Amateur Radio

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

COMMUNICATIONS & TECHNOLOGY

SEPTEMBER 2009

CQ

- **CW Results, 2008 CQ World Wide DX Contest, p. 13**
- **The New Face(s) of the FCC, p. 36**
- **CQ Reviews: Super Antennas YP-3 6-Band Yagi, p. 64**
- **Milliwatt Moonbounce, p. 80**

On the Cover: 2009 Newsline Young Ham of the Year Andrew Koenig, KE5GDB, of Houston, Texas. Details on pages 8 and 62.

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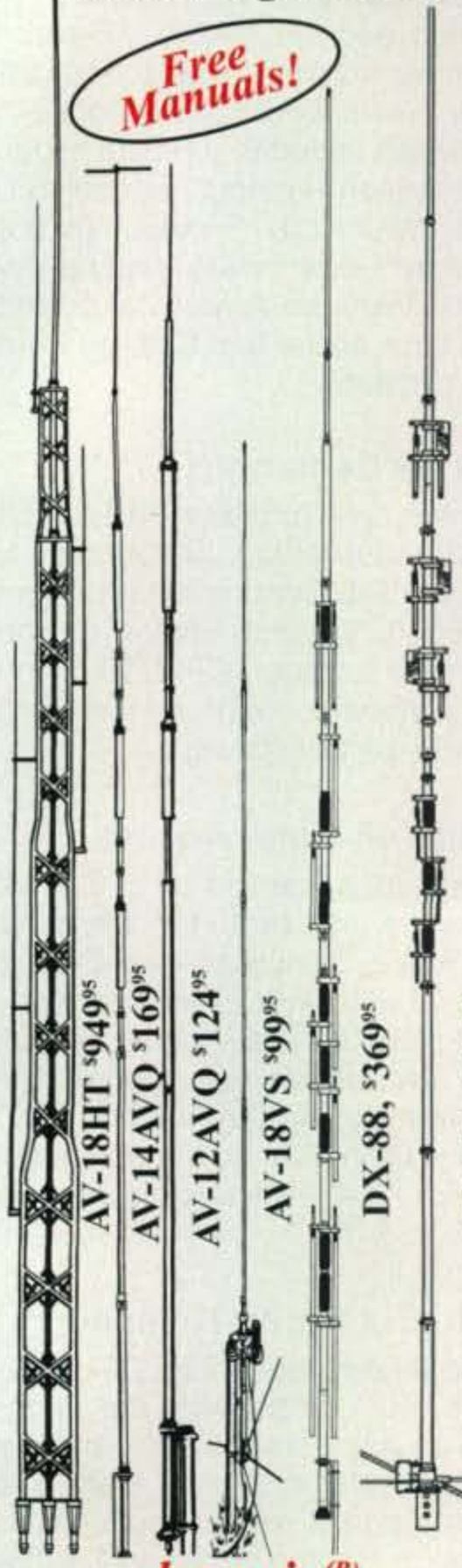
Self-supporting -- no guys required . . . Remarkable DX performance -- low angle radiation, omnidirectional . . . Handles 1500 Watts . . . Low SWR . . . Automatic band switching . . . Aircraft quality aluminum tubing . . . Stainless steel hardware . . . Recessed SO-239 connector . . . Two year limited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



hy-gain(R)

Classics

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

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

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

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

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

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

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

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

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

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

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

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

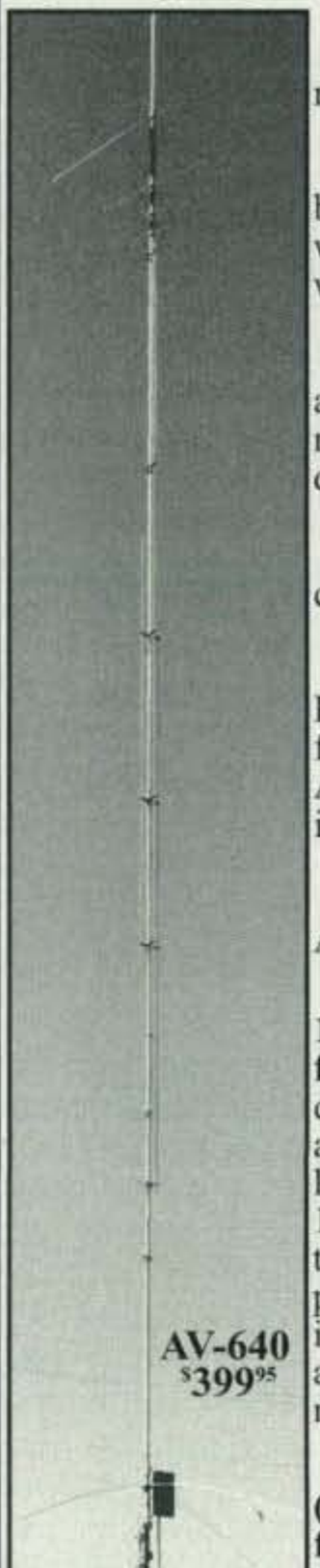
No ground radials required! Off-center-fed Windom has 55% greater bandwidth than competitive verticals. Heavy-duty tiltable base. Each band independently tunable.

Model #	Price	Bands	Max Power	Height	Weight	Wind Surv.	Rec. Mast
AV-18HT	$949.95	10,15,20,40,80	1500 W PEP	53 feet	114 pounds	75 MPH	------
AV-14AVQ	**$169.95**	**10,15,20,40**	**1500 W PEP**	**18 feet**	**9 pounds**	**80 MPH**	**1.5-1.625"**
AV-12AVQ	$124.95	10/15/20 M	1500 W PEP	13 feet	9 pounds	80 MPH	1.5-1.625"
AV-18VS	**$99.95**	**10 - 80 M**	**1500 W PEP**	**18 feet**	**4 pounds**	**80 MPH**	**1.5-1.625"**
DX-88	$369.95	10 - 80 M	1500 W PEP	25 feet	18 pounds	75 mph no guy	1.5-1.625"
DX-77A	**$449.95**	**10 - 40 M**	**1500 W PEP**	**29 feet**	**25 pounds**	**60 mph no guy**	**1.5-1.625"**

hy-gain®

PATRIOT

Hy-Gain's new PATRIOT HF verticals are the best built, best performing and best priced multiband verticals available today. For exciting DX make full use of your sunspot cycle with the PATRIOT's *low 17 degree angle* signal.



No ground or radials needed

Effective counterpoise replaces radials and ground.

Automatic bandswitching

Single coax cable feed. Each band is individually tunable. Extra wide VSWR bandwidth. End fed with broadband matching unit.

Sleek and low-profile

Low 2.5 sq. ft. wind surface area. Small area required for mounting. Mounts easily on decks, roofs and patios.

Full legal limit

Handles 1500 Watts key down continuous for two minutes.

Built-to-last

High wind survival of 80 mph. Broadband matching unit made from all *Teflon®* insulated wire. Aircraft quality aluminum tubing, stainless steel hardware.

hy-gain® warranty

Two year limited warranty. All replacement parts in stock.

AV-640, $399.95. (6,10,12, 15,17,20,30,40 Meters). 25.5 ft., 17.5 lbs. The AV-640 uses quarter wave stubs on 6, 10, 12 and 17 meters and efficient end loading coil and capacity hats on 15, 20, 30 and 40 meters -- no traps. Resonators are placed in parallel not in series. End loading of the lower HF bands allows efficient operation with a manageable antenna height.

AV-620, $299.95. (6,10,12,15,17,20 Meters). 22.5 ft., 10.5 lbs. The AV-620 covers all bands 6 through 20 Meters with no traps, no coils, no radials yielding an uncompromised signal across all bands.

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ham radio news

Walter Cronkite, KB2GSD, SK

Legendary CBS Newsman and ham radio ambassador Walter Cronkite, KB2GSD, passed away in July at age 92. A licensed ham since the mid-1980s, Cronkite narrated the ARRL's 2003 video, *Amateur Radio Today*, which focused on public service and emergency communications. See this month's "Zero Bias" editorial on page 8 for some of Editor W2VU's personal recollections of helping Cronkite get his ham license.

FCC Begins Follow-Up on BPL Rules

The FCC is offering to "split the difference" with ARRL over the question of measurements taken to determine the strength of Broadband over Power Line (BPL) signals radiated into the air. In a Request for Further Comment and Further Notice of Proposed Rule Making released on July 17, the Commission finally began taking the action ordered by the U.S. Court of Appeals in 2008 after the ARRL had sued over its original BPL decision in 2004. One of the main points of contention had been the signal attenuation formula to use in extrapolating signal strength at certain distances from the radiation point. The FCC adopted a standard of 40 dB per decade, while the ARRL argued that it should be 20 dB/decade and the Court of Appeals agreed that the FCC had not provided reasoning for its 40 dB standard. In this new proceeding, the FCC does explain its original decision and claims that the data continue to support it, but also offers to change the standard from 40 dB to 30 dB/decade. It also proposes an alternate standard for making actual measurements as opposed to extrapolating them. For those interested in the technical details, the entire document is on the FCC's website. Scan the news releases or do a search in the Electronic Comment Filing System for ET Docket 04-37 or 03-104. W5YI will summarize the proposal in next month's "Washington Readout" column.

WRC-11 May Be Delayed to 2012

The next World Radiocommunication Conference (WRC) will most likely be rescheduled from the fall of 2011 until early 2012. These conferences, held approximately every three years, are responsible for international radio frequency allocations. The last one was in 2007, and the next was tentatively scheduled to be held in October and November, 2011. According to the *ARRL Letter*, scheduling conflicts and meeting-site availability problems caused the International Telecommunication Union's administrative council to recommend delaying the conference until January and February, 2012, in Geneva, Switzerland. The main item of interest to amateur radio on the tentative agenda is the possibility of adding an international allocation for amateur radio as a secondary user ion the 415-526.5 kHz range. If enacted, it would be the first worldwide low-frequency allocation to amateur radio since hams were moved below 200 meters in the early 20th century.

Genachowski Takes Reins at FCC

Julius Genachowski was sworn in as FCC Chairman on June 30 and promised that the Commission's decisions under his leadership will be "fair... open and transparent" and "fact-based and data-driven." Within two weeks of taking the reins, Genachowski appointed a new team to lead the Wireless Telecommunications Bureau, whose umbrella includes the Amateur Radio Service. He named his transition director, Ruth Milkman, as the new WTB Chief. She has more than a decade of previous FCC experience in various roles. James Schlichting was named Senior Deputy Bureau Chief. He had been Deputy Bureau Chief and served as Acting Chief until Milkman was appointed. Two additional Deputy Bureau Chiefs were also named: Renee Roland Crittendon, who had been Chief of Staff to former Commissioner Jonathan Adelstein, and John Leibovitz, who had worked on President Obama's transition team as a member of the Technology, Innovation and Government Reform working group. It was not clear from the initial announcement which of the deputy chiefs would be responsible for the Mobility Division, which includes amateur radio. Check next month's "Washington Readout" for additional information; this issue's "Washington Readout" (p. 36) provides details on Chairman Genachowski and newly-appointed Commissioners Meredith Atwell Baker and Mignon Clyburn. At press time, Baker and Clyburn were still awaiting Senate confirmation.

UPenn ARC to Celebrate Centennial

The University of Pennsylvania Amateur Radio Club will be celebrating its 100th anniversary on October 4, 2009 and will be hosting special event on the air. From October, 2009 to May, 2010, the club station on the Philadelphia campus will be signing W3KZ/100, and Alumni Club member stations will be signing W3ABT/100. A special QSL will be offered.

More Countries Expand 40-Meter Access

The move of international broadcasters off of 7.1-7.2 MHz is making the segment available to hams in more countries in Europe and Africa. "Newsline" reports that South Africa has opened 7.0-7.2 MHz to amateur use, and decided to allow mid-class ZR-prefix hams access to the full 20-meter band. Belarus has also opened 7.1-7.2 to hams, as well as opening up the entire 1.8-2.0 MHz 160-meter band. In addition, France announced in July that it would soon make 7.1-7.2 MHz available to its hams, although no date was given.

Foxhunting in Boston, But Not in Thailand

This is the year for regional Amateur Radio Direction-Finding (ARDF) championships -- in between the worldwide championships in even-numbered years -- and the International Amateur Radio Union (IARU) Region 2 event for North and South America was run as planned in July on a course outside Boston, Massachusetts. Hams from across the U.S. and from eight other countries took part, according to "Newsline." However, political unrest in Thailand forced the cancellation of this year's Region 3 championships, which were scheduled for this fall near Bangkok. Thailand's national ham radio association was concerned about the safety of both participants and spectators in the wake of continuing clashes between supporters of the current and former prime ministers. The Region 1 championship for Europe and Africa will be held this month in Bulgaria, at the same site as, and immediately following, the Eighth World High Speed Telegraphy Championship.

Michigan Ham Killed in Tower Collapse

Larry Prelog, KE4PM, of Niles, Michigan, died as the result of a tower collapse at his club's Field Day site. According to the local "Herald-Palladium" newspaper, Prelog was helping to set up antennas for the Blossomland Amateur Radio Club's Field Day operation

(Continued on page 10)

TOKYO HY-POWER

The Biggest and Smallest Amps in the Industry!

Lightest and Most Compact 1kW HF Amplifier

HL-1.5KFX

HF/50MHz Linear Power

Outstanding for Desktop or DX-peditions!

Features

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

Specifications

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

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

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

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

---

HL-1.1KFX

Lightweight HF Linear

NEW!

Features

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

Specifications

Frequency:
1.8 ~ 28MHz all amateur bands including WARC bands
Mode:
SSB, CW, RTTY
RF Drive:
75 ~ 90W
Output Power:
SSB 600W PEP max.
CW 600W.
RTTY 500W (5 minutes)
Final Transistor:
SD 2933 x 4
(MOS FET by ST micro)
Circuit:
Class AB parallel push-pull

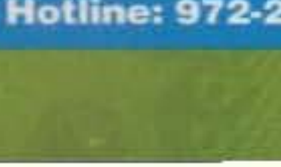
Cooling Method:
Forced Air Cooling
Multi-Meter:
Output Pf 1kW, Reflected Power 100W, Drain Voltage Vd 60V, Drain Current Id 50A
Input/Output Connectors:
Type M-J (UHF SO-239)
AC Power:
1.4kVA max. when TX
AC 100 ~ 250V (Auto Select)
Dimensions:
9.1 x 5.6 x 14.3 inches (WxHxD)
Weight:
Approx. 22.5 lbs.

More Fine Products from TOKYO HY-POWER

HC-1.5KAT
HF 1.5KW Auto Tuner

HL-2.5KFX
Legal Limit 1.5kW HF Amplifier

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



HL-1.2KFX
750W PEP HF Desktop Linear

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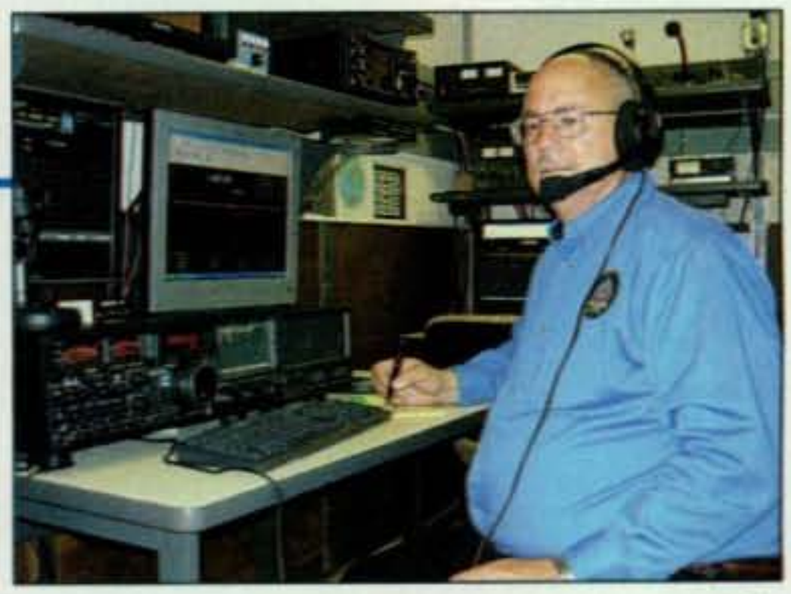

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departments

Life is a JOURNEY. Enjoy the ride!

NEW! COMET CTC-50M
Window Gap Adapter!

Max Power: HF 100W PEP
VHF: 60W FM
UHF: 40W FM
900MHz - 1.3GHz: 10W
VSWR: <500MHz 1.3:1
>500MHz 1.5:1
Impedance: 50Ohm
Length: 15.75"
Conn: 24k Gold Plated SO-239s

MALDOL HVU-8
Ultra-Compact 8 Band Antenna!

Unique ground radial system rotates 180 degrees around the base if building side mounting is required.

Max Power: HF 200W SSB/100W FM
6M - 70cm: 150W FM
TX: 80/40/20/15/10/6/2M/70cm
Impedance: 50 Ohm
Length: 8'6" approx
Weight: 5lbs 7oz
Conn: SO-239
Max Wind Speed: 92MPH

Each band tunes independently.
Approx 2:1 band-width:
80M 22kHz
40M 52kHz
20M 52kHz
15M 134kHz
10M 260kHz

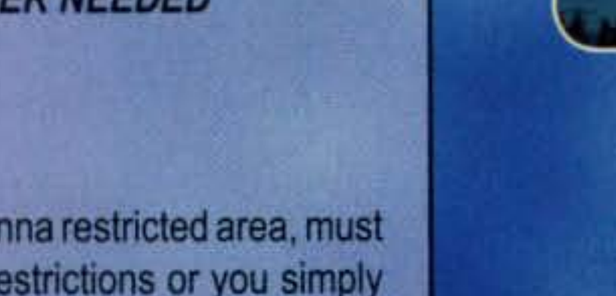
COMET CHA-250B
Broadband HF Vertical!

3.5 - 57MHz with SWR of 1.6:1 or less!

- ***NO ANTENNA TUNER NEEDED***
- ***NO RADIALS***
- ***NO TRAPS***
- ***NO COILS***

If you suffer in an antenna restricted area, must manage with space restrictions or you simply want to operate incognito you will be forced to make significant antenna compromises. The CHA-250B makes the most of the situation, making operating HF easy!!

Max Power: 250W SSB/125W FM
TX: 3.5– 57MHz
RX: 2.0– 90MHz
Impedance: 50Ohm
Length: 23'5"
Weight: 7lbs 1 oz
Conn: SO-239
Max Wind Speed: 67MPH



NEW! COMET H-422
40/20/15/10M compact, broadband, rotatable dipole!

Assemble in either a "V or horizontal ("H") configuration.
CBL-2500 2.5kW balun and heavy duty hardware included.

Max Power: 1000W SSB / 500W FM
SWR: Less than 1.5:1 at center frequency
Rotation Radius: "V" 12' 6" "H" 17' 5"
Length: "V" 24' 5" "H" 33' 10"
Weight: 11 lbs 14 ozs
Wind load: 3.01 sq feet
Max Wind Speed: 67 MPH

COMET and Maldol

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HF/50 MHz 100 W Transceiver

FT-950

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

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

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Introducing the new FT-950 Series with PEP-950 (Performance Enhancement Program)

COMPACT HF/50 MHz TRANSCEIVER WITH IF DSP

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

A superb, compact HF/50 MHz radio with state-of-the-art IF DSP technology configured to provide YAESU World-Class Performance in an easy to operate package.
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HF/50 MHz 100 W All Mode Transceiver

FT-450 Automatic Antenna Tuner ATU-450 optional

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

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FT-897D

TCXO DSP 60 m Band

HF/50/144/430 MHz
100 W All Mode Transceiver (144 MHz 50 W/430 MHz 20 W)

HF/VHF/UHF Multimode Mobile Transceiver, now Including Built-in DSP

FT-857D

DSP 60 m Band

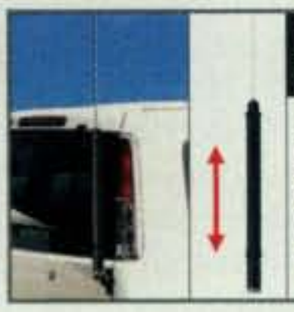
HF/50/144/430 MHz
100 W All Mode Transceiver (144 MHz 50 W/430 MHz 20 W)

Automatic Matching for FT-897/857 Series Transceivers

FC-40

Automatic-Matching 200-Memory Antenna Tuner (160 m ~ 6 m Band)

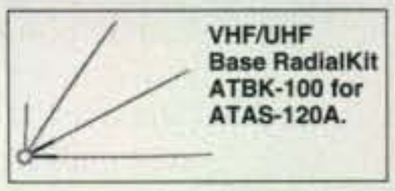
WATERPROOF



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

ATAS-120A

Active Tuning Antenna System (no separate tuner required)



REAL PERFORMANCE, REALLY PORTABLE

FT-817ND

HF/50/144/430 MHz
5 W All Mode Transceiver (AM 1.5 W)

60 m Band

ATAS-25 ATAS MICRO
Manually-Tuned Portable Antenna

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

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a CQ editorial — zero bias

BY RICH MOSESON,* W2VU

Neil and Buzz, Walter and Andrew

There are times in every writer's life when events and circumstances converge and conspire to inform you of what you will write about, even if whatever it is wasn't in your original plans. This is one of those times.

I am writing this on the middle weekend in July (instead of operating in the CQ WW VHF Contest). At the end of last week, we learned the identity of our next Newsline Young Ham of the Year and heard about the death of newsman Walter Cronkite. The new week begins with Monday's 40th anniversary of the Apollo 11 moon landing on July 20, 1969. Two threads—space and amateur radio—tie all these events together.

Neil and Buzz

Neither Neil Armstrong nor Buzz Aldrin, the first two men to walk on the moon, are or ever were ham radio operators. But they didn't go to the moon alone. The Apollo program was a huge team effort, backed by thousands of scientists, engineers, technicians and support personnel, hundreds of whom were (and still are) hams.

Part of that support team was a worldwide network of tracking stations, using huge dish antennas to pick up and relay weak radio signals from as far away as the moon itself. Some of those dishes are still in use today for various purposes. To help commemorate the 40th anniversary of the first moon landing, hams around the world this summer have been participating in the Echoes of Apollo event, using these and other big dish antennas to make Earth-Moon-Earth (EME) contacts via amateur radio. *CQ*'s "VHF Plus" editor Joe Lynch, N6CL, tells us in his column this month (pg. 80) about a truly amazing contact made as part of that effort.

Walter

One of the space program's biggest fans was "the most trusted man in America," CBS News anchor Walter Cronkite, who passed away in mid-July at age 92. One of Walter's wishes that never came true was to fly in space himself. I was working at CBS News back in the 1980s when NASA was planning a journalist-in -space program along with its educator-in-space program. I recall receiving a memo stating that none of us was to apply for that program—that NASA would be receiving only one application from CBS News—and that would be for Walter Cronkite. He was one of 40 finalists for the program when it was canceled in the wake of the Challenger explosion in 1986.

I also remember my boss at the time, Joel Heller, WA2FFI, calling me into his office one day. Sitting there were Steve Mendelsohn, WA2DHF (now W2ML)—then the ARRL Hudson Division Director and an engineer for the CBS Radio Network—and Walter Cronkite, whom I had passed in the halls many times but never met. After making the introductions, Joel said, "Walter has decided he wants to get his ham ticket. Would you be willing to give him his code test?" (In the days before volunteer examining, any two hams with General Class or higher licenses could administer a Novice exam.) Of course, I said yes. Steve pulled out a key and a code oscillator and I sent five minutes of text at five words per minute. Walter copied. Thankfully, he passed (I certainly didn't want to be the person who *flunked* Walter Cronkite on a code test!). The written exam was next and a few weeks later, the FCC issued him KB2GSD. Walter's primary personal use for ham radio was as backup communication on his boat—he was an avid sailor—and he had a 10-meter rig installed along with his marine radio gear. He was never particularly active on the ham bands but kept his license current, renewing it most recently just last year. 73, OM.

Andrew

On our cover this month is Andrew Koenig, KE5GDB, of Houston, Texas, who has just been named the 2009 Amateur Radio Newsline Young Ham of the Year. *CQ* is a corporate co-sponsor of the award and yours truly is a member of the YHOTY judging committee. Andrew has done some pretty impressive things in his short ham career, including installing a complete VHF/UHF station on his bicycle (see September, 2008, on the CQ Amateur Radio Calendar) and building his own IRLP (Internet Radio Linking Project) node in his bedroom closet! That's the photo we've got on the cover this month.

Young Ham of the Year Andrew Koenig, KE5GDB, with Astronaut Bill McArthur, KC5ACR, during a presentation on ham radio to future educator-astronauts at the Johnson Space Center. (Photo courtesy KC5KBO/ Newsline)

But neither his bicycle-mobile station nor his IRLP node was what earned Andrew the YHOTY Award. This is what did:

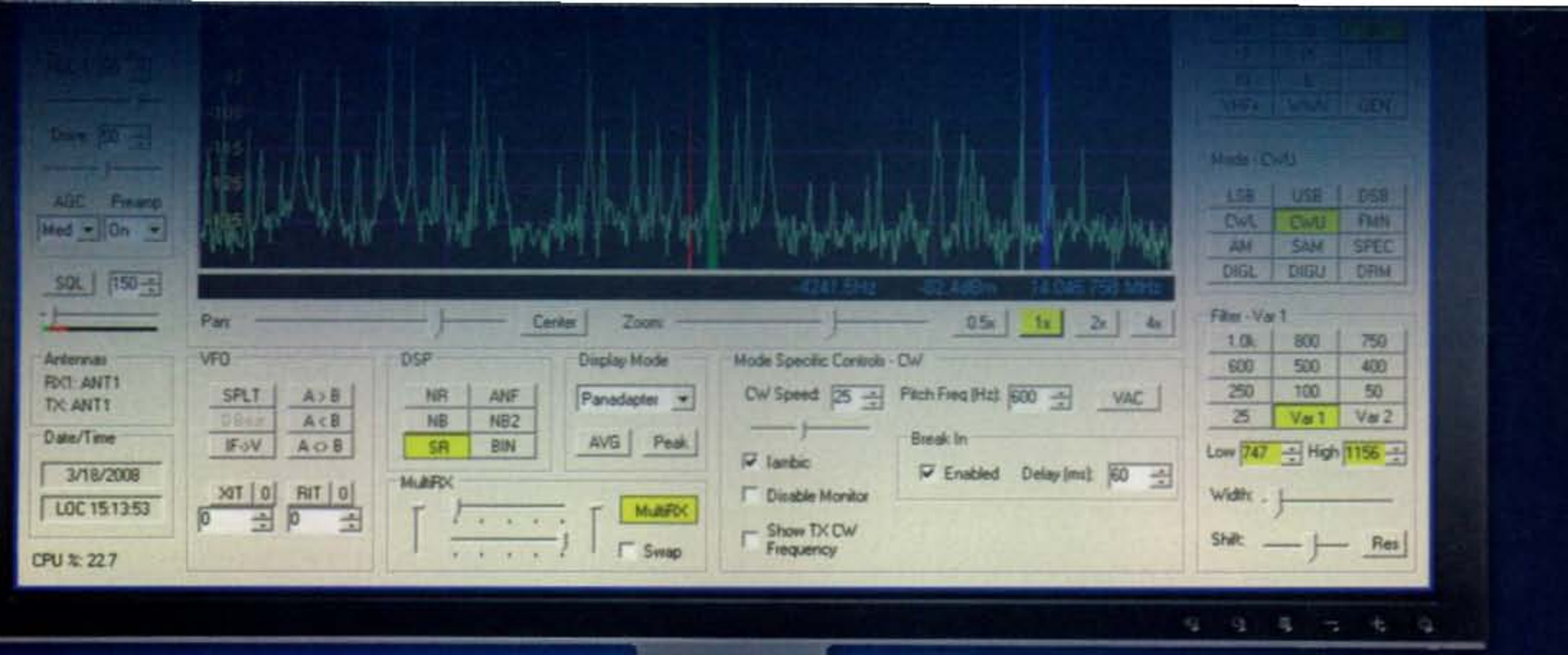
(1) Living near NASA's Johnson Space Center, Andrew has gotten involved both with conducting ARISS (Amateur Radio on the International Space Station) contacts and in *helping to train astronauts* for future ARISS contacts! He also joined astronaut Bill McArthur, KC5ACR (see photo) and NASA employee Nick Lance, KC5KBO (who nominated him), in explaining the role of amateur radio in space to the finalists in NASA's educator-astronaut program;

(2) NASA was looking to expand opportunities for astronauts to talk by ham radio with school children but wasn't happy with the options available for making contact. An IRLP node closer to the Johnson Space Center was needed. That motivated Andrew to start building his own link, which was then used for the first terrestrial astronaut contacts with two schools in Canada; and

(3) When Hurricane Ike blasted into Houston last year, Andrew used his IRLP node to connect the audio from a local repeater into a server in California, where it could be fed back to evacuees wherever they were, allowing them to keep track of what was happening in the evacuation area.

I look forward to meeting Andrew at the YHOTY presentation at the Huntsville Hamfest. It is truly a privilege for me each year to read about the activities of young hams like Andrew, to whom we are entrusting the future of our hobby. I am *not* worried.

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



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announcements

• The following Special Event stations are scheduled for Sept.:

N2UL, from "CQ Labor Day," Nutley, New Jersey; Robert D. Grant United labor ARA; 1200–2400Z Sept. 7 on 7.250, 14.260, 28.460 MHz, W2NJR-R EchoLink. For certificate send QSL and SASE to RDGULARA, c/o WA2VJA, 112 Prospect St., Nutley, NJ 07110-0716.

K4H, from 150th anniversary of the arrival of railroad to Herndon, Virgina, train depot along the Washington & Old Dominion Trail Park; Sterling Park ARC; 1400–2200Z Sept. 12 on 7.265, 14.265, 3.865 MHz. QSL available with SASE to Bill McCourt, 1554 Twisted Oark Drive, Reston, VA 20194.

K7T, from 82nd anniversary of the invention of electronic TV by Philo T. Farnsworth, Salt lake City, Utah; Utah DX association; 0000–2359Z Sept. 3 – Sept. 14 *(no frequencies given)*. For QSL send QSL and SASE to Wesley Wilkenson, W7WES, 7363 Galaxy Hill Rd., West Jordan, UT 84081.

