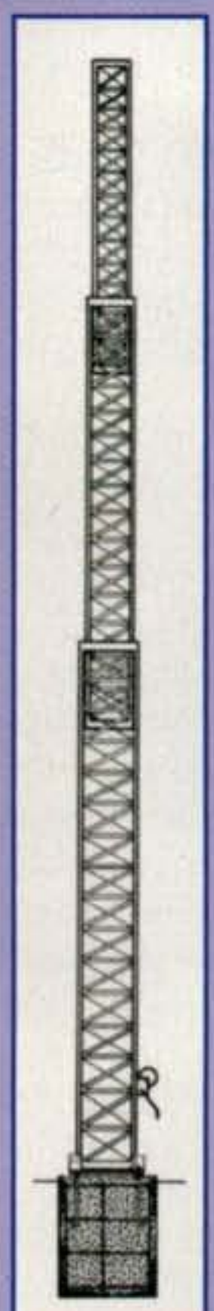


- Handles 35 square feet of antenna load at 50 MPH, 14.75 square feet at 70 MPH.
- All models supllied with hinged T-base, anchor bolts, hand winch (except motor drive models), top plate, and rotor plate.
- MDP & MDPL models include motor drive
- Options include coax arms, raising fixtures, masts, motor drives, and more!

Now shipping from CA for west coast customers, and KS for east coast and mid-west customers, to reduce freight cost!

TX SERIES HEAVY DUTY CRANK-UP TOWERS					
TOWER MODEL	MAX. HT.	MIN. HT.	WT. (LBS.)	LIST PRICE	SALE PRICE
TX-438	38'	21'6"	355	$1,523	$1279
TX-455	55'	22'	670	$2,107	$1,749
TX-472	72'	22'8"	1040	$3,462	$2,899
TX-472MDP	72'	22'8"	1210	$5,571	$4,499
TX-489MDPL	89'	23'4"	1800	$9,034	$7,299

HDX SERIES CRANK-UP TOWERS



- Heavy duty, handles 44.7 square feet of antenna load at 50 MPH, 35 square feet at 70 MPH.
- All models supllied with hinged T-base, anchor bolts, hand winch (except motor drive models), top plate, and rotor plate.
- MDPL models include motor drive
- Options include coax arms, raising fixtures, masts, motor drives, and more!

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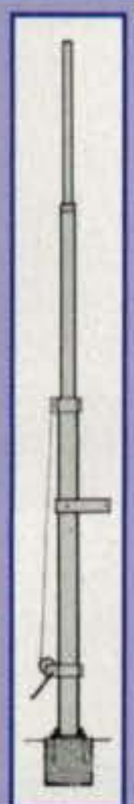
HDX SERIES HEAVY DUTY CRANK-UP TOWERS					
TOWER MODEL	MAX. HT.	MIN. HT.	WT. (LBS.)	LIST PRICE	SALE PRICE
HDX-538	38'	21'6"	600	$1,807	$2,099
HDX-555	55'	22'	870	$3,162	$2,549
HDX-572MDPL	72'	22'8"	1600	$8,281	$6,669
HDX-589MDPL	89'	23'8"	2440	$10,841	$8,699
HDX-689MDPL	89'	23'8"	3450	$20,943	$16,499
HDX-5106MDPL	106'	24'8"	3700	$22,791	$17,549

MA SERIES CRANK-UP MASTS



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

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MA SERIES CRANK-UP MASTS							
MAST MODEL	MAX. HT.	MIN. HT.	WT. (LBS.)	50 MPH (sq. ft.)	70 MPH (sq. ft.)	LIST PRICE	SALE PRICE
MA-40	40'	21'6"	242	16.5	6.8	$1,209	$999
MA-550	55'	22'1"	435	22	9	$1,875	$1,549
MA-550MDP	55'	22'1"	620	22	9	$3,584	$2,999
MA-770	71'	22'10"	645	15.5	5.5	$3,091	$2,599
MA-770MDP	71'	22'10"	830	15.5	5.5	$4,890	$3,999
MA-850MDP	85'	23'6"	1128	15.3	6.3	$6,591	$5,499

TMM SERIES COMPACT CRANK-UP TOWERS

- Handles 20 square feet of antenna load at 50 MPH, 8 square feet at 70 MPH.
- Compact design is great for areas with tower restrictions, or where a less intrusive installation is desirable.
- All models supllied with hinged T-base, anchor bolts, load-actuated hand winch, 8' steel mast, top plate, and rotor plate.
- Options include coax arms, raising fixtures, motor drives, thrust bearing, remote control panel, and more!

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TMM SERIES COMPACT CRANK-UP TOWERS					
TOWER MODEL	MAX. HT.	MIN. HT.	WT. (LBS.)	LIST PRICE	SALE PRICE
TMM-433SS	33'	11'4"	315	$1,626	$1,349
TMM-433HD	33'	11'4"	400	$1,970	$1,649
TMM-541SS	41'	12'	430	$2,135	$1,789

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Earthquake!

Indonesian amateur radio operators provided critical emergency communications in the greater Yogyakarta area, located in the center of Java Island, following a destructive earthquake in late May. The earthquake measured a 6.3 magnitude on the Richter scale. The quake left more than 6200 people dead, injured 30,000, and leveled entire communities.

According to reports relayed to Wyn Purwinto, AB2QV, amateurs from the Organization of Amateur Radio for Indonesia, ORARI, coordinated an emergency communications network comprised of individual hams and "Zulu Stations." Common practice in Indonesia is to designate several zulu-suffix emergency communication stations to handle disaster-related traffic on HF and VHF. Several ham radio medical teams headed to the affected area, including the North Sumatra team, led by Dr. Soejat Harto, YB6HB, which had provided important aid following the 2004 tsunami that struck the area. Other amateur radio teams responded from other parts of the country with equipment and backup generators. Some hams were also supporting the Indonesian Off-Road Federation with its heavy-duty all-wheel-drive vehicles.

The emergency nets not only provided communications for earthquake relief, but were also set up to monitor the active volcano situation at Mount Merapi. If providing communications for two emergencies was not enough, many local hams had to deal with personal tragedy from the earthquake. Several hams were killed as a result of the earthquake. One ham radio operator's daughter was killed when a wooden wardrobe hit her. Yet within one hour he was on the air reporting the tragedy.

Emergency station YC2ZEB was set up in the lobby of the Bantul Mayor's official house. (Photo courtesy of Halim Dani, YC2TJV, and Win Purwinto, AB2QV)

Erwin, YD2UER, operates emergency station YC2ZEB, which was set up in the lobby of the Bantul Mayor's official house. (Photo courtesy of Halim Dani, YC2TJV, and Win Purwinto, AB2QV)

By mid-June most of the amateur radio support had come to an end in the affected area, but hams were still stationed at the Yogyakarta gubernatorial building and several relief centers.

Indonesian amateur radio operators provided important emergency communications when an earthquake struck the Greater Yogyakarta area. (Photo courtesy of Deta Sayekti, YB2VTO, and Win Purwinto, AB2QV)

Flooding in Thailand

Meanwhile in Thailand, the Office of the National Telecommunications Commission set up two amateur radio repeaters in Sukhothai and Uttaradit to help provide communications in flood-stricken areas. Manas Songsaeng, deputy secretary-general of the Office of the NTC, said the repeaters would allow radio amateurs in the areas to link together to provide communications networks to assist the authorities in providing relief to flood victims.

The repeaters were installed based on advice from Thailand's King Bhumibol Adulyadej, HS1A, who voiced concern that mobile phones had no signal in the forested areas of the flood-stricken provinces. The flooding has affected over 200,000 people. At least 555 homes were destroyed and more than 75 people were killed.

MARS Mission Changing

There's word of a new evolving mission for Army MARS (Military Affiliate Radio System). As reported in *CQ*'s June Public Service column, Army MARS Chief Kathy Harrison said, "We will have many new challenges in the next year to meet our mission with directed budget cuts, but I feel our NETCOM/9TH ASC MARS staff and volunteer membership will meet those challenges."

Now Harrison has told MARS members that the customer base is being reviewed and updated. Missions throughout the Department of Defense and other government agencies have changed dramatically over the last few years, meaning the MARS customer base and its missions have also changed, she said.

In the past, so-called EEI messages (for Emergency Elements of Information) were directed to the Joint Staff Directorate of Military Support (JDOMS), which had the mission to coordinate military support to civil agencies. EEIs are used to alert federal authorities to disasters, weather emergencies, highway closings, and other situations with a potential to involve government operations. One example of EEIs being sent was on September 11, 2001, when information was relayed from the New York City area to the Pentagon. Harrison said that this reporting is a primary mission for MARS members who are distributed throughout the United States and charged with providing emergency back-up communications by radio when normal channels fail.

"The good news is that NORTHCOM (the U.S. Northern Command) assumed the role that JDOMS previously had and we are already working with them to define our roles and their needs," she said. "Please note that the elimination of JDOMS from our chain does not mean the mission no longer exists. It does mean that we are long overdue for a review of our customers, their needs, and our mission specifics."

Her wide-ranging message, dated May 11, called on MARS members "to stay actively involved in determining customer needs at the local levels." Also, she said, "(m)ilitary units and the state level and local agencies may have requirements for local and/or deployed operations."

Ms. Harrison, a civilian employee of the Department of the Army with 30 years experience in communications, is a former Eastern Area Director of Army MARS and graduated with honors from the U.S. Army Signal Officers Advanced Course. As Chief of Army MARS, she succeeded Robert Sutton, N7UZY, who retired after 16 years in the post.

"We already know MARS is continuing to evolve with technology, customer base, and cost containment," her message said. "There will be changes in our program to meet these needs...The Army is transforming and Army MARS will have to transform along with it. This will present many challenges to us at HQ and to all the membership. You have met the challenges to MARS in the past and I am confident you will do so again," she said.

U.S. Northern Command was established in 2002 to provide command and control of Department of Defense (DoD) homeland defense efforts and to coordinate military assistance to civil authorities. Civil service employees and uniformed members representing all service branches comprise NORTHCOM's headquarters, which is located at Peterson Air Force Base in Colorado Springs, Colo. The commander of NORTHCOM, Adm. Timothy J. Keating, also commands the North American Aerospace Defense Command (NORAD), a bi-national command responsible for aerospace warning and aerospace control for Canada, Alaska, and the continental United States.

What You've Told Us...

Our May column asked about tools in and around your ham shack, and 90% of the respondents said they have an electronics workbench or similar area in which they build &/or repair electronic gear.

Among tools in your possession, 99% of you have screwdrivers, pliers and wire cutters; 98% have a utility or hobby knife; 97% have a handheld electric drill, a hacksaw, a hammer, and wrenches; 95% have wire strippers, 94% have a magnifying glass and a soldering gun, 93% have tweezers, and 92% have a pencil-type soldering iron.

Next, 85% each have a crimper and a solder sucker or wick; 78% have a power saw, 76% have alignment tools, 75% have a "third hand" clamp, 74% have a Dremel® tool or similar, and 72% have some sort of punch (center, hole or chassis). Moving down, 63% have something that wasn't on our list, 62% have a drill press, 57% have a soldering torch, 51% have a nibbler, and 48% have an anti-static wrist strap. Finally, 19% have a metal bending brake and a lone one per cent reports having no tools at all.

Electronic tools are not quite so widespread, with an analog VOM topping the list at 88%, followed closely by an SWR/wattmeter at 87%, a digital multimeter at 86%, and a dummy load at 84%. Then we have a big drop, to 65% each with an antenna analyzer and a DC ammeter, followed by oscilloscopes and RF signal generators (56% each), a capacitance &/or inductance meter (50%), other (49%), an audio signal generator (47%), and a grid dip oscillator, at 43%. Getting into the more esoteric gear, 33% of you have an RF voltmeter, while 25% have a step attenuator, 24% have an impedance bridge, and 15% have a spectrum analyzer. Only 2% report having no electronic tools at all.

Finally, we asked how active you were in building and fixing things, and 13% responded "very active," while 31% replied "active" (for a total of 44%); another 48% said they occasionally build or fix something, while 7% said they rarely do so and only 2% said never. Overall, not too shabby for a group of people who, according to popular wisdom, never build anything anymore. Maybe it's time to rethink the popular wisdom.

Our free subscription winner for this month is Delbert Clark, KA9ZMK, of Menomonee Falls, Wisconsin.

Reader Survey
August 2006

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

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

This month, we'd like to ask about where your ham shack is located.

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

1. Where is your *primary* station location? (Choose one)
- In my house/apartment 26
- In my vacation home 27
- In another remote location 28
- In my vehicle 29
- On my boat....30
- On my belt (handheld)....31
- Not currently on the air 32

2. If you have a station in your home, where is it located?
- Basement 33
- Attic 34
- Room in main living area....35
- Garage/"real" shack 36
- Other 37
- No station in home 38

3. If you have a station in your home, is it in its own room?
- Separate room for ham station....39
- Shared room, main living area 40
- Shared room, attic or basement....41
- No station in home 42

4. From what type of vehicle (if any) do you operate? (Circle all that apply)
- Family car, truck or van 43
- Work vehicle....44
- Recreational vehicle 45
- Bicycle 46
- Boat....47
- Airplane 48
- Do not operate from a vehicle 49

5. If you operate mobile, is your radio permanently or temporarily installed in your vehicle?
- Permanent....50
- Temporary 51
- Combination 52

6. What band(s) do you operate from your vehicle? (Circle all that apply)
- HF 53
- VHF/UHF....54
- Do not operate mobile 55

7. Do you have more than one handheld and is it your primary radio?
- One HT, primary....56
- One HT, secondary 57
- More than one HT, primary 58
- More than one HT, secondary....59
- Do not own/use a handheld 60

Thank you very much for your replies. We'll be back next month with more questions.

AOR Digital Modem Helps Teach Your "Old" Radio New Tricks!

Add digital capabilities to your existing HF rig and get in on the FUN!

Amazing audio quality is just one of the reasons the ARD9000 and ARD9800 are fast becoming favorites with ham radio operators around the world.

Join the growing number of operators enjoying exciting, clear DIGITAL contacts – all without making any modifications to your transceiver. It couldn't be easier.

Using the open G4GUO protocol, the ARD9000 or ARD9800 allows any ham to convert any existing HF analog transceiver to work digital voice in one easy step! No radio modifications are necessary and it works with any brand of transceiver. The unit automatically detects digital signals and decodes them, but you also maintain full analog capabilities. Whether a contact comes in as digital or analog, the ARD9000 and ARD9800 can handle it.

It's a real breakthrough in communications technology that uses the same audio frequencies (300 Hz ~ 2500 Hz) as microphone audio to transmit digital SSB voice signals. It's like adding a whole new mode to your HF radio without having to buy a new one!

- ARD9000 for "voice only" operations
- NO transceiver modifications necessary
- Digital voice communications using existing analog transceivers
- Works on Single Side Band (SSB) mode.
- Automatic digital receive
- Optional interface cables for most popular transceivers
- Built-in high grade Vocoder (AMBE)
- Built-in FEC protocol
- Compact unit. Easy to operate.
- Utilizes a uniquely designed high performance DSP engine
- Uses the established G4GUO open protocol
- ARD9800 can also be used for digital slow scan TV and data transmissions (images require optional memory board)

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math's notes

BY IRWIN MATH,* WA2NDM

A Receiver for Aircraft Transmissions

It is well known fact that operating radio transmitters (cell phones, HTs, etc.) is not allowed onboard commercial airliners due to the fact that RF from such devices could potentially interfere with the signals normally used to communicate with and control the aircraft. The same potential problem also arises from radio receivers, particularly those of the superheterodyne variety, since harmonics of the local oscillator (in these circuits) could also cause interference. Even though most transmitters and receivers do not actually operate directly on specific vital frequencies, harmonics, various beat products and even unsuspected rectification products of high RF fields could still cause problems. Therefore, the simplest solution is just to sompletely prohibit any non-certified emitter. If, however, one were to fabricate a totally non-radiating receiver, this potential problem would be totally eliminated.

Last month we looked at field strength meters, and since these devices detect RF passively, one can slightly rearrange the various circuit components and build a neat, simple non-radiating receiver. Fig. 1 shows one example—an ultra-simple AM receiver, or as we called it in the old days, "a crystal set"!

In operation, a short antenna picks up nearby AM-modulated RF and applies it to a voltage doubler comprised of two germanium diode detectors. The output of the doubler is then filtered by a ceramic capacitor and converted back into audio by means of a high-impedance crystal earphone. Since the aircraft band extends from about 118 to 136 MHz, the input is specifically untuned to achieve the necessary wide bandwidth, and the receiver therefore responds to whatever strong RF is present.

For those who wish to experiment with a tuned front end, an optional input circuit (also shown in the schematic) should be connected in place of the 100K resistor. This circuit obviously is not very sensitive and, having no power supply, is not capable of radiating anything. However, that is precisely what we want. Its lack of sensitivity results in only the strongest signals being heard in the earphone. If used in an aircraft, the only strong, nearby RF

*c/o CQ magazine

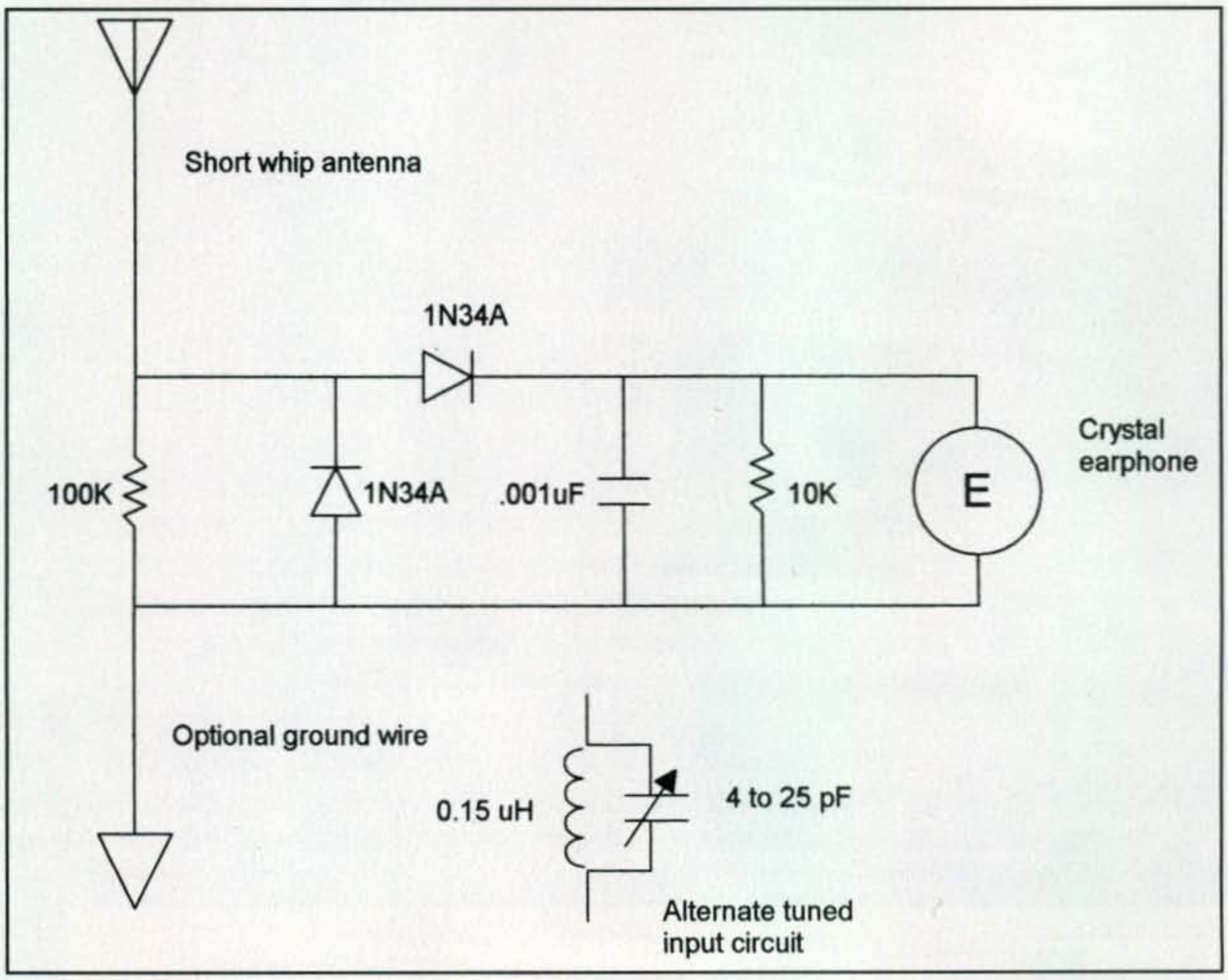

Fig. 1– A simple self-powered aircraft receiver.

carrier will be the transmitter in the cockpit, and we should be able to hear at least one side of the conversation between the pilot and ground (or other aircraft). The antenna is only 6 to 12 inches of wire, long enough to pick up the signals we want but not so long as to be too cumbersome. The optional ground wire is also just a few inches of wire separated from the antenna. In some cases, neither antenna nor ground leads actually will be needed, since the circuit by itself may pick up enough RF to work.

If the 1N34A diodes cannot be found, 1N5711 Shottkey diodes can be substituted and should also work well. However, the earphone must be of the high-impedance type (such as a Mouser Electronics part No. 25CR060), since the recovered audio will be very weak. Standard 8-ohm aircraft-type entertainment headphones will load the circuit and definitely not work properly. If you choose to try the input tuned circuit, a suitable capacitor (4 to 25 pF) is a Mouser Electronics 242-3410-34, and a suitable inductor (0.15 µH) is a Mouser Electronics 434-22-R15. Keep in mind that a simple tuned circuit will not be very selective, but may provide somewhat more signal. The best part, as we have already mentioned, is that the receiver does not need any operating power at all! Note that we have given Mouser Electronics parts numbers, but most other major distributors and surplus houses have similar parts, and you can certainly feel free to hunt around for the best value.

After building the receiver, you can easily test it if you happen to have an RF generator that covers the range of interest and can be modulated. Set the RF output of the generator to any point in the 118- to 136-MHz region (the center at 127 MHz is a good choice). Turn on the internal audio modulation of the generator and place a short lead from the generator's RF output connector near the antenna input of the receiver. You should clearly hear the modulation tone in the earphone. As an alternative, you can use any radio transmitter that can be AM modulated. Experiment with antenna and ground-lead lengths for best results.

If you plan to use (or even just test) this receiver on an actual commercial airline flight, be absolutely sure to divulge any and all details of your intentions to an appropriate security agent and/or flight attendant well before boarding. The last thing you want to do is cause any concerns or get into any legal hot water. Aircraft security is an extremely sensitive issue these days, and you do not want to start anything that could be construed as more than a simple, innocent experiment by a hobbyist. A good idea would be to build the receiver in a clear-plastic box with a complete unobstructed view of all components along with the schematic diagram. A copy of your amateur license also wouldn't hurt to help ease and explain the situation if necessary.

Above all, do not even think of trying to hide or camouflage the receiver. If the powers that be do not want you to use it, don't argue, and if necessary even be prepared to throw it away. The cost is less than a dollar and isn't worth a fraction of the trouble and aggravation that it can cause you.

In conclusion, keep in mind that this same idea can be employed at any frequency within the range of the various components, from hundreds of kHz to hundreds of MHz. You can add an audio amplifier such as the LM386 for more volume (but then you will need a power supply) or even bias the diodes (see last month's column) for more sensitivity, etc. Most of all, have fun!

73, Irwin, WA2NDM

BY FREDERICK O. MAIA,* W5YI

"Amateur-Radio-Friendly" BPL Company Gets Major Funding

Broadband over Power Lines (BPL) provider Current Communications Group announced in May that it had secured enough funding to begin building the nation's largest BPL system in metropolitan Dallas-Fort Worth, Texas. The Germantown, Maryland based company is one of the few BPL providers that the ARRL has deemed to be "amateur radio friendly."

BPL has been touted by its providers and even the FCC (especially former FCC Chairman Michael Powell) as a so-called "third pipe" to provide high-speed internet access to Americans along with cable TV lines and phone-line DSL (digital subscriber line) service.

Both Congress and the President have indicated that high-speed access to the internet for all Americans is critically important. Broadband is seen as a vital economic engine, a vehicle for enhanced business productivity and employee efficiency, and a way to improve learning, health care, news distribution, and entertainment.

A recent report, however, concludes that the U.S. is falling behind the rest of the world in broadband speeds due to various market and policy failures. Two reasons for the low ranking of the U.S. is that other countries have subsidized broadband service and that their populations live in areas that are easier to serve.

Hong Kong and South Korea have the world's highest per capita broadband penetration. More than two-thirds of their households have high-bandwidth connections, compared to less than one-third in the United States. Even though the U.S. has more total high-speed connections (about 50 million), it barely makes the top-20 country ranking based on population. It is expected that China will pass the U.S. in total broadband lines later this year.

The price of high-speed internet service remains a barrier to adoption for some consumers. Broadband prices in Korea are as little as $25 a month, about half of what Americans pay. On a per-megabit basis, U.S. consumers pay 10 to 25 times more than broadband users in Japan.

There are various ways to access the internet at high speeds, including digital subscriber lines (DSL) on copper telephone lines, cable TV connections, direct fiber optics ("fiber to the home," or FTTH), direct-to-home (D-T-H) satellite, terrestrial wireless (such as Wi-Fi), and in some areas BPL.

A typical home in urban or suburban America is connected to the outside world by three "wires"—coaxial TV cables, telephone lines, and electric power wiring. Right now two incoming "wires" lashed to cable modems and DSL access provide more than 98% of all household high-speed internet connections. Sixty-one percent are via cable modem service offered by companies such as Comcast Corp.; more than 37 percent are DSL offered by telephone companies such as AT&T; and the rest are split among the others listed above. According to the FCC, however, BPL currently has virtually no percentage (0.01%) of the broadband market.

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The Future of BPL

BPL consists of a variety of proprietary technologies, each of which uses electric power distribution lines to transmit data to reach the "last mile" into homes and businesses. These last-mile facilities are then connected to more traditional fiber and high-capacity wireless facilities to provide the backbone of the network.

The ability to use power lines to access the internet is not a new idea. It works because electricity operates at a lower frequency than internet signals and the two can coexist on the same line. Power lines are an attractive broadband delivery system because they are already in place and reach virtually everyone.

The FCC describes two types of BPL: "Access BPL" and "In-House BPL." Access BPL systems can deliver high-speed internet access or bundles of broadband services—including Voice Over Internet Protocol (VoIP) for internet phone service or video-on-demand—to homes and businesses. These broadband services are offered by electric utility companies to consumers either on their own or in partnership with other firms. In addition, electric utility companies can use Access BPL systems to monitor, and thereby more effectively manage, their electric power distribution operations.

Because Access BPL capability can be made available in conjunction with the delivery of electric power, it can provide an effective means for "last-mile" delivery of broadband services, and in many cases can offer a competitive alternative to DSL, cable modem services, and other high-speed internet access technologies.

In-House BPL systems use the electrical outlets available within a building to transfer information between computers, and between other home electronic devices, eliminating the need to install new wires between devices and hence facilitating the implementation of home networks via power lines.

According to BPL press releases, the most exciting thing about the technology is not its speed, but the ease with which an alternative nationwide broadband delivery system could be created. However, it's not as simple for the provider as for the consumer. Although the electrical wiring is already in place, additional infrastructure is required. For example, repeaters are needed every 500 to 2000 feet along a power line, along with equipment to "jump" the BPL signal from medium-voltage to low-voltage lines (it can't go through a trans-

former), so investment costs are significant for the utility or other provider.

The interference problems cited by the ARRL and others come primarily from Access BPL systems whose signals use portions of the HF radio spectrum. Electric lines are unshielded and overhead power lines can function as giant antennas.

Regulating BPL

The FCC began investigating BPL technology three years ago and adopted rules for using the nation's power grids to transport high-speed internet access in October of 2004. One of the primary purposes of those rules is to help overcome BPL's potential to interfere with radio and telecommunications signals. A database of BPL systems was mandated by the FCC and is being managed by the United Telecom Council. UTC is an association of utility and energy companies that operate telecommunications and data networks in support of their core businesses.

BPL testing began in a few communities even before the FCC's rulemaking, including Cincinnati, Ohio, Allentown, Pennsylvania, and Manassas, Virginia. Initially, there were reports of interference to some public safety communications and ham radio operations. The Allentown system is now shut down, one of many tests on which operators have decided to pull the plug for a variety of reasons. Some instances of interference, such as from the Manassas BPL system, exist to this day and have not been corrected. On the other hand, recent trials using updated technology from Current Communications and Motorola have largely been interference free.

Implementation of BPL is complicated by the fact that power companies are not regulated solely by the FCC, but also by state public utilities commissions (PUCs). Thus, the various state PUCs must also adopt regulations allowing BPL to operate in each state.

This past April, for example, California state regulators voted to reduce the number of regulatory hurdles companies must clear to provide Californians with a new broadband BPL pipe to the home. The new regulations—written by Commissioner Rachelle Chong, a former FCC Commissioner—permit non-utilities as well as utilities to provide BPL services in California. This means that a BPL provider can effectively "rent" a power company's lines to build and operate a BPL system in which the utility's role is limited to collecting a fee from the BPL provider.

San Diego Gas & Electric, Edison International's Southern California Edison subsidiary, and the Los Angeles Department of Water and Power, a municipally-owned utility, are already conducting BPL trials in California.

In 2003 the Washington, D.C. based National Association of Regulatory Utility Commissioners (NARUC) created a task force made up of six state regulators to examine the potential for BPL, and, in particular, the role of state utility commissions in advancing the use of the technology.

They echoed the FCC's desire to introduce more competition against cable and telephone companies. Also, as a group, state public utilities commissions largely have thrown their support behind BPL. Guidelines were drafted for use by the states to provide for joint ventures between utility companies, BPL equipment manufacturers, and internet access providers.

The United Power Line Council recently filed a petition for a declaratory ruling with the FCC, asking that BPL-enabled internet access services be

classified as information services under exclusive FCC jurisdiction. The FCC is currently considering that petition.

The IEEE (Institute of Electrical and Electronics Engineers) recently announced the formation of a BPL Working Group and has begun work on a standard to define the nature of the communication channel to be used with AC power lines. Targeted for completion in early 2007, the standards will apply to BPL devices for the first-mile /last-mile connections to BPL service and to local area networks and data distribution systems that operate over copper cables in buildings.

Current Communications Gets Major BPL Financing

Last fall, Current Communications Group, presently one of the leading BPL providers in the U.S., received a major cash infusion from industry giants such as Google, publisher Hearst Corp., and Goldman Sachs, a leading global investment banking firm. *The Wall Street Journal* said the company received about $100 million in financing from these sources. This was in addition to about the $70 million that Current received last year from Cinergy, EnerTech Capital, and Liberty Associated Partners to build out broadband and voice services in Ohio, Indiana, and Kentucky.

Under its relationship with most power companies, Current runs the service, bills the customers, and collects all of the revenue. Utility companies receive payments from Current in return for use of their power grids.

On May 5, Current announced that it had received a third round of new funding which will be used to build out the largest BPL network in the U.S. It will be located in the Dallas-Fort Worth metroplex.

The $130-million investment came from corporate powerhouses such as General Electric Co., internet service provider EarthLink, Texas electric utility TXU Corp., and automatic-metering provider Sensus Metering Systems Ltd. Venture capitalists are very interested in Current's BPL strategy to offer power-management capability to electric utility companies and broadband services to business and individual users.

The stage was set for the DFW venture by a new law in Texas, SB-5, specifically authorizing a utility company's deployment of BPL. According to the *Dallas Morning News*, the TXU investment—eventually totaling $150 million paid over 10 years—provides "...for an ownership stake in Current Communications Group Inc., which will turn TXU's transmission system into a 'smart electricity grid.' In turn, Current plans to offer broadband service over TXU's lines."

EarthLink wants to find ways to reach customers without depending on the cable and telephone companies to provide access, and will be Current's retail provider of internet service for the Dallas system. Google's interest is not clear, and the company declined to comment beyond a one-sentence statement saying it is "very excited" about its relationship with Current "to help promote better access to the internet." While Google doesn't compete directly against phone or cable companies today, it might in the future as it rolls out new services.

The so-called electrical two-way "smart grid" promises to reduce energy demand by as much as 10% by automatically monitoring, managing, and adjusting electricity demands. Appliances (such as not-yet-available intelligent refrigerators and washing machines) and any device that uses energy will ultimately be part of, and connected to, the grid. In addition, the BPL network will transmit user electric-usage and outage detection information back to a central office, eliminating the need for physical readings of utility meters.

Current's "CT Bridge" routes and manages "traffic" between each of the five to seven residents that are connected to a neighborhood transformer. The bridge also converts the power signal from medium voltage to low voltage and has built-in security. The two-way communication network on top of the utility backbone supports broadband including VoIP (Voice over Internet Protocol) telephone service. The "CT Coupler" bypasses the transformer and injects the communications signal directly onto the power line to establish the broadband connection. An upstream device transfers the local BPL signals to a fiber backbone network.

The majority of the $130 million reportedly will be spent in the Dallas-Fort Worth area, where Texas utility giant TXU Corp. plans to hook up its more than 2-million electricity customers to Current's "smart grid." Current's largest BPL deployment in the U.S. thus far is in Cincinnati, Ohio, where its lines pass more than 50,000 homes. No figures are available from the privately held company on how many of those are BPL subscribers.

Current Communications and Ham Radio

According to the ARRL, Current Technologies' equipment and the company itself are amateur radio friendly. Its BPL system uses 31–48 MHz for its medium-voltage distribution system. The signals placed on overhead lines (the lines that act the most like antennas and radiate signals) are well separated from spectrum used by ham operators. System designers have implemented a guard band so they are nowhere near spectrum allocated to the Amateur

Radio Service, so it is not likely that 10- or 6-meter amateur operation will be affected by a Current system. They do, however, use spectrum allocated to other radio services licensed in the low-VHF band.

Current's BPL systems also operate between 4 and 21 MHz, but those emissions are placed only on the low-voltage distribution wiring (240 volts), using HomePlug modems. Thus on HF, instead of having an interference potential along a mile-long run of overhead power lines from a single device connected to that line, the interference potential is essentially from premise wiring and, to some extent, from the low-voltage drop wires from the transformers to premises. The HomePlug modems then notch out all of the ham bands. They are also quiet except when in use.

The ARRL has done some testing in the Cincinnati area and concluded that the notching appears to be sufficient to generally protect mobile amateur radio operation. There could be some interference to fixed amateur stations near BPL-equipped houses, but that would depend on the local noise level, the level of the amateur communications signals, and whether the ham station is operating at the same time that the modem is in use.

The League concluded that the lack of major interference reports from the Cincinnati system indicates that the Current BPL system "...is effective enough that any problems that may crop up are small enough in number that they can be addressed on a case-by-case basis." The ARRL also said that Current Technologies' staff was cooperative and had a good communications relationship with the ARRL Laboratory.

ARRL Laboratory Manager Ed Hare, W1RFI, who has been involved with BPL on behalf of amateur radio for several years, says he is still very concerned about interference from BPL systems. According to Hare, "...although some BPL manufacturers have addressed interference to amateur radio, this is not universally the case. Some BPL manufacturers have not communicated effectively with ARRL and some are 'fixing' BPL with press releases, so there is still a lot more work to do. At this point, however, most BPL manufacturers have approached ARRL about resolving the ongoing problems with interference. Although talking about common ground is a good start, there is a long way to go in some cases to seeing that BPL is interference free for amateur radio."

73, Fred, W5YI

digital connection

BY DON ROTOLO,* N2IRZ

Data Encryption is Legal!

Just like Dorothy returning to Kansas, it turns out we've been able to do it any time we wanted to. Data encryption for our intended purposes *is already permitted* under Part 97 of the FCC rules. We just hadn't realized it. Read on for the details.

Data encryption has been a hot topic for some time in the digital community. We discussed both sides of the issue in the past two columns. In this month's column we'll be putting the topic to rest, once and for all.

The basic point is that our ham bands are not meant to be secure against casual listening. However, when we are providing communications for some agency or organization, such as for disaster relief, those agencies have some expectation of confidentiality. Information about people, as well as movement of supplies and resources, is not meant to be heard by the general public. Unlicensed Part 15 users are afforded the opportunity to encrypt this information to protect privacy, so why not Part 97 users?

Until now, the "common wisdom" has been that Section 97.113(a)(4) of the FCC rules, which prohibits *"messages in codes or ciphers intended to obscure the meaning thereof, except as otherwise provided herein...,"* made it illegal for hams to encrypt any information that wasn't specifically exempted, even passwords to prevent non-amateurs using Part 15 devices on shared frequencies from accessing Part 97 networks, even though another paragraph of §97.113, paragraph (e), says that except for a few specific exemptions, *"No station shall retransmit programs or signals emanating from any type of radio station other than an amateur station..."*

Paul Toth, NA4AR, a member of the ARRL's High-Speed Multimedia (HSMM) Working Group, a former ARRL Section Emergency Coordinator, and a recipient of the 2005 NOAA Environmental Hero award for his volunteer amateur radio work at the National Weather Service office in Ruskin, Florida during the 2004 hurricanes, posed some arguments for allowing limited encryption, which are excerpted here:

> Commercial Part 15 operations have brought with them many benefits to society. Wireless networking has enabled greater use of the Internet and the volumes of information that are available there ... IEEE 802.11 devices, wireless telephones and dozens of other types of unlicensed, Part 15 radio emitters have become so pervasive they now number in the tens of millions. And that is just in the United States.
>
> 802.11 Wireless Access Points (WAPs), by default, are configured to act as repeaters. Most of these Part 15 WAPs are equipped with security features that comply with IEEE standard 802.1x to limit access. When enabled, these 802.1x security features will repeat only those operators whose stations meet the encrypted access authentication criteria programmed into the WAP. Part 15 operators are free to use 802.1x security as well as WEP and WPA to limit access to their WAPs. Amateur Radio operators operating WAPs under Part 97 rules without encryption switched on are likely to violate 97.113(e) by inadvertently re-transmitting Part 15 signals. But 97.113(a)(4) prohibits encryption.
>
> Two years ago, before Charley, Ivan, Katrina, Rita, Wilma, and the other hurricanes that made landfall in the US in 2004 and 2005, the ARRL Board voted unanimously to petition the FCC for a rules change on encryption. The proposal sought to legalize the use of "industry-standard security and encryption protocols" for *domestic* communications on all bands above 50 MHz. Such a change in the rules would allow amateur operations to utilize spectrum shared with commercial operators without fear of violating 97.113(a)(4) or 97.113(e) and address the growing need for secure disaster response communications. However, at its January 2006 meeting, after hearing a report from ARRL General Counsel Chris Imlay, W3KD, on "the background for and implications of moving forward with" filing such a petition, the ARRL Board effectively rescinded its earlier motion, voting "to relieve the General Counsel of the requirements" to seek a rules change on this matter. Meanwhile, FEMA and the Department of Homeland Security have sought out organizations like Part15.org to explore emergency communications contingencies on frequencies licensed to the Amateur Radio Service.
>
> No one is suggesting relocation of Part 15 users to other radio spectrum. Hams, of course, are just as free to operate an 802.11 or 802.16 station under Part 15 rules as are non-licensees. But why should we? After all, we hold licenses to operate on these bands. That license is supposed to afford Amateur Radio operators priority as well as the privilege of operating with higher transmitter power than Part 15 operators. What is holding hams back are antiquated rules written without recognition of the mixed spectrum utilization now in place. A change in the rules to permit the use of industry standard security and encryption protocols on domestic transmissions can, once again, open these bands to those who hold a license to use them.

After reading Paul's comments, we at *CQ* began some follow-up work to try to tie up loose ends. The result was that a variety of strings began to come together, leading to the conclusions presented here. My thanks to Paul for his willingness to share his thoughts and keep the issue on the table long enough to get the ball rolling. Let's review Paul's basic points and how they led to a rather startling conclusion:

It's Been Legal All Along!

Note: The following was developed from a series of discussions, both public and private, with numerous hams, including some with authoritative knowledge on these matters who asked not to be quoted at this point, as the discussions were

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still ongoing. It started with Paul's comments above and reaches the conclusions below. While it would be impossible to acknowledge everyone involved, much of the credit goes to the members of the High Speed Multimedia (HSMM) Working Group.

Paul's primary point in advocating encryption under Part 97 is the need for *network security*, which is to prevent non-hams from accessing amateur equipment (inadvertently or on purpose), which could result in a violation of the FCC rules. His conclusion is that some encryption is absolutely necessary for amateurs today. Also, as Paul stated two years ago, the ARRL Board of Directors agreed that it was a good idea to petition the FCC to permit limited data encryption. The digital and emergency communications communities had convinced the directors that such an action would further the Amateur Radio Service. What, then, changed their minds in 2006?

Well, it turns out that there's no need for a petition because **there's nothing in the rules preventing the use of data encryption for the purposes we're discussing,** specifically protecting the network from unauthorized intrusion and usage, as well as the more general purpose of supporting emergency communications while maintaining the privacy of disaster victims—both in actual emergencies and in practice drills. (That last bit is important: While the emergency communications exemption in 97.401(a) essentially suspends all the rules when necessary, drills are not an emergency, and it is absolutely essential to practice with a system regularly if you expect it to work when there is an emergency.)

Network Security

First, let's discuss network security. What we're trying to accomplish here is to prevent outsiders from accessing the network, as required by 97.113(e) and implied in 97.105 and elsewhere. If this can be accomplished with a password, then there is nothing in the rules preventing us from encrypting that password. I compare that to keeping the control codes for a repeater secret: It is clear to anyone monitoring as to who is transmitting and the general purpose of the transmission, so the exact password that is being transmitted is not that important.

However, more than a password is needed to secure an 802.1x network. WEP (Wireline-Equivalent Privacy), for example, prevents anyone not using the proper key from associating with the

WAP (Wireless Access Point). That means if we enable WEP, we are effectively preventing Part 15 users from accessing—inadvertently or on purpose—a network operating under Part 97 rules.

The *Purpose* is What Matters

The key here is that the *purpose* of encrypting is *not* to obscure meaning. It is to *secure the network* from unauthorized access. Let's take a look at Section 97.113(a)(4) again, which states that no amateur station shall transmit "*...messages encoded for the purpose of obscuring their meaning....*" The key word here is *purpose*. This rule is not regulating a method or practice; it regulates a purpose or intent.

For the communications purposes we are discussing–network security and access control, emergency communications, and practice for same—our *purposes* in using encryption are the *security* of the network and the *privacy* of third-party information. In either case, the purpose is *not* to obscure meaning. We have to assume that the rules were written very carefully, and they mean what they say. It might seem kind of odd that the rules deal with intent, rather than practice, but they are what they are: **If the purpose of encryption is not to obscure meaning, then it is permitted.** This carries over to any encryption method, on any frequency, including HF.

The FCC's main concern is knowing who transmitted a particular signal. Then, if there are problems or questions, the Commission would know whom to contact for more information.

Caveats

Well, there's no such thing as a free lunch. Of course, there are limits to how we carry this out, both operationally and from a practical standpoint.

The first caveat is that nothing relieves amateur radio operators from the requirement to identify their stations, at least every 10 minutes and at the end of each contact. With 802.1x gear the simplest method is to set the SSID to your callsign. If you use something different, you may need to work out some other methods to accommodate whatever system you decide to use.

The second caveat is that you still need to comply with Section 97.309 (a)(4), which states that "An amateur station transmitting a RTTY or data emission using a digital code specified in this paragraph may use any technique whose technical characteristics have been documented publicly...." Whatever encryption methods you use —WEP, WPA, WPA2, or whatever—it *must* be publicly documented. Please note that this specifically means the encryption *algorithm, **not*** the encryption *key*. Making the key public is no security at all!

The third caveat is that you should probably refrain from attempting encrypted communications with other countries, since their FCC-equivalents may not permit it. At the very least, tread carefully here.

Finally, it would be good amateur practice to document the encryption key being used in your station logbook, and perhaps also a general characterization of the purposes for using encryption. It would also be good practice, particularly in a real emergency, to maintain copies of transmitted messages for possible future FCC inspection. Most e-mail programs do this automatically, unless you turn off the feature. It would be best to leave it on.

HSMM Leads the Direction

By the time you read this, the HSMM Working Group will have posted some new guidelines for the use of encryption on amateur frequencies. While this was still pending as I write this (mid-June), an update was expected by July. Have a look at the League's website for the latest news.

Again, my thanks to Paul Toth, NA4AR, for continuing the debate on encryption in the ham bands, and to all those I spoke with, especially those on the ARRL's HSMM WG, for the lively, spirited, and very intelligent discussion of this month's topic. The members of ARRL Board of Directors, even if you might not agree with everything they do, should certainly be thanked for their work to reach this point. This didn't happen in a vacuum, and it is only through the hard work of many that the amateur community can now celebrate the best possible outcome for this debate: It's been legal all along, so go out and have fun and/or provide the emergency communications services your community needs and that ham radio has traditionally been able to offer.

Finally, I thank everyone who takes the time to write to me with comments, suggestions, ideas for future columns and yes, even complaints. We're used to two-way communications, and this column isn't any different. See what it did this month?

Until next time . . .

73, Don, N2IRZ

BY JEFF REINHARDT,* AA6JR

"A Dollar Spent . . ."

There's an adage in ham radio that goes something like, "A dollar spent on an antenna is worth ten dollars spent on a radio." While that phrase seems to have been applied to conventional fixed installations, it doesn't always seem to hold when looking at mobile operations. Now don't get me wrong; I can't think of any mobile antenna that will replace a multi-element beam atop a 200-foot tower, but one advantage of mobiling is that you can take the antenna with you, and one of the places you can take it to is an elevated location.

If it's attached to a car, you could see it at Dayton, where this month's photos were taken. Magnet mounts are a good solution for those opposed to drilling a hole in the car body.

"I have a 2000-foot tower..."

Can height make a difference? You bet! Here on the West Coast, the summer months often see a big high-pressure system set up over the Pacific Ocean. One of its side effects is the presence of an inversion layer that traps warmer air below, which for decades has been a factor in the smog experienced in the Los Angeles area. However, it's not too difficult to take a drive up through the inversion layer, either along the coastal mountains or even to some of the higher peaks found inland. The trip can be rewarding.

CQ writer Gorden West, WB6NOA, is among the many who have done just that, and beside benefiting from cleaner air, hams such as Gordo have discovered the joy of having HF, VHF, and UHF signals "ducting" along the high-pressure ridge. How far do those signals go? It's not unusual to have 2-meter contacts between California and Hawaii, or 6-meter QSOs with Washington, Oregon and British Columbia. There have even been cases of repeater-to-repeater interference between California and Hawaii!

Thus, you may be envious of the fixed station that has a hundred-foot tower, but many mobile hams can easily take their portable antennas up several hundred or even a few thousand feet by just driving into hilly terrain, depending on where they *live*. A little elevation can make a big difference, and if you live on the Great Plains . . . well, there has to be a mound somewhere!

Consider the Choices

Another advantage mobile operators have is a wide choice of antennas. From relatively low-cost "stick" type antennas to elaborate "screwdriver" types, "bugcatchers," multiband tap or trap antennas, retracting motorized units, automatic tuners feeding whips, multi-element "spider"-style units, and yes, I've even seen an abbreviated 10-meter dipole mounted over a car roof, the choices of mobile antennas are many and seem to be growing all the time. If you haven't taken the time to really weigh the choices of mobile antennas, you'd be doing yourself a big favor by checking some of the ads found in *CQ* and then visiting the websites of some of the antenna manufacturers.

A Match Made in Heaven

One critical item to watch diligently in mobile antennas is the match, or SWR reading. While a nice home-station antenna usually has a substantial 2:1 SWR bandwidth range, mobile antennas are very narrow-banded and some are downright notchy. A

Tell me that's not tape. Really . . . that's not tape, is it? Yup, guess it is!

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Simple, neat, clean. It looks good and I hope it works as well!

Here's what happens when you cross a Ford Escort with a porcupine. (Photo taken by the author on I-70 just after the Dayton Hamvention®)

frequency change of just a few kilohertz can elevate your SWR to a level where the radio begins to reduce its output power in order to protect its finals. You then have to confine yourself to a narrow spread of operating frequencies, retune the antenna, or let a tuner (manual or automatic) help optimize the performance of your transceiver.

Low-Cost Performance Improvement

If your antenna is permanently installed on your vehicle, from time to time take a good look at it, including the connections to its feedline and, very importantly, to ground. Time has shown this to be the weakest link in many mobile installations, and it's always exposed to wind, moisture, and vibration. You may be amazed at how much signals improve with a little attention given to this critical area. Good transmission and reception seldom go away all at once. It often happens so gradually that you don't notice the effects of a deteriorating connection. To complicate the matter, you may lay the blame for poor operations on low sunspot activity, your transceiver, or other factors, when the real culprit is "father time" taking his toll on your antenna connections.

Seeing is Believing . . . Well, Maybe

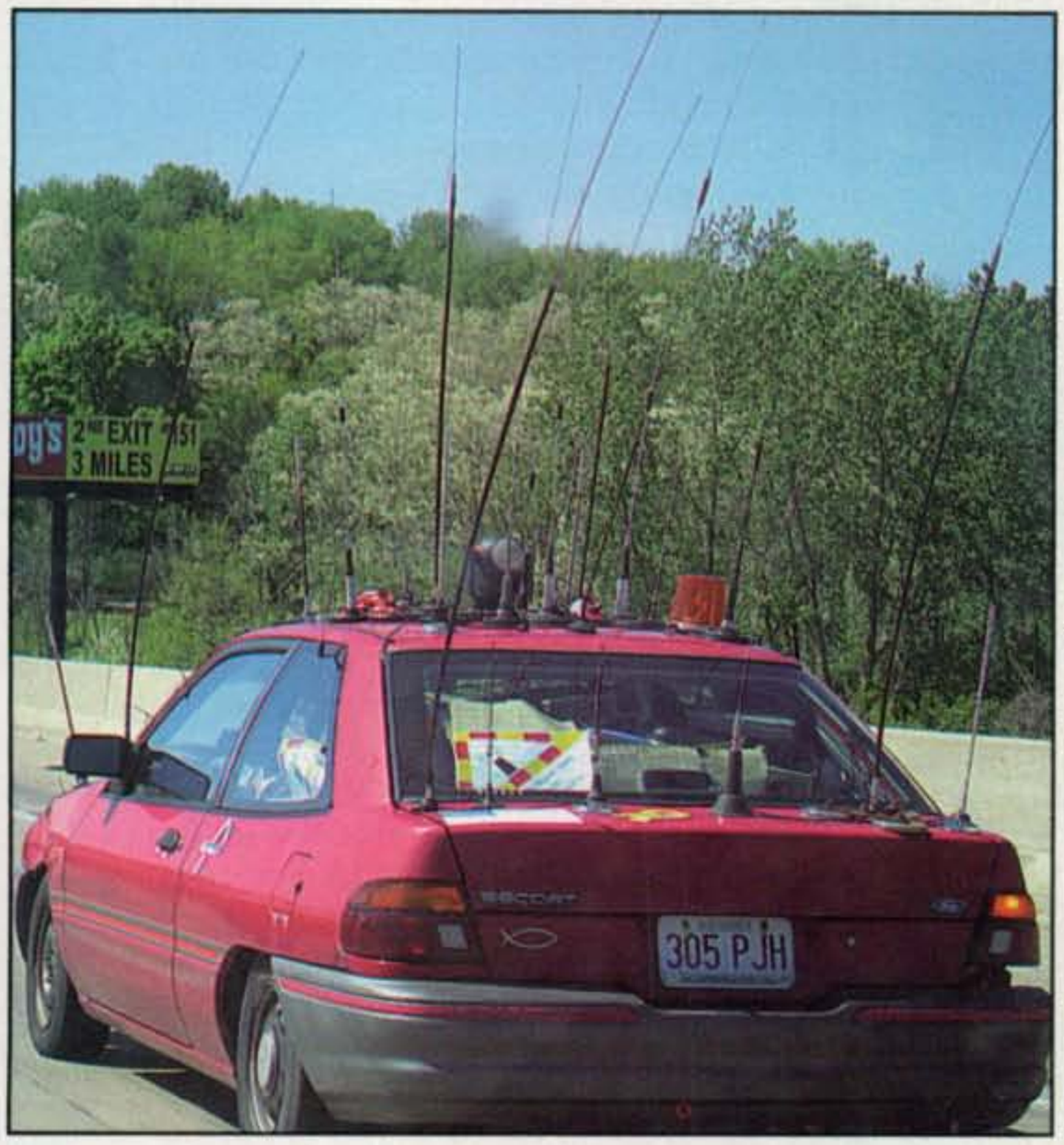
There are antennas . . . and there are antennas. With this month's column, I've included some snapshots captured at and near the Dayton Hamvention®. I believe there are nearly as many ways to mount antennas as there are hams. This year's collection provides us with some classics. Maybe I caught yours? The callsigns have been suppressed to protect the innocent—and maybe a few of the guilty!

Manufacturer Help

Once again I'll pass along the contact info for the U.S. auto manufacturers (see sidebar). As cars get more complex and

Impressive!

designs more efficient, mounting a radio and antenna can prove to be a real challenge. Do yourself a favor and check with the vehicle's manufacturer *before* breaking out the installation tools. Here's a place where an ounce of planning and prevention could make a huge difference not only in the



OK, it's your turn, readers. Send an e-mail with your suggested caption and I'll choose the best one for publication in our next "Mobiling" column. We'll give a one-year CQ subscription to the winner. The decision of the judge (AA6JR) is final, irrevocable, and subject to interminable second-guessing.

success of your radio project, but it could also help you avoid making some costly mistakes with your vehicle. At the ARRL, Ed Hare, W1RFI, has devoted considerable energy to helping mobile operators resolve issues that emerge when trying to mix radios and cars. The following URL can be very useful when trying to track down issues that pertain to many popular brands of vehicles: <http://www.arrl.org/tis/info/carproblems.html>.

Hit the Road

I hope the summer weather provides you with a backdrop for great mobile operations. Travel safely and enjoy!

73, Jeff, AA6JR

Vehicle Installation Information

Vehicle installation information from manufacturers can be found at: <www.arrl.org/ tis/info/rficar.html>.

Indidual manufactuer information:

Chrysler

Write to: DaimlerChrysler Technology Center, 800 Chrysler Drive East, Auburn Hills, MI 48326-2757

General Motors

Write to: Milford Proving Grounds EMC Facility, Department MR, Mail Code 483-340-111, General Motors Proving Ground, 3300 General Motors Road, Milford, MI 48380-3726

Ford

Ford suggests contacting its customer service hotline, 800-392-3673, or its customer website, <www.ownerconnection.com>.

world of ideas

BY DAVE INGRAM,* K4TWJ

HF Mobile and Lovin' It—Part II

Last month's views and notes on HF mobiling overfilled available space before all details on what's hot and happening could be squeezed in, so we continue with part two this month. After mailing part one to *CQ*, incidentally, I began wondering how many over-enthusiastic new mobileers might whittle half way through their auto's trunk or hatch lip before realizing it is not metal—and not ground. That's because an ever-increasing number of body sections on new autos are being made with "composite material" rather than metal, and full-metal underbody frames are also starting to disappear. A vehicle may seem made of metal when you tap on it or peek under it, but then you buy it and—surprise! Gotcha!

What's the importance of metal? Any quarter-wave vertical (or shorter than quarter-wave mobile antenna) must be complemented by a good electrical ground to operate effectively, and an automobile's metal body fills that requirement. Is there a good alternative here? Yes. Think elevated vertical or ground plane.

Time after time, simple four-radial ground planes have proven to work out as well as or better than ground-mounted verticals. Just apply that principle to your own vehicle to produce a rolling ground plane. It works! Using copper foil and double-sided tape to hold it, several years ago I devised a large and quite effective ground plane under the rear section of my Chevy Camaro. Since then I literally have worked the world from that car—and the SWR on any band is almost 1:1. A sketch of my quickly fabricated ground plane is shown in fig. 1.

The rear bumper section is comprised of three 6-foot strips of 3-inch wide copper foil. One 6-foot to rear bumper section may have been sufficient, but I wanted to install a maximum amount of metal directly below the antenna. One strip is fitted inside the rubber bumper, one is stretched across the hard bumper's bottom area. and one is stretched out width-wise under the rear body. All three connect together and to 5-foot strips that fit inside rear fender sections, their fenderwell lips, and associated quarter panels. A 1-foot section connects to the antenna's underbody mount. If a trunk-lip mount had been used, another strip would have been added for connecting it to the below-body maze, and yes, the copper braid removed from old RG-8 coax can be used in lieu of copper foil. You can even loosen some rear-bumper screws and retighten them on the coax to hold it in place. Just remember to include a jumper from your antenna mount to the maze. It is not hard to keep the force of good signals on your side; it just takes a little radio finesse!

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PSK-31 Mobile

Have you ever considered trying PSK-31 while mobile? Ed Cobb, K4YFR, thought it was an interesting challenge, so he gave it a go and had a ball. That makes sense. Running a digital mode with a computer in the car is quite an attraction. It generates as much curiosity and excitement as getting on the air with the first production run of a new model transceiver—and that is always a "biggie"!

The idea of going PSK mobile evolved when Ed and XYL Michelle began planning a 1000-mile, one-weekend road trip from Virginia Beach, Virginia, across the long Chesapeake Bay bridge and northeast Maryland, and into the Blue Ridge Mountains. The sojourn equated to 80 percent traveling and 20 percent stopped, so it was an ideal opportunity to get in some heavy-duty HF mobiling.

A view of Ed's setup is shown in photo A and a sketch of its interconnections are included in fig. 2. Laptops are notorious for their susceptibility to RF energy, so Ed took every measure and precaution imaginable to avoid problems—and it worked out admirably.

First, he completely isolated the laptop by powering it from a separate battery and used an optically coupled Electronic Devices, Inc. interface between it and his Kenwood TS-50. The antenna (a Hamstick for 20 meters) was mounted on the Honda van's roof, so it helped shield the setup from RF while pumping out a good signal. The TS-50 was powered by its own 100-amp/hour battery, directly grounded to the van's frame by a seat bolt, decoupled from the antenna by a Radio Works line isolator, and operated at the 10-watt level. The resultant setup was so squeaky clean that while XYL Michelle drove and listened to music on the

Photo A– Ed's setup ready for operating PSK-31 mobile with his Kenwood TS-50 transceiver, Compaq laptop computer, and Electronic Devices, Inc. interface. Numerous U.S. and DX contacts were made while traveling freeways and byways. (Photo via K4YFR)

Photo B– Check out this new multiband mobile and portable antenna from Super Antennas, friends. It covers 40 through 10 meters (plus 80/75 and 60 meters with optional coil on right) and is supplied with universal clamp-on mount, adjustable coil, retractable whip, radial wire for non metal supports, and double-base masts with threaded coupler. The antenna has a clean, brushed-aluminum look, works great, and it all fits in the 14-inch-long mailing box.

van's stereo, Ed worked Uruguay, Puerto Rico, Costa Rico, and a number of stations across the U.S.

Ed says it took a while to get everything connected and positioned for comfortable use (on the van's rear seat), but it was well worth the effort. Our compliments to K4YFR on his unique endeavor!

New Super Antennas

One of the fastest growing names in HF mobiling antennas today is Super Antennas, and thanks to the creative mind of owner Vern Wright, W6MMA, some clever new items recently have been added to the line.

First is an economical multiband mobile (and portable!) antenna that can be assembled to stand 4.5, 6.0, or 7.5 feet tall, as desired, and quickly separated to fit into a 14- inch long box for storing or carrying (photos B and C). The antenna's top section is a telescoping whip that extends to 50 inches or retracts to 10 inches. A standard 3/8-

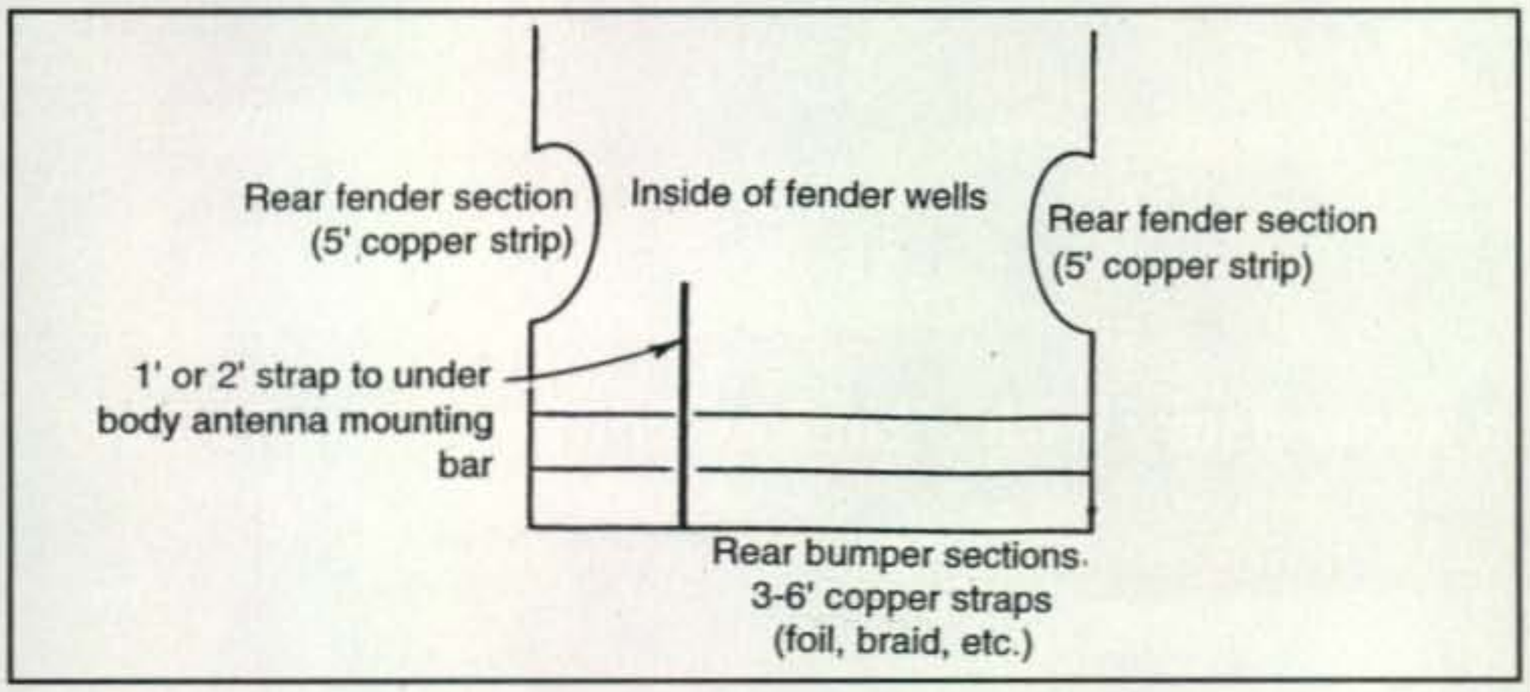

Fig. 1– Outline of a high-performance underbody ground plane for big-time mobiling in a composite (non-metal) body or "partial metal frame" vehicle. Strips may be held in place with heavy-duty double-sided tape or secured under existing body bolts, as desired. Details in text.