WØB, from Cold War memorial, the site of the B-52D crash on Sept. 16, 1958, Inver Grove Heights, Minnesota; South East Metro ARC; 1500–0300Z Sept. 12 on 3.952, 7.252, 14.252, 21.352 MHz. For certificate send QSL and SASE to WØCGM, 1655 68th St. West, Inver Grove Heights, MN 55077-2222. (www.semarc.org)

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

Sept 13, **North America DX Assn. (WR2DX) Hamfest**, Luigi's Restaurant parking lot, Tinton Falls, New Jersey. Information: e-mail: <nadxa@juno.com>; or call Mike, KC2Q, 908-415-6162. (Talk-in W2NJR Link System 449,525, 448.825, 146.490, 448.125 [PL 141])

Sept. 13, **Western CT Hamfest**, Edmond Town Hall, Newtown, Connecticut. Contact Joe de Groot, AB1DO, 203-938-4880; <www.danbury.org/cara/hamfest.html>. (Talk-in 147.30+ PL100)

Sept. 19, **Pierre Amateur Radio Club Hamfest**, Pierre Senior Center, Pierre, South Dakota. Contact Dave, WØNWT, 605-494-0423, e-mail: <eaglewings150@yahoo.com>. (Talk-in 145.350–; exams 4 PM)

Sept. 20, **Gloucester County Amateur Radio Club Hamfest**, Gloucester County 4-H Fairgrounds, Mullica Hill, New Jersey. Information: call 856-513-0407; e-mail: <hamfest@w2mmd.com>. (Talk-in 147.180+ PL131.8; exams 9 AM))

Sept. 20, **Greater Cincinnati Amateur Radio Assn. Hamfest**, Diamond Oaks career Development Center, Cincinnati, Ohio. Contact Stan Cohen, W8QDQ, 513-531-1011, e-mail: <stanco49@zoomtown. com; <www.gcara.org>. (Talk-in 146.88 [–600], 145.37 [–600]; exams)

Sept. 26, **ARA of the Southern Tier of NY Hamfest**, Chemung County Fairgrounds, Horseheads, New York. Contact Charlie Santi, e-mail: <ka2bed@arast.org>; <www.arast.org>.

• • •

ham radio news

(from page 2)

when the tower he was climbing on buckled and collapsed. The newspaper report says Prelog, 57, was a professional installer of radio systems and was using all proper safety equipment and procedures. A club spokesman quoted in the article said "the tower failed at the base" and fell over sideways. Prelog was at the top. There are conflicting reports about the tower's height. The club says it was 30 feet tall; an initial police report had said 60 feet. KE4PM is survived by his wife, Tammy, four children and two grandchildren.

FCC: We Don't Regulate Contests

The FCC moved with unusual speed to dismiss a petition aimed at the signal reports exchanged by hams in contests. Jack Najork, N5FG, of Hubbard, Texas, had asked the Commission to take action against what he termed "wholesale liar's exchanges"; in contests, and particularly to sanction the American Radio Relay League for failing to prohibit what he called "false 5-9 blanket reporting" in the
contests that it sponsors.

Responding some six weeks later, Mobility Division Deputy Chief Scot Stone dismissed the petition, noting that the Commission's rules do not require amateurs to transmit signal reports nor do they specify a standard for signal reports that are exchanged. He also stated that "(t)he Commission does not regulate amateur contests; rather, they are self-administered by the amateur community." He suggested that Najork direct his concerns to the various contest sponsors.

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

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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.**

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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.**

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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.**

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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

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

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

HDR-300A

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

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IC-T90A Triple Band Transceiver

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Results of the 2008 CQ WW DX CW Contest

BY BOB COX,* K3EST

Expanded CQ WW Contest Results on the Web

Several elements of our contest reporting are on the CQ website, including Station Operators of Multi-Op stations and expanded QRM.To view them go to <http://www.cq-amateur-radio.com/cqwwhome.html>, then click on "Expanded Results, 2008 CQ WW CW" 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, 2008 CQ WW CW."

Serge, 4L6QC, low power 40 meters.

Champ, E21EIC, low power 7 MHz.

What happens when the sun just won't cooperate? Enter the CQ WW DX CW Contest and see propagation improve for the event. As NL7G comments, "Who says the bottom cannot be fun?" As has been mentioned before, the CQ WW is a fantastic competition that brings out the best in amateur radio: team work, station construction, antenna design, propagation knowledge, and operating skills. Just turn on your radio and you can join in the fun. Once you listen to the bands during the CQ WW, you will be hooked. You can be guaranteed to have a good time. The CQ WW is a celebration of ham radio skill and effort.

Thousands of hams throughout the world received their first ham radio thrill in the CQ WW. New hams and old who try the CQ WW become addicted. K8GL's comments sum up the wonderful challenge the CQ WW brings to new and experienced operators: "A personal best of 33K-plus points with only a few hours of operation, using only a couple of dipoles. I am looking forward to next year. Thank you *CQ* magazine for a great contest. The expeditions were outstanding." You can try to work new band countries or set other personal goals. With over 200 DXCC countries on the air for the CQ WW, you are sure to get a few new ones. MØBUY had this to say: "Excellent competition, very busy with many opportunities to work new countries."

The number of CW logs received was 300 more than were received for SSB! A total of 5300 CW logs! It has been over twenty years since CW logs outnumbered SSB logs. CW is alive and well in contesting. Below are presented the results of the efforts of the entrants. Read on to see how you and your friends ended up. Everyone who operated the CQ WW in 2008 was a winner.

High Power

Every year there is a great deal of competition to achieve the number one score in the world in this prestigious category. 3V8BB took first place. Jose, CT1BOH, operating from CT3NT, put his considerable skill to work to allow him to rise to second place. Not far behind, another repeat winner, Andy, N2NT, keyed V47NT to third place. A call containing "NT" was in a lot of logs. Rising from second place in the CQ WW SSB Contest, Krassy, K1LZ, took top honors in the United States from his QTH in Massachusetts. Second place in the U.S. went to another familiar top finisher, Randy, K5ZD. Taking third place was Doug, K1DG, operating from his Maine QTH. Top honors in Europe again went to Toni, OH2UA, operating from CU2X. Toni has had the top European score for several years running. Second place Europe went to the efforts of Ranko, 4O3A. From Crete, Ben, DL6FBL, took SV9CVY to third place in Europe. Other worthy efforts from propagationally challenged areas that should be recognized are W6YI (N6MJ), BA1AN, VU2PTT, JH4UYB, 9M6CNC, VK2IA, AHØBT, ZS4TX, and A45XR.

The continental winners were: North America V47NT (N2NT), Africa 3V8BB (YT1AD), Asia C4W (5B4WN), Europe CU2X (OH2UA), Oceania VK2IA, South America PZ5TT (VE3DZ), Japan JH4UYB, U.S.: K1LZ.

Low Power

The minimum requirement to enter the Low Power category is to have a transceiver and an antenna, but since everyone has a transceiver and some sort of antenna, winning the Low Power category becomes a real challenge!

Finishing at the top was Scott, KØDQ operating from P4ØQ. Scott had this to say: "What a blast! First CQWW in four years. Hopefully, this is good for a #1 world finish." You did it, Scott! A familiar call usually ending up at or near the top is V26K operated by Bud, AA3B. Bud has been in the top ten world many times. Third place world went to Carsten, DL1EFD, who put 6V7N in a lot of logs. Here in the U.S. we had a repeat winner from 2007, Art, K1BX. Art took first place on both modes this year, quite an accomplishment. Second place went to Ed, N1UR, who finishes on or near the top almost every time. Third place U.S. went to Marvin, N5AW, from Texas. Using a different call than on SSB, but ending up in the same spot, was Felipe, CT1ILT. He keyed CS2T to top European honors. Second place in Europe went to Petr, OK2WTM operating the club call OL6P. Third place Europe went to Vlad, UA3BS. N6RV, KG7H, 9J3A, EA8CN, BD5WW, EX2A, HC5WW, VK2BJ, and T88CJ all had big scores from challenging locations.

The continental winners were: North America V26K (AA3B), Africa 6V7N (DL1EFD), Asia RA9FTM, Europe CS2T (CT1ILT), Oceania T88CJ (HA7TM), South America P4ØQ (KØDQ), Japan JF1NHD, U.S. K1BX.

QRP

The CQ WW offers a contester a very good opportunity to work rare DX which would otherwise prove elusive. Frank, W6JTI, comments, "QRP at the bottom of the sunspot cycle, now there's a challenge!" The QRP category sharpens your searching skills and the rewards are very satisfactory. You can work a lot of stations with 5 watts or less. Our world winner this time was Philip, NØKE, operating TI5N. Moving from WØ-land to TI really increases your chances of a good score. You had to travel to far western Siberia to find the QTH of second place world. It went to Rafael,

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

TROPHY WINNERS AND DONORS

SINGLE OPERATOR
ALL BAND
World
3V8BB (Opr.: Hrane Milosevic, YT1AD)
Donor: K4FW Memorial (Scott Robbins, W4PA)

World Low Power
P40Q (Opr.: Scott Redd, KØDQ)
Donor: Slovenia Contest Club

World QRPp
TI5N (Opr.: Philip Krichbaum, NØKE)
Donor: Gene Walsh, N2AA

World Assisted
5B4AII (Opr.: Jack Danielyan, RW3QC)
Donor: Robert McGwier, N4HY

USA
Krassimir Petkov, K1LZ
Donor: Frankford Radio Club

USA Low Power
Arthur Hambleton, K1BX
Donor: North Coast Contesters

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

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

USA - Zone 3
W6YI (Opr.: Daniel Craig, N6MJ)
Donor: Central Arizona DX Association

USA - Zone 4
Steven London, N2IC/5
Donor: The Society of Midwest Contesters

Canada
Jeffrey Briggs, VY2ZM
Donor: John Sluymer, VE3EJ & Jim Roberts, VE7ZO

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

Europe
CU2X (Opr.: Toni Linden, OH2UA)
Donor: W3AU Memorial (Pete Raymond, N4KW)

Europe - Low Power
CS2T (Opr.: Filipe Monteiro Lopes, CT1ILT)
Donor: Scott Jones, N3RA & Tim Duffy, K3LR

Scandinavia
OH4A (Opr.: Kim Ostman, OH6KZP)
Donor: W3FYS Memorial (Chas Weir, Jr., W6UM)

Russia
Vadim Ovsyannikov, UA9CLB
Donor: Roman Thomas, RZ3AA

Africa
CT3NT (Opr.: Jose Carlos Cardoso Nunes, CT1BOH)*
Donor: Gordon Marshall, W6RR

Asia
C4W (Opr.: Marios Nicolaou, 5B4WN)
Donor: Chuck Shinn, W7MAP

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

Japan - Low Power
Norio Inomata, JF1NHD
Donor: Western Washington DX Club

Oceania
Bernd Langer, VK2IA
Donor: Chris Tran, ZL1CT

South America
PZ5TT (Opr.: Yuri Onipko, VE3DZ)
Donor: Venezuela DX Club

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

World - 21 MHz
Hisanao Noda, 6W1SE
Donor: Lew Sayre, W7EW

World - 14 MHz
CN2M (Opr.: Ville Hiilesmaa, OH2MM)
Donor: W2JT Memorial (North Jersey DX Assn.)

World - 7 MHz
P49Y (Opr.: Andrew Faber, AE6Y)
Donor: Alex M. Kasevich, VP2MM

World - 3.5 MHz
EA8CMX (Opr.: Leppala Mauri, OH2BYS)
Donor: Fred Capossela, K6SSS

World - 1.8 MHz
CN2R (Opr.: James Sullivan, W7EJ)
Donor: Kenneth Byers, Jr., K4TEA

USA - 28 MHz
Courtney Judd, K4WI
Donor: Wireless Institute of the Northeast

USA - 21 MHz
Steve Sluz, NY3A
Donor: *CQ* magazine

USA - 14 MHz
Robert Shohet, KQ2M
Donor: Northern Illinois DX Association

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

USA - 3.5 MHz
Theodore J. Demopoulos, KT1V
Donor: Bill Feidt, NG3K

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

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

Carib./C.A. (14 MHz)
TG9/IV3IYH (Opr.: Roberto Pagano, IV3IYH)
Donor: *CQ* magazine

Europe - 28 MHz
Aleksander Zagar, S57S
Donor: Jay Pryor, K4OGG

Europe - 21 MHz
Ivica Matkic, E76AQ
Donor: Robert Naumann, W5OV

Europe - 14 MHz
CT1JLZ (Opr.: Jiri Pesta, OK1RF)
Donor: G3FXB Memorial (Maud Slater)

Europe - 7 MHz
OH2BH (Opr.: Ilkka Koreela, OH1WZ)
Donor: Ivo Pezer, 9A3A

Europe - 3.5 MHz
9A5Y (Opr.: Sasa Pokorni, 9A3NM)
Donor: K3VW Memorial (Frankford Radio Club)

Europe - 1.8 MHz
Arunas Vaglys, LY2IJ
Donor: Pat Barkey, N9RV & Terry Zivney, N4TZ

Japan - 21 MHz
Hiroyuki Inaba, JS3CTQ
Donor: *CQ* magazine

Japan - 14 MHz
Kenji Koishi, JH3AIU
Donor: Chris Terkla, N1XS

Asia – 21 MHz
Ryutaro Ezaki, JS6RGY
Donor: Coconut Wireless Contest Club

Asia – 14 MHz
4X2M (Opr.: Arthur Avrunin, 4X4DZ
Donor: *CQ* magazine

MULTI-OPERATOR, SINGLE TRANSMITTER
World
PJ4A (Oprs.: K4BAI, W4OC, KU8E, NO2R)
Donor: Anthony Susen, W3AOH

U.S.A.
W2FU (Oprs.: KØSM, K2DB, K2TJ, N2PP, N2ZN, W2FU, WB2ABD)
Donor: Douglas Zwiebel, KR2Q

Canada
VE3EJ (Oprs: VE3EJ, VE3EY, VE3OI)
Donor: Eastern Canadian DX Assn.

Carib./C.A.
VP5W (Oprs.: W7VV, VE7XF, N9ADG)
Donor: Lone Star DX Association

Africa
EA8ZS (Oprs.: EA8ZS, EA8BEX, EA8BQM, EA8DP, EA8AKW, EA8CAC)
Donor: Harry Booklan, RA3AUU

Asia
C4N (Oprs.: 5B8AD, RA9CKQ, RV6LNA, UA9CDV)
Donor: Steve Merchant, K6AW

Europe
OM8A (Oprs.: OM2KW, OM2VL, OM3BH, OM3GI, OM3NA, OM3RM, OM7JG)
Donor: Bob Cox, K3EST

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

Oceania - Pacific Rim
AH2R (Oprs.: JI3ERV, JR7OMD, JE8KKX, JK3GAD, JO1DFG)
Donor: Junichi Tanaka, JH4RHF

South America
ZW5B (Oprs.: PY2YU, PY5CA, PY5KD, PY3DX, PY3VK)
Donor: Araucaria DX Group

MULTI-OPERATOR, TWO TRANSMITTER
World
D4C (Oprs.: YL2KL, YL1ZF, LY2CY, IK2NCJ, YL2LY, YL2BJ)
Donor: Array Solutions

USA
WE3C (Oprs.: WE3C, W3FV, NN3Q, KQ3F, KF3B)
Donor: Eric Scace, K3NA

Europe
IR4X (Oprs.: IZ3EYZ, I2WIJ, I4EAT, I4IND, I4TJE, I4IKW, I4VEQ, IK4EWK, IK4DCT, IZ4BOY, IZ4CZE, IK4WMA, IK4UPB)
Donor: Aki Nagi, JA5DQH

MULTI-OPERATOR, MULTI-TRANSMITTER
World
HC8N (Oprs.: W2VJN, W6NL, N3RD, N5RZ, K6AW, KY7M, K6BL, N5KO)
Donor: K2GL Memorial (Doug Zwiebel, KR2Q)

USA
KC1XX (Oprs.: KC1XX, K1GQ, K1QX, K1TR, KA1R, KM3T, N1KWF, N2AA, W1FV, W2RQ, WA1Z)
Donor: N6RJ Memorial (Bob Ferrero, W6RJ)

Europe
DFØHQ (Oprs.: DG1ATN, DJ2QV, DJ9AO, DL1AUZ, DL1DTL, DL3TD, DL4MM, DL5ANT, DL5AOJ, DL5GA, DL5MLO, DL7ZZ, DL8WAA)
Donor: Finnish Amateur Radio League

Japan
JA5FDJ (Oprs.: JA5FDJ, JA5JCC, JH5FIS, JH5RXS, JR5IAH, JR5JAQ, JR5VHU, JM1UWB, JK6RIP, JJ6WYS)
Donor: Ryozo Goto, JH3JYS

WORLD – MULTI-MULTI SSB/CW COMBINED
K3LR: 30,263,912 Points
Donor: WØID Alpha Award

USA - MULTI-MULTI SSB/CW COMBINED
K3LR: 30,263,912 Points
Donor: N8SM Memorial (Operators of K3LR)

CONTEST EXPEDITIONS
World Single Operator
9J3A (Opr.: Niko Safaric, S53A)
Donor: Friends of Phil Goetz, N6ZZ

WORLD MULTI-OP
8Q7DV (Oprs.: UA9CDC, UN9LW, RN4WA)
Donor: Carl Cook, AI6V

SPECIAL - SINGLE OPERATOR AWARD
World SSB/CW Combined
8P5A (Opr.: Thomas Georgens, W2SC)
19,203,784 Points
Donor: Hrane Milosevic, YT1AD

CLUB
World SSB/CW
Yankee Clipper Contest Club (264,245,977)
Donor: W1WY Memorial (*CQ* magazine)

Non-USA SSB/CW
Bavarian Contest Club (197,477,787)
Donor: N6AUV Memorial
(Northern California Contest Club)

** Second Place*

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UA9SG. Long-time QRPer, Doug, KR2Q, took third place world and first place U.S. from northern New Jersey. Fourth place world and number one in Europe was Igor, UA4FER. Igor sums the conditions as: "The high bands were as expected. 15m opened only the first day. Low bands were amazingly above expectation." Second in Europe and fifth in the world was Alec, US2IZ. Third in Europe and sixth in the world was Antonin, OK7CM. Second place in the U.S. was Tom, N1TM. Third place U.S. went to a West Coast station, Frank, W6JTI. Wow! Great job, Frank. Once again special mention must be made of the fine score of Izuno-san, JR4DAH, #13 in the world and #2 in Asia. W8QZA/Ø, NN7SS, NDØC, JA2IVK, JA1KEB, N6WG, and K7TQ are to be congratulated for their outstanding efforts.

The continental winners were: North America TI5N (NØKE), Africa no entry, Asia UA9SG, Europe UA4FER, Oceania no entry, South America PY5MJ, Japan JR4DAH, U.S. KR2Q.

Assisted

Use of any QSO spotting tool places you in the Assisted category. The world top assisted score went to Jack, RW3QC, operating from 5B4AII. Second place world and number one in Europe was Davor, 9A1UN, operating club station 9A1P. Third place world and number two in Europe was Sergey,

TOP SCORES

WORLD

All Band

3V8BB	12,150,138
CT3NT	10,883,558
V47NT	10,201,212
PZ5TT	9,617,985
8P5A	8,856,694
V31WA	8,387,400
P4ØW	8,358,899
CU2X	7,502,385
VY2ZM	7,128,970
ZF2AM	6,809,354

28 MHz

LU1HF	77,691
S57S	10,478
JA6WIF	8,944
4X1VF	1,794
LZ1NG	1,368
UTØEO	80

21 MHz

6W1SE	490,504
9M8YY	271,845
E76AQ	241,984
JS6RGY	216,135
YM2W	205,821
SX5R	149,242

14 MHz

CN2M	2,026,725
KQ2M/1	965,125
CT1JLZ	905,905
4X2M	894,057
P49V	887,832
9A9A	755,494

7 MHz

P49Y	1,495,350
TC4X	1,333,164
ZC4LI	1,240,919
KH7B	1,222,634
RW9USA	1,053,876
ZM3A	866,880

3.5 MHz

EA8CMX	1,003,160
EY8MM	800,730
9A5Y	719,476
UN4L	695,898
SN7Q	649,952
F6ARC	649,887

1.8 MHz

CN2R	520,734
LY2IJ	329,372
SP3BQ	296,320
SN3R	270,125
LN9Z	254,016
OHØV	234,814

Low Power
All Band

P4ØQ	7,959,549
V26K	6,837,842
6V7N	6,300,198
HI3A	5,367,863
CS2T	4,579,659
9J3A	3,582,670
VE2XAA/2	2,988,643
YN2Z	2,869,940
J88DR	2,689,993
YS4RR	2,526,650

28 MHz

PU2MTS	13,572
LU1EJ	7,056
LW6DW	5,644
UA6AK	3,924
YO2AOB	3,264
K4WI	2,784

21 MHz

ZL3TE	145,250
YD1HUH	95,574
WHØS	80,360
JR3EOI	70,844
EA2AZ	65,932
OK2N	59,653

14 MHz

C6AKX	876,561
VP9I	641,792
LZ6W	494,725
W1MU	482,980
9A3B	465,365
HA8IH	417,186

7 MHz

UK9AA	787,200
C6AQQ	449,150
E21EIC	413,505
SQ9C	365,378
RA9AP	357,500
HK3TU	316,940

3.5 MHz

C6ATA	549,669
9AØAA	267,570
TA3D	267,410
OM3RDX	172,816
HA6NL	159,372
EU1CL	126,658

1.8 MHz

TA2RC	105,960
E77CFG	95,920
CM6RCR	83,348
UA9CBM	56,883
OMØTT	55,918
S52W	54,054

QRP
All Band

TI5N	1,154,937
UA9SG	712,725
KR2Q	664,699
UA4FER	659,296
US2IZ	615,942
OK7CM	594,580
YO8WW	512,426
OM7DX	502,560
UR5LAM	460,252
IK8EJN	457,808

ASSISTED
All Band

5B4AII	9,026,464
9A1P	6,510,080
ERØWW	6,073,268
NP4Z	5,980,898
K3WW	5,011,460
LP1H	4,689,190
E7DX	4,096,300
YQ9W	3,753,580
S57DX	3,682,656
KV2K	3,653,673

MULTI-OPERATOR
SINGLE TRANSMITTER

PJ4A	13,571,652
C4N	12,825,008
OM8A	9,946,342
TM6M	8,436,540
M6T	8,352,822
OM7M	8,170,184

MULTI-OPERATOR
TWO TRANSMITTER

D4C	31,955,086
PJ2T	19,313,427
P3F	17,276,832
KP2M	14,804,065
WE3C	10,750,157
8Q7DV	10,693,344

MULTI-OPERATOR
MULTI-TRANSMITTER

HC8N	32,378,115
3X5A	29,423,646
CT9L	22,783,077
KC1XX	14,636,349
K3LR	14,167,062
DFØHQ	13,161,400

UNITED STATES

All Band

K1LZ	6,796,620
K5ZD/1	6,666,975
K1DG	5,751,568
K3CR	5,697,146
NN4TO	5,366,740
N2IC/5	4,371,558
W9RE	3,904,510
K3ZM/4	3,808,512
K5GO	3,801,060
N2LT	3,655,708

21 MHz

NY3A	128,744
K4FJ	96,990
W6YA	57,340
W9XT	55,584
WA7LT	23,324
NI5F	7,896

14 MHz

KQ2M/1	965,125
K1RU	720,800
N2BA	623,149
K9BGL	500,157
NN1N	481,270
WW2DX	460,183

7 MHz

N2MF	620,740
K8PO/1	558,600
W7WA	496,557
K9OM/4	434,304
W1XX	300,729
W2XL	233,248

3.5 MHz

KT1V	423,654
W1MK	417,625
K1ZZI/4	303,537
K9NW/8	230,112
W3NO	169,344
W7AT	101,520

1.8 MHz

N7UA	139,411
K4PI	71,346
W4ZV	62,600
K7BG	41,840
N6TR/7	40,581
K1LT/8	38,632

Low Power
All Band

K1BX	2,301,420
N1UR	2,274,316
N5AW	1,754,984
N8AA	1,640,768
N4TZ/9	1,600,837
KS1J	1,266,027
W3EF	1,200,165
K2PS	1,074,827
W3AU/4	986,164
WJ9B/4	906,476

28 MHz

K4WI	2,784

21 MHz

WB4TDH	39,432
NG3Q/8	26,936
K9WZB/7	14,912
N4PQX	12,804
K8IR	8,085
W3DF	5,474

14 MHz

W1MU	482,980
WA1FCN/4	218,241
N4IJ/5	206,769
K2MFY	165,710
KR2AA	149,172
W2AW	127,292

7 MHz

K5RQ/4	132,600
W2EG	96,801
K3TW	63,765
K4MWB	62,941
K1MM	52,316
NA2AA	51,600

3.5 MHz

K9CS	47,334
W8GF	24,153
KØPJ/9	23,870
K7ZV	14,008
W1NK	12,160

1.8 MHz

W2LC	17,094
N2WN/4	7,392
NA4W	3,204
NT6K	2,530
WO9S	1,806
WD5BJT	132

QRP
All Band

KR2Q	664,699
N1TM	378,000
W6JTI	266,684
W8QZA/Ø	207,580
KT8K	184,830
NN7SS	95,178
AA1CA	92,800
NU4B	89,838
NDØC	88,752
KIØG	72,618

ASSISTED
All Band

K3WW	5,011,460
KV2K	3,653,673
N3AD	3,414,870
N1EU/2	2,847,614
W2RE	2,690,926
W1HR	2,602,839
K3PH	2,536,800
K3OO	2,525,587
N2MM	2,135,006
WB9Z	2,132,310

MULTI-OPERATOR
SINGLE TRANSMITTER

W2FU	6,377,626
W3UA/1	5,991,040
K8AZ	5,452,970
K9RS/3	5,162,400
K5NA	5,097,456
KT3Y/4	5,053,658

MULTI-OPERATOR
TWO TRANSMITTER

WE3C	10,750,157
K1AR	9,801,726
K1KI	8,369,448
NY4A	7,478,809
K2LE/1	6,118,125
KØTV/1	4,952,524

MULTI-OPERATOR
MULTI-TRANSMITTER

KC1XX	14,636,349
K3LR	14,167,062
W3LPL	13,084,806
K1TTT	9,769,104
W1KM	9,707,721
N3RS	9,409,104

EUROPE

All Band

CU2X	7,502,385
4O3A	6,425,418
SV9CVY	6,152,727
DJ5MW	4,427,990
S5ØA	4,426,425
OE4A	4,185,874
OH4A	3,515,420
TM6X	3,444,525
ES5TV	3,397,441
DL3YM	3,301,200

28 MHz

S57S	10,478
LZ1NG	1,368
UTØEO	80

21 MHz

E76AQ	241,984
SX5R	149,242
YTØZ	144,540
9A7R	140,185
OK4RQ	74,549
RZ6HX	59,301

14 MHz

CT1JLZ	905,905
9A9A	755,494
YT1BB	692,716
S57AL	689,040
Z35T	500,742
9A5D	486,522

7 MHz

OH2BH	865,884
S52AW	864,280
Z37M	822,976
DJ1YFK	751,128
OT4A	694,620
YU7KW	691,680

3.5 MHz

9A5Y	719,476
SN7Q	649,952
F6ARC	649,887
OHØX	507,468
S53MM	499,204
HA8JV	476,112

1.8 MHz

LY2IJ	329,372
SP3BQ	296,320
SN3R	270,125
LN9Z	254,016
OHØV	234,814
YL2SM	231,297

Low Power
All Band

CS2T	4,579,659
OL6P	1,775,565
UA3BS	1,677,740
S51F	1,577,148
LZ9R	1,387,146
UA6GO	1,364,895
S59AA	1,087,616
OK6Y	1,084,132
UT7NW	1,074,020
DD5M	1,050,800

28 MHz

UA6AK	3,924
YO2AOB	3,264
HA6IAB	1,890
9A3VM	1,029
LZ1AG	684
YT2T	180

21 MHz

EA2AZ	65,932
OK2N	59,653
F5JY	40,800
LZ2JA	35,640
LZ2HA	35,405
S54A	34,307

14 MHz

LZ6W	494,725
9A3B	465,365
HA8IH	417,186
GW3YDX	413,362
YT5C	257,012
HG8C	240,732

7 MHz

SQ9C	365,378
S53F	309,442
RK4SA	263,655
OT5W	258,750
YL3FT	251,158
SP6OJE	242,811

3.5 MHz

9AØAA	267,570
OM3RDX	172,816
HA6NL	159,372
EU1CL	126,658
EI6DX	110,732
DAØCA	107,994

1.8 MHz

E77CFG	95,920
OMØTT	55,918
S52W	54,054
YO3FRI	49,932
ES2MC	42,770
UR4CWQ	39,280

QRP
All Band

UA4FER	659,296
US2IZ	615,942
OK7CM	594,580
YO8WW	512,426
OM7DX	502,560
UR5LAM	460,252
IK8EJN	457,808
HA6IAM	422,244
DF1DX	341,601
UA6LCJ	315,436

ASSISTED
All Band

9A1P	6,510,080
ERØWW	6,073,268
9A7A	6,038,824
E7DX	4,096,300
YQ9W	3,753,580
S57DX	3,682,656
DC4A	3,465,924
YR9P	3,344,800
DL1IAO	3,333,651
G1A	3,310,868

MULTI-OPERATOR
SINGLE TRANSMITTER

OM8A	9,946,342
TM6M	8,436,540
M6T	8,352,822
OM7M	8,170,184
IR4M	8,128,603
RW2F	7,699,328

MULTI-OPERATOR
TWO TRANSMITTER

IR4X	9,297,256
LX7I	9,006,194
HG1S	7,466,250
DQ4W	6,969,048
HB9CA	6,698,660
OG2U	5,790,440

MULTI-OPERATOR
MULTI-TRANSMITTER

DFØHQ	13,161,400
LZ9W	12,613,560
EE2W	11,126,400
DR1A	10,795,902
SK3W	8,615,376
LX8M	6,508,644

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Lightweight HF Linear

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

HL-1.5KFX
HF/50MHz Linear

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

HL-2.5KFX
HF Linear Amplifier

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

HL-1.2KFX
750W PEP HF Desktop Linear

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

Tuners from TOKYO HY-POWER

HC-1.5KAT
HF 1.5KW Auto Tuner

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

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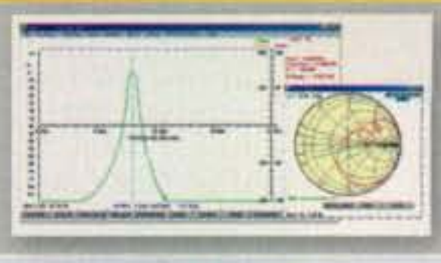
AA-200/AA-500 & AIM 4170

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

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

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



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

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

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

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WXØB ARRAY SOLUTIONS

Charles, K3WW, #1 U.S. Assisted, all band.

Krassy, K1LZ, #1 U.S. high power, all band.

Dave, K5RQ, low power 7 MHz.

UT5UDX, again putting ERØWW in a lot of logs. Third place in Europe went to Emir, E77DX, operating E7DX. First place in the U.S. was taken by someone who knows the assisted category very well: Charles, K3WW took top honors. Noah, K2NG, keyed KV2K to second place in the U.S. To round out a complete Frankford Radio Club sweep of the top slots, Alan, N3AD, took third place U.S. The strong efforts of BU2AI, 9M6/N2BB, and ZL1BYZ gave nice multipliers to many contesters.

The continental winners were: North America NP4Z, Africa ED4R/8 (EA4SV), Asia 5B4AII (RW3QC), Europe 9A1P (9A1UN), Oceania KG6DX, South America LP1H (LU5DX), Japan JH3PRR, U.S. K3WW.

Multi-Single

The Multi-Single category attracts a lot of interest—especially the CQWW MS, which allows the use of a second skilled operator on a second band to work only multipliers. A really competitive MS is an excellent run operator plus a multiplier expert. Atop of the world standings was the joint effort of PJ4A manned by the South East Contest Club and the Frankford Radio Club. Last year's winner, C4N, took away the second place award. Taking third place world and number one in Europe was the team of OM8A. Multi-single is very competitive, especially within Europe. Finishing second was TM6M from radio club F6KHM. Making their first appearance in the multi-single category in many years, team M6T representing the Martlesham DX & Contest Group took over third place. Making their first appear at the top of the leader board in the U.S. was W2FU. They had the right combination of QSOs and multipliers from western New York. Second place in the U.S. went to W3UA/1; the three operators did a fantastic job. Third place went to Tom's team, K8AZ.

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
3V8BB	342/12/53	1039/20/72	2285/35/107	3062/36/110	485/31/76	29/8/18
CT3NT	241/17/59	907/24/79	1918/33/106	2375/35/113	854/27/92	12/6/11
V47NT	433/16/59	854/22/84	2237/31/106	2549/33/109	1145/27/84	15/6/11
PZ5TT	226/15/37	642/23/76	1379/29/95	2240/34/113	1265/29/105	35/12/17
8P5A	474/18/60	870/22/86	1652/27/91	2212/30/100	1330/28/90	35/11/15
V31WA	130/12/40	659/26/90	2150/36/125	2238/34/123	918/26/75	12/6/7
P4ØW	477/17/61	714/23/90	1293/29/94	1633/31/83	1209/29/80	24/7/13
*P4ØQ	79/12/30	482/20/82	1845/28/93	2099/28/98	1066/31/68	10/3/6
CU2X	406/17/58	869/22/89	1573/31/105	1418/27/103	1598/29/103	71/11/20
VY2ZM	887/21/82	815/26/88	1005/26/101	1746/25/96	168/24/84	11/7/10

USA TOP SINGLE OPERATOR ALL BAND

Station	160	80	40	20	15	10
K1LZ	228/18/62	978/22/93	1135/30/117	1270/29/115	287/26/87	23/8/12
K5ZD/1	125/16/55	712/24/97	1208/32/112	1748/32/124	148/24/69	14/4/6
K1DG	301/16/70	803/23/95	535/24/95	1873/29/116	164/21/75	5/2/2
K3CR	139/16/62	507/24/89	955/30/113	1590/33/122	204/26/76	7/4/3
NN4TO	52/12/40	371/21/88	1441/32/110	1660/32/121	112/24/57	13/6/8
N2IC/5	82/16/48	323/30/85	916/36/114	1220/35/129	158/26/59	14/6/5
W9RE	151/17/50	676/21/87	683/29/106	1294/29/106	114/22/54	8/5/4
K3ZM/4	177/15/63	642/25/87	632/29/93	1176/30/108	75/18/44	6/5/5
K5GO	55/17/34	283/24/78	999/37/112	1202/33/118	114/23/54	8/4/6
N2LT	75/14/46	384/24/83	773/31/104	1015/31/113	178/23/73	3/3/3

WORLD MULTI-OPERATOR SINGLE TRANSMITTER

PJ4A	284/16/55	610/24/95	2627/30/119	2176/36/128	1522/29/97	43/11/21
C4N	335/17/62	1113/27/107	2272/34/118	2390/36/127	795/27/104	38/7/22
OM8A	473/24/90	1384/37/135	1870/38/150	1721/37/141	319/31/110	142/13/51
TM6M	385/18/76	971/29/111	1882/37/137	1982/37/139	295/31/104	16/7/16
M6T	567/23/82	1593/35/129	1448/39/141	1753/38/142	178/27/101	23/6/23
OM7M	686/26/99	1012/32/121	1783/39/149	1255/36/125	264/31/112	91/9/39

USA MULTI-OPERATOR SINGLE TRANSMITTER

W2FU	88/18/69	910/29/113	688/34/132	1515/36/134	119/27/86	11/9/11
W3UA/1	65/16/62	754/28/109	1082/32/121	1579/33/132	76/20/73	8/6/8
K8AZ	83/20/68	462/30/115	923/34/126	1322/34/138	121/27/82	13/9/12
K9RS/3	74/18/64	450/25/105	779/35/122	1428/34/137	171/26/88	13/9/12
K5NA	76/21/75	251/31/111	1170/38/144	1134/35/139	202/30/85	15/9/10
KT3Y/4	83/17/66	198/28/99	1156/35/126	1479/32/138	79/24/77	2/2/2

WORLD MULTI-OPERATOR TWO TRANSMITTER

D4C	205/22/80	1957/30/117	3475/34/127	4153/37/147	2973/35/142	244/20/62
PJ2T	588/23/82	1223/28/106	3111/34/131	2764/35/132	1764/29/101	19/7/13
P3F	496/19/73	1486/28/108	2985/37/135	2643/34/125	1248/30/97	24/9/22
KP2M	390/13/59	1392/28/102	3029/32/115	2826/35/130	1712/28/100	26/9/16
WE3C	132/20/77	806/31/116	1933/37/139	1748/36/143	520/29/106	43/9/14
8Q7DV	164/12/38	948/29/89	1971/36/120	1804/35/119	1578/32/113	86/13/32

USA MULTI-OPERATOR TWO TRANSMITTER

WE3C	132/20/77	806/31/116	1933/37/139	1748/36/143	520/29/106	43/9/14
K1AR	158/16/67	810/29/106	1829/35/137	1798/35/141	404/29/108	28/9/14
K1KI	124/17/65	558/29/115	1415/34/135	1665/34/138	416/28/103	35/10/15
NY4A	64/14/49	716/27/104	1707/35/130	1426/34/130	299/24/94	7/6/6
K2LE/1	57/13/35	664/25/98	1190/34/124	1517/33/128	248/25/92	22/7/11
KØTV/1	72/14/44	639/26/104	839/34/127	1221/31/124	192/24/78	7/4/4

WORLD MULTI-OPERATOR MULTI-TRANSMITTER

HC8N	1094/24/79	1904/32/118	3622/36/134	3438/40/152	2878/37/141	259/23/51
3X5A	873/23/81	1946/27/102	2756/34/117	4246/37/144	2668/33/129	389/17/53
CT9L	828/23/75	1527/27/112	3909/36/130	2941/37/130	1784/27/103	40/11/20
KC1XX	377/19/80	1551/34/126	1998/38/151	2142/38/151	590/29/118	105/13/22
K3LR	373/23/89	1425/35/131	1938/38/153	2116/36/148	679/32/111	62/10/13
DFØHQ	1170/24/88	2288/33/125	2958/38/165	1931/37/148	471/31/103	186/11/47

USA MULTI-OPERATOR MULTI-TRANSMITTER

KC1XX	377/19/80	1551/34/126	1998/38/151	2142/38/151	590/29/118	105/13/22
K3LR	373/23/89	1425/35/131	1938/38/153	2116/36/148	679/32/111	62/10/13
W3LPL	382/20/83	1247/31/119	1905/38/146	2011/37/150	706/29/116	77/12/17
K1TTT	252/17/74	881/29/110	1270/38/140	1998/37/153	388/27/102	113/12/19
W1KM	214/18/75	1088/29/112	1392/34/129	1751/34/140	356/27/101	33/10/14
N3RS	151/19/66	745/31/116	1757/36/135	1721/35/132	439/28/103	29/8/13

W7VJ took top honors from the U.S. West Coast. Outstanding performances were turned in by many teams. Calls appearing in many logs were: NØNI, W7VJ, AB7E, 5KØT, VP5W, TO3R, EA8ZS, RT9W, TA3KZ, A73A, ZM2M, ZM4A, CW5W, and ZW5B.

The continental winners were: North America VE3EJ, Africa EA8ZS, Asia C4N, Europe OM8A, Oceania AH2R, South America PJ4A, Japan JAØQNJ, U.S. W2FU.

Multi-Two

The Multi-Two category needs two stations manned nearly all the time and stations have to move skillfully as the propagation changes. Taking advantage of their location to find openings to the U.S. and Europe, the multi-national team of D4C ran away with world top honors. Taking second place in the world was the Caribbean Contesting Consortium, PJ2T. Third place went to P3F. They commented, "Heaps of fun despite lack luster conditions." First place in Europe went to long-time top finisher IR4X. They have been having a good time on a mountaintop in central Italy for a very long time. Second place in Europe went to LX7I. Their signal sure was booming into the states. Reprising their finish on SSB, third place in Europe went to the MTTOSZ Gyor Varosi Radio Klub, HG1S. Repeating their win on SSB, WE3C's station in eastern Pennsylvania took the top U.S. honors. Second place went to K1AR operating from K1EA's QTH. Third place in the U.S. went to Tom's team at K1KI. Several stations put rare multipliers on the air and made big scores. When great operators activate tough places, they make contacts easy. OX5AA gave a lot of people a double multiplier, YM3A, B1Z, 8Q7DV, ZM1A all added to the fun.

The continental winners were: North America KP2M, Africa D4C, Asia P3F, Europe IR4X, Oceania KH6LC, South America PJ2T, Japan JA1YPA, U.S. WE3C.

EUROPE TOP SINGLE OPERATOR ALL BAND

Station	160	80	40	20	15	10
CU2X	406/17/58	869/22/89	1573/31/105	1418/27/103	1598/29/103	71/11/20
4O3A	163/11/48	673/27/88	1958/39/118	2396/36/110	354/28/79	29/6/16
SV9CVY	378/13/54	814/23/86	2068/34/100	1893/32/108	587/32/93	134/8/26
*CS2T	194/8/42	655/21/86	1465/30/117	1318/30/113	557/25/87	5/3/5
DJ5MW	270/15/56	761/20/85	1072/35/115	1287/34/110	279/28/80	19/5/12
S5ØA	116/15/54	789/25/70	1331/36/107	1411/36/112	218/30/76	11/4/8
OE4A	303/10/47	1280/24/84	1298/30/90	1156/31/97	245/24/65	78/8/29
OH4A	649/19/57	1153/30/85	1055/32/96	811/34/96	99/25/60	10/5/9
TM6X	143/14/52	796/19/65	971/30/104	1044/29/103	325/26/76	5/2/5
ES5TV	661/21/65	1146/25/80	791/27/89	1253/30/92	151/17/50	50/4/21

EUROPE MULTI-OPERATOR SINGLE TRANSMITTER

OM8A	473/24/90	1384/37/135	1870/38/150	1721/37/141	319/31/110	142/13/51
TM6M	385/18/76	971/29/111	1882/37/137	1982/37/139	295/31/104	16/7/16
M6T	567/23/82	1593/35/129	1448/39/141	1753/38/142	178/27/101	23/6/23
OM7M	686/26/99	1013/32/121	1784/39/149	1255/36/125	264/31/112	91/9/39
IR4M	236/22/81	845/32/111	1660/37/143	1586/36/135	560/32/111	63/12/45
RW2F	870/30/98	1749/38/130	955/38/148	1203/36/139	203/29/98	117/10/38

EUROPE MULTI-OPERATOR TWO TRANSMITTER

IR4X	415/18/71	1566/32/117	2629/39/141	1528/37/133	333/31/103	60/11/43
LX7I	672/21/66	1800/29/106	2190/38/140	1862/37/128	463/29/96	34/6/23
HG1S	361/16/61	1767/34/123	2161/38/142	1201/37/136	369/28/102	36/7/26
DQ4W	451/18/67	1199/27/109	1792/38/147	1326/35/134	293/28/100	60/10/31
HB9CA	454/13/56	1488/27/89	1890/38/135	1402/37/129	416/28/89	61/7/22
OG2U	853/23/79	1524/37/127	1239/36/138	1088/36/132	135/23/68	33/4/19

EUROPE MULTI-OPERATOR MULTI-TRANSMITTER

DFØHQ	1170/24/88	2288/33/125	2958/38/165	1931/37/148	471/31/103	186/11/47
LZ9W	967/19/69	2165/34/135	3326/39/158	1972/37/143	581/32/113	78/9/30
EE2W	1124/21/68	1832/30/106	2565/38/135	2067/38/136	1046/32/112	116/9/35
DR1A	1031/20/80	1914/34/123	2109/37/128	1998/38/145	511/30/115	121/8/35
SK3W	966/21/73	1801/38/132	2036/38/144	1479/36/144	249/27/88	94/7/29
LX8M	1291/15/71	1827/23/97	2363/35/132	1172/32/116	235/22/73	40/3/15

Multi-Multi

Going into the Multi-Multi category is a real challenge. Months of planning the station site, gathering operators together, and waiting to see what nature deals you make for a combination of satisfaction and excitement. Operating from just below the equator on the side of an extinct volcano, the number one scorer in the world was HC8N. The world second high score was the VooDoo Contest Group, 3X5A. Third place in the world went to the Rhein-Ruhr DX Association team operating from CT9L. In the U.S. KC1XX pushed on the gas and ended up taking away the coveted U.S. #1 crown. K3LR was not far behind taking second place. Third place went to Frank, W3LPL's fine team from central Maryland. From farther west, NR5M, KØRF, and WØAIH/9 did fantastic jobs. The Ilmenau Contest Club, DFØHQ, once again returned to the first-place position in Europe. Second place went to LZ9W. Third place in Europe went to the Ondarroa Group, EE2W. Finishing as they did on SSB, JA5FDJ showed their muscle by taking first in Japan edging out the Nara QTH of JA3YBK.

The continental winners were: North America KC1XX, Africa 3X5A, Asia JA5FDJ, Europe DFØHQ, Oceania KH7X, South America HC8N, Japan JA5FDJ, U.S. KC1XX.

Team Contesting

A lot of planning goes into the top teams to recruit potential top scores. Teams can be formed with members from anywhere in the world. You can submit your team list to <teams@cqww.com>. You will receive an acknowledgement. For 2008 CW top honors go to team Pile-Up Survivors. Great job! The results of Team Contesting are as follows:

1. Pile-Up Survivors: 8P5A (W2SC), CT3NT (CT1BOH), ERØWW (UT5UDX), PZ5TT (VE3DZ), V47NT (N2NT): **45,633,217**

2. Code Sharks: TO5X (K5UN), V26K (AA3B), K5ZD, ZS1EL, ZS4TX, **23, 654,716**

3. Rhein Ruhr Steamboats: DJ2YA, YR9P, 6V7N, J3/DL5AXX, **18,834,955**

4. FCG #1: HI3A (AD4Z), J68V (K9VV), CW7T (CX7TT), NN4TO (K1TO), N6AR, **17,701,293**

5. CCF Team Sisu: OH8X (OH6UM), OHØZ (OH6EI), OH2BH (OH1WZ), OA4WW (HP1WW), CU2X (OH2UA), **17,649,144**

6. VKCC Devils: 9M2CNC, VK2IA, VK4EMM, VK6DXI, **9,051,909**

7. FCG #2: N4TB, KH7B (KH7XS), NJ4M (WD4AHZ), WK2G, N4BP, **7,178,772**

8. Team Strausberg re-united: 5H3EE (DL4SM), 9G5ZZ (DL1CW), DL4ME, DL5YL, DL5YM, **6,190,777**

9. Carolina DX Association: AA4S, ISØ/ K7QB, N2TU, N4ZC, WA4DOU, **5,391,638**

10. CCF Team Sauna: OG6N (OH6NIO), OG5B (OH5BM), OH4A (OH6KZP), **5,552,060**

11. Contest Group du Quebec: VE2XAA/2, VA2WDQ, VE2SB, VA2SG, VE2GHI, **4,913,545**

12. MCC#1: VY2SS, VE1RGB, VA1MM, VE1DT, VE1OP, **4,672,421**

13. VKCC Bushrangers: VK2BJ, VK2BPL, VK2GR, VK2IM, VK2NU, **2,632,714**

14. DXXE CW Freaks: XE2AUB, XE2S, XE1MM, XE1AY, XE1CT, **2,292,425**

15. FCG #3: N4CJ (G4BUE), KN4Y, K9OM, KE1F, **1,590,060**

16. VKCC Blue Tongues: PA0MIR, VK4TI, VK6LW, VK7GN, VK8AV, **1,522,820**

17. FCG #4: K5AUP, N2AN (WC4E), K4PG, **560,169**

18. DXXE CW light: LU8ADX, XE1ZVO, XE1NW, XE2WWW, **492,899**

19. FCG #5: W4EBA, **24,960**

Records

Take a look at the record list at CQWW.com and try to better an existing record. There are hundreds of records to try to beat. If you discover an error in the record list, please document it and let us know at <questions@cqww.com>. The following stations used their skill to obtain new CW records. Congratulations!

World: 14 CN2M (OH2MM); L3.5 C6ATA (K2KW); A7 IG9W (IZ1GAR); M2 D4C. **U.S.:** L14 W1MU. **North America:** L14 C6AKX (KE7X); L3.5 C6ATA (K2KW). **Africa:** 14 CN2M (OH2MM); A7 IG9W (IZ1GAR); M2 D4C. **Asia:** 3.5 EY8MM; A14 UP2L (UN7LZ);

CLUB SCORES

UNITED STATES

Yankee Clipper Contest Club	264,245,977
Frankford Radio Club	260,356,679
Potomac Valley Radio Club	135,287,845
Northern California Contest Club	76,863,949
Florida Contest Group	56,197,493
North Coast Contesters	50,898,748
Society of Midwest Contesters	50,397,751
Southern California Contest Club	46,462,006
South East Contest Club	36,840,999
Central Arizona DX Association	31,060,778
Minnesota Wireless Assn	28,407,752
Carolina DX Association	28,284,340
Western Washington DX Club	20,839,421
Mad River Radio Club	17,376,988
North Texas Contest Club	15,987,238
Central Texas DX and Contest Club	15,275,070
Hudson Valley Contesters and DXers	12,890,781
Grand Mesa Contesters of Colorado	12,471,090
Willamette Valley DX Club	12,295,376
Tennessee Contest Group	11,735,803
Rochester DX Assn	10,132,278
CTRI Contest Group	7,777,558
Alabama Contest Group	6,842,920
Mother Lode DX/Contest Club	5,764,808
Low Country Contest Club	4,467,905
Southwest Ohio DX Association	3,773,002
Utah DX Association	3,121,820
Western New York DX Association	1,867,151
Louisiana Contest Club	1,858,794
Kansas City DX Club	1,669,758
Northern Illinois DX Association	1,257,016
Boring Amateur Radio Club	1,172,181
Southern California DX Club	1,126,925
Sterling Park Amateur Radio Club	944,174
Spokane DX Association	835,920
Oklahoma DX Association	797,301
Kentucky Contest Group	780,004
Southeastern DX Club	729,740
Metro DX Club	727,844
Northern Arizona DX Assn	602,953
Bay Area Wireless Association	587,359
Northern Rockies DX Association	537,253
Redmond Top Key Contest Club	506,656
Carolina Shine	490,434
Mississippi Valley DX/Contest Club	385,569
San Diego DX Club	344,701
West Park Radiops	312,298
Arrow Communications Association	196,080
Bergen ARA	194,272
New Mexico Big River Contesters	187,049
Portage County Amateur Radio Service	177,876
Order of Boiled Owls Of New York	125,676
Eastern Iowa DX Association	61,044
Short Mountain Repeater Club: 910 Codgers4	55,012
South Jersey DX Association	39,578
Midland Amateur Radio Club	8,402

DX

Bavarian Contest Club	197,477,787
Rhein Ruhr DX Association	155,898,969
Contest Club Finland	110,930,529
Contest Club Ontario	79,549,522
Araucaria DX Group (PY)	73,440,297
LU Contest Group	50,376,149
Russian Contest Club	49,407,678
Black Sea Contest Club	47,951,347
Ural Contest Group	45,556,941
Slovenia Contest Club	43,305,529
Croatian Contest Club	40,282,373
Ukrainian Contest Club	37,821,042
Chiltern DX Club (G)	37,535,768
YU Contest Club	34,625,078
LZ Contest Team	28,516,275
Kaunas Univ. of Technology R.C.	26,567,923
Hungarian DX Club	26,170,679
Bosnia and Herzegovina Contest Club	24,376,408
Sky Contest Club	24,028,903
SP DX Club	21,479,352
Latvian Contest Club	21,137,275
VK Contest Club	20,089,258
South Ural Contest Club	17,001,150
*World Wide Young Contesters	16,723,703
UA2 Contest Club	15,372,090
Madeira Contest Team	14,075,895
British Columbia DX Club	13,299,120
LA Contest Club	11,874,014
Tartu Contest Club (ES)	11,509,940
Top of Europe Contesters (SM)	11,304,572
Lithuanian Contest Group	9,429,086
ALRS St Petersburg	9,043,585
LYNX DX Group (EA)	8,778,952
Bashkortostan DX Club (UA9W)	8,275,397
Rio DX Group	8,086,799
Maritime Contest Club (VE)	7,897,637
GMDX Group	7,430,917
Contest Group Du Quebec	6,781,579
CE Contest Group	6,655,309
Radio Club Radu Bratu (YO)	6,191,476
West Serbia Contest Club	6,108,452
Grupo DXXE (XE)	5,556,481
Belarus Contest Club	5,530,190
Belokranjec Contest Club (S5)	5,514,598
Les Nouvelles DX (F)	5,347,284
TuPY DX Group (PY)	5,094,766
East Coast Canada Contest Club	4,907,814
Novosibirsk Contest Club	4,119,133
Vrhnika Contesters (S5)	3,859,643
Michurinsk Contest Group (UA3R)	3,783,730
Orenburg Contest Club (UA9S)	3,756,998
Foshan Amateur Radio Club (BY7)	3,683,734
Shakhan Contest Club (UA6Y)	3,479,017
Northern Greece Contest Team	2,929,156
ATCC (EY)	2,894,492
Grupo Argentino De CW	2,851,307
Yaroslavl Contest Club (UA3M)	2,718,334
Amigos Radio Altoaragon (EA2)	2,593,887
Radio Club Sporadic (UA3W)	2,541,118
Waikiki Amateur Radio Club	2,505,130
Perm Radio Club	2,446,445
Danish DX Group	2,441,007
Alberta Clippers	2,405,430
Stavropol Region Radio Club (UA6H)	2,197,292
Belarus DX Club	2,113,006
Temirtau Contest Club (UN)	2,106,061
Guara DX Group (PY)	2,042,787
Radioclub Ljubljana	1,965,343
Dnepr Contest Group (UR5E)	1,922,933
Moscow Radio Club	1,776,570
Fox Contest Club (YU)	1,684,319
Irkutsk Radio Club	1,535,585
Central Siberia DX Club	1,523,801
Low Land Crazy Contesters (PA)	1,517,524
YO DX Club	1,441,104
Balkan Contest Club (LZ)	1,408,480
Czech Contest Club	1,389,713
Podolsk Radio Club (UA3)	1,321,904
Grupo HK CW	1,309,548
Novokuznetsk Radio Club (UA9U)	1,287,960
*RU-QRP Club	1,193,243
Obninsk QRU Club (UA3X)	1,190,233
Kiev Contest Group	1,161,648
Vytautas Magnus University R.C.	1,146,684
KKKK Contest Club (UA6A)	1,036,158
Calgary Amateur Radio Association	1,017,143
ARCK (UAØ)	948,531
CSTA Bucuresti	931,298
SK6AW Hisingens Radioklubb	911,868
South German DX Group	900,204
599 Contest Club (JA1)	886,622
SP Contest Club	885,066
Ivanovo DX Club	872,320
Jablanik Bears Contest Club (YU)	814,129
Siam DX Group	809,528
Southwest Scania Radioamateurs (SM7)	801,409
Cantareira DX Group (PY2)	793,509
Saskatchewan Contest Club	789,023
Rostov Club	786,678
Sozvezdie Club (UA3Q)	777,419
Vladimir Radio Club	767,557
Austrian Contest Club	712,229
Bristol Contest Group	705,993
Icelandic Radio Amateurs	654,896
Tikirriki Contest Club (I)	653,264
CS YO HD Antenna DX Group (YO)	612,870
Prima Klub (OK)	604,085
Haros Radio Club (HA)	602,081
Stv Radio Club (ES)	547,914
Solnice Contest Club (OK)	534,216
Donbass Club	527,198
Kiel Canal Aktivity Group (DL)	524,576
Tera Radio Club (HB)	515,888
Poisk Club (UAØA)	477,600
University of Tokyo Contest Club	458,564
Arj Arad (YO)	446,571
Samotlor Club (UA9J)	434,853
Strumble Head DX & Contest Group (GW)	433,630
Maycopskij Radio Club (UA6Y)	422,384
Kemerovo Radio Club	405,915
Spektr Club (UA3)	380,075
Tiras Club (ER)	339,686
Marconi Contest Club (I)	327,065
Stx Contest Club (KP2)	321,126
Krivbass (UT5E)	287,333
Cs Petrolul Ploiesti (YO)	287,104
Svark (SM7)	259,501
Csm Baia Mare (YO)	258,739
Amsterdam DX Club	230,806
R4f-DX-G	203,681
Radio Club Parma	202,434
Kirov Radio Club	187,311
Bracknell Amateur Radio Club (G)	179,351
Radio Klub Zagreb	178,972
Kiev Radio Club	176,630
Yamal Radio Club	165,645
Bahia DX Group (PY6)	162,584
Nor Nizhegorodskoe A.R. Community (UA3T)	160,412
SP-CW-C	157,265
CSM Cluj-Napoca (YO)	136,998
UR-QRP-Club	77,311
Eshaness Radio Club (Shetland Is)	63,346
CS Silver Fox Deva (YO)	53,446
Radio Klub Bagdala (YU1)	49,399
Shetland Contest Group (GM)	4,750

** Not a qualifying club.*

Dimitry, UT5UGR, put V31WA in many logs.

Vlad, UN5J, made a nice score on 21 MHz.

A3.5 5B/AJ2O (RN3QY). **Japan:** 3.5 JH1OGC; 1.8 JA7NI; Q7 JQ2UOZ; Q3.5 JA6GCE; A3.5 JN4MMO; A1.8 JH2FXK. **Europe:** 1.8 LY2IJ. **Oceania:** 7 KH7B (K4XS). **South America:** Q7 LU4MHQ; A7 PY7ZY.

Special Mention

Over the years, the CQ WW has become famous for hams going on Dxpeditions. It is easy to do. Just put some wire in your luggage, pack a small transceiver, jump on a plane, and head to a QTH near the water. You will be surprised how much fun you will have when you become the chased. Some of the DXpeditions that made the contest more interesting for all of us were: V26K, C6AKX, C6ATA, 8P5A, V31WA, VP9I, ZF2AM, YS4RR, J3/DL5AXX, TO2HI, TG9/IV3IYH, HQ9R, FM/F5IRO, VP2MDG, FJ/WJ2O, V47NT, J68V, J6/WØSA, EA8CMX, SU9HP, 9G5ZZ, 3B8/SM6GOR, CN2M, CN2R, C98LW, 6V7N, 5H3EE, 3V8BB, 9J3A, YM2W, TC4X, TA4ZA, 8Q7SC, 9M2CNC, OHØZ, OHØX, OHØV, OHØ/OH2LRE, CU2X, EA6IB, SV9CVY, J43J, HBØ/DK9TN, HBØ/DK4YJ, ERØ/UR5FEO, ERØ/UTØFT, ISØ/OLØA, 9M8YY, 9M6NA, 9M8DXX/6, WH2D, AHØBT, H44MY, YJØMM, R1ANR, P4ØW, P49V, P4ØQ, CEØY/SM6CUK, OA4WW, PZ5TT, TI5N, ISØ/OK1CZ, TO5X, HKØB/HK3JJH, IG9W, IG9X, ED4R/8, 5B4AII, 5B/AJ2O, 4X/DL3PS, EI/W5GN, ERØWW, ISØ/K7QB, ISØ/IT9VDQ, 9M6/N2BB, 5KØT, VP5W, 5C5T, TO3R, A73A, AH2R, PJ4A, OX5AA, KP2M, D4C, YM3A, P3F, 8Q7DV, PJ2T, TO4X, 3X5A, CT9L, and HC8N. Special mention must be made of the fantastic 160-meter single band win of N7UA. 160 conditions favored the West Coast at least once in our lifetimes!

Comments

Although conditions were far from excellent, contesters found a way to extract the maximum fun. The high bands suffered but the low bands were very good. Forty meters from the East Coast really never closed to Europe for 48 hours. The U.S. West Coast experienced dream-like conditions on 160 meters. The number of entrants in the CW contest set an all time high! We received about 5300 CW contest logs of which about 5150 were electronic! Between SSB and CW over 10,350 logs were received. Your continued submission of an electronic log allows the CQ WW CC to process the enormous amount of data received. We have again provided open logs so that you can learn about propagation and how the top scores do their operating. Thanks to all the contesters around the world who sent in a log. *Please send in your log no matter how small.*

Your effort to submit an electronic log allows for a fairer adjudication process. Submitting an electronic log is easy. Send your SSB log to <ssb@cqww.com>; CW to <cw@cqww.com>. Please send your log in Cabrillo format. If you did everything OK, you will get back an acknowledgment. If there was something wrong, you will get a mes-

sage telling you what to do to correct the error. You can then resubmit your log to the same above addresses. There is an added reason to submit an electronic log. We have a copy in case you suffer a computer failure. If you have the capability with your logging program please submit a log with exact frequencies. Exact frequencies help in the log checking and help with statistical analysis of band openings. Each year anyone who submitted an electronic log receives a UBN report of how their log was judged. The CQ WW CC provides many ways for an entrant to check his/her log for category, club, operator, and score accuracy. Long before the final results are published, a logs received list, with your category and your report are posted on the CQ WW site <http://www.cqww.com>. Look over the information to find if yours is accurate.

Double-check your Cabrillo submission. Please make sure the correct category is indicated and the call you used in the contest is shown. If you are submitting a single band entry, please check to see your chosen entry matches what is in your log. With your input and effort the results are made as accurate as possible. Everyone enters the contest to have fun, meet friends, perhaps work some new ones and fairly compete. You can see information concerning the CQ WW Contest on the web page mentioned above.