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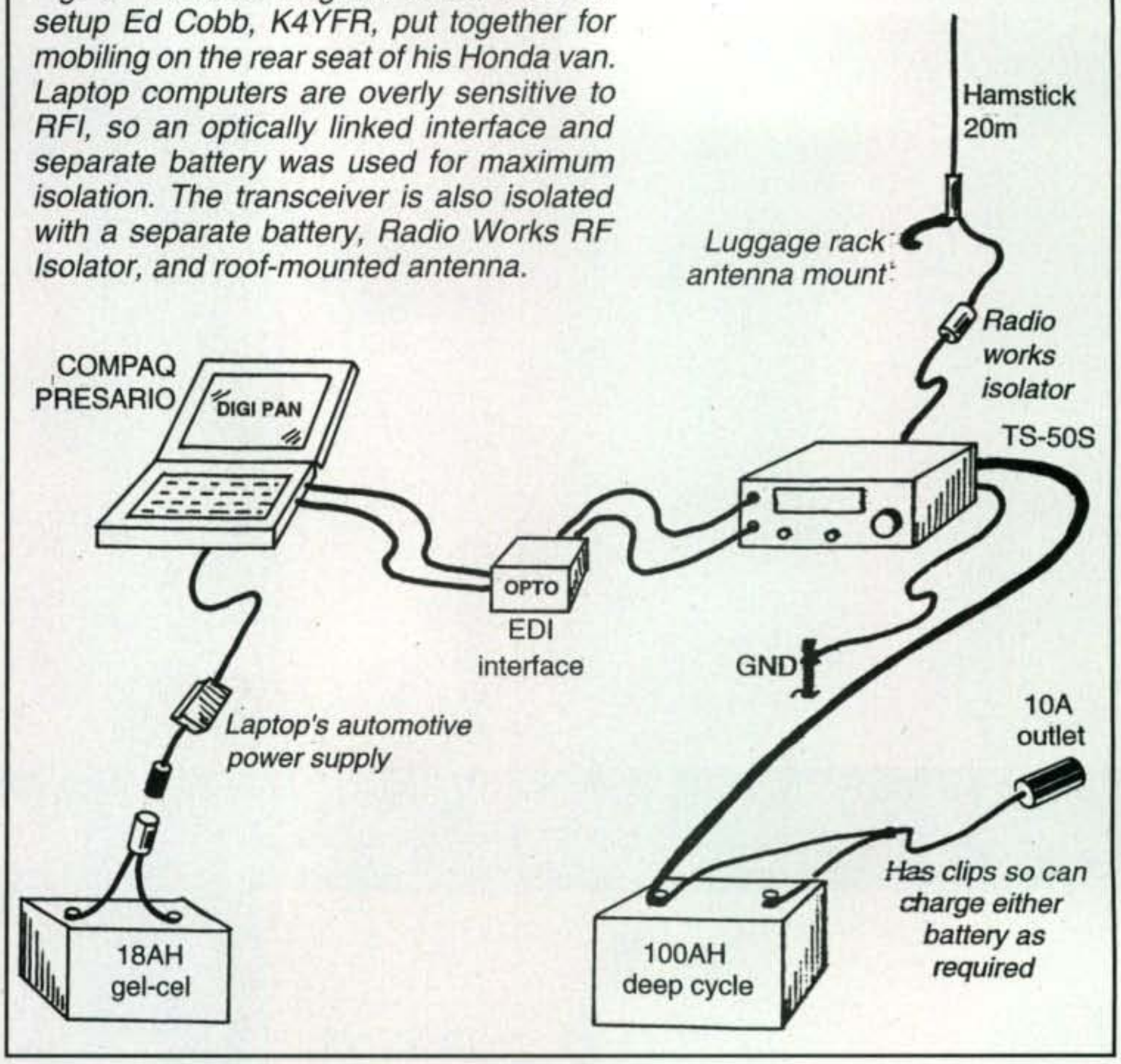
Fig. 2– Pictorial diagram of the PSK-31 setup Ed Cobb, K4YFR, put together for mobiling on the rear seat of his Honda van. Laptop computers are overly sensitive to RFI, so an optically linked interface and separate battery was used for maximum isolation. The transceiver is also isolated with a separate battery, Radio Works RF Isolator, and roof-mounted antenna.



24 thread ferrule at its base screws into the coil assembly, which you tune/adjust manually to cover any frequency between 40 and 10 meters (by unlocking its side nut and sliding its aluminum tube up/down the coil). An optional (fixed) coil can be added in series with the adjustable coil for 80-meter and/or 60-meter operation.

The antenna's lower section consists of two 12-inch tall/long aluminum masts also with 3/8-24 thread ends and a mating coupler. An owner can thus use both masts to make a tall antenna, one mast for reduced height, or simply attach the coil directly to the mount with the short piece of screw stock for base loading and easy garaging.

There is also an unrealized surprise in this antenna that warrants mention. Take a second look at the brushed-aluminum cover you slide up/down over the coil for frequency tuning. If you assemble the antenna with that cover upward (it can go either way), the cover can act like a capacity hat and increase overall efficiency by reducing the amount of required inductance. Cool!

Need a quick auto-frame mount idea for this new mobile/portable antenna? Look under your vehicle and notice the frame channels or ship tie-down arms with large holes waiting for you to bolt a long and flat antenna mounting plate to them. Do so, and then "C" clamp Super Antennas included "swivel to any angle bracket" with 3/8-24 thread-to SO-239 adapter to it. Screw the Super Antenna into the adapter, roughly tune it for maximum received signal strength, fine-tune it using low power and your rig's SWR metering, and then go mobiling in fine style.

Would you like to use the antenna at home or when vacationing, but your apartment's balcony rail (or other off-the-wall antenna mount) is not metal? No problem: Use the Super Antennas included multi-conductor radial wire to make a ground plane, and it will work out even better than a regular vertical. Remember that fact, too, if you discover your auto has a non-metallic composite material body. Tape, bolt, twist, and intertwine the radial wire under the vehicle's body to produce a rolling ground plane as I discussed earlier in this column.

Another new Super Antenna that is terrific for fixed-position mobiling is the three-element multiband mini beam with drive-on mast mount as shown in photos D and E. Many readers surely remember Super Antennas' two-element "beam in a bag" you can carry in an auto's trunk or "shoulder strap style"

Photo C– Here is the new Super Antenna standing tall on the trunk of XYL WB4OEE's Chevy Cavalier. Look closely and you can see the two base masts are coupled together to raise the coil above the roofline, and the sliding aluminum sleeve is positioned above the coil so it acts as a capacity hat. Combined, both measures ensure radiation of an impressive mobile signal.

Photo D– This new three-element Super Antennas mini beam is a traveler's delight. It easily fits in an auto's trunk or on a rear seat; can be configured for operation on 20, 17, 15, 12, 10, or 6 meters; and assembly time is only 10 or 15 minutes. Being heard from the boonies is a cinch with this antenna! (Photo via W6MMA)

and quickly field configure/adjust for operation on any band between 6 and 20 meters. This new antenna works the same way, but sports a third element for greater gain and directivity. It's a romper!

The drive-on mount is also wild. You just sit it on flat ground, secure it with one of the car's wheels, pull up and guy-rope the beam and mast in place, and you're set for fun. Does it sound good for those weekend jaunts to the mountains or visits to the in-laws? Yes, indeed, and I am also thinking it may be a way around antenna CC&Rs in apartments—provided you move it and the car once or twice a month. More details on these new goodies are available at <www.superantennas.com>, or you can contact Vern, W6MMA, at 212 Mariner Circle, Lincoln, CA 95648; e-mail <w6mma@superantennas.com>. Check them out!

Closing Notes

Have you ever wanted to try something off-the-wall and a little crazy just for the fun of it? No, I am not talking about a wild weekend at the beach. I am talking about running 160-meter mobile, QRP and CW to boot. When? Not during summer, as the band is too noisy, but during winter amidst the CQ 160 Meter Contest (the last full weekend of January) when outdoors is biting cold and dark as soot. What a blast!

I gave it a go this past winter, running 5 watts and a whip with a gigantic coil (IR losses galore—whew!), and filled a log page with good (but not DX) contacts before scurrying back indoors to warm up. Looking back over scratch sheets, I see roughly seven out of every ten calls resulted in a contact. That's enough inspiration for me.

I am planning to assemble a really tall antenna for working 160 meters CW mobile this coming winter. Like to join the pursuit? Drop me a brief e-mail with your thoughts. Let's share them with the multitudes and get everyone cold and shivering . . . err—enthused!

73, Dave, K4TWJ

Photo E– The new drive-on mast mount makes getting the three-element Super Antennas mini beam up in the air and working quick and easy. Just roll a vehicle's wheel on it, pull up the antenna, and secure it with guy ropes.

beginner's corner

BY WAYNE YOSHIDA,* KH6WZ

Swap Meets— Great Deals and Great Fun

One of the greatest places for good deals on ham gear is the swap meet. Depending on what part of the country (or even what country) you live in, these ham radio buying, selling, and browsing events are held indoors and out, and usually at regular intervals. Although these events are meant for buying and selling ham radio goodies, other "sub-events" usually occur at the same time, such as breakfast or lunch get-togethers, ham license tests, and club membership recruiting.

In almost all cases, when hams get together it means not just swapping stories of their latest construction project, station upgrade, or exotic-location contact. It also means that someone in the group has something for sale or trade.

Lists of buying and selling events are posted in various places such as in ham publications (including *CQ*) and on the internet, and are also broadcast via word-of-mouth. Plug in "ham radio swap meets" in the Google search engine, and you will be amazed at what you can find. I just did this and saw that there are 489,000 entries for this key phrase. Of course, you need to narrow down the search to your location to get more meaningful results. Also check with fellow club members to find out when and where the next event will be and mark your calendar so you will not miss it.

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Getting a Great Deal Takes Planning

Let's start with the "first order of business" at a swap meet as a visitor or buyer. You should think about what you want to accomplish on your swap-meet mission. Do you want to buy a used radio to set up your first station? If so, will it be an HF (or "low bands") rig for international communications (see photo 1), or a VHF and/or UHF FM rig for local comms from the car? Maybe you are looking for a cheap rig to install in the garage or workshop so you can eavesdrop on the local repeater chatter as you work.

Do you want to get an accessory such as a power meter or station clock? Are you looking for parts to build that "Weekender" project from last month's column in *CQ* by Phil Salas, AD5X? Maybe you

Photo 2– You never know what you will find at a ham radio swap meet. I am not sure what these glass things are, but they sure look interesting!

Photo 1– Here is some very nice-looking vintage ham gear for sale. On the left is a classic Collins receiver from the 1960s and a Heathkit transmitter from the same era. Both units use vacuum tubes. The small unit on top of the Collins receiver is a station console, a unit used to "interface" a microphone to the transmitter, and includes an SWR and RF power meter.

Photo 3– An amazing find. This ancient radio even works!

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SS-12	10	12	1⅝ x 6 x 9	3.4
SS-18	15	18	1⅝ x 6 x 9	3.6
SS-25	20	25	2⅞ x 7 x 9⅝	4.2
SS-30	25	30	3¼ x 7 x 9⅝	5.0

MODEL SS-25M

DESKTOP SWITCHING POWER SUPPLIES WITH VOLT AND AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SS-25M*	20	25	2⅞ x 7 x 9⅝	4.2
SS-30M*	25	30	3¼ x 7 x 9⅝	5.0

MODEL SRM-30

RACKMOUNT SWITCHING POWER SUPPLIES

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25	20	25	3½ x 19 x 9⅝	6.5
SRM-30	25	30	3½ x 19 x 9⅝	7.0

WITH SEPARATE VOLT & AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25M	20	25	3½ x 19 x 9⅝	6.5
SRM-30M	25	30	3½ x 19 x 9⅝	7.0

MODEL SRM-30M-2

2 ea SWITCHING POWER SUPPLIES ON ONE RACK PANEL

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25-2	20	25	3½ x 19 x 9⅝	10.5
SRM-30-2	25	30	3½ x 19 x 9⅝	11.0

WITH SEPARATE VOLT & AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25M-2	20	25	3½ x 19 x 9⅝	10.5
SRM-30M-2	25	30	3½ x 19 x 9⅝	11.0

MODEL SS-12SM/GTX

MODEL SS-10EFJ-98

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GE MARC SERIES
GE MONOGRAM SERIES & MAXON SM-4000 SERIES
ICOM IC-F11020 & IC-F2020
KENWOOD TK760, 762, 840, 860, 940, 941
KENWOOD TK760H, 762H
MOTOROLA LOW POWER SM50, SM120, & GTX
MOTOROLA HIGH POWER SM50, SM120, & GTX
MOTOROLA RADIUS & GM 300
MOTOROLA RADIUS & GM 300
MOTOROLA RADIUS & GM 300
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SS-10MG, SS-12MG
SS-101F, SS-121F
SS-10TK
SS-12TK OR SS-18TK
SS-10SM/GTX
SS-10SM/GTX, SS-12SM/GTX, SS-18SM/GTX
SS-10RA
SS-12RA
SS-18RA
SS-10SMU, SS-12SMU, SS-18SMU
SS-10V, SS-12V, SS-18V

*ICS – Intermittent Communication Service

Photo 4– It always pays to plan ahead and arrive as early as you can at swap events, since the offerings are usually one-of-a-kind. In this photo, the vendors are lining up to get into the selling area and no buyers are in sight yet.

have a vintage ham receiver that has those electronic glass objects called "tubes" and your local electronics parts emporium does not carry them. You can find these things and a whole lot more at the ham radio swap meet. You can even find some weird-looking items to decorate your ham shack. See photo 2 for something that made me go "hmmm" when I saw it and photo 3 for a neat-looking vintage receiver that actually works!

You may want to make up a shopping list before you venture out to the swap event. Just like going grocery shopping, this will help prevent "unwanted" purchases. One of the things I always try to do is limit the amount of cash in my wallet to avoid over-spending. By the same token, I generally leave my checkbook at home, too, although in just about all cases, these events are strictly "cash and carry."

After you have made your list, and if you are especially serious about buying something, make sure you arrive as early as you can. One secret I use is to get to the swap-meet location before the official opening time in order to see what's for sale (photo 4). In order to get there when it is "set-up time," you usually have to park in a more remote parking lot for the event. This makes me walk a bit farther than normal, but it provides me with some exercise and helps me find the best deals, even before the event actually opens.

If you are ready to buy something at the swap meet, it is a good idea to take a ham friend (or several) with you for several reasons: First, you will have someone to offer a second opinion on whether or not to buy a particular item. Second, by having others with you on your buying excursion, you will be able to "cover more ground" at the same time, making your search for a particular item more efficient. If everyone carries an HT (handie-talkie), you all can stay in touch with one another and report on any especially good deals. You should limit your conversations to

Photos 5 and 6– A cart of some kind is a blessing when you go swap-shopping. This poor fellow found a great deal on some cables, but now must carry them to his car in the remote parking lot.

Photo 7– Here is a great example of how to help buyers quickly find what they want to buy. Everything is sorted and stored in individual bins, and the prices are clearly marked.

a simplex channel, rather than tying up the local repeater. Besides, if someone in your group discovers a major find and mentions it on the repeater, you may attract too much attention, and others may have the chance to grab your deal!

Another bonus of shopping in a group is the financial advantage: You might be able to get an interest-free, short-term loan in case your cash allowance is too small. Also, if you buy something large and heavy, you will have someone to help you haul the object to the car. Photos 5 and 6 show a very smart thing to do while shopping: Bring some kind of cart to haul things in. You will save your arms and back when you do this.

The phrase "let the buyer beware" is the best advice when swap-shopping or buying any used item. Most of the time, these buying and selling negotiations are between individual private parties and there are no guarantees. The items are being sold for various reasons, from owners being "just plain tired" of the particular item, or the item being broken and beyond economical repair, to a perfectly good item that is simply no longer being used. Thud, like a lot of things in life, you get what you pay for, and if the deal looks too good to be true, it probably is. This is the main reason why it is a good idea to bring along an experienced friend, since he or she may be able to offer sound advice and prevent any grief.

One of the issues at swap meets is pricing of items. Depending on the seller, prices of goods may be fixed or negotiable. Photo 7 shows an example of a seller doing his best to help buyers by clearly sorting and marking what's what and how much each item costs.

I have noticed that there are "unwritten" and "regional" rules regarding the pricing of goods at swap meets. In some cases, the sellers encourage haggling over the price of an object, and yet there are many places where "the price is the price." Often the seller really does not want to part with the object on display and for sale, even if it has a little price sticker or sign on it. This is an odd thing, but I can understand that sometimes an old, favorite piece of ham gear has some sentimental value. In any and all cases, you as the buyer must talk to the seller and ask questions about an item you think you might want to purchase. Depending on the seller's personality, you may sometimes get a great story about the history of that special doo-dad on display.

This brings us to another great reason to go to a swap meet: the social aspect of getting good friends and radios and electronic goodies together. Shopping in a group is a lot of fun, since everyone will be able to celebrate and discuss their finds of the day. What could be a better way for a ham to spend a warm summer day?

73, Wayne, KH6WZ

BY PHIL SALAS,* AD5X

Boatanchor T/R Switching

This month I'll address an input from Tom, K8VZD: "How about an electronic T/R switch for those of us with vintage gear? My particular rig (HT-37) runs about 100 watts. Any thoughts on something simple and, of course, reasonably economical?"

Well Tom, there certainly appears to be an upsurge in folks who like to rebuild and operate vintage equipment, and this is recognized by columns in *CQ* (Radio Classics), *QST* (Old Radio), and *WorldRadio* (Old Time Radio). I personally have a vintage ham station consisting of a Johnson Ranger transmitter and Drake 2B receiver. Anyway, you can easily and inexpensively build a T/R switch that is controlled from the transmit switch control on your transmitter. Eventually I plan on building a QSK (break-in) switch, although a QSK switch can be somewhat complex and expensive. However, I have some interesting ideas for a stand-alone QSK switch for separate transmitter/receivers. You just need to give me a little time to complete this project.

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e-mail: <ad5x@arrl.net>

Photo A– This inexpensive T/R switch solves antenna-switching and receiver-muting problems for your vintage ham radio station.

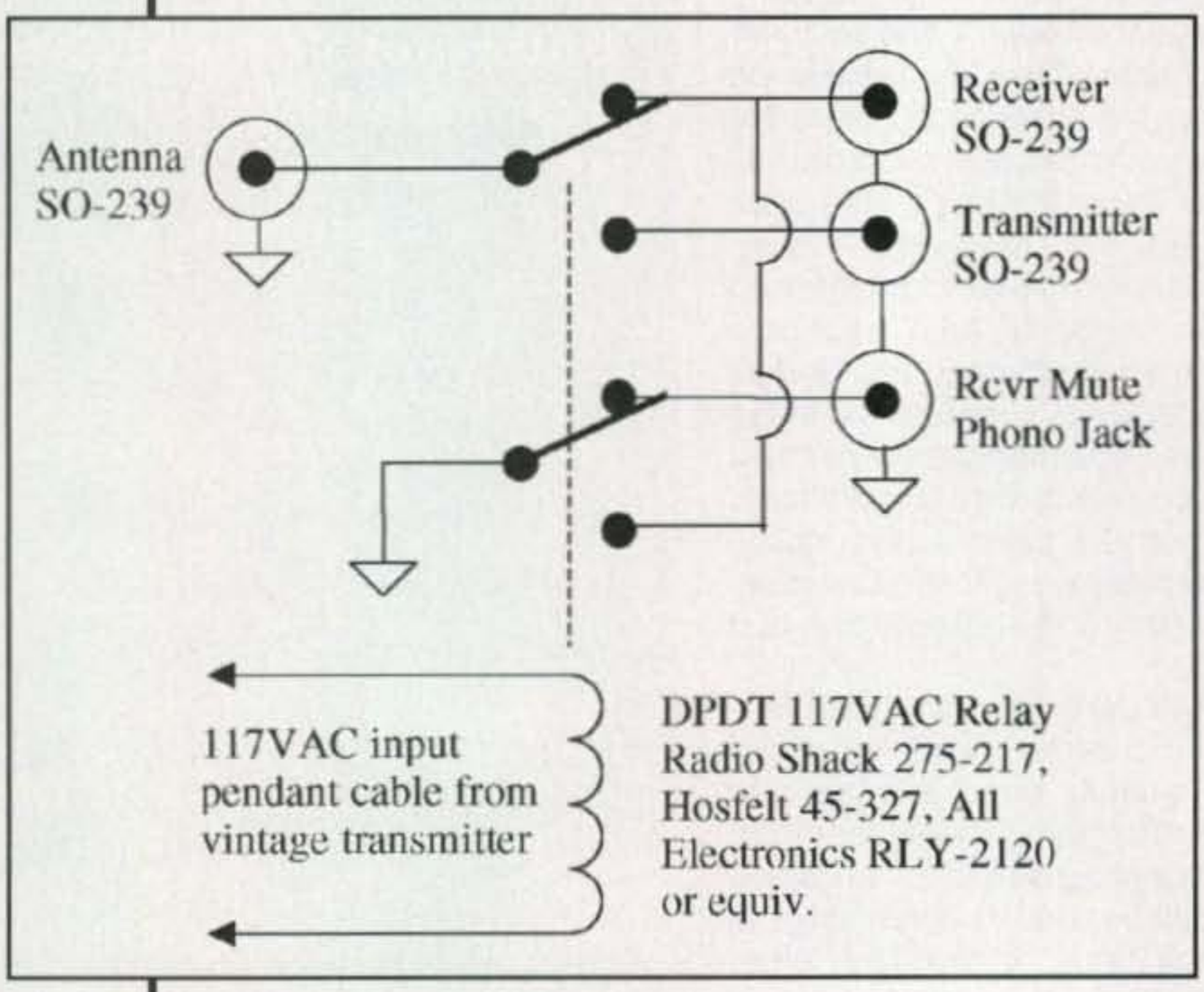

Fig. 1– Relay-based T/R switch for vintage ham equipment.

Back to the simple T/R switch: Most vintage transmitters have a 117-VAC relay driver output that is enabled on transmit. At frequencies below 30 MHz normal relays can be used for antenna switching, since lead lengths and their associated inductances are very forgiving at HF. The important thing becomes the current rating of the relay contacts and the required relay coil voltage. Also, at the 100-watt level you only need relay contacts capable of about two amps.

Power = I^2R, so rearranging this equation gives you the following:

I_{Relay} = (Power/Resistance)$^{1}/_{2}$ =
(100 watts/50 ohms)$^{1}/_{2}$ = 1.414 amps

Of course, normal relays are rated for 60 Hz current, not HF current. However, I've found that typical power relays work just fine for RF frequencies up to at least 50 MHz. I've even built a remote A/B antenna switch using a power relay that works fine at 2 meters after taking some care with lead lengths and routing. I do like plenty of margin, so I'd recommend using relays capable of higher contact current ratings. Relays I've used at the 200-watt level at HF include the following:

Radio Shack 275-217 DPDT w/10-amp contact ratings at $7.99 each.

Hosfelt 45-327 DPDT w/10-amp contact ratings at $1.99 each.

All Electronics RLY-2120 DPDT w/10-amp contact ratings at $2.75 each.

All Electronics 4PRLY-120L 4PDT w/5-amp contact ratings at $4.00 each.

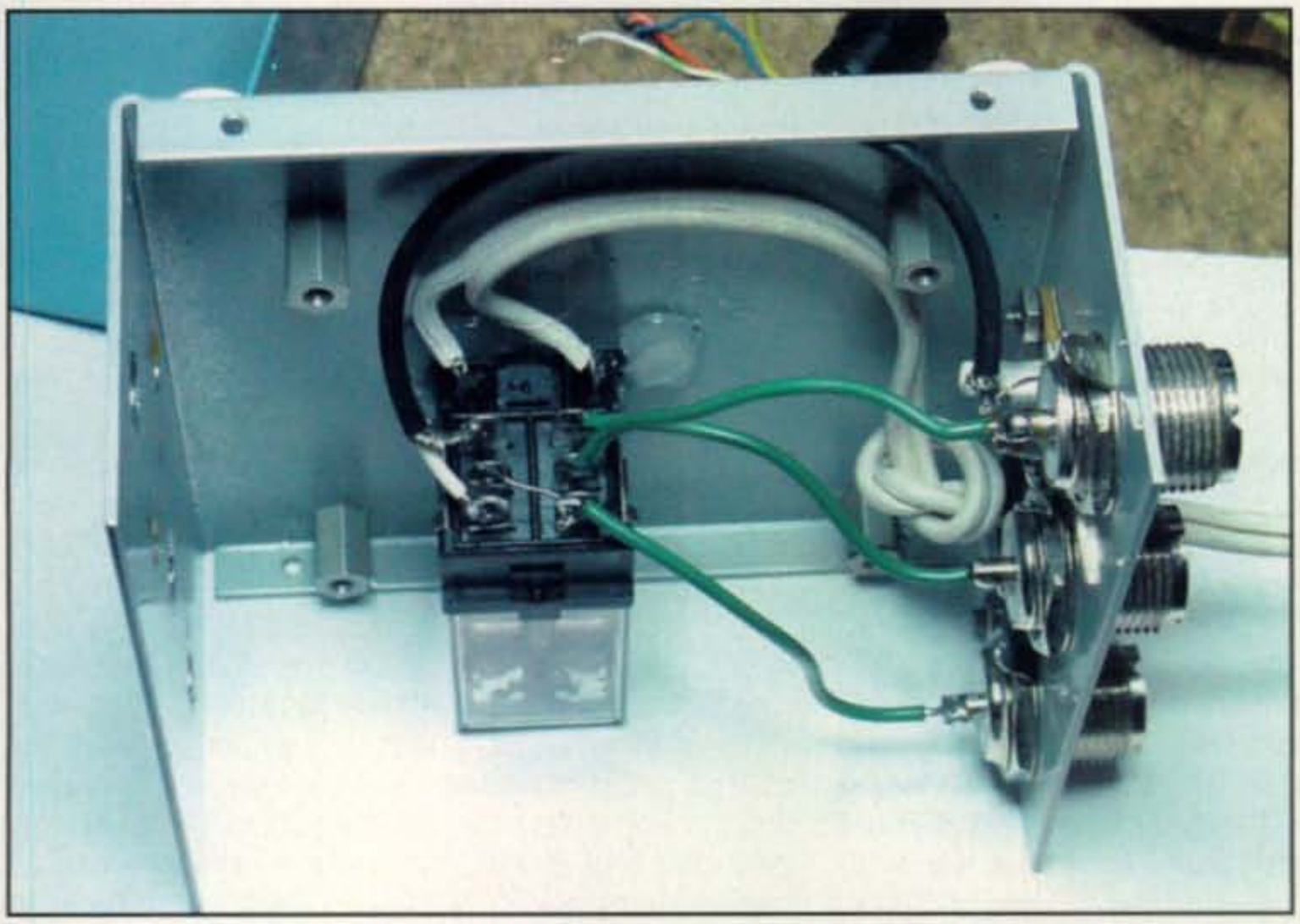

Photo B– The "innards" of the T/R switch. The relay is attached to the box with epoxy.

For QRP radios, miniature relays with 0.5-amp contacts work just fine.

Fig. 1 is the schematic of my T/R switch. I used SO-239 connectors for the RF interfaces, and an RCA phono jack for the "mute" interface. Everything can be built into any old aluminum box you can find. You can mount the relay to the aluminum box using hot-glue or epoxy. Photo A show the outside connector interfaces, and photo B shows a view of the internal wiring of the final T/R switch.

Incidentally, an inexpensive aluminum box you can use is one of those printer, telephone, or RS232 switch boxes that are so inexpensive in many of the surplus catalogs. A good example is the All Electronics FNS-2 A/B Phone Switch Box, which only costs $4. Its dimensions are 3.5" × 5.8" × 2.1". This is a perfect enclosure for the antenna switch. You can probably buy everything (box/ relay/connectors) for about $15.

Notice that the DPDT relay does several things:

1. It switches the antenna between receiver and transmitter.

2. It provides the necessary "mute" control to the receiver ("ground" for receive, "open" for mute).

3. It grounds the receiver antenna input when transmitting.

I only use the "mute" function when operating phone with my "boatanchors." I leave the receiver un-muted for CW, since I want to monitor my signal directly. The combination of fast AGC and a shorted receive antenna input during transmit works very well.

That's it for another month. You can e-mail your thoughts, questions, and ideas to me at <ad5x@ arrl.net>.

73, Phil, AD5X

qrp

BY DAVE INGRAM,* K4TWJ

Everything is Coming Up QRP!

The headline for this month's column may sound like a cliché, but it is more factual than many folks realize. Only a couple of days ago, for example, I answered a CQ on 20 meters and discovered it was Ed, WA1FVJ, running 400 mw with a home-built Rock Mite transceiver. Ed told us he had worked over 20 states plus Finland and St. Pierre Island with the palm-size gem, and he was having as much fun (or more) than when he ran a 50- or 100-watt rig. Next I worked W1RAN running a little MFJ Cub at 1 watt, and he, too, was happy with his success. That's right, friends—1 watt, and I did not realize he was QRP until he told me during the QSO (the AGC in modern rigs is an excellent power equalizer).

A couple of days later, and while running 4 watts with my trusty Elecraft KX-1 and Hy-Gain AV-640 vertical, I worked TA2ZF on 20 meters and 3B8MM on 30 meters. I was elated until I checked the mail-bag and found Russ, N9IV, did even better. Using a KX-1 with a 95-foot long wire, he worked 3B8CF plus EM1HO—the expedition to the Antarctica. Goodness gracious, but running high power (a rig's full 100 watts) seems like overkill!

That's enough "operating notes." Now let's check out the "homebrew" and "dink" scene!

One-Dollar Radio!

Our low-power colleagues in Great Britain have uncovered a unique "mod project" that seems too good to be true: a palm-size item they nicknamed the "Direct Conversion Pound Shop Radio." It was discovered and perfected by Peter Morris, G1IFN. Information on it appeared in the winter 2005 issue (No. 125) of the G-QRP Club's magazine *Sprat* (www.gqrp.com), and conversion details are also available on the website of GØUPL (www.hanssummers.com). The "Pound Shop" is Britain's counterpart to a "Dollar Store" in the U.S. (British pounds, U.S. dollars), and yes, this little FM auto-scan radio is actually available in the UK for one pound. A pair of earbuds is even included in the price. What a deal!

You can see and direct-order this radio at <www.poundshop.co.uk>. Click on "index," and then enter "radio" in the search box. Use a global charge card such as Mastercard when ordering, and the currency conversion (typically 1.6 dollars = 1 pound) plus postage charges (3 or 4 dollars) can be included in your purchase.

As an alternative, you may find similar versions of this radio in variety stores, gas/convenience stores, and drug stores around the U.S. (probably priced at 5 or 6 dollars). There is only one caveat (well, maybe two): Be sure to get one of the really low-cost (cheap!) jobs with a single Phillips TDA 7088 IC (or equivalent, such as the TDA 7021 or TDA 7000). Second, be prepared to do some circuit-board tracing and analyzing in converting it to a ham-band receiver. In other words, some improvising to our upcoming mod description may be necessary (think of it as a good guideline for a new "dink" project).

The Phillips TDA 7088 is an all-in-one IC that, in conjunction with a single onboard transistor for audio amplification, produces a stand-alone FM radio. The only sections of the IC used here, however, are its VXO (which is tunable from 1.5 to 110 MHz), mixer, and IF amplifier (its bandwidth is set by an external RC network). The mod involves resetting the VXO feeding one of the mixer's inputs to approximately 7 MHz and directing 40-meter signals from a resonant antenna into the mixer's other

*3994 Long Leaf Drive, Gardendale, AL 35071
e-mail: <k4twj@cq-amateur-radio.com>

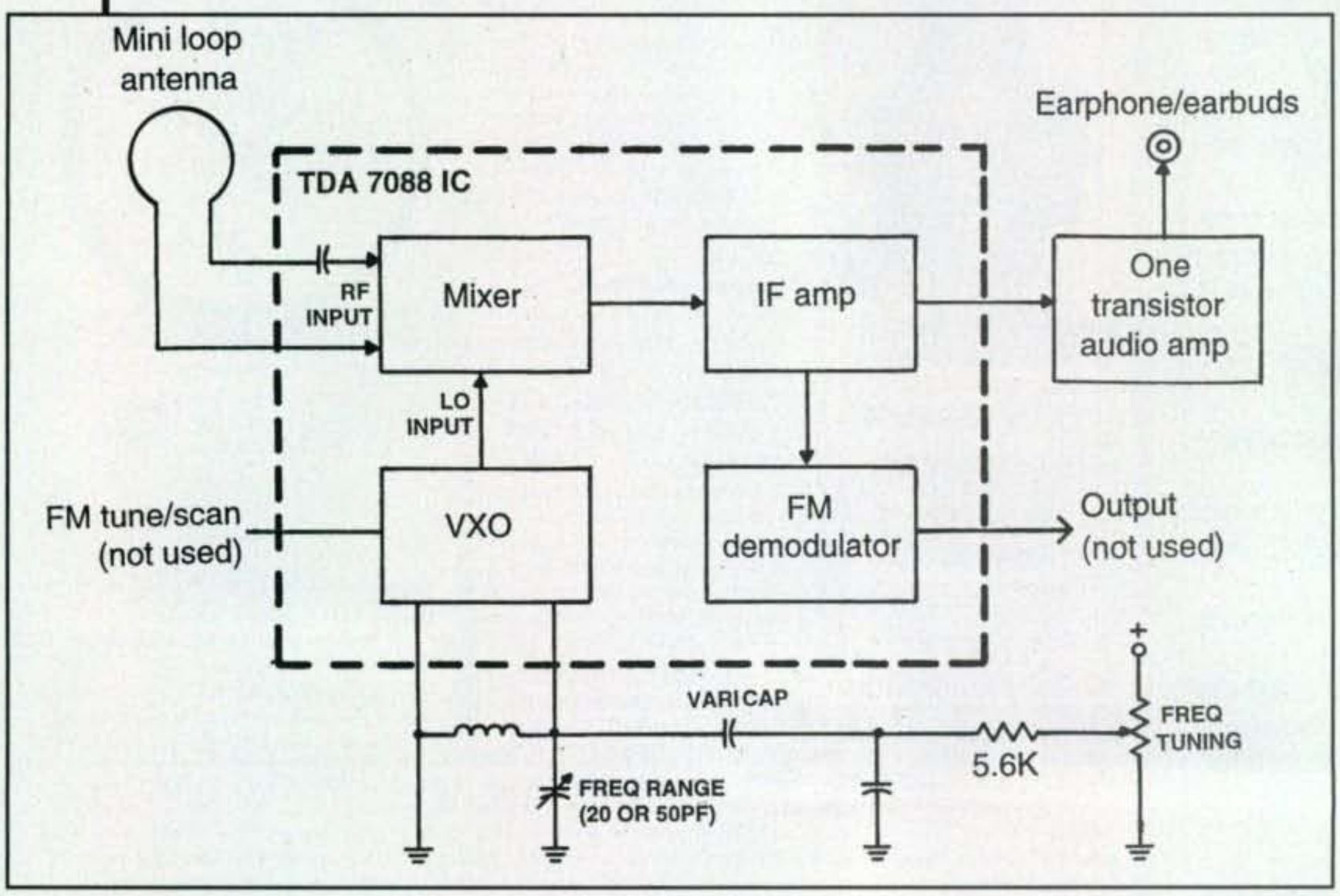

Fig. 1– Conceptual outline of how the components external to TDA 7088 IC in the Pound Shop radio are changed to make it a "volume control and varicap tuned receiver" for 40 meters.

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input. You then "re-RC" the IF following the mixer to produce a 3-kHz bandwidth and change one or two capacitors in the transistor audio amplifier (fig. 1 may help here).

Once you are generally familiar with the Phillips TDA 7088 (or equivalent IC), changing its external components for covering different frequencies is another appealing possibility. The VXO is not crystal-controlled, however, so some drift can be expected. That's also why conversion for 15 or 10 meters is not mentioned here. A general outline of the G1INF conversion follows.

First, the VXO is modified to tune 40 meters. Unsoldered R1 (5k6 ohm) from pin 16 of the IC. Remove any light or scan switches. Remove C5 (marked 473). Connect IC pin 16 to pin 14. Remove molded oscillator coil L1. Replace it with a 6.8-µH inductor and a 20-pFd or 50-pFd trimmer for 40-meter reception. Mount the trimmer in the hole used for the light switch. Cut the PC board trace between the hot side of R2 (22k) and potentiometer CW. Remove "C6" link. Connect the previously unsoldered end of R1 to pot W. Connect pot CW to +V (3-volt battery). The radio's volume control now becomes the varicap's tuning control. Replace C13 (marked 103) with 15 pFd (for 100-kHz tuning span with the varicap).

Next modify the mixer's input to receive 40 meters. Remove C1 (82 pFd). Connect IC pin 11 to the antenna via a 33-pFd capacitor. Connect the other antenna wire to IC pin 12. Then modify the IF and AF sections. Remove C8 (332). Replace C10 (181) with a 562 capacitor. Replace C9 (332) with a 104 capacitor. Connect IC pin 15 to transistor base through a 104 capacitor. Connect a 22k-ohm resistor from the base to the collector (or earphone) of the transistor. Connect a .1 mFd capacitor between IC pins 8 and 9. Bypass IC pin 3 to ground with a 220-mFd capacitor. As a helpful guide here, a diagram

On the Cover

Steve Flood, KK7UV, of Missoula, Montana, has a blend of current and vintage gear in his shack. Steve's main rig is a Kenwood TS-870 transceiver, but he also has—and regularly uses—a Johnson Viking Valiant AM transmitter and National NC-183 receiver. Outside, he has a 270-foot dipole that he uses on all bands from 160–10 meters, plus a few more wire antennas specifically for his favorite band, 160 meters. The main "top band" transmitting antenna is a T-loaded wire vertical, a 75-foot vertical wire topped by a 70-foot horizontal top-hat, all built over a field of 60 radials on the ground. Steve's receive antennas are K9AY loops.

Steve's path to ham radio was a long one, starting in childhood as he listened on his shortwave receiver to hams on AM. But his interest dropped off after high school as he "managed to intimidate myself" into believing that the test was too hard. After college, though, Steve says he met a ham with whom he worked for a year and he "asked lots of questions, put it off some more and then decided in 1999 it was time to do it." He did, and passed.

Steve got interested in 160 meters by "the challenge," he told *CQ*, explaining that "it takes a little extra effort to work DX on it." Steve also notes that he has more time for hamming in the winter, when the band is at its best, and that "right now, with the dip in the solar cycle, there's a little more activity on it."

Professionally, Steve is a hydrologist with the U.S. Department of the Interior. He is married with two children, neither of whom is a ham ... yet. "But I'm working on my son," says Steve.

(Cover photo by Larry Mulvehill, WB2ZPI)

Photo A– Three varieties of ultra-low-cost (cheap!) personal FM radios with pushbutton tuning/scanning sold by Pound Shops in Great Britain. These single-IC radios are easily modified into direct-conversion 40-meter receivers for casual monitoring of QRP activity. (Photo courtesy of GØUPL)

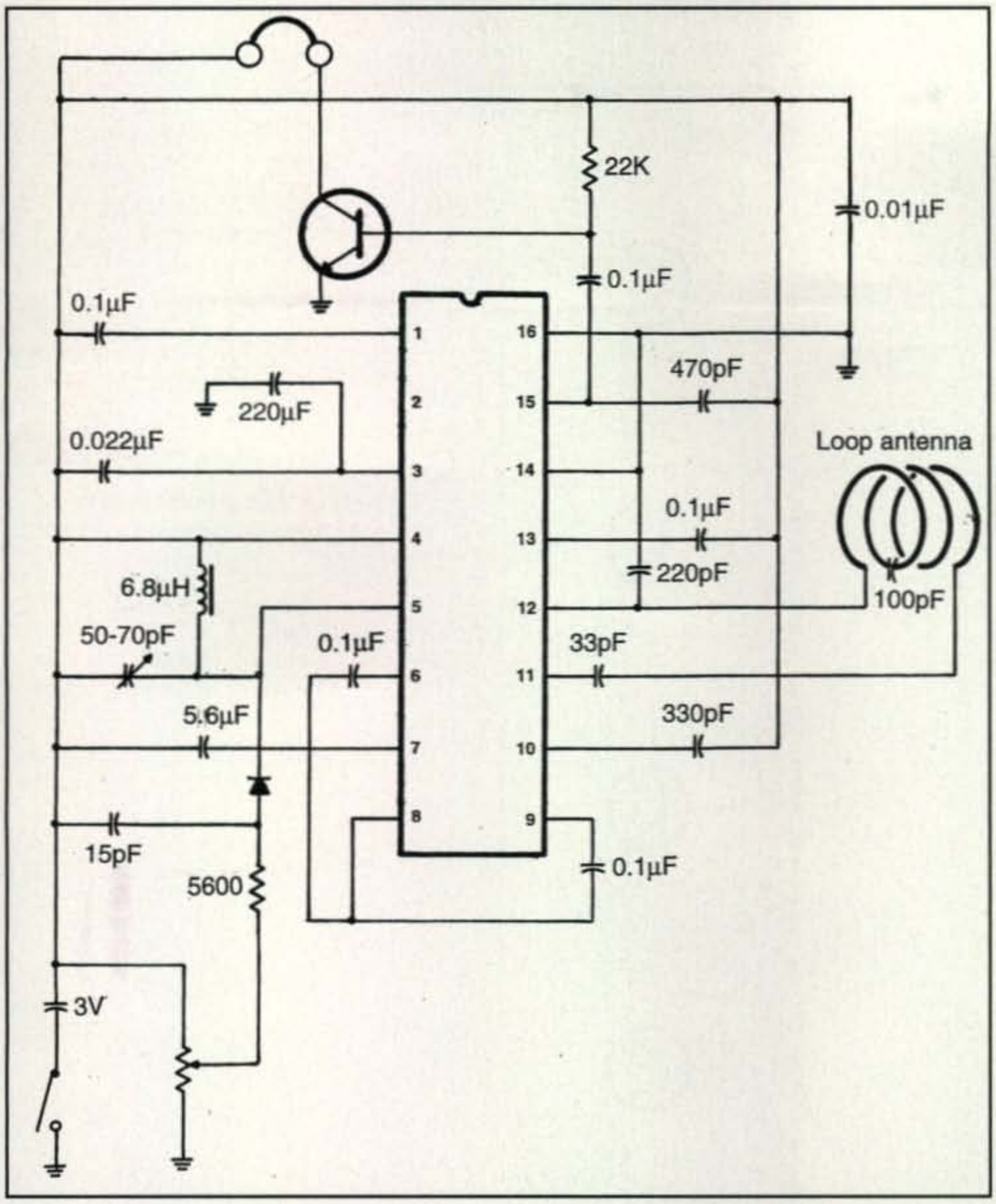

Fig. 2– Circuit diagram of the TDA 7088-based personal portable FM radio after modification to a direct-conversion 40-meter CW receiver. Discussion in text. (Figure courtesy of G1IFN, GØUPL, and G-QRP Club's magazine, Sprat*)*

of the fully rebuilt or "full moded" receiver is shown in fig. 2.

Now let's review some final notes. The pocket-size loop antenna (connected between IC pins 11 and 12) is made by cutting a 4-foot length of unshielded three-conductor cable, and then forming a two-turn coil with two of the wires. The wires are spliced at one end and their other ends connected in series through a 100-pFd capacitor. The third wire is used as a pickup or coupling loop (again see fig. 2). G1INF used a grid dip meter as an aid in tweaking the coil's overall length for resonant at precisely 7.0 MHz. You can, of course, experiment with your own mini-antenna. A small antenna might seem wimpy here, but bear in mind that the little receiver runs at maximum gain and does not have AGC. Remember, too, all cheap FM radios are not necessarily TDA-family based. Armed with the information presented here plus details of their IC's internal stages and pinouts (obtained from their particular manufacturer's website), however, modification should be relatively straightforward. Some references to helpful websites, incidentally, are listed under Pound Shop Radio discussions at <www.hanssummers.com>.

Need a small multi-function QRP transmitter to mate with this "el cheapo" receiver? Take a second look at my quick-to-assemble "Hamfest Buddy" featured in the August 2005 QRP column and revisited in the June 2006 QRP column. It is tiny, versatile, and kits (complete with a 40-, 30-, or 20-meter crystal) are still available direct to you from me (K4TWJ, 3994 Long Leaf Drive, Gardendale, AL 35071) for $16 plus $2 postage. Mail delivery is sometimes undependable, so drop me an e-mail before ordering and I will help "bird

dog" your order. That also brings our next subject into focus.

Boost for Buddy

Several readers have requested that we highlight a small RF amplifier capable of boosting a Hamfest Buddy's output, so we did some heavy-duty hunting and came up with the mini-amp circuit shown in fig. 3. When driven by 50 or 60 milliwatts (typical output of a Hamfest Buddy), this mini-amp will produce 400 or 800 milliwatts output (400 with two parallel-connected 2N2222s, 800 with four parallel-connected 2N2222s). You can use a small .01-mFd capacitor or a small ferrite bead slipped over the input wire for passing signals to the transistors' bases. Separate 2-ohm resistors on their emitters ensure each transistor draws the same current and conducts equally.

A T-50-2 toroid wound with No. 22 or 24 enamel-coated wire is used in the output filter. Wind 16 turns for 40 meters, 14 turns for 30 meters, or 12 turns for 20 meters. Space the turns evenly around the toroid, leaving only a small gap at the "start/finish" line, and remember each time you pass the wire through the toroid's center counts as one turn.

Rather than winding 30 turns of No. 28 or 30 wire on another T-50-2 toroid to make the RF choke, I used a molded inductor (Mouser No. 542-78F120, telephone 1-800-346-6873). A similar 3.4- or 4.7-µH inductor (Mouser No. 542-78F3R4 or 542-78F4R7) can probably be substituted for the output filter's toroid. Try one of each after assembly, and then go with the one giving the most output. This little mini-amp works quite well to be so simple. Try it!

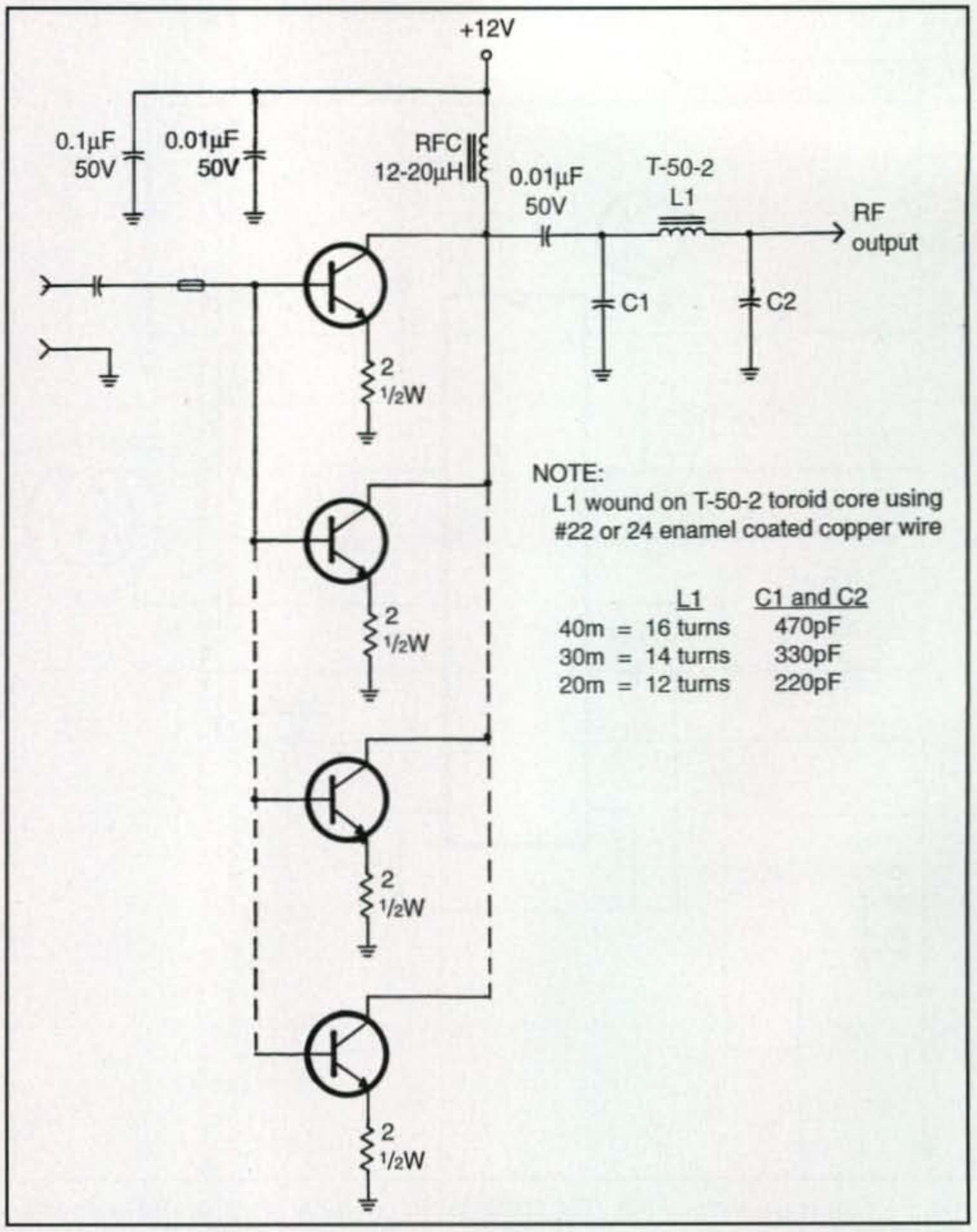

Fig. 3– Circuit diagram of a simple two- or four-transistor mini-amplifier capable of boosting the output of a 50- or 60-milliwatt transmitter to 400 to 800 milliwatts. (Details in text.)

Closing Notes

Have you sensed QRP activity spreading out a bit on 40 meters lately? You may be correct. Our all-time favored frequency of 7.040 kHz is still the main focal point, but QRP ARCI is also promoting 7.030 kHz as an international frequency, and the Flying Pigs QRP Club gathers around 7.044 kHz to help minimize congestion on 7.040 kHz. An ever-increasing number of amateurs are also joining our ranks and discovering the attraction of QRP—of operating the ever-popular HF bands without concern of strong RFI or large and ultra-expensive gear. As a result, an approximate 15-kHz section of 40 meters is supporting some good QRP action almost every day and night. Check it out!

That fills available space for this month, friends, but watch for more timely news and notes on today's hottest area of special interest, QRP, coming in our next column. Meanwhile, we look forward to exchanging on-the-air greetings with each of you soon—maybe during the Flying Pigs monthly "Run For the Bacon" contest (details at <www.fpqrp.com>). Click on "Flying Pigs Monthly Run For The Bacon Contest."

73, Dave, K4TWJ

BY KARL T. THURBER, JR.,* W8FX

RF Accessories, Ultra-Portable Transceiver Adapter, Antenna Tuner & more

This month we again shine *CQ*'s bright product spotlight on a wide variety of accessories for the radio shack; antennas and antenna accessories; interesting websites; software; and books and catalogs for your bookshelf, taking a close look at "what's new" in our great radio hobby. Let's begin.

Accessories for the Shack

"Splatter View"© RF Demodulator and RF Sampler from CleanRF Technologies. CleanRF Technologies, on the web at <http://www.cleanRF.com> (see fig. 1), has announced several new products for the discriminating RF-signal perfectionist.

When an HF linear amplifier is not tuned correctly, undesired out-of-band or unintelligible RF products will develop. With more and more HF amateurs becoming increasingly concerned with bandwidth, the "Splatter View"© model RF-D RF Demodulator (see photo A) and the model RF-S RF Sampler (photo B) have been created to ensure that your signal remains truly linear and distortion free for maximum intelligibility.

Now a real-time signal comparison between your amplifier's various pre- and post-operating conditions can be achieved, helping to eliminate the true root causes of splatter, buckshot, over/under modulation, and nonlinearity.

*289 Poplar Drive, Millbrook, AL 35054-1674
e-mail: <w8fx@cq-amateur-radio.com>

Photo A– The "Splatter View"© RF-D Demodulator from CleanRF Technologies directly demodulates the RF envelope from your transmitter. See the text for technical details. (Photo courtesy of Tyler Stampfli, KAØKA)

The "Splatter View" RF-D and RF-S, when used with your existing oscilloscope, will provide an exact reference observation as your occupied RF bandwidth stays directly proportional to your transmitter's audio passband. The possibility of IMD (intermodulation distortion) products will be exponentially reduced to help you say goodbye to mistuned nonlinear amplifiers and dirty signals.

Specifically, the "Splatter View" RF-D is de-

Fig. 1– CleanRF Technologies, which you'll find on the web at <http://www.cleanRF.com>, has announced innovative new products for the discriminating RF-signal perfectionist. Check out this month's column for details. (Image from the CleanRF Technologies website)

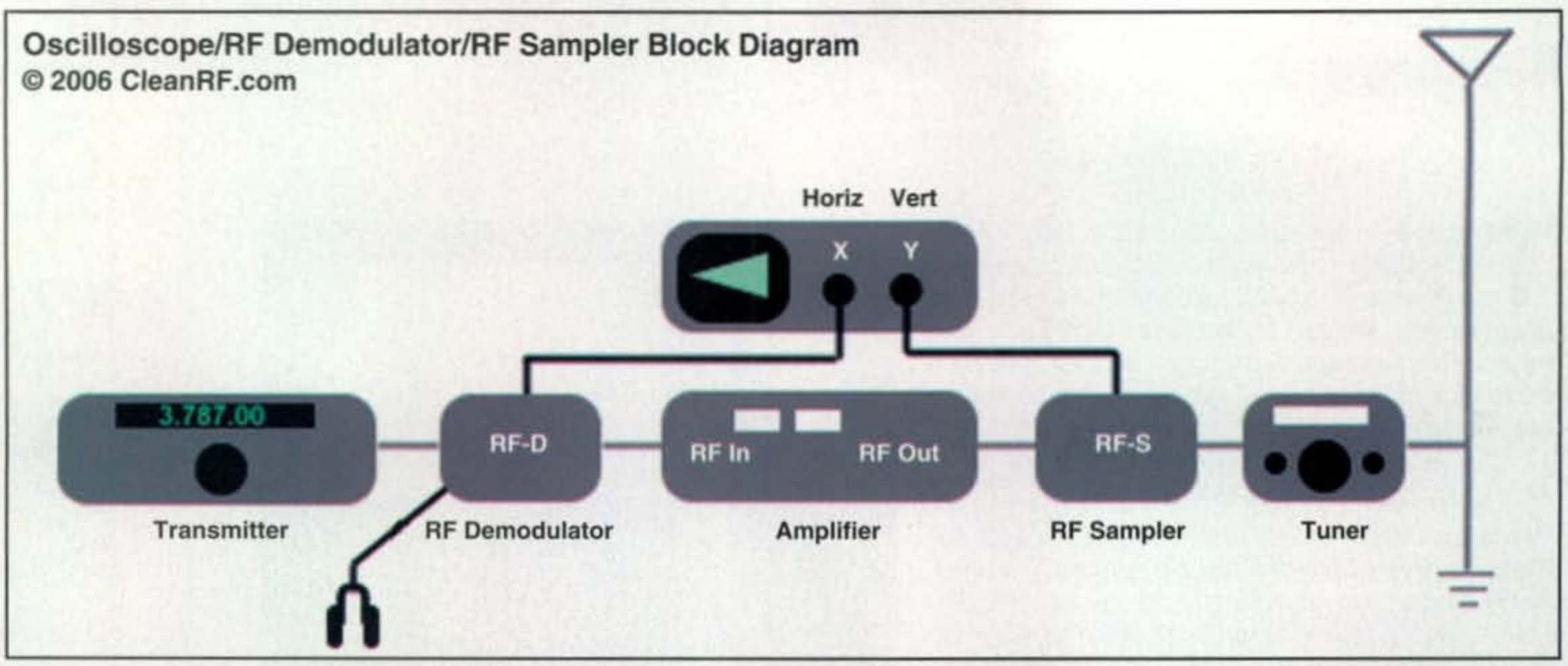

Fig. 2– A copyrighted complete block diagram of Clean RF's "Splatter View"© system illustrating pre- and post-signal monitoring connections is shown here. A description of the system is in this month's text. (Image courtesy of Tyler Stampfli, KAØKA)

signed to directly demodulate the RF envelope from your transmitter, converting the low-power RF envelope to a usable audio signal suitable for feeding the horizontal "X" input of your oscilloscope. This establishes a preamplifier reference signal.

In addition, the RF-D may be used as an AM audio modulation monitor, reproducing a flat audio frequency response from DC to 30 kHz. The unit features a very low operational VSWR over a broad frequency range, and insertion loss is a negligible 0.1 dB. The RF-D produces a rectified, nondirectional demodulated source at the BNC and 1/4-inch TRS jacks.

The "Splatter View" RF-S directly samples the RF envelope from your amplifier, converting the high-power RF envelope to a signal suitable for feeding the vertical "Y" input of your oscilloscope. This establishes a post-amplifier reference signal.

Also, the RF-S may be used as an RF coupling probe for spectrum analysis, RF envelope observation on an oscilloscope, or frequency counting and control. It features a very low operational VSWR over a broad frequency range, and insertion loss is 0.1 dB. The RF-S produces an unrectified, nondirectional sample at the BNC jack.

Photo B– The "Splatter View"© RF-S RF Sampler is designed to directly sample the RF envelope from your amplifier. See the explanation in the text. (Photo courtesy of KAØKA)

Each completed unit is made with high-quality silver and gold Teflon® connectors, measures 3 1/4"L × 2 1/8"W × 1 5/8" H, and comes complete with 6-foot BNC-to-BNC cables and UHF male-to-male RF adapters for coupling directly to RF outputs.

A complete block diagram of the "Splatter View" system illustrating pre- and post-signal monitoring connections is shown in fig. 2.

For further information, contact Tyler Stampfli, KAØKA, at CleanRF Technologies, 1410B Hillwood Drive, Murray, KY 42071 (970-412-3456; e-mail: <info@cleanrf.com>; on the web: <http://www.cleanrf.com/index.html>).

Elecraft KX1 Ultra-Portable Transceiver Now Covers Up to Four Bands with an 80- and 30-meter Adapter. With the introduction of the KXB3080 option, the popular Elecraft KX1 Ultra-Portable Transceiver now covers up to four bands. The dual-band KXB3080 module, covering 80 and 30 meters, is installed in the same location as the 30-meter option, the KXB30 (photo C). The KX1 covers the full 40- and 20-meter bands as well.

KX1 revision 1.02 firmware is included at no charge with the KXB3080 option. The new firmware adds a scanning feature, useful for monitoring quiet bands. Scanning proceeds in "live" (unmuted) fashion, allowing you to hear even very weak stations. In emergency situations, scanning could help you find a strong local station you could contact even with weak batteries or an inefficient antenna.

With the KXB3080 installed, the rig's DDS VFO allows reception from 1.0 to 16.5 MHz, which includes many popular shortwave broadcast bands. While signals outside the amateur bands are attenuated, it is still possible to copy strong stations even in the commercial AM broadcast band. The KX1 transmits only in CW mode, but it can receive SSB and AM signals, thanks to its variable-passband crystal filter.

The four-band KX1—with internal automatic antenna tuner, internal batteries, and clip-on keyer paddle—represents a new level of integration in QRP transceivers. The enclosure measures just 1.2" × 3" × 5.3", and the transceiver weighs just 9

New DJ-V17 makes a SPLASH

with great audio and high grade waterproof design!

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

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

Actual Size

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

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Photo C– The Elecraft KX1 Ultra-Portable CW Transceiver Kit is a backpacker's dream. Addition of the KXB3080 option kit allows four-band coverage; new firmware adds a scanning feature. (Photo courtesy of Elecraft)

ounces (11 ounces with both the optional ATU and keyer paddle installed)—still a "backpacker's dream."

The KXB3080 option kit is $65. It can be ordered at the time one purchases a KX1, or at any time afterwards. As in all of the Elecraft transceivers, the options are all designed to be added at any time after the radio is built. For those who have already installed a 30-meter option, it can be removed and the 30/80-meter option installed.

For more information, contact Elecraft, Inc., P.O. Box 69, Aptos, CA 95001-0069 (831-662-8345; e-mail: <sales@elecraft.com>; on the web: <http://www.elecraft.com>). Online ordering and downloadable manuals are available on the company's website.

Antennas and Accessories

MFJ 2500-Watt ContinuousCarrier™ Antenna Tuner. The MFJ-9982 ContinuousCarrier™ Antenna Tuner handles 2500 watts continuous carrier output on all modes and all HF bands into most unbalanced antennas. The MFJ-9982 (photos D and E) gives you almost every feature you'd ever want in a high-power tuner: wide matching range, 1.8 to 30 MHz coverage, a six-position antenna switch, a four-core balun, a dummy load, true peak/average lighted SWR/wattmeter, 6:1 reduction drives, detailed logging scales, a 3-digit counter, large knobs, and more.