If you plan to try to make the elite Top Scores box, you can count on your log being scrutinized. The few contesters trying to win a number one position in the world, USA, or Europe must realize the necessity of honesty in their efforts. In order to ensure the legitimacy of these very top scoring entrants, a new rule has been added for the 2009 CQ WW contests (see the 2009 rules elsewhere in this issue). The new rule reads: "A competitor who wishes to be judged for a top score in their category must agree to a potential visitation at any time during the contest by an observer appointed by the CQ WW Contest Committee. Failure of the entrant to respond to our correspondence or to allow an observer full access to the contest QTH may result in the competitor being removed from award eligibility for three years." This observer can serve two positive purposes. First, the observer legitimizes the ongoing operation and second, the observer through observation can learn skills from a master contester. In a perfect world we would not have to spend this extra effort to check potential top contenders; however, some entrants feel they must win even if it means not following the rules. Just as in other aspects of life, cheating will not be tolerated. Although 99% of entrants will not be affected by this new rule, those few top contenders who are affected are important because they set an example of what is possible in our sport.

The use of a QSO spotting network of any kind places the entrant in the Assisted category. The Assisted category is fully competitive and fun. When you do use a spotting aid, please claim to be Assisted. The use of undeclared packet, the use of additional operators for a single operator entry, two signals at the same time on the same band or on separate bands at the same time, if you are single operator, is in violation of the CQ WW rules. 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, reverse log time/band checking (the stations an entrant works can be electronically queried for frequencies and times; therefore an entrants 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. This year we had to reclassify and disqualify several stations. These few individuals take up hundreds of hours of work by the CQ WW CC to find what they are trying to hide.

It is an exciting time in contesting. There have been recent advances in remote radio control and CW decoding software. Both of these interesting advancements will surely impact future contesting. CQ has developed a new Xtreme category which allows for innovation and implementation of new technologies. If you are interested in this new category you can find the rules at <http://www.cqww.com> and click on the Xtreme category rules for 2009 (or see the June issue of *CQ* magazine).

Thanks

The final line scores you see in *CQ* magazine

are the product of a lot of work. With your help and our bookkeeping, we hope the results are as true as possible. We use many log-checking tools and data sources to certify the winners. The members of the Committee who provided insight into many contesting topics are: K1DG, K3WW, K3ZO, KR2Q, K3LR, N2AA, N2NC, N3ED, N9RV, W3ZZ, K1AR, KM3T, KT3Y, W5OV, K5ZD, N2NC, WØYK, N5KO, K6AW, N6AA, N6TW, N6TR, K5TR, W6OAT, and N8BJQ. The DX advisors who offered advice and sorted out potential problems are: CT1BOH, EA3DU, F6BEE, G3SXW, JE1CKA, OH2KI, OH2MM, PY5EG, S50A, UA9BA, VA7RR, VE3EJ, and E21EIC. A special thank you to Ken, K1EA, who spent countless hours making the CQWW database the best in contesting. We want to thank Barry, W5GN. Barry has provided the machinery to send certificates to you in a timely manner. The CQ WW records are maintained by John, N2NC, and K3EST.

Congratulations to all the winners and entrants! CU in the 2009 contests!

73, Bob, K3EST

DX QRM

It's my first ever WW CW Contest and I'm now the first Tunisian CW operator ever. I'm very happy for this first participation. Look for me next year! Thanks for managing this great contest! . . . **3V8SS.** QRM heavy. Ops good. Woodpecker back on 40m. Sigs strong. 10m still dead . . . **7J1AQH.** Probably youngest participants: 9A3BOB (15 yrs) 329 QSOs, and 9A3CIB (14 yrs) 139 QSOs . . . **9A1CIG.** Thanks to A71CV and A71CO for their help with generator and setup. Sorry we could not spend more time on the low bands, but we had local thunderstorms and rain most of the weekend! Lots of really FB operators out there . . . **A73A.** First time taking part in CQWW CW in Multi-Op category, using special event callsign for the 150th birthday anniversary of Acharya Jagadish Chandra Bose, the inventor of wireless communication using millimetric waves. The operators thank all of those who gave QSOs, asked repeats of calls again and again . . . **AU5JCB.** My first Top band contest, lots of fun! Worked a few new ones on TB. It's tough in a contest running only barefoot into a sloper and using a horizontal loop as RX antenna. . . . **BD7JSQ.** Many thanks to my old school (5B4ES) for hosting me again after many years. Very poor propagation conditions but still great CW test! Lot of fun! Many CW enthusiasts show that CW will never die. Thanks for maintaining CW and amateur radio spirit alive. Best 73s for everyone . . . **CT1BWW.** This was my second CQ WW DX CW competition. I like CW and QRP and so I spend more than 17 hours active on the air. There are now lot of new countries down in my log. I enjoyed this contest! Thank you to all for the work . . . **DF2OK.** First CW participation in my life, being an experienced SSB-only old timer (64 now)! S&P only, but great fun and a lot of respect for what is possible within low signal reception in CW . . . **DL8OH.** Thanks E21YDP for invited me to used his station, which is same station as Fred, HSØZAR/K3ZO used in CQWW CW 2004 and 2007. This is my first time on 40m single band contest. Congrats to Bruce, XW1B, for his new MonstIR antenna at 45 m. His signal very loud! A lot of fun! . . . **E21EIC.** S&P all the way. Fantastic fun. Highlight: ZM3A at 1130 UTC local time on Sunday morning. Low point: Could not work JA (Z25) no matter how hard I tried. Thanks to 9M2CNC for a good contact (in the end) despite horrible QRM. Great Ears Award goes to ZM3A and 9M2CNC . . . **EI4HQ.** I did my best with 100W and a dipole. Not the ideal setup at bottom of solar cycle . . . **F5SGI.** I just love the last hour. We have had 47 hours before, but we all go mad in the last hour. Then silence. Never ceases to amaze me . . . **GØVDZ.** My thanks to all the amateurs who activated the rarer country prefixes . . . **G4EBK.** Problems, problems, problems. Lost antenna control cables due to mice activity in the garden; lost 160m dipole due to icing until we cleared it; lost main computer due to failed 160m dipole high voltages/currents; but it was still fun despite the poor 10/15 conditions We spent a lot of time outside in the dark fixing things this time . . . **G5W.** Seriously thinking of taking up stamp collecting! Telescoping tower imploded 3 weeks ago destroying HF and 6 metre beams. Left with 80 metre doublet. Set up day prior to contest to do a single band entry. Due to changes in earthing(?) PC had RF in. Took all day Saturday solving problem, then half hearted but enjoyable bash for a few hours on 80 metres where conditioned seemed reasonable for my simple setup. The GW prefix really does help! . . . **GW3JXN.** Fun test, good openings on 40 and 80. Worked over 100 QSOs on 80 from a city lot, so should be some smiles out there from people needing zone 26 on 80 . . . **HSØZDY.** All wire antenna operation. Thanks to J69KZ and friends for their outstanding island hospitality! . . . **J68V (Op K9VV).** Two full timers (NRI and me) made 99% of our QSOs. Atsu, JF3NRI (aka N9KAU) visited Hokkaido from Tokyo for the test for the first time to my QTH and to JA8. Very tough condx on high bands, but low bands were great. The most mults ever on both 80m and 160m. Finally worked South America (HC8N) on 160m for the first time and completed 160m WAC at last! . . . **JA8RWU.** First trial for me! . . . **JI3OGI.** Once again, the contest of contests makes for an exciting weekend! Only thing missing was a nice European opening but I did manage a few contacts over the pole. My best score yet and many thanks for the QSOs! . . . **KL8DX.** We had lots of fun, but enough is enough. Give us some flux now! Thanks for the Qs. 73 LA Contest Club . . . **LN8W.**

The weather was not very good here for flying the Helikite. I lost confidence with the kite when it started to drizzle with rain, which made the kite fall out of the sky across the main road into the neighbour's garden. It was a good job; it was 2 in the morning . . . **M4T.** Operated from West Sands St. Andrews with frost on the ground. Amazing fun. Apologies to all who needed repeats as using a paddle with winter gloves on proved interesting! See you next year . . . **MM5FUN.** The black holes did not show up this time, so the result, as expected, was almost the same as 2007. Thank you for the QSOs! . . . **OA4WW.** Trying what's possible running K1 with 5W and antenna 8-el LPA at 25m. Lots of DX and patient ops at the big guns . . . **OE3GSA.** The best CQWW CW ever, but QRV 7 hours only. Just 3 hours after the begining of the contest, my son Simon was born (4 kg/53 cm). I'm happy man. See you in next contest . . . **OK8WW.** Knowing and understanding the restrictions of a downtown city dweller one has to set reasonable goals. Nearly 1,200 QSOs including some new bandpoints and IOTAs makes this guy happy. Come on sunspots, it's time to open the conjurer's box! With special thanks to my XYL and sons for allowing me to vanish from daily life for an entire weekend . . . **ON4CAS.** With over 100 DXCC entities from 35 zones,the contest has been a real success! Thanks a lot to all who called me and particularly to KH7B. A real exploit on 40 meter band! . . . **OT5W.** 40 was in great shape. This year I went for Qs, not mults, and it seems to have paid off. The 4 new Beverages and the K3 were a great help . . . **P49Y.** Good activity on the lower bands. Thanks for FB contest. I was coding and decoding CW by head and hand . . . **PAØFEI.** We had a litlle rain when we set up the antenna but we did it with pleasure The crew had the motto fun and education . . . **PI4ZOD.** This is my first WW CW contest. Very interesting contest! All the best and best regards! 73! . . . **RD4HD.** It was very good propagation on 40m! Thanks V31WA for coming back to my CQ. Nice run to USA. Thanks to all! Good contest! . . . **RK9AD.** Good conditions on low bands but very bad on 21/28 . . . **S57DX.** Happened to hear Nigel (G3TXF)and had to give him a few points. And I got a new one on 160m! . . . **SM5CLE.** 80m proved to be our best band. Top band good as well. No 10m opening this year but a few Q's on 15. The TF4M station is improving year by year. The new Beverage antennas performed well and reception overall is exceptional. All equipment performed flawlessly and we all had a good time . . . **TF4M.** Another year. Another small step. Another case of the good, the bad, and the ugly. The good: did better than the previous year. The bad: did not meet my personal goal (half a million points). The ugly: after three attempts an absolute certainty that you cannot compete in Formula 1 on the go-cart. Anybody who knows how to build a semi-decent all-band antenna system on a postage-stamp-size city lot, please share! . . . **VE3FDT.** Operating from VE6JY superstation. A really fun contest this year with lots of activity and decent conditions . . . **VE6WQ.** Loads of activity In this amazing can't miss contest, Great openings to Europe even on low power . . . **VK4EJ.** Have enjoyed working this contest inspite of several power faulures and low voltage conditions . . . **VU2UR.** The only thing louder than HC8N were the fishing boats, chirps, bells, whistles, and SSB pirates that frequent these parts! A fun time and good test of the new antenna! . . . **XW1B.** A weak call is sometimes a multiplier, so listen, listen, listen. 73 from Tanna Island/Vanuatu . . . **YJØMM.** The 160m band was very populated in this contest. I used the narrow filter . . . **YO5BTZ.** 80m seemed to be in good shape. Only operated for 80 minutes and ended up with 103 QSOs in the log! . . . **ZL1AZE.** Didn't have a lot of time, but worked HC8N for a new one. Enjoyed myself A thrill to hear KH7X on an otherwise dead 10m band in ZL! . . . **ZL3PAH.**

USA QRM

I was glad that the propagation to northeast Florida improved a little for the contest. A number of stations were worked on 15 meters, which I didn't expect. Thanks to all who strained to hear my QRP signal . . . **AA4W.** Super conditions. A thrill to work EY8MM LP on Saturday morning . . . **KØKT.** Made a bunch of neat contacts . . . **KØOU.** My 40m beam failed after the first day, and I have no backup antenna. I put together a jury-rigged ground plane so I could at least pick off a few multipliers Sunday afternoon. Very pleased with the performance on all other bands . . . **K1DG.** Wow! Personal best 33K plus with only a few hours and a couple of dipoles. I am looking forward to next year already! . . . **K1HTJ.** Unbelievable pile-ups on those few rare African countries! My 40th year in this crazy contest! . . . **K2MFY.** Conditions were way down from 2006/2007. Biggest event was working 48 JAs on Saturday morning from here on the East Coast. Satuday night was awful. Was very hard to work any EU on Saturday. Rain and QRN all weekend . . . **K4PI.** Spectacular opening to Europe the second night on 80m . . . **K6GEP.** Good time on 40/20 meters. Not much on 15, but some good moments on 80m. Some very good ops out there . . . **K7CS.** Start a contest on 80!? Strange, didn't we once start them on 10 or 15? Thank you *CQ* magazine for a great contest. The expeditions were outstanding. A special "thanks" to OX5AA for putting up with the cold wx in order to give us a mult . . . **K8GL.** I was only able to do half the contest. RL gets in the way. 10m was totally dead and not much on 15m. 20m was the money band. Good EU in the morning and AF and Far East later. 40m had a great opening to EU before sunset each day, even worked zone 20, which is tough from the left coast . . . **KC6X.** Great chance to work a little DX! Thanks to all who participated . . . **KE7DX.** My first CW contest. Great fun! . . . **KFØIQ.** Tried really hard to break back into the 40+ hours, guys, but only made 39.5 hours. Exciting to work TF, OX, and OY with QRP . . . **KR2Q.** Tough contest, which band and do I even try a run. While brief, my surprise QSOs were those calling me on my frequency. I really had fun with the new A3S and its 40m kit! Look Ma! No amp! . . . **NØAH.** My goal for participating in CW contests is to increase my copying ability and to boost my country count . . . **N2CK.** My first inclination was not to send a log in based on my paltry number of contacts. Amazing what can happen when you replace a faulty vertical radiator on my Carolina Windom and the antenna starts to load properly! Definite highlight was bagging 3X5A on four bands! Getting a (relatively) large number of Q's on 40m was great as well. Hope to be back next year with a better antenna! . . . **N4HXI.** "When the going get tough, the tough get going." . . . **N4TZ.** Band cndx are improving! . . . **N6IE.** Another great DX contest, I look forward to this one every year. But I had never talked to 3 African stations before: Ascension Is., Guinea, and South Africa, all on 15 meters! The sun's starting to make noises . . . **N7EIE.** Great contest! Conditions here were better than expected. In fact, 20m was exceptionally good Saturday afternoon with openings to Guam, JA, VK, and ZL while at the same time African stations were still booming in . . . **ND4V.** Great condx in this CW WW CW test, especially on 20m and 40m. Other nice mults were available on 80 and 160m. Mni thanks to the ops who got on from rare DX countries! . . . **WØETT.** No TVI multiplier this year! . . . **W2YR.** Great operators on the bands as usual. First DX contest from my new QTH. The 40m dipole and 20m vertical worked FB. CW rocks! . . . **W3TUA.** QRP at the bottom of the sunspot cycle, now there's a challenge! Thanks to all who struggled to copy my 5W (especially European stations) . . . **W6JTI.** My biggest effort ever. Sure would like th have caught the 8Q7 but so didnt everyone else. Maybe next year . . . **W6XI.** Had a ball. 40 was excellent and 80 good too. 800W and a R7000 vertical on 40 and higher and my 24 ft. homebrew vertical dipole on 80 worked very well. I'm happy with 34 overall zones but can't believe I missed zone 30 due to poor record keeping. About 12 hours of sporadic operating time in the search and pounce mode. Better antennas (especially for 40) next year . . . **W7XA.** Wonderful time. TU to KH6LC on 15m to push me over 40K! . . . **W8LEW.** Thanks to NØKE, Phil, for letting me use his station near Silt, CO while he went to TI5N for this contest! My best QSO was when my 5 watts and Phil's new 3-el delta managed to snag TO3R on Reunion Isl at the bottom of 15 meters! . . . **W8QZA.** Another great contest. Too bad condx were not better. Biggest thrill? Having 9Q1EK answer my CQ on an almost dead band. Thanks! . . . **W9ILY.** Figured that I'd try to pick up some new countries. One thing led to another and wouldn't you know it there I was, in the contest. 68 countries on 20. 97 countries overall; heck I only had 94 countries "worked" in my log. Of course it was pretty slow going with only a vertical and a wire antenna. Had to do something about that if I were going to get new countries! So, true to form in my "young" contesting years, I went out back to see what I had that I could throw in the air. Had a TH7 sitting there that I bought from Jim Price and pondered where to put it. Nay-sayers shook their heads at me and said, "in the middle of a contest?" Now the challenge was on and my only comment was that I could have that antenna put together in 40 minutes. They looked me like I was nuts! Well I got after it, there was a couple of extra things to do, but I had it all together ready to throw in the air in an hour. I was going to put it on a tower trailer that I built for the CQP, but changed my mind and pulled the vertical down, added a 10 foot piece of mast material to the existing pipe, and mounted the beam. Tied a rope on either end of it to rotate it and viola! I had a TRT, "Two Rope Tenna" in two hours. Even though it's only about 8 feet over the steel roof of my shop, it matched within 1.5 to 1 and I made a lot of contacts. Oh what fun . . . **WB6BFG.** I spent most of Sunday afternoon waiting for 10 meters to open. I did hear some very weak bursts, but no opening. Sure could have used some 10 meter mults. . . . **WB8JUI.** Not bad for 50W, a dipole, and a terrible location. Sean was right: wait til Sunday afternoon when the big guns get bored and start listening for the weak ones . . . **WB8MIW.** Great contest! Things began a bit slow but picked up as the weekend continued. Can't wait to see more improvement in conditions next year! . . . **WKØP.** Sunday conditions much better than Saturday. Always fun! . . . **WR2G.**

TOP SCORES IN VERY ACTIVE ZONES

Zone 3

W6YI	3,380,952
K7RL	2,224,200
K6XX	2,177,980
N6TV	2,120,760
K7GK	1,942,605
KO7AA	1,885,505
W6RJ	1,846,992
K6NA	1,786,176
W6YX	1,735,079
N7TT	1,168,860

Zone 4

CK3AT	4,771,290
N2IC/5	4,371,558
VE3JM	3,979,212
W9RE	3,898,150
K5GO	3,801,060
WXØB/5	2,808,162
K8GL	2,606,080
VE3TA	2,165,428
*N5AW	1,754,984
*N8AA	1,640,768

Zone 5

VY2ZM	7,121,890
K1LZ	6,789,192
VY2TT	6,709,815
K5ZD/1	6,666,975
K1DG	5,744,752
K3CR	5,689,970
NN4TO	5,360,128
K3ZM/4	3,802,248
N2LT	3,655,708
AA1K/3	3,121,986

Zone 14

CU2X	7,499,925
*CS2T	4,579,659
DJ5MW	4,427,990
TM6X	3,442,425
DL3YM	3,299,100
PA3AAV	2,355,108
EA5FV	2,174,305
OZ1LO	1,979,649
DJ5QV	1,975,382
EI5DI	1,963,770

Zone 15

4O3A	6,420,570
S5ØA	4,424,133
OE4A	4,183,718
OH4A	3,515,420
ES5TV	3,393,273
IU2R	3,034,640
LY7Z	3,017,846
YL6W	2,680,770
OH8X	2,522,970
TK5EP	2,352,301

Zone 16

RA3CM	2,082,420
RT9S	1,915,200
RD4WA	1,734,735
*UA3BS	1,677,740
*UA6GO	1,364,895
UW1M	1,352,560
RW1ZA	1,272,150
*RU9WZ	1,120,068
UA6GP	1,059,380
RU3UR	927,943

Zone 20

C4W	6,528,720
SV9CVY	6,147,855
*LZ9R	1,387,146
TC4X	1,331,040
ZC4LI	1,238,963
LZ1GL	983,105
LZ1BJ	948,996
4X2M	894,057
*LZ5XQ	888,507
SV1ENG	783,104

Zone 25

JH4UYB	4,457,511
JA7DLE	1,741,510
JF1SQC	1,485,507
*JF1NHD	1,053,756
*JH8SLS	1,007,952
JK1OPL	985,525
*JI1RXQ	962,337
JN2AMD	894,842
JA3OOK	837,375
JA7IC	827,400

**Low Power*

(Continued on page 102)

Our Dayton "Sunday Safari" report concludes this month with a look at newly introduced antennas, antenna accessories and station accessories.

The 2009 Dayton Hamvention® Sunday Safari – Part II

BY ANTHONY A. LUSCRE,* K8ZT

Photo A– The flea market at the Dayton Hamvention® is a great source for used gear, as seen here, but you will find some new-equipment dealers out there as well. (Photos by staff or courtesy of respective manufacturers)

Editor's note: Once again this month, Anthony's report on new products introduced at the Dayton Hamvention® replaces his usual "What's New" column. Anthony's regular column resumes next month, bringing us up to date on new products introduced since Dayton. —W2VU

This month, we continue our Sunday Safari for a look at what's new from the 2009 Dayton Hamvention® (photo A). Part I was in the August issue and focused on transceivers, amplifiers, and antenna tuners. This month we focus on antennas, antenna accessories, station accessories, and some products for the ham on the go. Finally we take a look at The Amateur Radio Website of the Month.

Antennas and Antenna Accessories

The **MacTenna Model SB20-10** "Simple Beam" uses a patented switching technology to change the resonant frequency of a 3-element Yagi antenna. The "Simple Beam" covers 10, 12, 15, 17, and 20 meters. Band changing is nearly instantaneous and is accomplished without the use of motors, mechanisms, or control cables. No traps or matching networks are required with the Simple Beam. The desired band is selected by using the **MT-32 controller** (located at the operating position), which sends control signals to the Simple Beam over the coaxial feed line. The MT-32 (photo B) has a USB port and comes with software, which allows programming of your antenna configurations into the controller using a computer.

MacTenna's SB6-2 option allows users to mount their own 2-meter and/or 6-meter beam(s) or vertical(s) on the same tower as the Simple Beam. The SB6-2 consists of a larger junction box on the SB20-10 with two additional SO-239 connectors. Internal relays connect the feedline to the Simple Beam and to the 6-meter or the 2-meter antenna(s). Introductory pricing: SB20-10, $995; MT-32, $99; and SB6-2, $89. For more information visit <www.mactenna.net/simpleBeam.htm>.

SteppIR's slogan for Dayton was "step up to the next generation of antennas." There were two new SteppIR™ beams

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

Photo B– The MacTenna Model SB20-10 "Simple Beam" is controlled from your operating position by this remote SB-32 controller.

Photo D– Super Antennas by W6MMA's YP-3 "Yagi in a Bag" shown unassembled with included carry bag.

Photo C– SteppIR's new SDA-100 Controller has a larger LCD display than previous models, as well as dedicated LEDs for direction and antenna tuning, among other features.

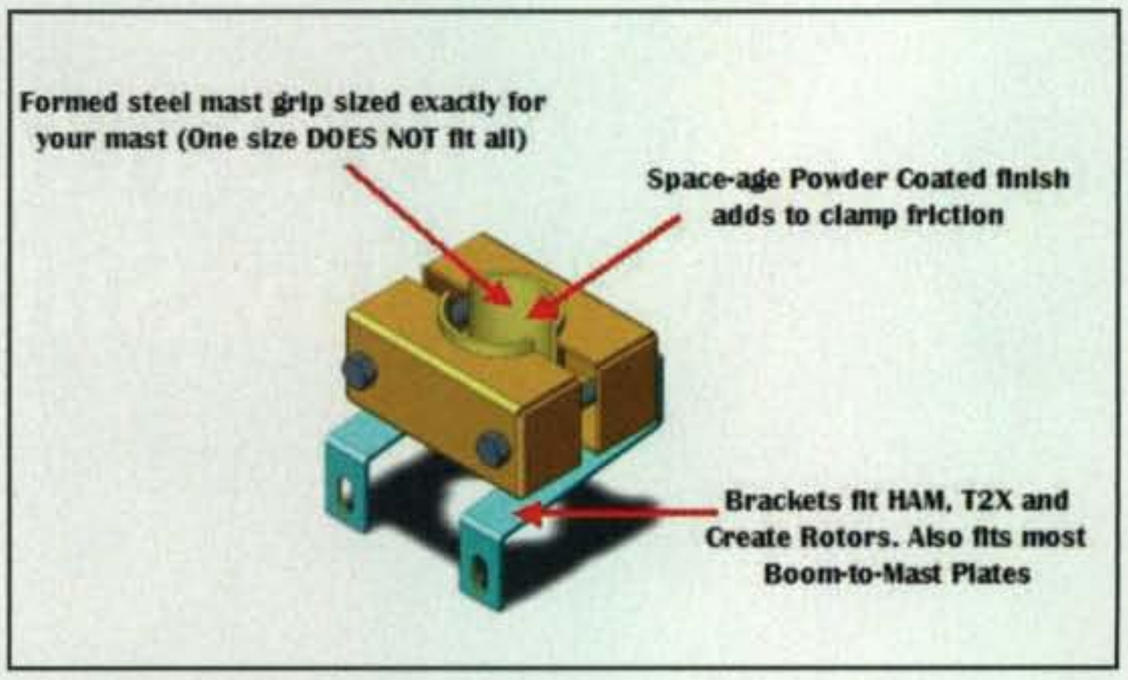


Photo E– Tennadyne's new Slip-Nott high-friction clamp for rotators and boom-to-mast brackets.

on display. The **Dream Beam 18E** covers seven bands (40–10 meters, with optional passive element add-on for 6 meters) with three active elements (two elements on 40 meters). The use of a "loop" for 30m/40m "provides a physically smaller antenna while maintaining the performance of a full-size antenna." Producing high performance from 40 to 6 meters on a single 18-ft. boom is made possible by switching the feedpoint from the center element to either of the outer elements when operating below 20 meters. This switching is accomplished by high-power relays located in each element housing. The feedline is then switched by the controller between each of the elements via a 5-KW three-port antenna switch mounted on the boom. Price is $2950. The Dream Beam 18 is similar but with only 2 elements on both 40 and 30 meters. Price is $2550.

SteppIR's new **SDA-100 controller** (photo C), designed around the AMTEL 1890 microprocessor, has many more features made possible by the larger memory capacity of the chip. Features include larger LCD display, dedicated LEDs for direction indicator and antenna tuning, software updates via USB, and passive lightning protection. For more details, visit <www.steppir.com>.

Super Antennas by W6MMA introduced the **YP-3 "Yagi in a Bag"** (photo D), a portable, 3-element, 6-band Yagi for 20, 15, 17, 12, 10, and 6 meters. This highly portable antenna fits into the included 36-inch carry bag. Field adjustable, the YP-3 can be set up to optimize operation on any of the six bands. The price is $395. **The YP-1** is a new rotatable 6-band dipole covering 20 through 6 meters. It includes its own 36-inch travel bag. Price is $195.

Super Antennas' new heavy-duty 26-foot tripod is the perfect companion for the YP-3 or YP-1 antenna. Collapsing to

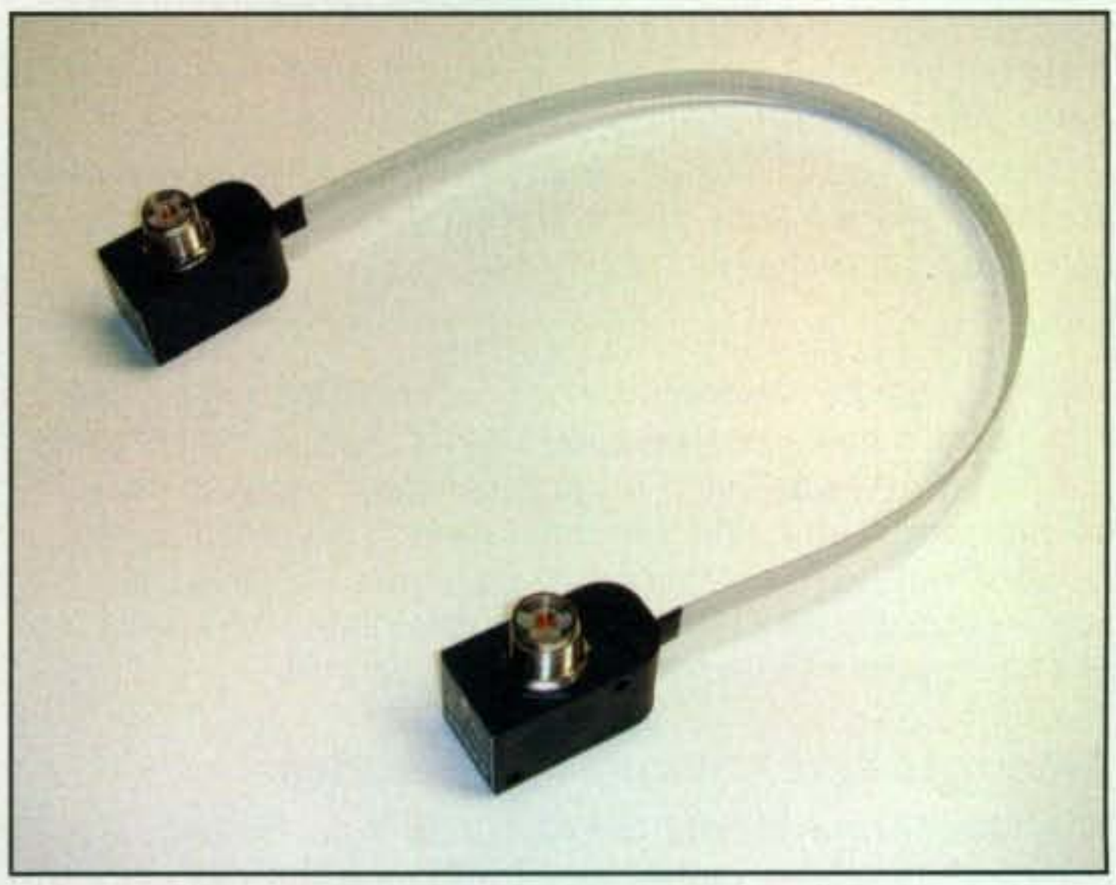


Photo F– The "flat coax" in Comet's new CTC-50M lets you pass a feedline through a window without having to keep it open.

just over 5 feet, the tripod can easily be transported to your remote location. Add Super Antenna's new **PR-1**, a 12-VDC mini antenna rotator, and you have a complete antenna system for the field. Price is $249. To order or for more information visit <www.superantennas.com>.

Tennadyne's new **Slip-Nott** (photo E) is a high-friction clamp for rotators and boom-to-mast brackets. Each unit is custom designed for specific applications. A formed mast grip, sized for your specific application, and a "space-age" polymer coating maximize gripping and prevent slipping. Price is $89.95. For more details, visit <www.tennadyne.com/slipp_nott.htm>.

Comet's new **CTC-50M** (photo F) is an ingenious device that allows you to get your signal from a coax cable in your house over a door or window to an outside antenna without drilling holes in the wall or leaving a window/door open. The center core of the flat wire coax is "copper-clad steel" chosen for its strength and resistance to metal fatigue. The film is made of ALPET (aluminum/PET plastic), which is supposed to resist damage due to material fatigue. Gold-plated connectors are supplied with screws to attach them securely to the wall/window frame. Close the window and screen freely without damaging the coax! Price is $49.95. For more information visit <www.cometantenna.com>.

Photo G– Green Heron Engineering is introducing a wireless station switch controller to let you operate tower-mounted switches and relays without running an extra cable. This board is the heart of the system. It's mounted in a weatherproof enclosure.