MFJ's high power, high-Q continuous current AirCore™ roller inductor is no ordinary roller inductor. It's edge-wound from thick .06-inch silver-plated, solid-copper strap. It can carry huge circulating RF currents and withstand tremendous heat that will melt or burn up ordinary roller inductors. Self-insulating construction reduces stray capacitance, and dual silver-plated compression wheels give ultra low-resistance contacts. A new fast-tune crank knob complements the unit.

High-current, high-capacitance 1000-pF and 500-pF air variable capacitors have low minimum capacitance and are self-insulating. These new capacitors and MFJ's patent-pending innovation are said to offer high efficiency on 160/80 meters and an extremely wide matching range on 10/12/15 meters.

The antenna switch is completely isolated to handle high-voltage, high-impedance antennas. High-current, low-

Photo D– The heavy-duty MFJ-9982 ContinuousCarrier™ Antenna Tuner handles 2500 watts continuous carrier output on all modes and all HF bands into most unbalanced antennas. It's designed to give you virtually every feature you'll ever want in a high-power tuner. (Photo courtesy of MFJ)

impedance antennas are handled by parallel sets of high-current contacts of two ceramic switches. Also, the TrueActive™ circuit reads true peak or average power on all modes, a cross-needle meter reads SWR/forward/ reflected power, and a 1500-watt air-cooled, non-inductive 50-ohm resistor serves as a dummy load.

The MFJ-9982, at $699.95, is protected by MFJ's famous No Matter What™ one-year limited warranty. Under it, MFJ will repair or replace (at its option) your MFJ products, no matter what, for one complete year.

To order any MFJ product, find the name of your nearest MFJ dealer, or to request a free catalog, contact MFJ Enterprises, Inc., 300 Industrial Park Rd., Starkville, MS 39759 (1-800-647-1800; e-mail: <mfj@mfjenterprises.com>; on the web: <http://www.mfjenterprises.com>).

Software and Computers

MicroLog Ham Radio Logging Program from WAØH. Jerry Gentry, WAØH, has added many new features to his ambitious MicroLog shareware logging program since it was men-

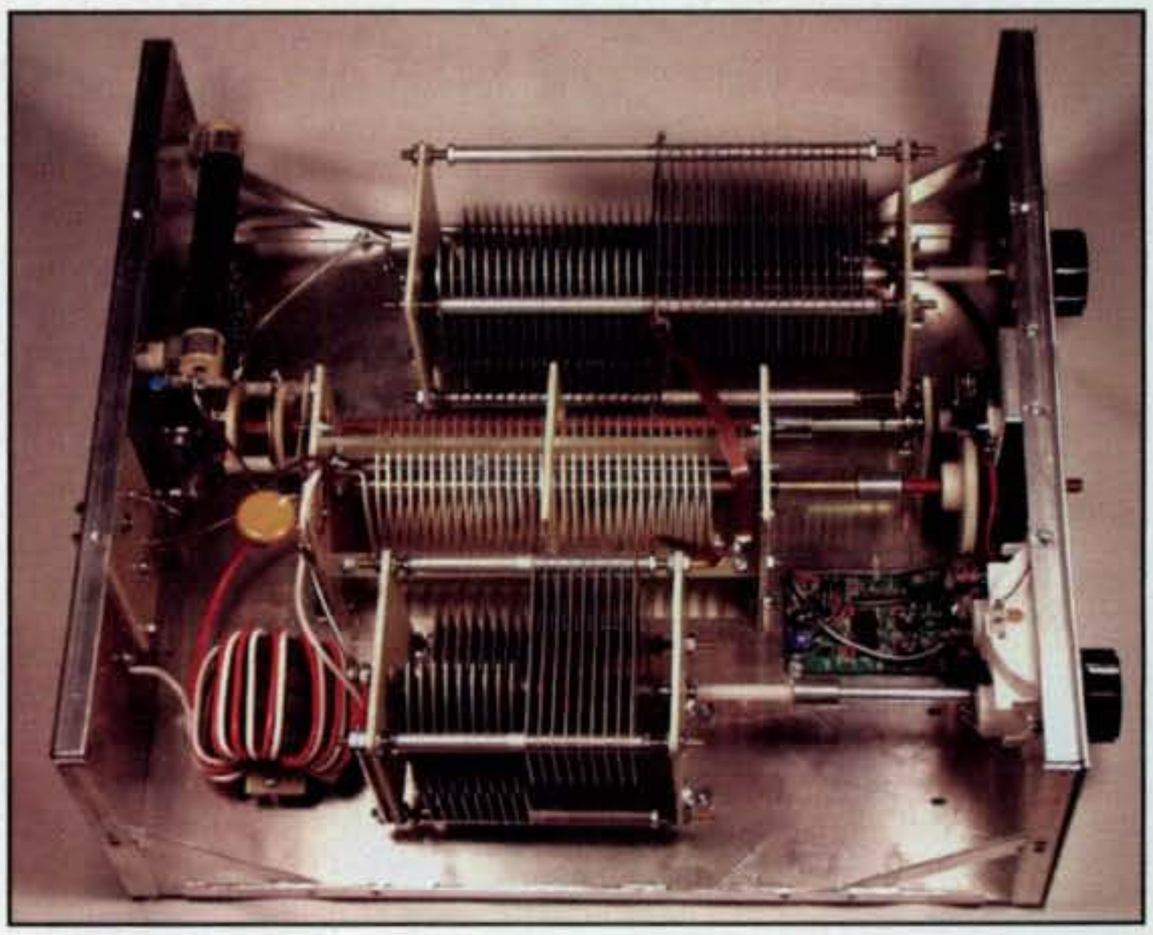


Photo E– The interior view of the MFJ-9982 tuner speaks for itself. It features heavy-duty construction, especially in its roller inductor, high-current air variable capacitors, and antenna switch. Details are in this month's column. (Photo courtesy of MFJ)

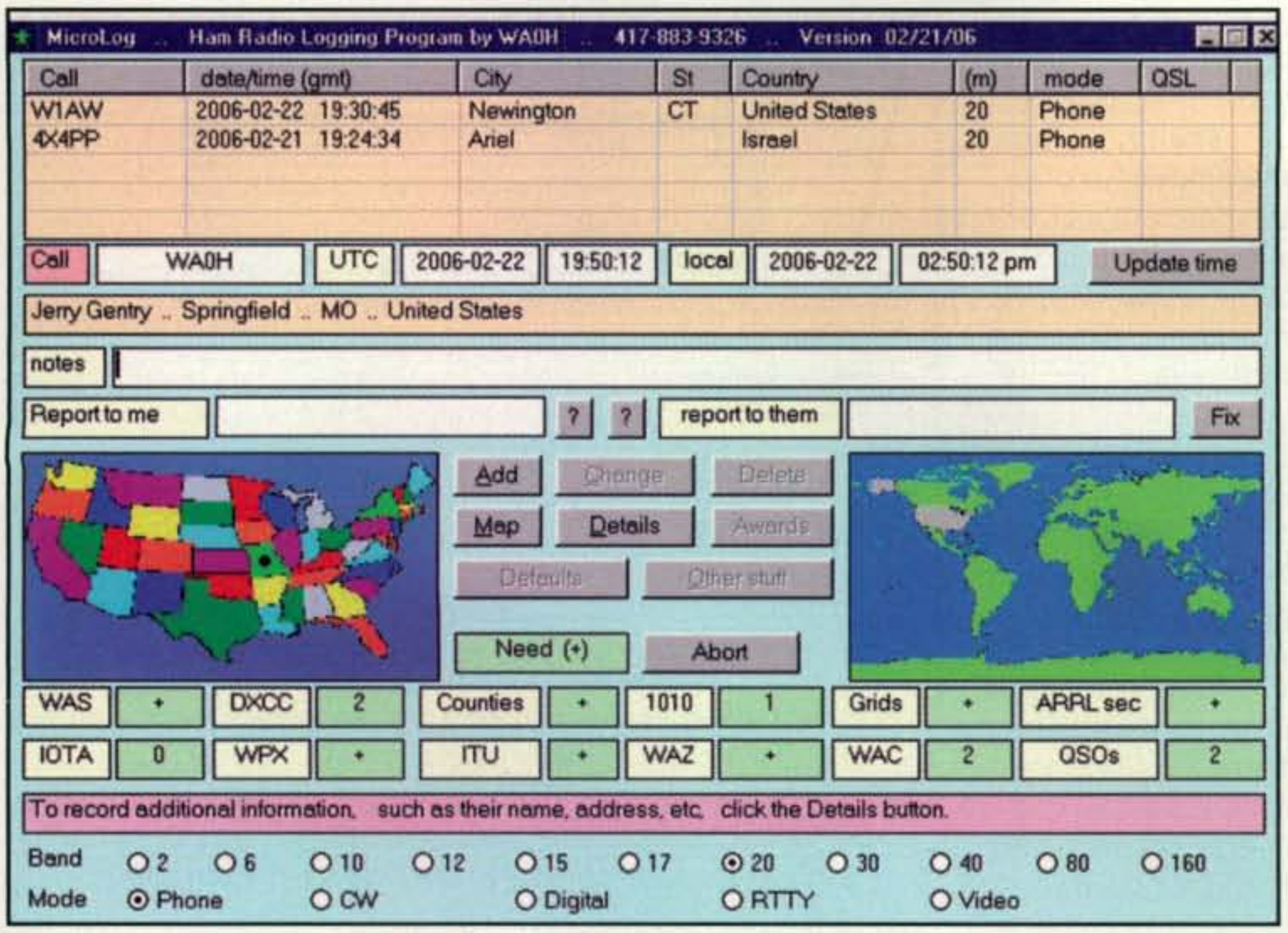


Fig. 3– Jerry Gentry, WAØH, has added many new features to his MicroLog shareware logging program since it was mentioned in a previous column. The program's Main Menu is shown here. (Image courtesy of Jerry Gentry, WAØH)

tioned in our July 2004 column. To recall, Jerry's MicroLog can be freely downloaded, copied, and given to others. MicroLog runs under Windows® 98 or later. Importantly, the U.S. and Canadian callbooks are built into the program, although due to the size of the U.S. and Canadian callbooks, they are not included as part of the downloaded program. The program's main menu is shown in fig. 3.

Once a callsign is entered, MicroLog can display additional information, which it extracts from the built-in callbooks, or which can be entered manually. Also, for several different types of awards, MicroLog can display a summary of the stations worked and confirmed. Too, MicroLog can display several types of lists, such as a list of islands, or a customized list of stations worked. The program allows you to specify which fields to display, and it can present a map that shows the location of the callsign you entered. MicroLog also can display a list of which types of licensees are allowed to work which frequencies, as well as present several types of maps, such as a U.S. grid map.

In the latest version, the U.S. and Canadian callbooks are still built into the program so you can enter a callsign and immediately see who the person is and where (on a map) he is located. And, the program still tells you if you have worked the station before, or if you need to work him for an award.

MicroLog now lets you change the band or mode from the main screen. Also on the main screen, the U.S. and world maps can now be replaced with band charts or beacon maps, and QSL status has been added to the display. MicroLog also now lets you print your log and specify which fields to print.

Jerry downloads the U.S. and Canadian callbooks every month and builds them into MicroLog. For international calls, the program now can access any of the commercial callsign databases that you own, such as the Radio Amateur Callbook, Buckmaster's HamCall™ database, QRZ!™, or Golist.

Another nice "plus" is that MicroLog now lets you create and use multiple logs. You can even move records from one log to another. For stations operating from a portable location, MicroLog now separates the home location from the portable location, to allow more accurate award tracking.

MicroLog is still easy to use, still runs on Windows® 98 or later, and still costs just $10 for a registered version of the program, which is mailed on a CD. You can download MicroLog from Jerry's website, but the website version does not have the callbooks built into the program, nor does it access commercial callsign databases. The registered version also allows the owner to have free phone or e-mail technical support; you'll also be notified of new program versions.

Contact Jerry Gentry, WAØH, Box 4485, Springfield, MO 65807 (417-883-9326; e-mail: <wa0h@arrl.net>; on the web: <http://www.wa0h.com>).

New on the Web

HamTestOnline™ Website Adds Canadian Exams. The popular HamTestOnline website has announced the addition of the Canadian Basic and Advanced question banks, making the impressive website even better. "We often get requests to add question banks," explained Harold "Pi" Pugh, K1RV, the website's sales manager, "and most of them come from Canadians. In fact, many of our existing customers are Canadians using the U.S. questions to study for the Canadian exams!"

The U.S. and Canadian exams cover the same subjects—regulations, electronics, circuits, antennas, propagation, operating, RF safety, etc.—but often with different emphasis. For example, the U.S. exams have more questions on RF safety, while the Canadian exams put more emphasis on electronics.

"We have two kinds of customers," Pi points out. "Those who just want to pass the exams and those who want to learn the materials. If education is your primary goal, turn on both sets of questions—except for the regulations—and you get a more thorough question drill." Pi adds, "That's why we're not selling the Canadian courses separately. We want our students to have access to both question sets."

The Canadian courses include all the same features, including logical question order, intelligent repetition, explanations, linked questions, and focus exams. The difference is that you get the Canadian exam questions.

The website offers unlimited, free, random practice exams that track your answer history. Advanced features require a $49.95 USD subscription, which provides full access to all features and all U.S. and Canadian exams for two years. The sub is guaranteed: If you fail the test, you get your money back.

For more information, visit <http://www.hamtestonline.com> or send an e-mail to <k1rv@hamtestonline.com>.

Electronics Tutorials Website. Some time ago, a reader of our column, Tom Schwinn, W4BNS, alerted us to the existence of a very useful and popular tutorial website, which you'll find at <http://www.electronics-tutorials.com> (fig. 4). Offered by Ian Purdie, VK2TIP, the tutorials are free to you and are extremely comprehensive, with over 120 individual electronics tutorials topics covering a very wide range of electronics being offered online. The website is expanding, so it's a good idea to return to it often to see what new tutorials are offered.

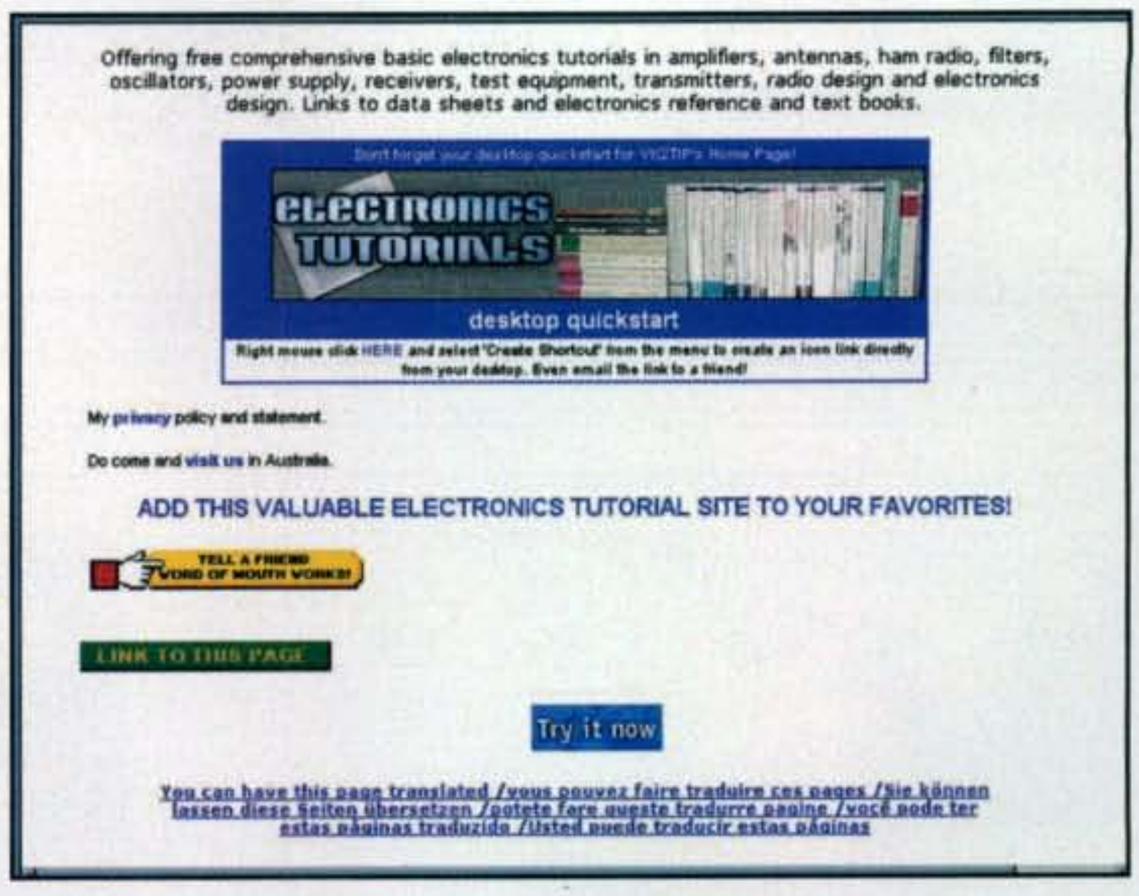


Fig. 4– Looking for some online learning? You'll find a very useful tutorial website at <http://www.electronics-tutorials.com>. The tutorials are free and very comprehensive. (Image from the Electronics Tutorials website)

Looking Ahead in CQ

Here's a look at articles we're working on for upcoming issues of *CQ:*

- "CW Results, 2005 CQ World-Wide DX Contest"
- "All-Time Records, CQ World-Wide DX Contest"
- "Rack-Mount Your Station," by John Ellis, NP2B
- "The BasicX-24—An Easy-to-Use Microprocessor," by Dennis Nendza, W7KMV

Do you have a ham radio story to tell? See our writers' guidelines on the CQ website at <http://www.cq-amateurradio.com/guide.html>

Fig. 5– In the book Google Gmail: Visual QuickStart Guide, *a visual, task-based reference from Peachpit Press, author Steve Schwartz shows you exactly what you need to know to get your Gmail account up and running fast. (Graphic from the Peachpit Press website)*

The site offers free comprehensive basic electronics tutorials on amplifiers, antennas, amateur radio, filters, oscillators, power supplies, receivers, test equipment, transmitters, radio design, and electronics design. Links to data sheets, electronics references, and textbooks are provided.

So you don't become confused when navigating the site, it's largely set up on a basis of "directories." On the left-hand side are "clickable" navigation links that take you to things such as basic electronics, antennas, amplifiers, data sheets, downloads, filters, oscillators, receivers, etc. Each directory has its own navigation bars to different topics under that general heading. Also, each topic has at the end, and often throughout the topic, related topic links. It's that easy to use.

Bottom line: Be sure to check out the Electronics Tutorial Website at <http://www.electronics-tutorials.com>. You'll likely be pleased with what you find.

From the Bookshelf

Google Gmail: Visual QuickStart Guide. Imagine never having to delete or file an old e-mail—and still being able to find just the missive you need—and you begin to understand the incredible power of Google's new (and free) e-mail service. With Google's legendary search engine as its backbone and offering an unheard of 1 gigabyte of storage space, Google's new Gmail service promises to revolutionize the way we use e-mail.

In this visual, task-based reference from Peachpit Press (fig. 5), author Steve Schwartz shows you exactly what you need to know to get your Gmail account up and running fast—from determining system requirements to signing up for an account, configuring your system, sending and receiving e-mail, fighting spam, managing e-mail, using Gmail's labeling and filtering systems, and more. Simple step-by-step instructions, loads of screen shots, and a plethora of time-saving tips will have you up and running with Google's Gmail in no time. *Google Gmail: Visual QuickStart Reference* is priced at $16.99.

Visit your local bookstore, or for more information, contact Pearson Education, 200 Old Tappan Road, Tappan, NJ 07675 (1-800- 283-9444 or 1-800-922-0579; e-mail: <info@peachpit.com>; on the web: <http://www.peachpit.com>).

Note: We should also mention that the 80-page, color Peachpit 2006 Catalog now is available. With the catalog you'll be able to search for titles by software program as well as by subject matter. It includes a full title index and an author index. Visit the Peachpit Press website's catalog page to download your copy or request a printed version.

ARRL Periodicals on CD-ROM. As a technical writer and as an educator, I find it useful to have an array of reference software on my PC or at arm's reach on CD-ROM. Thus, I read with interest the availability of the 2005 ARRL Periodicals on CD-ROM, a compilation of all 2005 *QST, QEX* (ARRL Experimenter's Exchange), and *NCJ* (*National Contest Journal*) articles.

The ARRL Periodicals on CD-ROM are fully searchable collections of popular ARRL journals, and reportedly every word and photo published throughout the year is included. With it, you can search the full text of every article by entering titles, callsigns, names—almost any word. You can see every word, photo, drawing, and table in technical and general-interest features, columns, and product reviews—plus all advertisements. You can print what you see, or copy it into other applications.

The 2005 ARRL Periodicals on CD-ROM is $19.95 plus s/h from the ARRL. For more information, such as to check PC system requirements, or to order, contact the American Radio Relay League, 225 Main Street, Newington, CT 06111-1494 (1-888-2775289; e-mail: <pubsales@arrl.org>; on the web: <http://www.arrl.org/shop>). You may place orders online, and the paper-based ARRL Publications Catalog is available upon request.

Wrap-Up

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

Overheard: I have found that to fully appreciate some advice others have offered, I sometimes have to reject it—and then, sadly, learn the lesson the hard way.

73, Karl, W8FX

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

vhf plus

BY JOE LYNCH,* N6CL

Tremendous 6-meter Propagation

The middle of May to early June saw tremendous propagation on the "Magic Band" for those who were among the faithful listeners. This propagation included the West Coast working Europe and the Midwest and the Southwest working dozens of Japanese stations, as well as days of double-hop propagation that included CO2OJ working dozens of stateside stations on the West Coast. Among the reports received directly or via the VHF reflector are the following:

On May 20, 2006, **Oscar Morales, CO2OJ**, wrote: "Big opening on May 20, 2006. I turned on the IC-551 a little before 1200 UTC and called CQ on 50.125 MHz, and the party started! In about three hours I made 192 QSOs in 71 grids. These included 43 EM grids, 8 ENs, 6 FNs, 13 FMs, and one EL87. Worked a couple of stations in Canada. Wow! I was really missing those big pile-ups. Hi!

"By the way, I made most of the QSOs between 50.130 and 50.150 MHz. I wonder why during such an opening, so many people choose 50,125 for just chatting. Well, let's hope that this opening was only the beginning of a good summer season."

On June 3, 2006, Oscar wrote: "Good opening this Saturday morning and afternoon again. Worked more than 150 stations in 54 grids. Lot of stations in California, Arizona, New Mexico, and even a couple of XEs. Most reports were 59+ and some QSOs with FM grids were with the side of the 4-element beam."

Dave Bernhardt, N7DB: OK, why don't we throw out conventional wisdom this season? We are in the doldrums between cycles this summer. Usually the *E*-layer needs a kick, however slight, to produce any usable propagation. This low solar activity period is hardly conducive to producing anything beyond double-hop sporadic-*E* right?

Well, perhaps. In days of yore, before real-time propagation data, the type of band openings we have seen in the past week were just not seen, period. So, maybe these paths have been there all along, we just never realized their existence.

The evening of May 28, 2006 was a new chapter in NA-AS propagation, at least for the PNW. I cannot recall an earlier time for this path. Oregon stations were on the edge of the main action, but Seattle stations made the big score with HL1LTC (K7CW & W7FI.) Now, NL7Z made a pretty good haul with HL, VR2, UWØ, BD4, and DU, besides the JAs, of course.

I have noted during this past week how our friends to the east have really made a haul to EU and the Caribbean. Yes, we have had some propagation out here, but nothing too exciting.

This morning (June 3, 2006) the local stations were put on *full alert*. I had my suspicions when I saw the EU postings to NA earlier in the morning. Our propagation had a northerly tilt. KØGU reporting EU video was key in my mind. This was when I started to call local operators to look EU way. Around 1630 UTC I was on the phone to K7RWT when the report came over the local 2-meter FM network that VE7SL had worked IV3SIX. Then things really got crazy around here. Dan, NN7J, finally got his antenna system swung around towards EU and heard IV3SIX about 1631 UTC. Bruce, KI7JA, heard a watery sounding CW signal in that direction too, so he probably heard IV3 also. I had some line noise and did not copy anything here. Dan was a bit perturbed at not getting his keyer working quickly enough!

To date the most exciting days were June 4–6. Among the comments were the following:

Sam Whitley, K5SW: "Got home from church about 1730 UTC on June 4, 2006 and found EH8BPX IL18 on 50.200. (Texas guys said that he had been for two hours.) Heard Missouri and Arkansas stations work CT3, but nil here.

"At 2240 UTC on June 4, I began hearing JAs on 50.110 MHz (all about S1). I began picking out calls as stations moved off 50.110 MHz. I worked 14 JAs by 2354Z and left for church. I got back (gone 90 minutes) and worked two additional JAs, at 0124 and 0146 UTC on June 5, making a total of 16 JAs worked. This was the best JA opening during summer sporadic-*E* season ever for me, all time. All were worked on CW. I heard no SSB JA signals. Last JA signal heard was about 0157 UTC on June 5. However, Pacific Northwest 7-land stations were in longer. I heard no KL7 or HL stations."

Dan Osborne, WB5AFY (EM04id): "I worked three JA stations on CW around 0100 UTC: JE1BMJ, JA9SJI, and JH7MSB, from EM04id using 100 watts and 7 elements at 90 ft. on my end. Listened to the guys in EM12 and EM13 working the JAs earlier and was not able to copy the JA end until 0100 UTC. Strange. Also no 6-meter Alaska or Europe heard or worked from here during the opening.

Jon Jones, NØJK: I worked at Wesley Hospital 3 PM to 12 AM Sunday, but was able to get on the radio around 6:30 PM. I worked JA7QVI QM08 at 2341 UTC

e-mail: <n6cl@sbcglobal.net>

VHF Plus Calendar

Aug. 2	First Quarter Moon
Aug. 2-6	Great Plains Super Launch, Hutchinson, Kansas (See text for details)
Aug. 5-6	ARRL UHF and Above Contest (See text for details)
Aug. 6	Very poor EME conditions
Aug. 9	Full Moon
Aug. 10	Moon Perigee
Aug. 12–13	Predicted peak for the *Perseids* meteor shower
Aug. 13	Good EME conditions.
Aug. 16	Last Quarter Moon.
Aug. 19–20	First weekend of the ARRL 10 GHz and Above Contest (See text for details)
Aug. 20	Poor EME conditions
Aug. 23	New Moon
Aug. 26	Moon Apogee
Aug. 25–17	EME 2006 Conference, Wuerzberg, Germany (See text for details)
Aug. 27	Poor EME conditions
Aug. 31	First Quarter Moon

—EME conditions courtesy W5LUU.

Members of Union Fire Company Number 1 pose after retrieving the Blanchard 1 payload during the the Pennsylvania Leadership Charter School (PALCS) Balloon Launch. (Photo from the PALCS website)

Members of the Blanchard 1 team pose with the payload after its retrieval from the ivy-wrapped hickory tree. (Photo from the PALCS website)

on 50.101 MHz. Was using a 2-element Yagi, and an IC-706MII, at 100 watts from the roof of the employee parking garage (east of the main Wesley tower). There is a clear shot to the northwest from there. JA7QVI had a solid clear signal. He gave me a 559.

The *Es* footprint in the central USA seemed best for Texas, then Oklahoma. It then moved north. I had JAs before Larry Lambert, NØLL, in EM09, who worked JA7QVI and another JA around 0015 UTC. Jim Kesterson, KØGU, in DM70, didn't hear them until later.

During the openings Pat Rose, W5OZI, EM00, claimed 20 JA QSOs. Joel Harrison, W5ZN, in EM45, reported working 78 JAs on June 6. During these sporadic-*E* openings, QSOs were reported as far east as K4RX, EM70; KY5R, EM64; and WZ8D, EM89.

Some perspectives: Not counting the 1958–59 *F2* openings, the June 4– 6, 2006 sporadic-*E* openings to Japan are likely the best ever in terms of duration, intensity, and geographical extent. It was also, I believe, one of the best all-time ionospheric openings to Japan in recent history. The only one I recall as big was in solar cycle 21, on November 25, 1989. During that opening WBØDRL ran JAs that afternoon, and worked HL and DU. JAs worked as far east as W4.

JA summer sporadic-*E* openings are very rare, and when they do occur, are usually confined to W6, W7, and VE7. For example, during all the years between 1979 and 2000 Bob Magnani, K6QXY, reported working 85 JAs.

Chip Margelli, K7JA, reported that the June 4–5 opening footprint left many in the southern California area out of the loop. He reported working only two JAs during the Sunday–Monday UTC opening. He also stated that others did not hear anything during that time.

There were more than 250 DX QSOs of more than 6000 km listed on the DX Sherlock V 1.3 V-U-SHF DX-Spot QSO database lookup for the days of June 4–6, 2006. Altogether, thousands of QSOs took place over these two days. (see <http://www.vhfdx.net/index.html> for more information). As Jon Jones, NØJK, points out above, these were truly unique days of 6-meter sporadic-*E* propagation. More coverage of these summer openings will appear in the Summer 2006 issue of *CQ VHF* magazine.

PALCS Balloon Launch

The Pennsylvania Leadership Charter School (PALCS) Balloon Launch on June 10, 2006 was a qualified success. Launching from the Samuel Lewis State Park between Lancaster and York, Pennsylvania, the balloon, named Blanchard I, carried a payload of an APRS beacon, an MCW beacon, and a digital camera. The original target altitude was to be 95,000 feet. However, because of the presence of unfavorable winds, the lift was purposely kept low so as to keep the payload from landing in the Delaware River.

Instead of reaching its target altitude, it is estimated that it only reached about 20,000 feet. Furthermore, instead of landing in the Delaware River, it landed in a poison-ivy-wrapped hickory tree, perched 70 feet high, at the Ware Boy Scout Camp near the Maryland-Pennsylvania border, southeast of Oxford, Pennsylvania.

It took some time for the Union Fire Company Number 1 to show up with its long ladder truck. However, when they did, the firemen were able to extend their long ladder and fairly quickly retrieve the payload from its branched perch.

For more information on this balloon launch as well as information on the Pennsylvania Leadership Charter School, please see the school's website: <http://the.captain.al.googlepages.com/home>.

Jean Pierre, F1ANH, SK

The following is from Herve, F5HRY: "Jean Pierre, F1ANH, passed away on May 24, 2006 after a hard struggle against cancer. A few weeks ago he was still on the air, finishing his last QSOs, over the thousands he had during his long ham radio life.

"He was a very good technician and a great weak-signal operator. He was giving his time, and much more, to others. He was one of our references and more simply, he was our friend. We will deeply miss you Jean Pierre."

Current Contests

There are two important contests this month. The **ARRL UHF and Above Contest** is scheduled for August 5–6. The first weekend of the **ARRL 10 GHz** and above cumulative contest is scheduled for August 19–20. The second weekend is September 16–17. Complete rules for both contests can be found in the July issue of *QST* and at <www arrl.org>.

Current Conferences and Conventions

The **Great Plains Super Launch:** The sixth Great Plains Super Launch (GPSL) will be held in Hutchinson, Kansas August 3–6. These dates encompass a Thursday evening gathering at Houlihans Restaurant, which is located in the Grand Prairie Hotel and Convention Center, 1400 North Lorraine Street, Hutchinson, KS 67501. The Grand Prairie Hotel is the lodging site for the conference. Other lodging is

Participants in the 2004 Great Plains Super Launch in Hutchinson, Kansas pause for a photo op. This year the GPSL returns to Hutchinson. See the text for further details. (N6CL photo)

available in the Hutchinson area.

The symposium will be held on Friday at the Kansas Cosmosphere and Space Center, which is located at 1100 North Plum, Hutchinson, Kansas. A full slate of speakers is scheduled, beginning at 8 AM. There will be a $5 cover charge at the door to offset the cost of renting the room.

The launch will take place at 7:30 AM, either on Saturday or Sunday, depending upon the weather at launch time. The location of the launch site will be announced at the symposium, and is expected to be no more than 30 minutes drive time from Hutchinson.

For more information, please see the GPSL website: <http://www.custom-ds.com/gpsl>.

EME Conference 2006: The EME Conference 2006 will be held in Wuerzburg, Germany, August 25–27. For more information see: <http://www.eme2006.com>.

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, email, etc., please contact the person listed with the announcement. The following have announced a call for papers:

ARRL and TAPR Digital Communications Conference: Technical papers are solicited for presentation at the 25th Annual ARRL and TAPR Digital Communications Conference to be held September 15–17 in Tucson, Arizona. These papers will also be published in the Conference *Proceedings* (you do *not* need to attend the conference to have your paper included in the *Proceedings*). The submission deadline is July 31, 2006. Send papers to: Maty Weinberg, ARRL, 225 Main St., Newington, CT 06111, or you can make your submission via e-mail to: <maty@arrl.org>. Papers will be published exactly as submitted and authors will retain all rights.

Microwave Update: A call for papers has been issue for the 2006 Microwave Update, which will be held October 19–22 in Dayton, Ohio. If you are interested in submitting a paper for publication in the *Proceedings,* please contact Gerd Schrick, WB8IFM, at 937-253-3993 or e-mail: <wb8ifm@amsat.org>. The submission deadline is August 7, 2006. For more information on the conference, see: <http://microwaveupdate.org/2006/mud06.html>.

Current Meteor Shower

What began around July 23 and will last until approximately August 22 is increased activity tied to the *Perseids* meteor shower. Its predicted peak is

Drew Glasbrenner, KO4MA, demonstrates how easy it is to make amateur radio satellite QSOs during the Dayton Hamvention®. (N6CL photo)

around 2300–0130 UTC between August 12–13. According to the International Meteor Organization: "Simulations by Peter Brown made some years ago suggest enhanced *Perseid* activity is possible this year, though perhaps not as strongly as in 2004. The timing of any enhancement, though probably not far from the expected spread of possible maxima noted here, is not known."

For more information on the above meteor shower predictions see Tomas Hood, NW7US's "Propagation" column. Also visit the International Meteor Organization's website: <http://www.imo.net/calendar/2006>.

And Finally . . .

Just under 20,400 hams attended this year's Dayton Hamvention®. This number was down slightly from last year, which was just over 20,400. From the perspective of the exhibitors, it was a successful convention.

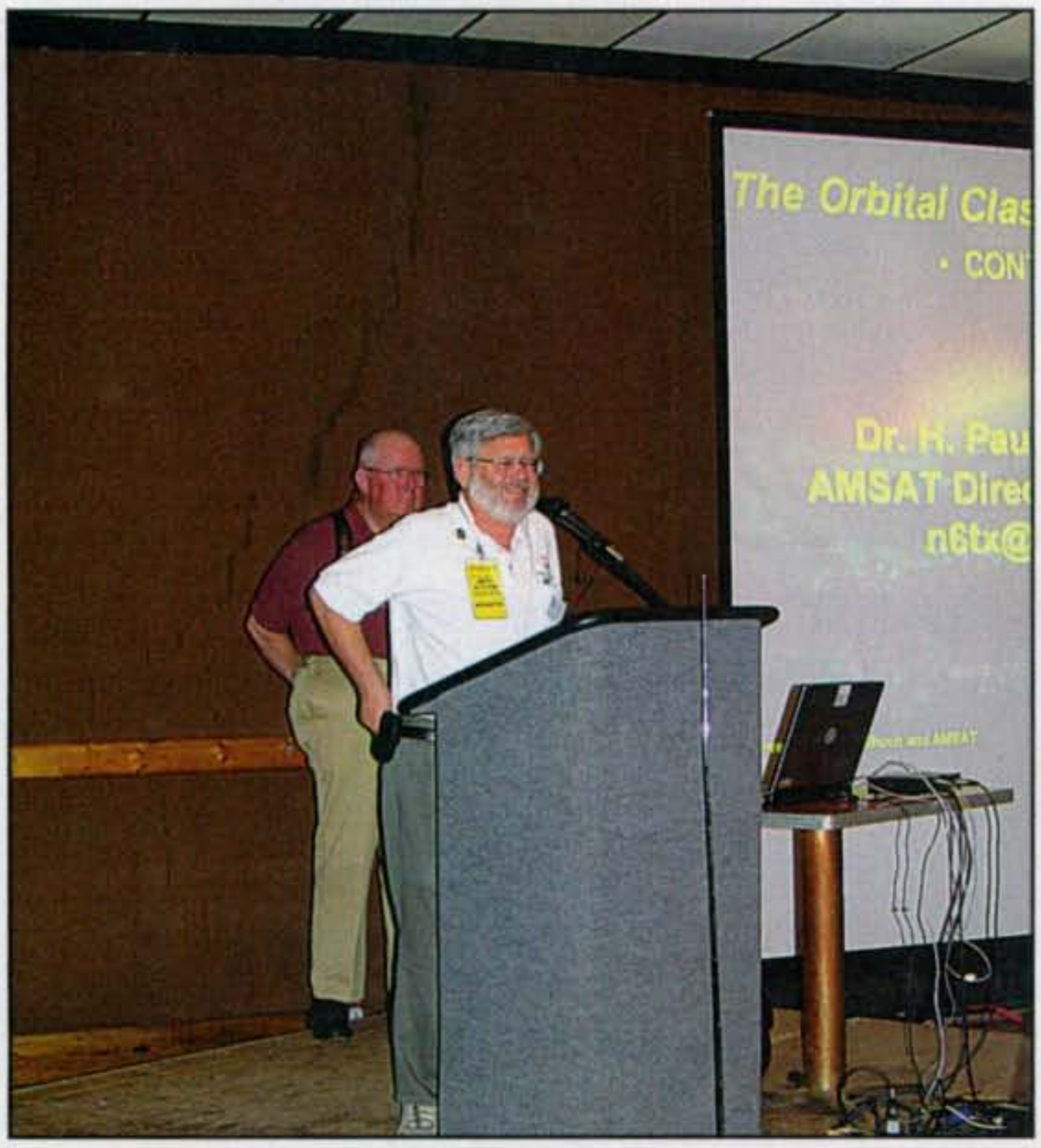
From the perspective of those of us on the VHF+ ham bands, there were exciting presentations. The guys at AMSAT touted their partnership with AMSAT-DL and the future launches. Gordon West, WB6NOA, demonstrated the AVMAP GPS RX and how it can be married to the Kenwood D7 or D700 radios for APRS tracking. Weak-signal gatherings at the Shuckin' Shack restaurant on Thursday night and the banquet on Friday night at the Holiday Inn North were well attended, as was the VHF forum on Saturday. Plus, there were lots and lots of VHF-related goodies in the flea market. Even with all of this activity, one still wonders about the future of the hobby in general and our specific niche. Here are a few of my observations:

First, AMSAT. The AMSAT people have lofty goals for the future. What has to happen, however, is funding. It will take lots of money to launch these satellites in the coming years. It is my suggestion that AMSAT seriously consider hiring a director of development to do some major fundraising from some major contributors in order to secure the needed financing. In addition, AMSAT needs to find a way to keep the sizzle of its projects alive during the months and years of development.

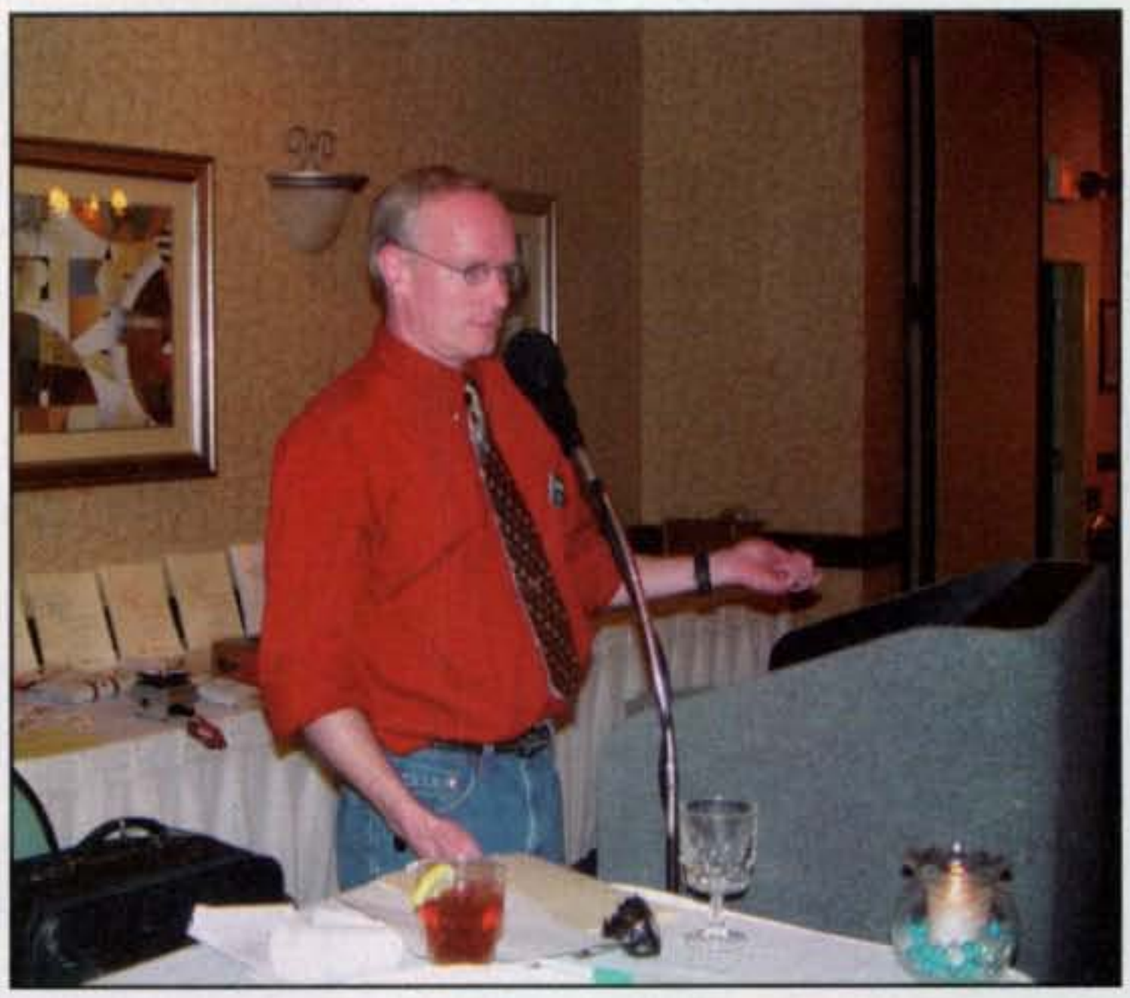
One way in which they are working on keeping the interest alive is via the new Eaglepedia program. Eaglepedia is the communications media used by the Project Eagle developers, and it was opened to all AMSAT members beginning on June 10, 2006. If you are an AMSAT member, you can go to <http://www.amsat.org> and access these development pages.

Another way that AMSAT is working on keeping the sizzle alive is via the Suitsat program. The first deployment captured worldwide media coverage and brought a lot of attention to amateur radio. Another Suitsat is scheduled for deployment next year. Hopefully, school projects can be developed that will piggyback on the deployment so as to involve more and more school children in learning about AMSAT and amateur radio in general.

Speaking of education, Dr. Paul Shuch, N6TX, recently was appointed to be AMSAT's Director of Education. Beginning with the spring issues of *CQ VHF* magazine and the *AMSAT Journal*, Paul began running columns related to education. This education of our



Dr. Paul Shuch, N6TX, accompanied by Keith Pugh, W5IU, encouraged educators to become involved in Project Classroom during a forum at Dayton. (N6CL photo)



Brian Justin, WA1ZMS, tells how he made all of those record-setting GHz QSOs during the Friday night VHF banquet at the Dayton Hamvention®. (N6CL photo)

Russ Hummel, WB4PGT, models Suitsat, accompanied by Lou McFadin, W5DID, who provided much technical support for its success. Look for an announcement of the next Suitsat later this year. (N6CL photo)

youth is a wide-open opportunity, and it need not stop with our youth. We need to find ways of educating adults as a way of recruiting them into the hobby. I believe that all age groups can be successfully targeted for recruitment. For example, as members of my generation begin to retire, amateur radio can be touted as a hobby that has so many applications for the increased leisure time available to us. For example, the use of APRS tracking in a growing hobby called "geocaching" is one such untapped use of our hobby.

This tracking system has a huge upside potential. It has been used in emergency communications, ballooning, and bike and motorcycle rallies, as well as parades. Its precise locating feature lends itself to many, many applications. Couple an APRS beacon with an ATV transmitter and the tracker cannot only watch the positioning of the beacon, but also see the environment. Such an application is being used in balloon launches, but also can be used in other areas, such as bike and motorcycle rallies, where the environment may need to be known by the participants.

Finally, we need to support our manufacturers and dealers. Through advertisements in magazines such as *CQ* and *CQ VHF,* they provide information about the latest and greatest toys for the hobby. We need to support them by buying the products. We also need to support them by telling them what products we would like to see developed.

For example, the new ICOM IC-7000 touts a fancy microphone that allows almost complete control of the radio from it. This is a great idea for the mobile operator. However, what about the fixed-station operator? One way of using the controls of the microphone is to plug it into one of the two mic jacks on the radio. What if you want to use a fancy aftermarket mic, such as something from Heil Sound? You need to plug that mic into the other jack. Now you have two microphones plugged into two jacks. What if instead of two mics, a keypad specifically designed around the controls built into the ICOM mic was developed and could plug into one or the other jack? A logical developer for such a keypad would be LDG, since the company has already developed an aftermarket antenna tuner for the radio.

As the saying goes, "If you are not part of the solution, you are part of the problem." Which part are you playing, the problem or the solution? It's your hobby, so you had better make up your mind as to whether or not you want it to have a future. For me, as long as I can, I intend to be part of the solution by way of this column and editorship of *CQ VHF* magazine.

I would love to publicize your efforts in also being part of the solution. If you have some ideas, please let me hear from you. Until next month… 73 de Joe, N6CL

BY TED MELINOSKY,* K1BV

Special Event Stations Award and Awards from Slovakia

Every day, and especially on weekends, you can find stations operating to commemorate one kind of special event or another. You've probably heard them on 20 meters SSB soliciting contacts.

The range of topics is truly astounding. Representative events include the 399th Anniversary of Jamestown Island (VA), Amusement Park Physics and Communications Day (PA), C. Grover Cleveland Birthplace (IL), D. Delta Junction Friendly Frontier Days (AK), and E. CQ Memorial Day (NJ). These were actual scheduled special event stations that planned to operate during May 2006, and each of them offered a certificate for making one contact with the keynoted station. Best of all, there was no charge for any of them, except that you should supply return postage. This is a cross section of Americana that covers an amazing array of history, education, and patriotic activities.

Where do you find out about these events? *CQ* lists them in the "Announcements" section in the front of the magazine. *QST* lists them in the appropriately named "Special Events" section.

Some of the certificates are really well-designed, such as the sample from the Upper Cumberland Amateur Radio Association (TN) commemorating a Railroad Rendezvous in 2005. The evil, grinning villain and the beauty tied to the railroad tracks recall the days of silent movies and the "Perils of Pauline" tragi-comedy. In this case, the award sponsors were assisted by the Cookeville Chamber of Commerce, which contributed to the professional layout of the award.

Not all such award certificates are as attractive. However, the cost of most of them is low, the number of events is large, and your contact with these little groups helps to promote the awareness of the event. Everyone wins.

Special Event Century Club Award

Stop the presses! Just as I was writing this month's column, VE3TMG sent me the details of an award for working special event stations. It's a perfect tie-in designed to provide a little stimulus to work this fascinating sub-division of awards. Here are the award details:

The SECC award is issued to any licensed amateur radio operator who has worked and confirmed contacts with 100 special event stations. For the initial award you only have to work and confirm 25 special event stations. You can upgrade the award in increments of 25, up to a total of 100 contacts. Stickers are available for 50, 75, and 100 stations. All bands and modes okay. Only two-way simplex-type contacts count. No contacts on repeaters, satellites, IRLP, or Echolink count for this award. Contacts are valid on or after January 1, 2006. You must have the QSLs in your possession.

USA-CA Special Honor Roll

Larry (Frosty) Phillips, WØFP
USA-CA All Counties #1135
May 16, 2006

USA-CA Honor Roll

500
WØFP.....3375

1000
WØFP.....1713

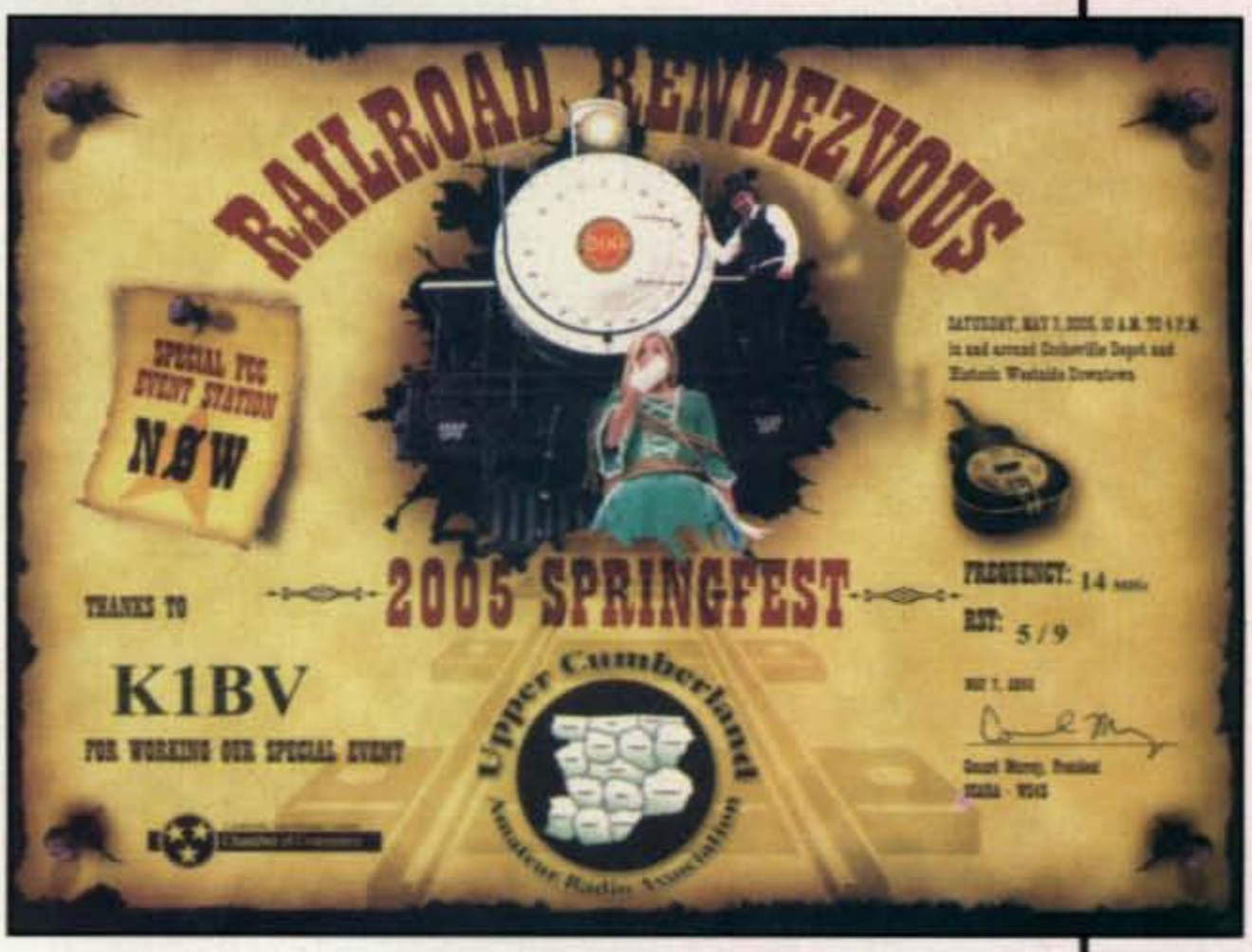
1500
WØFP.....1436

2000
KU4YM.....1329
WØFP.....1330
K4IJQ.....1331

2500
WØFP.....1248

3000
WØFP.....1158

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.



In 2005 the Upper Cumberland Amateur Radio Association (TN) commemorated Railroad Rendezvous with a special event station.

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

The application form is available on website listed below. Send completed form along with fee of $US5.00 and a copy of at least 10 of your QSL cards or certificates to Terry Greenwood, VE3TMG, 2210 Janette Ave., Windsor, ON, N8X 1Z8, Canada; internet <http://www.mnsi.net/~tgreen/newaward.html>.

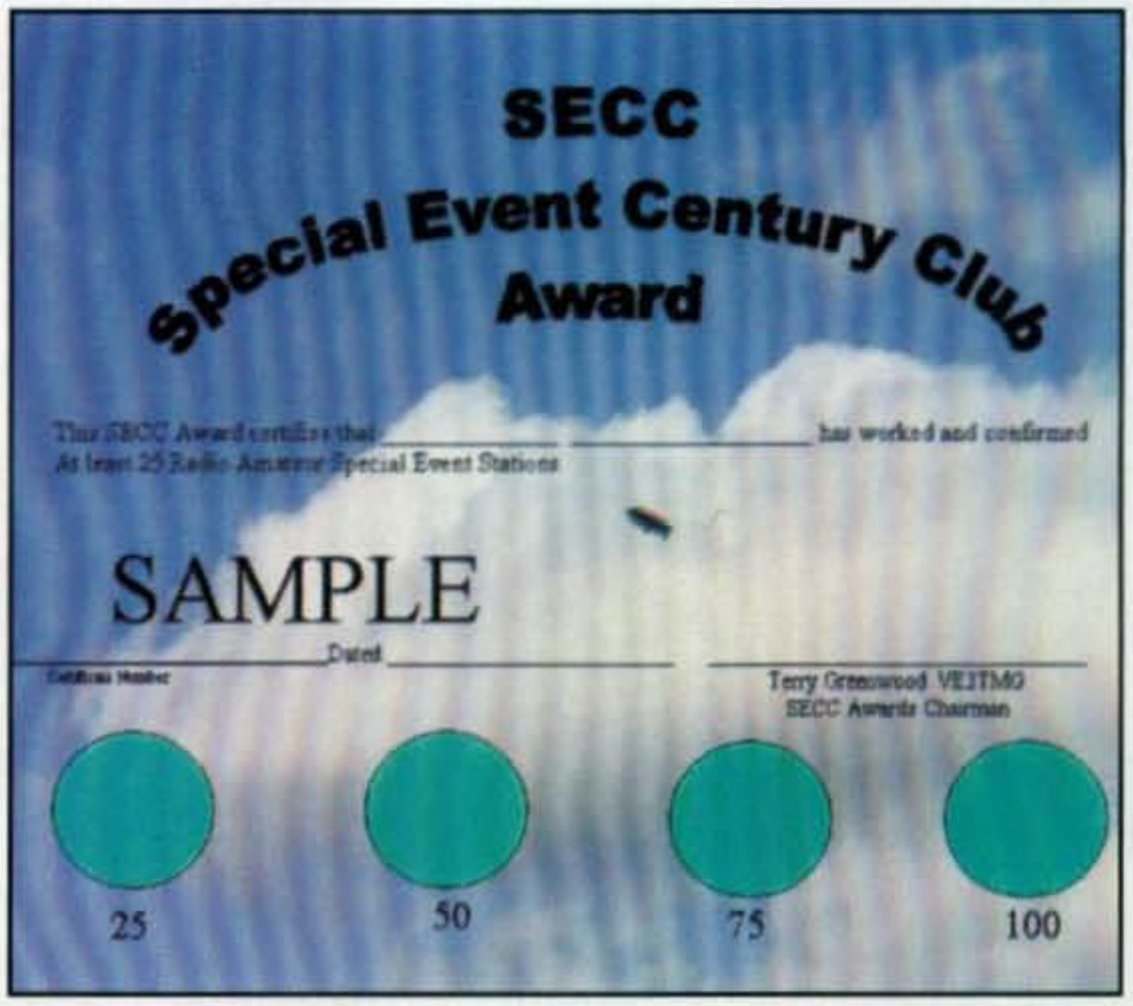
Slovak Assn. of R. A. Awards Series

Nestled in central Europe, the country of Slovakia comprised the eastern portion of the nation of Czechoslovakia. On January 1, 1993 a peaceful division created the Slovak Republic and the Czech Republic.

The Slovak Republic is a small country, an area only about twice the size of New Hampshire, and has a population of about 5.5 million. OM stations can be heard in just about all DX contests, and a great time to work them in order to earn these awards is in their annual contest, which is shared with the Czech Republic each year in mid-November.

The Slovak Association of Radio Amateurs sponsors a colorful series of awards. Most of them are fairly easy to earn, and their fee structure is modest—a good combination. The Slovakian equivalent of our county is the *okre* (there are 79 of them), and during their contest that is part of the exchange as a three-letter abbreviation.

General Requirements. All bands and modes except as indicated. No repeater contacts. SWLs may earn the awards under the same conditions. Send GCR list and fee of 5 Euros, $US7, or 10 IRCs (endorsements are 2 Euros, 2 IRCs, or $US2) to: Milan Horvath, OM3CDN, Lopenicka 23, 831 02 Bratislava, Slovakia (a self-addressed label is welcomed); internet: <http://www.hamradio.sk>.



The Special Event Century Club Award is issued for confirmed contacts with 100 special event stations.

Diplom Slovensko. Issued for contacts with different okres after Janusry 1, 1997. OM, OK, HA, OE, SP, and UR need 50 okres; other Europeans need 30 okres; DX stations need 15 okres. Foreign stations may use contacts made during the OK/OM contest. A log excerpt must be enclosed with your application.

Diplom Slovakia. Contacts after January 1, 1993 count for the award. All bands and modes except repeaters allowed. OM9HQ (OM3KAB), the HQ station of the SARA, equals 2 QSOs. Slovak stations need 10 different OM stations, 3 of them from Bratislava. European stations need 5 different OM stations, 2 of them from Bratislava. All others need 3 different OM stations, 1 of them from Bratislava.

Bratislava Award. Bratislava, the capital of the Slovak Republic, celebrated the 200th anniversary of its founding in

The Slovak Association of Radio Amateurs sponsors the Diplom Slovensko for contacting the "okres" (counties) of the Slovak Republic.

The Diplom Slovakia is issued for contacting stations with the OM prefix.

To earn the Dipl W-100 OM Award, contact at least 100 different Slovak stations (OM prefix).

1991. This permanent award is available to all amateurs and SWLs for contacting Bratislava stations since January 1, 1991. All bands, including repeaters allowed. Slovak stations need 10 different contacts, Europeans 5, DX 3.

Dipl W-100 OM Award. Contact at least 100 different Slovak stations (OM prefix) after January 1, 1993. SWL okay. Contacts must have been made from the same country. All bands and modes allowed. No use of packet or repeaters. There are separate certificates for CW, SSB, RTTY, and Mixed. Separate certificates are issued for each successive 100 contacts (200 up to 700). Minimum allowed reports are 33 or 339 both ways.

Slovak Republic WW Locator Award. Contact Slovak stations (SWL okay) in different geographical coordinates established by the WGS system on or after January 1, 1993. Only one QSO permitted from each locator. Endorsements are available for single band or mode as requested. The locator must be noted on the QSL card by the contacted station, not by the applicant. In the case of handwritten locators, the locator has to be countersigned by the original operator, not the applicant. The application must be accompanied by an alphabetical list of cards, using the following format as an example:

LOC	Call	Date	Band	Mode	QTH/okres
JN88NC	OM3FR	01.01.93	3.5 MHz	CW	Bratislava/BAE
JN98HS	OM4TX	10.05.95	7 MHz	SSB	Prievidza/PRI
JN99TB	OM6PR	17.07.94	10.1 MHz	CW	Lip. Mikulas/LMI
KN08MO	OM8AQ/p	23.03.97	3.5 MHz	CW	Cana/KEO
KN08OR	OM8AQ	30.09.00	3.7 MHz	SSB	Kosice/KEB

Europeans need 25 different locators, all others 5 with great (large-scale) locators: JN87, JN88, JN89, JN97, JN98, JN99, KN08, KN09, KN18, KN19.

Looking for some help in publicizing your group or club's award? *CQ* magazine can help. Send all details and samples to me to review.

73, Ted, K1BV

Contact Bratislava, the capital of the Slovak Republic, stations to earn the Bratislava Award.

Contact Slovak stations in different geographical coordinates established by the WGS system for the Slovak Republic WW Locator Award.

dx

BY CARL SMITH,* N4AA

Lightning, A Serious Matter

As I sit here writing this column today, in mid-June, I am looking out over the mountains of western North Carolina at some pretty severe thunderstorms. Lightning is flashing, thunder crashing, and I am thinking of two of my ham friends over in eastern Tennessee. Both were hit by lightning recently. One suffered thousands of dollars of damage to antennas and equipment. The other was more fortunate, as he heard the storm approaching and was able to disconnect most of his cables before the lightning struck. Still, he was off the air for an extended period of time while the damaged equipment was evaluated and replaced/repaired. The first case obviously took considerably longer to put all of his gear back in operating order.

Some of us are more prone to lightning than others, but everyone should take it very seriously. Personally, I've been hit twice in my 50-plus years of hamming. The first was many years ago when I was a teenager and still lived at home. It was over 40 years before it happened again, but that time the damage was more severe. I lost antennas, equipment, etc., to the tune of around $6000. It took weeks to get it all put back together.

Nowl often watch the Weather Channel, and if I even *think* there might be a storm in the area, the cables come off everything—antennas, control cables, power cables, etc. Computers all have UPS (uninterruptible power supplies), and telephone lines are protected as much as possible. Even with all that, lightning can still get in through grounds, AC lines, etc.

We can do a lot to protect our investments, but lightning has a way of doing its "thing" in spite of our efforts. I wish all of you the best through this year's thunderstorm season, as well as the hurricane season.

DX Activity

DXing has been just a bit tough so far this year. There have been some DXpeditions and some DX activity, but that pesky old sun just doesn't want to cooperate right now. Many DXers have found other outlets for their "habit" while waiting out the solar cycle.

I have found a lot of HF DXers experimenting with other modes and bands this year. RTTY has taken on a life of its own, with a huge number of spots on the clusters for that mode. Then there is PSK showing a lot of activity, too. Recently (early June), 6 meters has been wide open with propagation from the USA to Europe and even Japan. The ARRL's June VHF QSO Party found the band open for hours on end, with many stations working the whole country and beyond. I had not been on six meters for many, many years, but even I found time to get an antenna working on 6 and made a lot of contacts. Unfortunately, I didn't have time to get the antenna up in the air, so the six-element Yagi was used with it just lying on the roof of the house pointing NNW. Even so, it was possible for me to hear a lot of HF DXers working the contest. Doug, K1DG, was in there along with Dennis, K7BV, and a lot of other calls I recognized from the low-band pile-ups. The grid-square business was something relatively new to me, but I

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e-mail: <n4aa@cq-amateur-radio.com>

In April Jim, WØNB, had the opportunity to visit China. Here he is with the welcoming committee at the Shanghai Amateur Radio Club station. Left to right: Shanghai's first ham, Xu Ru, BA4AA; WØNB; and Hu Song Qing, BA4HU. (Photo courtesy of Jim, WØNB)

Tom, N4XP (right), says Roman, RZ3AA, visited with him for three days after the Dayton Hamvention®. (Photo courtesy of Tom, N4XP)

Dr. Kevin Roberts operating from AH8LG as AH8/W9EYE. He was with a group of volunteers working on repairing children's eyes in American Samoa and in the evening getting on the air. (Photo courtesy of Larry, AH8LG)

Paul, HC7AE, operates from an oil-pumping station in Dayuma, Provincia de Orellana, "Acua Territory" in the Amazon Jungle of Ecuador. He uses an FT-100D and 20-meter dipole. (Photo courtesy of Rick, NE8Z)

quickly figured it out and had a great time . . . until my XYL informed me that I was "talking through all the television sets in the house." That pretty much ended my participation in the contest. Now I have to figure a way to get that antenna away from the house . . . hmm-mmm.

Upcoming DXpeditions

Glorioso, FR/G: We are anxiously awaiting word from Dany, F5CW, on just when this operation will finally take place. He confirmed that the nasty *chikougounia* disease that delayed the group earlier has been brought under control, and they are waiting for final word from the authorities on when they will be allowed to go to Glorioso. He says it is still expected to be in late October.

Cook Islands: We have heard that New Zealand will be assigning a new prefix for the Cook Islands sometime this summer. It is reported that the ZK prefix will be changed to E5. You may hear that E5 prefix sometime after July 1, but the date has not been confirmed.

Afghanistan: Although I have not seen confirmation yet, it is reported that the YA prefix is being replaced with T6. There have been some T6 calls on the air, but Ross, EX1UN, says he was issued the first "official" license of the Afghan Amateur Service—T61AA.

Montenegro: By the time you read this, Montenegro may be a "New One" with a new prefix. The people of Montenegro voted for independence and the new government applied for UN membership. That is one of the two ways for Montenegro to be added to the DXCC list as a New One. The other is for the ITU to assign it a new prefix. As soon as one or the other happens, there will be a flurry of activity to put those new

The WAZ Program

10 Meter SSB

577 ..... KR4W

15 Meter SSB

628 ..... YB2VTO 629 ..... JA8JOZ

20 Meter SSB

1147 ..... ZS6NK 1148 ..... W6IGK

10 Meter CW

194 ..... OH2BCK

15 Meter CW

328 ..... OH2BCK

160 Meters

229 ..... DL9YX 231 ..... HA9RT
230 ..... WA5VGI 232 ..... DJØMDR

All Band WAZ SSB

4996 ..... K2CVG 4998 ..... K2AQ
4997 ..... DL6MRS 4999 ..... IK2DZN

Mixed

8408 ..... UAØCA 8409 ..... KM4H

CW

485 ..... UR5MA

Satellite

23 ..... VR2XMT

Rules and applications for the WAZ program may be obtained by sending a large SAE with two units of postage or an address label and $1.00 to: WAZ Award Manager, Floyd Gerald, N5FG, 17 Green Hollow Rd., Wiggins, MS 39577. The processing fee for all *CQ* awards is $6.00 for subscribers (please include your most recent *CQ* mailing label or a copy) and $12.00 for nonsubscribers. Please make all checks payable to Floyd Gerald. Applicants sending QSL cards to a *CQ* checkpoint or the Award Manager must include return postage. N5FG may also be reached via e-mail: <n5fg@cq-amateur-radio.com>.

CQ DX Awards Program

SSB Endorsements

320 ..... YU4VN/326 300 ..... W4PGC/302

CW Endorsements

250 ..... W4PGC/262 200 ..... K6UXO/240

The basic award fee for subscribers to *CQ* is $6. For nonsubscribers, it is $12. In order to qualify for the reduced subscriber rate, please enclose your latest *CQ* mailing label with your application. Endorsement stickers are $1.00 each plus SASE. Updates not involving the issuance of a sticker are free. All updates and correspondence must include an SASE. Rules and application forms for the CQ DX Awards may be found on the <www.cq-amateur-radio.com> website, or may be obtained by sending a business-size, self-addressed, stamped envelope to CQ DX Awards Manager, Billy Williams, N4UF, Box 9673, Jacksonville, FL 32208 U.S.A. Currently we recognize 335 active countries. Please make all checks payable to the award manager.

5 Band WAZ

As of JUNE 1, 2006, 700 stations have attained the 200 zone level and 1502 stations have attained the 150 zone level.

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

VO1CV NRØX

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

N4WW, 199 (26)
W4LI, 199 (26)
K7UR, 199 (34)
W2YY, 199 (26)
VE7AHA, 199 (34)
IK8BQE, 199 (31)
JA2IVK, 199 (34 on 40m)
IK1AOD, 199 (1)
DF3CB, 199 (1)
GM3YOR, 199 (31)
VO1FB, 199 (19)
KZ4V, 199 (26)
W6DN, 199 (17)
W3NO, 199 (26)
HB9DDZ, 199 (31)
RU3FM, 199 (1)
HB9BGV, 199 (31)
N3UN, 199 (18)
OH2VZ, 199 (31)
W1JZ, 199 (24)
W1FZ, 199 (26)
SM7BIP, 199 (31)
SP5DVP, 199 (31 on 40)
N4NX, 199 (26)
N4MM, 199 (26)
EA7GF, 199 (1)
N6HR/7, 199 (37)
JA5IU, 199 (2)
CT3DL, 199 (26)
NØIJ, 199 (21)
RU3DX, 199 (6)
N4XR, 199 (27)
WØPGI, 199 (26)
HA5AGS, 199 (1)
EA8AYV, 199 (27)
W6XK, 198 (17, 34)
EA5BCX, 198 (27, 39)
G3KDB, 198 (1, 12)
KG9N, 198 (18, 22)
JA1DM, 198 (2, 40)
9A5I, 198 (1, 16)
K5PC, 198 (18, 23)
K4CN, 198 (23, 26)
G3KMQ, 198 (1, 27)
N2QT, 198 (23, 24)
OK1DWC, 198 (6, 31)
W4UM, 198 (18, 23)
US7MM,198 (2, 6)
K2TK, 198 (23, 24)
K3JGJ, 198 (24, 26)
W4DC, 198 (24, 26)
F5NBU, 198 (19, 31)
OE2LCM, 198 (1, 31)
HA1RW, 198 (1, 31)
WK3N, 198 (23, 24)
W9XY, 198 (22, 26)
KZ2I, 198 (24, 26)
WA5VGI, 198 (34, 37)
K7BG, 198 (17, 22)
W7VJ, 198 (34, 37)
WØCP, 198 (18, 40)
K9MIE (18, 21)

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

UAØCA (190 zones)
OH2BK (160 zones)
W4GMY (162 zones)
KM4H (162 zones)

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

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

calls on the air, and then to get those QSOs confirmed to add to your DXCC totals.

DXCC Fee Increase

The revised DXCC awards fee schedule becomes effective July 1. The ARRL DXCC Desk has announced DXCC program fees will rise slightly when a new awards fee schedule goes into effect on July 1 <http://www.arrl.org/news/stories/2006/05/23/3/fees-06Jul.html>.

The fee for a basic DXCC application (including certificate and pin for initial applications only, 120 QSOs maximum) and for first endorsement applications within a year will increase to $12 for ARRL members and $22 for foreign nonmembers.

Second and subsequent endorsements (up to 120 QSOs maximum) within a year will be $22 for ARRL members and $32 for foreign nonmembers.

The $10 fee for a basic DXCC application (120-credit maximum) was established in 1990, and the current overall fee schedule has been in effect since 1998.

"It costs us to provide this service," explains ARRL Membership Services Manager Wayne Mills, N7NG. "We don't make any money from DXCC." The cost of other DXCC-related items such as plaques and pins also will go up July 1. Mills advised that DXCC fees will increase further in the years ahead, possibly at two-year intervals, at least to catch up with the Consumer Price Index, which has risen 49 percent since 1990. He estimates the active population of DXCC members at between 15,000 and 18,000.

Clarification: The 120 QSO maximum applies to the stated fee charged for initial or endorsement applications. You may submit more than 120 QSOs, but you will be charged 15 cents per QSO for all over the first 120 QSOs. Also, the "120" for endorsement and/or subsequent submissions *will be increased* from the current 100 to 120 under the new fee schedule.

Dayton Recap

Allow me a moment to recap this year's Dayton hamvention®.

I spent most of my time around the CQ booth this year. I also spent some time across the aisle with Bob Locher, W9KNI, at the Bencher booth. Roger, G3SXW, was there and we spent some time talking about his DXploits. I was a little surprised when he told me he had acquired an Elecraft K2/100 to replace his trusty Kenwood TS-570 for DXpeditioning. He explained it by saying it was a "weight" thing. The K2/100 and a small switching power supply weigh far less

QSL Information

In response to a recent inquiry about the route for QSLs formerly handled by John Parrot, W4FRU, John Shelton, K1XN, editor of "The Go List," provided the following. I hope you find it useful.

New QSL Routes: The QSL Managers Society (http://www.qsl.net/qslmanagers) was created to protect and preserve amateur radio DX and DXpedition logs and to make QSL cards available for all such logs, no matter how old. In March 2003, the QSL Managers Society was approached by Bob Young, K4JDJ, about taking over the logs that he was handling (many of them were those from the late John Parrot, W4FRU) and on April 5, Bob Schenck, N2OO, and Skip Maze, N1IBM, drove down to Virginia to pick up 60 logs and some 100,000 blank QSL cards. Thirteen new QSL managers were solicited among the members of the QSL Managers Society to take over these logs, and on April 23 the logs and appropriate blank cards were shipped to their new homes.

The new QSL routes for cards formerly handled by W4FRU and/or K4JDJ are as follows:

Station	via	Time Period
1SØXV	N2OO	Apr – May 90
1S1RR	N2OO	11–12 May 90
3WØA	K2PF	Jan 89 – Feb 89
3W100HCM	K2PF	May 90
3W7A	K2PF	Mar 90
3X1Z	K2PF	Aug 81 – Nov 82
5NØDOG	NZ9Z	11 May 79 – 17 Mar 81
5NØRMJ	K2PF	Jun 80 – Mar 81
5N20DOG	NZ9Z	Oct 80
5N20RMJ	K2PF	Oct 81
5N4ROF	K1BV	21 Sep 80 – 13 Apr 81
5T5ZZ	K1BV	Jun 81 – Dec 81
5Z4BI	NZ9Z	2 Sep 89 – 4 Jul 93
8R1ZG	NZ9Z	12 Feb 96 – 21 Jun 97
9MØS	N2OO	26 May – 2 Jun 93
9X5AA	W9OL	15 Nov 87 – 19 Dec 89
A4XYS	W9OL	Sep 83 – Mar 84
BS7H	KU9C	1995 and 1997
E30GA	N2OO	4–17 Nov 98
ET3USE	W2GR	8 Dec 73 – 3 Feb 75
FB8WJ	N2OO	
FM5WE	WF1N	Oct 85 – Dec 2001
FR7BE	N1IBM	Jun 78 – Mar 79
J28EM	W1TE	Jul 85 – Jul 87
KB4ATV/4S7	W9OL	Apr 84
KX6PO	W9OL	10 Jun 83 – 14 Dec 83
S21A	N2VW	Jul 92 – Oct 95
S21B	K2PF	Nov 92 – Apr 2000
S21NQ	W2GR	5 Jun 91 – 30 Sep 91
S21ZG	AA1M	7 Dec 92 – 27 Jul 94
TA1A	N1IBM	1 Mar 88 – 2 Jan 89
TOØR	N2OO	26 Dec 96 – 2 Jan 97
TOØR/mm	N2OO	Jan–Feb 97
TYA11	W9OL	19–21 Jun 81
V29A	W9OL	Nov 88 – May 91
VKØIR	N2OO	14–27 Jan 97
VK4NIC/3X	W2GR	7 Nov 80 – 20 Apr 81
VP8CBC	N2OO	Dec 94
VP8CRB	N2OO	Dec 94
VP8CRC	N2OO	Dec 94
VP8SGP	N2OO	6–15 Jan 95
W3IVP/5N1	K2PF	Mar–Apr 81
WZ6C/MM/S21	W2GR	
WZ6C/S21	W2GR	18 Jan 92 – 31 May 92
WZ6C/ST4	W2GR	29 Nov 89 – 22 Oct 90
XVØSU	K2PF	Apr 90
XVØSU/mm	K2PF	Apr 80
XV100HCM	K2PF	May 90
YB1AQC	W9OL	16 Feb 88 – 11 Oct 88
ZD7BJ	N1IBM	Dec 86 – Sep 96
ZD7HH	N1IBM	14 Sep 79 – 4 Jan 81, 26 May 00 – 12 Oct 00
ZD7XY	N1IBM	20 Oct 95 – 7 Jun 96
ZD8HH	N1IBM	25 Mar 87 – 5 May 90
ZD8XX	W9OL	5 Aug 89 – 24 Aug 89, 30 May 91 – 10 Jun 91
ZD9BV	WB2YQH	1 Mar 81 – 17 Oct 2000
ZD9CK	WF1N	Mar 86 – Oct 87
ZD9CN	K1BV	Jun 90 – Jul 90
ZD9CO	WF1N	Aug 90 – Dec 91, Jan 93 – Nov 93
ZD9YL	WF1N	May 82 – Sep 83
ZS1EDR	K1BV	May 90 – Mar 92

(The table of QSL Managers is courtesy of John Shelton, K1XN, editor of "The Go List," 106 Dogwood Dr., Paris, TN 38242; phone 731-641-4354; e-mail: <golist@golist.net>.)

CQ DX 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	229	F6HMJ	182
VE3XN	217	K2SHZ	182
HAØDU	217	N4NX	182
KØDEQ	207	KØCA	181
N8PR	200	OK1AOV	181
HA1RW	197	W5ODD	177
JN3SAC	194	K2AU	177
N4MM	194	NØFW	176
W4UM	193	ON4CAS	175
BA4DW	188	K8OOK	175

SSB

VE7SMP	182	NØFW	176
KØDEQ	180	N4MM	176
W4ABW	177	W4UM	176

CW

KØDEQ	198	KØCA	175
W4UM	184	N4MM	175
JN3SAC	181		

The CQ DX Field Award Program

Mixed

71	HA1RW	74	CT3EE
72	VA2SG	75	OE3JAG
73	WF4W		

SSB

42	AE6RR	43	CT3EE

CW

43	WF4W	45	N6MA
44	CT3EE		

Endorsements

Mixed

200	HA1RW/197	150	WF4W/154

SSB

100.....DL3DXX/175

CW

200	100	WF4W/123
DL3DXX/203	3.5/7 MHz	WF4W

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.

than the TS-570 and are easier to carry. Also, Roger says the K2 is an excellent radio. I wonder where Roger will turn up next? Wherever it is, he is sure to make a lot of DXers happy.

Another event at Dayton made my day. Way back in my early days of ham radio, late 1954 and early 1955, I literally ran home from school each day to get on the air. Almost daily I talked to Jon, WNØUHL. We lost track of one another as we each went our separate ways after getting the General class ticket, etc.

A few months ago I got a letter from John, along with copies of some of his old log pages showing WNØYFT on almost every day. To say I was surprised is an understatement. He had seen the DX column in which I had mentioned some of my old calls and he remembered me. Well, Jon said he was coming to Dayton and we agreed to meet at the CQ booth. Sure enough, he showed up, and we spent a long time talking about our lives after our "novice" days. Jon still lives in Kansas, while I've been all over the country. We had never met, and it was a special treat to meet him after 52 years. Thanks for the memories, Jon. We'll try to stay in touch in the future.

Some of you will note the absence of the WPX Award Program box and Honor Roll. We'll be back with those in the October column.

That's a wrap for this month. I hope to see you on one of the bands or in some contest along the way. Until next time, enjoy the chase and Have Fun!

73, Carl, N4AA

contesting

BY JOHN DORR,* K1AR

How is Contesting Doing These Days?

August's Contest Tip

Hearing is winning—especially when it comes to low-band operating. Until just recently, achieving acceptable listening conditions meant that you needed to install beverage antennas that often were longer than the width of most developed countries. Now there are new "short verticals" and other alternatives available to deal with the problem. This month's tip is simple: Check out the latest products that deal with low-band reception. Implementation undoubtedly will result in better scores—both in logging weak stations and getting their calls/exchanges right!

More often than not, when I return from my annual trek to the Dayton Hamvention® I inevitably reflect on the state of contesting. It may be because I've just enjoyed seeing so many of my contesting friends in that once-a-year setting, or the fact that more and more of them have gray hair, or less hair, than the previous year.

While I'm hardly qualified to provide the definitive state-of-the-union, I can at least offer an opinion. So how is contesting doing these days? I'm glad you asked. The fact is that we do indeed have our challenges. While activity in contesting is at record levels (more on that later), so is our average age. I'm reminded every time I enter a group setting filled with fellow contesters that the vast majority appear to be "over-50" men, well on their way to retirement. As we engage in conversation, we talk about our college-bound kids, various ailments, retirement activities . . . and sometimes even a bit about contesting.

The current solar downturn is perhaps the biggest threat to the health of ham radio that we have ever experienced. Never before have we had to struggle with a world of competing goods that includes the internet, unrelenting antenna restrictions, sometimes high cost of entry, and a world that is more complicated and busy than ever before. Simply put, we're dealing with all of these issues at a time when band conditions are at their absolute low. It's hardly a scenario to get newcomers excited about contesting.

Of course, I'm exaggerating to make a point, but the challenges to our long-term viability are very real. However, the fact remains that there is significant room for optimism. As I mentioned earlier, activity in contesting is at an all-time high. All you need to do is tune the bands in virtually any major contest and observe the wall-to-wall activity, whether it be CW or SSB. The CQ WW DX Contest, for example, now routinely receives over 4,000 entries per mode, with over 25,000 stations operating in the contest. Its activity levels have been steadily climbing throughout the current solar decline. By these measures alone, you'd be hard pressed to observe contesting being in a state of crisis.

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Calendar of Events

All year	**CQ DX Marathon**
July 15-16	**CQ WW VHF Contest**
July 29–30	RSGB IOTA Contest
Aug. 5	European HF Championship
Aug. 5–6	North American CW QSO Party
Aug. 5–6	10-10 Int'l Summer SSB Contest
Aug. 5–6	ARRL UHF Contest
Aug. 6	SARL HF SSB Contest
Aug. 12–13	Worked All Europe CW Contest
Aug. 12–13	Maryland/DC QSO Party
Aug. 19–20	SARTG WW RTTY Contest
Aug. 19–20	North American SSB QSO Party
Aug. 19–21	New Jersey QSO Party
Aug. 26–27	ALARA Contest
Aug. 26–27	Hawaii QSO Party
Aug. 26–27	YO DX HF Contest
Aug. 26–27	SCC RTTY Contest
Aug. 26–27	Ohio QSO Party
Aug. 27	SARL HF CW Contest
Aug. 27–28	Kentucky QSO Party
Sept. 2	Russian RTTY Contest
Sept. 2–3	All Asian SSB Contest
Sept. 2–3	RSGB SSB Field Day
Sept. 23–24	**CQ WW RTTY Contest**
Oct. 28–29	**CQ WW SSB Contest**
Nov. 25–26	**CQ WW CW Contest**

There are other encouraging indicators as well. Generally speaking, contest club membership rolls continue to grow to new highs. This year's contest dinner at Dayton had a record number of attendees. The Contest Forum was standing room only, with scores of contesters filling a very large room. From the count we know of as of now (mid-June), WRTC (World Radio Team Championships) 2006 will have hundreds of guests flying to Brazil In July, and we know it will be a huge success for the Brazilian hosts.

Thus, much of this comes down to two key points: (1) interest in contesting is at an all-time high, and (2) so is the age of those playing the game. We are not challenged by the lack of participation in contesting; rather, we are confronted with the need to get younger hams involved.

A key initiative for Dayton next year will be the Contest University that Tim Duffy, K3LR, is trying to pull together (see <www.contestuniversity.com> for more information). While that is not an automatic draw for young contesters, it certainly will pull in its share and is a step in the right direction. Our broader objective should be to seek every opportunity possible to break down the barriers that exist for younger hams to get involved, beginning with access to existing contest stations. Take a look at what Dave Robbins, K1TTT, is doing to bring new operators along, and you'll be both impressed and hopefully motivated to do the same.

There is plenty of opportunity to contribute. It just takes a little commitment and focus. Give it some thought, and you'll probably agree that contesting

Tim Duffy, K3LR, receiving his CQ Contest Hall of Fame plaque from CQ WW Contest Director Bob Cox, K3EST, at the 2006 Dayton Contest Dinner. (Tnx K8CX)

is still doing pretty well. The long-term ball is still in our court!

CQ Contest Hall of Fame Induction Ceremony

For those of you who don't know, the CQ Contest Hall of Fame induction ceremony takes place every year at the Contest Banquet in Dayton. This year, Tim Duffy, K3LR, and Bill Fisher, W4AN (SK), were the recipients of this prestigious honor, ably led by CQ WW Contest Director Bob Cox, K3EST. *(Also see the July issue of* CQ *for the announcement of this year's recipients of* CQ*'s Contest, DX, and Amateur Radio Halls of Fame.—ed.)*

Tim Duffy was introduced by two well-known contesters, N9RV and K8AZ, both highly accomplished operators themselves. It was a moving experience to hear the accolades come from both Pat and Tom, respectively. As I can attest from personal experience, the Hall of Fame ceremony is one of those rare times at Dayton when tears come to many eyes. Pat and Tom both did the process proud.

We also had the honor of inducting Bill Fisher, W4AN, into the Contest Hall of Fame. Although Bill passed away two years ago, his presence is still being felt in contest circles, as has been widely discussed in this venue and elsewhere. Hal, N4GG, did a tremendous job of honoring Bill and thanking him on behalf of all of us for his contributions to the sport of contesting.

I'm honored to pass along my personal congratulations. The contesting world is a better place because of all they have given to us. Thank you!

A Great New Product for Contesters

What makes a proficient contester? What makes a good operator? For most of us, it takes years of hard work and practice. Practice, participation, and persistence are key factors. Contesters indeed possess unique operating skills, capabilities that we were not born with and that are not covered or learned by reading any radio's manual or handbook, or by being on the neighborhood repeater or down at the local radio club.

Using over 24 hours of raw material, Don Daso, K4ZA, has edited and collected the experience, wisdom, and opinions of 50 of today's contesters in one place—a special two-disc DVD compilation, running two hours, 49 minutes. *Contest Video Essay, A Look At Radiosport,* provides unique and personal insights into this aspect of ham radio.

The collection premiered at the Dayton Hamvention® in May and is now available directly from K4ZA. The DVD boxed set is $40; a VHS tape is $20. If you'd like to place an order or want more information, contact Don directly via e-mail at <K4ZA@juno.com> or via snail mail at 515 Withershinn Drive, Charlotte, NC 28262.

Final Comments

I'm running short on time this month. Can you believe the 2006 CQ WW SSB DX Contest is only about 90 days away (depending on when you're reading this)? Time sure flies! Hope to see you on the bands.

73, John, K1AR

BY TOMAS HOOD,* NW7US

Solar Wind and Coronal Holes

A Quick Look at Current Cycle 23 Conditions
(Data rounded to nearest whole number)

Sunspots
Observed Monthly, May 2006: 22
Twelve-month smoothed, November 2005: 25

10.7 cm Flux
Observed Monthly, May 2006: 81
Twelve-month smoothed, November 2005: 87

***Ap* Index**
Observed Monthly, May 2006: 8
Twelve-month smoothed, November 2005: 11

Space is not a vacuum, at least in our solar system. The sun's atmosphere actually extends very far out from the sun. Space in our system is filled with plasma, a low-density gas in which the individual atoms are charged. The temperature of the sun's atmosphere is so high that the sun's gravity cannot hold on to it. The plasma streams off the sun in all directions at speeds of about 400 kilometers per second (about 1 million miles per hour). This is known as the *solar wind*.

The speed of the solar wind fluctuates and carries with it magnetic clouds. These magnetic clouds are interacting regions where high-speed wind catches up with slow-speed wind. The solar wind speed is high (on average 800 km/s) over coronal holes and low (300 km/s) over streamers. These high- and low-speed streams interact with each other and alternately pass by the Earth as the sun rotates. These wind-speed variations buffet the Earth's magnetic field and can produce storms in the Earth's magnetosphere.

Coronal holes are an extended region of the corona that have exceptionally low density and "open" magnetic field topology. Coronal holes are largest and most stable at or near the solar poles and are a source of high-speed solar wind. However, those coronal holes situated at or near the solar equator tend to have the greatest impact on the Earth.

Coronal holes follow the rotation of the sun, taking about 27 days for a full revolution around the sun. This means that if the coronal hole lasts long enough, we'll see its influence on space weather every 27 days. When a coronal hole survives to make it around a second time, the coronal hole is said to be "recurrent." Coronal holes, then, are typically long-duration features, and since they spew out plasma at elevated speeds, degrade ionospheric propagation for days at a time.

The Earth has a magnetic field with a north and a south pole which are enclosed within a region surrounding the Earth called the "magnetosphere." As the Earth rotates, its hot core generates strong electric currents that produce the magnetic field, which reaches 36,000 miles into space. The magnetosphere prevents most of the particles from the sun, carried in solar wind, from impacting the Earth. The solar wind distorts the shape of the magnetosphere by compressing it at the front and causing a long tail to form on the side away from the sun. This long tail is called the *magnetotail*.

Let's look at the relationship between coronal material and magnetic fields. The corona is so hot that the gases in it lose some of their electrons in the powerful collisions between atoms. This plasma is a mixture of positively charged ions and negatively charged electrons.

An example of plasma can be seen by looking at a neon light. You are looking at plasma, energized to the point where light is emitted. Because plasmas are electrically conductive, they can steer magnetic fields, and they are steered by magnetic fields. These loops of magnetic force are stretched and dragged into interplanetary space by the inertia of the expanding plasma that spirals out as the solar wind. When these magnetic forces impact the Earth, they are either diverted by or combined with Earth's magnetic field.

The speed of the solar wind fluctuates. During this year, at the end of solar Cycle 23, we're seeing a range of solar-wind speed of between 300 km/s to around 600 km/s on average (see fig. 1). When the solar wind picks up speed, and when the magnetic-field lines that are stretched out on the solar wind pass the Earth, geomagnetic storms may be triggered.

The majority of geomagnetic disturbances are generated by the encounter with the magnetic fields, and the volume and speed of the solar wind.

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LAST-MINUTE FORECAST

Day-to-Day Conditions Expected for August 2006

	Expected Signal Quality			
Propagation Index.....	**(4)**	**(3)**	**(2)**	**(1)**
Above Normal: 5-8, 10-11, 13-19, 21, 24-26	**A**	**A**	**B**	**C**
High Normal: 3-4, 9, 12, 20, 22-23 30-31	**A**	**B**	**C**	**C-D**
Low Normal: 2, 29	**B**	**C-B**	**C-D**	**D-E**
Below Normal: 1, 27-28	**C**	**C-D**	**D-E**	**E**
Disturbed: None	**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 on the following pages.
2. With the *propagation index,* use the above table to find the expected signal quality associated with the path opening for any given day of the month. For example, an opening shown in the Propagation Charts with a *propagation index* of 2 will be poor (D), if there even is an opening, on August 1st, fair to poor (C-D) on the 2nd, fair (C) on the 3rd and 4th, etc.

Issued: 2006 Jun 16 1244 UTC
Product: documentation at http://www.sidc.be/products/meu

DAILY BULLETIN ON SOLAR AND GEOMAGNETIC ACTIVITY from the SIDC
(RWC Belgium)

SIDC URSIGRAM 60616
SIDC SOLAR BULLETIN 16 Jun 2006, 1149UT
SIDC FORECAST (valid from 1230UT, 16 Jun 2006 until 18 Jun 2006)
SOLAR FLARES : Quiet conditions (<50% probability of C-class flares)
GEOMAGNETISM : Quiet (A<20 and K<4)
SOLAR PROTONS : Quiet
PREDICTIONS FOR 16 Jun 2006 10CM FLUX: 077 / AP: 008
PREDICTIONS FOR 17 Jun 2006 10CM FLUX: 078 / AP: 012
PREDICTIONS FOR 18 Jun 2006 10CM FLUX: 085 / AP: 007
COMMENT: The solar wind speed is currently at 600 km/s, driven by arecurrent coronal hole. Geomagnetic conditions remain however quiet. Flaring activity is supposed to remain quiet as a few active region areturning beyond the west limb. SOHO/EIT has awaken from its beauty sleep!

TODAY'S ESTIMATED ISN : 015, BASED ON 05 STATIONS.

SOLAR INDICES FOR 15 Jun 2006
WOLF NUMBER CATANIA: 023
10CM SOLAR FLUX : 076
AK CHAMBON LA FORET: 028
AK WINGST: ///
ESTIMATED AP: 029
ESTIMATED ISN:011, BASED ON 11 STATIONS.

NOTICEABLE EVENTS SUMMARY
DAY BEGIN MAX END LOC XRAY OP 10CM RADIO BURST TYPES Catania NOAA NOTE
NONE
END
BT

Solar Influences Data analysis Center - RWC Belgium
Royal Observatory of Belgium
Fax : 32 (0) 2 373 0 224
Tel.: 32 (0) 2 373 0 491

For more information, see http://sidc.be/products/meu.
Please do not reply directly to this message, but send comments directly to this message, but send comments and suggestions to 'sidctech@oma.be'. If you are unable to use that address, use 'rvdlinden@spd.aas.org' instead.

Fig. 1– Sample daily solar and geomagnetic bulletin issued from the Solar Influences Data Analysis Center (SIDC) at the Royal Observatory of Belgium. Notice the comment that the solar wind speed is at 600 kilometers per second as the result of a recurrent coronal hole (see text).

The ability of the solar wind to disturb the Earth's magnetosphere is a function of its speed and the strength and orientation of the magnetic fields. In the presence of a strong southward magnetic field component, a "connection" is made between the solar wind's magnetic fields and the Earth's magnetic fields (picture two pole magnets, where the north pole of one "connects" with the south pole of the other).

The Earth's magnetosphere is formed from two essential ingredients, the Earth's magnetic field (which has much the same form as that of a bar magnet, and is from pole to pole) and the solar wind. When the solar wind and magnetic fields combine with the Earth's magnetic field, they alter the shape and intensity of this shield around the Earth. The ionosphere is affected by these changes, either by an increase of ionization, or a decrease or even a depletion of ionization. Depressions in ionospheric density cause major communications problems, because radio frequencies that previously had been refracting off the ionosphere now punch through. The MUF (maximum usable frequency) on a given radio signal path can be decreased by a factor of two during an ionospheric storm event. Storm effects are more pronounced at high latitudes.

During the periods of lowest solar activity of a solar cycle, such as we are in this month, we see far fewer CMEs (coronal mass ejections) than during the peak years of a cycle. However, we still see frequent recurring coronal holes. These combine with the low solar

sunspot activity to contribute to days of poor propagation. The elevated solar wind speed and the increase in plasma volume, combined with a low solar X-ray energy level of the ionosphere, all cause the propagation of radio signals to suffer.

During August, we'll see days when coronal holes dominate space weather. Solar activity will be low to moderate, too, as we are at the end of solar Cycle 23. Major shortwave broadcasters have taken this into consideration and have chosen frequencies that, with the high power and gain of their transmitting facilities, will overcome tough propagation into their target areas. However, there may be days when it will be a challenge to hear the station for which you are hunting.

August Propagation

Late August and early September are a difficult time of year for which to make accurate band predictions, because conditions can change drastically from day to day. On many days typical summertime conditions will continue much as they were during June and July.

On the other days conditions may sound typically fall-like, with somewhat higher daytime usable frequencies and somewhat lower nighttime usable frequencies. When you add *equinoctial* conditions, which can begin as early as late August, we often experience optimum openings between the Northern and Southern Hemispheres on the one hand, but periods of active to stormy conditions on the other.

Since this is a period of transition, this month's DX Propagation Charts cover only the one-month period from August 15th through September 15th, rather than the usual two-month period. Short-Skip Charts for use during this period appeared in last month's column.

Despite being near the end of solar Cycle 23, with low solar activity, during the daylight hours good DX conditions should be possible on several bands: 15, 17, and 20 meters. Expect signals on the 17- and 20-meter bands to peak approximately during the two-hour window immediately following sunrise and again during the late afternoon. These two bands, and to a lesser degree the 15-meter band, will see openings for DX throughout the daylight hours. Fairly good DX openings should occur along an arc extending across central Africa, Latin America, and into the far Pacific area. Peak conditions should occur during the afternoon hours, but an increasing number of earlier openings should be possible by early September.

HOW TO USE THE DX PROPAGATION CHARTS

1. Use chart appropriate to your transmitter location. The Eastern USA Chart can be used in the 1, 2, 3, 4, 8, KP4, KG4, and KV4 areas in the USA and adjacent call areas in Canada; the Central USA Chart in the 5, 9, and 0 areas; the Western USA Chart in the 6 and 7 areas; and with somewhat less accuracy in the KH6 and KL7 areas.

2. The predicted times of openings are found under the appropriate meter band column (10 through 80 meters) for a particular DX region, as shown in the left-hand column of the charts. An * indicates the best time to listen for 160 meter openings.

3. The propagation index is the number that appears in ( ) after the time of each predicted opening. The index indicates the number of days during the month on which the opening is expected to take place as follows:

(4) Opening should occur on more than 22 days
(3) Opening should occur between 14 and 22 days
(2) Opening should occur between 7 and 13 days
(1) Opening should occur on less than 7 days

Refer to the "Last Minute Forecast" at the beginning of this column for the actual dates on which an opening with a specific propagation index is likely to occur, and the signal quality that can be expected.

4. Times shown in the charts are in the 24-hour system, where 00 is midnight; 12 is noon; 01 is 1 A.M.; 13 is 1 P.M., etc. Appropriate *daylight* time is used, not GMT. To convert to GMT, add to the times shown in the appropriate chart 7 hours in PDT Zone, 6 hours in MDT Zone, 5 hours in CDT Zone, and 4 hours in EDT Zone. For example, 14 hours in Washington, D.C. is 18 GMT. When it is 20 hours in Los Angeles, it is 03 GMT, etc.

5. The charts are based upon a transmitted power of 250 watts CW, or 1 kw, PEP on sideband, into a dipole antenna a quarter-wavelength above ground on 160 and 80 meters, and a half-wavelength above ground on 40 and 20 meters, and a wavelength above ground on 15 and 10 meters. For each 10 dB gain above these reference levels, the *propagation index* will increase by one level; for each 10 dB loss, it will lower by one level.

6. Propagation data contained in the charts has been prepared from basic data published by the Institute for Telecommunication Sciences of the U.S. Dept of Commerce, Boulder, Colorado 80302.

August 15–September 15, 2006
Time Zone: EDT (24 Hour Time)
EASTERN USA TO:

Reception Area	*10 Meters*	*15 Meters*	*20 Meters*	*40/80 Meters*
Western & Central Europe & North Africa	*Nil*	09-11 (1) 14-16 (1)	06-07 (1) 07-08 (2) 08-09 (3) 09-10 (2) 10-13 (1) 13-14 (2) 14-16 (3) 16-17 (4) 17-18 (3) 18-19 (2) 19-20 (1)	19-21 (1) 21-22 (2) 22-01 (3) 01-03 (2) 03-04 (1) 21-23 (1)* 23-01 (2)* 01-03 (1)*
Northern Europe & CIS	*Nil*	09-11(1)	06-07 (1) 07-10 (2) 10-12 (1) 12-14 (2) 14-16 (3) 16-17 (2) 17-18 (1)	20-22 (1) 22-00 (2) 00-03 (1) 22-02 (1)*
Eastern Mediter-ranean & Middle East	*Nil*	11-13 (1) 13-15 (2) 15-16 (1)	06-07 (1) 07-09 (2) 09-14 (1) 14-15 (2) 15-17 (3) 17-18 (2) 18-19 (1) 22-00 (1)	19-21 (1) 21-23 (2) 23-00 (1) 22-00 (1)*
West Africa	14-16 (1)	09-13 (1) 13-14 (2) 14-16 (3) 16-17 (2) 17-18 (1)	13-15 (1) 15-16 (2) 16-17 (3) 17-18 (4) 18-20 (3) 20-21 (2) 21-23 (1)	20-23 (1) 23-02 (2) 02-04 (1) 22-02 (1)*
Central & East Africa	*Nil*	11-14 (1) 14-16 (2) 16-17 (1)	13-15 (1) 15-17 (2) 17-19 (3) 19-20 (2) 20-21 (1)	21-01 (1)
South Africa	12-14 (1)	08-11 (1) 11-12 (2) 12-14 (3) 14-15 (2) 15-16 (1)	07-15 (1) 15-16 (2) 16-17 (3) 17-18 (2) 18-20 (1) 23-01 (1)	21-23 (1) 23-01 (2) 01-03 (1) 23-02 (1)*
Central & South Asia	*Nil*	17-19 (1)	07-08 (1) 08-10 (2) 10-11 (1) 20-23 (1)	05-07 (1) 18-21 (1)
Southeast Asia	*Nil*	18-20 (1)	07-08 (1) 08-10 (2) 10-11 (1) 18-22 (1)	*Nil*
Far East	*Nil*	17-20 (1)	07-08 (1) 08-10 (2) 10-12 (1) 17-19 (1) 19-21 (2) 21-23 (1)	06-08 (1)
South Pacific & New Zealand	16-19 (1)	13-16 (1) 16-18 (2) 18-20 (1)	07-08 (1) 08-11 (2) 11-13 (1) 18-21 (1) 21-00 (2) 00-02 (1)	01-02 (1) 02-03 (2) 03-06 (3) 06-08 (2) 08-09 (1) 04-08 (1)*
Australasia	17-19 (1)	16-17 (1) 17-19 (2) 19-20 (1)	06-08 (1) 08-10 (2) 10-12 (1) 15-16 (1) 16-18 (2) 18-21 (1) 21-00 (2) 00-02 (1)	03-04 (1) 04-07 (2) 07-08 (1) 05-07 (1)*
Northern South America	13-15 (1) 15-17 (2) 17-18 (1)	08-12 (1) 12-14 (2) 14-16 (4) 16-17 (3) 17-19 (2) 19-20 (1)	06-07 (1) 07-08 (2) 08-10 (4) 10-12 (3) 12-15 (2) 15-17 (3) 17-19 (4) 19-21 (3) 21-22 (2) 22-02 (1)	19-20 (1) 20-21 (2) 21-04 (3) 04-06 (2) 06-08 (1) 22-02 (1)* 02-04 (2)* 04-07 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	14-16 (1) 16-17 (2) 17-18 (1)	08-10 (1) 10-12 (2) 12-15 (1) 15-16 (2) 16-18 (4) 18-19 (2) 19-20 (1)	06-08 (1) 14-16 (1) 16-17 (2) 17-18 (3) 18-20 (4) 20-21 (3) 21-00 (2) 00-02 (1)	21-23 (1) 23-01 (2) 01-03 (1) 03-06 (2) 06-07 (1) 04-06 (1)*
McMurdo Sound, Antarctica	*Nil*	15-18 (1)	07-09 (1) 16-18 (1) 18-19 (2) 19-21 (3) 21-23 (2) 23-01 (1)	01-06 (1)

Time Zones: CDT & MDT
(24 Hour Time)
CENTRAL USA TO:

Reception Area	*10 Meters*	*15 Meters*	*20 Meters*	*40/80 Meters*
Western & Central Europe & North Africa	*Nil*	09-11 (1) 13-15 (1)	06-07 (1) 07-09 (2) 09-13 (1) 13-15 (2) 15-16 (3) 16-17 (2) 17-19 (1)	20-22 (1) 22-01 (2) 01-04 (1) 22-02 (1)*
Northern Europe & CIS	*Nil*	10-13 (1)	06-07 (1) 07-09 (2) 09-12 (1) 12-13 (2) 13-14 (3) 14-16 (2) 16-17 (1) 21-23 (1)	20-02 (1) 22-01 (1)*
Eastern Mediter-ranean & Middle East	*Nil*	10-15 (1)	07-14 (1) 14-16 (2) 16-18 (1) 21-23(1)	20-21 (1) 21-23 (2) 23-00 (1) 21-23(1)*
West Africa	12-14 (1)	09-11 (1) 11-14 (2) 14-16 (1)	07-09 (1) 13-15 (1) 15-16 (2) 16-19 (3) 19-20 (2) 20-22 (1)	20-22 (1) 22-01 (2) 01-02 (1) 23-01 (1)*

Reception Area	10 Meters	15 Meters	20 Meters	40/80 Meters
Central & East Africa	*Nil*	12-15 (1)	13-17 (1) 17-19 (2) 19-21 (1) 07-09 (1)	21-00 (1)
South Africa	11-14 (1)	08-10 (1) 10-14 (2) 14-15 (1)	07-09 (1) 12-15 (1) 15-18 (2) 18-20 (1) 22-01 (1)	20-21 (1) 21-23 (2) 23-01 (1) 22-00 (1)*
Central & South Asia	*Nil*	18-21 (1)	07-08 (1) 08-10 (2) 10-11 (1) 18-21 (1)	06-08 (1) 19-21 (1)
Southeast Asia	*Nil*	17-21 (1)	07-08 (1) 08-10 (2) 10-12 (1) 20-23 (1)	06-08 (1)
Far East	*Nil*	15-17 (1) 17-19 (2) 19-20 (1)	07-08 (1) 08-10 (2) 10-13 (1) 17-19 (1) 19-22 (1) 22-01 (1)	03-06 (1) 06-07 (2) 07-08 (1) 06-07 (1)*
South Pacific & New Zealand	16-19 (1)	12-15 (1) 15-19 (2) 19-21 (1)	07-08 (1) 08-10 (2) 10-12 (1) 12-14 (2) 14-18 (1) 18-21 (2) 21-23 (3) 23-02 (2) 02-07 (1)	00-01 (1) 01-03 (2) 03-06 (3) 06-08 (2) 08-09 (1) 02-04 (1)* 04-06 (2)* 06-07 (1)*
Australasia	16-19 (1)	14-16 (1) 16-19 (2) 19-21 (1)	00-07 (1) 07-08 (2) 08-10 (3) 10-11 (2) 11-16 (1) 16-18 (2) 18-20 (1) 20-00 (2)	02-04 (1) 04-07 (2) 07-09 (1) 04-05 (1)* 05-07 (2)* 07-08 (1)*
Northern & Central South America	12-15 (1) 15-17 (2) 17-18 (1)	08-09 (1) 09-12 (2) 12-14 (3) 14-17 (4) 17-18 (2) 18-19 (1)	06-07 (1) 07-08 (3) 08-10 (4) 10-12 (3) 12-16 (2) 16-17 (3) 17-19 (4) 19-21 (3) 21-22 (2) 22-02 (1)	19-21 (1) 21-23 (2) 23-03 (3) 03-06 (2) 06-07 (1) 21-00 (1)* 00-03 (2)* 03-06 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina, Uruguay	13-14 (1) 14-16 (2) 16-17 (1)	08-10 (1) 10-12 (2) 12-15 (1) 15-16 (2) 16-18 (4) 18-19 (2) 19-20 (1)	07-09 (1) 13-15 (1) 15-16 (2) 16-17 (3) 17-20 (4) 20-22 (3) 22-01 (2) 01-03 (1)	21-23 (1) 23-01 (2) 01-03 (1) 03-05 (2) 05-07 (1) 02-06 (1)*
McMurdo Sound, Antarctica	Nil	15-18 (1)	15-17 (1) 17-19 (2) 19-21 (3) 21-23 (2) 23-00 (1) 08-10 (1)	01-06 (1)

Time Zone: PDT (24 Hour Time)
WESTERN USA TO:

Reception Area	10 Meters	15 Meters	20 Meters	40/80 Meters
Western Europe & North Africa	*Nil*	11-13 (1)	06-07 (1) 07-09 (2) 09-12 (1) 12-15 (2) 15-17 (1) 22-00 (1)	20-21 (1) 21-23 (2) 23-00 (1) 22-23 (1)*
Central & Northern Europe & CIS	*Nil*	10-13 (1)	06-07 (1) 07-09 (2) 09-12 (1) 12-14 (2) 14-16 (1) 21-23 (1)	19-00 (1)
Eastern Mediter-ranean & Middle East	*Nil*	09-12 (1)	07-08 (1) 08-10 (2) 10-12 (1) 12-14 (2) 14-15 (1) 20-22 (1)	20-23 (1)
Western & Central Africa	*Nil*	12-15 (1)	06-07 (1) 07-09 (2) 09-14 (1) 14-16 (2) 16-18 (3) 18-19 (2) 19-20 (1)	21-01 (1)
East Africa	*Nil*	*Nil*	12-15 (1) 15-17 (2) 17-19 (1)	20-22 (1)
South Africa	*Nil*	10-12 (1)	07-09 (1) 12-14 (1) 14-16 (2) 16-18 (1) 22-00 (1)	20-21 (1) 21-22 (2) 22-23 (1) 20-22 (1)*
Central & South Asia	*Nil*	17-20 (1)	07-08 (1) 08-10 (2) 10-12 (1) 17-19 (1) 19-20 (2) 20-21 (1)	06-08 (1)
Southeast Asia	*Nil*	16-20 (1)	08-09 (1) 09-11 (2) 11-13 (1) 18-21 (1) 21-00 (2) 00-01 (1)	02-05 (1) 05-07 (2) 07-08 (1) 06-07 (1)*
Far East	*Nil*	15-17 (1) 17-19 (2) 19-20 (1)	07-08 (1) 08-10 (2) 10-12 (1) 12-14 (2) 14-18 (1) 18-20 (2) 20-22 (3) 22-23 (3) 23-01 (1)	01-02 (1) 02-06 (2) 06-07 (3) 07-08 (1) 03-07 (1)*
South Pacific & New Zealand	16-18 (1)	12-15 (1) 15-16 (2) 16-19 (3) 19-20 (2) 20-21 (1)	01-07 (1) 07-08 (2) 08-10 (3) 10-11 (2) 11-14 (1) 14-18 (2) 18-20 (3) 20-22 (4) 22-23 (3) 23-01 (2)	22-23 (1) 23-00 (2) 00-06 (3) 06-07 (2) 07-08 (1) 23-02 (1)* 02-05 (2)* 05-07 (1)*
Australasia	15-18 (1)	13-16 (1) 16-17 (2) 17-19 (3) 19-21 (2) 21-22 (1)	12-19 (1) 19-20 (2) 20-01 (3) 01-04 (2) 04-07 (1) 07-08 (2) 08-10 (3) 10-12 (2)	00-02 (1) 02-03 (2) 03-06 (3) 06-08 2) 08-09 (1) 02-04 (1)* 04-06 (2)* 06-07 (1)*
Northern & Central South America	12-14 (1) 14-17 (2) 17-18 (1)	08-09 (1) 09-12 (2) 12-14 (3) 14-16 (4) 16-17 (3) 17-18 (2) 18-19 (1)	06-07 (1) 07-08 (2) 08-10 (3) 10-16 (2) 16-17 (3) 17-19 (4) 19-20 (3) 20-22 (2) 22-02 (1)	18-21 (1) 21-22 (2) 22-01 (3) 01-03 (2) 03-07 (1) 20-22 (1)* 22-02 (2)* 02-05 (1)
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	13-14 (1) 14-16 (2) 16-17 (1)	08-10 (1) 10-12 (2) 12-15 (1) 15-16 (2) 16-17 (4) 17-19 (2) 19-20 (1)	04-07 (1) 07-09 (2) 09-15 (1) 15-17 (2) 17-19 (3) 19-22 (2) 22-00 (1)	20-22 (1) 22-00 (2) 00-02 (1) 02-04 (2) 04-06 (1) 01-05 (1)*
McMurdo Sound, Antarctica	*Nil*	13-16 (1) 16-18 (2) 18-20 (1)	08-10 (1) 16-19 (1) 19-21 (2) 21-23 (3) 23-00 (2) 00-01 (1)	01-06 (1)

**Indicates best times to listen for 80 meter openings. Openings on 160 meters are also likely to occur during those times when 80 meter openings are shown with a propagation index of (2) or higher.*
For 12 meter openings interpolate between 10 and 15 meter openings.
For 17 meter openings interpolate between 15 and 20 meter openings.
For 30 meter openings interpolate between 40 and 20 meter openings.

Propagation charts prepared by George Jacobs, W3ASK.

Between sundown and sunrise 20 meters is expected to be the best DX band. However, with lower solar activity, the band in general will suffer compared with the past few years. Openings might be possible to many areas of the world, some with surprisingly strong signal levels. Until midnight good DX conditions should be found for openings toward Latin America, the far Pacific, and into Asia. You might even catch some activity on 17 or even 15 meters. Fairly good conditions are also expected on 30, 40, 60, and 80 meters despite the high static level at times. Openings should be possible before midnight along an arc extending from northern Europe, through Africa, and into Latin America, the far Pacific, and Asia after midnight.

By late August it should be possible to work some DX on 160 meters during the hours of darkness. Conditions on this band—as well as on 40, 60, and 80 meters—will tend to peak just as the sun begins to *rise* on the *light*, or easternmost, terminal of a path.

For *short-skip* openings during August and early September, try 80 meters during the day for distances less than 250 miles, with 60 and 40 meters also usable. During the hours of darkness both 80 and 160 meters should provide excellent communications over this distance. For openings between 250 and 750 miles, use 30 and 40 meters during the day for distances up to 500 miles, and 20 and 17 meters between 500 and 750 miles. At night, 40 and 30 meters should be the best bands for this distance until midnight, with 80 meters optimum from midnight to sunrise. Try 60 meters, as well. For openings between 750 and 1300 miles, try 20 and 17 meters, as they should provide optimum propagation during the hours of daylight. Optimum conditions should continue on these bands for this distance range after sundown and until midnight. Between midnight and sunrise the best band should be 40 meters, but check 60 meters, too. For openings between 1300 miles and the one-hop short-skip limit of approximately 2300 miles, try 20 and 17 meters during the day, with 15 meters also usable. After sundown try 30, 40, and 60 meters, with 80 meters also providing good propagation conditions for this distance range.

VHF Conditions

Sporadic-*E* propagation usually begins to taper off during August, but may continue to occur fairly frequently. Some 6-meter sporadic-*E* openings are expected during the month over distances of approximately 750 to 1300 miles. During periods of intense and widespread sporadic-*E* ionization, two-hop openings may be possible considerably beyond this range. Also check the 2-meter band for an occasional sporadic-*E* short-skip opening between approximately 1200 and 1400 miles. While sporadic-*E* short-skip openings may occur at any time, there is a tendency for them to peak between 8 AM and noon, and again between 6 PM and 9 PM local daylight time.

The *Perseids* meteor shower covers the period of July 23 to August 22. The peak is expected to occur between August 12 and 13, and will be most observable in the Northern Hemisphere. The radiant point for this shower will be in the constellation of Perseus. Look to the northeast. The maximum hourly visual rate is expected to reach about 60.

For the very patient, check the 6-meter band for possible TE (trans-equatorial) openings between 8 and 11 PM local daylight time. This type of propagation favors openings from the southern tier states into the far southern areas of South America, with the signal path crossing the magnetic equator at a right angle. TE openings during August are rare, but they can occur. Very weak signals and severe flutter fading usually characterize them.

Current Solar Cycle Progress

The Royal Observatory of Belgium reports that the monthly mean observed sunspot number for May 2006 is 22.2, just down from April's 30.2. The lowest daily sunspot value during May, recorded on May 14 through May 17, was zero (0). The highest daily sunspot count was 37 on May 28. The 12-month running smoothed sunspot number centered on November 2005 is 42.1. A smoothed sunspot count of 9 is expected for August 2006, but can be anywhere from a high of 22, down to zero, which is more and more likely as we near the very end of solar Cycle 23.

The Dominion Radio Astrophysical Observatory at Penticton, BC, Canada, reports a 10.7-cm observed monthly mean solar flux of 81 for May 2006. The 12-month smoothed 10.7-cm flux centered on November 2005 is 86.7. The predicted smoothed 10.7-cm solar flux for August 2006 is about 73, with a range from a high of 92 to a low of 60.

The observed monthly mean planetary *A*-index (*Ap*) for May 2006 is 8. The 12-month smoothed *Ap*-index centered on November 2005 is 11.1. Expect the overall geomagnetic activity to be quiet to unsettled during most days in August, with one or two possibly stormy periods; check the Last-Minute Forecast for those days likely to see geomagnetic storms.

Please come and participate in my online propagation discussion forum at <http://hfradio.org/forums/>. I've also enhanced my Space Weather and Radio Propagation center at <http://prop.hfradio.org>, so take a look. These resources may also be viewed on a cell phone or other wireless device that has WAP/WML features by browsing to <http://wap.hfradio.org>.

Drop me an e-mail or send me a letter if you have questions or topics you would like to see me explore in this column. I'd also love to hear any feedback you might have on what I have written. Until next *month* . . .