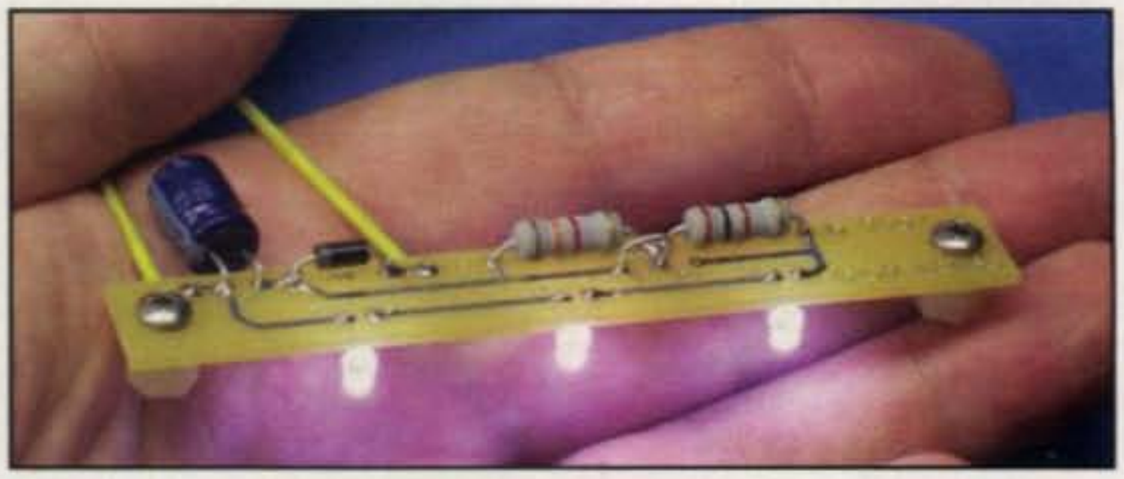


Photo H– Idiom Press's Rotor Illuminator is a three-LED replacement circuit for 24V incandescent bulbs in certain Hy-Gain rotors.

Photo I– The bhi ANEM MKII "noise away" amplified noise elimination module.

Green Heron Engineering introduced prototypes of its new **Wireless Station Switch Controllers** (photo G). These controllers are designed to control relays and other devices at the base or top of towers without the need to run additional cables from within your shack. The units operate in the 2.4-GHz band.

Station Accessories

Is your rotor control box's light burned out? Idiom Press's **Rotor Illuminator** (photo H) is a three-LED replacement circuit for the incandescent lamp in Hy-Gain control boxes. "Buy this kit and never have to worry about finding scarce 28-VAC bulbs, and never have to change the bulb ever again!" says the company. Price is $10.95 postpaid. Visit <http://idiompress.com> for more information or to order.

Also from Idiom Press are the **LogiKlipper RF Speech Processor** and the **Rotor Illuminator**. Full details on the LogiKlipper were not currently available, so watch for further information in following months.

The bhi **ANEM MkII 'Noise Away'** amplified noise elimination module (photo I) is a compact, easy-to-use in-line solution to noise and interference problems in radio communications. Using unique, fully adaptive DSP noise-cancellation technology, unwanted noise and interference are removed to leave clear speech with virtually no distortion of the voice signal.

The ANEM simply fits in-line between the communications equipment and the loudspeaker or headphones. It is suitable for a variety of applications, but is particularly useful for improving voice quality in radio communications across all modes (SSB, UHF, VHF, HF, AM, and FM).

The ANEM is suited to customers who prefer simple controls and operation, and who do not want to modify their existing radios. It is easy to set up and its functions are microprocessor controlled, enabling simple operation via two pushbuttons—power on/off audio bypass and DSP filter on/off. Four or eight levels of noise cancellation are selectable via the pushbuttons on power-up, the last selected filter level remaining in the memory when the unit is switched off. MSRP is $179. Visit <http://www.w4wb.com/bhi-main-page.htm> for the U.S. supplier.

This was the year for Heil Sound's rollout of a new line of active noise-canceling headsets. The Heil **Quiet Phone Pro™** (photo J), according to the company, "is a result of years of research and development at Heil Sound, Ltd. While typical headsets are designed to reproduce audio, they pay no attention to the outside environment. In most cases, the ambient room noise is louder than the program information that comes through the speakers in the headphones." Heil Sound's solution to this is an active noise-canceling technology that uses two small microphones placed deep inside each headphone speaker and wired to a differential amplifier, which switches the mics in or out of phase. As the micro-

Photo J– The Heil Quiet Phone Pro™ headset uses ANC (active noise canceling) to remove room noise.

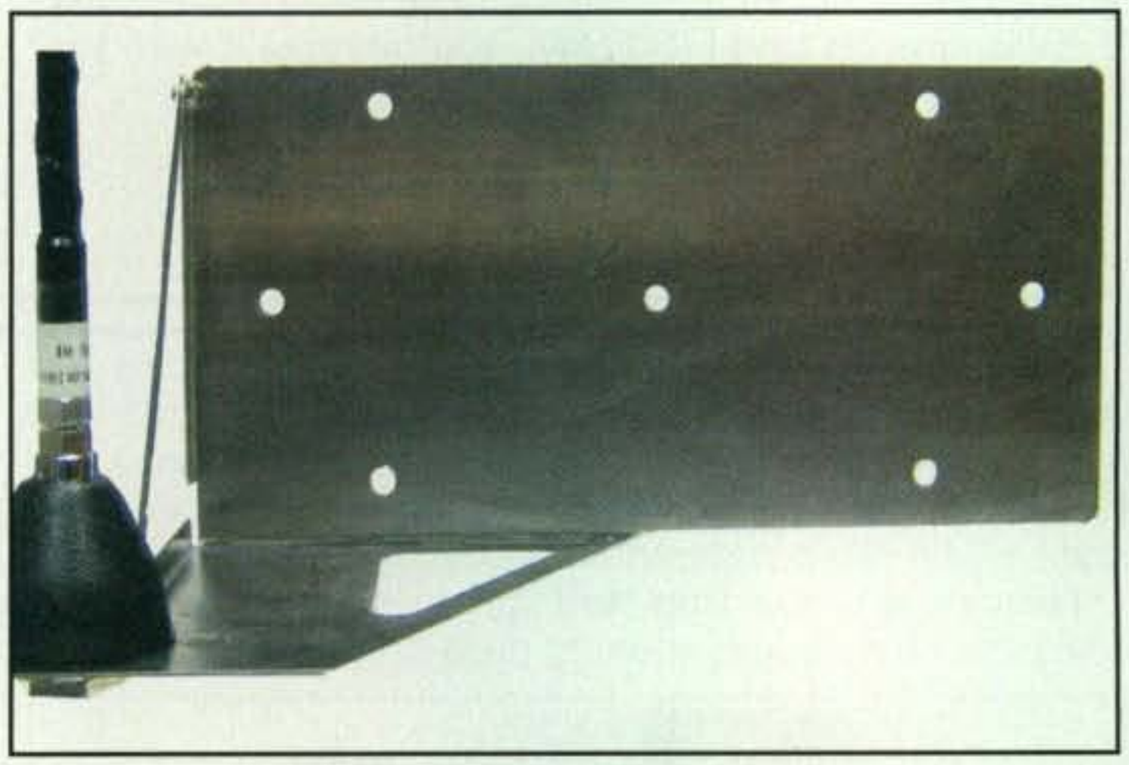


Photo K– The MFJ-2820 fits between your car's license plate and bracket and provides a convenient antenna mount.

Photo L– Ten-Tec's Model 610- remote USB keyer interface gives greater flexibility to remote users of the Omni-VII transceiver.

phones listen to the outside ambient noise as well as the program information, the out-of-phase background noises are greatly reduced, particularly at frequencies below 400 Hz. Equipment or computer fan blower noise, outside car traffic (not to be used by the driver of vehicle!), ambient room noise, the multi-op operator next to you during a contest, or the TV in the next room will all be reduced to levels tens of decibels below your desired audio source.

A unique feature of this Heil Sound product is the optional microphone boom assembly. Removing the small rubber plug, located above the ON/OFF switch, exposes a sturdy brass insert that allows the user to attach one of five different boom assemblies to the Quiet Phone Pro. You can choose any of five different types of microphone elements that match various amateur radio transmitters as well as computers, podcasting, and commercial radio/TV broadcasting. Street price is $150; boom mic and elements are extra. For further information, including detailed specifications, visit <www.heilsound.com/ amateur/products/quietphonepro/>.

The MFJ booth at Dayton is a cornucopia of equipment, accessories, and gadgets, where a visitor can easily lose sense of time while browsing the offerings. Many of the featured new products have for been covered in recent "What's New" columns, but definitely merit a quick rundown.

The **MFJ-706 Grab-and-Go Emergency Communications Center** is an EmComm box that turns your ICOM IC-706 into an instant and foolproof emergency communications center. Price is $399.95. The **MFJ-2820 License Plate Antenna Mount** (photo K) fits between your car's license holder and license plate and provides you with a sturdy, convenient, no-hassle antenna mount for most HF/VHF/UHF antennas. Price is $49.95. The **MFJ-869 Giant HF SWR/Digital Wattmeter** is a fully-automatic auto-ranging 6 1/2 inch meter with 20/200/2000-watt scales and TruePeak® average forward and reflected power modes. Price is $219.95. The **MFJ-4416BRC** gives you full remote control of your MFJ-4416B Super Battery Booster, plus it allows you to monitor battery voltage and battery-booster out-

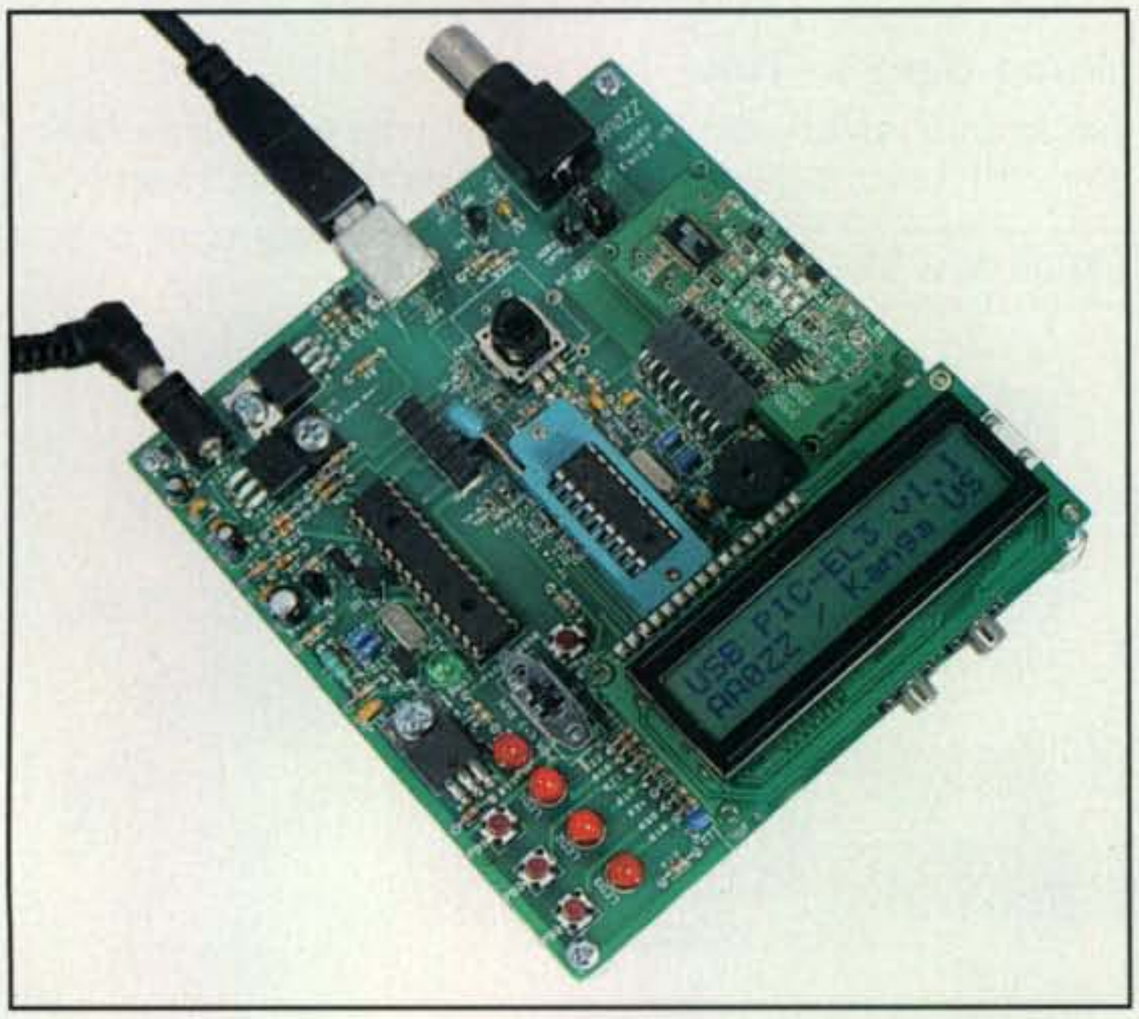


Photo M– From Kanga US, the PIC-EL III by AAØZZ. See text for description.

put voltage. Price is $79.95. For more information or to purchase any of these items visit <www.mfjenterprises.com>.

Ten-Tec was displaying a pre-production version of its **Model 610 USB Keyer Interface** (photo L). With the 610, remote users of the Omni-VII (via the One PlugRemote software) can easily interface keyer paddles, microphones, and headphones. Controls include code speed and audio volume. Expected availability is early summer with a price under $200. To order or for more information visit <http://radio.tentec.com>.

From Kanga US, the **PIC-EL III** by AAØZZ (photo M) is the newest version of PIC Programmer for 18-pin PICs via your PC's USB port. Available as a kit, the unit runs with Microchip's free PICKit2 application software (supplied with kit). Price is $65. For details visit <www.kangaus.com/picel_iii.htm>.

Hamgadgets.com presented a new full-featured keyer (photo N). The **MasterKeyer MK-1** has six multi-color, LED-illuminated pushbuttons giving instant access to stored messages in any of five banks—that's 30 messages in all, for over 7500 total characters. Changing colors tell you whether a message is being sent or recorded. You can embed commands into memory messages for a wide range of functions. With these commands you can send your stored callsign, serial/QSO number (with or without automatic incrementing and with support for "cut numbers"), send the last word sent from the paddles, or call any other message from any bank. Message stacking lets you quickly send up to six messages in sequence (messages can be paused to manually insert information from the paddle). To order or for more information, visit <www.hamgadgets.com>.

Photo N– Hamgadgets.com's new full-featured keyer, the MasterKeyer MK-1.

Miscellaneous Goodies

An important reminder for your next visit to the Hamvention®: Do not forget to check the outdoor flea market for great new products as well as bargains on used gear (it's not all old stuff!). Mark Mantia, WN8ATM, of iPORTABLE Products, manufactures radio stands and field communication boxes for emergency or portable uses. His **Portable Rack System with Transport Covers** (photo O) is just the thing for emergency communications, Field Day, or any portable operation. Starting with an "Xtreme Rugged Case" design with an extra-wide carrying strap, the rack systems have universal slots and adjustable shelves for equipment mounting and can hold up to two radios or a radio/power supply combo. Included front and rear transport covers protect your gear when not in use. Units are all fully wired using 12-AWG wire and panel-mounted ACT/ATO fuses. All DC input power connectors are panel mounted Anderson PowerPoles® along with a fused 12V/10A cigarette-plug socket for accessories. Case audio is pre-wired for your radio with a 3.5-mm plug and a 3-inch front-firing speaker, and a 1/4-inch headphone jack on the front panel (headphones mute the rack speaker). There is a rear storage area for power cords, microphones, keys headphones, and/or a 12V, 7.2AH sealed battery.

Photo O– iPORTABLE field communication box for emergency or portable uses.

Going Back in Time

We end our safari with a trip back in time to old-time radio days with two receivers. The words "crystal" and "regenera-

Photo P– The Xtal Set Society's My-Marconi 2106 Crystal Radio is a step back in time.

Photo Q– Hendricks QRP Kits' Scout Regen Receiver is a new, simple two-band regenerative-receiver kit.

tive" bring fond memories of receivers of my youth. The Xtal Set Society was featuring its **My-Marconi 2106 Crystal Radio Kit** (photo P). It's a double-tuned set using toroid-wound coils and includes an antenna tuner. The kit tunes the AM band. The primary and secondary LC "tank" circuits each utilize a 365-pF air variable capacitor with a 250-µH coil wound on an FT82-61 ferrite toroid core. A third air-variable cap is used for antenna matching. The tank caps and coils mount on a 10" × 7" × 1/8" hardboard chassis. The antenna cap and 1/4-inch phone jack mount on the 10" × 6.625" × 1/8" hardboard front panel. Nylon shaft extenders connect the tuning caps to the front-panel knobs. Price for the full kit is $69.95; partial kits are also available. To order or for more details visit <www.midnightscience.com/kits.html>.

Not all regenerative receivers are old, either; the Hendricks QRP Kits **Scout Regen Receiver** (photo Q) is a new, simple two-band regenerative radio receiver that is capable of receiving signals from 3.5 to 11 MHz. This covers the 75/80-, 60-, 40-, and 30-meter ham bands plus the SWL bands around 6 and 9 MHz. WWV coverage on 5 and 10 MHz is also a bonus. The kit is complete with L-shaped aluminum chassis, quality double-sided silk-screened solder-masked board, all parts, hookup wire, and board-mounted battery holder. It even has a 2.1-mm power connector in case you want to use it with a wall-wart type of power supply.

Doug Hendricks, KI6DS's comments say it best: "This kit is ideal for the first-time builder, and a great kit to have a kid build with some help from an Elmer. All parts are through-hole, the manual is very complete and easy to understand, and it has been designed with the first-time builder in mind. All that you need (to add are) a 9V battery and a length of wire for an antenna and you will be pulling signals out of the air!! Reception and sensitivity are quite good, and the rig is very stable. It is perfect to use for monitoring the bands while you are busy at the bench, building that next project." Price to be announced, but under $50. To order or for more information, including a detailed, full-color PDF of the assembly manual, visit <www.qrpkits.com/scoutregen.html>.

The Amateur Radio Website of the Month

While visions of Dayton 2010 dance in your head, do not forget about the large number of local and regional hamfests around the country throughout the year. This month's site is the ARRL Hamfest and Convention Database website. The site at <www.arrl.org/hamfests.html> provides searchable information on hamfests by state, ARRL division or section, zip code, or even words or phrases in the event's name. Hamfests are a great way to support local clubs, meet old friends, make new friends, finds bargains, and of course, discover "what's new" in the world of amateur radio.

Wrap-up

That is all for this month's column and the end of our two-part Sunday Safari of the 2009 Dayton Hamvention®. Next month we return to the usual "What's New" format. Remember, I welcome your feedback, questions, and/or comments. If you are a producer of a new product for amateur radio, please feel free to e-mail me or use the snail mail address on the first page of this column. Until next month... 73. Anthony, K8ZT

Announcing:

The 2009 CQ WW DX Contest

Phone: October 24–25 CW: November 28–29
Starts 0000 GMT Saturday Ends 2400 GMT Sunday

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

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

III. TYPE OF COMPETITION (choose only one):

For all categories:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

C. Xtreme Contesting: To encourage the development of new technologies in contesting. For the full rules, go to <http://www.cqww.com> and click on Xtreme category rules for 2009; or see the June 2009 issue of *CQ*, p. 32

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

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

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

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

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

Stations are permitted to contact their own country and zone for multiplier

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

VI. POINTS:

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

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

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

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

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

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

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

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

IX. TROPHIES AND PLAQUES:

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

X. CLUB COMPETITION:

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

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

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

XI. LOG INSTRUCTIONS:

1. All times must be in GMT.

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

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

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

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

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

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

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

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

An entrant whose log is deemed by the Contest Committee to contain a large number of discrepancies may be disqualified from eligibility for an award, both as a participant operator or station, for one year. Disqualification of an entrant in any CQ contest will lead to check-log status in all CQ contests for a period of one year. One year ineligibility will commence with the publication of the disqualified entrant's callsign. If an operator is disqualified a second time within five years, he/she will be ineligible for any *CQ* contest awards for three years. ANY use by an entrant of any non-amateur means including, but not limited to, telephones, telegrams, internet, Instant Messenger, chat rooms, VoIP, or the use of packet to SOLICIT, ARRANGE, or CONFIRM any contacts during the contest is unsportsmanlike and the entry is subject to disqualification. Disqualification Action and decisions of the CQ WW Contest Committee are official and final.

XIII. DEADLINE:

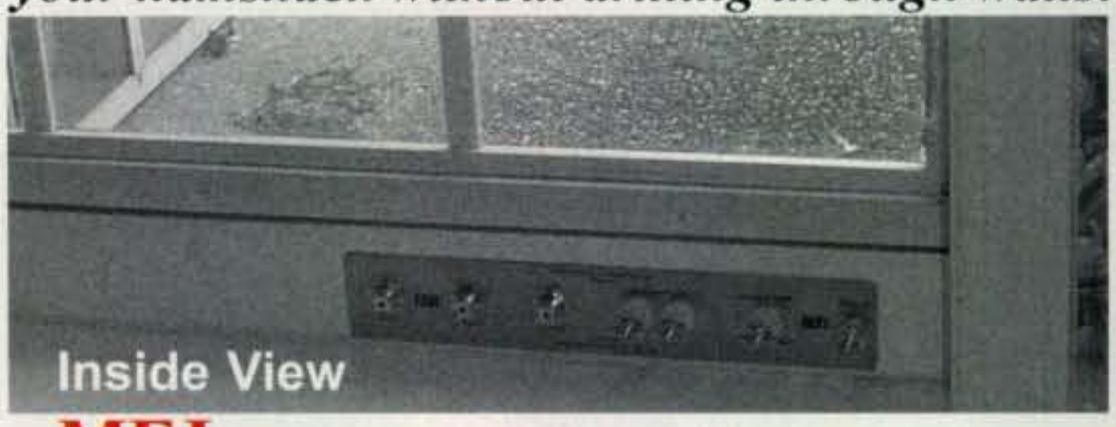
1. All entries must be postmarked NO LATER than December 1, 2008 for the SSB section and January 15, 2009 for the CW section. **Indicate SSB or CW on the envelope and/or disk.**

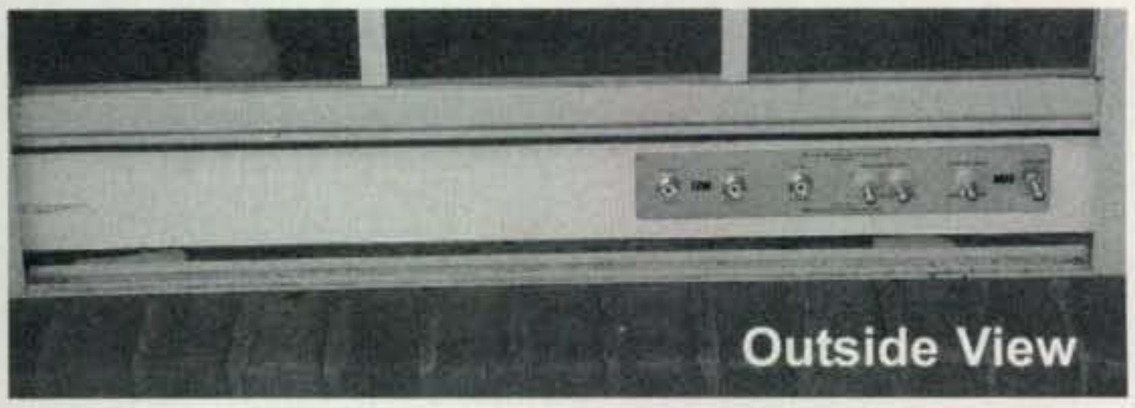
2. An extension of up to one month may be given if requested by e-mail (questions@cqww.com). The granted extension must be confirmed by the Contest Director, must state a legitimate reason, and the request must be received before the log mailing deadline. Logs postmarked after the extension deadline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

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

MFJ Weather-Proof *Window Feedthrough Panels*

Weather-proof window feedthrough panels bring coax, balanced lines, HF/VHF/UHF antennas, random wire antennas, ground, rotator/antenna switch cables and DC/AC power into your hamshack without drilling through walls!





MFJ Weather-Proof *Window Feedthrough Panels* mount in your window sill. Lets you bring all your antenna connections into your hamshack *without* drilling holes through walls.

Simply place in window sill and close window. One cut customizes it for any window up to 48 inches. Use horizontally or vertically. Connectors are mounted on inside/outside stainless steel plates and attached to a 4 foot long, 3½ inch high, ¾ inch thick *pressure-treated* wood panel. Has excellent insulating properties. Weather-sealed with a heavy coat of long-lasting white outdoor enamel paint. Edges sealed by weather-stripping. Seals and insulates against all weather conditions. Includes window locking rod.

Inside/outside stainless steel plates ground all coax shields. Stainless steel ground post brings ground in.

MFJ-4603 Universal Window Feedthru Panel

MFJ-4603
$89.95

Four 50 Ohm *Teflon*® SO-239 coax connectors lets you feed HF/VHF/UHF antennas at full legal power limit.

A 50 Ohm *Teflon*® coax *N-connector* lets you use any antenna up to 11 GHz, including 450 MHz, UHF, satellite, moon bounce and 2.4/5.8 GHz Wi-Fi antennas.

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A pair of high-voltage *ceramic feedthru insulators* lets you bring in 450/300 Ohm balanced lines directly to your antenna tuner.

Has random/longwire antenna *ceramic feedthru insulator*.

***5-way** binding posts* lets you supply 50 Volts/15 Amps DC/AC power to your outside antenna tuners/relays/switches.

Stainless ground post brings in ground connection, bonds inside/outside stainless steel panels together and drains away static charges.

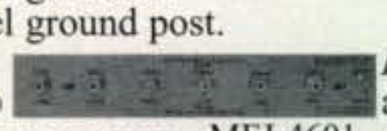
MFJ's exclusive *Adaptive Cable Feedthru*™ lets you bring in rotator/antenna switch cable, etc. without removing connectors (up to 1¼X1⅝ in). Adapts to virtually *any* cable size. Seals out rain, snow, adverse weather.

3 Coax, Balanced Line, Random Wire

MFJ-4602
$69.95

Best Seller! 3 *Teflon*® coax connectors for HF/VHF/UHF antennas. Separate high voltage *ceramic* feed-thru insulators for balanced lines and longwire/random wire, Stainless steel ground post.

6 Coax



MFJ-4601
$59.95
New!

6 high quality *Teflon*® coax connectors for HF/VHF/UHF antennas. Stainless steel ground post. Full 1500 Watt legal limit.

4 Balanced Line, 2 Coax

MFJ-4600
New! **$79.95**

4 pairs of high-voltage *ceramic* feed-thru insulators for balanced lines and 2 coax connectors.

5 Cables, any-size

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5 *Adaptive Cable Feedthrus*™. Pass any cable with connector: 2 cables with large connectors up to 1¼x1⅝ inches and 3 cables with UHF/N size coax connectors. Seals out weather.

All-Purpose FeedThru/CableThru™

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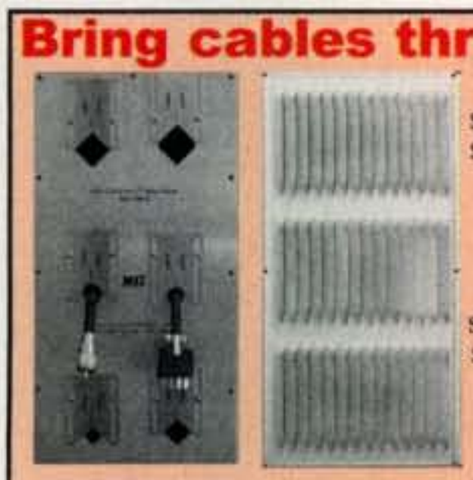
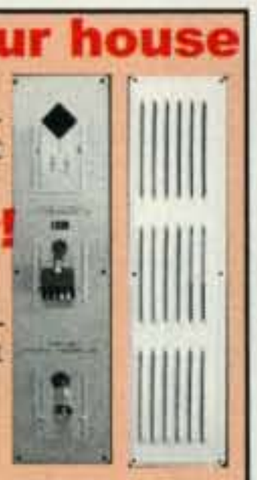
New!

***Stacks** MFJ-4603 **and** MFJ-4604!* Gives you every possible cable connection you'll ever need through your window without drilling holes in wall -- including UHF, N and F coax connectors, balanced lines, random wire, ground, DC/AC power and cables of any size for rotators, antenna switches, etc.

Bring cables thru eave of your house



MFJ-4616
shown with standard full-size vent (not included) it replaces. For *6 Cables*
$26.95 **New!**



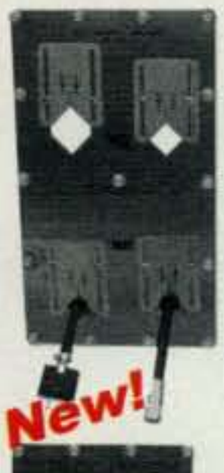
MFJ-4613
shown with standard half-size vent (not included) it replaces. For *3 Cables*
$14.95

Replace your standard air vents on the eave/sofitt of your house with these *MFJ AdaptiveCable*™ *Air Vent Plates* and…

Bring in coax, rotator, antenna switch, power cables, etc. *with connectors* up to 1¼x1⅝ inches!

Sliding plates and rubber grommets adjust for virtually any cable size to seal out adverse weather, insects and varmints. Use existing vent hole, mounting screws and screw holes.

AdaptiveCable™ Wall Plates



MFJ-4614
For 4 Cables
$34.95

Bring nearly any cable -- rotator, antenna switch, coax, DC/ AC power, etc. -- through walls *without removing connectors* (up to 1¼x1⅝ inches). Sliding plates and rubber grommets adjust hole size to weather-seal virtually any size cable.

Includes *stainless steel* plates for each side of wall, sliding plates, rubber grommets, weather stripping and screws.

New!

MFJ-4612
For 2 Cables
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The New FCC: Its Makeup and Future Direction

BY FREDERICK O. MAIA,* W5YI

"The FCC has the inspiring mission of ensuring that our communications networks and technologies serve the nation's needs and improve the lives of all Americans."

FCC Chairman Julius Genachowski

The Federal Communications Commission has a new look, starting at the top. Julius Genachowski was sworn in as Chairman on June 29 and two additional appointments to seats on the Commission were awaiting Senate confirmation as we went to press. They will join sitting Commissioners Michael Copps, who has been Acting Chairman since January, and Robert McDowell in filling out the five-member commission.

The five commissioners are appointed by the President and confirmed by the Senate for staggered five-year terms except when fulfilling an unexpired term. No more than three can be members of the same political party and no commissioner may have a financial interest in any Commission-related business.