73, de Tomas, NW7US

Results of the 2005 CQ WW DX SSB Contest *(from page 19)*

for use of station (www.api-japan.com). I'm ex-G4JVG and P29DX. Nice to be back in zone 28 again! See you next year . . . **9M6DXX.** Good contest. Surprisingly good propogation on 10m. Usual QRM on the rest of the bands however . . . **A45WG.** 80m is pure "masochism" in Europe, especially running QRP! But anyway, had great fun running just 5 watts (FT-817) into a 83m delta loop, although plagued by S9+ contest QRM all over . . . **DH8BQA.** First contest with DQ5T callsign and new team in Munich. Everybody was happy and we will improve our setup permanently. 40m operation with TH3 element beam was a dream . . . **DQ5T.** This contest is a surprise box. The whole band was full of stations calling, which is perfect for a QRP as me as I always found a station to call! I hope to repeat last year's award but now on 15. Congratulations to winners and organization as well for the biggest event in radio . . .**EA4DUT.** First ever serious entry, as so (last entry was as M/S and for fun) nice to be in France, as you are rare. Pleasant to be called by West Indies big guns or guys from Pacific area! . . . **F6KNB (F4CIB).** On a beautiful late-autumn day, what better than a little portable operation from the Belgian countryside? . . . **G3VQO.** Just a few hours of S&P concentrating mainly on 21 and 28. Good conditions on 21 and some new DXCC entities for the log. 28 opened across the Atlantic on Sunday afternoon . . . **G4FKA.** Every frequency between 7.00–7.10 MHz three deep in QSOs. 15m had some interest but 10m remained dead . . . **G6CSY.** Conditions better than expected for this time of the sunspot cycle, but still wall to wall stations on 20. Having 15 open for many hours helped, as did some short openings on 10 . . . **GD6IA.** No sunspots, but no solar storms either. Could have been a lot worse! . . . **GW4BLE.** Have you ever participated in an SSB contest without a micro-

TOP SCORES

WORLD
ALL BAND
8P1A.....10,540,052
P40W.....9,654,145
VY2PA.....8,602,286
ZD8Z.....8,452,150
ES5TV.....6,437,918
GW4BLE.....6,118,605
VE2IM.....6,047,000
EA9LZ.....5,968,812
VC3O.....5,794,200
K5ZD/1.....5,553,841

28 MHz
LU1HF.....620,398
LT2H.....490,496
LU6ETB.....407,464
PY5XT.....272,844
ZW5B.....196,098
9Y4NZ.....178,717

21 MHz
PX5E.....2,274,068
P49Y.....1,703,924
EA8AH.....1,667,064
AY8A.....1,278,468
T96Q.....1,152,180
VP5DX.....1,052,142

14 MHz
D44TD.....2,222,829
OH6KN.....1,710,648
4L8A.....1,644,070
KH7X.....1,539,072
EA8EA.....1,206,918
PY2NY.....1,042,440

7 MHz
CN2R.....1,590,675
9Y4W.....975,652
UA9AYA.....792,990
EY8MM.....714,298
OK1RI.....677,673
YZ1E.....660,152

3.7 MHz
EA8/OH4NL.....473,060
SMØW.....424,424
SN3A.....386,400
IR4M.....304,673
CU2B.....294,261
GM7V.....243,540

1.8 MHz
OZ1DD.....125,178
YT6Y.....116,400
OE8Q.....97,440
LY2IJ.....82,302
HG8L.....77,077
OZ1HXQ.....75,850

LOW POWER
ALL BAND
P40A.....7,649,824
FG/K9NW.....5,104,410
CT7T.....3,638,544
FS/AH8DX.....3,483,000
HK3JJH.....2,793,392
9A5K.....2,497,536
LY9A.....1,795,560
CO8LY.....1,792,461
UA4FER.....1,643,880
N1UR.....1,577,730

28 MHz
EA8TX.....223,236
L44DX.....190,256
LR2D.....161,360
PY2CX.....147,157
PY2DY.....145,950
CX1AV.....144,000

21 MHz
CN8NK.....1,366,290
ST2T.....1,218,040
HC1JQ.....1,015,653
IH9P.....937,728
5B/HA5PP.....713,952
5H3EE.....617,848

14 MHz
YT1AD.....670,721
HP1XX.....597,839
XE1L.....516,838
UN6LN.....349,200
YV5YMA.....347,508
LY6A.....341,400

7 MHz
HI3TEJ.....286,794
T94DO.....216,008
TA3J.....185,440
V49A.....135,408
RW9DX.....116,957
S54A.....102,297

3.7 MHz
TA3D.....208,616
IO1T.....128,364
S59CDE.....64,148
7XØRY.....58,401
LY1DT.....54,273
UU4JKY.....46,480

1.8 MHz
YMØT.....67,716
S54W.....41,778
4N7ZZ.....24,507
9A3RE.....15,288
SP4XQN.....14,964
TA7OM.....13,400

QRP
ALL BAND
F5BEG.....654,126
KO1H.....649,399
KA1LMR.....495,818
IK5RUN.....427,440
DF1DX.....328,750
JR4DAH.....316,560
RV3QX.....295,776
OK1VBA.....263,948
RW3AI.....263,625
RN6AL.....230,914

ASSISTED
ALL BAND
FM5BH.....5,925,228
ZX2B.....4,943,323
RG9A.....4,776,046
LX7I.....4,296,919
RK4FD.....4,197,388
DRØW.....4,080,231
W2RE.....4,013,064
K2NG.....3,853,056
VO1MP.....3,649,805
TM7F.....3,610,978

MULTI-OPERATOR
SINGLE TRANSMITTER
FY5KE.....19,055,673
PJ4W.....12,645,826
OM8A.....9,652,744
EI7M.....8,125,830
9A1P.....7,982,590
OM7M.....7,709,190

MULTI-OPERATOR
TWO TRANSMITTER
CT9L.....18,787,200
VE3EJ.....16,493,120
PJ2T.....15,085,936
3V5A.....14,896,200
IR4X.....13,734,300
PS2T.....12,487,515

MULTI-OPERATOR
MULTI-TRANSMITTER
CT3YA.....28,261,325
6Y2Z.....18,564,588
V26B.....17,865,770
K3LR.....16,283,848
DFØCG.....15,337,439
KC1XX.....14,482,410

USA
ALL BAND
K5ZD/1.....5,553,841
K4ZW.....4,906,980
K3CR.....4,445,930
W9RE.....4,282,720
AA1K/3.....4,112,913
WB9Z.....3,523,377
N2IC/5.....3,335,815
W3BGN.....3,257,436
NN3W.....2,704,683
K3ZO.....2,579,927

28 MHz
W5PR.....21,200
W9YYG.....3,335

21 MHz
K4EA.....448,635
N4PN.....321,372
W7UT.....288,686
N2ZO/Ø.....283,432
N4CT.....254,332
K8IA/7.....240,464

14 MHz
W7WA.....848,350
N3HBX.....744,430
K2XA.....675,273
WC1M.....599,696
KD2RD.....504,488
NI6W.....372,570

7 MHz
K4XS.....379,362
N4NX.....59,750
NA5Q.....51,213
WØGJ.....41,886
AG4W.....35,061
AA4VV.....28,785

3.7 MHz
K5RX.....78,810
KU1CW/Ø.....60,334
K2RR/1.....57,285
W6KW.....52,116
AA4MM.....42,133
KG9N.....23,868

1.8 MHz
W4ZV.....32,038
KT1V.....27,807
KK4SI.....4,972
W3GH.....4,387
W7IZL.....3,584
KC7V.....1,260

LOW POWER
ALL BAND
N1UR.....1,577,730
WA1S.....1,221,903
N1PGA.....1,140,800
W1KT.....1,034,722
N5AW.....1,030,680
W3LL.....966,966
W1JQ.....875,826
WD5K.....848,202
ACØW.....751,983
K1HT.....599,616

28 MHz
K4WI.....12,120
W4JIK.....1,529

21 MHz
W6AFA.....202,365
N2GM.....132,514
W4EEH.....94,752
W7UPF.....89,577
W6EUF.....76,964
K5MQ.....52,965

14 MHz
WØAH.....207,632
N4MO.....156,264
K2MFY.....152,366
W7FP.....132,736
W3NO.....130,582
K7OX.....126,758

7 MHz
KU8E/4.....28,925
KE5AQD.....3,738
W6XI/7.....2,240

3.7 MHz
K8DO.....7,695
K2YEH.....7,584
K7SP.....2,877
KI6PG.....407

1.8 MHz
K9RO.....4,416
W9VW.....752
NT6K.....432
KB3KYZ.....60

QRP
ALL BAND
KO1H.....649,399
KA1LMR.....495,818
K8ZT.....193,048
N1TM.....108,100
K3GM/1.....50,700
N8XA.....18,853
N3HU.....17,679
NE1RD.....13,275
W4DEC.....5,408
KØCD/9.....4,464

ASSISTED
ALL BAND
W2RE.....4,013,064
K2NG.....3,853,056
K1AR.....3,469,180
K3WW.....3,134,720
N1DG.....2,569,252
K5KG/4.....2,553,904
NN3Q.....2,202,680
KQ3F.....2,185,442
AA3B.....2,168,185
W6YI.....2,091,712

MULTI-OPERATOR
SINGLE TRANSMITTER
K8AZ.....4,170,038
K3EST/4.....3,431,878
KØRF.....3,255,548
K5TR.....3,193,918
W3UA/1.....3,094,456
W4WS.....3,070,730

MULTI-OPERATOR
TWO TRANSMITTER
N3RS.....10,158,016
K3NA/1.....7,986,663
KI1G.....7,395,500
WE3C.....6,756,390
KØTV/1.....4,075,428
W4RM.....4,026,330

MULTI-OPERATOR
MULTI-TRANSMITTER
K3LR.....16,283,848
KC1XX.....14,482,410
W3LPL.....12,884,120
K1TTT.....9,757,348
NQ4I.....7,606,080
K1RX.....6,453,523

EUROPE
ALL BAND
ES5TV.....6,437,918
GW4BLE.....6,118,605
S50A.....5,136,192
M6T.....4,685,268
EA4KR.....3,762,529
DJ4PT.....3,656,405
LB8IB.....3,638,669
OZ7X.....3,172,320
US5D.....2,720,374
IR4T.....2,511,008

28 MHz
9A9A.....169,743
UT2IY.....106,040
T93O.....100,980
S57S.....98,136
LZ9X.....77,748
S58D.....72,114

21 MHz
T96Q.....1,152,180
OH4R.....734,125
YT5G.....659,987
F6KNB.....610,344
OH5Z.....527,692
YT7Z.....491,346

14 MHz
OH6KN.....1,710,648
CT8T.....1,036,104
S50K.....916,584
M7Z.....898,184
S57DX.....882,640
OH8L.....851,694

7 MHz
OK1RI.....677,673
YZ1E.....660,152
YT7A.....574,035
MIØLLL.....484,806
SO6X.....467,866
ES5MC.....439,725

3.7 MHz
SMØW.....424,424
SN3A.....386,400
IR4M.....304,673
CU2B.....294,261
GM7V.....243,540
YU7AV.....241,488

1.8 MHz
OZ1DD.....125,178
YT6Y.....116,400
OE8Q.....97,440
LY2IJ.....82,302
HG8L.....77,077
OZ1HXQ.....75,850

LOW POWER
ALL BAND
CT7T.....3,638,544
9A5K.....2,497,536
LY9A.....1,795,560
UA4FER.....1,643,880
9A2EU.....1,572,974
RV3FF.....1,379,460
OK1WCF.....1,162,647
RU3QW.....1,129,051
S51F.....963,795
SQ9JKW.....824,472

28 MHz
S58P.....64,800
S57L.....49,674
OM5FA.....42,964
IKØEIE.....33,488
UA4CC.....27,643
IZ8DBJ.....27,307

21 MHz
CU2/OH1VR.....405,990
UR5HAC.....362,520
S57J.....293,997
RV6LFE.....227,476
T94LW.....206,206
YO3JF.....190,284
YT1AD.....670,721
LY6A.....341,400
SO9L.....293,722
UA1ANA.....287,835
HG4F.....253,232
YU7ZZ.....236,082

7 MHz
T94DO.....216,008
S54A.....102,297
YT1VP.....100,375
7S7V.....82,812
ON5KQ.....80,613
SP4TKR.....74,898

3.7 MHz
IO1T.....128,364
S59CDE.....64,148
LY1DT.....54,273
UU4JKY.....46,480
OM7AB.....41,052
OO6UU.....37,204

1.8 MHz
S54W.....41,778
4N7ZZ.....24,507
9A3RE.....15,288
SP4XQN.....14,964
PA2SWL.....11,385
IR8J.....9,500

QRP
ALL BAND
F5BEG.....654,126
IK5RUN.....427,440
DF1DX.....328,750
RV3QX.....295,776
OK1VBA.....263,948
RW3AI.....263,625
RN6AL.....230,914
HA1CW.....220,745
EA1TI.....204,856
PG2AA.....188,265

ASSISTED
ALL BAND
LX7I.....4,296,919
RK4FD.....4,197,388
DRØW.....4,080,231
TM7F.....3,610,978
YR9P.....3,404,606
UW8M.....3,310,560
RN3QO.....3,119,616
RX4HZ.....2,979,720
HG3M.....2,868,222
SN7V.....2,749,626

MULTI-OPERATOR
SINGLE TRANSMITTER
OM8A.....9,652,744
EI7M.....8,125,830
9A1P.....7,982,590
OM7M.....7,709,190
G5W.....7,266,795
OK5W.....6,973,560

MULTI-OPERATOR
TWO TRANSMITTER
IR4X.....13,734,300
9A7A.....11,800,646
RU1A.....10,766,559
HG6N.....8,787,519
DQ4W.....7,925,148
LY7Z.....7,592,400

MULTI-OPERATOR
MULTI-TRANSMITTER
DFØCG.....15,337,439
OT5A.....13,053,528
DQØQ.....12,921,984
RW2F.....12,877,980
LZ9W.....12,467,430
MD4K.....9,628,416

VK9XD (op. VK2CZ) Single Op All Band from Christmas Island.

phone? With my wife sleeping next to the radio I had to resort to a PC voice keyer. The next day my mic PTT switch died, so the pre-recorded computer messages helped not give up . . . **HA5X.** We run 100 watts limited power in Multi Single class and we have new Thai HF hams join with us in contest. A lot of fun! Thanks to all for QSOs . . . **HSØAR (E21EIC).** Fine experience withIC8C special call. Lot of hams and activity on 80 meters. Hope to meet all of them next year too . . . **IC8C.** It was my first effort in LP category in phone mode. I must say that it is quite "harder" than CW with LP, which I like very much. I lost some multipliers because I could not get through the pile-ups. I used two beams (4-el OWA and 3-el tribander) and I think it helped to me in the pile-ups as well with 100w. Generally the contest was very nice, especially thanks to excellent propagation on 15. Thanks to all for QSOs and CU in CW! . . . **IH9P.** For me is the first time. I'm very happy . . . **IW2MWZ.**

Not good propagation . . . **IZ1DGG.** Propagation hurt, and high winds and rough sea did the rest! Our best ever low bands' beach setup was almost completely ruined on Saturday afternoon! Radials thrown away by the sea waves, one 40 mt vertical brought down by the sea, 160m vertical blown out when hit by sea waves, what more? Ah, Mr. Murphy, no, we didn't see him around. CU next one! . . . **J49Z** *(Bob, I2WIJ, on behalf of the team).* As expected, high band propagation was not very good. Still, we had fairly good runs on 15m on Sunday toward Europe (around 06Z) and toward North America (around 22Z) . . . **JM1LPN.** Can't wait to get out of the bottom of this cycle . . . **KH6FI.** No propagation on second day . . . **KL7RA.** Gearing up and going full tilt and having lightning . . . **KP4US.** First effort from Sardinia . . . **LSØ/WHØQ.** Excellent conditions! And many many mults! Congratulations! . . . **LU8VCC.** Nice test, but who closed the door to JA? . . . **LV5V.** First attempt at CQ WW DX. Limited station and only two full-time operators made it fun but hard work. Need to develop better antennas and bigger tower for next year. See you in 2006 with a special contest call . . . **M5ARC.** Very, very hard work this year. Nearly gave up on a number of occasions. I'm pleased that I didn't. Such a great contest . . . **MW5HOC.** My special thanks to Eduardo, CU2AF/CU2T and Pedro, CU2JX. Their great help made this operation possible! It was a real sign of a true ham spirit. Thanks to everybody who called me. I had a great fun . . . **OH1VR.** This was a "one-man-show." I brought the whole stn to Crete Island by car. That meant 5 days to go down, 2 days to set up the stn, 2 days contest, 1 day removal, and another 5 days back (yes, I also had 3 weeks sunny vacation in-between). Condx were not as bad as I feared with the sunspot number near zero. Thanks to everybody who called me. I had great fun in the pile-up! . . . **OH4FR.** Condx not too good. 10m almost dead and no opening til West Coast USA/Canada on 15. But I did better than my own Danish record from 1978, 3,186,303 points . . . **OZ7X.** The display burned out on both transceivers, my microphone boom broke, and the pre-amp power supply burned up. Even with these inconveniences, it was a very fun contest! . . . **P4ØA.** We participated in the contest just for fun and education. We had fun and we learned a lot, so we got the goal! . . . **PI4ZOD.**

Propagation was very poor in our Arctic region. Tnx to many ops for attention! . . . **RK9XWW.** Double L and inverted V with ICOM 746, 100W. Some problems with setting antennas, but we managed to fix it all before the test (we finished setting the antennas in the dark). Location Mount Slivnica, 1114m asl S50L location. Tnx to S55Z, S59MA, and S56WKC for the support. The score is higher as was expected, but lack of experience made me miss some DX = mult . . . **S59CDE (S55O).** Spent the weekend hiding in the basement shack. My little daughter thought I was away at work, hihi. Not the best condx from Sweden. Nice anyway. We will be on next year . . . **SM6RXZ.** This was my first contest with my new first license call. I am 16 years old. My father, SP4Z, said it is the biggest contest all over the world. See you again . . . **SQ4LH.** This was my first contest from a DX location. It's quite different to be on the other end of the pile-up. It's thrilling to be called by a weak station, and to find that he's a rare double-multiplier . . . **V31MQ.** Thanks to Karl Sage, V44NK, who helped set up the antennas; operated from the Golden Rock Estates Hotel on Nevis Island. Mike and Bain last did a contest together while in high school in Cleveland, Ohio in 1960, some 45 years ago! . . . **V47NS.** I'm a new ham and was first contest. Had fun and really enjoyed it. Looking forward to more . . . **VA3TPS.** Even at the bottom of the cycle this contest always delivers. It is the best of the best! . . . **VC6R.** Loads of fun. Strangest occurrence when I tried in vain to break a pile-up for SV3 and then moments later I get called by an SV9. Go figure . . . **VE3JAQ.** Limited operating time but still had fun. Hard to compete with 100W and a vertical! . . . **VE3TMT.** Did better the second time around. Tnx for getting me interested in contesting . . . **VE3VMP.**This was Joe's (VE6JSL) first contest and I think he is hooked! My 2004 certificate arrived just before the contest began and I think it was a great motivation for both of us to do well. Low bands were disappointing at this QTH after 0700Z Saturday, particularly 160. Better luck next year . . . **VE6ZC.**

All the ops except VE7FO are members of the Vector Club's basic license class and are working towards getting their first ticket. This was the first time any of them had ever made a ham radio contact. The idea was to give them some hands-on experience to help the classroom stuff come alive. It's such a great experience to watch the first nervous Q being made followed by a few less nervous ones, and somewhere around Q #5, the cheat sheet is no longer required . . . **VE7FO.** 10m just didn't get a chance to fire. 15m was certainly worth the effort and the new 5-element mono certainly proved its value. Now planning for next year begins! . . . **VK4CXZ.** Had good time but few contacts . . . **VK5UE.** This was a real mixture of disappointment (with intial condx and my own tactical errors), frustration (with extreme crowding and one important, flaky beam), excitement (called by VP6DB), and learning (how to do SO2R better). My score is way down, but it was still fun . . . **VO1AU.** Very good conditions. The best ever personal score in this contest. Was fun all time. Tnx for all the calls . . . **XE2K.** First activation of Koh Tas Island. Complete portable on generator. Antenna Spiderbeam for 20,15, 17,delta loop, longwire from Yaesu FT-857D . . . **XU7TAS.** This is the greatest contest! It is hard to join the contest this year. We have fasting days, no food, no drink, so hungry and thirsty, but again contesting is fun! See you in next contest! . . . **YB2ECG.** My first attempt on 160m ever! Thanks all guys over Atlantic Ocean for patience, because on this side I had no beverages. It is good to be back in ham radio after 6 years . . . **YT6Y.** Antenna problems, electricity supply problems, wife left me on Friday, thank goodness she returned on Sunday (visiting parents!). Most enjoyable time . . . **ZS4BS.**

USA QRM

My first contest in 48 years as a ham. Had a great time. Already planning for next year! . . . **KØIZ.** Good opening to Asia on Sunday night. Was working a few JAs, and after I worked another station he gave his call as B1Z. Almost fell off my chair when I realized I just worked the China station without any trouble! . . . **K2MFY.** Thanks for the QSOs . . . **K3TW.** First contest in 30 years since old RTTY contests with "machines." Had a good time, but lots to learn . . . **K3WC.** Whew! I'm ready for the sunspot cycle to come back . . . **K5LAD.** Not many Asia/Pacific stations heard as expected. Some nice openings to Europe but wish they would have been longer. Where were all the Asia mults? . . . **K7ACZ.** Hope K1TTT is happy with my Q's ... I got his dupes! . . . **K9TTT.**

Band conditions didn't start off too well. SD logger makes contesting a lot of fun . . . **KA1C.** I only wish I had more time to work more stations. Thirteen contacts isn't very many at all, but maybe by filing my log it might help confirm someone else's scores . . . **KA6GDT.** This is the first time I did single band (80m). Didn't do as well this year; same equipment and antennas when compared to last year's results. But I have learned value of RX antennas . . . **KBØFHP.** Only got a few hours in but hope it helps when added to the club score . . . **KB1LAX.** This is the third year with a Field Day type of operation. We bring all equipment up to Zone 2. Even with the low band conditions, everyone had a great time. Vertical antennas, including a home-built one for 160 meters, performed great . . . **KD3TB.** Great to be back on the air, even with a G5RV in the trees! 10m opening was a nice surprise . . . **KU4V.** Exciting contest as usual, but sadly my last log for the CQ WW. After 50 years at this QTH, we are moving to a retirement apartment without towers or beam antennas. Goodbye my friends from November One Alpha Uniform. I have enjoyed contesting with you immensely! . . . **N1AU.** Conditions were a lot rougher this year but still had fun. Sure wish more EU would listen up for USA on 40m. Where was the Pacific? Always amazing when you break a double mult pile-up on first call with 100w . . .**N1UR.** Finally worked JT on 40 SSB for last zone for 40m SSB WAZ. Thanks JT1JA! Casual contest fun as usual, mostly S&P for me . . . **N4CC.** If we're gonna get beat in 4-land, it might as well be by CQ WW Director K3EST. Nice work, Bob and Phil, KT3Y! Our best low band scores. Sure miss 10 meters . . . **W4WS.** Bands seemed to be in good shape. Great opening into Asia Saturday night on 20 meters . . . **W4WTB.** Using Telnet was a lot of fun. Did not operate enough during the wee hours to work the normal number of JA's. Getting too old for operating more than 40 hours. The CQ WW test is a "must" operate event. Glad to have make this event one more time! . . . **W7GG.** Honey dews = 1; contest = 0 . . . **W7KB.** Our first group effort, more for fun than glory. Great conditions using modern and ancient equipment . . . **W9DEW.** Excellent conditions. Boy I hate to think what the bedlam is going to be again when conditions get better . . . **W9IGJ.** As our crew became more familiar with multi-single, and with operating as a team, the more fun we had! This was great in spite of poor conditions . . . **WA7LT.** More good stuff to work than I've heard for years . . . **WBØHCH.** We are training new contest operators and having a great time . . . **WX7P.**

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.)

2005 SSB RESULTS

SINGLE OPERATOR

NORTH AMERICA

UNITED STATES

K5ZD/1	**A**	**5,553,841**	**3402**	**131**	**470**
				(OP: KM3T)	
AA1ON	*	**1,883,310**	**1590**	**99**	**340**
W1AO	*	1,806,588	1400	103	366
N1DD	*	1,269,168	1153	94	317
N1IK	*	1,237,775	1170	82	303
W1CU	*	1,077,804	884	97	344
W1WEF	*	1,041,179	1078	92	275
W1AA	*	956,551	907	85	304
				(OP: K1VV)	
K1UQ	*	944,531	838	96	317
W1OP	*	612,912	698	76	263
W1ZK	*	498,264	597	77	235
K5MA/1	*	440,568	621	58	203
W3IZ/1	*	437,670	671	61	209
W6ZF/1	*	383,320	502	59	221
N3KCJ/1	*	329,265	497	59	212
K1BD	*	306,432	447	66	200
K1BV	*	342,519	518	54	200
W1FM	*	265,031	415	60	187
KV1W	*	242,757	353	55	188
N1ZZ	*	239,564	398	78	193
W1ZS	*	234,491	397	51	176
KQ2M/1	*	193,980	651	20	86
K1CN	*	191,864	322	46	173
WE1H	*	119,880	239	44	141
NW1A	*	117,404	300	54	142
K1KU	*	114,330	273	49	136
KK1L	*	85,176	200	45	124
N1JW	*	83,420	214	48	124
W6KDK/1	*	78,246	175	56	133
W2QQ/1	*	40,590	145	32	78
K1DX	*	29,848	119	32	72
KB1LAX	*	3,572	43	13	25
W7JAM/1	*	2,009	36	14	27
KD1OG	*	1,705	38	17	32
KA1ZD	**21**	**118,166**	**345**	**29**	**100**
WC1M	**14**	**599,696**	**1492**	**31**	**117**
W1OHM	*	27,690	135	17	61
AB1EP	*	2,560	33	10	22
K2RR/1	**3.7**	**57,285**	**260**	**20**	**75**
K2LP/1	*	1,206	27	8	18
KT1V	**1.8**	**27,807**	**244**	**14**	**55**
W1ZT	*	799	28	6	11
***N1UR**	**A**	**1,577,730**	**1288**	**102**	**360**
***WA1S**	*	**1,221,903**	**1111**	**88**	**323**
***N1PGA**	*	**1,140,800**	**1041**	**86**	**314**
*W1KT	*	1,034,722	860	99	343
*W1JQ	*	875,826	873	80	298
*K1HT	*	599,616	618	82	265
*W2JU/1	*	348,920	463	67	219
*AK1Q	*	292,329	440	55	188
*K1NSS	*	168,586	369	45	149
*KA1C	*	132,618	290	49	137
*K1SE	*	88,184	224	38	113
*N1DC	*	69,552	195	35	103
*W1LZ	*	60,760	181	31	93
*K1VU	*	48,512	160	35	93
*KB1FRK	*	26,675	120	27	70
*W1EQ	*	21,840	100	18	60
*KQ1F	*	21,330	90	27	63
*KA1CQR	*	14,651	94	33	58
*K1WCC	*	14,630	81	24	53
*KA1CJI	*	12,740	74	22	48
*N1DS	*	12,584	91	26	62
*W1CRK	*	6,095	47	17	36
*KA1EKR	*	5,814	42	18	39
*KB1JUF	*	4,701	46	10	33
*KB1CJ	*	3,196	40	14	33
*KA1VMG	*	2,280	36	12	26
*K1KAV	*	35	3	3	2
*K1SND	14	22,896	128	14	58
N2LT	**A**	**2,377,892**	**1819**	**109**	**375**
N2RM	*	**1,713,573**	**1508**	**97**	**326**
N2MM	*	1,378,150	1255	96	334
WE2F	*	1,046,272	1454	56	212
K2UOP	*	652,320	682	88	272
W2LU	*	549,010	726	80	261
NA2P	*	502,600	565	82	268
K2FU	*	362,080	533	64	228
N2MR	*	346,797	469	67	212
K2UT	*	274,560	372	62	202
N2MUN	*	246,064	428	46	162
N2ED	*	208,290	327	66	196
W2UDT	*	168,872	318	54	155
KB2DE	*	162,766	319	44	150
W2FUI	*	99,357	213	47	139
N2CU	*	59,983	178	40	93
N2SY	*	47,104	143	41	87
N2BEE	*	40,748	156	29	93
KM2L	*	36,663	135	28	73
N2SQW	*	28,167	102	36	87
W2OP	*	13,825	78	26	53
WB2KLD	*	12,062	69	25	49
N2VM	*	6,016	45	12	35
WA2BKN	*	4,931	45	20	32
KC2HZW	*	4,389	52	21	36
KB4VL/2	*	1,376	25	11	21
KC2MDQ	*	374	11	8	9
K2XA	**14**	**675,273**	**1621**	**33**	**126**
KD2RD	*	**504,488**	**1258**	**34**	**118**
WA2NHA	*	195,696	539	30	109
N2GC	**7**	**28,028**	**114**	**20**	**71**
***K2CS**	**A**	**365,284**	**520**	**66**	**202**
***NA2NA**	*	**329,810**	**415**	**65**	**230**
*WB2WPM	*	317,730	497	57	198
*KX2S	*	196,318	353	49	157
*W2YK	*	156,148	282	52	154
*KC2GOW	*	126,477	257	54	153
*NJ2BB	*	113,300	281	53	153
				(OP: W2OF)	
*KV2M	*	101,403	225	46	125
*KA2CYN	*	86,416	228	47	129
*KM2O	*	75,349	197	43	108
*N2USM	*	68,665	229	38	117
*W2VU	*	49,700	142	42	100
*N2OPW	*	46,512	157	32	82
*AB2TC	*	41,992	151	36	80
*NJ1F/2	*	30,780	117	38	76
*W2ARP	*	20,970	112	22	68
*WV2ZOW	*	19,206	90	31	66
*N2MTG	*	17,688	89	29	59
*K2YSY	*	17,578	90	29	65
*N2QDK	*	14,872	98	24	64
*KC2KTZ	*	12,920	85	21	55
*WA2OCG	*	7,124	58	19	27
*K2SZ	*	3,162	35	23	28
*KC2LNC	*	2,139	29	11	20
*K2SST	*	1,104	21	11	17
*K2DL	*	1,084	19	8	16
*KC2KME	*	896	18	11	17
*N2LQQ	*	720	19	8	16
*KA2BXH	*	544	12	6	10
***N2GM**	**21**	**132,514**	**414**	**25**	**93**
*KA2ASU	*	11,658	87	14	44
*KR2Q	*	4,107	49	12	25
*W3EH/2	*	3,344	41	12	26
***K2MFY**	**14**	**152,366**	**406**	**30**	**112**
*N2KX	*	37,620	148	21	78
*KA2JEM	*	14,210	108	16	54
*KZ2G	*	8,502	96	15	36
*K2HVE	*	6,345	61	14	33
*WA2MCR	*	5,336	62	11	35
*K3IRV	*	48,714	157	41	97
*W3HVQ	*	39,520	166	41	89
*W3DON	*	27,840	150	36	84
*N3FNE	*	25,009	109	28	61
*W3GNQ	*	22,800	115	28	72
*KT3RR	*	17,974	78	28	58
*K3WGR	*	13,884	93	25	64
*K3VED	*	11,844	94	29	55
*W3FLH	*	10,948	72	24	44
*N3CHX	*	8,680	74	16	46
*KN3A	*	8,375	73	25	42
*N3XL	*	5,332	50	20	42
*NF3R	*	4,950	41	16	34
				(OP: K3ASK)	
*K1EFI/3	21	20,540	111	12	53
***W3NO**	**14**	**146,400**	**382**	**32**	**116**
*N3GH	*	79,422	246	29	93
*KB3KYZ	1.8	60	11	3	3
K4ZW	**A**	**4,906,980**	**3014**	**136**	**449**
K4SSU	*	**1,674,741**	**1507**	**110**	**343**
				(OP: NA4BW)	
WA4TII	*	1,379,540	1145	108	352
N4PQX	*	1,098,086	946	99	319
K4PV	*	912,240	1234	92	270
N1GC/4	*	702,039	708	90	293
W4STB	*	33,465	123	35	80
W4HJ	*	8,976	63	24	42
NT4D	*	6,400	47	14	36
W1GUD/4	*	5,832	53	29	43
K4DXU	*	2,898	32	18	24
K4EA	**21**	**448,635**	**1018**	**33**	**132**
N4PN	*	**321,372**	**816**	**34**	**124**
N4CT	*	**254,332**	**644**	**31**	**115**
K4UTE	*	175,764	424	32	119
K1UM/4	*	84,924	324	28	98
K4SV	*	19,652	100	16	52
W4ZYT	14	17,280	96	17	55
K4APG	*	13,320	78	21	51
K1ZW/4	*	6,710	52	15	40
WD4CNZ	*	5,938	99	15	50
K4XS	**7**	**379,362**	**1041**	**30**	**108**
N4NX	*	**59,750**	**195**	**30**	**95**
AG4W	*	35,061	161	20	73
AA4VV	*	28,785	135	19	76
AA4MM	**3.7**	**42,133**	**211**	**20**	**71**
K4KZZ	*	25,188	135	15	62
W4ZV	**1.8**	**32,838**	**184**	**17**	**66**
KK4SI	*	4,972	71	11	33
***KA8Q/4**	**A**	**554,741**	**660**	**81**	**238**
***NA4CW**	*	**385,299**	**516**	**75**	**204**
*K9OM/4	*	372,620	482	80	230
*KU5D/4	*	20,805	107	31	64
*KG4RTA	*	19,982	99	39	64
*W3TB/4	*	19,762	100	28	54
*WA4DOU	*	19,402	80	28	61
*KD4MZM	*	19,120	103	20	60
*N4TX	*	19,819	101	28	57
*W4BNO	*	15,170	97	27	55
*W4OGG	*	16,067	93	24	57
*AD4YQ	*	14,329	75	32	57
*KG8B/4	*	12,775	75	21	52
*WA4FXX	*	12,480	76	25	53
*K4FTO	*	12,096	85	27	57
*WA4OSD	*	11,736	72	26	46
*AE4EC	*	10,281	73	22	47
*K4GM	*	9,211	75	19	42
*WA4JA	*	8,400	61	26	44
*AB1R/4	*	7,440	53	22	40
*K4TVO	*	7,150	55	18	37
*N4EKG	*	5,184	41	20	34
*K4GOP	*	4,840	62	19	36
*WB4SQ	*	4,770	56	16	37
*KD4BJW	*	4,437	44	20	31
*KD6AKC/4	*	3,760	44	17	30
*K3MZ/4	*	2,730	26	18	24
*K4OH	*	1,500	24	11	19
*N4EK	*	1,320	24	9	15
*KG4TPO	*	100	139	43	87
*W4NSC	*	10	8	7	6
***K4WI**	**28**	**12,120**	**125**	**11**	**29**
*W4JIK	*	1,715	27	8	19
***W4EEH**	**21**	**94,752**	**314**	**24**	**88**
*AA4FU	*	34,340	152	17	68
*NO4K	*	12,154	98	13	46
*KI4EGT	*	3,528	56	10	26
***N4MO**	**14**	**156,264**	**435**	**31**	**105**
*W9IGJ/4	*	59,640	291	23	82
*N4DL	*	6,110	54	12	35
*K4NVJ	*	3,268	33	15	28
*N4ZTK	*	2,079	24	12	21
*N4NTO	*	1,302	24	5	16
*NT4Q	*	621	20	9	14
***KU8E/4**	**7**	**28,925**	**138**	**20**	**69**
N2IC/5	**A**	**3,335,815**	**2547**	**135**	**364**
N5AU	*	**1,182,162**	**985**	**110**	**328**
N5PA	*	810,529	817	93	280
N5ZK	*	492,926	704	73	201
				(OP: W5ASP)	
W6PU/5	*	433,133	521	93	208
K5LAD	*	338,376	490	71	205
W5WMU	*	294,888	468	79	185
KE5K	*	236,693	352	73	178
NX5N	*	199,984	340	67	165
KU5S	*	188,178	311	74	163
KS5V	*	101,616	233	52	122
AB5C	*	83,805	206	47	104
KD5NFW	*	65,136	192	41	97
N5LYG	*	52,055	163	52	93
KD5JAA	*	51,430	168	45	94
K5GN	*	27,104	157	26	51
WT5U	*	25,280	129	23	56
W5NIG	*	19,104	75	25	71
NA4M/5	*	15,675	79	25	50
W5PR	**28**	**21,200**	**176**	**16**	**37**
W5KI	21	680	14	5	12
W5FO	**14**	**178,950**	**542**	**36**	**114**
N5MV	*	41,736	275	26	85
W5PQ	*	2,849	46	11	26
NA5Q	**7**	**51,213**	**222**	**30**	**99**
K5RX	**3.7**	**78,810**	**311**	**25**	**86**
W5GZ	*	6,157	57	17	30
***N5AW**	**A**	**1,030,680**	**994**	**110**	**310**
***WD5K**	*	**848,202**	**868**	**96**	**277**
*W5GAI	*	267,280	417	72	188
*AC5ZO	*	141,114	330	53	121
*WA5IYX	*	99,000	262	46	104
*KE5LQ	*	92,685	213	55	112
*W5WRE	*	49,536	182	41	88
*KC5LK	*	40,068	127	42	84
*NN5T	*	34,662	120	33	73
*AB5XZ	*	32,256	134	39	73
*WA5OK	*	31,808	140	41	71
*KE3D/5	*	25,573	122	37	70
*KA5BJY	*	22,523	111	31	70
*N5DTT	*	19,170	84	30	60
*KA5EYH	*	16,642	97	35	71
*WØZW/5	*	16,182	73	32	55
*WA5ZUP	*	16,160	101	28	52
*W6TRO/5	*	14,615	82	28	51
*AD5SR	*	10,880	67	22	42
*WD7Z/5	*	9,455	58	20	41
*KD5OWO	*	8,643	93	28	39
*N5MOC	*	8,228	70	22	46
*AD6G/5	*	6,996	50	24	42
*KB5TMD	*	5,832	60	20	34
*N5GO	*	4,840	48	16	28
*KE5DHY	*	4,386	53	22	29
*N8OWD/5	*	2,664	43	16	21
*N5XU	*	1,728	30	12	20
				(OP: AD5RA)	
*KB5DRJ	*	496	13	6	10
*N5KEV	*	220	9	6	5
***K5MQ**	**21**	**52,965**	**194**	**28**	**79**
*K5PAX	*	12	2	1	2
***KZ5OH**	**14**	**51,060**	**222**	**21**	**71**
*K5WW	*	10,679	85	18	41
*KE5AQD	7	3,738	41	15	27
K5NA	**A**	**1,853,728**	**1655**	**123**	**301**
W5PH	*	**1,036,940**	**1052**	**108**	**265**
K5XX	*	847,540	1006	93	217
KI5CG	*	591,462	905	80	163
N5HC	*	498,012	695	86	196
WA5VGI/5	*	354,926	525	85	219
N5QQ	*	352,352	538	89	219
NN5XX	*	216,944	397	57	151
NF5V	*	207,669	386	60	143
K7AGE/5	*	157,974	311	64	162
K5QK	*	151,110	319	67	140
K5JAT	*	123,318	296	70	116
N5DA	*	109,208	230	60	127
WO5M	*	78,820	222	45	95
K5SGH	*	65,800	261	34	60
WB5JJJ	*	44,730	182	39	51
N5WS	*	42,224	148	35	69
W5ISO	*	41,538	129	49	89
KI5T	*	36,800	148	36	56
W5EB	*	28,890	126	43	64
K5ST	*	26,220	162	35	60
K5NR	*	17,680	90	29	56
KY5LA	*	15,132	107	32	46
AE5RR	*	15,124	105	29	47

*K2YEH	3.7	7,584	67	12	36
K3CR	**A**	**4,445,930**	**2876**	**130**	**436**
				(OP: LZ4AX)	
AA1K/3	*	**4,112,913**	**2729**	**130**	**441**
W3BGN	*	**3,257,436**	**2237**	**120**	**412**
NN3W	*	**2,704,683**	**2171**	**124**	**419**
K3ZO	*	**2,579,927**	**1868**	**113**	**384**
W3PT	*	999,040	842	102	344
N3UM	*	567,155	629	78	257
KW3W	*	506,198	568	78	268
N3RJ	*	497,812	644	78	244
K4JLD/3	*	363,475	474	84	251
W8FJ/3	*	307,372	408	80	219
N3KR	*	276,640	416	62	198
W3DF	*	271,956	447	73	189
W3FVT	*	271,272	437	64	190
N3ONM	*	212,296	359	52	186
N3RW	*	211,596	367	57	172
N3ST	*	91,184	230	47	117
W3AP	*	84,108	215	44	119
W3KV	*	78,683	210	35	117
K3RWN	*	50,995	169	49	106
NA3M	*	45,506	155	33	89
WB2ZAB/3	*	41,160	123	52	95
K3GV	*	23,042	102	24	58
K3MRG	*	21,931	99	22	69
N3HBX	**14**	**744,438**	**1831**	**36**	**134**
K3RH	*	32,300	157	22	63
KBØFHP/3	3.7	7,650	88	11	40
W3GH	**1.8**	**4,387**	**61**	**10**	**31**
***W3LL**	**A**	**966,966**	**862**	**98**	**331**
*KA3FZN	*	123,623	269	43	138
*WR3H	*	110,044	254	44	120
*W6NRJ/3	*	109,368	260	53	143
*K2LNS/3	*	105,952	255	47	129
N4MM	*	745,647	726	99	307
W6NWS/4	*	529,573	612	85	256
N4AA	*	523,940	569	79	261
K4LTA	*	471,450	639	86	264
W2OO/4	*	466,416	562	76	240
KR4M	*	447,720	567	86	242
W4NTI	*	421,200	534	77	223
W2YE/4	*	419,312	544	69	223
AB9H/4	*	391,416	576	73	209
KB4QLZ	*	388,969	539	74	233
W4YE	*	381,840	564	55	203
KZ2I/4	*	342,808	435	68	224
N4ZC	*	328,410	465	68	199
K4FYM	*	286,776	428	63	189
K4LQ	*	268,051	414	66	191
K4GHS	*	245,110	356	60	194
N4GI	*	237,864	414	51	153
W7QF/4	*	212,852	328	70	184
NX9T/4	*	192,640	358	65	159
KB4FWN	*	192,444	347	66	171
KU4FP	*	167,388	277	56	166
W4MY	*	153,725	292	62	153
W4UFO	*	133,980	249	51	152
KD4MCA	*	124,146	260	55	143
N4KZ	*	121,002	234	59	142
K4IRS	*	120,650	246	49	141
N4ZZ	*	120,291	445	24	77
N4UH	*	111,672	250	56	132
K4CC	*	101,019	256	38	113
K4ZTL	*	98,280	211	48	134
NJ4F	*	65,274	222	41	97
W4CEO	*	62,181	168	35	106
NE4M	*	60,624	174	42	102
K4PPK	*	46,980	160	41	104
KD4K	*	44,556	139	47	94
AD4L	*	38,804	147	32	77
*AI4MK	*	324,447	546	65	184
*K4JAF	*	246,075	382	70	185
*WB2RHM/4	*	215,031	368	60	169
*KK4TE	*	190,302	397	49	148
*KB4ET	*	189,104	346	57	155
*K4ZGB	*	172,601	324	56	165
*KI3O/4	*	167,040	302	64	168
*K4GKD	*	166,026	300	52	149
*W4AN	*	133,282	260	57	149
				(OP: KU8E)	
*W4QK	*	131,412	289	52	136
*KU4V	*	125,846	269	54	148
*W4KAZ	*	121,953	270	45	132
*WF4W	*	114,390	261	48	138
*KE4GWV	*	108,800	292	40	120
*AD4IE	*	103,806	247	37	121
*N4JED	*	92,820	246	42	114
*N6CY/4	*	88,672	209	41	122
*KD3GC/4	*	84,165	210	53	128
*KG4ORA	*	72,542	184	49	117
*W4WNT	*	60,140	168	44	111
*NA4K	*	56,030	172	39	91
*WA3OFC/4	*	54,051	176	34	95
*N4WO	*	46,816	157	41	92
*W4KTF	*	46,107	144	40	101
*KI4AOC	*	44,505	158	33	82
*N4CU	*	32,918	131	35	74
*N2IXX/4	*	31,937	119	38	71
*KD4ULW	*	30,694	121	33	70
*WX8V/4	*	28,808	109	31	73
*N4DXI	*	27,025	112	33	82
*KG4ZXP	*	25,877	98	37	76
*KS4S	*	25,482	115	25	68
*W4TU	*	24,638	108	30	67
*KA8FAN/4	*	22,563	99	37	72
*KA4AXS	*	22,220	111	32	69

KG6AO	*	12,480	71	30	48
AJ6V	*	9,676	72	24	35
WØYK/6	*	7,695	53	23	34
W6SJ	*	2,440	33	19	21
K6KO	21	1,056	20	5	17
NI6W	**14**	**372,570**	**926**	**36**	**129**
W6AQ	*	144,584	462	31	93
W6DCC	*	64,782	262	31	91
WJ6T	**7**	**24,035**	**137**	**29**	**66**
W6KW	**3.7**	**52,116**	**326**	**28**	**58**
K6OY	*	9,920	65	24	40
K6SE	**1.8**	**780**	**24**	**8**	**12**
***N6EM**	**A**	**100,960**	**281**	**57**	**103**
*W6RJC	*	82,940	214	53	92
*WB6NFO	*	92,881	124	33	50
*KI6VC	*	61,628	207	45	79
*N6NF	*	53,572	182	37	81
*KE6WC	*	51,171	202	38	73
*W6RCL	*	43,164	154	42	67
*WI7F/6	*	40,828	151	46	72
*AA6DX	*	40,120	162	46	72
*AD6ZJ	*	22,515	113	38	57
*K6GO	*	9,591	71	27	42
*K6CSL	*	7,369	61	24	31
*N6RCE	*	6,160	47	19	36
*KC6MZY	*	4,563	60	18	21
*KK6TV	*	2,646	57	21	21
*KG6OIX	*	1,829	22	16	15
*KD6PQF	*	1,624	23	14	15
*WB6NL	*	1,344	28	13	15
*W6RFF	*	1,122	23	8	9
*KA6GDT	*	140	10	5	5
***W6AFA**	**21**	**226,879**	**666**	**31**	**99**
***W6EUF**	**"**	**99,180**	**290**	**31**	**83**
*N6RV	*	50,776	221	24	64
*AE9F/6	*	42,510	198	24	54
*W6/NP4IW	*	29,736	207	20	39
*W6VM	*	12,110	76	15	43
*K6EY	*	3,936	37	12	29
*KU6T	14	12,198	81	18	39
*NE6M	*	646	27	8	9
*KI6PG	3.7	457	17	8	7
*NT6K	1.8	432	19	7	9
K7RL	**A**	**2,511,519**	**2326**	**130**	**309**
K5RR/7	**"**	**1,198,120**	**1127**	**106**	**279**
K4XU/7	*	798,206	974	97	220
K7ZZ	*	795,544	1260	83	194
W7VJ	*	650,770	861	92	203
N7TT	*	501,760	646	97	223
N7RO	*	447,008	749	68	161
AF7Y	*	361,790	595	73	169
AA7PM	*	226,590	402	68	142
NE9Z/7	*	179,690	332	70	168
NF7E	*	170,818	327	72	151
K7EG	*	161,350	363	49	126
N7LOX	*	138,330	315	60	114
W7WW	*	117,935	218	60	169
N7BF	*	106,212	259	58	101
KC7UP	*	92,106	238	47	106
W7QN	*	88,800	241	55	105
W7EKM	*	91,042	213	59	104
W7MGC	*	68,497	187	54	89
K7WP	*	58,504	170	51	91
WG7X	*	42,360	146	39	81
W7SW	*	40,592	134	46	72
K7RX	*	35,032	137	35	81
K7MY	*	34,020	147	32	76
KS7T	*	27,977	114	38	63
K7LV	*	13,770	105	25	56
W7LKG	*	13,250	90	15	35
N7XY	*	7,350	61	22	27
K2DI/7	*	6,480	63	28	32
N7LR	*	3,403	39	15	26
K7CHC	*	1,344	21	11	17
W7UT	**21**	**288,686**	**730**	**32**	**110**
K8IA/7	**"**	**240,464**	**756**	**33**	**100**
W7AYY	*	25,956	118	25	60
W7WA	**14**	**848,350**	**1624**	**39**	**151**
W7EB	*	124,890	512	29	86
W7KKR	*	36,749	155	26	70
W9PL/7	7	4,785	53	12	21
W8AEF/7	**3.7**	**15,872**	**121**	**23**	**41**
W7IZL	**1.8**	**3,584**	**200**	**11**	**21**
KC7V	*	1,260	35	8	13
***K7ACZ**	**A**	**368,816**	**484**	**87**	**209**
***W7YAQ**	**"**	**267,495**	**420**	**84**	**171**
*KO7X	*	199,804	363	64	145
*W6AEA/7	*	198,900	385	56	139
*KE7RT	*	171,045	352	60	129
*N7ZG	*	150,728	351	49	117
*KW7V	*	141,911	272	65	144
*K7PRW	*	107,520	266	59	109
*AE7DX	*	89,700	227	56	100
*N7VZU	*	77,220	207	43	100
*KE7YF	*	55,200	190	38	77
*K6AIA/7	*	45,085	166	43	84
*W7YVK	*	42,846	155	42	66
*W7KB	*	28,032	117	32	64
*W7QDM	*	26,433	125	36	63
*AC7GP	*	19,656	119	32	46
*N7WI	*	19,434	104	29	53
*AK7S	*	18,907	103	31	42
*N7VS	*	18,424	106	44	54
*W8AKS/7	*	17,425	102	36	49
*N7CN	*	15,600	115	33	42
*KC7NUP	*	15,210	93	33	45
*KT7G	*	13,884	79	32	46
*W7GTO	*	12,096	85	25	39
*K7AEK	*	10,500	66	22	38
*KG7WZ	*	4,365	68	20	25
*K7TR	*	3,640	38	16	24
*AD7BK	*	3,198	41	20	19
*WQ1H/7	*	2,128	35	18	20
*W7TMT	*	1,863	26	12	15
*N7IZ	*	1,767	24	12	19
*K6BIR/7	*	1,500	28	13	12
***W7UPF**	**21**	**89,577**	**324**	**29**	**82**
*W3CP/7	*	30,186	160	23	55
***W7FP**	**14**	**132,736**	**360**	**30**	**106**
***K7OX**	**"**	**126,758**	**398**	**28**	**94**
*WAØKDS/7	*	97,686	277	33	101
*KG7RZ	*	28,724	140	27	59
*W7DAM	*	480	20	6	6
*KA7LXM	*	532	23	7	5
*W6XI/7	7	2,240	35	10	18
*K7SP	3.7	3,226	42	13	23
N8II	**A**	**2,520,258**	**1952**	**114**	**360**
K8MN	*	914,158	889	96	295
W8MJ	*	553,306	701	86	252
K8ZZU	*	311,168	427	72	214

W8RJL	*	226,435	372	65	188
N8MZ	*	208,330	341	63	188
NE8J	*	35,200	130	34	76
N8OH	*	33,078	119	32	79
K8AO	*	5,236	52	15	29
W8TK	*	2,379	22	18	21
N8OL	**21**	**78,892**	**254**	**27**	**94**
W8CZN	**14**	**282,275**	**690**	**37**	**138**
W8TWA	**"**	**212,232**	**532**	**33**	**115**
W8UD	*	120,320	369	29	99
W8IQ	3.7	8,384	73	13	35
KC8IVC	*	2,197	43	9	16
***WB8TLI**	**A**	**513,921**	**604**	**81**	**240**
*K8LY	*	159,597	303	54	153
*KD5LNO/8	*	153,906	289	57	169
*KK8MM	*	136,552	278	57	145
*NV8N	*	136,485	403	28	107
*N8IE	*	135,976	295	47	137
*WB8JUI	*	135,548	275	52	136
*K8VUS	*	114,696	263	44	133
*N8XD	*	100,206	230	42	129
*W8KNO	*	69,440	197	43	112
*N8ET	*	53,314	167	31	91
*N8ERL	*	44,388	163	38	99
*KA8PTT	*	31,506	115	37	81
*N4EL/8	*	25,584	107	33	71
*KN8J	*	25,300	100	31	69
*KB8TXZ	*	10,362	66	20	46
*K8MJZ	*	8,866	60	18	44
*W8IDM	*	8,820	61	22	38
*WG8R	*	9,821	58	20	51
*K8SCR	*	8,160	58	21	39
*NF8M	*	8,001	50	25	38
*W8PRO	*	7,134	113	28	59
*KC8F	*	4,268	43	16	28
*N8PUG	*	775	21	9	16
*W8FT	*	0	0	0	0
*KD8AUQ	21	24	2	2	2
***W8WT**	**14**	**38,115**	**145**	**21**	**78**
*AF8C	*	22,960	120	23	59
***K8DO**	**3.7**	**7,695**	**102**	**11**	**34**
W9RE	**A**	**4,282,720**	**2707**	**130**	**450**
WB9Z	**"**	**3,523,377**	**2313**	**134**	**439**
K9BGL	*	1,156,021	1066	102	317
NØIJ/9	*	837,564	919	93	261
K9SG	*	511,200	564	91	264
W9OP	*	509,600	564	84	266
W9JA	*	365,913	477	83	244
W9GXR	*	136,573	288	49	139
W9TY	*	108,108	251	46	136
			(OP: K9MDO)		
W3HDH/9	*	92,400	237	44	121
W9OA	*	77,420	204	43	115
W9VA	*	42,364	135	33	86
WI9WI	*	31,411	130	29	72
N9LYE	*	15,397	82	34	55
W9YYG	28	3,335	45	8	21
W9LAS	21	12,322	78	14	47
			(OP: K9JS)		
K2AAW/9	*	2,072	31	7	21
N9MW	**14**	**119,770**	**410**	**32**	**113**
K9CAN	*	91,590	283	23	101
K9TTT	7	6,141	89	20	49
KG9N	**3.7**	**23,868**	**126**	**19**	**59**
W9SE	1.8	455	23	5	8
***AC9X**	**A**	**319,754**	**444**	**82**	**216**
***W9HPJ**	**"**	**245,385**	**457**	**43**	**162**
*K9QVB	*	216,678	370	64	167
*AJ9C	*	207,835	378	51	160
*AB9KZ	*	163,213	291	61	166
*N9TTX	*	134,126	271	56	143
*KD9MS	*	94,844	223	53	128
*K1TN/9	*	78,369	184	47	126
*K9JE	*	77,720	196	40	105
*W9LYN	*	70,929	208	36	101
*KA9WAR	*	29,211	139	28	79
*K9SQL	*	26,892	116	32	76
*W9LYA	*	12,464	91	31	51
*K9OR	*	11,421	58	27	54
*KC9HAV	*	9,702	87	30	47
*KB9IJW	*	7,482	105	28	58
*KB2QQM/9	*	7,245	53	26	37
*KB9WBM	*	5,452	49	16	31
*N9MTT	*	5,198	48	14	32
*K9QH	*	3,182	32	18	25
*AD9T	*	2,880	36	14	26
*KA9OBZ	*	108	7	5	7
***WD9DZV**	**21**	**45,980**	**200**	**20**	**75**
*N9ALC	*	2,240	31	8	24
*W9HLY	*	1,701	30	3	18
***W9ILY**	**14**	**81,535**	**276**	**23**	**92**
*W9RN	*	60,907	218	27	86
*W9AEM	*	14,312	86	18	52
*KA9CBJ	*	135	9	5	4
*WD9DCW	*	36	4	1	2
***K9RO**	**1.8**	**4,416**	**43**	**14**	**32**
*W9VW	*	752	25	7	9
			(OP: W9IND)		
KØRH	**A**	**678,339**	**826**	**90**	**249**
WØZA	**"**	**459,420**	**690**	**78**	**182**
KØIR	*	425,656	529	82	226
KØRC	*	157,762	325	56	146
WBØHCH	*	151,887	292	50	147
KØEU	*	110,550	300	51	99
WBØN	*	96,957	251	45	126
WØOR	*	79,032	212	41	107
WAØMHJ	*	71,121	175	49	108
KØJJR	*	64,812	206	39	93
WØML	*	59,974	199	50	107
KØDAT	*	50,651	137	50	114
WØEB	*	43,344	139	34	92
WØPPF	*	48,407	154	36	94
KØCOM	*	21,090	95	43	68
WØCBH	*	7,888	51	23	45
NØKK	*	4,140	43	26	34
N2ZO/Ø	**21**	**283,432**	**883**	**34**	**108**
WBØTSR	*	27,965	130	21	64
KØIZ	**14**	**141,087**	**650**	**30**	**101**
NØUU	*	110,564	335	32	99
WØCEM	*	35,867	216	22	67
WØGJ	**7**	**41,886**	**180**	**30**	**87**
K4VX/Ø	*	9,499	63	17	42
WNØL	*	8,866	62	19	43
KU1CW/Ø	**3.7**	**60,334**	**251**	**21**	**76**
***ACØW**	**A**	**751,983**	**802**	**91**	**276**
*WØETT	*	287,432	466	74	174
*KØSQ	*	284,988	435	64	190
*NTØF	*	279,468	433	70	182
*KJØB	*	212,976	358	56	160
*NØFP	*	163,240	323	61	151

*WGØM	*	117,786	240	58	143
*KØIW	*	112,833	244	64	125
*NØEO	*	100,701	235	47	120
			(OP: AAØAW)		
*WØQQS	*	51,030	176	39	96
*WBØIEL	*	54,371	146	40	105
*WBØYJT	*	44,880	181	37	95
*KØUK	*	44,640	146	48	72
*WAØDCB	*	42,240	164	36	84
*KØMPH	*	35,625	141	37	88
*WØPI	*	30,464	115	34	78
*WA2MNO/Ø	*	26,216	121	36	77
*KEØL	*	26,136	108	30	69
*K5QQ/Ø	*	22,140	113	28	62
*KCØRQH	*	16,686	84	28	53
*NØCQI	*	15,092	99	25	52
*NØWY	*	13,650	73	24	54
*NØUV	*	13,182	83	24	54
*WAØBNX	*	11,968	69	20	44
*KØPYK	*	11,644	78	30	52
*KAØEIC	*	10,521	72	25	38
*ABØOX	*	5,800	42	15	35
*KBØJQO	*	5,643	52	19	38
*KAØLDG	*	4,462	38	16	30
*WØPSS	*	4,089	43	19	28
*WBØM	*	2,128	22	19	19
*KIØDI	*	1,537	25	11	18
*K2HT/Ø	*	399	11	6	11
*KCØNFB	*	100	5	5	5
*KØFA	21	19,652	121	15	53
*NEØP	*	4,687	46	13	30
***WØAH**	**14**	**207,632**	**597**	**34**	**118**

ALASKA

AL1G	**A**	**263,262**	**1219**	**41**	**61**
KL7RA	**1.8**	**6,504**	**143**	**10**	**14**
*WL7BDO	A	4,768	63	16	16

ANGUILLA

***VP2EAZ**	**28**	**18,700**	**239**	**13**	**21**
			(OP: W9AAZ)		
***VP2EWX**	**21**	**43,355**	**305**	**19**	**46**
			(OP: W4WX)		
*VP2ECM	14	11,907	135	14	35
			(OP: N1WON)		

BARBADOS

8P1A	**A**	**10,540,052**	**7808**	**135**	**431**
			(OP: W2SC)		

BELIZE

***V31MQ**	**14**	**179,157**	**1005**	**22**	**67**
			(OP: WQ5C)		

CANADA

VO1AU	**A**	**2,758,896**	**2248**	**99**	**377**
VO1TA	**"**	**1,789,909**	**1961**	**76**	**265**
VE1SLL	*	1,872	27	14	22
***VO1ONE**	**A**	**133,455**	**356**	**39**	**116**
VY2PA	**A**	**8,602,286**	**5672**	**116**	**465**
			(OP: W4PA)		
VE2IM	**"**	**6,047,000**	**4804**	**107**	**393**
VE2AYU	*	920,430	1109	76	239
VY2LI	*	696,250	1093	62	188
VE2DC	*	159,032	308	59	147
VA2BMG	*	13,104	72	26	52
VE2QIP	7	9,291	76	14	43
***VE2GSO**	**A**	**513,570**	**1182**	**49**	**141**
*VA2SG	*	194,629	410	50	141
*VE2QY	*	38,556	173	33	69
*VA2UK	*	19,936	105	33	56
VC3O	**A**	**5,794,200**	**4546**	**126**	**414**
			(OP: VE3AT)		
VE3KZ	**"**	**2,309,960**	**2248**	**98**	**332**
VE3XN	*	2,043,700	1874	100	328
VA3DX	*	1,564,460	1248	108	352
VA3YP	*	783,126	1253	71	207
VE3CR	*	472,590	598	73	222
VA3EC	*	131,652	263	52	155
VE3UZ	*	111,630	263	50	133
VA3XH	*	25,500	106	31	71
VE3NZ	**7**	**53,680**	**341**	**17**	**63**
VE3RER	3.7	5,390	71	10	25
VA3XQ	*	3,729	51	13	20
VE3PN	**1.8**	**22,440**	**270**	**11**	**33**
***VE3JAQ**	**A**	**771,162**	**1176**	**72**	**229**
***VE3XAT**	**"**	**522,546**	**695**	**79**	**248**
*VE3KP	*	422,564	582	71	227
*VA3SWG	*	252,928	612	55	153
*VE3AD	*	230,145	414	44	157
*VE3TW	*	221,752	391	46	166
*VE3KPP	*	133,940	435	42	106
*VE3ZZ	*	119,616	288	36	132
*VE3OM	*	82,170	212	42	123
*VE3VMP	*	52,780	201	47	83
*VA3ZWT	*	32,412	152	34	77
*VA3OBR	*	29,637	127	34	77
*VE3HLS	*	27,830	107	36	74
*VE3TMT	*	27,734	139	30	68
*VA3UV	*	20,020	129	25	52
*VE3EL	*	17,712	112	30	52
*VA3TPS	*	13,300	80	20	50
*VA3QR	*	12,312	73	27	54
*VE3DUN	*	4,108	48	20	32
*VE3AGC	*	2,170	38	16	19
***VE3FH**	**21**	**42,606**	**200**	**16**	**65**
*VA3FP	*	35,274	151	18	67
***VE3/W4TAA**	**14**	**87,696**	**448**	**24**	**84**
*VA3TSG	*	2,077	69	13	34
***VE3MGY**	**1.8**	**11,025**	**411**	**6**	**9**
VE4KZ	A	17,424	132	22	50
***VE4YU**	**A**	**154,475**	**354**	**46**	**121**
VE5UA	**A**	**917,969**	**1529**	**94**	**199**
VE5CPU	*	171,430	541	57	98
VE5FX	**14**	**241,359**	**802**	**30**	**99**
*VE5SF	14	32,312	233	13	43
VE6WQ	**14**	**1,028,300**	**2531**	**37**	**138**
VA6MA	**7**	**47,808**	**288**	**28**	**55**
VE6WZ	**3.7**	**72,600**	**613**	**22**	**44**
VE6JY	*	16,320	131	19	41
***VE6TN**	**A**	**559,820**	**1076**	**64**	**166**
*VA6AE	*	44,232	228	41	56
*VE6GJ	*	10,824	70	25	41
*VE6IHS	*	5,628	74	21	21
***VE6CNU**	**21**	**64,728**	**423**	**24**	**48**
***VE6EX**	**14**	**256,088**	**1060**	**30**	**89**
VE7VR	**A**	**162,195**	**381**	**58**	**107**
VE7TK	*	52,122	150	49	97
VE7JKZ	*	13,741	80	39	52
VA7AM	**21**	**279,936**	**1331**	**28**	**68**
VE7IG	**14**	**659,921**	**2002**	**33**	**116**
VA7JW	*	48,685	246	21	70
***VE7IN**	**A**	**233,967**	**643**	**57**	**110**
*VA7LC	*	108,450	298	53	97
*VE7NS	*	24,024	125	34	44
*VE7KPB	*	23,490	122	36	45
*VA7MJR	*	14,274	95	28	50
*VE7WWW	*	11,554	111	26	27
*VA7BS	*	1,075	62	20	23
VY1CQ	**14**	**89,310**	**625**	**25**	**40**
*VE8NSD	A	2,289	73	11	10
***VY1MB**	**14**	**53,808**	**620**	**20**	**28**

CAYMAN ISLANDS

ZF2AH	**7**	**235,935**	**990**	**22**	**85**

COSTA RICA

TI2JCY	**14**	**74,188**	**666**	**20**	**48**
***TI3MAO**	**14**	**37,819**	**357**	**19**	**40**

CUBA

***CO8LY**	**A**	**1,792,461**	**2829**	**80**	**239**

DOMINICAN REPUBLIC

HI3CCP	**14**	**355,914**	**1763**	**28**	**89**
***HI8ROX**	**28**	**26,496**	**334**	**15**	**21**
***HI3NR**	**21**	**437,320**	**1887**	**25**	**79**
***HI3TEJ**	**7**	**286,794**	**1212**	**24**	**89**

GRENADA

***J3/SP9PT**	**21**	**284,676**	**1548**	**19**	**65**
***J3/SP9BQJ**	**7**	**49,970**	**281**	**18**	**77**

GUADELOUPE

***FG/K9NW**	**A**	**5,104,410**	**4621**	**106**	**352**

GUANTANAMO BAY

KG4WW	**14**	**788,256**	**2554**	**29**	**109**
			(OP: KX4WW)		

GUATEMALA

***TGØAA**	**14**	**95,460**	**646**	**22**	**52**
			(OP: TG9ANF)		

HONDURAS

***HQ9R**	**A**	**941,949**	**1723**	**71**	**190**
			(OP: WQ7R)		
***HR2DMR**	**"**	**382,536**	**883**	**64**	**143**
*HR2AHC	*	232,087	760	55	96
*HR1RTF	*	180,856	589	51	97
*HR2JGG	*	43,050	320	35	70

JAMAICA

*6Y5/N6TW	21	4,356	71	12	21

MARTINIQUE

***FM5FJ**	**14**	**318,918**	**1036**	**32**	**106**

MEXICO

XE2K	**A**	**2,533,923**	**3420**	**103**	**224**
XE1MM	*	47,943	394	28	35
XE1KK	1.8	10,368	280	9	15
***XE2TG**	**A**	**752,754**	**1694**	**79**	**139**
***4A1UN**	**"**	**714,560**	**1648**	**68**	**156**
			(OP: XE1UN)		
*XE1FSK	*	419,862	1228	57	117
*XE2AUB	*	207,414	567	54	113
*XE1YJS	*	177,031	602	58	121
*XE2MX	*	85,789	362	43	78
*XE1ZTW	*	51,528	181	42	72
*6D8C	*	43,384	390	26	32
			(OP: XE1BEF)		
*XE1AKM	*	16,770	119	28	37
*XE1CL	*	16,320	116	23	41
*XE1ZVO	*	4,368	43	25	31
*XE2GPP	*	840	52	24	32
***XE1CQ**	**21**	**445,730**	**1342**	**32**	**113**
*XE1BY	*	162,060	694	28	83
*XE3WAO	*	121,296	697	21	63
***XE1L**	**14**	**516,838**	**2007**	**34**	**99**
*XE1CT	*	126,720	676	24	72
*XE1NW	7	12,540	99	16	41

PANAMA

*HP1ALX	A	10,134	80	21	35
*HP1DCP	*	78	5	3	3
***HP1BYS**	**21**	**78,736**	**472**	**18**	**58**
***HP1XX**	**14**	**597,839**	**2090**	**30**	**109**

PUERTO RICO

***NP3CW**	**A**	**163,396**	**750**	**39**	**111**
*KP4RV	*	96,903	492	36	61
*WP3GW	*	76,111	233	43	88
*KP4JFR	*	18,746	111	35	56

ST. KITTS & NEVIS

V47KP	**A**	**2,246,088**	**3625**	**82**	**231**
			(OP: K3NM)		
***V49A**	**7**	**135,408**	**705**	**18**	**75**
			(OP: EW1AR)		

SAINT MARTIN

***FS/AH8DX**	**A**	**3,483,000**	**3527**	**106**	**344**

TURKS & CAICOS ISLANDS

VP5KE	**28**	**60,268**	**560**	**17**	**35**
			(OP: N4KE)		
VP5DX	**21**	**1,052,142**	**3144**	**32**	**109**
			(OP: NU4Y)		

U.S. VIRGIN ISLANDS

KV4FZ	**1.8**	**49,140**	**520**	**13**	**41**
***NP2KW**	**A**	**116,332**	**492**	**44**	**83**

AFRICA

AFRICAN ITALY

*IH9YMC	28	510	15	5	10
***IH9P**	**21**	**937,728**	**2210**	**33**	**115**
			(OP: OL5Y)		

ALGERIA

***7XØRY**	**3.7**	**58,401**	**375**	**9**	**54**

ASCENSION ISLAND

ZD8Z	**A**	**8,452,150**	**5025**	**139**	**450**
			(OP: N6TJ)		

CANARY ISLANDS

EA8KV	**A**	**323,190**	**704**	**55**	**135**
EA8AH	**21**	**1,667,064**	**3652**	**37**	**131**
			(OP: OH1RY)		
EA8LS	*	227,260	758	27	83
EA8EA	**14**	**1,206,918**	**2427**	**38**	**133**
			(OP: OH2MM)		
EA8/OH4NL	**3.7**	**473,060**	**1365**	**25**	**99**
*EA8JA	A	96,192	225	53	139
*EA8NQ	*	45	6	4	5
***EA8TX**	**28**	**223,236**	**780**	**23**	**83**
*EA8KK	*	32,368	257	18	38
*EA8BMH	*	7,183	68	12	31
***EA8BHD**	**21**	**197,300**	**704**	**24**	**76**
*EA8BGO	*	33,150	213	19	59
***EA8AG**	**14**	**59,340**	**418**	**22**	**64**

CAPE VERDE

D44TD	**14**	**2,222,829**	**4218**	**38**	**151**
			(OP: IV3TAN)		

CEUTA & MELILLA

EA9LZ	**A**	**5,968,812**	**3905**	**118**	**439**
EA9GW	**28**	**9,216**	**114**	**8**	**28**

MADAGASCAR

5R8FU	**A**	**340,010**	**512**	**65**	**177**

MADEIRA ISLANDS

CQ9T	1.8	18,620	139	9	40
			(OP: CT3KN)		
*CT3FJ	14	3,360	51	11	24

MOROCCO

CN2R	**7**	**1,558,611**	**3271**	**35**	**132**
			(OP: W7EJ)		
***CN8SG**	**A**	**1,536,724**	**1943**	**61**	**223**
***CN8YE**	**"**	**23,088**	**110**	**22**	**32**
***CN8NK**	**21**	**1,366,290**	**3185**	**32**	**121**

NIGER

5U7JB	**A**	**4,157,420**	**3104**	**114**	**371**
			(OP: N4HX)		
5U7B	**"**	**1,084,192**	**1546**	**64**	**208**

REUNION

***FR1HZ**	**A**	**519,585**	**967**	**49**	**152**
*FR/F5SGI	*	595	15	6	11

SENEGAL

*6W7RP	A	336	10	7	9

SOUTH AFRICA

ZS4U	**A**	**2,847,960**	**2802**	**90**	**270**
ZS5NK	*	764,120	1013	71	209
ZS6BRZ	*	264,209	486	66	137
ZS5ZZ	*	48,400	170	42	79
			(OP: ZS5ACT)		
*ZS4BS	A	5,650	43	19	31
*ZS6RAE	*	4,346	45	17	24
*ZS1AJS	*	2,870	27	20	21
***ZS4JAN**	**28**	**20,234**	**126**	**15**	**52**
***ZS9Z**	**21**	**54,516**	**279**	**19**	**58**

SUDAN

***ST2T**	**21**	**1,218,040**	**2955**	**32**	**116**
			(OP: S57DX)		

TANZANIA

***5H3EE**	**21**	**617,848**	**1589**	**30**	**106**
			(OP: DL4SM)		

UGANDA

*5X1RI	14	450	12	8	10

ASIA

AFGHANISTAN

***T6X**	**A**	**397,248**	**1020**	**58**	**134**
			(OP: RW3AH)		

ARMENIA

***EK3SA**	**21**	**243,264**	**942**	**24**	**72**

ASIATIC RUSSIA

UA9CLB	**A**	**4,020,678**	**3089**	**116**	**370**
UA9JDP	**"**	**1,571,940**	**1747**	**83**	**272**
UA9CMQ	*	630,734	1050	51	170
RK9KWI	*	579,261	796	64	229
RA9DZ	*	576,576	822	69	204
UA9KJ	*	401,348	887	70	199
RW9DW	*	253,409	509	42	151
UA9FM	*	192,892	440	37	129
RV9XO	*	143,472	230	62	182
UA9YAD	*	21,306	98	36	70
UA9UDC	*	20,230	96	42	77
UA4LCQ/9	**28**	**71,600**	**844**	**22**	**78**
RV9AZ	*	35,836	208	19	49
UA9UR	**21**	**499,272**	**1574**	**31**	**111**
UA9CBN	*	313,436	934	27	100
RV9UF	*	194,016	976	22	74
UA9HR	*	109,228	571	17	66
RA9ST	*	67,024	434	16	55
UA9SP	**14**	**281,728**	**767**	**35**	**107**
RX9JD	*	62,648	351	22	60
UA9AYA	**7**	**792,990**	**1910**	**34**	**128**
			(OP: UA9BA)		
RU9CK	*	154,517	548	28	93
UA9QA	*	70,191	334	20	79
RA9MJ	3.7	13,311	121	11	40
RU9TO	**1.8**	**36,714**	**257**	**9**	**49**
***RA9FEL**	**A**	**624,237**	**924**	**55**	**196**
***RX9FW**	**"**	**565,239**	**833**	**61**	**206**
***RA9CB**	**"**	**518,340**	**751**	**53**	**212**
*RK9DR	*	499,865	787	59	198
*RA9XF	*	498,150	775	56	187
*RW9RA	*	490,064	683	68	213
*RV9UP	*	435,974	658	86	212
*RV9CM	*	402,144	732	46	167
*RK9CR	*	391,428	635	56	193
*UA9MQR	*	308,385	547	60	171
*RX9FR	*	260,520	512	43	152
*UA9FGJ	*	211,914	411	40	153
*RX9FG	*	189,382	428	37	142
*UA9OMT	*	154,926	445	38	113
*RX9DJ	*	152,541	444	32	121
*RU9UG	*	96,824	296	47	105
*RA9WV	*	84,108	241	42	121

*RA9FR	"	79,856	286	51	133
*RV9XE	"	76,962	238	25	102
*RA9SK	"	72,206	270	39	119
*RX9WN	"	68,134	167	54	109
*UA9UCK	"	73,506	193	51	115
*UA9ODE	"	62,055	256	21	84
*UA9MFB	"	61,908	224	36	96
*RU9UC	"	42,750	156	33	81
*RK9XWW	"	27,468	121	25	59
			(OP: UA6LTO)		
*RK9UC	"	26,216	141	37	79
*RA9BZ	"	24,189	132	24	60
*RZ9WF	"	15,477	103	19	48
*UA9OV	"	7,406	59	14	32
*UA9SAW	"	4,712	45	10	28
*RX9FB	"	2,250	29	20	25
*RN9AA/9	"	1,271	20	13	18
*RA9DT	"	288	14	8	8
***RA9KM**	**21**	**113,940**	**475**	**25**	**83**
*RA9UN	"	47,878	297	17	57
*RV9CLF	"	15,903	123	12	45
*RA9YAH	"	9,552	121	12	36
***RA9AU**	**14**	**293,898**	**902**	**30**	**92**
*UA9AX	"	163,755	463	33	102
*RZ9OQ	"	124,800	410	30	90
*RA9XU	"	100,672	431	22	82
*RX9JP	"	40,420	211	23	63
*RA9HTO	"	27,456	194	14	52
*RZ9IB	"	27,389	177	12	49
***RW9DX**	**7**	**116,957**	**482**	**25**	**84**
*UA9ACJ	"	55,045	245	20	75
*UA9AL	1.8	3,129	65	6	15
RKØUT	**A**	**773,439**	**1492**	**83**	**200**
RWØCF	**"**	**592,044**	**1004**	**95**	**214**
UAØAZ	**"**	**462,210**	**667**	**81**	**229**
RWØAQ	"	322,844	794	46	126
UAØAPV	"	295,056	623	61	155
RUØAW	"	267,778	530	63	154
RAØAA	"	250,268	645	57	121
UAØDC	"	197,640	671	68	112
RWØUU	"	120,212	382	55	109
RAØZD	"	59,214	168	54	88
RAØQC	"	19,740	112	33	61
UAØBA	"	210	7	7	7
RAØBA	**21**	**194,940**	**584**	**33**	**102**
UAØCW	**14**	**118,306**	**321**	**36**	**113**
RWØLC	"	47,582	323	24	50
RUØSN	"	44,226	219	27	54
RZØSR	**3.7**	**12,768**	**117**	**16**	**40**
***UAØFGZ**	**A**	**230,184**	**553**	**75**	**132**
***RAØAY**	**"**	**196,650**	**514**	**53**	**118**
***UAØFBS**	**"**	**149,864**	**619**	**57**	**86**
*UAØYAY	"	101,178	309	43	111
*RXØQA	"	66,700	291	30	86
*UAØFOO	"	30,800	164	39	61
*RAØLE	"	32,776	196	42	75
*RWØLDF	"	28,466	150	42	59
*UAØFDX	"	23,406	173	43	51
*UAØQNV	"	17,794	137	24	58
*RWØUM	"	11,580	111	22	38
*UAØZS	"	5,994	77	15	22
*RWØCOA	"	5,655	62	19	20
***RUØSU**	**28**	**7,052**	**72**	**14**	**28**
***RVØAL**	**21**	**254,241**	**963**	**28**	**89**
*UAØSR	"	16,992	101	17	55
*UAØLGY	"	3,822	74	16	26
***UAØSAD**	**14**	**125,216**	**460**	**30**	**82**
*RWØCV	"	74,360	433	26	62
*RZØCQ	"	390	17	7	6
***UAØACG**	**3.7**	**9,396**	**104**	**17**	**37**

ASIATIC TURKEY

***TA2IB**	**21**	**80,880**	**382**	**19**	**61**
***TA2ZAF**	**14**	**260,972**	**860**	**22**	**84**
*TAØU	"	77,319	666	15	56
***TA3J**	**7**	**185,440**	**734**	**14**	**81**
*TA3YJ	"	10	3	2	3
***TA3D**	**3.7**	**208,616**	**905**	**15**	**74**
***YMØT**	**1.8**	**67,716**	**420**	**9**	**48**
			(OP: TA2RC)		
***TA7OM**	**1.8**	**13,400**	**136**	**6**	**34**

AZERBAIJAN

***4K9W**	**A**	**108,232**	**288**	**44**	**122**

CHINA

***BG1DRJ**	**A**	**107,280**	**658**	**37**	**83**
***BD7OH**	**"**	**60,192**	**240**	**53**	**91**
***BD4ALC**	**"**	**54,240**	**210**	**47**	**73**
*BY4VAM	"	48,840	306	49	83
*BG1FBV	"	47,160	220	44	87
*BG7IUN	"	44,804	384	36	56
*BA6QD	"	19,018	187	23	51
*BG7LVL	"	7,865	70	27	38
*BG4AGK	"	4,158	61	14	28
*BG6AHP	"	4,081	75	24	29
*BG7KFY	"	3,096	51	18	25
*BG1CAL	"	2,262	43	18	21
*BD3ABR	"	540	42	17	19
*BY1BJ	"	252	43	3	4
			(OP: JA1PTO)		
***BD5RT**	**21**	**525,200**	**1917**	**34**	**96**
*BG4BTB	"	1,170	31	7	19
***BD4SUG**	**14**	**64,766**	**480**	**28**	**66**
*BG7KLO	"	36,806	368	27	50
*BD5QDM	"	1,980	71	18	26

CYPRUS

H2T	**21**	**942,420**	**2500**	**34**	**105**
			(OP: 5B4XF)		
C4M	**1.8**	**29,312**	**202**	**11**	**53**
			(OP: 5B4AGM)		
***5B/HA5PP**	**21**	**713,952**	**2035**	**31**	**103**

GEORGIA

4L1AN	21	52,668	315	16	47
4L8A	**14**	**1,644,070**	**3314**	**38**	**152**
4L2M	**3.7**	**111,306**	**527**	**16**	**62**

HONG KONG

VR2BG	**A**	**1,425,900**	**1938**	**132**	**256**
***VR2XLN**	**A**	**360,360**	**883**	**80**	**172**
*VR2UDU	"	90	5	5	5

INDIA

***ATØD**	**A**	**59,411**	**247**	**36**	**85**
			(OP: VU3DJQ)		

ISRAEL

4X4DZ	**21**	**859,883**	**2108**	**36**	**131**
***4Z5FI**	**A**	**104,938**	**276**	**44**	**98**
*4Z4TL	"	70,452	170	58	113
*4Z5KZ	"	35,752	135	35	74
*4X6UU	"	27,911	92	42	71

JAPAN

JR1AIB	**A**	**1,813,448**	**2047**	**113**	**263**
JO1WKO	**"**	**874,152**	**857**	**124**	**302**
JA1TMG	"	484,692	788	80	159
JF1SQC	"	406,505	706	73	136
JF1OPL	"	368,018	553	97	174
JH1EVD	"	202,230	436	63	126
JA1PVX	"	161,116	312	65	123
JR1VAY	"	119,002	231	79	120
JN1BMX	"	102,960	258	63	102
7J1ABD	"	84,785	223	59	96
JH1OCC	**28**	**28,835**	**166**	**21**	**52**
7L1JHN	"	7,150	74	20	30
JH1ACA	**21**	**153,388**	**498**	**35**	**89**
JQ1NGT	"	109,858	494	27	71
JH1OGC	**14**	**331,650**	**988**	**37**	**113**
JA1ELY	**7**	**199,220**	**583**	**35**	**105**
JH1AEP	"	85,260	326	32	73
JA1KFX	"	1,904	44	8	8
***JG1TVK**	**A**	**263,067**	**425**	**86**	**172**
***JA1GYO**	**"**	**200,914**	**370**	**74**	**152**
***JP1QDH**	**"**	**166,828**	**373**	**55**	**124**
*JH1UUT	"	129,444	363	57	104
*JH1ABP	"	108,352	295	47	106
*JA1CP	"	57,908	204	45	79
*JA1HFY	"	50,000	218	48	77
*JA1BUI	"	48,108	165	42	72
*JF1RMM	"	47,268	187	35	66
*JF1MQS	"	43,155	179	40	65
*JA1HNW	"	42,822	160	51	71
*JA1XPU	"	40,657	160	43	66
*JR1MRG	"	38,896	160	45	59
*JA1IZ	"	37,030	131	44	71
*JA1BPN	"	33,411	111	42	69
*JA1KK	"	35,618	143	48	67
*JE1COB	"	28,512	147	38	50
*JA1STY	"	24,750	134	41	69
*JK1NSR	"	18,648	97	34	50
*JA1HG	"	14,700	94	34	41
*JA1OQ	"	12,338	87	21	41
*JH1RMH	"	12,935	87	24	39
*JK1BII	"	7,585	74	17	24
*JA1AAT	"	7,392	59	22	37
*JH1OLB	"	5,876	56	20	32
*JA1WZG	"	4,094	34	18	28
*JA1IWP	"	3,570	35	21	30
*JP1SRG	"	3,375	36	18	27
*JO1SIM	"	2,970	50	13	20
*JJ1WWL	"	2,583	30	16	25
*JH1SWD	"	1,320	18	14	16
*JG1FGL	"	827	17	11	14
*JE1SCJ	"	209	12	10	9
***7N2UQC**	**28**	**5,985**	**69**	**18**	**27**
*JA1XZF	"	3,341	43	14	26
*JI1HFJ	"	1,972	38	13	16
*JE1ALA	"	980	25	8	12
***JA9SCB/1**	**21**	**146,816**	**443**	**33**	**91**
***7K4XNN**	**"**	**117,859**	**447**	**33**	**80**
*JA1MVK	"	78,588	317	33	78
*JA1RQT	"	52,532	224	27	65
*JA1XMT	"	23,325	134	25	45
*JH1CML	"	8,441	88	18	31
*JE1JAC	"	6,862	63	17	30
*JA1JLP	"	6,812	59	18	54
*JA1DBG	"	4,942	59	15	25
*JA1LBZ	"	1,978	34	11	12
*JG1GCO	"	689	14	10	14
*JE1CAC	"	135	9	4	5
*JA1LBN	"	28	3	2	2
***JI1FDF**	**14**	**78,120**	**308**	**30**	**75**
*JE1RRK	"	8,688	74	20	28
*JE1GZB	"	8,514	92	18	24
*7J1AIL	"	4,332	50	17	21
*JA1ANF	"	726	13	10	12
***JH1APZ**	**7**	**20,572**	**114**	**24**	**50**
*JM1NKT	"	6,885	62	21	30
***JE1SPY**	**3.7**	**1,200**	**34**	**10**	**15**
*JG1OWV	"	400	13	8	8
JA2BNN	**A**	**736,320**	**1037**	**88**	**172**
JJ2CJB	**"**	**387,600**	**584**	**95**	**177**
JA2FSM	"	313,540	507	86	171
JA2BQX	"	117,603	298	69	110
JF2IWL	"	55,264	233	34	54
JH2BTM	"	33,201	147	31	62
JF2FIU	"	1,860	31	14	16
JI2UNR	**21**	**473,478**	**1391**	**36**	**102**
JF2BDK	**14**	**81,075**	**268**	**32**	**83**
JA2XCR	"	49,632	202	29	67
JS2LGN	**7**	**71,526**	**329**	**28**	**63**
JA2KVD	"	8,100	59	21	39
***JF2QNM**	**A**	**445,410**	**651**	**108**	**195**
*JA2PFO	"	135,420	307	73	110
*JA2BY	"	71,264	205	47	84
*JA2KPW	"	42,680	167	44	66
*JK2VOC	"	39,936	157	47	81
*JA2GHP	"	33,840	181	33	57
***JG2TKH**	**28**	**14,805**	**96**	**21**	**42**
*JG2SON	"	11,058	104	21	36
***JA2VZL**	**21**	**23,596**	**132**	**22**	**46**
***JG2KKG**	**14**	**271,453**	**686**	**39**	**118**
***JF2WXS**	**7**	**24,795**	**121**	**28**	**59**
*JE2OTM	"	17,612	112	25	49
*JA2DLM	"	6,034	55	19	32
JF3KNW	**A**	**129,360**	**223**	**84**	**136**
JR3CVO	"	30,954	129	32	57
JA3XOG	21	29,700	163	23	52
JS3CTQ	**14**	**617,933**	**1418**	**37**	**126**
JA3AYX	"	8,530	71	22	31
***JR3RIY**	**A**	**357,984**	**786**	**55**	**121**
*JA3YPL	"	94,214	254	61	102
			(OP: JJ3TBB)		
*JH3CUL	"	78,126	216	65	109
*JA3AVO	"	37,800	150	42	66
*JA3VUI	"	9,666	83	26	28
*JA4XHF/3	"	7,245	49	26	37
*JL3RDC	"	4,756	58	15	26
*JM3HYL	"	171	8	7	7
***JF3BFS**	**21**	**170,868**	**568**	**31**	**85**
*JL3TEM	"	78,946	325	29	74
*JG3FWI	"	24,920	158	23	47
*JA3BBG	"	15,912	122	16	36
*JA3PYH	"	5,643	57	15	32
*JR3KAH	"	2,994	52	11	20
*JA9XAT/3	"	405	13	8	7
*JO3CQF	"	42	3	3	3
***JI3BFC**	**14**	**120,292**	**399**	**36**	**86**
*JN3DSH	"	42,680	197	31	66
*JA3DAY	"	12,650	91	20	35
*JO3FUO	"	1,260	19	11	17
			(OP: JJ1BDX)		
JH4UYB	**A**	**3,454,647**	**2781**	**134**	**363**
JA4RWN	"	198,990	410	72	129
JA4EZP	"	19,646	103	38	56
JA4DHN	"	8,810	92	22	41
JE4VVM	**21**	**447,161**	**1251**	**35**	**108**
JM4WUZ	**14**	**43,011**	**213**	**27**	**54**
***JA4AQR**	**A**	**57,856**	**207**	**40**	**73**
*JA4BAA	"	39,171	160	47	65
*JH1GUO/4	"	9,563	78	30	43
*JH4OYA	"	877	23	7	7
JA5CPO	A	44,528	178	44	77
JA5APU	**21**	**148,934**	**576**	**32**	**81**
JA5GSG	14	12,011	87	19	40
***JR5HXU**	**21**	**16,488**	**101**	**22**	**50**
JA6WJL	**28**	**69,615**	**327**	**23**	**68**
JA6BGA	"	26,528	149	22	55
JA6AV	"	14,616	113	18	52
JA6WIF	7	9,238	70	22	40
JA6GCE	**3.7**	**22,875**	**173**	**17**	**44**
***JH6WHN**	**A**	**409,656**	**558**	**98**	**205**
*JH6QFJ	"	257,922	572	64	114
*JQ1AHZ/6	"	50,290	208	40	67
*JA6JVY	"	6,771	69	26	35
*JR6VIX/6	"	1,200	16	14	16
***JH6AUS**	**28**	**45,528**	**244**	**24**	**60**
*JA6BIF	21	3,168	58	12	20
*JA6FCL	14	2,427	31	15	15
JA7NVF	**A**	**1,502,228**	**1703**	**111**	**253**
JA7COI	"	426,600	738	76	149
JA7JH	"	75,987	164	60	107
JA7OWD	**28**	**24,618**	**170**	**20**	**46**
JH7XMO	**21**	**362,500**	**995**	**35**	**110**
***JA7LMZ**	**A**	**269,876**	**513**	**70**	**142**
*JA7BME	"	156,798	350	65	121
*JE7YSS	"	119,153	301	49	114
			(OP: 7N4TEN)		
*JF7VVL/7	"	16,936	101	27	46
*JI7WPV	"	11,718	80	27	36
*JF7GDF	"	5,593	57	21	26
***JP1JIP/7**	**21**	**51,414**	**256**	**26**	**63**
*JR7UOL/7	"	4,392	61	14	22
*JA7ADV	"	2,220	68	14	32
*JI7GYU	"	660	18	9	11
*JA7AXP	14	445	11	7	9
*JH7XGN	3.7	738	20	9	9
JH8DEH	**14**	**62,255**	**324**	**26**	**48**
JA8BMK	**7**	**96,904**	**392**	**35**	**82**
***JA8CSY**	**A**	**200,970**	**403**	**73**	**137**
*JA8CJY	"	44,928	153	48	69
*JA8IJI	"	43,775	182	39	64
*JI8BUR	21	1,562	28	10	12
*JE8BCJ	"	45	4	2	3
JA9CCG	A	45,727	198	34	56
JH9URT	**21**	**69,615**	**293**	**28**	**63**
***JA1ALX/9**	**A**	**47,725**	**186**	**42**	**73**
***JR9NVB**	**21**	**131,055**	**476**	**31**	**78**
*JF9KVT	"	15,736	122	19	37
JAØUMV	**A**	**59,752**	**168**	**64**	**90**
JAØGEY	"	20,280	103	37	53
JHØEQN	28	1,794	32	11	15
JAØJHA	**14**	**871,815**	**2147**	**39**	**122**
JJØKRD	"	175,560	526	35	98
***JHØNEC**	**A**	**230,120**	**431**	**78**	**142**
*JAØBMS	"	42,660	190	46	62
*JHØQYS	"	25,648	137	41	52
*JAØTEA	"	15,416	83	35	47
*JAØRCK	"	9,372	50	24	42
*JJØAEB	"	6,240	60	18	30
*JAØAAQ	"	4,233	45	21	30
*JAØAVS	"	1,472	22	12	11
*JGØGGI	"	744	17	14	17
*JGØIPW	"	312	13	7	6
*JEØVFV	21	512	16	9	10
*JFØVMJ	"	180	11	7	8

KAZAKHSTAN

UPØL	**A**	**5,446,056**	**3921**	**127**	**412**
			(OP: UN9LW)		
UN2E	"	658,239	805	70	243
UN6G	"	581,389	875	70	211
UN6P	"	420,900	708	76	200
UN6T	"	9,000	107	18	32
UN8DG	"	8,362	82	8	29
UN7QF	**14**	**151,570**	**602**	**29**	**86**
***UN7PBY**	**A**	**653,472**	**969**	**76**	**212**
***UN4L**	**28**	**75,263**	**379**	**19**	**54**
*UN4PG	"	7,695	77	13	32
*UN7EX	"	5,376	62	13	29
***UN7JX**	**21**	**177,632**	**770**	**24**	**80**
***UN6LN**	**14**	**349,200**	**935**	**34**	**116**

KYRGYZSTAN

EX8O	**A**	**30,528**	**102**	**52**	**92**
EX2X	**14**	**305,386**	**928**	**31**	**103**
***EX2T**	**A**	**472,402**	**678**	**69**	**218**
***EX7ML**	**21**	**117,213**	**598**	**22**	**67**
***EX8MAT**	**7**	**7,038**	**121**	**12**	**39**

MACAO

*XX9AU	21	2,106	88	12	14

MONGOLIA

JT1CH	**A**	**248,460**	**831**	**46**	**118**
JT1BG	"	72,335	324	38	77
***JT1CJ**	**14**	**79,680**	**610**	**22**	**61**

OGASAWARA ISLANDS

*JD1BIA	21	8	5	4	4

OMAN

A45WG	**A**	**289,467**	**640**	**63**	**150**
***A47RS**	**A**	**171,976**	**382**	**52**	**114**
			(OP: F6BEE)		

SAUDI ARABIA

HZ1IK	**A**	**170,173**	**387**	**43**	**124**
***7Z1SJ**	**A**	**1,070,706**	**1375**	**75**	**243**
*HZ1AM	"	3,542	39	17	29

SINGAPORE

9V1UV	A	48,077	230	53	78
9V1AL	"	156	9	5	7
9V1YC	**14**	**320,271**	**926**	**36**	**115**

TAIWAN

*BU2AO	A	54,436	258	49	75

TAJIKISTAN

EY8MM	**7**	**714,298**	**1814**	**34**	**132**
*EY7AB	21	19,200	156	17	47

THAILAND

***HSØZEE**	**A**	**835,560**	**1315**	**102**	**258**
*HSØT	"	180,544	614	64	118
			(OP: HS1CKC)		
*E2ØYLM	"	5,720	69	22	30
*HS1OVH	"	5,394	44	24	34
*HS8KAY	21	2,046	38	12	21
***HSØZCW**	**14**	**42,509**	**284**	**29**	**60**
*E2ØWXA	7	252	56	12	16

TURKMENISTAN

EZ8CQ	**A**	**71,195**	**312**	**36**	**109**

UK BASES ON CYPRUS

ZC4LI	**28**	**95,355**	**530**	**12**	**53**

UNITED ARAB EMIRATES

A61M	**14**	**11,712**	**119**	**10**	**38**

UZBEKISTAN

UK9AA	**7**	**218,120**	**733**	**31**	**102**
***UK/JI2MED**	**A**	**204,036**	**714**	**40**	**107**

WEST MALAYSIA

9M2CNC	**A**	**1,944,630**	**2190**	**110**	**300**

EUROPE

ALAND ISLANDS

OHØJFP	**14**	**433,827**	**1899**	**32**	**97**
			(OP: SMØJHF)		

ALBANIA

ZA/Z35M	**A**	**352,946**	**1058**	**56**	**207**
*ZA/LZ5PL	A	3,822	56	11	28

AUSTRIA

OE1TKW	A	30,744	154	36	86
OE8Q	**1.8**	**97,440**	**1233**	**13**	**67**
			(OP: OE8SKQ)		
OE6Z	**"**	**73,730**	**1025**	**12**	**61**
			(OP: OE6MBG)		
***OE5ØCWL**	**A**	**343,470**	**777**	**72**	**249**
			(OP: OE5CWL)		
***OE6MDF**	**"**	**334,407**	**646**	**64**	**185**
*OE8P	"	118,475	596	37	138
			(OP: OE8VIE)		
*OE3BCA	"	91,744	330	46	142
*OE6WSF	"	8,528	113	27	77
*OE2IJL	"	5,120	65	22	42
*OE8KDK/1	28	630	22	7	14
***OE5ØWIG**	**21**	**57,717**	**337**	**24**	**75**
***OE3JIS**	**14**	**25,200**	**252**	**22**	**78**

AZORES

CU2A	**14**	**775,236**	**2591**	**34**	**120**
			(OP: OH2UA)		
CU2/OH2PM	**7**	**247,000**	**1062**	**24**	**101**
CU2B	**3.7**	**294,261**	**1168**	**22**	**89**
			(OP: OH2BH)		
CU2CE	**1.8**	**28,480**	**326**	**12**	**52**
CU2T	"	15,606	214	9	42
			(OP: CU2AF)		
*CU2JT	A	40,494	176	34	68
*CU3AL	"	19,513	117	25	54
***CU2/OH1VR**	**21**	**405,990**	**1698**	**27**	**103**

BALEARIC ISLANDS

EA6LP	**A**	**404,754**	**830**	**73**	**249**
EA6AZ	**21**	**65,436**	**350**	**22**	**54**
*EC6UD	21	4,600	56	18	28
***EA6DD**	**7**	**10,557**	**116**	**12**	**57**

BELARUS

EU1PA	**A**	**864,852**	**1665**	**80**	**308**
EW1CQ	"	500,910	889	74	280
EU1CQ	"	271,700	633	64	222
EU4LY	"	228,697	692	57	202
EW2EO	"	123,395	410	50	135
EW3LN	"	81,204	355	57	145
EW8RX	"	5,920	108	15	59
EU3AR	**28**	**18,270**	**221**	**14**	**49**
EW8MW	**14**	**360,393**	**1483**	**33**	**130**
EW2DN	7	1,470	52	7	35
***EW6GL**	**A**	**151,392**	**416**	**57**	**171**
*EU6AA	"	32,125	265	27	98
*EW1CK	"	3,009	54	13	38
*EU6NN	"	2,565	80	13	44
*EW2EG	"	2,662	57	8	42
*EU4CQ	"	100	21	13	15
***EW1ABF**	**28**	**2,688**	**70**	**7**	**25**
***EU1GA**	**21**	**27,864**	**207**	**21**	**51**
*EW8DA	"	21,320	119	22	60
***EW6AF**	**14**	**69,564**	**504**	**24**	**69**
*EW6EW	"	18,836	235	13	55
*EU6FF	"	16,298	167	11	47
***EU2MM**	**7**	**30,408**	**307**	**15**	**69**
*EW6AL	"	16,102	166	16	67

BELGIUM

ON4UN	**A**	**404,708**	**992**	**47**	**119**
ON4CCP	"	286,800	988	58	181
ON4TNB	"	20,680	214	26	84
ON6OM	"	5,141	67	16	37
ON5ZO	**14**	**314,400**	**1244**	**30**	**90**
ON5GQ	"	264,750	805	32	118
***ON4ADZ**	**A**	**507,744**	**796**	**85**	**284**
*OO6ML	"	82,834	366	40	126
*ON4XG	"	85,323	287	40	124
*OO6FC	"	63,293	291	43	124
*OO7DDG	"	29,524	132	40	81
*OO4LWX	"	14,608	112	27	61
*ON5SV	"	10,650	104	22	53
*ON/G3VQO	"	8,892	104	19	57
*ON7BS	"	3,075	55	13	28
*ON4KVA	"	2,494	58	9	34
*OO5JD	"	528	24	5	19
			(OP: ON5JD)		
***ON5KQ**	**7**	**80,613**	**493**	**22**	**95**
*OO4ZD	"	19,750	209	15	64
*ON4MGY	"	9,730	109	13	57
***OO6UU**	**3.7**	**37,204**	**510**	**11**	**60**

BOSNIA-HERZEGOVINA

T93O	**28**	**100,980**	**702**	**26**	**82**
T96Q	**21**	**1,152,180**	**2794**	**39**	**146**
			(OP: YZ1AU)		
T97C	**3.7**	**128,304**	**1257**	**15**	**73**
*T93Y	A	18,618	85	32	55
***T94LW**	**21**	**206,206**	**801**	**33**	**110**
*T93R	"	110,908	452	29	90
***T92M**	**14**	**53,820**	**477**	**19**	**73**
***T94DO**	**7**	**216,008**	**1558**	**22**	**102**
*T95MMX	3.7	14,079	239	9	48

BULGARIA

LZ1ABC	A	61,006	231	37	81
LZ1BJ	"	3,288	51	9	15
LZ9X	**28**	**77,748**	**456**	**27**	**87**
			(OP: LZ1UK)		
LZ5Z	**21**	**38,976**	**250**	**22**	**62**
			(OP: LZ3DJ)		
***LZ2DF**	**A**	**726,264**	**1180**	**90**	**303**
***LZ2ZY**	**"**	**419,432**	**1007**	**69**	**227**
*LZ1CAR	"	200,692	500	68	194
*LZ2HN	"	139,376	365	53	195
*LZ3SM	"	123,264	347	47	145
*LZ1AQ	"	112,266	443	49	140
*LZ1GU	"	26,201	99	44	89
*LZ1QV	"	6,210	48	26	43
*LZ1MC	"	3,876	39	21	30
***LZ2JA**	**28**	**12,025**	**126**	**17**	**48**
*LZ2ZG	21	7,380	101	17	28
***LZ2CE**	**14**	**41,600**	**419**	**19**	**61**
*LZ5AZ	"	27,720	304	16	61
*LZ7H	"	3,731	95	7	34
			(OP: LZ3FN)		

CRETE

SV9/OH4FR	**21**	**350,526**	**2216**	**25**	**88**

CROATIA

9A2VR	**A**	**212,986**	**554**	**59**	**159**
9A9A	**28**	**169,743**	**748**	**30**	**107**
9A4CD	"	375,386	1040	37	114
9A7D	**14**	**615,000**	**2080**	**38**	**126**
			(OP: 9A3HX)		
9A6A	**3.7**	**191,360**	**1570**	**24**	**91**
9A2DQ	**1.8**	**28,800**	**360**	**11**	**61**
***9A5K**	**A**	**2,497,536**	**2315**	**111**	**431**
***9A2EU**	**"**	**1,572,974**	**1499**	**134**	**465**
*9A7R	"	59,730	196	46	135
*9A5BB	"	37,024	167	34	70
*9A1DL	"	35,777	195	36	97
*9A3QB	"	26,936	120	40	64
*9A2GA	"	23,004	195	24	84
*9A3KS	"	16,906	102	29	78
*9A5YY	"	5,074	65	21	38
***9A5KV**	**28**	**22,382**	**292**	**14**	**48**
***9A2TE**	**21**	**92,344**	**364**	**30**	**89**
*9A4RV	"	56,760	228	32	78
***9A3RE**	**1.8**	**15,288**	**284**	**7**	**49**

CZECH REPUBLIC

OK1AXB	**A**	**377,420**	**743**	**81**	**253**
OL6W	**"**	**304,681**	**695**	**61**	**238**
			(OP: OK2FB)		
OK2PZ	"	21,462	122	28	70
OK1FRO	"	16,544	145	23	71
OK2ABU	**28**	**9,464**	**109**	**16**	**36**
OK2PTC	**21**	**110,011**	**398**	**33**	**104**
OK1TN	**14**	**473,658**	**1299**	**37**	**141**
OK5SWL	"	725	29	5	24
			(OP: OK2SWD)		
OK1RI	**7**	**677,673**	**2665**	**36**	**135**
OK1FM	1.8	8,650	172	8	42
***OK1WCF**	**A**	**1,162,647**	**1697**	**101**	**346**
***OL6P**	**"**	**540,750**	**1053**	**83**	**292**
			(OP: OK2WTM)		
*OK2MBP	"	379,260	1010	56	245
*OK2TCW	"	356,166	723	67	215
*OK1BOA	"	225,492	634	69	189
*OK1DKR	"	191,980	407	67	223
*OK1CJN	"	166,972	396	64	183
*OK1LO	"	123,981	425	50	171
*OK2BEN	"	108,732	411	43	178
*OK2BRX	"	84,846	335	41	138
*OK1DOL	"	67,408	254	51	125
*OK1DVK	"	67,928	151	63	119
*OK2DU	"	58,976	323	36	116
*OK1VOF	"	48,285	289	36	109
*OK1UDJ	"	43,608	224	41	97
*OK1DRQ	"	43,230	152	45	86
*OK1CLD	"	39,786	267	29	85
*OK2SWD	"	32,760	260	26	100
*OK1ZTA	"	30,720	174	39	81
*OK1BA	"	29,853	134	35	72
*OK2PBG	"	29,768	165	30	64
*OK2PPM	"	25,272	162	31	77
*OK1DOZ	"	24,531	141	35	76
*OK1ULE	"	22,388	203	26	90
*OK1DKO	"	20,430	93	39	51
*OK2WYK	"	13,970	187	25	102
*OK1FCA	"	7,728	113	12	57
*OK1TIR	"	4,224	67	14	34
*OK1DSX	"	2,226	30	16	26
***OK1UND**	**28**	**5,734**	**60**	**15**	**32**
***OL3Z**	**21**	**154,570**	**577**	**32**	**98**
			(OP: OK1FPS)		
***OK2N**	**"**	**153,029**	**547**	**33**	**104**
			(OP: OK2NN)		
*OK2PTZ	"	101,787	415	29	82
*OK2HZ	"	95,220	367	31	84
*OK5SAZ	"	86,106	368	29	84
*OK1TD	"	76,212	292	29	87
*OK1MGW	"	61,079	262	29	74
*OK1CYC	"	38,731	231	21	56
*OK1KZ	"	3,359	53	12	21
***OK1MMN**	**14**	**24,528**	**216**	**17**	**56**
*OK1GI	"	16,683	164	16	51
*OK2TBC	"	12,586	127	16	46
*OK1BLU	"	11,966	139	14	48
*OK2BRA	"	11,172	164	10	39
*OK4AZ	"	2,961	79	11	36
*OL5DIG	"	475	25	7	18
*OK1JNL	"	375	24	7	18
***OL7P**	**7**	**30,420**	**398**	**12**	**66**
			(OP: OK1CRM)		
*OK5AA	3.7	1,134	40	4	23

*OK2YT	1.8	6,314	159	4	37
*OK1JOK	"	5,676	172	5	38
*OK2BQL	"	5,166	138	4	38
*OK2VP	"	1,050	44	4	21

DENMARK

OZ7X	A	3,172,320	3425	111	369
OZ5EV	"	270,478	454	81	278
OZ1JTE	"	147,518	311	76	181
OZ4O	"	102,684	331	48	151
OZ5WQ	7	10,921	144	14	53
OZ1DD	1.8	125,178	1264	16	77
OZ1HXQ	"	75,850	899	15	59
***OZ1ACB**	A	210,897	544	49	170
***OZ6PI**	"	147,159	324	59	190
*OZ7AM	"	94,062	376	49	134
*OZ1RD	"	47,541	236	45	114
*OZ9EC	"	12,546	113	33	69
*OZ4EL	"	12,384	98	29	67
*OZ4RT	"	9,727	82	23	48
*OZ6OQ	"	6,566	86	22	45
*OZ5DSB	"	4,500	71	23	52
*OZ1DGQ	"	1,911	44	14	25
***OZ1HX**	21	30,875	115	31	94
***OZ1JVX**	14	38,232	283	18	63
*OZ1XV	"	1,292	58	10	28
*OZ7AEI	3.7	4,028	98	6	32

ENGLAND

M6T	A	4,685,268	3898	127	451
			(OP: G4PIQ)		
G4DBL	"	922,131	1413	89	280
MØWLF	"	645,280	1456	54	164
G9Z	"	244,970	933	41	146
G3LUW	"	159,698	479	53	134
GØMYX	"	89,540	336	44	141
GØVQR	"	12,267	118	18	69
GØJTN	"	152	13	4	4
GØAEV	28	64,263	417	21	72
MØCYB	21	2,376	40	10	14
			(OP: M3NDP)		
M7Z	14	898,184	2264	37	135
			(OP: G3VHB)		
G3RAU	"	406,174	1185	34	115
G3TXF	7	3,440	46	12	31
G3CEN	3.7	6,916	123	9	43
***GØMTN**	A	569,742	1027	74	279
***G4LDL**	"	209,355	505	61	194
*G4ADJ	"	192,720	531	49	170
*GØKDS	"	180,348	529	52	174
*M5FUN	"	140,220	409	58	147
*G4FKA	"	104,111	354	39	100
*MØDDT	"	98,600	317	53	147
*M5KJM	"	97,378	297	51	130
*G4NXG	"	82,940	246	42	103
*G6UBM	"	60,300	249	37	97
*G4DBX	"	54,432	222	49	95
*G4DDL	"	43,310	209	34	108
*G4WGE	"	31,097	209	25	96
*G8ZRE	"	29,264	199	30	88
*G8NBI	"	28,388	196	27	67
*2EØPLA	"	27,371	182	30	71
*M1SMH	"	26,372	158	22	54
*G6CSY	"	20,806	142	27	74
*G3ZRJ	"	19,683	126	28	53
*GØUGO	"	18,585	145	24	81
*G7UGC	"	8,118	78	24	42
***G1VDP**	28	5,880	101	10	32
*G6HOU	"	3,330	74	11	26
*G8GHD	21	20,923	188	19	42
*G3RSD	"	11,610	143	17	26
*M1MAJ	"	1,792	28	10	18
***MØEYB**	14	17,640	204	14	49
*G4AXX	7	7,056	110	8	48

ESTONIA

ES5TV	A	6,437,918	5342	155	518
ES2DJ	"	1,530	37	9	8
ES4RD	14	217,242	1071	32	117
ES5MC	7	439,725	1816	34	131
***ES6KW**	A	74,036	423	35	131
*ES5JR	"	37,700	248	33	97
*ES1BA	"	1,260	16	14	16
*ES4RC	21	22,311	167	20	47
*ES5CX	"	3,185	77	8	27
*ES5RIM	14	1,392	38	9	23
*ES1IP	7	289	15	4	13
***ES5TJO**	3.7	15,162	241	12	45
*ES8DH	"	9,420	138	12	48

EUROPEAN RUSSIA

UA3QDX	A	1,983,276	2426	117	417
UA3TCJ	"	1,740,464	1578	125	339
RU6FA	"	1,345,894	1797	107	360
RN3ZC	"	1,190,680	1999	93	319
RN4AA	"	815,833	1315	94	355
RV4HC	"	707,016	1545	75	256
RA3CQ	"	704,520	858	100	356
UA4SU	"	652,893	1218	83	284
RD4WA	"	616,878	1417	79	308
RA4PO	"	611,100	1097	91	329
UA1OMX	"	587,163	899	86	311
RT3T	"	538,880	1013	88	333
			(OP: UA3TU)		
RA3RK	"	476,064	980	77	265
RK3DK	"	439,132	1011	73	238
RX3AEX	"	364,278	779	70	257
RA3UT	"	179,200	401	70	210
RW6HX	"	176,902	370	79	163
RN1AO	"	141,825	303	72	233
RV3NA	"	108,870	234	67	124
UA3BM	"	89,947	188	71	150
UA3DEE	"	88,650	261	47	103
RA3TT	"	64,090	209	42	103
UA4NC	"	54,600	283	47	135
RA3NC	"	50,954	229	40	106
RV1CC	"	45,457	199	44	87
RU3GN	"	22,660	96	35	75
RW6FO	"	12,690	69	39	51
UA6LV	"	8,241	60	24	43
RA3AMG	"	7,316	58	22	40
RN3OG	"	2,747	25	17	24
RV3ZN	"	2,538	51	16	38
RA6DB	21	180,040	741	33	107
RK3XWD	"	69,120	331	28	100
RA4YW	"	32,943	385	17	62
RD3A	14	846,362	2560	38	149
RW1ZA	"	483,560	1595	37	120
UA4LCH	"	401,540	1463	37	133
UA1ORT	7	18,060	179	12	58
RZ6ARM	"	5,661	89	11	40
RA6AFB	3.7	23,616	321	14	58
RA6AMA	"	23,025	256	13	62
UA1OMS	"	19,108	212	15	53
RK6ABM	"	1,824	62	7	25
UA6JFG	1.8	3,024	77	6	30
***UA4FER**	A	1,643,880	1936	108	407
***RV3FF**	"	1,379,460	1818	109	389
***RU3QW**	"	1,129,051	1599	96	377
*UA4FRL	"	805,232	1156	101	371
*UA3BL	"	741,312	1232	82	334
*UA3ABJ	"	644,245	1137	86	309
*RX3ZX	"	524,858	887	76	283
*UA3LHL	"	397,800	794	69	256
*UA3FDX	"	373,425	743	70	255
*RN4ACQ	"	372,125	762	62	263
*RZ3DA	"	329,766	635	88	278
*UA3WHF	"	271,950	437	77	217
*RV6BC	"	253,953	662	62	199
*RW1CW	"	243,930	692	58	224
*RW3DL	"	228,464	520	53	209
*RW3GB	"	192,955	412	71	188
*RA3GJ	"	164,478	490	51	186
*U1BA	"	142,410	494	44	158
*RX3AW	"	137,804	412	48	140
*RD3AD	"	137,170	467	40	175
*UA3QIX	"	134,550	461	48	182
*RV3MI	"	121,394	366	48	155
*UA3RW	"	120,818	421	52	141
*RX3QDF	"	135,381	445	45	202
*RV4LC	"	111,776	410	43	181
*RA3NZ	"	109,848	429	39	145
*RA3VIA	"	107,184	256	57	174
*UA3RN	"	104,674	379	44	155
*UA1AFZ	"	80,136	358	38	130
*RA6DE	"	78,526	233	47	111
*RW4FX	"	75,342	279	47	127
*RN1NP	"	73,315	396	37	118
*RN6FK	"	71,808	163	68	136
*RU3WR	"	69,810	268	47	132
*RA3QG	"	66,185	380	33	122
*UA1WGV	"	66,021	289	42	135
*UA4FUW	"	64,156	225	38	134
*RK3AQW	"	62,604	328	43	145
*RU3DM	"	59,187	167	48	133
*RV1CB	"	58,394	333	39	155
*RZ6HAZ	"	56,564	300	41	117
*RL3FA	"	55,014	226	43	130
*UA4SMM	"	51,986	251	32	107
*RW3LL	"	49,760	205	43	117
*UA3AAP	"	48,160	264	42	130
*RA4NCC	"	47,388	248	30	102
*RA3DAH	"	46,964	251	33	85
*RU3XB	"	44,640	281	35	120
*UA3MEJ	"	38,608	136	50	102
*RA3NK	"	36,960	153	35	77
*UA4FEN	"	36,530	205	37	93
*UA3AKI	"	34,160	225	23	89
*RV3IC	"	31,110	214	23	79
*RV3RM	"	29,853	285	25	82
*RA4LBS	"	29,400	196	24	96
*RW4LBL	"	27,927	189	23	84
*RZ3ARO	"	27,600	188	32	106
*RN3FY	"	27,255	206	27	88
*RW4PY	"	26,136	150	32	89
*RW3TA	"	26,091	172	27	90
*RW6HCG	"	20,740	80	48	74
*RA6AAW	"	20,125	79	47	68
*UA4AN	"	19,760	136	27	68
*UA1WBV	"	17,820	87	37	44
*RA6FOT	"	17,381	86	39	52
*RX3AA	"	16,290	106	26	64
*RV1AE	"	12,420	159	20	70
*RW4NH	"	11,704	63	26	50
*RA3TYL	"	11,284	99	28	63
*RX3BP	"	8,295	46	35	44
*RU4AO	"	8,025	101	18	57
*UA3VFI	"	7,973	106	15	52
*RA1QDP	"	5,643	118	13	44
*UA3ABF	"	5,287	80	15	44
*RV3LO	"	4,332	69	15	42
*UA3DPM	"	4,290	36	20	35
*RK6AQP	"	4,284	77	17	51
*UA3ABW	"	3,149	37	15	32
*RW1ZZ/3	"	2,226	41	13	29
*RW3SU	"	1,353	19	14	19
*UA4FX	"	1,350	28	11	19
*RA3FD	"	300	12	6	9
*UA3XAC	"	12	5	2	2
***UA4CC**	28	27,643	252	19	58
*UA6ADC	"	10,773	101	13	44
*RA3XO	"	9,900	119	13	42
*RA3RA	"	5,544	89	13	43
***RV6LFE**	21	227,476	1030	34	114
*RX6AH	"	76,160	436	31	81
*RZ3VA	"	73,593	340	25	92
*RX3RZ	"	45,080	341	21	71
*UA6HON	"	34,710	217	23	66
*RA3DGH	"	19,825	210	13	52
*UA4LW	"	16,640	105	18	62
*UA4ACP	"	12,932	157	13	48
*UA4WAG	"	7,803	112	11	40
*RW4LQ	"	6,120	47	21	39
*RV4LS	"	2,470	28	14	24
*RA3GFG	"	368	16	5	11
***UA1ANA**	14	287,835	1163	35	120
*RK4FM	"	125,796	599	33	99
*UA6LCN	"	97,290	690	29	86
*UA3EDQ	"	70,707	410	26	85
*UA1CEC	"	28,083	391	11	58
*RN6HI	"	15,096	132	17	51
*RL3DD	"	252	16	4	10
***RU4SS**	7	34,752	229	17	79
*RA6CT	"	11,560	110	13	55
*RA1AGL	"	4,250	83	9	41
*RA3UAG	1.8	8,745	154	8	45
*UA6BAE	"	7,526	148	8	45
*RZ3AUL	"	3,800	99	6	34
*UA6BQD	"	2,736	90	7	31
*UA6BMY	"	540	29	5	15
*RA3REZ	"	238	13	4	10

EUROPEAN TURKEY

*TA1CM	A	18,088	152	37	99
*TA1AL	"	6,111	110	29	68

FAROE ISLANDS

OY1CT	A	244,260	886	52	184
***OY9R**	A	70,784	334	40	118

FINLAND

OH3RR	A	509,206	848	93	289
OH3JR	"	471,468	714	89	315
OH1BV	"	437,296	898	75	227
OH6OS	"	265,232	488	77	197
OH1EB	"	248,200	533	67	225
OH2LU	"	198,924	451	55	187
OH7KD	"	147,200	445	52	178
OH8JT	"	124,605	495	29	106
OH6SO	"	115,635	518	49	146
OH1BOI	"	93,219	269	42	151
OH2VZ	"	82,296	314	46	116
OH1MA	"	69,806	172	54	113
OH5NS	"	16,354	144	17	57
OH1ØA	"	2,744	42	18	31
			(OP: OH3WW)		
OH2BP	28	16,008	182	17	52
OH4R	21	734,125	2196	39	136
			(OP: OH4JFN)		
OH5Z	"	527,692	1453	40	139
			(OP: OH5KS)		
OH2XF	"	91,612	286	34	114
OH6KN	14	1,710,648	3911	38	146
			(OP: OH6UM)		
OH8L	"	851,694	2425	39	147
			(OP: OH8LQ)		
OH5LF	3.7	224,264	1383	29	107
OH1TX	"	103,540	546	29	95
OH4MFA	1.8	21,641	320	11	56
***OH1ZE**	A	125,350	384	54	176
***OH2FS**	"	100,064	255	56	180
*OH2LP	"	81,200	301	48	152
*OH3HS	"	40,166	152	40	111
*OH6TN	"	7,590	71	19	36
*OH9GIT	"	7,140	101	24	46
*OH5DX	"	7,128	67	24	48
*OH6GFI	"	754	27	12	17
*OH4GRM	"	210	16	7	14
***OH4YT**	21	26,810	173	21	51
*OH3MC	"	6,348	55	18	28
***OH5TS**	14	135,386	531	34	105
*OH6RC	"	4,980	57	11	42

FRANCE

F5VJK	A	2,506,218	2513	112	394
F5BBD	"	850,845	1272	91	302
F6DZU	"	609,984	1073	85	203
F5RAB	"	501,354	887	78	268
F5CQ	"	190,754	429	59	195
F1TXI	"	133,144	415	53	125
F6CXJ	"	50,832	221	39	105
F8DYD	"	45,466	219	38	89
F5IHN	"	11,808	70	32	50
F6KNB	21	610,344	1559	37	131
			(OP: F4CIB)		
F5IHP	7	31,928	285	19	85
F6CWA	1.8	4,784	108	8	44
***F4BKV**	A	628,965	883	93	312
***F4EIZ**	"	536,190	895	81	285
***F1RHS**	"	483,516	893	73	260
*F6HKA	"	431,618	1088	56	197
*F6FTB	"	393,204	768	74	228
*F8AAN	"	270,320	717	68	180
*F8DPN	"	239,051	566	71	206
*F5LIW	"	236,256	515	70	206
*F5INJ	"	181,940	520	60	160
*F8ADY	"	174,002	440	64	177
*F1FPL	"	145,544	442	55	171
*F4DXX	"	128,340	393	46	134
*F6BAT	"	125,312	435	47	131
*F5DRD	"	102,238	357	44	150
*F4EYQ	"	76,208	373	48	128
*F4ETG	"	67,773	475	21	74
*F4EFI	"	58,212	166	47	107
*F5QF	"	57,233	228	39	82
*F4AGR	"	44,625	257	26	79
*F4EUN	"	32,688	135	44	100
*F6KQK	"	32,280	146	41	79
			(OP: F5IHN)		
*F4CPF	"	28,860	134	36	112
*F5RPB	"	21,225	128	28	79
*F4CVA	"	17,270	186	25	85
*F4CJV	"	14,964	117	25	62
*F1TIM	"	14,322	126	21	56
*F5LCU	"	12,155	107	20	65
*F8DFP	"	7,659	100	15	54
*F/HB9TRE	"	6,532	63	18	53
*F5NQL	"	5,181	72	14	19
*F6DZD	"	3,895	50	14	27
*F6CZV	"	3,740	54	19	36
*F5MLJ	"	3,198	47	16	25
*F8AXI	"	2,900	61	16	42
*F8DNX	"	2,520	42	17	28
*F8IN	"	974	20	12	20
***F5JY**	21	124,248	464	31	93
***TM6Q**	14	138,397	748	23	96
			(OP: FY5FY)		
*F4EYE	"	3,290	104	11	36
***F6IIT**	7	19,241	224	12	59
*F5LEN	1.8	7,740	189	6	39

GERMANY

DJ4PT	A	3,656,405	2994	133	412
DQ4A	"	1,136,096	1682	92	324
			(OP: DF3CB)		
DL2RMC	"	997,296	1318	106	368
DJ9HX	"	755,744	848	101	351
DL2ZAE	"	515,829	777	92	325
DH6JL	"	443,022	815	79	203
DJ5FS	"	407,985	722	71	224
DL2APJ	"	375,858	722	75	267
DL8OBF	"	319,920	677	72	238
DL6UNF	"	319,060	710	62	239
DL9GWD	"	302,512	616	72	220
DF3IS	"	283,432	602	63	221
DK3KD	"	280,959	468	82	275
DL6RBO	"	267,840	581	68	202
DLØAZ	"	265,434	625	57	192
			(OP: DHØGDS)		
DF7IT	"	252,888	517	72	174
DJØIF	"	247,778	576	66	163
DH2RTW	"	235,926	538	63	194
DM5TI	"	185,976	484	68	178
DLØEW	"	182,121	503	66	180
DG5MKU	"	132,492	264	70	174
DL1PT	"	124,978	416	52	174
DF5BX	"	112,093	397	45	152
DL6RBH	"	105,711	323	60	151
DL9HD	"	105,289	304	54	157
DL2MWB	"	86,814	376	37	145
DG4DB	"	78,925	295	42	133
DLØLA	"	50,949	194	44	109
			(OP: DL6RCK)		
DL6AG	"	48,732	144	47	84
DK4IO	"	48,240	212	32	88
DL3EBX	"	37,009	184	27	92
DL8KJ	"	36,425	181	42	113
DJ5VB	"	34,425	226	41	112
DL9DYL	"	23,800	107	37	63
DC3HB	"	19,046	111	31	58
DL4RDZ	"	17,028	143	27	59
DL5RBR	"	15,655	78	35	66
DK7CH	"	13,462	265	27	100
DF5AU	"	11,502	64	28	53
DK4JM	"	11,457	91	22	35
DG6OAG	"	7,826	101	11	32
DC8QT	"	7,192	57	20	42
DKØOG	"	5,460	44	25	40
			(OP: DL2RMC)		
DL5OO	"	3,360	66	17	43
DJ5IW	"	2,496	36	12	20
DL8NCS	"	1,860	34	12	19
DJØIA	"	702	29	6	3
DJ1ZU	28	21,784	165	20	53
DJ1AA	21	208,944	667	35	109
DL3BQA	"	86,730	346	27	91
DL4MCF	14	760,114	2105	36	130
DL4WA	"	184,824	745	30	106
DL3KZA	"	129,465	541	31	104
DK1QH	"	72,684	400	24	84
DL4CF	"	20,515	172	13	42
DM3ML	7	31,164	217	18	80
DK8JB	"	21,576	229	14	73
***DK1FW**	A	659,832	767	98	358
***DM2DX**	"	598,367	966	92	317
***DL3EA**	"	512,875	661	93	280
*DR4G	"	274,649	585	66	203
			(OP: DJØGM)		
*DM5JBN	"	272,986	625	63	196
*DJ8UV	"	246,984	863	54	197
*DJ4JF	"	244,480	454	80	240
*DL7UMK	"	206,885	550	59	198
*DL3BRA	"	198,912	553	55	201
*DJ9MH	"	197,100	464	59	211
*DL7UXG	"	175,032	510	50	171
*DL7BD	"	157,765	382	59	168
*DF3QG	"	155,472	334	68	178
*DK5DQ	"	152,720	305	61	169
*DK8NC	"	151,848	441	56	166
*DH5AO	"	151,200	459	50	166
*DLØIH	"	140,392	530	48	170
			(OP: DF6QC)		
*DL5NAV	"	137,144	351	59	158
*DF6WE	"	133,056	461	44	172
*DL9GTB	"	124,334	430	50	164
*DL1DTC	"	122,430	258	61	149
*DJ1OJ	"	121,030	344	54	136
*DL8ULO	"	113,400	425	49	167
*DL1BWU	"	112,266	338	43	155
*DH2PL	"	110,416	367	52	154
*DK8EY	"	108,054	342	53	154
*DL3ZAI	"	106,872	325	50	133
*DK7FP	"	106,582	376	44	117
*DL2KCK	"	97,280	307	50	110
*DL7VX	"	95,000	351	44	146
*DF2FM	"	94,696	283	48	130
*DK5KMA	"	86,005	306	50	117
*DL1JGO	"	94,127	347	51	133
*DL4JYT	"	82,012	298	48	154
*DK3WJ	"	77,760	264	49	131
*DL3DRN	"	73,486	278	49	132
*DM2AWM	"	64,988	261	42	112
*DJ2ZS	"	64,702	258	45	142
*DL6DCD	"	64,024	291	42	109
*DM9CM	"	63,630	335	46	164
*DK3WN	"	63,368	281	46	132
*DH2MA	"	62,825	238	52	123
*DK8AX	"	62,484	237	44	120
*DL6ATI	"	61,072	291	40	136
*DM2GFN	"	59,808	211	46	122
*DJ6OL	"	58,671	298	38	121
*DK4WF	"	63,447	211	45	127
*DG8AM	"	55,854	304	39	135
*DB6FO	"	53,332	275	35	99
*DL6UAM	"	47,196	217	34	104
*DG6DAF	"	46,529	250	42	119
*DK7MCX	"	46,512	226	42	94
*DL3APM	"	46,472	213	38	110
*DC8RU	"	46,125	197	39	84
*DL2ANM	"	44,523	231	37	116
*DL2ZA	"	43,472	236	42	134
*DM5JF	"	40,963	211	34	103
*DJ7IK	"	40,386	201	36	123
*DL7APK	"	39,446	175	42	121
*DJ1FZ	"	38,225	233	29	110
*DM2CKK	"	37,905	213	37	96
*DF5AN	"	37,800	149	33	117
*DL3KDC	"	41,553	231	33	110
*DL9SUB	"	35,598	149	37	65
*DH5WB	"	35,369	197	36	77
*DH3MAY	"	35,179	213	36	91
*DL3SCN	"	34,362	179	36	102
*DK7AN	"	32,964	169	37	97
*DL1NUX	"	26,768	164	32	80
*DJ3GE	"	26,361	156	27	74
*DF1GW	"	25,696	155	29	59
*DL8UVG	"	25,000	138	41	84
*DC3MH	"	22,890	176	37	72
*DL7VRG	"	22,755	135	33	90
*DL4EAX	"	22,464	143	29	79
*DG8DBW	"	22,288	132	35	77
*DL7BA	"	21,750	116	34	91
*DL5AZZ	"	20,210	134	25	61
*DG1DRS	"	19,890	158	26	76
*DC2LF	"	19,380	107	33	69
*DK8RE	"	18,988	99	30	64
*DF9AL	"	17,176	136	30	83
*DL6NAL	"	17,069	170	21	80
*DJØZY	"	15,688	79	32	74
*DL5MAE	"	15,312	70	29	58
*DL3VL	"	15,207	96	31	80
*DL2AL	"	14,976	132	30	74
*DJ6TK	"	14,469	106	26	65
*DH1OK	"	13,950	112	24	51
*DL1HSI	"	12,720	100	20	33
*DL3DBY	"	11,685	100	29	66
*DC2VE	"	10,962	101	23	64
*DL1DUO	"	10,812	74	37	69
*DG5OBB	"	10,578	85	30	52
*DL9CW	"	10,500	123	24	60
*DP5K	"	10,472	100	22	55
			(OP: DK5TX)		
*DL5ANS	"	9,916	83	27	47
*DK2CB	"	9,792	110	32	70
*DH9KR	"	9,545	103	23	60
*DH6BH	"	8,890	145	39	88
*DL3NGN	"	8,588	86	24	52
*DL2DVL	"	8,520	75	28	43
*DG4MA	"	6,624	79	19	50
*DL2QT	"	6,278	61	18	25
*DC1MBB	"	6,160	93	14	56
*DGØDG	"	6,120	59	22	46
*DJ2AX	"	5,548	58	16	22
*DL4KUG	"	5,301	44	23	34
*DF2PH	"	5,184	49	19	35
*DL7CU	"	4,968	59	15	31
*DL1TPY	"	4,617	100	11	46
*DL5SVB	"	4,484	84	8	51
*DC1MPP	"	4,189	66	13	46
*DL2YET	"	4,354	66	13	52
*DJ2T	"	3,300	65	8	42
			(OP: NJØIP)		
*DL2ASK	"	2,960	47	16	24
*DJ6XB	"	2,607	31	12	21
*DC8HF	"	2,405	47	14	23
*DH9SB	"	1,976	28	11	15
*DG1MSR	"	1,890	45	17	28
*DM2AJK	"	1,815	35	13	20
*DB3FS	"	1,534	59	16	43
*DL5CX	"	1,426	21	14	17
*DL5MG	"	1,152	18	15	17
*DL8JDX	"	805	14	9	14
*DG8KAD	"	675	28	9	16
*DG2BAR	"	272	8	8	8
*DG7NBU	"	204	7	6	6
*DC3FR	"	162	6	5	4
*DN6XU	"	10	5	4	4
			(OP: DO2BTS)		
*DLØIU	"	10	5	4	4
			(OP: DG6XU)		
***DP3A**	28	11,658	98	17	50
			(OP: DK2GZ)		
*DF7LS	"	182	12	5	8
***DL9URZ**	21	83,300	295	31	88
*DL2MIH	"	13,454	92	22	40
***DJ2XC**	14	54,742	350	21	80
*DL9ZWG	"	24,057	207	18	63
*DG4MCB	"	16,835	200	14	51
*DL7UIO	"	8,120	105	13	45
*DL2SHR	"	4,224	83	11	33
*DL1EFD	"	1,680	42	8	6
*DL3WB	"	1,697	42	8	22
*DL6BQE	"	1,221	40	7	20
*DL7LZ	"	148	7	5	5
*DL1TS	7	16,892	152	13	69
*DG5FCX	"	12,366	124	12	57
*DL6UAA	"	10,440	109	14	46
*DB7MA	"	7,367	137	6	47
*DB4SP	"	1,254	37	5	28
*DD2TC	"	782	35	3	20
*DK2A	"	100	11	6	10
			(OP: DL8NCR)		
*DF1IAQ	3.7	5,800	114	6	44
*DJ9KV	1.8	1,590	55	3	27
*DL2YED	"	912	46	3	21
*DL9JON	"	744	32	3	21