The President designates one of the commissioners to serve as its chairman, in effect, its chief executive officer. The chairman presides over all FCC meetings and sets its agenda. A minimum of three commissioners is needed to vote on issues.

Traditionally, the FCC Chairman offers his resignation when a new U.S. president is elected. Under fire by the Democratic majority, outgoing Republican Chairman Kevin Martin left the Commission on January 20 when President Barack Obama assumed office. Democrat Michael Copps was named acting FCC Chairman, and his immediate job was to oversee the February 17 switch to digital television, later postponed to June 12. Our FCC sources also report that he reassigned many of the bureau chiefs who had been appointed by Martin in order to give his successor the ability to assemble his own management team.

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

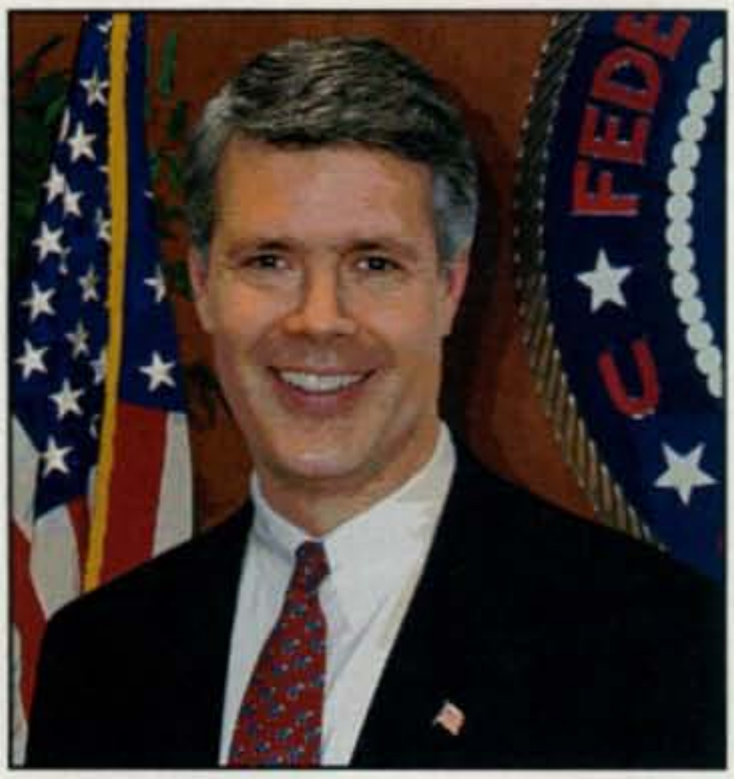
Julius Genachowski was sworn in as FCC Chairman at the end of June. (Courtesy FCC)

Genachowski Confirmed as FCC Chairman

The President had signaled his intention to nominate Julius Genachowksi, 46, to lead the FCC back in January, but the official nomination didn't come until March 3, 2009. Genachowski, an advisor to Barack Obama on technology issues during his presidential campaign, was a major fund-raiser for Obama.

He headed a tech policy group and guided Obama's use of social networking on the internet to reach out to voters. They were classmates at New York's prestigious Columbia College and Harvard Law School, and they played basketball together, as well.

After graduating from law school in 1991, Genachowski worked as a law clerk in the U.S. Supreme Court and the U.S. Court of Appeals for the D.C. Circuit. His FCC experience includes three years as the chief counsel to FCC Chairman Reed Hundt during the Clinton administration. He has worked on a Congressional committee, giving



Robert McDowell was sworn in July 2 for a full term as Commissioner at the FCC's first open meeting under Chairman Genachowski. (Courtesy FCC)

him a knowledge of all three branches of the federal government.

Genachowski also has an eight-year private-sector background as a senior executive at Barry Diller's internet-based media company, IAC/ InterActiveCorp. He has been a director of well-known firms suchas Expedia.com, Hotels.com, and Ticketmaster, and a venture capitalist. Genachowski thus brings to the Commission a unique range of experience in law, business, politics, communications, and the "new media."

All FCC commissioners must be confirmed by the U.S. Senate. The confirmation process involves first being approved at a hearing of the Senate's Commerce, Science and Transportation Committee, followed by a full Senate vote. Genachowski's varied experience drew rave reviews from senators on both sides of the aisle at his confirmation hearing.

Genachowski pledged his support for media diversity and widespread broadband access and registered his opposition to the fairness doctrine. He told the Senate committee that he would focus on national broadband service and consumer issues.

He is a staunch supporter of "open government, open networks, and open markets." Genachowski will take Commissioner Jonathan Adelstein's seat. Adelstein left the FCC upon Genachowski's confirmation to take over the U.S. Department of Agriculture's Rural Utilities Service (more on this later).

Currently-serving Republican Commissioner Robert McDowell was renomi-

What Else Does the FCC Do?

Most hams know that the FCC issues our licenses and writes the rules we must follow on the air, but its broader role affects nearly every aspect of our lives.

On June 19, 1934, President Franklin D. Roosevelt established the Federal Communications Commission—replacing the old Federal Radio Commission—by signing Public Law 73-416, the Communications Act of 1934.

The FCC is an independent federal regulatory agency responsible directly to Congress. It is charged with encouraging the effective and widespread use of radio and wireline communications. Its jurisdiction extends to all 50 states, the District of Columbia, and U.S. territories and possessions.

The FCC, governed by a five-person commission, regulates all U.S. non-federal government interstate telecommunications including telephone, radio, cable TV, satellite, and broadcasting. Its major activities include the allocation of frequencies to public (state and local) and private communications services and stations, licensing of stations and operators, and the regulation of electrical transmissions. It does not regulate radio operations of federal government agencies. That is the responsibility of the National Telecommunications and Information Administration, or NTIA.

Since radio waves do not respect international boundaries, the FCC must govern telecommunications within the regulatory framework agreed upon by the International Telecommunication Union.

The Commission is organized into six operating bureaus and ten offices which provide support services. The operating bureaus reflect six broad divisions of Commission responsibility. They are the Enforcement Bureau, International Bureau, Media Bureau, Wireless Telecommunications Bureau, Public Safety & Homeland Security Bureau, and the Wireline Competition Bureau. Amateur radio falls under the Wireless Telecommunications Bureau.

nated by President Obama on June 2 and, for the confirmation process, was paired with Genachowski. McDowell was first nominated by President George W. Bush and sworn into office in June 2006, filling the unexpired term of Republican Kathleen Q. Abernathy.

Genachowski and McDowell had smooth confirmation hearings and swift votes of approval from the Commerce Committee and full Senate. On June 25, the Senate both confirmed Julius Genachowski as FCC Chairman and reconfirmed Robert McDowell for a full five-year term as commissioner.

Now, along with former Acting FCC Chairman Michael Copps, the FCC has the minimum number of three commissioners needed to vote on issues. Copps will be returning to commissioner status after he headed up a very successful transition from analog to digital television.

New Commissioners Awaiting Confirmation

Earlier, on June 25, the White House announced its intention to nominate former NTIA acting Administrator Meredith Attwell Baker (a Republican) and South Carolina utility regulator Mignon Clyburn (a Democrat) to the two vacant commissioner seats.

Baker holds a 1994 law degree from the University of Houston and is the daughter-in-law of former Secretary of State James Baker. She had been acting head of the National Telecommunications and Information Administration (NTIA) before exiting in January. She had been with the NTIA since 2004, when she joined as a senior advisor. The NTIA is the White House advisor on telecommunications matters. It is also the FCC's in-government counterpart, regulating radio-spectrum use by federal government agencies.

Before joining the NTIA, Baker was vice president of Williams Mullen Strategies, and before that Director of Congressional Affairs at the Cellular Telecommunications Industry Association. Her resumé also includes time in the Legislative-Affairs Office at the State Department. She will assume the FCC seat vacated by Deborah Taylor Tate.

Mignon Clyburn graduated from the University of South Carolina with a Bachelor of Science degree in Banking, Finance, and Economics in 1984. She is the daughter of House Majority Whip James Clyburn (D-S.C.) Clyburn spent most of her career with the *Coastal Times*, a Charleston, S.C., newspaper where she worked as an editor, general manager, and publisher. Since 1998, she has served on the state's Public Service Commission, which regulates utilities and transportation companies.

Both must now go through a confirmation hearing and full Senate vote. Clyburn and Baker will complete the full FCC team and will be joining the Commission later this summer after they go through the Senate confirmation process. Confirmation hearings for both before the Senate Commerce Committee were scheduled for July 15.

The New FCC and the Future

The FCC was originally created to regulate radio and telephones and to ensure its licensees served the "public interest, convenience and necessity" (see sidebar, "What Else Does the FCC Do?"). However, today's "digital revolution" has produced all sorts of technologies and information-delivery mechanisms never dreamed of back in the 1930s when the Commission was first established. HDTV, cell phones, text messaging, the internet, faxes, wireless networks, distance learning, electronic commerce, and satellite services are examples of the products and services that digital technology has delivered. You can expect that to continue and expand. A shift away from similarly priced incumbent wired internet technology—cable and DSL—to new "third pipe" wireless broadband access with no limits on content or devices seems inevitable.

Genachowski has promised to run a more transparent Commission with a strong technology orientation. The Obama administration and Genachowski are strong backers of "Net Neutrality," the guiding principle that preserves the free and open internet. Net Neutrality simply means no discrimination. Net Neutrality prevents internet providers from blocking, speeding up or slowing down web content based on its source, ownership, or destination. It protects the consumer's right to use any equipment, content, application, or service without interference from the network provider. Cable and telephone companies generally oppose Net Neutrality.

On the FCC website: Genachowski pledged to develop a more user-friendly communications interface between the Commission and the public. "Consumers are top priority," he said.

Genachowski's major goal is to extend the "digital revolution" to everyone. At his confirmation hearing, he stated that he wants to use federal economic stimulus money to bring broadband internet services to rural and under-served areas. The Obama administration included $7.2 billion in funds in its massive $787 billion economic stimulus package for this purpose.

While that grant/loan money will be administered by the NTIA and USDA (through its Rural Utilities Service, to be headed up by former FCC Commissioner Jonathan Adelstein; see below), the FCC has a consulting capacity and must come up with its own national broadband plan. The Commission must tell Congress how it envisions broadband service should be rolled out to the nation.

Genachowski said the FCC's broadband rollout plan must ensure that

everyone has "affordable and robust" broadband service, no matter who they are or where they live. "Affordable and robust" translates to lower cost and faster speed. The FCC plan is due at Congress by February 17, 2010.

Expanding broadband internet access is not the only issue that the FCC must address. A nationwide public safety network, open-access internet rules, and reforming the Universal Service Fund (US) also must be dealt with.

The US taxes long-distance bills to subsidize phone service to poor people and those in rural areas. The fund's base continues to shrink as more people drop landline for wireless and internet phone service.

The Commission also needs to determine what to do with a block of 700-MHz wireless spectrum, meant to standardize communications among public service agencies, that was not sold at auction last year.

With the United States lacking a clear-cut policy on broadband and wireless communications, the coming years will be critical in defining whether this country will be a leader or follower in broadband availability and mobile communications. New digital services delivered over the web—including streaming video, music, IP telephony, telemedicine and advanced e-commerce applications—are being developed.

The FCC under Julius Genachowski will play a critical role in determining both the direction and success of our nation's progress in these areas. The FCC must effectively make the transition from "protector of broadcasting in the public interest" to "communications technology consultant for the U.S." and do it quickly.

Closing the "Digital Divide"

After Genachowski and McDowell were confirmed, Commissioner Jonathan Adelstein left the FCC to await a hearing and confirmation on his new post to head up the USDA's Rural Utilities Service. The RUS is a little-known agency whose major goal is to provide affordable broadband to all rural Americans. Broadband is a utility just like power and water. The agency has financed traditional telephone service capable of providing digital subscriber loop (DSL) broadband. More than $1 billion allocated by Congress has been invested already,

RUS has also financed some wireless broadband, and school districts are beginning to be linked, thereby sharing teacher resources. Distance learning allows a teacher in one district to provide instruction to students in multiple

districts. The high-speed internet is very important to learning, and some students are even taking college-level courses while attending high school.

Despite these gains, there are many rural areas with little or no broadband service; they are still waiting for the digital revolution to arrive. Rural Americans account for nearly 25% of the U.S. population, more than 60-million people. They want and need to be connected to the outside world.

The goal of Congress is to drive broadband penetration to rural areas that have long lagged urban areas in terms of choice, quality, and cost. About 60% of U.S. households in populated areas subscribe to broadband; in rural communities, only 38%.

President Obama sees broadband as the future of the USA. Web-based commerce is booming among city dwellers. Just a 5% increase in total broadband penetration adds $100 billion to the economy. That means jobs.

Rural communities suffer from a lack of adequate health-care resources. A recent study showed that more than 80% of rural counties are classified as medically under-served. Only 9% of America's physicians practice in rural areas, and only 3% of medical students are planning to practice in small towns or rural areas.

With too few primary-care practitioners and the need to travel long distances for specialty care, it is difficult for many rural residents to receive the care they need when they need it. Telemedicine gives rural doctors real-time access to specialists.

Consumer health information is also widely available on the web to those far from a doctor. The full benefits of telemedicine can only be reached by expanding broadband services into private physicians' offices and into non-traditional points of care, such as homes, schools, businesses, and extended-care facilities.

The Rural Utilities Service has been allocated about one-third of the broadband stimulus money (about $2.5 billion) to fund the expansion of broadband in rural areas. Together, the FCC and RUS will recommend how $7.2 billion in broadband funding will be spent. Adelstein will work closely with the FCC, since both have been charged by Congress with rolling out broadband to the nation.

Broadband in America

There is a difference of opinion as to exactly what speed is to be considered "broad band." One large research firm suggests that broadband includes all lines offering internet connectivity capable of achieving download speeds of at least 256 kbit/s.

The average cost of broadband in the USA is about $45 per month, but fees in rural areas can run much higher, primarily because of the fewer households per square mile and the cost to connect them. By contrast, the cost of broadband service in more densely populated Japan averages $30 per month.

A new broadband survey out from *Strategy Analytics* shows the U.S. in 20th position among the countries of the world at 60% household broadband penetration. This is well behind countries such as South Korea (95%), Singapore (88%), The Netherlands (88%), Denmark (82%), Taiwan (81%), and Hong Kong (81%). *Strategy Analytics* estimates that the U.S. will fall to 23rd place by the end of this year.

South Korea's dominance in broadband penetration is attributable in part to its highly urbanized population, as well as the existence of a comprehensive government-backed broadband policy.

In Japan, the typical internet speed is faster than the U.S. (8–50 Mbps vs. 1–7 Mbps). About half of all broadband connections in Japan and Korea are fiber optic. In the U.S., Verizon is the only large provider of fiber-optic service (FiOS), and it accounts for less than 4% of all broadband connections. There are three levels of Verizon's FIOS service: 15 Mbps, 25 Mbps, and 50 Mbps with costs ranging from $50–$145 per month. In Japan, the average fiber-optic speed ranges between 100 Mbps and 1 Gbps, with costs from $25 to $56 per month.

Now that the transition to digital television is complete, the FCC has released the "white spaces" of unused television spectrum to the public. White spaces are frequencies allocated to digital television but not used locally. Rules adopted by the FCC on November 4, 2008 allow for the use of unlicensed devices in the unused TV spectrum for a nationwide mobile broadband network. It opens the way for the widespread deployment of low-cost broadband for every American household using new wireless technologies.

The new FCC team has its work cut out for it, transitioning telecommunications into the 21st century. Developments are going to start coming fast and furious. We'll keep you informed on those that affect amateur radio.

73, Fred, W5YI

What You've Told Us...

Our June survey asked "how high your tech is," and we're glad to see that most of you have, at minimum, made it to the latter half of the 20th century (just kidding!). Of those who responded, 95% have all-solid-state radios, while 38% have one or more tube radios and 8% report they have software-defined radios. Just over half (51%) have radios that may be controlled by a computer, while 4% have radios that must be controlled by a computer. The vast majority of you (84%) have a computer in your ham shack, and the vast majority of you (89%) use the Windows® operating system (19% Vista, 62% XP, 8% earlier versions). Only 5% of you use Macs; another 5% use Linux or Unix, and 2% run another operating system.

Among those of you with computers in your shack, just over half (53%) use them for logging and award tracking, and about the same number (52%) use them for general operating, such as PSK31 or Echolink. In addition, 36% use them for cooperative operating aids, such as DX Cluster, while 14% use them for in-station operating aids, such as CW Skimmer. Plus, 24% of you use your computers for contest operating.

Nearly everyone (91%) has a computer connected to the internet, and 78% of you have broadband, while 13% have dialup and 6% are not online. Among those of you with internet access, 92% use it for callsign lookups, 87% for e-mail, 78% to get ham radio news and information, and 71% to research or purchase new gear. In addition, 44% use the internet for getting propagation information and for DX spotting, 37% for online QSLing and operating awards, 28% for ham radio blogging, 26% for other, 17% for code practice/license study, and 4% for remote station control.

This month's free subscription winner is Larry Jones, K5ZRK, of Sandersville, Mississippi.

Reader Survey September 2009

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

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

This month, with lots of new faces at the FCC, we'd like your views on the FCC and amateur radio.

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

1. How knowledgeable about amateur radio do you think the five FCC Commissioners are?
- Extremely knowledgeable 1
- Somewhat knowledgeable 2
- Slightly knowledgeable 3
- Not at all knowledgeable 4

2. How high a priority is the Amateur Radio Service to the FCC Commissioners?
- Very high 5
- Higher than many other services 6
- Equal with other services 7
- Lower than many other services 8
- Very low 9

3. How knowledgeable about amateur radio do you think the staff of the FCC's Wirelesss Telecommunications Bureau is?
- Very knowledgeable 10
- Somewhat knowledgeable 11
- Slightly knowledgeable 12
- Not at all knowledgeable 13
- Bill Cross is the only one who is knowledgeable 14

4. Do you think the staff of the Wireless Telecommunications Bureau has ham radio's best interests at heart?
- Yes, all of the time 15
- Yes, most of the time 16
- Yes, some of the time 17
- No 18
- Don't know 19

5. When the FCC is deciding an issue relating to amateur radio, on what do you believe the Commissioners base their decisions?
- Entirely on the Notice of Proposed Rule Making and comments received 20
- Entirely on recommendations from staff 21
- A mixture of comments received and staff recommendations 22
- Don't know 23

6. Do you believe the comments filed by individuals in amateur radio matters are given the same weight by the FCC as those filed by the ARRL or other organizations (including CQ)?
- All are treated equally 24
- Comments from organizations carry more weight 25
- Only comments from ARRL carry more weight 26
- Don't know 27

7. Do you believe the FCC *should* give more weight to comments by the ARRL and other ham radio organizations than to those by individuals?
- Yes, as amateur radio's main voice, comments from ARRL should carry more weight 28
- Yes, comments from organizations tend to reflect the views of many hams and should carry more weight 29
- No, comments from organizations tend to promote each organization's self-interests and should not be given greater weight 30
- No, comments should be considered only on their content and not on who they're from 31

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

math's notes

BY IRWIN MATH,* WA2NDM

Interesting Reading and Building a Coherer

I read two books over the summer that I think will be of interest to readers of this column. Both have to do with some of the history of communications, and both do a very good job of explaining not only the technical details, but, more interestingly, the social atmosphere of the times as it relates to the topics.

The first is entitled *The Victorian Internet,* by Tom Standage, published by Walker & Company and was copyright first in 1998 and then again in 2007. This book is about the events leading up to the creation of the telegraph, the actual creation itself, the impact the telegraph had on late 19th century society, and the various people involved. The book is clever in that while it covers the development of the telegraph in detail, it also attempts to show how similar (although quite a bit slower) its development was as compared to the internet. The parallels are quite interesting.

The book begins with detailed descriptions of various mechanical telegraph systems, and how important they grew to become well before the actual electrical versions made their appearance. It clearly describes the technical thinking of the time, and, of course, the actual work of Samuel F. B. Morse. The first telegraph, as you will learn when you read the book, was not exactly what we regard as today's version. In fact, there were several attempts at electrical systems that were unique to be sure ,and these are described in detail. Morse's role in development of the final version of the code and the reason for it is covered, as well as the contributions of various people both favorable as well as unfavorable to him at the time. The problems of long-distance communications and the Atlantic cable are also described. You will learn of the tremendous impact that "instant messaging" had on society and how it changed the world permanently in a relatively short period of time.

Without giving too much information and spoil the book for you, I would suggest that if you have any interest in the history of CW, as well as the past somewhat before our hobby (as we know it) began, get a copy. It is very well written and, at least for me, thoroughly enjoyable. In case you are concerned, it is technical enough to satisfy those so inclined without boring the layman. If you search Amazon.com or one of its competitors, I am sure that you will be able to find a copy easily and rather inexpensive.

The second book is almost a continuation of the first, but moves forward into the realm of radio, or "wireless" as it was called then. This book is entitled *Signor Marconi's Magic Box* and was written by Gavin Weightman in 2004. It covers the very early experiments of Hertz and the fervor (and problems) that Marconi had while trying to extend the range of so-called "Hertzian Waves" to something practical. It also covers the achievements, frustrations, and disappointments of those involved with this endeavor. There are plenty of references

*c/o CQ magazine

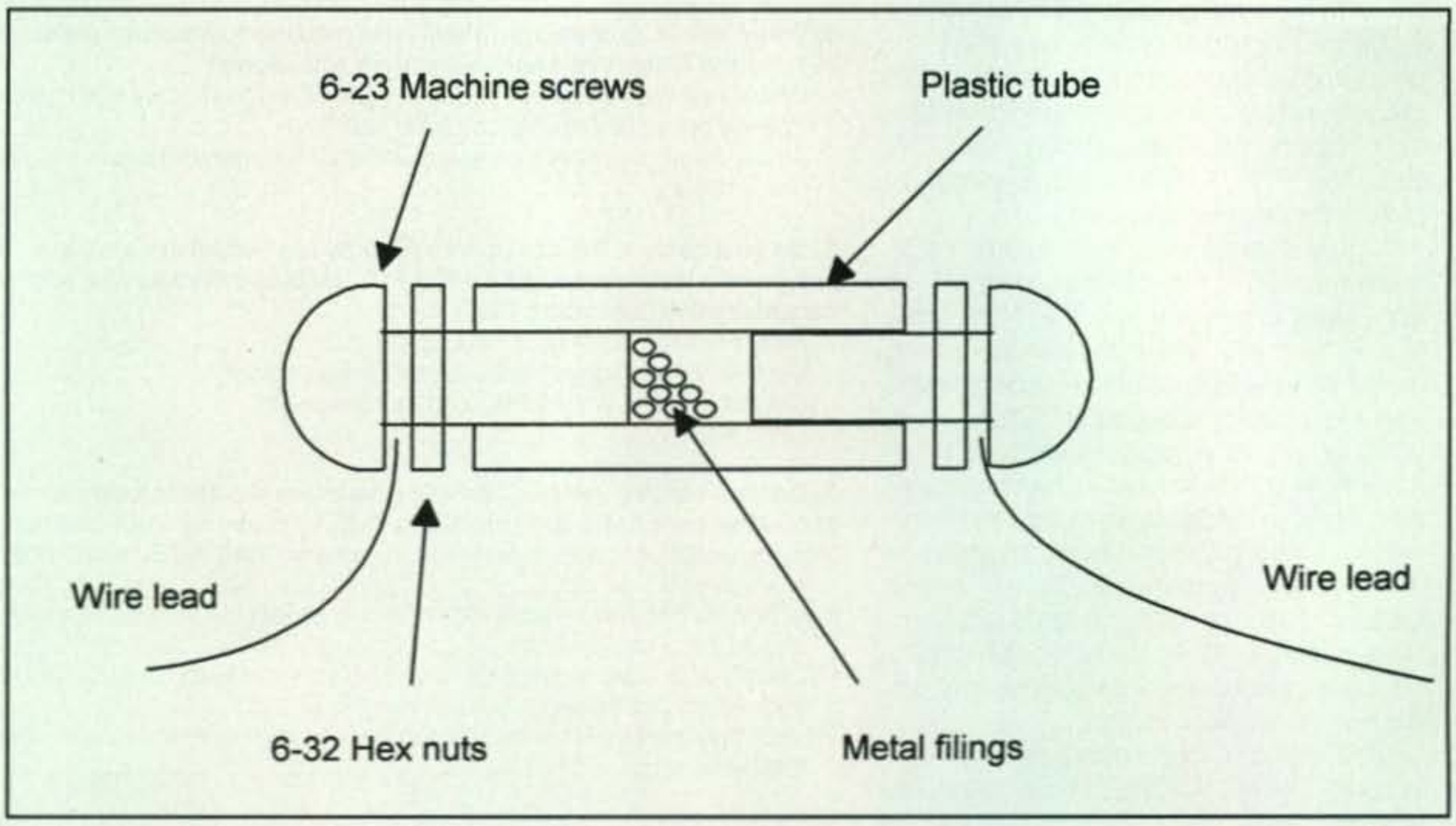


Fig. 1– Basic construction of a coherer.

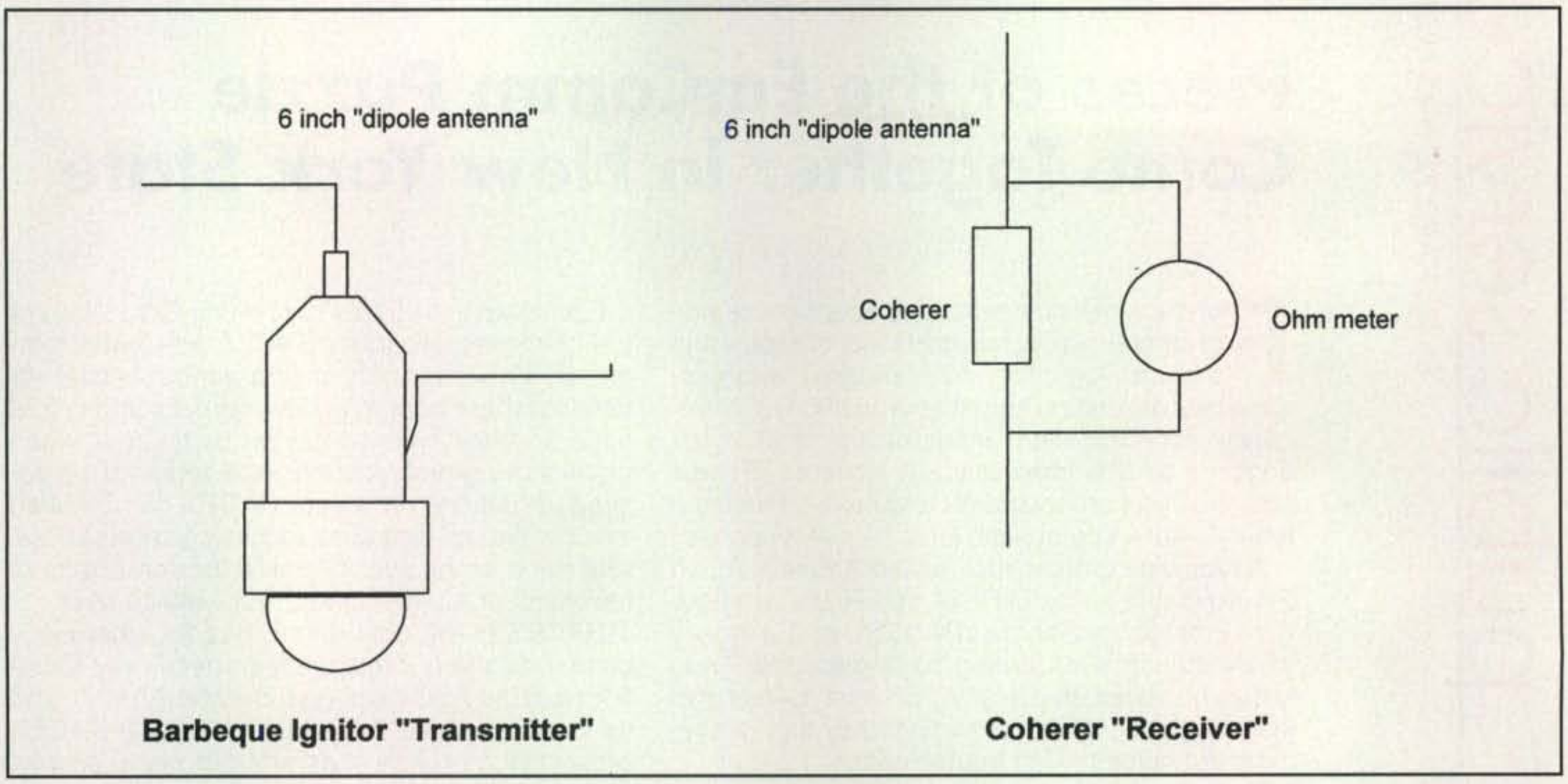


Fig. 2– "Wireless" transmitter experiment.

to the new "hams" and how they impacted early wireless transmissions. The society of the time is also very well described, and you will be surprised at what went on. Technical descriptions and photos are clear and plentiful, and I did not realize just how crude the early equipment really was. In fact, I was amazed that it worked at all! For an example of what Marconi and others had to work with, I have included a description and construction details for a device called a *coherer*, one of the very first radio-wave detectors. You can easily build one for virtually no cost and experiment with it, and if you do, you too will be amazed. Remember, this was in common use even before crystal detectors.

The book describes Marconi's life, and, as in the case of the first book, will be quite interesting to many amateurs. If you search Amazon.com or one of their competitors I am sure that you will be able to find a copy of this book as well.

How to Build and Test a Coherer

For those who wish to experiment with a coherer to experience what the technology was like at the end of the 19th century, the device described in fig. 1 is a simple detector that can be fabricated for virtually no cost. A short length of plastic tubing (such as a section of a soda straw), two 6-23 machine screws and nuts, and a common iron nail are all that is needed. Use a metal file to first grind the ends of the machine screws flat. Then take a common iron nail and file it in order to collect a small amount of fine filings. Next screw the nuts onto the machine screws near the head to act as terminals. Now turn one screw half-way into the plastic tube. Add the filings to the open end of the tube and then turn the other screw/nut combination into the other side of the tube until a small gap is left between the two screws with enough space to allow the filings to move around. Place the assembly in a horizontal position and tape it to a tabletop or other surface to eliminate any extraneous vibrations. Using an ohmmeter, adjust one of the screws until you achieve a resistance reading of more than 3 to 4K ohms between it and the other screw.

Now obtain a spark "transmitter," which can be a common barbecue ignitor or the ignitor on a gas range in the kitchen. Move the coherer assembly a few inches from the spark gap and momentarily generate the spark. You should note that the resistance reading of the coherer significantly decreases. To reset the coherer, tap the assembly to free the metal particles. You can "play" with the settings until you achieve a good on/off ratio. With a 1/4-inch to 1/2-inch spark generator you should be able to achieve a transmission range of at least a few feet with ease. Fig. 2 shows the complete "wireless transmitter and receiver" experiment. This is true QRP!