GREECE

J48NL	A	530,395	1578	63	242
			(OP: HA6NL)		
SV8CRI	"	433,344	745	84	282
SV1BFW	"	391,068	816	79	245
J48PL	"	373,890	953	69	240
			(OP: HA7PL)		
SV1GRD	"	52,807	245	44	134
SV1CER	28	35,952	409	16	68
SV3EXU	21	144,072	975	27	81
J43J	14	325,720	1883	30	106
			(OP: DJ5JH)		
***SV3GKE**	A	237,130	813	54	176
*SV3AQN	"	102,312	325	63	140
*SV1NK	"	96,642	330	47	135
***SV1UT**	21	80,012	793	22	61
*SV1HEM	"	6,864	98	13	39
***SV1AAU**	7	67,116	731	19	75
*SV1DZB	"	15,400	316	15	62

GUERNSEY

MUØFAL	A	125,970	394	47	143
GU4EON	"	50,500	323	28	97
***GU6RWD**	A	44,460	259	27	90
*2UØGSY	"	22,790	180	24	82

HUNGARY

HG8W	A	226,630	544	57	116
			(OP: HA8ZO)		
HA3OU	"	161,622	537	53	166
HG8L	1.8	77,077	927	13	64
***HA8FW**	A	347,956	659	68	233
*HA1YI	"	263,580	734	54	222
*HA6IAM	"	139,374	508	56	205
*HA9PP	"	40,098	231	30	93
*HA3LI	"	29,212	101	41	68
*HA8KW	"	5,782	62	19	30
*HA2MN/5	"	3,572	72	14	33
***HA3FT**	28	24,056	189	23	56
*HG9X	"	15,510	181	16	31
			(OP: HA8IB)		
*HA6IGM	21	9,947	97	17	32
***HG4F**	14	253,232	1210	33	100
			(OP: HA4FF)		
*HA6D	"	19,525	209	15	56

ICELAND

TF3ZA	A	1,188,984	3038	70	251
TF3AM	"	209,888	713	51	173
TF3MA	"	64,938	218	39	119
TF3CW	14	269,892	1078	22	80

IRELAND

EI4DW	A	62,133	193	43	106
EI6JK	1.8	5,184	112	6	42
***EI7CC**	A	269,124	634	49	197
*EI6FE	"	164,483	459	47	162
*EI5FQB	"	24,000	165	30	70
*EI5JP	"	23,108	146	28	81
*EI7JR	"	10,981	118	21	58
*EI7JN	3.7	4,845	151	8	43

ITALY

IR4T	A	2,511,008	2166	122	402
			(OP: IK4UPB)		
II4A	"	1,586,200	1967	98	287
			(OP: IK4ADE)		
IK2SND	"	667,440	1309	80	280

IK3UNA	*	497,169	860	82	251
IR2K	*	187,775	519	55	130
					(OP: IK2HKT)
IK1JJM	*	136,448	357	53	155
IK2UCK	*	111,585	352	53	162
IZØFWE	*	106,080	445	47	157
IZ8DSX	*	104,160	471	42	113
I4XNN	*	26,334	119	42	84
IW3HXW	*	16,274	95	39	64
IK3SWB	*	10,710	99	18	67
IK4ZGO	*	4,392	66	17	44
IW2MWZ	*	2,301	28	16	23
I4CSP	28	2,195	36	11	18
IR5T	14	613,870	2010	36	121
					(OP: IK5ORP)
IR2M	"	415,470	1324	37	128
					(OP: IK2QPR)
IR8P	*	256,768	1486	28	100
					(OP: IZ8FWN)
IZ8DPL	*	232,375	1045	30	95
IK4WKU	*	179,443	894	31	90
II3B	*	115,232	666	27	77
					(OP: IV3IPS)
IR4B	*	95,760	372	29	91
					(OP: IK4AUY)
IO3Z	7	196,995	1344	23	92
					(OP: IV3ZXQ)
IR4M	3.7	304,673	1787	26	101
					(OP: IK4MGP)
I1EIS	*	64,710	647	14	76
IZ1CQZ	*	616	25	5	17
IZ6ERS	1.8	11,070	345	7	47
*IK2DZN	A	767,008	1091	83	269
*IZ2FOS	"	467,122	972	75	236
*IK6OIN	*	280,896	663	76	228
*IKØXBX	*	265,920	477	72	248
*IZ3ENH	*	230,480	690	49	219
*IK2YDM	*	212,779	601	55	214
*IW7EFC	*	143,406	295	70	209
*IZ8GBH	*	142,080	431	57	165
*IW7EBE	*	112,210	319	67	162
*IZ2ABN	*	78,870	219	59	106
*IK7RVY	*	77,112	334	41	112
*IK2WXQ	*	70,047	235	47	134
*IZ2GNQ	*	67,374	245	56	141
*IZ2EID	*	65,221	269	48	125
*IZ7DOK	*	64,325	329	37	118
*IK2YSJ	*	64,240	328	43	133
*IK2QLX	*	53,508	197	50	97
*IK3OII	*	40,424	163	44	80
*IZ2GTO	*	38,700	261	39	111
*IV3MGN	*	38,700	214	39	111
*IZ2BKA	*	35,258	156	36	86
*IK2WZQ	*	34,202	158	35	63
*IZ1DXS	*	32,890	161	40	90
*IW2BSQ	*	31,590	124	41	89
*IK8YFU	*	28,380	142	39	90
*IW2MYH	*	26,448	151	37	77
*IYØTC	*	29,597	173	33	102
					(OP: IØKHP)
*IZ8GNH	*	23,520	131	39	81
*IK2XYI	*	22,248	105	36	67
*IWØBET	*	21,000	146	26	74
*IK5ZTT	*	19,440	153	27	81
*IZ3GNG	*	18,445	115	29	56
*IW3BAS	*	16,468	163	20	72
*IW5EIJ	*	14,896	110	27	49
*IZ2GMT	*	14,620	143	16	70
*IW4ENR	*	13,774	131	28	69
*IZ8FSL	*	13,699	134	29	74
*IWØGYC	*	11,583	119	24	57
*IZ1DBY	*	11,021	84	32	75
*IZ7FMM	*	8,814	68	28	50
*IZØBNR	*	9,062	112	14	42
*IZ1AOD	*	8,064	107	19	53
*IN3FHE	*	6,820	50	23	39
*IZ8DGR	*	6,095	77	15	38
*IZ5GSV	*	4,590	102	12	39
*IZØFVD	*	3,942	53	20	34
*IK5YJK	*	2,976	45	13	19
*IV3NVB	*	2,835	70	29	52
*IWØHEX	*	1,748	21	17	21
*IV3KSE	*	1,700	20	14	20
*IW3BTR	*	1,680	33	12	28
*IK2SAW	*	1,680	57	10	32
*IZ5GRS	*	520	17	8	12
*IZ8FTW	*	196	8	6	8
*IZ8GRZ	*	114	12	8	11
*IKØEIE	28	33,488	182	24	67
*IZ8DBJ	"	27,307	232	21	62
*IW7EGQ	*	11,760	107	18	38
*IK8IFW	*	880	20	7	13
*IZ7EDQ	21	114,777	445	29	88
*IR7C	*	66,624	354	24	72
					(OP: IZ7AUH)
*IØQM	*	63,036	272	27	75
*IKØVAQ	*	1,982	27	12	22
*IW8ELR	*	100	22	13	19
*IK5ZTW	14	51,069	361	21	66
*IK2YGZ	*	34,850	308	19	66
*IZ8EPY	*	24,764	213	19	63
*IV3BSE	*	7,424	146	12	46
*IW2HUS	*	6,480	110	10	38
*IW4EQI	*	6,440	79	12	44
*IW2ENA	*	1,548	57	6	30
*IV3WMS	*	288	19	4	5
*IZ8EDL	7	29,328	286	15	79
*IZ8GNR	*	3,264	43	11	40
*IK2MPR	*	1,080	38	5	25
*IV3BKH	*	57	10	1	1
*IO1T	3.7	128,364	925	23	91
					(OP: IK1RQT)
*IK2ULV	*	31,990	441	11	59
*IR5B	*	20,803	268	12	59
					(OP: I5VXG)
*IR8J	1.8	9,500	241	6	44
					(OP: IK8WEJ)
*IK7XNF	*	7,567	184	5	42
*IZØBTV	*	4,559	94	6	41
*IK4SPB	*	4,160	115	6	46
*IK8WEJ	*	3,569	106	6	37

KALININGRAD

UA2CZ	14	1,914	39	9	13
*RU2FL	A	270,603	596	70	211
*RA2FIA	*	120,510	408	48	158
*RK2FXG	7	9,576	165	10	46

LATVIA

YL6W	A	1,889,059	2005	123	406
					(OP: YL2GD)
YL9T	*	811,876	1796	75	263
					(OP: YL2TW)
YL5W	14	738,500	2476	38	137
					(OP: YL2GN)
YL2BJ	*	69,099	614	20	73
*YL2CR	A	170,170	629	42	179
*YL2IP	*	53,040	198	43	127
*YL3BZ	21	50,112	260	22	78
*YL2PJ	*	41,454	249	23	71

LITHUANIA

LY2FN	A	609,000	1039	96	310
LY4CW	*	489,118	954	82	261
LY4OO	*	181,185	439	71	186
					(OP: LY2BET)
LY2AE	*	162,360	485	59	187
LY2CO	*	21,098	253	12	65
LY3BU	*	5,478	72	15	51
LY1XM	*	3,420	73	16	44
LY6ØUN	*	100	56	17	39
					(OP: LY2BG)
LY2GF	28	19,108	213	20	48
LY1CX	3.7	86,480	730	17	75
LY6ØFW	*	44,496	624	15	57
					(OP: LY1FW)
LY2IJ	1.8	82,302	916	16	71
LY2OU	*	29,431	527	11	52
*LY9A	A	1,795,560	2146	116	404
					(OP: LY3BA)
*LY3CY	*	203,852	627	45	181
*LY2HM	*	202,540	609	59	201
*LY2MM	*	155,472	436	48	189
*LY2OO	*	117,667	467	44	165
*LY3UV	*	31,641	240	39	120
*LY3BW	*	30,960	137	31	55
*LY1BX	*	19,184	188	24	85
*LY2BGB	*	11,259	104	26	55
*LY2AT	*	9,450	93	25	65
*LY2IC	21	167,134	559	34	108
*LY3QT	*	14,732	136	15	43
*LY6A	14	341,400	1259	34	116
					(OP: LY2BM)
*LY2LF	*	2,730	83	9	26
*LY1DT	3.7	54,273	658	16	63
*LY2HK	*	30,184	588	9	47
*LY2QJ	*	14,906	267	8	50

LUXEMBOURG

LX1NO	A	592,800	994	74	251
LX1EA	*	136,305	395	70	163
LX6T	7	283,314	1501	29	109
					(OP: LX1KC)
*LX1JH	A	199,348	589	62	182
*LX1SF	*	6,615	117	18	31

MACEDONIA

Z36W	1.8	61,202	798	10	61
*Z31MM	A	72	9	5	7

MALTA

*9H1DE	A	23,690	204	23	92

MOLDOVA

ER1Q	3.7	187,380	1447	24	84
*ER3CT	14	11,700	160	12	48

NETHERLANDS

PAØIJM	A	1,636,110	2750	84	287
PAØJNH	*	205,972	596	56	165
PA9DX	*	126,027	298	54	155
PAØLSK	*	78,480	268	41	103
PA3BWD	21	193,444	656	35	102
*PAØAGA	A	702,835	1408	76	225
*PC4M	"	286,405	656	58	187
*PF9A	*	230,632	599	55	172
*PAØKHS	*	169,335	489	49	164
*PAØLOU	*	102,340	257	64	151
*PA1PAT	*	92,400	383	46	154
*PAØLRK	*	94,676	380	33	110
*PAØW	*	68,913	251	46	125
*PE1MMZ	*	44,892	144	47	82
*PH3BDJ	*	43,585	245	34	81
*PG2D	*	43,066	248	32	90
*PG7V	*	42,822	198	37	85
*PAØB	*	18,135	144	22	71
*PA3GBI	*	14,413	115	24	47
*PAØCGB	*	11,413	177	20	81
*PI6ØAZL	*	8,232	91	26	58
					(OP: PHØAS)
*PA3DBC	*	8,596	91	19	46
*PA3CAL	*	4,717	60	17	36
*PA7HPH	*	3,420	60	18	42
*PAØADP	*	800	21	14	18
*PA1BDO	14	75,048	413	22	84
*PAØRRS	7	110	9	3	8
*PAØMIR	3.7	16,080	263	11	49
*PA2SWL	1.8	12,765	243	6	50

NORTHERN IRELAND

GI4VIV	A	184,234	415	62	189
MIØLLL	7	484,806	2327	30	117
*GIØKVQ	A	576,096	1012	59	213
*GI4AAM	*	103,224	385	41	143
*GI4SJQ	*	33,866	147	40	78
*GIØOUM	*	2,297	47	8	29
*GI4MWA	14	20,096	173	16	48

NORWAY

LB8IB	A	3,638,669	3631	122	441
					(OP: LA8SDA)
LA9TY	*	149,248	469	47	165
LA6HL	*	82,080	225	55	116
LA2MJA	14	179,436	787	26	88
LA6WEA	1.8	39,702	586	17	61
LA7THA	*	4,446	131	5	34
*LB8AE	A	36,480	240	24	104
*LB8CA	*	31,360	131	34	94
*LA2QJA	*	27,370	183	26	89
*LA8OM	*	13,104	97	20	36
*LA2LI	*	11,753	97	23	50
*LA7GNA	*	10,582	94	24	50
*LA9NM	*	4,698	71	16	38
*LA6CF	*	3,726	47	21	33
*LA1YE	*	1,924	36	13	24
*LA1PHA	*	1,316	27	11	17
*LA6ZFA	7	4,830	122	7	39
*LA8WG	3.7	7,929	135	9	40

POLAND

SN8F	A	1,469,232	2224	94	338
					(OP: SP8FHK)
SN5N	*	770,350	1080	92	258
					(OP: SP5KP)
SP9QMP	*	281,505	1062	33	114
SP2JMB	*	108,990	450	54	119
SP5GMM	*	74,871	224	58	119
SP6RLK	*	71,628	226	56	132
SP1S	*	68,208	205	61	135
SP1RKT	*	32,007	247	40	101
SP5BWO	*	25,990	160	28	85
SP2JMR	*	19,809	121	31	62
SP4LXC	*	15,900	86	36	64
SP9BGS	*	4,224	57	18	46
SP8SN	*	3,740	31	17	27
SP1DPA	*	1,820	20	16	19
SP1BBT	*	52	8	6	7
SQ6R	28	9,384	151	16	35
					(OP: SP6EQZ)
SN1X	21	373,998	1061	37	129
					(OP: SP5XVY)
SP6AEG	*	252	7	6	6
SP8IMG	14	637,632	2082	37	125
SN7Q	*	202,120	940	31	93
					(OP: SP7GIQ)
SO5O	*	161,417	881	29	98
					(OP: SP5MXZ)
SP8CUR	*	72,276	370	26	88
SP9MAX	*	6,000	84	14	34
SP9MAT	*	2,040	36	11	23
SO6X	7	467,866	2004	35	126
					(OP: SP6IXF)
SP3LPG	*	127,400	799	30	100
SP2QG	*	47,045	413	18	79
SQ3BDQ	*	8,710	97	14	53
SN3A	3.7	386,400	1702	32	118
					(OP: SP3GEM)
SN2N	*	51,898	796	17	60
					(OP: SP2ASJ)
SP3CYY	*	17,982	199	13	61
SP6HEQ	1.8	69,190	978	12	62
SP6EQZ	*	9,400	239	6	41
*SQ9JKW	A	824,472	1216	93	303
*SP9HQC	"	480,244	726	81	275
*SP2JSS	"	454,104	736	85	272
*SP4Z	*	313,252	566	73	211
*SP1MVG	*	216,240	669	53	202
*SP6KFA	*	209,532	691	50	178
					(OP: SP6JQC)
*SP4AAZ	*	176,080	515	55	193
*SQ9ANS	*	172,520	524	55	172
*SP1DTE	*	183,018	522	62	199
*SP4FDF	*	160,688	496	59	183
*SP9NWN	*	153,225	455	57	168
*SP6TRX	*	151,420	434	52	174
*3Z8Z	*	139,260	331	62	149
					(OP: SP8AJC)
*SP6IEQ	*	132,506	348	57	152
*SP4YFJ	*	107,730	258	64	146
*SQ5MX	*	107,640	323	56	174
*SP8ONB	*	96,320	366	50	165
*SQ2EAN	*	92,274	422	33	149
*SP3XR	*	88,816	300	52	130
*SQ7B	*	85,498	399	44	153
*SP9EMI	*	83,619	250	45	118
*SP2GCE	*	72,767	321	42	122
*SP2GJI	*	63,365	266	37	108
*SP2AVE	*	70,929	265	44	128
*SP9MAN	*	60,941	259	40	109
*SP1KZE	*	60,306	289	41	97
					(OP: SP1MWN)
*SP7TEX	*	60,214	263	46	115
*SQ9FCH	*	58,482	334	39	123
*SP9FT	*	53,862	285	42	99
*SP2AYC	*	52,734	193	45	142
*SP2FTL	*	44,100	289	37	103
*SQ5EBM	*	43,955	150	50	99
*SQ9GJP	*	40,348	262	39	115
*SP1DMD	*	42,562	186	40	82
*SP5EPP	*	34,220	184	39	106
*SP5BUJ	*	33,408	208	33	111
*SP6LUV	*	33,108	123	47	77
*SQ3DD	*	29,870	236	24	79
*SP3BJK	*	29,555	138	35	80
*SP8HPW	*	28,820	219	32	99
*SP6BEN	*	28,060	100	44	78
*SP4DDS	*	26,208	211	30	87
*SP3BVI	*	25,480	169	31	60
*SP3FLQ	*	24,892	168	29	69
*SP4BPH	*	24,564	252	14	55
*SP1DTG	*	24,045	86	41	64
*SP3DOF	*	22,795	125	35	62
*SP3PSM	*	22,515	197	23	72
*SP9CQ	*	21,156	93	43	80
*SP5IKO	*	20,292	84	46	68
*SP2SGN	*	18,531	174	25	62
*SP8DHJ	*	17,776	97	37	64
*SP5IT	*	14,080	85	34	54
*SP8UFB	*	13,973	92	22	67
*SP5COR	*	13,965	144	31	102
*SQ9CNN	*	13,760	152	15	65
*SP9TCC	*	13,321	102	13	64
*SP5XO	*	13,029	111	24	77
*SP6DHH	*	14,224	182	17	57
*SP9LAS	*	12,060	100	36	54
*SP5TAM	*	11,764	125	19	49
*SQ9ZM	*	11,316	99	24	68
*SP9OYK	*	10,868	85	20	56
*SP9MRK	*	10,032	78	30	46
*SQ4FXS	*	9,900	95	21	45
*SP5COF	*	9,360	101	30	74
*SP5CGN	*	9,360	106	19	61
*SPØPZK	*	9,324	89	18	45
*SP9IKN	*	8,657	150	30	92
*SP2UKO	*	7,455	139	16	55
*SP9UUC	*	7,182	71	25	38
*SQ8LSC	*	7,138	107	25	61
*SP6GNJ	*	6,786	88	13	65
*SP9KSP	*	7,539	283	25	89
*SP5WLV	*	6,624	86	28	64
*SQ8T	*	5,880	49	27	43
*SP5NN	*	5,628	80	22	45
*SQ9DXN	*	4,484	49	19	40
*SP9PTG	*	4,785	71	15	40
*SP7CXV	*	3,942	32	22	32
*SP2DKI	*	3,900	57	18	32
*SP4AUN	*	3,480	73	18	40
*SP1MWK	*	3,286	43	20	42
*SP7LHX	*	3,425	126	11	66
*SP1O	*	2,408	33	13	30
*SQ9HHV	*	2,318	77	9	29
*SP5LMT	*	1,950	48	16	34
*SP7FBQ	*	1,850	26	15	22
*SP5WLO	*	1,500	48	14	36
*SP9UMJ	*	1,408	19	13	19
*SP5YWA	*	1,200	20	14	16
*SP5GDY	*	946	15	9	13
*SP7OU	*	660	19	12	18
*SP5AAJ	*	348	22	10	19
*SQ5LNJ/4	*	342	22	7	12
*SQ5MGG	*	93	27	11	20
*SQ5ESM	*	56	10	4	10
*SP9IQO	*	24	36	5	19
*SP3LWP	28	17,792	164	20	44
*SP5LCC	"	14,986	165	17	42
*SQ4HRN	*	14,839	147	20	51
*SQ6ELV	*	14,742	126	18	45
*SP9DSD	*	13,936	131	22	45
*SQ9CWO	*	8,250	115	15	35
*SQ9IAU	*	6,174	107	11	31
*SQ9DJG	*	2,610	62	10	20
*SP2EXN	21	126,991	378	36	115
*SQ4LP	"	112,791	375	33	90
*SP9DLY	*	36,100	209	23	72
*SP4DC	*	26,544	167	20	59
*SP9KJ	*	20,240	118	27	61
*SP9OJQ	*	15,372	135	19	42
*SP4ICD	*	12,031	120	16	37
*SP5XSD	*	10,672	87	17	41
*SQ9AOR	*	5,070	60	18	21
*SP5TAT	*	4,329	42	14	25
*SP2MHC	*	3,808	48	13	21
*SP8LXE	*	2,067	25	15	21
*SO9L	14	293,722	1168	32	126
					(OP: SP9UML)
*SQ9HZM	*	102,912	512	27	101
*SP9EWO	*	95,934	504	25	93
*SP3GTS	*	91,307	404	29	102
*3Z6V	*	79,540	402	27	88
*SQ4MP	*	70,560	346	24	96
*SQ2CW	*	36,735	290	22	71
*SQ1WO	*	21,016	228	16	55
*SP9BMH	*	18,630	204	13	56
*SP5DRE	*	14,616	162	12	46
*SQ8JLU	*	14,274	179	13	48
*SQ3RX	*	13,496	199	12	44
*SP9IBJ	*	13,020	154	14	46
*SP8OOB	*	12,876	161	12	46
*SP2HXY	*	9,911	121	13	40
*SQ3WW	*	5,217	98	7	40
*SP2JGK	*	3,772	86	8	33
*SP9KGG	*	365	24	5	15
*SQ5EK/6	*	238	9	8	9
*SP6FIB	*	113	5	5	5
*SP4TKR	7	74,898	530	23	91
*SP4SHD	*	36,490	306	14	75
*SP8EEX	*	17,360	141	14	64
*SP4LVK	*	14,948	159	15	59
*SP5BB	*	8,044	82	14	55
*SP7MUZ	*	2,376	61	6	30
*SQ9E	*	2,070	43	7	23
*SQ4GXF	*	460	26	7	16
*SP6FJ	*	72	4	2	4
*SQ9MZ	3.7	18,126	299	9	48
*SP6RGB	"	14,906	248	8	50
*SQ9HQ	*	8,262	148	9	45
*SP9LDB	*	7,824	192	6	42
*SQ5ARG	*	7,395	135	8	43
*SQ5IZX	*	2,808	79	6	30
*SQ3GNA	*	2,700	161	8	42
*SP1JON	*	2,040	66	4	31
*SP3SXX	*	1,089	43	5	28
*SP4XQN	1.8	14,964	292	9	49
*SN5J	*	4,480	126	4	36
					(OP: SP5JXK)

PORTUGAL

CT1AGS	A	106,118	288	56	138
CT1BOL	21	374,480	1360	35	116
CT8T	14	1,036,104	3076	38	146
					(OP: CT1ESV)
*CT7T	A	3,638,544	3157	114	432
					(OP: CT1CJJ)
*CT7F	*	402,392	827	64	217
					(OP: CT1FFU)
*CT1FMS	*	215,917	607	53	168
*CT1EGW	*	135,716	291	60	199
*CT2HWP	*	103,350	415	45	150
*CT1ESQ	*	66,834	292	39	119
*CT2IZW	*	46,704	196	42	126
*CT1DJE	*	12,516	62	31	53
*CT2FQA	*	901	68	16	37
*CT2GQN	28	4,212	62	9	27
*CT1FNT	21	15,651	160	17	53
*CT2GWZ	14	11,937	101	17	52

ROMANIA

YO5PBW	A	840,582	1685	86	283
YO3BL	*	260,145	842	59	176
YO3CCC	*	21,084	173	21	63
YO6BHN	21	162,348	499	37	129
YR2I	1.8	52,022	724	12	62
					(OP: YO2DFA)
YO5OHZ	*	10,716	243	5	42
YO2RR	*	8,694	206	7	39
*YO3CZW	A	568,288	1165	79	265
*YO8BPY	"	209,483	602	56	215
*YO7ARY	*	193,963	622	49	180
*YO2MAX	*	96,866	320	51	136
*YO3XL	*	87,626	363	49	122
*YO6QT	*	74,750	349	45	115
*YO6GCW	*	59,947	344	29	122
*YO4GNJ	*	58,739	320	33	118
*YO4RST	*	50,421	306	25	122
*YO7AWZ	*	42,898	277	46	132
*YO2LSK	*	31,720	194	34	96
*YO2MET	*	26,061	177	25	94
*YO5DAS	*	25,437	180	41	98
*YO9AGI	*	28,251	173	35	88
*YO7CWP	*	22,990	177	28	67
*YO3FOM	*	15,563	104	24	55
*YO8GF	*	13,975	129	24	63
*YO5BWI	*	15,081	140	21	60
*YO2BPZ	*	11,000	109	25	63
*YO8DHD	*	7,236	95	19	48
*YO8RAC	*	5,292	104	15	48
*YO7LTQ	*	5,133	79	16	43
*YO8RKP	*	2,592	53	17	37
*YO3FRI	*	1,073	29	10	19
*YO9IKW	28	5,782	59	14	35
*YO7HHI	*	180	9	5	7
*YO3JF	21	190,284	665	36	121
*YO2AOB	*	76,450	361	31	79
*YO3AIL	*	32,574	202	25	64
*YO9CWY	*	20,822	203	17	41
*YO8KGA	14	221,130	1346	31	86
*YO4BEX	*	7,713	146	9	36
*YO9W	*	6,179	165	7	30
					(OP: YO9WF)
*YO7LYM	*	10	5	3	5
*YO7LFV	7	71,982	770	16	77
*YO4RDN	3.7	26,733	420	11	56
*YO6ADW	*	13,654	225	7	52
*YO8MI	*	5,207	118	7	38

SARDINIA

ISØ/WHØQ	14	385,140	1797	29	102
					(OP: IN3ZNR)
ISØDFC	*	315	50	7	28
ISØ/K7QB	1.8	35,880	494	10	59
					(OP: IN3QBR)
*ISØVSG	A	178,295	400	57	154
*ISØIGV	*	93,097	382	45	131
*ISØHQJ	*	65,440	302	48	112

SCOTLAND

GMØF	A	2,018,292	2459	99	375
					(OP: GM4AFF)
GMØDBW	*	70,272	409	31	91
GM7V	3.7	243,540	1994	20	88
					(OP: GM4YXI)
*MMØDHQ	A	50,816	270	33	95
*GM4JYB	*	36,288	159	38	74
*MMØGOR	*	17,812	100	30	43
*MMØEDZ	*	14,691	140	20	63
*MM3IOF	*	100	121	21	49
*GM7TUD	21	13,886	95	19	34
*GM8KSJ	*	100	17	5	11
*GMØIIO	14	84,192	788	23	73
*MMØDGR	1.8	169	15	2	11

SICILY

IT9UFP	A	1,750	36	12	23
IW9GEC	*	1,496	39	11	23
IU9A	14	185,500	1400	24	76
					(OP: IT9SSI)
*IR9Z	A	255,725	789	59	206
					(OP: IT9VCE)
*IT9BOR	*	75,808	280	51	133
*IW9GUR	*	66,254	301	57	154
*IT9ORA	*	2,814	37	16	26
*IW9HDD	21	78,055	385	28	86
*IT9YSW	*	14,731	114	20	48
*IT9RJE	14	69,853	415	24	95
*IT9RBW	*	61,207	520	21	76

SLOVAK REPUBLIC

OM6KW	A	654,728	1109	82	285
OM4JD	*	16,200	95	36	64
OM3DX	*	3,525	35	16	31
*OM6AL	A	105,074	516	39	175
*OM3PQ	"	105,060	392	43	161
*OM5UM	*	57,892	317	35	129
*OM7AG	*	39,621	199	41	100
*OM7AT	*	20,718	125	23	65
*OM4DA	*	15,965	163	26	77
*OM1TD	*	6,969	106	19	50
*OM5FA	28	42,964	305	24	68
*OM7YC	21	16,320	120	23	41
*OM2TB	14	12,716	185	11	47
*OM7AB	3.7	41,052	605	9	57
*OM6TX	*	4,524	119	5	34
*OM5LR	*	4,935	151	5	32
*OM4APD	*	792	42	4	18

SLOVENIA

S5ØA	A	5,136,192	3867	139	453
S58ØA	*	948,024	1044	109	423
					(OP: S56A)
S52QM	*	304,110	822	71	208
S57S	28	98,136	523	26	90
S58D	"	72,114	391	28	73
S5ØO	21	259,440	994	37	104
S5ØK	14	916,584	2460	39	142
S57DX	"	882,640	2312	38	149
S57UN	*	567,248	1725	37	139
S53M	*	563,834	1904	36	115
					(OP: S51FB)
S5ØY	*	393,000	1312	37	113
					(OP: S57AL)
S53S	*	313,608	1220	33	113
					(OP: S5ØB)
S57PM	*	64,624	388	26	86
S53XX	*	7,320	118	9	15
S53F	3.7	157,257	1464	18	83
S51NA	"	135,000	1196	20	80
*S51F	A	963,795	1265	97	372
*S52OT	"	718,998	1135	84	287
*S58RU	*	182,024	515	53	191
*S51SK	*	124,656	393	48	120
*S57U	*	118,404	303	58	176
*S5ØL	*	91,271	418	30	77
					(OP: S59MA)
*S58L	*	90,190	388	40	105
*S57YX	*	43,160	182	37	93
*S57JEL	*	5,874	88	29	60
*S57WVM	*	3,965	78	22	43
*S58P	28	64,800	381	24	76
*S57L	"	49,674	300	26	76
*S53AJL	*	9,360	134	15	33
					(OP: S55Z)
*S57J	21	293,997	847	33	118
*S58V	*	111,020	504	32	90
*S51SL	*	47,236	266	26	72
*S54A	7	102,297	614	26	103
*S55Z	*	5,565	96	8	45
*S59CDE	3.7	64,148	815	12	67
					(OP: S55O)
*S56T	*	2,176	79	5	27
*S54W	1.8	41,778	662	9	57

SPAIN

EA4KR	A	3,762,529	3398	117	446
EA5DFV	"	1,278,018	1912	87	291
EA3DUM	*	190,993	612	46	133
EA3CCN	*	178,374	505	49	168
EA4DXP	*	138,538	347	53	173
EA1HV	*	133,650	445	62	163
EA3EJI	*	120,392	407	50	152
EA5OL	*	34,846	155	43	90
EA5DY	21	487,893	1701	33	114
EA7HF	*	344,448	1298	30	98
EA1DLU	*	199,696	878	30	82
EA4BT	*	47,658	258	27	67
EC5CJH	*	10	7	3	6

EA3EYD	14	96,774	482	30	97
EA1COE	"	78,480	529	26	83
EA1ASG	"	74,703	360	27	84
EA4KD	3.7	86,616	562	20	88
EA5AT	1.8	15,980	292	12	56
*EA1WS	A	666,498	1196	67	227
*EA7TN	"	597,498	1002	77	286
*EA3KN	"	491,535	743	77	254
*EA3OR	"	482,589	744	85	302
*EA4NP	"	377,140	547	83	263
*EA7IA	"	302,761	587	68	209
*EA1AJV	"	242,440	672	52	157
*EA1JO	"	238,080	531	57	183
*EA3NA	"	219,180	482	68	192
*EA1GAR	"	217,512	589	56	172
*EA1BXQ	"	212,471	502	64	175
*EA1USB	"	206,346	484	62	176
*EA1AST	"	199,091	526	63	200
*EA7AA	"	198,912	500	64	192
*EA3ALV	"	194,040	395	69	211
*EA3AKA	"	188,238	591	55	174
*EA7OT	"	182,835	452	65	190
*EA5GQM	"	179,256	418	65	166
*EA1CS	"	165,870	534	49	141
*EA3AGB	"	155,877	422	56	167
*EA7EWX	"	147,060	381	56	159
*EA4DAT	"	146,050	572	54	176
*EA2TO	"	141,290	427	52	147
*EA1ET	"	126,945	488	44	173
*EA2BOV	"	107,088	382	48	136
*EA5EOR	"	106,944	306	54	138
*EA7CWA	"	105,868	308	55	144
*EA1IGZ	"	98,748	400	54	180
*EA1OT	"	89,760	453	32	88
*EA1AE	"	82,915	323	47	114
*EA1DOU	"	68,688	241	43	101
*EA2BNU	"	65,565	231	47	108
*EC7ABV	"	63,800	318	39	106
*EA1JJ	"	49,920	210	39	57
*EA2AP	"	48,773	177	47	104
*EA5BWR	"	45,864	262	27	90
*EA5BAH	"	51,085	262	39	118
*EA5ACO	"	45,036	240	38	101
*EA5BJI	"	42,343	243	38	123
*EA3DEN	"	39,483	255	32	91
*EA7EUF	"	37,820	183	31	91
*EA7EYQ	"	37,310	174	40	90
*EA7EPF	"	40,215	184	44	100
*EA1CGK	"	35,392	131	42	116
*EA1AHC	"	34,272	135	45	91
*EA2AVM	"	31,916	169	31	70
*EC1CUV	"	30,602	194	26	81
*EA4TX	"	26,781	194	26	53
*EA5EVC	"	26,586	188	35	91
*EA5AAJ	"	26,136	137	35	73
*EA7LU	"	22,572	133	35	79
*EA4CIE	"	21,960	118	31	59
*EA1WXD	"	19,504	179	21	85
*EC7AMT	"	19,227	232	23	64
*EA5DIT	"	19,215	94	37	68
*EA3EIQ	"	19,250	122	32	77
*EC1AGG	"	16,195	192	18	61
*EA2CND	"	16,936	118	25	78
*EA1BDC	"	13,680	136	17	40
*EA3CEC	"	13,286	90	28	63
*EA2BXV	"	12,672	95	21	45
*EA1NE	"	12,075	104	20	55
*EA2CNU	"	11,850	64	27	48
*EC2AH	"	11,704	92	22	54
*EA3GBU	"	11,620	81	28	42
*EA3FAJ	"	10,902	87	26	43
*EA5QB	"	8,954	93	17	57
*EA4CZS	"	7,410	91	21	57
*EA7TG	"	7,360	71	20	26
*EA7NW	"	6,972	59	35	49
*EA5FST	"	6,555	62	22	35
*EA3DL	"	6,870	64	15	38
*EA7HE	"	6,867	142	25	75
*EA4AFP	"	5,133	62	10	49
*EA3WX	"	4,940	49	20	32
*EA1TCR	"	4,900	57	22	28
*EA1EBJ	"	4,543	51	19	40
*EA1AUS	"	4,400	35	19	31
*EA1CFA	"	3,795	68	17	38
*EA7GGU	"	2,860	57	10	34
*EC5ADE	"	2,600	48	14	36
*EA1BTK	"	2,500	32	21	29
*EA1BGV	"	1,806	46	14	29
*EA4CRP	"	1,258	38	15	22
*EC7CUH	"	1,240	43	11	29
*EC1AMS	"	278	11	8	12
*EA2BAP	"	120	19	14	16
*EA7BGR	"	100	87	26	51
*EC7ALM	"	100	31	10	22
*EA7GV	28	17,442	256	12	42
*EA1DWE	"	11,568	107	13	35
*EA1CCM	21	123,660	534	22	68
*EA1BIM	"	118,449	591	23	84
*EF7AGG	"	109,536	772	29	83
(OP: EC7AGG)					
*EA1YB	"	101,430	445	28	87
*EA7ANM	"	48,320	473	15	49
*EA1EXE	"	31,944	327	22	66
*EC3CJN	"	27,742	156	26	71
*EA7KJ	"	26,600	226	20	50
*EA7FRX	"	25,974	155	21	57
*EA5WX	"	28,592	164	22	57
*EC5AAJ	"	21,560	225	18	59
*EC7AKV	"	21,164	233	18	56
*EA3EXV	"	15,695	113	22	51
*EC1DGX	"	9,699	96	16	45
*EC4ACS	"	6,669	78	17	40
*EC7DDZ	"	6,477	70	17	34
*EC3PL	"	3,256	54	10	27
*EC3CFO	"	2,996	47	12	30
*EC1DHS	"	2,501	44	14	27
*EC3ACH	"	2,370	46	11	19
*EC2AWD	"	1,783	73	15	39
*EC7DNB	"	775	31	11	20
*EC2ADE	"	646	25	10	24
*EC5BYB	"	504	21	6	15
*EC1CTV	"	165	9	6	9
*EC2ADT	"	84	19	7	14
*EA7HBP	14	231,330	1592	26	84
*EA3GHZ	"	193,228	965	29	105
*EA1MR	"	115,948	731	21	80
*EA1EVS	"	81,576	503	21	78
*EA4UV	"	42,222	398	21	72
*EA3CS	"	23,280	206	18	62
*EA1ASC	"	22,120	210	16	63
*EA5GFK	"	17,739	129	18	63
*EA4DBS	"	3,840	63	12	36
*EA3FHP	"	2,819	76	8	28
*EA3KT	7	16,272	211	14	58
*EA3ATM	"	8,664	101	14	43
*EA5AFY	"	3,956	60	9	34
*EA4ENF	3.7	5,734	103	8	39
*EA5CGU	"	853	23	6	8
*EC5ACZ	"	312	32	5	21
*EA3FF	1.8	2,652	85	6	33

SWEDEN

SM5CEU	A	1,219,602	1423	110	364
SM6FJY	"	284,878	506	66	200
7S5C	"	118,084	398	51	161
(OP: SM5CBM)					
SM7BJW	"	85,671	289	50	117
SM3B	"	52,110	202	50	85
SMØEPO	"	32,334	207	32	70
8SØW	"	22,755	102	37	74
(OP: SMØNJO)					
SM3R	"	552	19	8	16
(OP: SM3CBR)					
SM5QU	14	27,370	274	17	53
SMØGYX	"	24,653	220	20	69
SM3LIV	"	1,856	52	7	22
SM3FJF	"	1,248	34	8	18
SMØP	7	333,165	1663	30	103
(OP: SMØPSO)					
SMØW	3.7	424,424	1964	33	121
(OP: SMØWKA)					
SM6IQD	"	5,418	104	10	33
SM6DOI	1.8	68,992	810	14	63
*SM6D	A	408,343	762	78	233
(OP: SM6DER)					
*SM6CRM	"	161,772	395	62	182
*7S5S	"	112,233	349	52	157
(OP: SM5CSS)					
*SMØBDS	"	68,623	252	42	121
*SMØFM	"	47,128	167	39	98
*SM6NET	"	37,152	187	31	77
*SA5AKA	"	36,557	194	34	105
*SM7DIE	"	26,999	128	39	94
*SM6MVL	"	18,564	117	30	72
*SM5AOG	"	18,360	100	26	46
*SM2YIP	"	14,432	97	26	62
*SM2MZC	"	11,760	84	27	53
*SM7CWI	"	11,186	102	29	65
*SM3EAE	"	8,712	86	23	43
*SM5OSZ	"	3,358	63	14	32
*SA7J	"	832	33	10	22
(OP: SM7XGG)					
*SF5ØA	21	156,484	720	37	105
*SM2EKN	"	33,448	333	18	56
*SM5DQE	14	25,604	294	17	57
*7S7V	7	82,812	661	20	83
(OP: SM7VZX)					
*SM4HEJ	1.8	196	17	3	11

SWITZERLAND

HB9AUS	A	342,735	743	61	158
HB9AAA	"	333,095	582	66	241
HB9ACA	21	29,295	204	20	43
*HB9TOG	A	371,727	804	67	242
*HB9AWS	"	222,750	644	57	213
*HB9AAP	"	183,244	516	48	196
*HB9BTI	"	118,544	436	55	184

UKRAINE

US5D	A	2,720,374	2879	111	382
(OP: UT7DX)					
UY5ZZ	"	1,501,948	1896	116	437
UV5U	"	606,171	1023	97	284
(OP: UX1UA)					
UT5UML	"	523,698	888	82	255
US3IZ	"	456,621	1017	75	228
UR5ZLK	"	298,404	652	66	241
UR6QS	"	231,211	592	66	217
UR7EM	"	180,027	547	55	194
UT2UB	"	179,424	526	65	223
UT5ECZ	"	150,396	527	47	202
US5QR	"	126,720	262	64	192
US5ZF	"	32,500	147	45	80
UT7MD	"	27,216	121	29	97
US1MM	"	22,360	168	35	95
UT4PZ	"	10,112	126	19	45
UY5QZ	"	32	5	4	4
UT2IY	28	106,040	851	24	86
UU5WW	"	24,309	314	18	55
UW2I	14	584,785	2185	38	147
(OP: UT2IJ)					
UT4EK	"	106,272	671	30	93
UR5WCQ	"	27,576	209	23	49
US5EAE	"	2,401	61	7	23
UR5AKU	"	1,035	18	7	16
UW2M	7	432,846	1475	36	137
(OP: URØMC)					
UT3UA	3.7	184,080	1173	26	94
US2IOO	"	56,015	552	22	63
UT3SA	1.8	33,138	529	10	53
UW5Y	"	945	47	5	16
(OP: UR5YAM)					
*UT9MZ	A	762,851	1272	86	363
*UW7M	"	298,711	697	73	234
(OP: UR3MP)					
*UR6MX	"	294,824	570	58	211
*USØKW	"	282,364	579	73	219
*UT1ML	"	202,276	580	52	192
*UR5ETN	"	184,526	557	51	206
*US7IA	"	199,226	491	63	208
*UY5TE	"	160,012	566	43	175
*UR5WDQ	"	118,170	478	44	158
*UX8ZA	"	79,947	396	44	145
*UY2UQ	"	78,660	336	44	136
*UT4MW	"	64,321	319	31	100
*UYØLL	"	59,090	191	48	142
*UY2RA	"	45,738	200	41	113
*UR5FS	"	39,672	198	37	77
*US5EEK	"	31,535	157	35	84
*UT3FM	"	22,968	157	27	61
*UT7CL	"	6,887	62	21	50
*UR5ZRB	"	6,405	55	26	35
*US5ZCW	"	6,384	74	18	58
*UU2JA	"	1,968	27	16	25
*UR5WCR	"	980	36	7	21
*UT1IA	28	1,827	50	5	24
*UR5HAC	21	362,520	1336	33	119
*UR8QR	"	71,369	389	26	81
*UR8IDX	"	35,397	296	20	61
*UR5LY	"	2,144	53	9	23
*UR6IJ	14	181,780	752	31	118
*UX4UA	"	104,202	485	28	98
*US5ESP	"	61,380	407	22	88
*UTØUT	"	22,253	175	19	58
*UT4NY	"	11,229	144	13	44
*UY3AW	"	11,088	103	18	45
*UR7OM	"	8,109	97	14	39
*UR5KAT	"	4,176	81	12	36
*UU4JKY	3.7	46,480	584	14	66
*UW8SM	"	34,932	490	12	59
*UV5EEO	1.8	1,643	56	5	26

WALES

GW4BLE	A	6,118,605	4808	119	430
GW3NAS	"	321,732	516	74	257
GW3NJW	"	27,216	245	24	39
GW8IZR	"	16,468	129	18	74
*GW3JXN	A	203,962	457	61	193
*MWØYDX	"	59,901	262	37	86
*MW1MDH	"	26,200	159	25	75
*MWØIDX	"	9,936	73	24	48
*GW3YVC	"	1,739	44	20	27

YUGOSLAVIA

YU1LA	28	12,095	149	14	45
YT5G	21	659,987	1914	38	125
YT7Z	"	491,346	1704	38	124
(OP: YU7SK)					
YU2A	"	8,772	100	14	37
(OP: YU1BX)					
YZ9A	14	744,800	2351	39	136
(OP: YU1AU)					
YZ5Z	"	638,616	2346	38	139
YZ3EW	"	561,760	2092	36	124
(OP: YZ1EW)					
YZ1E	7	660,152	2201	38	141
(OP: YU1EW)					
YT7A	"	574,035	2418	36	129
YU7AV	3.7	241,488	1464	30	99
4N1N	"	115,433	1280	16	73
(OP: 4N1LB)					
YT6Y	1.8	116,400	940	16	81
*YU1EQ	A	63,360	256	45	131
*YU1JF	"	3,458	31	17	21
*YU1JT	21	31,047	217	22	57
*YU7KM	"	31,772	177	23	60
*YT1AD	14	670,721	2194	38	135
*YU7ZZ	"	236,082	1063	35	111
*YT1VP	7	100,375	573	24	101
*YT5B	"	15,884	273	13	63
*YZ6AMD	"	2,535	68	7	32
*4N7ZZ	1.8	24,507	388	9	54
*YT2W	"	3,640	87	5	35
(OP: YU1RA)					

OCEANIA

AUSTRALIA

VK4CZ	A	2,138,564	2212	106	255
(OP: VK4JSR)					
VK7GN	"	404,414	650	78	151
VK3FM	"	201,587	409	65	134
VK3KE	"	59,640	207	49	93
VK2GWK	"	37,516	136	39	74
VK3AVV	"	28,224	127	43	55
VK4AN	21	309,250	930	32	93
VK6DXI	3.7	24,365	204	20	35
*VK2KPP	A	786,609	1375	73	140
*VK4EJ	"	351,880	685	69	121
*VK8AV	"	220,993	379	78	145
*VK2GR	"	30,281	120	45	62
*VK6HZ	"	19,068	100	33	51
*VK4FJ	"	8,736	72	27	25
*VK4DX	"	987	18	8	13
*VK2ZQX	"	459	10	11	11
*VK5UE	"	52	7	7	6
*VK4HTM	21	1,617	55	9	12
*VK7VH	14	25,280	132	22	57
*VK4ACB	"	24,485	120	26	57

CHRISTMAS ISLAND

VK9XD	A	1,538,535	1863	101	226
(OP: VK2CZ)					
VK9XG	14	70	10	7	7
(OP: WØYG)					

EAST MALAYSIA

9M6/G3OOK	A	249,084	598	50	103
9M8YY	21	491,363	1338	37	90
(OP: JR3WXA)					

GUAM

KH2X	A	112,086	189	83	151

HAWAII

AH7C	A	2,999,088	3130	119	234
KH6FI	"	223,744	459	72	112
KH7E	28	2,018	47	7	9
KH7X	14	1,539,072	3306	37	130
KH6FKG	7	126,400	735	24	40
AH6JR	"	74,100	534	23	34
KH7U	3.7	105,152	613	25	37
*KH6/NØCO	A	26,400	146	36	44
*NH7WB	"	5,616	56	26	28
*NH6T	28	3,190	52	12	17
*NH7PE	"	376	17	3	5
*NH7FY	21	66,684	380	25	42
*KH6/WØCN	7	39,168	415	14	18

INDONESIA

YB2DX	A	908,522	1192	105	212
YBØJS	"	167,544	402	52	127
YBØCOU	"	35,425	161	44	65
YBØEIN	21	11,872	84	19	34
YB1YG	14	19,620	152	18	42
*YBØAI	A	645,984	915	75	213
*YBØDPO	"	101,750	351	32	78
*YB4IR	"	52,554	185	36	78
*YC1UGK	"	35,934	169	30	76
*YBØJK	"	34,749	151	43	74
*YB5BO	"	28,783	125	41	66
*YBØIR	"	26,412	115	30	63
*YB7KNV	"	20,412	104	32	52
*YBØKVN	"	10,098	59	20	46
*YC5JAU	"	4,459	47	22	27
*YBØECT	28	13,571	122	10	31
*YC3BDJ	21	496,524	1308	35	103
*YB2OBL	"	277,590	906	30	84
*YCØMJY	"	17,664	137	22	47
*YBØQO	"	10,128	90	18	30
*YB5QZ	14	87,514	324	26	72
*YB2ECG	"	1,472	37	9	14
*YBØZAF	"	1,148	24	10	18
(OP: YCØNDT)					
*YBØZZ	"	777	14	8	13
*YB2VTO	7	8,250	66	19	36
*YC3MM	"	6,512	55	14	30
*YC9WZJ	"	4,551	47	16	25
*YCØLOW	3.7	156	10	5	8

NEW CALEDONIA

*FK8HN	A	328,662	673	70	116

NEW ZEALAND

ZL2AL	A	505,519	753	88	169
ZL2MF	"	310,648	536	80	152
ZL1ALZ	"	186,864	510	45	91
ZL2UO	"	69,713	171	57	104
ZL2CC	14	46,410	181	27	64
*ZL4PW	A	195,720	362	79	131
*ZL1KMN	"	25,452	112	37	64
*ZL1BYZ	"	25,428	137	34	44
*ZL3DW	"	1,908	24	17	19
*ZL2DZ	14	28,208	128	26	56
*ZL4JB	7	6,550	66	21	29

NORTHERN MARIANAS

WHØV	A	1,844,058	1955	108	250

PAPUA-NEW GUINEA

P29NB	A	826,099	1251	88	181

PHILIPPINES

DU9RG	A	1,003,860	1282	98	199
*DV1JM	A	329,856	630	65	127
*DV3ZQR	"	177,016	558	47	69
*DU4JT	28	2,340	87	5	5
*4F4ACV	21	8,814	95	16	23
*4F1MEU	14	17,766	143	20	27

TONGA

*A35BO	A	375,606	934	65	89

SOUTH AMERICA

ANTARCTICA

R1ANN	A	80,398	263	42	80
(OP: RU3HD)					
*R1ANC	14	2,889	41	12	15
(OP: RA1PC)					

ARGENTINA

LR4E	A	930,312	1579	77	159
(OP: LW4EU)					
LU1HF	28	620,398	1738	30	112
LT2H	"	490,496	1567	25	103
(OP: LU7HN)					
LU6ETB	"	407,464	1369	24	82
AY8A	21	1,278,468	2976	34	119
(OP: LU8ADX)					
LW9ETQ	"	148,263	745	21	52
LU1VM	3.7	8,319	99	17	30
*LU1HLH	A	609,390	906	89	181
*LU6MA	"	130,720	456	56	104
*LU9FFZ	"	127,702	391	45	89
*L4ØK	"	77,268	323	51	86
(OP: LU6KA)					
*LT5Y	"	69,557	545	50	81
*LU1ARV	"	50,963	197	43	70
*LR1A	"	45,898	207	37	69
(OP: LU1AS)					
*LU5CAB	"	21,696	137	35	78
*LU7DUE	"	18,130	129	27	43
*L44DX	28	190,256	822	20	68
(OP: LW1DTZ)					
*LR2D	"	161,360	781	20	60
(OP: LW7DUC)					
*LU9DAG	"	142,074	701	20	61
*LU3HIP	"	135,290	608	20	63
*LU6FOV	"	104,858	548	21	53
*LW1HDJ	"	90,508	513	18	50
*LU8EOT	"	69,030	409	20	45
*LU9DPM	"	52,440	319	18	51
*LW7HT	"	51,264	366	21	43
*LV5V	21	604,416	1681	29	99
(OP: LU5VV)					
*LU1BJW	"	133,095	544	23	72
*LU4HKL	"	17,312	110	20	47
*LW5ET	"	12,805	136	20	45
*LU3DR	14	242,764	675	34	103
*LS1A	"	211,860	623	37	95
(OP: LU2BA)					
*LU8VCC	"	169,840	652	29	81
*LU1DK	"	106,848	490	26	70
*LU6HDV	"	33,704	138	27	61
*LU1DAQ	"	15,443	123	24	47

ARUBA

P4ØW	A	9,654,145	6402	126	415
(OP: W2GD)					
P49Y	21	1,703,924	4086	34	114
(OP: AE6Y)					
*P4ØA	A	7,649,824	5690	119	362
(OP: KK9A)					

BOLIVIA

*CP1FF	21	17,388	163	16	30

BRAZIL

PY3PA	A	438,402	918	68	118
PY5JO	"	158,480	435	40	100
PY3MSS	"	19,620	144	40	50
PY3CAL	"	13,600	128	26	54
PT2CSM	"	10,320	76	32	48
PY5XT	28	272,844	1041	22	84
ZW5B	"	196,098	785	24	74
(OP: PY5KD)					
PP5VB	"	172,710	762	22	73
ZV5K	"	19,872	125	19	50
(OP: PP5AMP)					
PU2MXU	"	5,590	108	16	27
PX5E	21	2,274,068	4223	40	154
(OP: PP5JR)					
PY2NY	14	1,042,440	2178	37	131
PP5AM	"	128,232	365	35	102
PP5BB	"	11,388	85	26	52
PT5W	7	190,400	733	26	74
(OP: PP5NW)					
*PY2TNT	A	695,537	1435	57	166
*PP2RON	"	300,655	768	43	114
*PY3FOX	"	201,344	577	52	91
*PY7EG	"	145,560	464	40	80
*PY2IQ	"	90,082	295	51	95
*PY5ZD	"	33,210	197	28	53
*PY2ZA	"	20,096	141	26	38
*PY3AJB	"	9,756	68	25	38
*PP5ZP	"	5,487	42	26	33
*PY2SRL	"	4,959	59	21	36
*PY2ZQ	"	1,713	50	12	20
*PT8CWA	"	1,064	41	16	22
*PY2CX	28	147,157	600	27	74
*PY2DY	"	145,950	593	25	80
*PY2SBY	"	139,770	609	23	67
*PY2MTV	"	57,525	415	21	44
*PY4ZE	"	46,866	296	22	51
*PY2HL	"	43,601	314	16	43
*PP5BZ	"	28,608	188	19	45
*PY2DXX	"	11,886	75	21	48
*PY2RML	"	7,400	110	13	27
*PY2SF	"	7,084	127	15	29
*PY2BT	"	2,142	71	9	12
*PY2VZ	"	2,128	72	10	18
*PV8TAK	"	1,248	36	9	15
*PY2RDZ	"	100	16	6	8
*PY2XAT	21	313,728	957	32	97
*ZV5E	"	269,468	1116	24	68
(OP: PP5KE)					
*PY2EJ	"	250,776	909	29	79
*PY2RDM	"	205,200	703	29	85
*PY3SGO	"	170,807	697	23	68
*ZY3Y	"	166,675	552	24	89
(OP: PY3FJ)					
*PY2APQ	"	31,564	189	22	49
*PS8FAL	"	9,715	124	10	19
*PT2ND	14	86,850	420	18	57
*PY2BRZ	"	68,850	370	22	53
*PY2ZR	"	33,698	237	16	42
*PS8ET	"	21,690	97	25	65
*PP5AR	"	18,426	164	28	55
*PY5DC	"	16,425	96	22	51
*PS8DX	"	12,980	97	17	42
*PV8ABC	"	660	17	8	14
*PS8SP	"	558	16	8	10
*PV8IG	7	37,944	235	15	57
*PY6KY	"	90	5	4	5
*PV8AZ	3.7	1,008	24	6	15
*PV8DX	1.8	1,276	27	6	16

CHILE

CE4PBB	A	1,272,815	1805	91	186
CE1L	"	1,252,783	1797	83	176
(OP: XQ1VLY)					
XR4B	21	37,553	331	13	31
*CA1RYJ	A	63,042	312	43	71
*XQ4ZW	28	15,895	133	17	38
*XQ5CIE	"	16,574	161	17	33
*CE1RQB	14	54,625	294	25	70

COLOMBIA

HK3AXY	A	97,528	255	51	116
*HK3JJH	A	2,793,392	2947	84	259
*HK3SVP	21	4,590	71	15	36
*HK3SGP	3.7	10,570	69	13	57

ECUADOR

HC1JP	3.7	45	3	2	3
*HC1JQ	21	1,015,653	2213	34	129

FRENCH GUIANA

*FY/F5IRO	A	95,784	393	34	70

SURINAME

PZ5RA	A	1,487,040	1698	79	241

TRINIDAD & TOBAGO

9Y4NZ	28	178,717	991	19	58
9Y4W	7	975,652	2294	30	119
(OP: 9Y4ZC)					
*9Y4LDK	14	81,258	534	17	41

URUGUAY

CX7TT	A	185,304	440	59	109
CX5BW	3.7	25,200	205	21	39
*CX2ABP	A	31,860	234	19	35
*CX1AV	28	144,000	725	20	60
*CX4DX	"	127,756	636	20	56
*CX9DX	"	63,375	534	20	55
*CX4ABO	"	51,678	362	14	40
*CX4AD	"	36,167	261	18	41
*CX7ACH	"	18,786	234	12	19
*CX9AU	14	125,064	449	29	79

VENEZUELA

YW5NN	21	369,035	1143	30	85
(OP: YV5NWG)					
4M5R	14	623,040	1992	30	88
(OP: YV5TVX)					
4M5DX	7	495,740	1561	30	110
(OP: YV5SSB)					
YV2IF	1.8	3,804	45	10	28
*YV5KAJ	A	12,760	115	42	68
*YY5JRU	"	2,890	67	15	19
*YV7QP	"	1,014	27	16	23
*YY5RED	28	8,208	174	12	15
*YV5YMA	14	347,508	1409	25	73

QRP

F5BEG	A	654,126	995	82	281
KO1H	"	649,399	735	80	257
KA1LMR	"	495,818	574	81	265
IK5RUN	"	427,440	581	94	296
DF1DX	"	328,750	636	60	203
JR4DAH	"	316,560	554	80	160
RV3QX	"	295,776	705	59	229
OK1VBA	"	263,948	535	71	231
RW3AI	"	263,625	677	57	228
RN6AL	"	230,914	626	54	209
HA1CW	"	220,745	619	53	212
UA9SG	"	220,420	459	49	157
EA1TI	"	204,856	496	51	181
K8ZT	"	193,048	335	61	175
LU1VK	"	189,552	449	61	115
PG2AA	"	188,265	563	55	176
UT2UZ	"	158,427	420	58	203
SP2DNI	"	131,646	483	50	172
DL1DQY	"	145,847	347	69	195
RA9UAD	"	123,409	458	40	103
UR5KHZ	"	122,428	337	60	181
YO8WW	"	115,713	438	51	156
N1TM	"	108,100	232	41	147
RX1CQ	"	98,736	410	46	158
SP5FKW	"	99,566	324	49	149
UA9LAU	"	87,756	247	35	107
MM3AWD	"	83,266	366	36	122
DF3AX	"	72,960	299	39	121

CT1ELF	"	72,240	257	40	128
EA2RW	"	71,991	230	52	119
IZ1ANK	"	66,868	538	57	172
EA2CAR	"	62,186	224	34	84
EA8IK	"	61,620	178	35	95
YO5OHY	"	61,202	289	40	102
RV6LA	"	53,856	229	41	103
YB5AQB	"	53,793	187	58	81
K3GM/1	"	50,700	144	43	107
RV3YR	"	50,283	203	35	76
OK1ES	"	42,470	222	31	124
JA2MWV	"	42,000	182	42	70
UX9ZA	"	37,118	233	30	104
DL2EF	"	34,047	248	28	69
DLØMFL	"	28,302	197	27	79
			(OP: DL2JRM)		
RW3VI	"	27,450	191	31	91
JL7XBN	"	27,300	134	37	54
VA3DF	"	23,030	96	24	70
YO4AAC	"	23,699	290	26	105
N8XA	"	21,137	94	49	64
VE3SMA	"	19,967	97	22	63
N3HU	"	17,679	85	20	63
PE2KP	"	17,195	141	28	67
UA3LMR	"	15,092	137	24	74
EA4CU	"	14,705	89	28	57
OO7CC	"	14,060	159	22	73
NE1RD	"	13,275	76	27	48
GM4HQF	"	12,760	110	18	40
US5IND	"	12,940	128	111	134
UA9BS	"	10,864	72	16	40
OK1SI	"	9,316	80	22	46
EA5GX	"	8,382	84	21	45
SM5XSH	"	7,904	94	18	58
TA2RX	"	7,540	61	16	42
USØYA	"	6,728	50	20	38
LA5WNA	"	6,384	112	14	43
KT8K	"	5,936	51	21	32
ES8SW	"	5,456	106	12	50
W4DEC	"	5,408	47	19	33
VA3RKM	"	4,559	56	21	26
KØCD/9	"	4,464	49	17	31
K9FOH	"	4,018	41	20	29
7K1CPT	"	3,675	53	15	20
US6IKF	"	3,698	40	15	35
AF4KL	"	3,135	45	19	36
SQ1K	"	2,640	52	12	21
W8VE	"	2,288	29	16	28
KIØOV	"	2,232	25	14	17
W1CEK	"	1,734	25	14	20
PA1W	"	1,596	51	11	27
W5FIO	"	1,512	20	10	17
W2JEK	"	1,523	25	13	22
RX6LDK	"	1,292	30	9	25
N2HTT	"	850	23	9	16
8P9AR	"	756	27	6	8
DL1ARJ	"	682	25	10	21
IV3/IK2AIT	"	300	21	8	17
MW3JNI	"	112	13	5	11
K9DXR	"	100	356	85	215
UA1CAK	"	36	3	3	3
LW3DC	28	28,539	222	20	43
LW1DRH	"	27,404	242	16	36
UT8QQ	"	11,008	140	15	49
4X6DK	"	9,761	110	9	24
EA7UU	"	7,497	94	12	37
JR3RWB	"	7,392	79	17	27
I5KAP	"	5,836	68	12	27
SP1RFC	"	3,927	69	9	24
YO5PCY	"	3,967	66	10	30
YO9BXC	"	3,276	62	12	27
UR5ZQV	"	660	29	6	16
WBØIWG/3	"	420	15	5	10
OE5ØWWL	"	72	13	4	5
			(OP: OE4WWL)		
RA9MU	"	54	4	2	4
UA3SAQ	21	102,476	455	34	103
JH7RTQ	"	80,784	321	31	77
RZ6HX	"	74,879	452	33	100
7K4QOK	"	41,572	222	24	52
HAØGK	"	35,757	231	25	62
YL2PP	"	28,576	183	20	56
F5ODA	"	28,196	208	20	56
JR1NKN	"	28,083	183	24	45
JH3DMQ	"	19,512	127	22	41
HA7MW	"	15,760	100	26	54
EA4DUT	"	10,752	107	15	41
WW4LL	"	8,288	61	17	39
IZ8EWD	"	7,536	97	13	35
WA6FGV	"	4,640	58	11	21
OK1AIJ	"	3,248	63	11	18
MWØCRI	"	3,104	76	9	23
JI8GZS/1	"	1,402	28	11	15
SP6DHD	"	1,236	18	14	15
JA1UCW	"	969	21	9	10
AI4G	"	24	3	2	2
IW1GIM	"	12	2	1	2
SP6T	14	107,502	463	31	107
SP3SLA	"	80,080	383	26	86
SM3C	"	64,660	403	23	83
			(OP: SM5CCT)		
K3TW	"	63,448	229	23	80
OM7DX	"	57,528	394	22	72
RW9QA	"	36,719	211	15	58
YT1CS	"	31,609	376	16	57
UA3DDA	"	29,414	301	20	57
SQ4LH	"	19,902	159	17	45
RK9AXX	"	17,500	160	8	42
			(OP: RA9AMN)		
VK2BAA	"	17,171	96	23	54
YZ2M	"	16,897	222	10	51
			(OP: YU1LM)		
JA4DQX	"	14,274	112	22	39
F5CYS	"	9,448	120	13	47
HA1ZV	"	7,535	116	13	42
RU4WE	"	6,118	105	9	37
YO4RLP	"	5,940	113	11	34
WA2ASQ	"	6,011	52	14	35
EW2WW	"	4,070	89	7	30
			(OP: EW2126)		
M3TBK	"	3,306	59	9	29
M5AAV	"	3,128	84	8	26
9A8MM	"	2,016	50	7	25
I5JHW	7	32,860	181	20	86
SP9W	"	29,580	210	19	83
SP4GFG	"	26,487	256	15	66
OL4W	"	17,360	213	11	59
			(OP: OK1IF)		
YZ8A	"	16,272	184	11	61
G4CWH	"	14,508	185	11	51
DK3W	"	9,610	134	10	52
			(OP: DL6MHW)		
SP5XSL	"	7,290	168	8	46
DL9SXX	"	5,916	83	10	48
WB7OCV/2	"	2,278	28	10	24
PY2VAI	"	800	27	10	15
SP5DDJ	"	575	27	4	21
OK1JOC	"	399	15	5	14
JK1TCV	"	6	1	1	1
LZ5T	3.7	24,090	324	10	63
			(OP: LZ3RR)		
ES1CW	"	17,360	265	11	51
DH8BQA	"	14,579	257	9	52
EA3CKX	"	9,163	152	7	42
SM3CCT	"	3,078	97	6	32
			(OP: SM5CCT)		
UN7CN	"	602	24	5	9
JE1LFX	"	468	18	9	9
SP2FNC	"	288	28	3	13
JA9XBW	"	19	3	3	3
KP4KE	1.8	37,345	364	13	42
S57MSU	"	15,147	301	6	45
SP6IHE	"	7,599	167	7	44
SP6M	"	3,344	87	4	34
EW2AA	"	3,168	86	5	31
US6IQE	"	3,283	105	6	31
DM7C	"	2,268	72	3	33
			(OP: DL7CX)		
K3BU	"	1,254	40	6	13
N7IR	"	90	7	5	4
RK9QWZ	"	42	5	4	3
			(OP: RW9QA)		

ASSISTED

NORTH AMERICA

UNITED STATES

K1AR	A	3,469,180	2247	133	439
N1DG	"	2,569,252	1489	132	491
N1IW	"	1,720,062	1312	109	368
N8RA/1	"	1,647,054	1222	103	383
K1BX	"	1,559,313	1206	99	368
WB1DX	"	1,409,484	1177	99	339
K2TE/1	"	1,119,380	1051	83	305
W1NR	"	1,069,818	819	109	365
KE1IH	"	985,338	878	90	336
W1NT	"	957,718	929	81	308
W1LLU	"	857,265	996	75	260
N1RK	"	795,491	754	84	299
W1EBI	"	680,742	717	78	276
K1QX	"	636,400	697	77	267
K1OA	"	592,662	678	62	247
W1QK	"	577,760	613	80	288
N1AU	"	447,426	511	72	246
K1RV	"	427,548	504	73	243
KX1X	"	375,084	482	68	234
K1AE	"	374,832	394	80	262
KV1J	"	305,942	417	71	216
W1CSM	"	220,825	312	59	216
W1UK	"	205,785	319	60	195
K1JN	"	164,220	260	60	178
K1KD	"	159,679	336	46	127
WB1EDI	"	128,128	224	55	169
N1MD	"	121,410	240	41	149
W1RM	"	119,782	200	58	163
K1NU	"	96,906	186	37	149
KB1JFG	"	78,416	226	44	125
AA1QD	"	69,378	142	52	134
KK1W	"	67,693	178	39	100
N1HTS	"	60,741	163	47	106
K1BG	"	51,352	148	30	101
NF1A	"	46,004	142	38	86
N1OZF	"	39,390	116	35	95
N1ICE	"	36,842	138	30	79
WA1ZYX	"	30,525	136	12	63
AA1V	"	11,644	63	27	55
W1MAT	"	11,388	63	28	50
NE1B	"	10,824	71	20	46
W2RE	A	4,013,064	2540	125	469
K2NG	"	3,853,056	2098	150	546
NA2U	"	1,826,190	1291	115	400
W1GD/2	"	1,791,180	1221	115	425
NO2R	"	1,771,000	1202	119	431
W2WB	"	1,694,292	1190	122	420
W2GDJ	"	1,189,664	991	103	349
W2LE	"	965,073	917	78	303
W2IRT	"	931,500	820	95	319
W2RD	"	899,988	768	108	336
N1EU/2	"	750,074	631	105	337
KF2O	"	738,036	571	112	382
N1JP/2	"	720,018	781	75	287
K2XF	"	707,924	698	89	297
W2YR	"	696,697	611	94	339
K2SX	"	673,808	738	78	290
N2UN	"	580,328	643	75	269
W2CG	"	564,466	666	69	253
K2EP	"	476,855	523	81	256
W2TV	"	475,401	555	71	250
KA2D	"	445,200	512	78	272
K2ONP	"	401,140	472	73	237
AB2E	"	297,190	420	68	195
KG2MY	"	291,082	426	69	193
K2SB	"	289,711	461	62	219
K2QMF	"	272,412	368	59	217
K2QM	"	258,856	378	68	194
WK2H	"	229,670	353	55	183
K2SQS	"	219,891	374	60	199
K2QPN	"	153,276	278	52	160
N2NI	"	130,020	252	49	148
N2FF	"	120,704	242	41	143
N2BC	"	114,816	230	46	162
W2RU	"	96,333	250	40	123
W2REH	"	74,630	172	45	125
KG2V	"	10,293	64	21	52
KS2G	21	47,223	179	21	78
WR2G	14	87,170	293	24	91
W2MF	1.8	15,120	109	13	50
K3WW	A	3,134,720	1847	131	509
NN3Q	"	2,202,680	1542	120	410
KQ3F	"	2,185,442	1539	117	401
AA3B	"	2,168,185	1420	115	436
N3ZA	"	1,351,228	945	115	412
K3MD	"	1,235,682	1110	104	363
W3GM	"	1,188,450	918	110	365
			(OP: K3ND)		
W3CC	"	1,109,952	830	108	384
N3MX	"	1,107,293	885	102	371
WA3C	"	837,612	756	97	342
K3SV	"	809,818	724	93	329
W3MR	"	796,572	736	93	313
W9GE/3	"	719,364	689	94	303
W3BG	"	703,640	739	84	275
W3GK	"	600,724	650	81	277
K3BZ	"	593,640	613	88	272
N3PV	"	538,356	601	82	266
W2UP/3	"	503,649	597	81	240
NY3C	"	495,194	571	76	250
W3OU	"	470,092	547	74	252
K1RH/3	"	469,270	520	76	258
WW3S	"	408,870	470	75	240
W4ZE/3	"	394,085	510	69	224
WA3RHW	"	346,060	498	60	200
N3AM	"	315,500	474	54	196
N3GNW	"	235,560	375	62	198
N3KN	"	205,084	321	53	183
WA3G	"	134,792	293	52	151
W4EE/3	"	133,985	265	51	160
K3ATO	"	131,868	271	71	151
NS3T	"	62,986	196	50	104
NE3H	"	37,674	114	41	97
KI3G	"	30,840	121	34	86
WR3L	21	128,655	365	28	107
K3WC	14	203,056	504	31	117
K5KG/4	A	2,553,904	1830	123	419
W4WTB	"	2,066,128	1564	116	375
AD4EB	"	1,581,510	1414	108	335
N4WW	"	1,519,156	1005	135	452
N4NW	"	1,179,789	881	124	413
K1GU/4	"	1,038,700	913	105	320
N4KG	"	1,034,484	856	106	355
W3OA/4	"	876,129	797	99	320
K4HR	"	828,165	786	98	305
W3YY/4	"	648,711	539	117	324
N4LR	"	586,187	633	75	268
W9WI/4	"	499,041	612	78	225
K3KO/4	"	454,194	490	78	273
K4YKZ	"	375,518	517	68	218
K4VV	"	335,546	475	65	213
W4/KP4TR	"	313,584	428	75	207
K1PT/4	"	298,144	367	77	231
N4VA	"	326,459	455	77	218
N4VV	"	285,956	408	69	199
W4UNP	"	264,228	365	87	204
K4FPF	"	255,723	402	55	182
K4SAV	"	233,232	409	53	173
N4HH	"	225,398	357	57	194
K4RO	"	210,944	341	79	177
K8YC/4	"	179,994	286	61	201
K2PT/4	"	171,355	346	53	162
N2NQ/4	"	147,459	288	59	140
W4FDA	"	125,130	250	52	142
N4TL	"	117,130	253	40	130
K2SD/4	"	114,149	277	40	121
N4DWK	"	111,720	189	67	161
N4AWU	"	103,488	214	54	142
N4HN	"	94,320	200	49	131
W4JAM	"	90,216	209	51	128
KN4Q	"	80,896	214	45	113
K4CZ	"	73,392	204	41	98
WD4LBR	"	52,052	145	51	103
K4NAU	"	36,295	147	36	83
WA2MBP/4	"	25,756	110	27	67
N4XMX	"	24,990	100	36	66
W4MEL	"	19,068	94	22	62
K4WNW	"	16,008	76	31	61
W4DR	"	17,711	110	19	68
W4ATL	"	10,540	65	21	41
W4DKB	"	2,356	25	15	23
N4CC	7	106,110	284	32	103
W3BP/4	"	92,235	278	28	101
WA1FCN/4	"	30,225	141	25	68
WØPV/4	3.7	6,300	52	9	36
W5GN	A	1,405,464	1194	108	363
WØVX/5	"	752,950	762	90	280
N5JR	"	677,805	679	86	279
KM5VI	"	620,940	647	96	297
W6TER/5	"	498,780	595	85	241
N5KDV	"	381,435	532	70	225
W5ZO	"	315,744	422	92	220
W3TZ/5	"	283,331	409	75	218
K5NZ	"	224,224	452	51	145
KE5BL	"	114,208	272	44	122
K5RKS	"	52,910	202	41	89
N5IET	"	14,720	132	43	72
W5GA	"	13,299	78	35	58
N5EPA	"	4,371	33	18	29
W5TAF	"	2,583	30	17	24
K5AM	14	25,252	111	23	84
N5JB	7	77,364	253	28	98
W6YI	A	2,091,712	1797	126	322
W6TK	"	756,679	857	100	241
K6TA	"	602,688	658	104	240
K6RIM	"	528,751	630	91	232
W6FRH	"	357,512	530	85	183
WA5VGI/6	"	354,926	559	65	156
N6VH	"	228,360	385	66	154
K6III	"	97,110	241	63	103
W6SZG	"	75,082	179	54	119
N6AJR	"	58,320	205	58	77
N6SF	"	57,280	205	58	102
W6BBL	"	38,913	139	38	81
NZ6L	"	30,174	148	44	63
N6OU	"	28,272	119	33	60
N6AN	"	27,864	97	42	66
ND6S	"	14,784	84	36	52
NU6T	"	11,991	75	29	38
K6OWL	"	9,112	53	21	46
NC6P	"	1,776	52	18	19
W6RKC	21	55,264	232	26	62
K6IPV	"	38,298	190	24	54
AD6WL	"	532	12	8	11
N3LQ/6	"	252	17	3	3
W7GG	A	1,313,169	1244	122	307
W7ZR	"	608,656	693	101	248
WU9B/7	"	237,237	416	65	166
W7YED	"	223,385	421	63	152
KN5H/7	"	193,815	332	72	147
WA1PMA/7	"	184,128	317	60	164
NJ7I	"	121,924	288	53	110
K7VIT	"	121,409	282	60	107
W6SA/7	"	85,870	235	55	100
N7MBL	"	24,624	98	38	70
AK7AT	"	23,068	108	32	47
WA7RR	"	18,788	91	31	46
W7WHY	"	13,392	88	28	34
N7NJO	"	11,154	93	26	40
N7BV	21	115,974	495	28	74
W3ZZX/7	"	34,170	148	20	65
W7VV	14	45,017	159	26	83
N8TR	A	1,970,929	1213	135	472
N8BJQ	"	1,368,450	1118	111	339
N8BI	"	790,748	696	99	335
AJ1M/8	"	610,032	664	81	277
W8JY	"	565,480	641	80	255
K3WA/8	"	395,136	484	83	253
N8TDL	"	360,112	495	71	213
W7JW/8	"	116,963	253	58	159
K8GT	"	97,734	215	60	122
W8TN	"	68,250	148	53	122
K6VWE/8	"	36,252	127	27	79
KD8BIZ	"	30,765	126	28	77
N4ZR/8	"	14,688	75	17	55
W8UM	"	4,902	46	18	39
			(OP: KG6URI)		
WBØWAO/8	"	2,160	33	14	26
KF9YR	A	523,143	598	77	256
N9ZM	"	501,149	575	80	239
K9UQN	"	220,420	403	52	154
W9GIG	"	134,375	239	56	159
W9COD	"	90,654	234	53	121
KC9ECI	"	55,341	171	44	99
KD9AC	"	41,674	139	42	92
W9QL	"	35,409	142	32	79
KB9KEG	"	33,887	136	31	72
NC9I	"	22,351	98	37	66
WT9U	"	21,138	111	22	56
K9OSH	"	10,152	62	26	46
KM9M	"	7,475	57	23	42
N9GGO	"	2,318	33	14	24
W9IND	3.7	25,092	135	20	62
NØAT	A	818,296	713	105	334
KØKT	"	375,081	460	92	245
KØOU	"	311,740	480	72	188
KØOB	"	268,136	411	55	187
KØCS	"	146,232	278	64	152
WØMJN	"	131,937	293	53	146
KØKX	"	100,655	183	70	135
KCØDEB	"	83,080	207	46	109
K4IU/Ø	"	73,440	195	47	113
NØIM	"	54,349	167	43	96
KØBX	"	42,372	125	46	86
KSØT	"	34,680	134	40	80
KØAD	"	24,276	98	32	70
KCØRET	"	1,152	20	9	15
KVØQ	1.8	6,579	102	13	30

ALASKA

AL9A	A	626,280	1294	68	136
KL7FH	"	1,701	34	13	14

BERMUDA

VP9I	A	3,054,180	3133	98	338
			(OP: K1XM)		

CANADA

VO1MP	A	3,649,805	2773	101	414
VE1OP	"	1,468,422	1480	81	302
VE3/W1AJT	"	945,206	977	87	307
VE9NC	"	246,522	415	51	176
VE9FX	"	202,055	349	58	193
VE7ABC	"	191,770	550	50	101
VE3WO	"	173,595	358	58	155
VE1XYZ	"	135,378	424	36	102
VE6AVR	"	110,448	311	54	102
VE2TZT	"	104,384	194	62	162
VE7IO	"	49,617	252	45	66
VE3EY	"	43,318	144	31	90
VE1RAR	"	19,804	110	19	61
VE5MX	"	3,060	33	19	26
VE7KET	14	43,414	205	29	69

MARTINIQUE

FM5BH	A	5,925,228	5219	120	396
			(OP: F6HLC)		

MEXICO

XE2AC	A	1,283,590	1485	98	287
XE1MEX	"	127,866	238	57	154
XE1CWJ	21	188,998	945	28	78

AFRICA

AFRICAN ITALY

IH9GPI	7	48,216	203	16	68

CANARY ISLANDS

EA8/DL5AXX	A	407,925	669	66	159
EA8URL	21	668,928	1570	34	122
(OP: EC8AUA)					

ASIA

ASIATIC RUSSIA

RG9A	A	4,776,046	2682	141	541
			(OP: UA9AM)		
RM9RZ	"	78,064	236	48	116
RN9XA	"	48,262	163	33	85
RW9MD	"	27,140	93	45	73
UA9XLC	28	3,795	50	10	23
UA9YAB	21	696,647	1900	34	127
UAØSE	A	344,862	718	58	149
RAØAM	21	24,096	154	22	74

ASIATIC TURKEY

TA2MW	3.7	11,904	131	10	38

JAPAN

JF2SKV	A	913,647	1203	103	210
JE1OHL	"	607,050	706	109	233
JA3PYC	"	199,585	377	77	146
JS1KOQ	"	120,508	256	65	123
JG7AMD	"	38,734	135	44	63
JAØCRI	"	28,224	115	44	68
JR1BAS	"	22,504	86	44	53
JI1ALP	"	21,736	117	35	41
JG2REJ	"	14,720	84	24	48
JH4UTP	28	35,920	252	24	56
JA1PCY	21	268,488	783	35	97
JH9KVF	"	197,679	602	35	96
JH9JJD	"	4,838	47	14	27
JO7KMB	7	15,142	95	24	43
JAØFVU	3.7	340	12	8	9

KAZAKHSTAN

UP4L	14	600,440	1375	37	133
			(OP: UN7LZ)		

KYRGYZSTAN

EXØM	A	3,175,396	3294	102	374

TAJIKISTAN

EY8CQ	21	95,337	446	28	79

THAILAND

HS1PDY	A	58,896	209	52	92

UNITED ARAB EMIRATES

A61AR	7	337,485	1076	32	119
			(OP: RV6LNA)		

EUROPE

AUSTRIA

OE2S	A	1,342,705	1600	105	350
			(OP: OE2LCM)		
OE5ØV	28	78,100	496	27	83
			(OP: OE6VHF)		

BELARUS

EU1AZ	3.7	106,040	1102	15	73

BELGIUM

ON6LR	A	101,928	258	64	122
ON4WW	1.8	141,120	1192	17	81

CROATIA

9A5ZP	A	65,312	282	52	156
9A2U	28	22,572	167	19	57
			(OP: 9A3ZA)		
9A5E	14	770,526	2409	37	134
9A3AG	3.7	92,400	984	17	71

CZECH REPUBLIC

OK2ZC	A	657,720	918	90	330
OK1UU	"	209,670	601	55	186
OK2ZJ	28	3,230	47	11	27
OK1DVM	21	358,176	987	38	126
OK2EQ	"	90,174	351	29	85
OK1DG	14	169,912	694	29	105
OK1TP	1.8	45,023	632	10	65

DENMARK

OZ5E	28	17,301	133	23	56
			(OP: OZ1XJ)		
OZ1ADL	7	309,048	1324	36	127

ENGLAND

GØTSM	A	450,072	698	77	265
MØBLF	"	70,356	320	37	127
GØPHY	"	10,696	69	32	45
G3UHU	21	18,792	128	23	58
G3YYD	7	69,892	659	19	82
MØMCX	"	24,140	378	11	60

ESTONIA

ES5RY	A	1,210,302	1379	114	444
ES5MG	21	84,185	331	35	114
ES5RW	14	847,670	2341	38	147
ES7GM	7	74,366	675	18	85
ES5QX	1.8	13,720	227	8	48

EUROPEAN RUSSIA

RK4FD	A	4,197,388	4171	149	540
RN3QO	"	3,119,616	2742	143	534
RX4HZ	"	2,979,720	2778	148	564
RA3DNC	"	792,180	1237	90	315
RN4WA	"	735,616	1152	92	356
RU6YY	"	471,450	544	94	355
UA3AGW	"	461,825	596	103	274
UA4LU	"	376,689	721	74	233
RZ3DH	"	110,930	378	49	330
RZ6HF	"	43,851	178	48	93
RA3CO	"	25,984	114	41	71
UA4HQS	"	17,658	140	19	62
RZ3FR	"	552	19	10	13
RC4Q	28	115,805	837	22	93
			(OP: UA4RC)		
UA3BS	21	374,352	1391	38	138
RU6LA	14	767,464	2362	39	155
RA3CW/3	"	548,504	1750	37	147
RW4PL	3.7	102,796	623	28	96

FINLAND

OH6NIO	A	2,127,987	1551	122	481
OH6DX	"	223,850	494	74	201
OH1MM	"	113,487	286	52	157
OH6NJ	21	262,596	905	37	121
OH5B	14	943,428	2789	37	137
			(OP: OH5BM)		
OH4MDY	"	416,888	1700	34	130
OH2BPF	"	329	11	9	9
OH3BU	3.7	30,118	335	12	62
OH2BO	1.8	22,703	260	12	61

FRANCE

TM7F	A	3,610,978	3048	116	402
			(OP: F6GYT)		
F6BNH	"	346,652	556	78	238
F1JKJ	"	326,906	744	62	236
F5IN	"	147,568	372	55	129
F5NZO	"	145,512	397	57	131
F5PHW	"	89,496	273	55	143
F6KCP	14	164,781	573	32	121
			(OP: F5VHN)		
F1EBN	7	21,402	169	14	68

GERMANY

DRØW	A	4,080,231	3350	143	526
			(OP: DJ5MW)		
DJ2YA	"	2,706,052	1970	130	498
DL5AWI	"	2,037,110	1893	117	404
DL2CC	"	1,542,597	1288	109	384
DP9N	"	1,504,190	1675	101	330
			(OP: DL9NDS)		
DF6QV	"	1,069,224	1193	97	350
DL4R	"	709,080	886	103	353
			(OP: DL4RCK)		
DL2OBO	"	648,582	974	91	250
DL7ON	"	608,388	710	111	308
DF6QN	"	581,544	808	82	312
DLØWW	"	555,103	735	96	293
DM5T	"	491,904	812	76	290
			(OP: DHØGHU)		
DJ3WE	"	379,400	799	71	279
DJ4PI	"	293,646	404	93	234
DL2UH	"	262,440	569	67	257
DF2UU	"	253,377	370	79	344
DL1RG	"	219,240	436	62	199
DF6JC	"	216,495	348	76	207
DF5ZV	"	197,400	439	63	219
DL8AAM	"	194,525	551	50	201

DF2RG	*	181,944	356	63	165
DR5X	*	95,266	332	48	170
			(OP: DL8LAS)		
DK2ZZ	*	30,250	124	39	82
DL8WX	*	29,748	112	45	66
DK6RS	*	29,155	142	38	81
DL1DBR	*	24,192	163	29	79
DK4VY	*	11,703	99	27	56
DG7RO	*	7,684	46	28	40
DL2DYL	*	6,741	62	23	40
DL1LH	**28**	**18,620**	**158**	**17**	**53**
DQ4Q	**21**	**702,720**	**1720**	**38**	**145**
			(OP: DF9ZP)		
DQ5A	*	135,783	431	34	107
(OP: DL4SDW)					
DK1MAX	**14**	**338,400**	**884**	**37**	**143**
DL2DBH	*	329,508	1106	35	127
DAØI	*	210,144	869	33	99
			(OP: DK1II)		
DJ2RG	*	7,560	194	21	51
DJ8QP	**7**	**43,512**	**241**	**21**	**90**

GREECE

SV1DPI	**A**	**1,380,197**	**1724**	**113**	**410**

HUNGARY

HG3M	**A**	**2,868,222**	**3106**	**137**	**521**
			(OP: HA3MY)		
HAØHW	*	177,840	574	55	173
HA1ZN	**14**	**138,621**	**833**	**28**	**95**
HA5BSW	**1.8**	**11,658**	**303**	**9**	**49**

ICELAND

TF/NØHJZ	**A**	**1,938,762**	**3454**	**73**	**249**

ITALY

IU1B	**A**	**1,319,200**	**1577**	**113**	**372**
			(OP: IK1HJS)		
IK2EGL	*	**1,128,210**	**1206**	**104**	**351**
IK2TDM	*	439,095	686	84	281
IKØYUT	*	14,162	105	23	50
IR8M	**28**	**29,403**	**278**	**19**	**62**
			(OP: IZ8CCW)		
IBLYO	**21**	**97,409**	**412**	**30**	**97**
IU3A	**14**	**745,590**	**2118**	**36**	**138**
			(OP: IV3HAX)		
IR3Z	*	145,928	572	34	114
			(OP: IN3XUG)		
IZ1DGG	*	51,779	410	20	71
II3G	*	51,040	275	25	85
			(OP: IV3RJT)		
IC8C	**3.7**	**54,913**	**571**	**16**	**73**
			(OP: IC8JAH)		

LATVIA

YL7A	**A**	**2,644,289**	**2447**	**140**	**507**
			(OP: YL2GM)		
YL7X	**7**	**92,220**	**791**	**19**	**87**
			(OP: YL2LY)		

LITHUANIA

LY3BH	**A**	**104,043**	**268**	**64**	**173**
LY8O	**21**	**342,468**	**1088**	**36**	**126**
			(OP: LY2MW)		
LY7M	**1.8**	**30,520**	**418**	**11**	**59**
			(OP: LY2BW)		

LUXEMBOURG

LX7I	**A**	**4,296,919**	**3127**	**141**	**536**
			(OP: LX2AJ)		
LX/ON4ACA	*	301,716	1088	62	227

MACEDONIA

Z33F	**14**	**404,000**	**2013**	**34**	**126**

NETHERLANDS

PAØABM	**A**	**684,020**	**862**	**100**	**360**
PA4A	*	437,346	831	81	270
PG3N	*	204,104	695	51	197
PA3C	*	109,032	243	67	197
PE1FTV	*	24,864	179	29	82
PA3EWP	**7**	**320,800**	**1241**	**34**	**126**
PC2T	**3.7**	**66,750**	**735**	**14**	**75**
PA2R	*	53,508	449	18	80
PA3GCV	**1.8**	**118,624**	**1200**	**17**	**71**
PA5A	*	23,249	363	10	57

NORTHERN IRELAND

GIØVTS	**A**	**21,489**	**124**	**27**	**60**

POLAND

SN7V	**A**	**2,749,626**	**2338**	**137**	**457**
			(OP: SP7VC)		
SQ9IDE	*	601,312	1176	74	270
SP8TJU	*	427,548	857	73	243
SP5KEH	*	399,398	951	68	221
			(OP: SP5JTF)		
SQ8FEW	*	244,065	657	60	205
SP3HRN	*	130,417	444	65	152
SP8QED	*	3,567	35	18	23
SP3GXH	**21**	**165,669**	**506**	**36**	**111**
SP8BRQ	**3.7**	**297,704**	**1558**	**30**	**106**
SO9O	*	102,660	1128	16	71
			(OP: SP9P)		

PORTUGAL

CT1IUA	**A**	**313,110**	**658**	**70**	**224**

ROMANIA

YR9P	**A**	**3,404,606**	**3307**	**135**	**482**
			(OP: YO9HP)		
YO2LYN	**28**	**6,109**	**116**	**11**	**30**
YO3JW	*	3,978	97	11	28
YO3RU	**21**	**44,161**	**296**	**22**	**57**

SICILY

IT9STX	**14**	**382,228**	**1534**	**32**	**114**

SLOVAK REPUBLIC

OM7PY	**A**	**203,962**	**497**	**62**	**192**
OMØM	**14**	**624,138**	**1934**	**38**	**136**
			(OP: OM3CGN)		

SLOVENIA

S51DX	**A**	**56,420**	**255**	**39**	**116**
S52ZW	**21**	**756,096**	**1889**	**37**	**142**
S56X	**7**	**274,274**	**1365**	**31**	**112**
S58M	*	232,738	1200	33	116
				(OP: S58P)	
S57M	**1.8**	**118,487**	**1252**	**13**	**74**

SPAIN

EA7RU	**A**	**2,239,182**	**2035**	**106**	**420**
EA3AKY	*	**1,052,410**	**1489**	**87**	**295**
EA2AYD	*	971,348	1009	99	353
EA3QA	*	812,988	1538	85	311
EA5YJ	*	680,040	1351	73	287
EA1UU	*	352,534	611	75	263
EA5FID	*	340,275	491	82	243
EA3KU	*	181,792	509	50	102
EA4DEC	*	55,815	169	59	124
EA3BHK	*	5,508	51	22	32
EA1BFZ	**28**	**34,880**	**290**	**20**	**60**
EA1ACP	**21**	**227,910**	**696**	**34**	**108**
EC3AJU	*	44,688	426	21	63
EA1DAX	**14**	**9,295**	**93**	**14**	**41**
EA7VG	**7**	**178,080**	**1029**	**23**	**89**
			(OP: EA7JB)		

SWEDEN

SM6WET	**A**	**5,382**	**57**	**23**	**46**
SMØOGQ	**28**	**648**	**25**	**6**	**12**
8SØF	**21**	**15,067**	**141**	**15**	**46**
			(OP: SMØOGQ)		
SM4F	**14**	**66,599**	**380**	**23**	**86**
			(OP: SM4DHF)		
SAØQ	*	22,010	262	14	57
			(OP: SMØOGQ)		

SWITZERLAND

HB9FBS	**3.7**	**40,320**	**566**	**10**	**60**

UKRAINE

UW8M	**A**	**3,310,560**	**3702**	**138**	**489**
			(OP: URSMID)		
UV8M	**14**	**440,100**	**1920**	**37**	**125**
			(OP: UX3MR)		
EM2U	**3.7**	**120,666**	**1080**	**20**	**82**
			(OP: UY2UA)		

WALES

MW5HOC	**7**	**24,455**	**307**	**11**	**56**

YUGOSLAVIA

YU9VK	**A**	**186,318**	**510**	**55**	**143**
YZ1V	**14**	**94,501**	**700**	**24**	**97**
			(OP: YZ1ZV)		
YTØT	**3.7**	**189,952**	**1394**	**22**	**90**
			(OP: YU1EA)		

OCEANIA

AUSTRALIA

VK1AA	**14**	**535,248**	**1213**	**37**	**131**
VK6DU	7	14,805	128	24	39

EAST MALAYSIA

9M6DXX	**14**	**600,300**	**1615**	**35**	**103**

GUAM

KG6DX	**21**	**558,159**	**1400**	**38**	**109**

HAWAII

AH6NF	**21**	**311,100**	**1285**	**29**	**56**
AH6RF	**7**	**91,104**	**343**	**32**	**64**

INDONESIA

YBØ/HA2VR	21	5,400	42	18	32

NEW ZEALAND

ZL1ANH	**A**	**206,850**	**440**	**71**	**126**
ZL3TE	**21**	**188,832**	**706**	**31**	**65**
			(OP: W3SE)		

SOUTH AMERICA

ARGENTINA

LR1F	**A**	**1,224,219**	**1674**	**78**	**191**
			(OP: LU5FD)		
LQ5H	**14**	**274,365**	**1022**	**26**	**91**
			(OP: LU3HS)		

BRAZIL

ZX2B	**A**	**4,943,323**	**3677**	**114**	**359**
			(OP: PY2MNL)		
PR7AB	*	803,640	1477	64	158
PY5TJ	28	6,900	78	16	30
PY2XC	*	5,365	93	13	24
PP5FMM	*	792	20	8	14
PY1KN	**21**	**750,126**	**1642**	**37**	**126**
PY2LTY	*	136,818	550	25	74
PR7AR	14	9,932	100	19	33
PX8C	**7**	**344,890**	**977**	**28**	**102**
			(OP: PY8AZT)		
PY1NB	*	31,562	150	21	65

CHILE

CE3BFZ	**A**	**1,876,800**	**2026**	**117**	**228**

URUGUAY

CX6VM	**A**	**940,215**	**1234**	**79**	**206**

MULTI-OPERATOR
SINGLE TRANSMITTER

NORTH AMERICA

UNITED STATES

W3UA/1	**3,094,456**	**2428**	**113**	**390**
K1LZ	**2,713,272**	**2018**	**115**	**409**
N1MM	2,369,082	1627	117	425
NY1Q	1,560,716	1326	110	372
N1RY	1,009,830	947	88	322
W1MX	280,225	422	71	204
K1KI	129,108	250	64	148
NN2W	**2,121,613**	**1595**	**123**	**434**
W2XL	848,115	785	92	309
N2LBR	695,450	730	75	275
N2CW	399,398	541	72	217
N2KPB	353,562	627	80	283
K2UG	312,194	505	69	209
N2BZP	78,936	210	32	124
K3000	**2,981,628**	**1963**	**138**	**468**
NE3F	**2,722,737**	**1891**	**138**	**461**
W3MF	2,425,764	1587	119	445
N3BNA	629,964	541	114	399
W3LJ	207,152	344	61	181
W3ZGD	131,220	282	66	177
WB3CJU	63,560	191	36	104
K3QQ	31,416	124	45	87
K3EST/4	**3,431,878**	**2582**	**129**	**418**
W4WS	**3,070,730**	**2054**	**134**	**464**
K4JNY	2,394,000	1776	132	428
W3GQ/4	1,690,080	1268	113	390
W4IW	673,104	734	85	294
K4RY	28,288	134	33	71
K5TR	**3,193,918**	**2234**	**147**	**490**
K5YA	**1,500,920**	**1263**	**113**	**365**
K5FD	1,387,992	1230	114	339
W5GM	468,270	602	84	246
W5LCC	115,818	299	64	135
WE6DX	**645,456**	**1115**	**86**	**186**
N6KI	294,764	596	80	156
W6NL	186,468	445	62	102
AE6VW	2,886	37	17	22
WA7LT	**1,136,520**	**1193**	**114**	**296**
NI7T	**892,674**	**1037**	**104**	**262**
K6KR/7	739,532	942	90	203
N7YX	533,104	679	87	199
WX7P	223,254	547	52	105
WF7I	35,640	197	42	68
W6JA/7	9,211	73	24	37
K8AZ	**4,170,038**	**2449**	**148**	**526**
KC8IMB	166,413	309	61	160
N8HKI	30,848	163	40	88
W8VM	6,328	53	21	35
WN9O	**1,669,735**	**1211**	**124**	**411**
KD9ST	1,391,205	1117	122	367
W89AYW	41,022	165	39	90
KØRF	**3,255,548**	**2234**	**148**	**474**
NØNI	**2,419,984**	**1916**	**129**	**445**
NØSTL	998,452	983	107	315
KØUE	305,545	464	78	187
KØRAY	67,348	187	42	107
KØSV	32,856	121	40	71

CANADA

VA3SK	**4,258,518**	**3238**	**126**	**445**
VC6R	**3,094,416**	**3089**	**123**	**341**
VE7GL	**2,771,266**	**2974**	**117**	**302**
VY2TT	**1,604,805**	**1601**	**88**	**327**
VA2ZM	1,246,510	1560	66	244
VE6AO	632,362	1339	76	157
VE2CQ	415,773	624	62	199
VO1HE	375,578	531	68	210
VA2TG	292,945	650	45	160
VA3MAH	244,188	445	60	178
VE7DGO	128,440	378	55	114
VA7MAR	71,614	308	46	76
VE7NA	47,088	199	42	67

COSTA RICA

TI8M	**451,764**	**1278**	**76**	**112**

DOMINICA

J7DM	**6,335,254**	**5734**	**112**	**367**

PUERTO RICO

KP4US	**317,034**	**1300**	**53**	**109**

ST. KITTS & NEVIS

V47NS	**1,227,424**	**1461**	**81**	**271**

SAINT MARTIN

FS/AA4V	**1,314,378**	**2964**	**78**	**156**

AFRICA

AFRICAN ITALY

IG9R	**6,817,490**	**3915**	**135**	**538**

CANARY ISLANDS

EA8ZS	**5,515,396**	**3740**	**129**	**460**

GHANA

9G5A	**5,127,664**	**4189**	**109**	**355**

TUNISIA

3V8SF	**476,470**	**708**	**54**	**211**

ASIA

ASIATIC RUSSIA

RK9CWW	**5,421,528**	**3102**	**134**	**517**
RN9SXX	**2,658,904**	**2541**	**95**	**329**
UA9UZZ	1,564,456	2090	88	246
RZ9UWZ	524,640	931	58	182
RZ9WXK	480,207	734	54	219
RZ9AWJ	358,720	677	62	174
RK9XXX	274,560	531	54	166
RK9CYQ	104,994	366	26	88
RK9AWN	49,005	191	29	70

AZERBAIJAN

4K7Z	**2,240,865**	**2192**	**90**	**315**

CAMBODIA

XU7TAS	**436,540**	**1094**	**80**	**180**

CHINA

BG7JEZ	100	12	7	8

ISRAEL

4X1DX	**5,719,500**	**3782**	**120**	**438**
4XØWV	1,809,952	2138	75	251

JAPAN

JA7YAA	**3,028,314**	**2216**	**148**	**386**
JI2ZJS	**2,527,260**	**2320**	**126**	**312**
JM1LPN	**2,467,108**	**2071**	**134**	**342**
JA8RWU	**2,312,388**	**1867**	**134**	**352**
JI2ZEY	1,324,848	1648	102	234
JA2ZJW	325,134	544	79	164
JO1ZYI	202,714	601	52	106
JA1YAI	6	1	1	1

KAZAKHSTAN

UP9L	**1,919,316**	**1772**	**103**	**335**

KUWAIT

9K2HN	**6,565,209**	**4198**	**132**	**465**

MONGOLIA

JT1JA	**1,478,652**	**2525**	**99**	**249**
JT1KAI	247,500	1265	54	96

THAILAND

HSØAR	**780,160**	**1119**	**106**	**262**

EUROPE

ALAND ISLANDS

OHØZ	**5,744,928**	**4483**	**147**	**574**

AUSTRIA

OE9XRV	**1,160,097**	**1982**	**83**	**308**
OE7B	238,560	803	46	194

BELGIUM

OT5L	**5,175,184**	**3754**	**140**	**516**
OT5G	**3,546,443**	**2838**	**141**	**512**
OT5W	344,160	767	63	225
OR5N	186,396	988	22	76
ON4OSA	162,877	469	45	142

CRETE

J49Z	**5,343,254**	**5138**	**143**	**543**

CROATIA

9A1P	**7,982,590**	**4911**	**166**	**604**
9A5D	1,572,940	2423	101	329
9AØR	114,842	383	48	134
9A7P	100,068	371	40	146

CZECH REPUBLIC

OK5W	**6,973,560**	**4411**	**168**	**624**
OL7R	**4,910,051**	**3809**	**155**	**564**
OL5Q	2,218,155	2575	126	417
OL1X	2,101,818	2058	120	417
OK1OUE	361,641	973	79	278
OL1B	357,568	693	72	230
OK1KDO	354,423	728	72	237
OL7C	213,776	637	56	192
OL2U	41,020	242	31	109
OL5DX	1,378	24	15	21

DENMARK

OZ5ESB	**939,784**	**1508**	**75**	**241**
OZ3RIN	219,456	593	69	219

ENGLAND

G5W	**7,266,795**	**4893**	**143**	**574**
G6PZ	**5,264,742**	**3862**	**143**	**578**
M1P	1,478,304	1419	110	362
M4A	1,456,832	1874	96	316
G3B	1,443,644	1933	93	335
M2W	1,077,321	1579	89	338
M5ARC	896,448	1662	84	284
M2H	716,040	1258	64	242
M4U	501,325	1043	58	217
G3UEG	352,314	654	78	255
G1T	292,140	748	60	210
GØKRS	61,460	283	38	102

EUROPEAN RUSSIA

RL3A	**5,996,890**	**4685**	**161**	**629**
R3R	**4,505,946**	**3907**	**147**	**580**
RZ6AZZ	**4,359,628**	**3658**	**163**	**604**
RW4LYL	**4,054,584**	**3618**	**146**	**555**
RF3A	2,631,132	3169	129	507
UA3R	2,451,912	2962	120	446
RK3DZB	2,110,040	2519	113	422
RZ4CWW	1,582,530	2013	112	423
RK4WWA	1,020,915	1909	93	348
RZ4HZW	658,374	1468	86	308
RK3AWK	246,744	774	58	240
RK3SWB	183,183	447	60	213
RK4CYW	105,690	341	53	142
RU3EJ	67,893	195	54	129
RK3WWA	8,772	197	36	93
RK3PWJ	6,935	79	23	50

FINLAND

OH6XX	**2,835,152**	**2909**	**133**	**499**
OH3TR	152,382	475	56	177

FRANCE

TM2Y	**6,596,676**	**4597**	**149**	**564**
TM2T	**4,613,126**	**3864**	**145**	**534**
F6KHM	3,677,808	3004	116	463
F8KGM	1,122,680	1427	119	389
F8KHF	879,529	1563	89	300
F6KFI	367,731	745	65	208
F5KDQ	357,678	615	77	202
F5KEE	310,994	794	65	197
F8KGH	246,246	749	56	217
F6KFA	61,824	283	41	87

GERMANY

DL2ARD	**5,842,746**	**4179**	**146**	**556**
DA3X	1,803,758	1837	104	399
DP6A	1,747,008	1610	127	449
DAØCA	1,167,010	2385	90	292
DL4GBA	758,142	989	100	362
DD4B	714,816	1082	92	316
DL1RYD	652,383	1019	91	328
DKØALK	403,929	715	77	256
DLØGL	281,600	724	66	209
DFØRW	216,972	692	58	188
DKØFR	212,949	492	64	175
DLØHCC	164,268	453	58	176
DKØIA	129,355	332	57	148
DLØBIB	26,535	219	47	98

HUNGARY

HA8BIARU	**3,880,890**	**3626**	**134**	**451**

ICELAND

TF3W	**548,826**	**1680**	**58**	**188**

IRELAND

EI7M	**8,125,830**	**6277**	**139**	**539**
EI9E	1,130,936	1515	81	298

ISLE OF MAN

GD6IA	**2,705,850**	**3096**	**98**	**352**

ITALY

IU2R	**4,298,704**	**3392**	**142**	**550**
IR2C	**3,250,044**	**3017**	**122**	**445**
IO4T	2,693,592	2459	132	495
IQ5LV	2,360,592	2576	120	387
IQ1SM	894,976	1467	92	345
IK6JNH	665,878	965	107	339
IR3J	629,724	1281	76	215
IW3IE	513,857	1080	81	236
IQ2GM	73,917	287	52	139
IK8MIG	24,840	137	28	64
IW4DUV	4,891	57	26	41

JERSEY

GJ2A	**691,542**	**995**	**81**	**292**

LATVIA

YL1XN	**236,944**	**794**	**52**	**199**

LITHUANIA

LY3TL	9,768	112	25	63

MOLDOVA

ER3R	**1,927,583**	**2620**	**105**	**404**

NETHERLANDS

PA7MM	**3,848,133**	**3051**	**134**	**515**
PA1T	**3,348,800**	**3214**	**128**	**470**
PIØHQ	409,200	751	77	233
PI4ZOD	29,820	255	33	107

NORWAY

LN1T	**1,146,080**	**1845**	**88**	**289**
LN1B	165,480	513	45	152

POLAND

SN2K	**1,098,795**	**1572**	**99**	**366**
SP9KDA	**958,464**	**1467**	**103**	**365**
SN5Z	434,700	960	82	268
SP3KCL	202,920	525	65	202
SN5T	152,071	622	52	189
SN6U	127,008	425	54	162
SP1YGL	115,233	229	64	149
SP9KRT	88,821	490	44	169

PORTUGAL

CT1GGO	**384,820**	**1227**	**60**	**224**
CQ2T	**375,989**	**1002**	**71**	**218**
CT7Z	28,750	174	34	81

ROMANIA

YR7M	**4,537,106**	**4235**	**137**	**554**

SCOTLAND

MMØDQP	**152,090**	**488**	**52**	**175**
GSØADX	105,646	409	46	156

SICILY

IT9ZMX	**3,131,876**	**2986**	**126**	**457**
IW9FRA	609,865	978	94	337

SLOVAK REPUBLIC

OM8A	**9,652,744**	**5513**	**170**	**657**
OM7M	**7,709,190**	**4578**	**174**	**647**
OM5M	**5,407,207**	**3853**	**152**	**579**
OM3KWZ	67,155	294	42	123
OM3ROM	2,295	44	16	29

SLOVENIA

S54K	**230,840**	**909**	**65**	**225**

SPAIN

ED3SSB	**4,564,236**	**3713**	**128**	**494**
EA1COZ	**2,379,792**	**2458**	**113**	**403**
EA1BVP	2,191,164	2770	89	302
EA3RKG	1,894,970	2342	108	398
EA2URD	1,265,625	1856	99	306
EA7RM	1,055,690	1234	94	367
EA1YM	1,045,817	1791	82	279
EA2RKO	658,424	1364	76	262
EA1BP	420,660	992	71	214
ED2BI	334,671	954	62	219
ED2WW	219,704	596	64	168
EA1FCR	212,115	568	55	182
EA1URO	211,128	624	55	173

SWEDEN

SK5AA	**1,166,832**	**1744**	**95**	**337**
SM5U	621,628	1321	81	217
8SØC/5	282,388	581	71	240
SM6RXZ	107,643	478	45	114

SWITZERLAND

HB9EP	**813,618**	**1447**	**66**	**285**
HB9OK	252,880	711	59	231
HB9F	3,960	58	23	43

UKRAINE

UTØAZA	**2,272,839**	**3275**	**102**	**389**
UT7L	**1,977,378**	**2107**	**134**	**472**
UZØG	1,403,188	2233	102	397
UZ4E	1,177,995	1939	99	356
US7HZZ	949,118	1736	93	346
UT4IYZ	282,555	755	55	244
UX4E	150,060	562	60	184
UR6GWZ	131,472	601	53	211
UR4PWC	12,558	128	23	55
UX5UU	3,108	54	10	32

WALES

MW4C	**248,310**	**696**	**54**	**124**

YUGOSLAVIA

YT9X	**4,445,400**	**4275**	**132**	**468**
4NØW	1,127,610	2065	81	293

OCEANIA

AUSTRALIA

VK1CC	**2,688,420**	**2361**	**126**	**318**
VK4WR	1,126,142	1522	93	205

GUAM

AH2R	**4,624,704**	**3360**	**142**	**354**

HAWAII

KH6GMP	**938,308**	**1589**	**85**	**132**

INDONESIA

YE1ZAT	**309,047**	**660**	**68**	**131**

NEW ZEALAND

ZL6QH	**847,742**	**1257**	**95**	**171**

SOUTH AMERICA

ARGENTINA

LR2F	**6,005,664**	**4021**	**142**	**425**
LU8YE	**2,378,340**	**2579**	**104**	**261**
LV1E	742,248	1291	72	172

LU1FC	582,200	1189	62	138
LU1WBM	470,448	994	58	118
LU8XW	309,600	795	54	126
LU4DLU	265,994	575	59	120
LU4DQ	246,432	708	51	85
BRAZIL				
ZY7C	**5,494,326**	**3857**	**119**	**415**
PW2C	**2,242,570**	**2162**	**103**	**304**
PQ7Q	748,995	1070	79	220
PY2TEL	270,478	1061	27	76
PY2RDS	221,728	608	55	109
CHILE				
CE6TC	**1,255,600**	**1745**	**96**	**196**
FRENCH GUIANA				
FY5KE	**19,055,673**	**8183**	**167**	**652**
NETHERLANDS ANTILLES				
PJ4W	**12,645,826**	**7167**	**141**	**485**
PARAGUAY				
ZP8VAO	**680,586**	**1297**	**62**	**139**
ZPØR	633,422	1355	64	147
SOUTH SHETLAND ISLANDS				
R1ANF	**287,310**	**712**	**47**	**110**

MULTI-OPERATOR TWO TRANSMITTER

NORTH AMERICA

UNITED STATES

K3NA/1	**7,986,663**	**4134**	**149**	**568**
KI1G	**7,395,500**	**3969**	**142**	**558**
KBTV/1	**4,875,428**	**2659**	**131**	**457**
N3RS	**10,158,016**	**5148**	**157**	**595**
WE3C	**6,756,390**	**3653**	**158**	**580**
K3DI	1,784,108	1390	118	384
NE3MD	233,766	391	61	182
W4RM	**4,026,330**	**2970**	**118**	**421**
NE4AA	705,692	787	81	250
AA5NT	**2,219,805**	**1820**	**140**	**427**
K5PTC	1,978,149	1773	126	417
K6KM	**1,560,148**	**1771**	**115**	**273**
W6YX	1,016,400	1041	110	275
NK7U	**3,747,786**	**3087**	**140**	**403**
K7ZSD	2,609,336	2210	133	355
WC8VOA	**90,459**	**279**	**58**	**149**
N9AKR	**473,088**	**550**	**88**	**248**
N9KI	168,454	351	58	151
W9DEW	26,624	123	33	71
KTØR	**1,316,412**	**1371**	**109**	**350**
NØUNL	35,728	129	37	79
BELIZE				
V31MD	**2,750,782**	**3555**	**100**	**282**
CANADA				
VE3EJ	**16,493,120**	**8547**	**162**	**634**
VE3RM	**8,002,500**	**5266**	**133**	**492**
VE1JF	**5,162,448**	**4384**	**116**	**408**
VE7SV	**4,785,720**	**4695**	**128**	**328**
VE3SY	2,425,136	2071	110	362
VE6FI	**2,183,000**	**2969**	**108**	**262**
VE2/KD3TB	1,337,103	2141	82	245
VE3DC	240,316	487	70	222
VE6ZC	35,712	243	38	58
COSTA RICA				
TI5N	**4,767,616**	**5160**	**117**	**359**

AFRICA

MADEIRA ISLANDS

CT9L	**18,787,200**	**8995**	**154**	**606**
TUNISIA				
3V5A	**14,896,200**	**8597**	**138**	**522**

ASIA

ARMENIA

EK8B	**7,574,044**	**5660**	**103**	**424**
ASIATIC RUSSIA				
UABAZA	**5,464,752**	**4027**	**138**	**491**
CHINA				
B1Z	**2,867,431**	**3570**	**124**	**297**
B7P	**1,861,828**	**3100**	**127**	**285**
HONG KONG				
VR2MX	**1,720,232**	**2537**	**117**	**287**
KOREA				
DTØHF	**108,837**	**475**	**43**	**96**
MALDIVE ISLANDS				
8Q7EA	**1,332,090**	**1629**	**85**	**257**
TAIWAN				
BVBJ	**1,443,204**	**2433**	**119**	**259**
BV5ØCRA	236,603	917	64	159

EUROPE

CROATIA

9A7A	**11,800,646**	**8152**	**164**	**642**
DODECANESE				
SX5P	**3,373,284**	**4538**	**120**	**444**
ENGLAND				
M8C	**3,274,475**	**3881**	**113**	**464**
G6M	**2,768,480**	**3178**	**111**	**409**
G4UJS	2,143,845	2187	98	397
EUROPEAN RUSSIA				
RU1A	**10,766,559**	**7789**	**173**	**640**
FINLAND				
OH4A	**3,956,154**	**3888**	**134**	**457**
GERMANY				
DQ4W	**7,925,148**	**5501**	**159**	**597**
DL8CS	**5,197,632**	**3979**	**159**	**577**
DR5Z	3,786,948	3359	132	525
DR5N	2,570,386	2957	112	375
DLØKC	2,520,540	2578	120	450
DP5Z	404,345	846	77	258
DA3A	226,476	626	48	195
HUNGARY				
HG6N	**8,787,519**	**6484**	**160**	**607**
ITALY				
IR4X	**13,734,300**	**7545**	**177**	**673**
IQ6TH	14,784	119	28	68
LITHUANIA				
LY7Z	**7,592,400**	**5738**	**158**	**545**
NETHERLANDS				
PI4CC	**2,807,480**	**3175**	**115**	**405**
PI4FRG	520,938	1564	68	229
PI6ØZI	183,533	778	36	121
POLAND				
SQ6Z	**5,724,675**	**4750**	**142**	**533**
ROMANIA				
YP3A	**2,860,480**	**3422**	**120**	**440**
SCOTLAND				
GM2T	**2,528,326**	**3454**	**95**	**359**
SPAIN				
EA4TD	**492,135**	**1349**	**59**	**212**
SWEDEN				
SK2T	**877,725**	**1415**	**90**	**333**
SWITZERLAND				
HB9H	**3,102,130**	**3957**	**122**	**429**

OCEANIA

AUSTRALIA

VK6ANC	**297,275**	**539**	**79**	**156**

SOUTH AMERICA

BRAZIL

PS2T	**12,487,515**	**7208**	**152**	**521**
NETHERLANDS ANTILLES				
PJ2T	**15,085,936**	**8723**	**143**	**486**
PARAGUAY				
ZP5MAL	**2,700,594**	**3124**	**101**	**250**
URUGUAY				
CV5D	**1,611,871**	**2261**	**94**	**249**

MULTI-OPERATOR MULTI-TRANSMITTER

NORTH AMERICA

UNITED STATES

K3LR	**16,283,848**	**7920**	**172**	**648**
KC1XX	**14,482,410**	**6673**	**172**	**662**
W3LPL	**12,884,120**	**6294**	**171**	**670**
K1TTT	**9,757,348**	**5276**	**150**	**574**
NQ4I	**7,606,080**	**4668**	**163**	**557**
K1RX	**6,453,523**	**3826**	**153**	**544**
N3AD	5,901,552	3676	149	535
W3PP	5,341,632	3294	151	537
KB1H	4,807,045	2861	143	512
W2AX	**4,494,784**	**2753**	**140**	**492**
W4MYA	4,491,628	2847	142	510
K5NA	**4,373,418**	**3172**	**153**	**498**
K3II	3,076,150	1994	131	464
N3CA	2,664,951	1987	138	461
WØAIH/9	**2,523,000**	**2008**	**146**	**454**
W8ZA	**1,939,000**	**1690**	**119**	**381**
W2YC	1,325,610	1062	113	402
N4CW/1	659,190	701	80	285
K6IDX	428,002	484	100	246
WN6K	419,696	618	83	189
AB8SD	17,010	145	28	53
ANTIGUA				
V26B	**17,865,770**	**11238**	**156**	**533**
CANADA				
VE5RI	**1,277,587**	**1694**	**101**	**252**
VE7FO	25,608	136	40	57
GRENADA				
J3A	**9,470,264**	**7382**	**130**	**438**
JAMAICA				
6Y2Z	**18,564,588**	**12839**	**143**	**501**
PUERTO RICO				
WP4BL	**122,112**	**418**	**46**	**98**
TURKS & CAICOS ISLANDS				
VP5T	**5,499,000**	**5394**	**114**	**354**
U.S. VIRGIN ISLANDS				
WP2Z	**11,035,976**	**8292**	**139**	**460**

AFRICA

CHAGOS ISLANDS

VQ9X	**2,132,324**	**2076**	**96**	**286**
MADEIRA ISLANDS				
CT3YA	**28,261,325**	**11827**	**178**	**699**

ASIA

JAPAN

JA3YBK	**7,666,216**	**4633**	**157**	**495**
JA5BJC	7,357,320	4546	157	485
JA7YRR	5,247,320	4055	143	377

EUROPE

BELGIUM

OT5A	**13,053,528**	**9396**	**168**	**645**
BULGARIA				
LZ9W	**12,467,430**	**9292**	**168**	**662**
ESTONIA				
ES1A	**1,472,625**	**2012**	**110**	**415**
EUROPEAN RUSSIA				
RK6YZZ	**372,999**	**916**	**82**	**299**
GERMANY				
DFØCG	**15,337,439**	**9677**	**180**	**691**
DQ8Q	**12,921,984**	**9405**	**176**	**688**
DQ5T	1,854,496	1738	122	422
ISLE OF MAN				
MD4K	**9,628,416**	**8944**	**148**	**620**
KALININGRAD				
RW2F	**12,877,980**	**9018**	**174**	**678**
LIECHTENSTEIN				
HBØ/HB9AON	**5,307,196**	**5635**	**117**	**461**
LITHUANIA				
LY7A	**5,786,088**	**5860**	**149**	**558**
NETHERLANDS				
PA6Z	**3,709,164**	**4504**	**124**	**480**
PI4D	**2,228,448**	**3122**	**99**	**402**
NORWAY				
LN2T	69,864	333	41	123
SARDINIA				
ISØ/DL3EW	**5,522,307**	**5497**	**138**	**541**
ISØA	192,066	706	59	210
SCOTLAND				
GM5A	**8,534,130**	**6677**	**147**	**579**
GMØB	5,879,664	5836	131	483
UKRAINE				
UU7J	**7,446,558**	**7108**	**167**	**582**

OCEANIA

PHILIPPINES

DX1DBT	**600,546**	**1245**	**79**	**123**

SOUTH AMERICA

ARGENTINA

LT1F	**10,926,902**	**6932**	**148**	**454**
VENEZUELA				
YV4A	**12,446,028**	**7953**	**138**	**468**

TOP SCORES IN MOST ACTIVE ZONES

Zone 3

K7RL	2,511,519
K6NA	1,853,728
K5RR/7	1,198,120
W6PH	1,036,940
W7WA	848,350
K6XX	847,540
K4XU/7	798,206
K7ZZ	795,544
VE7IG	659,921
W7VJ	650,770

Zone 4

VC3O	5,794,200
W9RE	4,282,720
WB9Z	3,523,377
N2IC/5	3,335,815
VE3KZ	2,309,960
VE3XN	2,043,700
VA3DX	1,564,460
N5AU	1,182,162
K9BGL	1,156,021
*N5AW	1,030,680

Zone 5

VY2PA	8,602,286
K5ZD/1	5,553,841
K3CR	4,445,930
AA1K/3	4,112,913
W3BGN	3,257,436
VO1AU	2,758,896
NN3W	2,704,683
K3ZO	2,579,927
N8II	2,520,258
N2LT	2,377,892

Zone 14

GW4BLE	6,118,605
M6T	4,685,268
EA4KR	3,762,529
DJ4PT	3,656,405
LB8IB	3,638,669
*CT7T	3,638,544
OZ7X	3,172,320
F5VJK	2,506,218
GMØF	2,018,292
PAØIJM	1,636,110

Zone 15

ES5TV	6,437,918
S50A	5,136,192
IR4T	2,511,008
*9A5K	2,497,536
YL6W	1,889,059
*LY9A	1,795,560
OH6KN	1,710,648
II4A	1,586,200
*9A2EU	1,572,974
SN8F	1,469,232

Zone 16

US5D	2,720,374
UA3QDX	1,983,276
UA3TCJ	1,740,464
*UA4FER	1,643,880
UY5ZZ	1,501,948
*RV3FF	1,379,460
RU6FA	1,345,894
RN3ZC	1,190,680
*RU3QW	1,129,051
EU1PA	864,852

Zone 25

JH4UYB	3,454,647
JR1AIB	1,813,448
JA7NVF	1,502,228
JO1WKO	874,152
JAØJHA	871,815
JS3CTQ	617,933
JA1TMG	484,692
JI2UNR	473,478
JE4VVM	447,161
*JF2QNM	445,410

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4Z5FL, 8N1C5ØA, A35RK, DG1BQC, DH5MM, DJ1CW, DJ6NH, DL2KUF, DL2RTL, DL5DWW, DL5MK, DL7CX, DL8AXJ, DL9AWI, EA2AZ, EA3BJM, EA3TJ, EA4YT, EA5GMA, EI7GY, EO3Q (OP: UR3QCW), ES1AN, ES1LS, F8KCF, G3YOG, G4LWB, HA5AF, HA5AZZ, HA5PT, HA5X, HB9QA, HF7JKD(OP:SP7MOA), IKØOTJ, IQ5GR, IT9XTP, IW5EFX, IW9CTR, JR3RVO, KØOK/6, K1VSJ, K2QD, KA5M, KB9WQJ, KC8IUM, KE5FDW, KTØP/4, LA2GH, LA3BO, LA3S, LA4OGA, LA6BNA, LA6HJA, LA6PBA, LA8HGA, LA9TJA, M3KXZ, N6MZ, N9LF, OH1PY, OK2DFD, OK2HFC, OK2PCL, OK2SG, OK4MM, OM4K (OP: OM4AA), PAØRBO, PA5O, PY2D8U, PY7ZY, RAØQD, RAØSS, RA3EG, RA3RGQ, RA3WNS, RA6HSM, RA9MX, RD3AN, RK3BA, RK9JYY, RL3AW, RU6MM, RV1OO, RV3DBK, RV3DUT, RV6ASU, RV6LLI, RV9FT, RW3DY, RW3WWW, RW4NQ, RW4UW, RX3AHL, RX3DTN, RX9CDT, RX9TL, RX9TX, RZ10A, RZ3OV, SM2YPZ, SM5KG, SM6BSK, SP1GZT, SP1KV, SP2FAP, SP2MEF, SP2MKI, SP2QCU, SP3BLT, SP3CGK, SP3DTB, SP3EPX, SP3HC, SP3KRE, SP5BYC, SP5ECC, SP5ELM, SP5ELW, SP5VYI, SP6CIK, SP6FXF, SP6NVK, SP7FAH, SP7HOV, SP7HQ, SP7IXT, SP7XK, SP8HDP, SP8HXN, SP9CVY, SP9GFI/7, SP9IHP, SP9ODY, SP9OHP, SP9UOP, SQ4NR, SQ9AOR, SQ5FWR, SQ6IU, TF3VS, UA1AKE, UA1RG, UA3DLD, UA3DSS, UA3SFP, UA4RC, UA6ECU, UA6JCC, UA6LLE, UA9CL, UA9JLL, UN7ECA, UN8FR, UR5FAV, UTØFT, UT2AB, UUØJC, UU2JG, UX1IL, VU2UR, WØEF, W3QY, XE1TRP, YL2TQ, YO2BS, YO3HOT, YO3ISA, YO6EZ, ZL1TM.

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The TI8M Multi-Single team.

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