Believe it or not, this was "state of the art" in the early Marconi years. Imagine what work had to be done to extend the range to the point where it was really practical. Above all, however, do not connect this transmitter to your three-element beam! 73, Irwin, WA2NDM

public service

BY RICHARD FISHER,* KI6SN

Pieces of the EmComm Puzzle Come Together in New York State

For many newcomers to the public service side of amateur radio, the patchwork of people and organizations that focus tirelessly and passionately on putting together a well-oiled emergency communications infrastructure is as mind-boggling as it is impressive. A labyrinth of radio amateurs and organizations and modes touch the federal, state, county, and local tiers of response.

Nationwide groups such as the Amateur Radio Emergency Service (ARES) and Radio Amateur Civil Emergency Service (RACES) have a legacy of life-saving work dating back decades. They know, however, that resting on past laurels can lead to a false sense of competency that is anything but helpful when trouble arises.

This month, we're taking a look at how an aggressive initiative on the state level in New York has grown a communications network integrating RACES, many modes (notably packet), and many driven radio amateurs.

First, some basics: RACES' mission is "to establish and maintain the leadership and organizational infrastructure necessary to provide amateur radio communications in support of emergency management entities throughout the United States and its territories," according to <www.USRACES.org>, an unofficial RACES website.

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

Ken Goetz, N2SQW, New York State RACES radio officer, takes traffic at the controls of an FTDX9000, part of the EmComm network in the Empire State. (Photo by Chuck Jaed, N2EIR)

Launched in 1952 as part of the Cold War-era Civil Defense program, RACES has been "employed during a variety of emergency/disaster situations where normal governmental communications systems have sustained damage or when additional communications are required or desired. Situations (in which) RACES can be used include: natural disasters, technological disasters, civil disorder, nuclear/chemical incidents, acts of terrorism, or enemy attack," the website says.

RACES is the only amateur radio emergency communications organization specifically sanctioned in the FCC rules (see Section 97.407), and as such, is subject to certain limitations. RACES organizations function as arms of state, county, and local offices of emergency management, and may operate only when specifically authorized by the appropriate emergency management officials. (A certain number of drills per month are permitted as well.)

Fortunately, a common thread among most responders is a need and passion for painstaking and continual improvement of their response plan. When amateur radio is only part of a disaster communications initiative that includes federal, state, county and city elements, it's vitally important to assure everyone is "on the same page"—especially when so many people, offices, and communications modes are in play.

With that in mind, we recently talked with Ken Goetz, N2SQW, New York State RACES Radio Officer and of the State Emergency Management Office (SEMO), about ongoing efforts developing a packet radio system. Through coordination with RACES, it is being designed to assure that in times of need, key players in official and volunteer positions up and down the line in the Empire State have the tools necessary to get the important mission of disaster communications accomplished.

Goetz and many others have recognized the need and are aggressively acting upon it. His insights give us a peek into how amateur radio and government efforts can mesh in a well-constructed EmComm system with packet radio as a key element:

***CQ:** What is the impetus for developing this statewide network for emergency communication?*

N2SQW: The packet radio network is being developed within the structure of RACES. Since the primary purpose of RACES is to provide emergency communications for civil preparedness purposes, a robust network was needed.

In the mid 1980s New York State RACES, through the State Emergency Management Office, became involved with improving the

Chuck Jaed, N2EIR, sits at one of the State Emergency Management Office operating positions of the emergency communications packet network in New York State. (Photo by Ken Goetz, N2SQW)

already-existing packet radio system in New York State. At that time there were many packet nodes already operating, but *there* were still some disconnected areas and often very long delays in message transmission times.

Almost all of the nodes were privately owned, with only a few being installed at—and funded by—... county emergency management offices. Through some federal grant programs, New York State was able to provide packet radio equipment to many of the county emergency management offices in the early 1990s.

Additional packet nodes were also installed at some of the SEMO tower sites.

CQ: *Why is this network necessary? How broad a swath of New York State does it cover?*

N2SQW: The overall packet network is required to provide a means of digital communications among the various county emergency operations centers and the state emergency operations center. During a natural disaster or other emergency, government communication capabilities can often be stretched to its limit. This is where the RACES system comes into use.

Through the use of packet radio, text files are easily transferred. A large amount of data can easily be transferred without the potential for error that can often be found in voice transmissions. The packet radio system is only a part of the overall RACES capabilities. This system is not a new network, but rather an ongoing improvement to the already existing packet radio network. Access to the packet radio system is available throughout most of the state.

CQ: *What agencies and institutions (amateur and non-amateur) does it involve?*

N2SQW: The overall amateur radio community has provided tremendous support contributing to the growth of the packet radio system. Many individual operators and radio clubs have constructed and funded privately owned nodes. There has also been support from SEMO as well as many of the county emergency management offices and county RACES organizations.

CQ: *What is amateur radio's specific goal/mission?*

N2SQW: The specific mission of RACES is to provide communications support to government agencies when the normal communications systems are either overloaded or have become disabled.

CQ: *How many radio amateurs or amateur organizations are involved? How is intra-agency coordination handled? Chain of command?*

N2SQW: This build-out has involved amateurs in all parts of the state. Putting

Radio Amateurs Recognized for Emergency Communications in Puerto Rico

The Executive Director of the State Agency for Emergency Management and Disaster Administration in Puerto Rico (AEMEAD—Agencia Estatal de Manejo de Emergencias y Administracion de Desastres) has recognized the work that amateur radio operators do in emergency situations. Heriberto Sauri, from San Juan, delivered a proclamation from Gov. Luis Fortuno declaring Amateur Radio Operator Day earlier this year.

"The honorable Luis Fortuno, Governor of Puerto Rico, has given me the duty to give out a proclamation of his, declaring May 12 as the Amateur Radio Operator Day (Dia del Radioaficionado)," Sauri said.

"By these means, this administration recognizes the important work that the amateur radio operators do in Puerto Rico and around the world in emergency situations to protect the lives and safety of our citizens."

"Men and women from different parts of the world enjoy the (passion) to find and interchange ideas, as well to help others when natural disasters occur, help when ships are in danger, contribute in the organization to (summons) medicines where needed," Sauri continued.

The recognition noted that in many different emergency situations for more than 80 years, "the world has had the collaboration" with radio amateurs from Puerto Rico, KP4s.

"Worldwide, there have been very well known people as amateur radio operators," Sauri added, such as "the late King Hussein of Jordan, known by the callsign JY1; and King Juan Carlos de Borbon (of Spain), identified as EAØJC; and others."

Radio amateurs in Puerto Rico were recognized in a proclamation from Gov. Luis Fortuno and delivered by Heriberto Sauri, Executive Director of the State Agency for Emergency Management and Disaster Administration for their continuing efforts in providing critically needed communications during times of emergency. (Photo courtesy of Angel Santana, WP3GW)

The citation applauded the KP4s for following basic amateur radio principles, including: "promoting friendship and good relations with the community and other countries worldwide; never operat(ing) in a way that may bother others; always be(ing) able to help those in need; besides other things."

The Executive Director of AEMEAD announced that he will develop an Understanding of Cooperation with the amateur radio community of Puerto Rico, "who offer an excellent service to the people before any emergency situation."

an exact number on this would be difficult. Since this is not a specific system for emergency use but rather an improvement to the already existing packet system, use is available to all amateur radio operators. RACES within New York State is organized on a county level, with each county having its own RACES organization. The county RACES Radio Officer answers directly to the county emergency manager. Additional assistance and guidance are available at the state level from SEMO.

CQ: *What specific portions of the amateur spectrum are being used?*

N2SQW: The packet system uses predominantly 2 meters and 70 centimeters. There are some links utilizing 6 meters and 1.25 meters as well.

CQ: *From a packet standpoint, what data protocol is being used?*

N2SQW: Much of the system (today uses) FlexNet. The robustness and redundancy of the FlexNet system has been just what is needed for a system that is going to be used in times of emergency. Due to the automatic re-routing capabilities in the FlexNet system there have been a few times when the temporary loss of a node has even gone undetected.

CQ: *What other modes are being used?*

N2SQW: Several areas are now incorporating Winlink 2000 into their capabilities. With the HF capabilities of Winlink, this will vastly improve the "long-haul" digital complement of RACES. Of course, RACES utilizes all modes available to amateur radio operators, with the mode in use depending on the needs at the time. Everything from SSB to FM to PSK31 has found a use. We have resorted to CW in some cases of poor propagation. I guess that can be included in here as well, since CW was the first digital mode.

CQ: *What kinds of information are being exchanged? Words, photos, voice, video?*

N2SQW: Anything that can be handled by FlexNet and AX25 travels on the network. Again, this is not a specific network for emergency use only, but a network that is being used every day by amateur radio operators.

CQ: *What radio amateurs coordinate/manage this network?*

N2SQW: This is coordinated and managed by amateur radio operators near the various nodes throughout the state. Much of the coordination regarding additional node construction has come from this office.

Tremendous help has been provided by Rusty Seastrum, KE2PW. A few years ago I appointed Rusty as coordinator for the state packet system. Rusty has assisted greatly in both the development and maintenance of many of the packet nodes. Additionally, invaluable help in the early stages of conversion … to FlexNet was provided by Bob Anderson, K2BJG.

CQ: *From the amateur standpoint, how is recruiting for the network handled? What kinds of outreach have been necessary to develop the system?*

N2SQW: Word quickly spread through the amateur community regarding the improvements we were making to the packet system throughout New York State. In most cases, amateurs in various parts of the state contacted us at SEMO regarding the potential growth of the network.

***CQ:** How are training and testing managed? How much? How often?*

N2SQW: The system is in constant, day-to-day use. It is only through continued use of any system that you can be certain that it is operational. Various RACES training nets are held, both locally and statewide. However, most of these are strictly voice nets and do not use the packet system.

***CQ:** What lessons have been learned in using the network—either in testing or in a real-life emergency?*

N2SQW: Redundancy is an absolute must. Reliance on a single path among areas can only lead to failure when the system is needed the most. Most areas are now connected through multiple packet paths, but some areas are still being improved upon.

***CQ:** What has been the most challenging part of developing such a network?*

N2SQW: There has been some difficulty in getting all of the nodes sited at appropriate locations. Wherever possible, government (either state or county) sites are being utilized. There are still many privately owned sites in use, but this can prove troublesome if the operator either moves or the node must be removed for some other reason.

***CQ:** Are there past instances where the network has been used to great benefit?*

N2SQW: There has been utilization of the system as far back as the rather serious ice storm of 1998. There have been many other short-term localized uses of the system. The packet system has also been utilized during many of the nuclear power plant drills here in New York."

In conclusion, Goetz reminded us that the packet radio system "is only one part of the overall New York State RACES capabilities. There are very active RACES groups in most of the counties in New York.

"These groups practice regularly, and provide services for local government when they are called upon. From the tragic events of September 11th, when

Tidy and efficient operating positions combine for cool operation of the EmComm packet system in ongoing development in New York.

all of New York State RACES activated on a statewide level, to localized events that may only last for an hour or two, the RACES group in New York State has repeatedly provided outstanding communications services to multiple government agencies."

Additional information about SEMO and the New York State RACES program can be found on the SEMO webpage: <http://www.semo.state.ny.us>.

EmComm East on Deck for Early October in Rochester, NY

Speaking of disaster preparedness and New York State, next month radio amateurs will be converging on Rochester for EmComm East.

According to Tony Pazzola, W2BEJ, the weekend-long event being held October 3–4 on the campus of St. John Fisher College draws hundreds of emergency communications officials from around the northeast for seminars, demonstrations, and casual meetings.

"Everyone attending has a common interest (emergency communications)," Pazzola said, "but all of them have specialties. Getting everyone on the same page is important. The big 'buzz' word is *interoperability*. We have to get together to be sure that in an emergency everybody knows what everybody else is doing."

Pazzola said "the same page" includes communications support for a wide range of areas including shelters, food and emergency supplies, health and welfare communications, and roadway and debris conditions.

Organizations expected to be represented at EmComm East include the American Red Cross, Salvation Army, MARS, RACES, ARES, Skywarn, National Weather Service, and governmental agencies such as the State Emergency Management Office and FEMA.

Weekend seminars and training sessions are expected to cover the gamut of EmComm issues, including weather (NWS and Skywarn), emergency communications coordination (RACES and ARES), local club involvement in EmComm, Volunteer Organizations Assisting in Disasters (VOAD), and many more, Pazzola said.

Various agencies' emergency communications vans will also be on static display in a parking lot at the college, he said. "It's a chance for the people attending to see what radios are in each vehicle" and to get ideas for the type of gear that is needed to most efficiently outfit a mobile emergency communications van.

"Amateur radio's role in emergency communications has changed from what we remember from years ago," Pazzola said. "In the past (radio amateurs) primarily passed messages. Now we're very specialized and are usually used to support other agencies," which is an extremely important function in times of a disaster, he said.

EmComm East was first held in 2008, Pazzola noted, and was modeled after EmComm West, which was inaugurated in Reno, Nevada in 2003.

Licensed since 1963, W2BEJ is former Eastern New York Section Emergency Coordinator (SEC) for the American Radio Relay League, and is current Air Force MARS statewide emergency coordinator, Eastern New York Red Cross Emergency Coordinator, and a radio officer with the New York State Emergency Management Office. He's a logistics coordinator for the 2009 EmComm East.

For updates on the web, visit: <http://www.emcommeast.org/>.

Keeping Ahead of the Curve in 2009 Atlantic Hurricane Season

Residents of Florida, the Carolinas, Eastern seaboard and Gulf states—inhabitants of Hurricane Alley—will tell you that the calendar does not dictate when the Atlantic hurricane season begins and ends. Generally, it's June through the end of November, but as radio amateurs, we need to be ready for action at any time. August and September, though, are the heart of the season, when the waters are warmest and the threat is greatest.

Here are some of the best places to check to keep on top of your game:

The Hurricane Watch Net: 14.325 MHz SSB; <http://www.hwn.org>

VoIP Skywarn and Hurricane Net: <http://www.voipwx.net>

National Hurricane Center, Miami: <http://www.nhc.noaa.gov>

NHC Amateur Radio Station WX4NHC: <http://www.wx4nhc.org/>

Salvation Army Team Emergency Radio Network: 14.265 MHz SSB; <http://www.satern.org>

Maritime Mobile Service Net: 14.300 MHz SSB; <http://www.mmsn.org>

Check the organizations' websites for details on net schedules and other information.

Wanted . . .

Information about your area's disaster preparedness initiatives. The packet radio network in New York is a snapshot of what dedicated radio amateurs in one state can do to make a good response system even better.

Are there operators/volunteers in your state, county, city ,or town involved in innovative disaster preparedness initiatives? We'd like to hear about them. Please drop me at line at: <ki6sn@cq-amateur-radio.com>.

73, Richard, KI6SN

BY ROBERT KENYON,* K8LJ, AND STEVEN KATZ,† N8WL

DC Power Availability for All Occasions

Many of us have heard the term *interoperability* before, and usually it's with regard to public service agencies (law enforcement, fire, emergency management, Red Cross, and others) being able to talk to each other via common frequencies and modes of operation. There's another kind of interoperability that we hams involved in ARES® and RACES must be concerned about, and that is being able to use any transceiver with any power supply.

The Problem

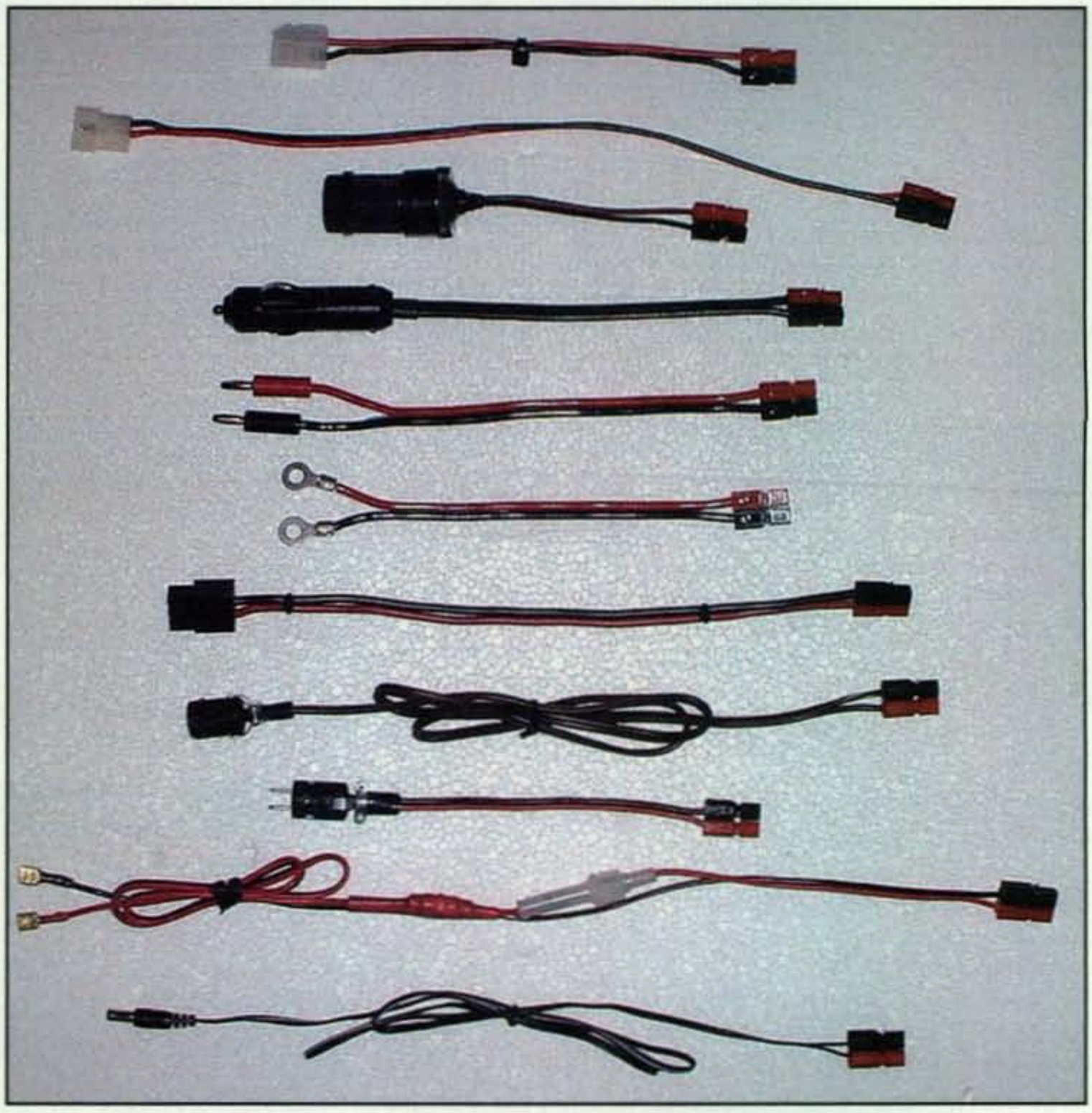
Over the years there have been many DC connectors invented to mate with various power sources, from the earliest Fahnestock clips to the most recent Anderson Powerpole® connectors. In between there have been screw terminals, banana plugs, spade terminals, Cinch-Jones® connectors, Molex® connectors, cigarette-lighter connectors, coaxial connectors (HTs and computers), and others. None of these are interchangeable with each other, of course, and if you have a power supply with one kind of connector and a rig with another, you're out of luck! You'll have to do some wire snipping and connector replacement before you can operate. That means lost time in an emergency situation—not good!

The Solution

Anderson PowerPole® connectors have become the de facto ARES standard, and once you've used them, it's easy to see why. The connector itself is the same color as the wire to which it mates, so you can tell at a quick glance which side of the connector is positive (red) and which is negative

*4682 Granview Rd., Granville, OH 43023
e-mail: <K8LJ@arrl.net>

†221 East Elm St., Granville, OH 43023
e-mail: <N8WL@arrl.net>



Anderson PowerPole® jumpers with a variety of common power connectors. See text for rundown of which is which.

(black). The connectors are hermaphroditic, which means no male or female version exists; all the connectors are the same gender and geometry, so they fit together perfectly. That's a big selling point!

They come in different sizes to fit 15-, 30-, and 45-amp (and larger) currents, but for most of us, the 30- and 45-amp sizes are adequate for almost all applications. They are very reasonably priced, too. You can get them from West Mountain Radio and other sources, online or at hamfests. (*Note:* The 15-, 30-, and 45-amp versions all have the same outer shell; the difference is in the size of the barrel in which you attach the wire. The 15-amp barrel is designed to fit 16–18 gauge wire, the 30-amp will take 12–14 gauge wire, and the 45-amp version will fit a thicker 10-gauge wire.)

You have to follow the convention in putting the connectors onto the DC cable to make sure the red and black are on the correct sides of each other, but that's not difficult. See the excellent illustrated instructions on West Mountain Radio's website at <http://www.westmountainradio.com/supportrr_RC.htm>

The connectors can be soldered or crimped, although crimping is generally preferred *(some people do both—ed.)*. Special tools exist for this. There are two general types of crimping tools. An inexpensive one is about $13 and is a bit tricky to use, and a more expensive one for about $40 works right every time. Spring for the better one to save headaches, or better yet, get your club to get one (if it doesn't already own one) so members can share it. It's not a tool you'll need often once you've converted all your connectors to PowerPoles®.

The Go-Kit

Just as your emergency deployment Go-Kit or Grab Bag should have a lot of different coax-cable jumpers and adapters so you can mate the transceiver's output to any coax connector, you should also be concerned about your transceiver's power cables. In the event you need to use your transceiver with another power supply, or your power supply with another transceiver, will the cables connect?

They will if the Anderson PowerPole® connector is used and if you have a series of adapter cables that will match to other kinds of connectors. The accompanying photo shows K8LJ's Go-Kit's array of jumpers. You can see Molex and Cinch-Jones plugs, screw terminal, banana plug, cigarette lighter, coaxial, spade, and several other common connectors with the Anderson PowerPole® on the opposite end. When called out for an emergency, he can be fairly confident that no matter what power supply and rig combination he or his colleagues might face, he will be able to adapt them to each other using the common Anderson Powerpole®. Assembling this package of jumpers is a good weekend project.

Strategy

Take some time at the next hamfest or go online to obtain some red and black DC power cable, a bag of Anderson PowerPole® connectors, and the following types of connectors (follow the photograph):

1 & 2. Molex 2 conductor socket. There are two commonly used types in many VHF/UHF rigs. One type has blades positioned at right angles to each other so they can fit together just one way. The other has round pins, but one end of the plug and socket is pointed so they only fit together one way. Be sure to observe the correct polarity. You may want jumpers of each gender, too.

3 & 4. Cigarette-lighter socket and plug.

5. Banana plugs.

6. Round spades for 1/4-inch screw terminals.

7. Six-pin connector commonly found on HF transceivers.

8 & 9. Cinch-Jones two-conductor socket and plug (with one large blade and one small one; the convention is that the large blade is negative). Be sure to observe the polarity.

10. Spade connectors

11. Coaxial power plug, as used in HTs and laptop computers. There are several sizes, so you might want to have more than just one jumper.

Conclusion

Having a supply of these jumpers in your Go-Kit can make the difference between a quick deployment and having to take the time to do major (and permanent) surgery on the DC cables of your transceiver or power supply (or someone else's). Lives can be at stake while your soldering iron is warming up. It is far better to arrive prepared.

73, Robert, K8LJ, & Steven, N8WL

world of ideas

BY DAVE INGRAM,* K4TWJ

Wild and Wacky Keys

Do you occasionally feel as if life has become a bit too serious and complex? Ready for a lighthearted, fun break? We definitely agree, and this month's column supports that with an off-the-wall look at some of the most unique (absurd?) CW instruments imaginable. Our featured items may not fall into the "used daily" category, but they are quite capable of adding some good old-fashioned humor to your CW pursuits.

The idea of spotlighting wild and wacky keys, incidentally, was a spinoff from our annual double-feature columns highlighting keys here in *CQ*. Then it was boosted by Gordon West, WB6NOA's flashing pickle demo and the Wacky Key Contest at Ozarkcon, the big QRP meet held annually in Missouri during early May. One idea inspired another and, well, it grew into the collection featured this month. As I assembled this column, the idea of making it a contest also gained foothold. Read on, remember to tell us which key(s) you like best, and also consider sending us pictures of your own wacky key for inclusion in a future column.

Outside the Box

We start as close to reality as possible with a key Bud Larson, W7LNG, made from a key—a large door knocker key, that is (photo A). First he drilled out the original top hinge pin and installed a brass machine screw to free up the movement. Then he drilled a hole in the base approximately one inch from the end, installed an insulated contact, and routed its wire to a rear connection post. A mating contact was added to the (movable key) arm and its wire was routed to another rear connection post. Bud says he may consider adding ball bearings to the movement, but will wait until after Straight Key Night (January 1st every year) to make that decision. Good thinking, old boy!

Dennis Burton, N5DRB, keeps the ball rolling with his Smiley Face Ball Key, which won first place in the 2009 Ozarkcon Wacky Key contest (photo B). Dennis made this high-tech devil by inserting a long screw in the top of the ball and a copper strap in the ball's side. He points out the important consideration is picking a ball with just-right "squeeze ability" and keeping it out of sight from the family dog.

Next is one of my own Wild Woody WARC Keys, the ones I occasionally send to friends as a special QSL for an on-the-air QSO (photo C). Arm height is set by the back screw, gap is set by the front screw, and tension is set by bending the spring. The feel is anything but ideal and the arm occasionally wobbles during use, but that just makes it a true Code Wabbler. This "clothespin manipulator" was also my first code key as a penniless Novice back when Methuselah was a little kid. I paired it with a homebrewed 6L6 transmitter built on a cigar box using donated parts and a BC455 military surplus receiver purchased for

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

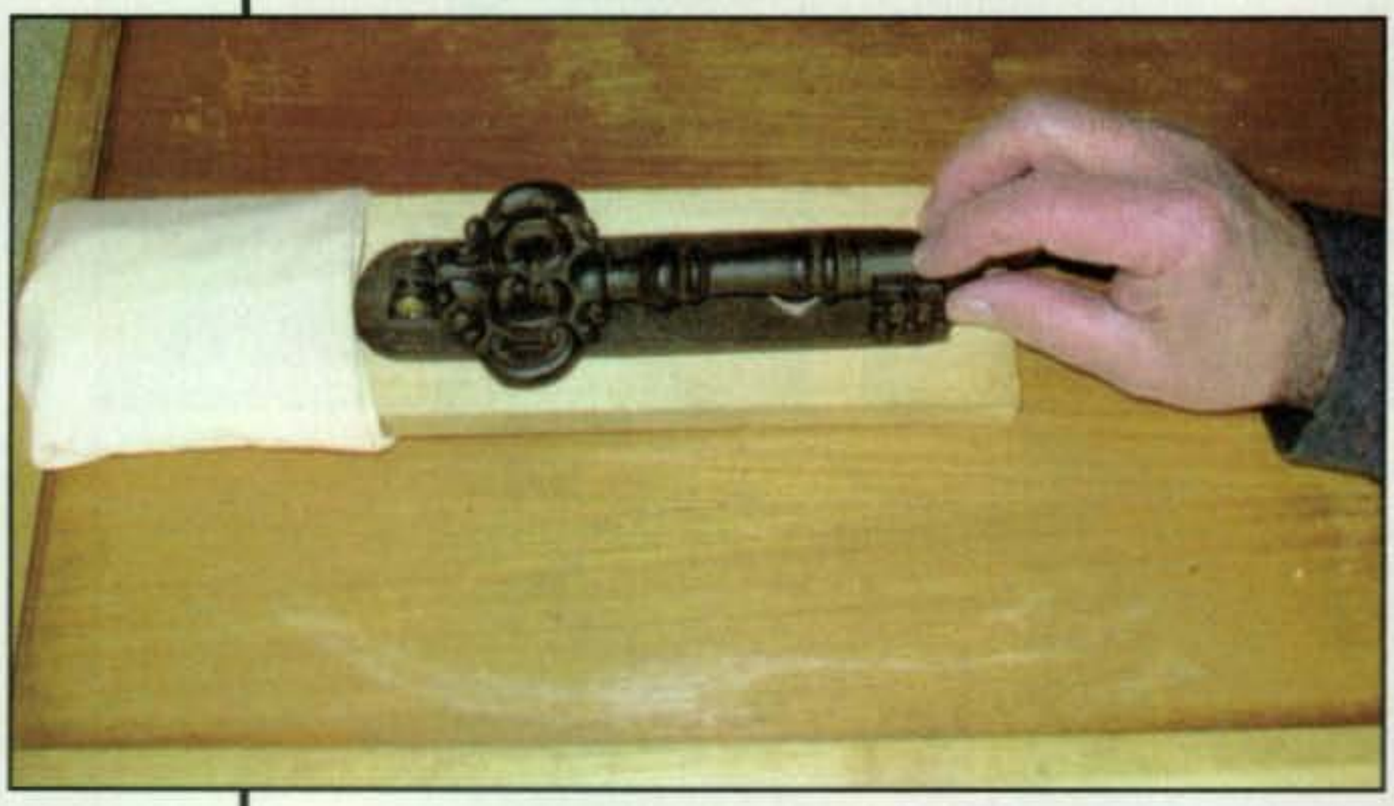


Photo A– Bud Larson, W7LNG, was definitely thinking outside the amateur radio box when he purchased this large door-knocker key at a local home supply store. He rebuilt its rear pivot point, installed a spring for tensioning, and added base plus arm contacts to make a unique hand key. A code practice buzzer and battery for code practice are under the white cover at rear. Neat! (Photo courtesy of W7LNG)

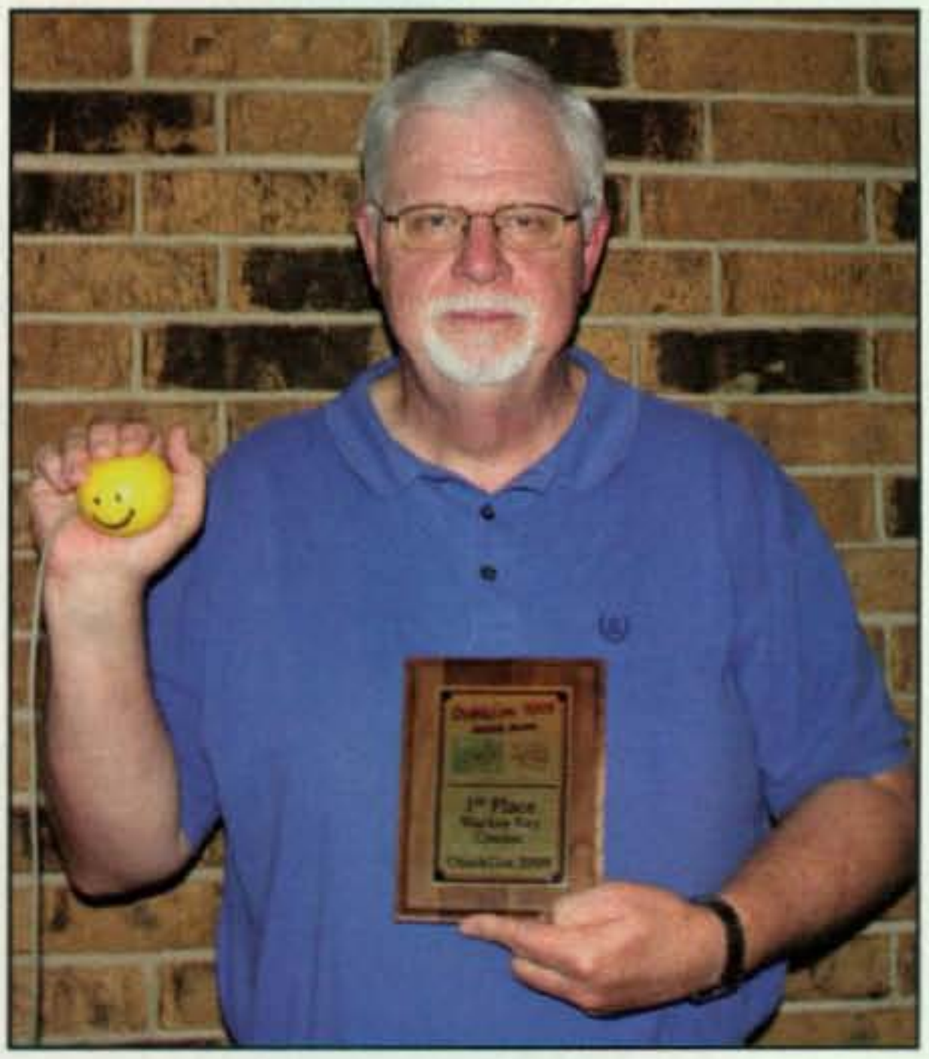


Photo B– Dennis Burton, N5DRB, won the Wacky Key Contest at Ozarkcon 2008 with his Smiley Face Ball Key. When squeezed, a 1.5-inch long screw inserted in the ball's top contacts mates with a flat copper plate in a horizontal-cut slit to send CW. When asked about the feel, Dennis said "good but a tad spongy." (Photo courtesy of N5DRB)

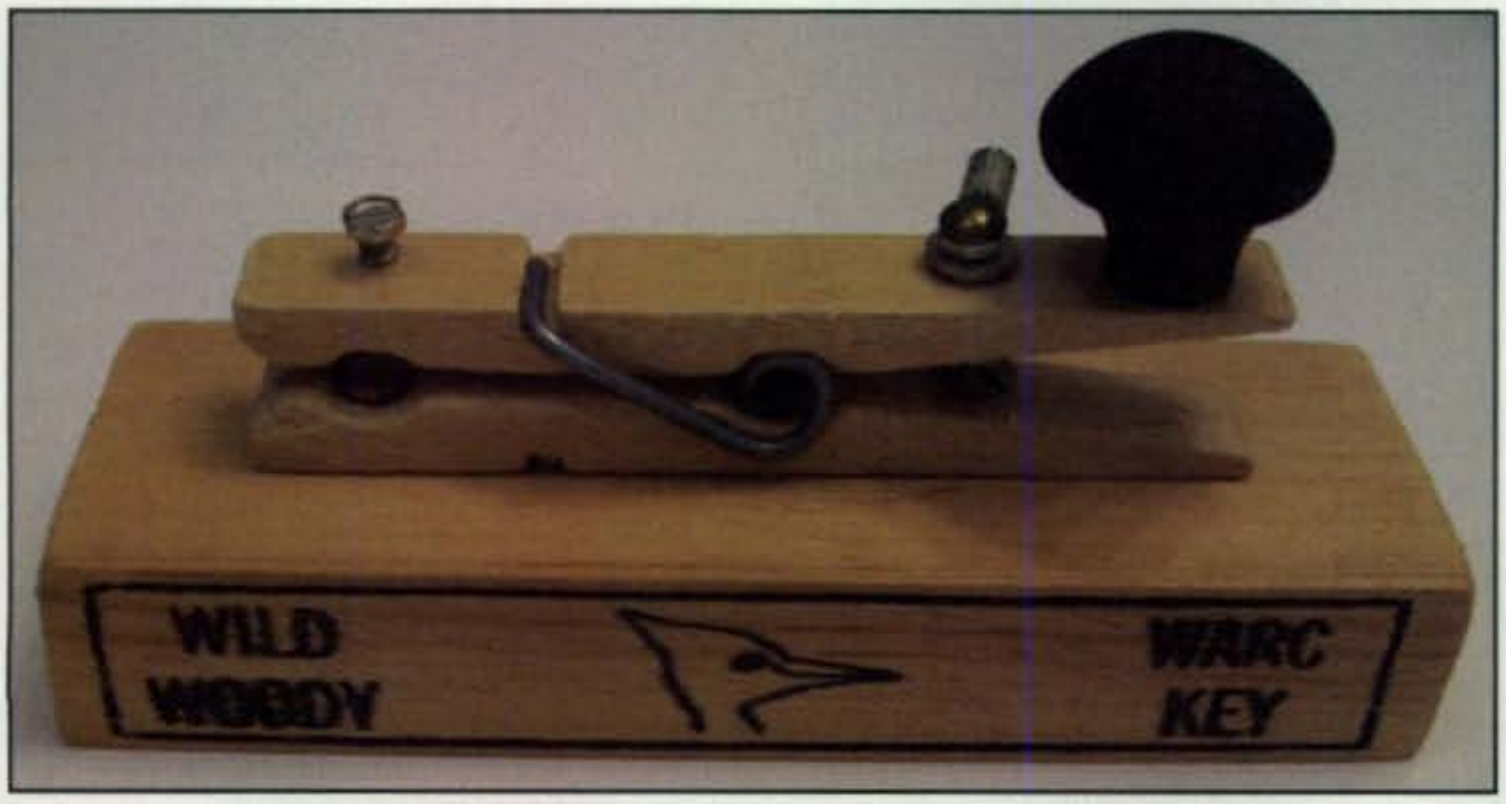


Photo C– This little looney is one of my own K4TWJ Wild Woody WARC Keys. It is made from a clothespin and works well for hanging poor CW operators out to dry. The key's spring is bent and stretched to reduce tension, and screw tips serve as contacts. It is the perfect pumper for heavy-fisted ops.

Photo E– Gordon, WB6NOA, assumes a safe (getaway) position as demo emcee while curious Chip Margelli, K7JA, sends Morse code on the Pickle Keyer. The more Chip sends, the higher the current through the pickles. Notice the steam starting to rise from the pickles. As they get hotter, they begin glowing amber—and soon explode! Front row onlookers usually hit the door earlier, however!

$4.00 of saved-up school lunch money. My Elmer took pity on me and gave me a J-38, which I still cherish today.

Pickle Launcher

Well-known radio school instructor Gordon West, WB6NOA, has a most unusual Pickle Keyer he occasionally uses to demonstrate current flow, resistance, voltage, and power (photos D and E). He places three large green pickles between stainless-steel skewers and then applies 120 volts AC to them through a well-insulated key. Current flows through the pickles causing them to glow amber (caution!) in color. The more the key is used for sending "visual CW" on the pickles, the brighter and hotter they become—until they explode!

When asked about his pickle keyer, Gordon emphasizes the (120-volt) wall plug must be out of the socket when loading pickles, the key must be well-insulated (or we have fried ham with the steamed pickles), and the whole kit and caboodle is definitely not U.L. approved.

Some good lessons in electronic theory surface here. Voltage across the pickles divided by the current through the pickles equals their overall resis-

Photo D– Here you see the hot Pickle Keyer of Gordon West, WB6NOA, as photographed by Editor Rich Moseson, W2VU, at the 2005 Dayton Hamvention®. Big juicy pickles are placed between stainless-steel skewers and 120 volts AC is applied to the pickles through the key. What happens next? Well, one of my Wild Woody Keys with its arm blown off on the left side (obviously from a past demo) is a good clue.

Photo F– Walter Dufrain, Jr., K5EST, demonstrating his large-arm and small--mechanism Tailgate Key at Ozarkcon, a big-time QRP meet in Branson, Missouri. The key is made from the south end of a north-bound Datsun pick-up truck. When asked how it works, Walter replied "pretty good, but getting it in and out of the shack is a struggle! (Photo via K5EST)

Photo G– Headstrong CW ops should find this Thermostat Hat Key made by Richard Bennett, KCØPET, uplifting. The thermostat is rebuilt/rewired so its internal mercury switch keys a transmitter according to fro and aft head tilts. High-speed CW can really give you whiplash with a key like this gem. (Photo via KCØPET)

tance, which drops as they are heated. As resistance drops, current increases and that current times the voltage equals the wattage dissipated by the pickles (pickle dissipation). The pickles are connected in parallel, so the brightest, most steaming-hot pickle has the lowest resistance, highest current, greatest power dissipation. I notice a loading coil and variable tuning capacitor on Gordon's demo board and can only imagine what would happen if the pickles were tuned to resonance!

Wacky Wabblers

Now moving (stumbling?) off the beaten path of hot keys and exploding pickles, we highlight two top entries in the (previously mentioned) Wacky Key contest held at Ozarkcon 2008. Ozarkcon, incidentally, is a large QRP meet conducted by the 4 States QRP Club and held near Branson, Missouri each May. Activities include technical seminars, show-and-tell discussions, homebrew contests, banjo-picking jam sessions, and more. It is a big-time event, and a Wacky Key contest is icing on the cake.

Walter Dufrain, Jr., K5EST, endorses that fact with his Datsun pickup truck tailgate key (photo F). Walter found the tailgate on a remote area of his farm, carried it home, cleaned it up, and set it up to serve as a hand/pump key, but he did not discuss the fine details. I assume the tailgate activates a momentary micro switch or rocker switch. One fact is certain: Carrying this monster into a multi-multi contest room should produce a roar of laughter.

Next is the Thermostat Hat Key devised and demonstrated by Richard Bennett, KCØPET (photo G), and yes that is a home wall thermostat attached to the Kenwood ball cap. If you have examined an older style heater thermostat, you know it uses a spiraled strip of metal that curls and uncurls ever so slightly according to temperature changes; that (small) movement causes an attached capsule containing a drop of mercury to move from one end to another. The mercury then shorts the contacts to switch the heater on/off. A simple rewiring changes the mercury switch into a key, and then the whole thermostat is attached to a cap so back-and-forth head tilts can send CW. Fit the cap with mouseketeer ears, put this chap mobile in the rider's seat of a top-down convertible, and watch it grab attention like crazy.

The Wild Ones

Rounding out our fine selection of extraordinary pumpers are three exquisite offerings from CW aficionado supreme Jari Vainio, OH6DC. This chap's sense of humor is equaled only by his creativity, and some of his keys are really wild. One, for example, consists of a tennis racquet with a large piece of vinyl floor-

Photo H– The Onion Chopper Key was devised by Jari Vainio, OH6DC, and it is equally at home in the shack or in the kitchen. Key wires connect to the plunger rod and a piece of copper-clad PC board inside the chopping bowl. Note the colorful keying knob atop the chopper. Every ham needs a key like this! (photos H, I, and J courtesy of OH6DC)

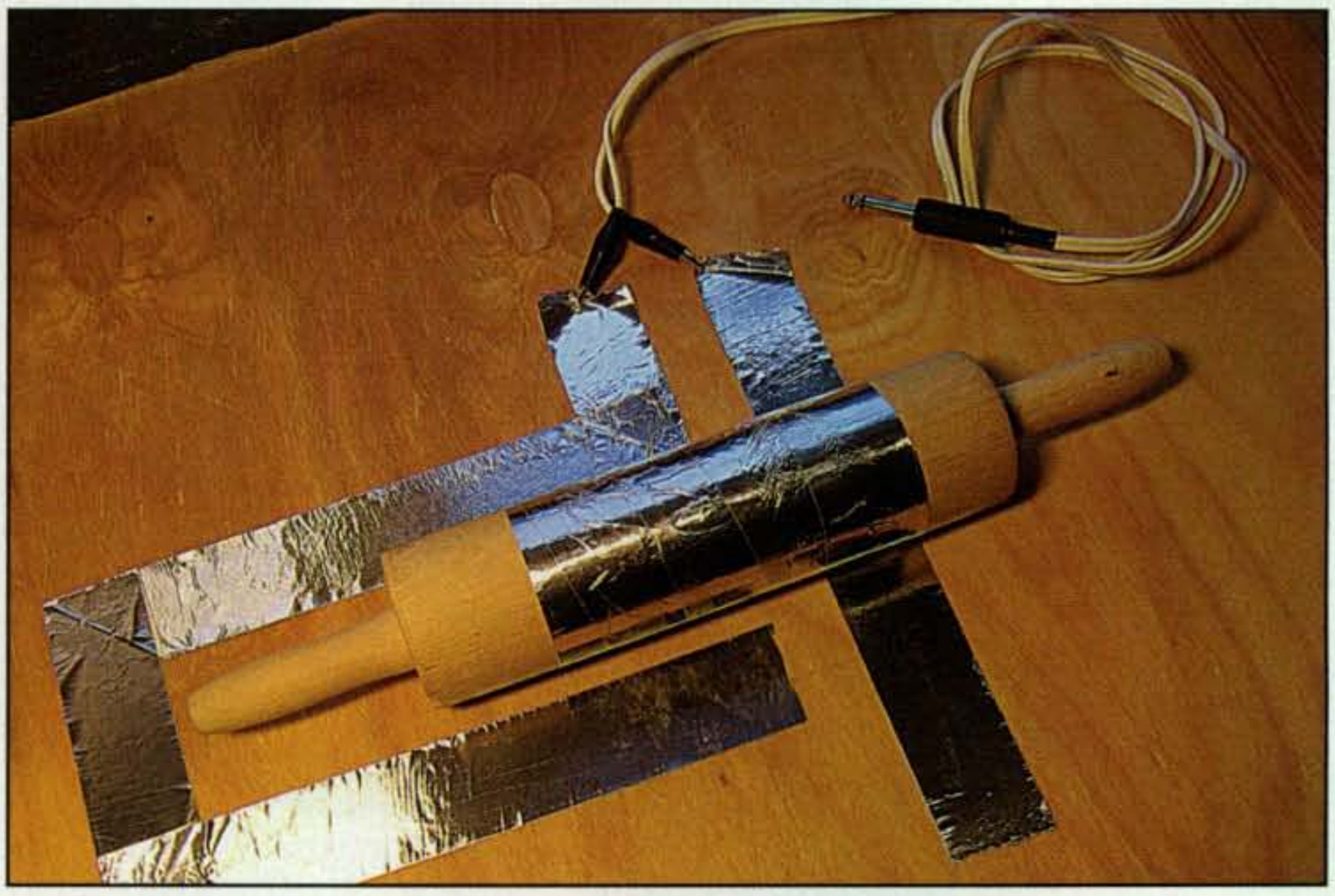


Photo I– Check out this brilliantly designed and magnificently polished rolling-pin Sideswiper Key made by Jari, OH6DC. The movable arm—err . . . rolling pin—continuously connects with the fixed aluminum-foil strip on the right side and you roll the pin from side to side to connect with the foil strips on left side to send CW. Notice how removing the foil jumper on the left and rewiring the strips can convert this marvel into a paddle. Neat!

Photo J– OH6DC presents the every CW devotee's dream—a dual-lever paddle disguised as a paper coffee cup. Each handle is fitted with a precision-bent gem clip that, with handle moves, contacts a big blob of solder between the handles. We know you can't wait to make your very own copy of this treat, so details are in the text.

ing over the "net end," a large knob on the handle end, and a big pivot block near the middle. Jari starts a roaring fire in his home's fireplace, climbs on the roof (with racquet key in tow), places it over the chimney, and sends dot-dash CW in smoke signals. Another key is built around a pogo stick that you balance on and then bounce around the room to send CW. Fortunately, Jari limited his designs for this year's introductory offerings.

When asked to describe his Onion Chopper key showing in photo H, Jari replied the key has a spring-loaded metal push rod, a four-blade upper contact, a piece of copper foil PC board material (with soldered wire) sitting on its bottom wood block for a lower contact. Connection wires route to a socket on the chopper's top/lid. You forgo the onions, cable the chopper to your transceiver, grasp the round knob, and start sending tear-jerking CW.

Moving into the shake, bake, and roll-it-out category, we next spotlight the Rolling Pin Sideswiper of OH6DC (photo I). Notice the thoughtful design and clever engineering here, friends. First a narrow strip of heavy-duty aluminum foil with one wire attached is hot-glued to the table (whew!). Then a solid wrapper of aluminum foil is hot-glued to the rolling pin to make a moving arm-type contact. Next, left and right contacts (of aluminum foil) are hot -glued to the table on each side of the rolling pin and the other key wire is attached. Now follow this point and mod. The left and right contacts are connected together by a short strip of aluminum foil on the rolling pin's left end so this, err, "thingee" functions as a side-swiper. Remove that short strip of foil, connect the left and right contacts to a three-conductor cable, and it becomes a single-lever CW paddle. I thought about adding a second rolling pin and expanding this gem into an iambic paddle, but somehow I think the world may not be quite ready for such an item.

Wrapping up this trio of Morse morsels from OH6DC is the paper-cup paddle in photo J. This is no wimp-o-cup. It has a stout cardboard handle—two of them—and they flex and move independently. Jari converted this paper cup into a paddle by first hot-gluing a big blob of silver solder between the handles (check it out with your magnifier). He then bent a pair of gem clips to just-right angles and glued each to a handle so when either handle is moved toward the other, that gem clip's end connects to the solder blob. The paper handles have just enough stiffness (tension?) to hold their (unkeyed) position, and a near-full cup of juice gives the paddle good stability.

Onion choppers, rolling pins, and paper-cup keys. Who could ask for more?

Conclusion

That overflows available space, so I will quickly close with a reminder and encouragement to vote for your two favorite keys and send me details of your own deranged key for inclusion in the next column/contest. Meanwhile, here's hoping we meet on 20 or 30 meter CW—using readable keys! 73, Dave, K4TWJ

Vote—and Join the Fun!

Now, and just like TV's "Dancing with the Stars," it is your turn to vote for the couple (of keys) you like best. The two top-scoring entrants can choose a copy of my popular *World of Keys/Keys III* book, my new *QRP Romps! book* (your choice), or a year's subscription to *CQ*, a place in my future *Keys IV*, and an invitation to compete in a future "Walk of the Wacko Keys" tap-off. E-mail or snail mail your vote to me (addresses on the first page of the column), and if via e-mail, keep it brief to avoid overloading the server.

You are invited to join the fun and frolics, too! Homebrew your own wacky wabbler, shoot a couple of pictures (prints, or high-resolution/250K to 1-meg digital images), include a brief description, and send both to me for inclusion in our next Wacky Keys column/contest. This promises to become a big and popular event, so get cracking while those creative ideas are spinning! *—Dave, K4TWJ*

LDG ELECTRONICS

The #1 Line of Autotuners

NEW! KT-100

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

NEW! IT-100

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

Suggested Price $179.99

AT-200Pro

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

Suggested Price $249

NEW! Z-817

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

Z-11Pro

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

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

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

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

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

Now With 2 Year Transferable Warranty!

AT-100Pro

This desktop tuner covers all frequencies from 1.8 – 54 MHz (including 6 meters), and will automatically match your antenna in no time. It features a two-position antenna switch, allowing you to switch instantly between two antennas. The AT-100Pro requires just 1 watt for operation, but will handle up to 125 watts. All cables included. ***Suggested Price $219***

radio not included

AT-897 for the Yaesu FT-897

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

radio not included

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

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

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

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

AT-1000Pro

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

NEW! YT-100

An autotuner for several popular Yaesu Radios. An included cable interfaces with your FT-857, FT-897 and FT-100 (and all D models) making it an integrated tuner, powered by the interface. Just press the tune button on the tuner, and everything else happens automatically: mode and power are set, a tune cycle runs, and the radio is returned to its original settings. It's the perfect complement to your Yaesu radio. ***Suggested Price $199.99***

NEW! Z-100Plus

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

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LDG

kids' korner

BY BRITTANY DECKER,* KB1OGL

Helping Ham Radio "Age Backwards"

Meeting Three Young Leaders of Amateur Radio

In the last "Kids' Korner" published in the June issue, I had come across a survey of kids who were involved in amateur radio. The survey was mostly focused on why it seems so difficult to attract kids to having an enjoyable time in the hobby. Therefore, I took the main points of the survey and wrote out a "Ten Things We Could Be Doing Better" type guide. In case my expectations for youth and their mentors seem outrageous or unattainable, I found three young people who are prime examples of how the rest of us should be participating in this beloved hobby. The actions and accomplishments of these three young people provide an even more detailed guide on how to help this hobby grow, prosper, and stand the test of time.

First, Megan McClellan, K5MEM, the ARRL Assistant Section Manager for Youth in North Texas, contacted me with her take on what we should be doing to attract youth. Megan is extremely dedicated to her position, and persists in even the toughest situations to help her peers see the benefits of amateur radio. She even has a few success stories under her belt. Then, Miles Seiver, KI6LDU, Assistant Section Manager for Youth in Santa Clara Valley, California, gives his take on this dilemma for which amateurs are constantly striving for an answer. He focuses on the importance of marketing amateur radio where youth gather, for example, on Facebook. Reaching out to youth where they naturally congregate makes it easier to get their attention. Last, Nick Esposito, KC2ONP, net control for a growing kids net in New Jersey, talks about how kids are also responsible for their own growth and development as well as others around them.

*c/o CQ magazine

Megan McClellan, K5MEM, age 17, is the ARRL North Texas Assistant Section Manager for Youth. She organizes youth activities each year at HamCom, one of the country's largest hamfests.

We'll start off with Megan, K5MEM, reporting mostly on the youth activities she organizes for HamCom, the big hamfest each June outside Dallas, Texas.

Bringing youth into amateur radio is one of the biggest issues that the hobby faces today. A few (ARRL) sections across the nation are attempting to address this problem by appointing an Assistant Section Manager (ASM) for Youth. Such has been the case in the North Texas section, among others. As an ASM for Youth, I am expected to help the youth of today get involved and interested in ham radio. It has been noticed that the average age of amateur radio operators has gradually been rising. To curb this trend, more young people must be taught to admire the hobby. Most teenagers are busy either talking on their cell phones or texting their friends. They just do not see the need to pass a technical test in order to use a radio to talk to their friends. As ASM for Youth in North Texas, it is my job to change their minds, or at least get them to recognize the entire other world of communications out there.

Yes, I admit I am one of those teenagers who never leaves the house without my cell phone, but just recently, I convinced one of my friends to start studying for her ham license. She saw how much fun I had in the hobby and wanted to be a part of it. She thinks it is cool to talk to people around the world by just picking up a microphone. I've been the ASM for Youth for the North Texas Division since 2007. It requires a lot of dedication, but I believe in the end it's worth it.

Youth Activities at HamCom

HamCom is the major ham radio event in my area and is the largest ham radio event in the southwest. Every year, there are over 3,000 people in attendance. There is a large flea market where used equipment is sold, but most of the major radio manufacturers are also there. Of course, there are vendors who sell radio accessories, too. HamCom provides at least 80 hours of education at this event. There are presentations on new technology, new laws affecting ham radio operators, and of course, storm spotting and Skywarn training. I've set up a youth lounge every year at HamCom in which I have information for scouts, children, and even adults on what amateur radio can do for them. It is a place that young people can "hang out" together. By building relationships, I get them interested in radio. I set up scavenger hunts for the children that, based on how many items they find, children receive prizes. These scavenger hunts have a variety of questions. The easy ones are just looking for the prize barrel or finding an operator on each level (i.e., Technician, General, and Extra), going all the way to the more difficult ones such as finding a two by two callsign or a TNC connector for sale or a radio that is older than they are (not hard, hi hi!). The children enjoy trying to find these things, and it gives them something to do at the event so that they are not bugging Mom and Dad about being bored. It also introduces them to ham radio without any pressure to take a test.

I helped organize the one-day Boy Scout Radio Merit badge training at HamCom. One-hundred-four Boy Scouts attended this year. All the instructors are amateur radio operators and Boy Scout leaders. All Scouts and Scoutmasters in uniform were admitted free.

Registration began at 7:15 AM, but reservations for a spot in the class started pouring in several months

before. The class has been provided for Scouts for several years and is a much sought-after mechanism to acquire the badge. The merit badge class ran from 8 AM until 5 PM. The Scouts attended the class until mid-afternoon, followed by testing opportunities or a chance to get on the air. Lunch was provided free of charge for all Scouts in uniform under the age of 18. Richard Phillips, KB5YBQ, is one of the teachers and adult organizers of this event.

Radio stations were made available to the Scouts on site so that they could see amateur radio equipment as well as make that all-important first contact. This year, I arranged for the Rockwall Amateur Radio Club to set up three separate stations, complete with solar power and antennas for the boys to talk to other hams. Each station had a mentor and control operator so that everything was legal. Both HF (long distance) and UHF (more local) contacts were made. All Boy Scouts in uniform who had completed the one-day Radio Merit Badge class had the chance to take the FCC Technician Exam at *no cost*. What a great deal!

In addition to learning the required Scouting material, the Scouts were treated to several presentations from guest speakers. Gordon West, WB6NOA, talked to them about ham radio and long-distance communications. Gary Woodall from the National Weather Service spoke about the importance of ham radio in weather forecasting and reporting. I talked to them about the fun that young people can have as licensed ham radio operators. There were also speakers from the ARRL and the West Gulf Division.

This class was specifically developed to be taught in conjunction with HamCom. It seems this event has started a trend, as a number of other areas of the country have been interested in organizing similar training events.

Beyond HamCom

I have started inviting myself to some of the smaller hamfests in the area. Not only will I be just walking around talking to young people, I plan to set up some activities for them on a smaller scale. These events are generally only one day (or a half day) so my plans are not nearly as involved.

I have made a point of talking about the advantages of holding an amateur radio license, such as storm spotting and aiding the National Weather Service in locating potentially dangerous weather conditions. I also let my peers know that ham radio operators provide priceless service during times of emergencies and disasters. I have discussed some of the new technologies that link radio and the internet with my friends. They seem to think it's pretty cool.

I am also part of the Robotics team at Rockwall High School. We build robots that are radio controlled and compete in international competitions. I have proposed that ham radio be taught as part of construction training. The information required for a ham radio Technician license is very similar to what is involved in construction training. The mentors for the program are considering my proposal.

I believe that getting more youth involved in amateur radio is the future of our hobby. New blood and new energy will keep the hobby moving forward.

Megan McClellan, 17
Assistant Section Manager for Youth
North Texas Section

Miles Seiver, KI6LDU, noticed that he was one-of-a-kind in amateur radio in his community. He decided to take action, finding ways to share the hobby that he loves with others his age.

I am the Assistant Section Manager for Youth in the Santa Clara Valley, California section of the ARRL. I became interested in amateur radio through my town's Emergency Communication Committee. I recently wrote an article for the town newsletter on my experiences on the committee. Soon after joining the ECC I realized that I was the only member under 50 years old. In fact, after spending six months going to training sessions and other emergency communication events, I saw literally zero youth participation besides my own. If amateur radio is going to remain a valuable communication tool in the future, more people from my generation need to participate.

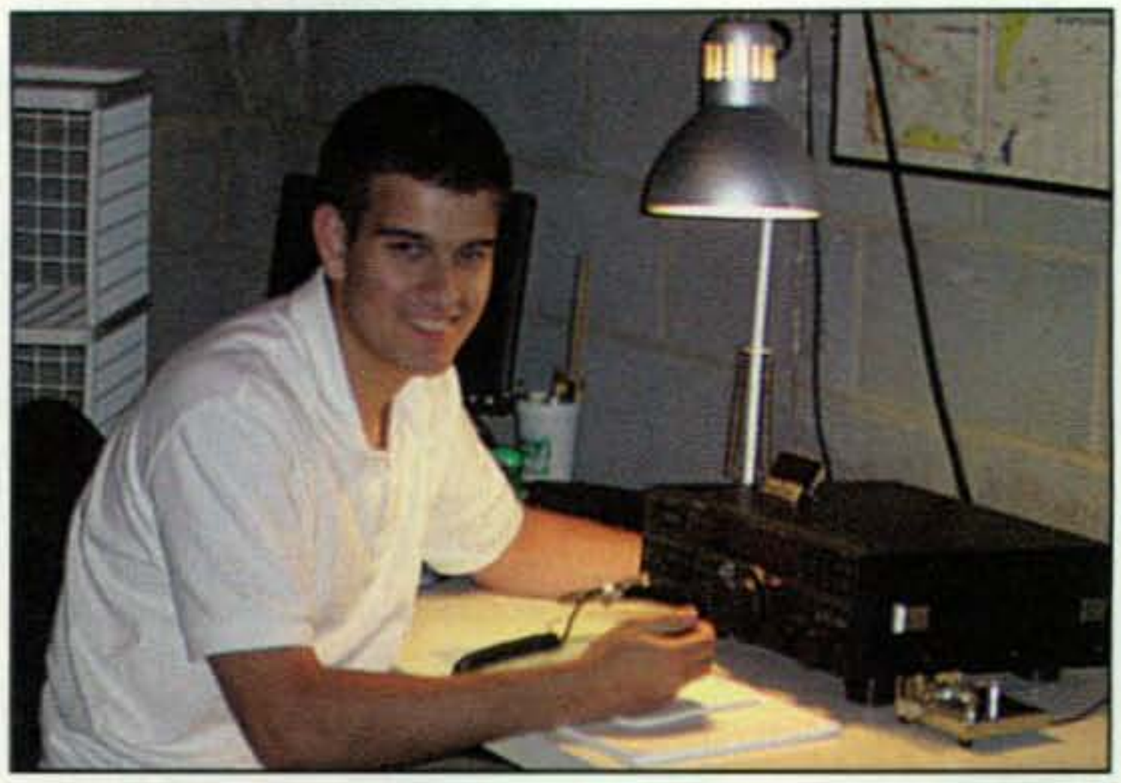
The main issue hindering interest in amateur radio from my age group is the proliferation of other communication means such as cell phones, Facebook, AIM, etc. The

main philosophy I brought to my section of the ARRL when I joined was simply, "if you can't beat 'em, join 'em!" So, when I became ASM for Youth, my main goal was to give ham radio a more modern face that would appeal more to people my age.

Since a lot of high schools have emergency preparedness clubs, I have worked on educating club leaders on the valuable component to community preparedness that amateur radio offers. Another project that I have focused on is the creation of a Facebook page for the section which allows members of all ages to join and post dates for events, pictures, notes, or anything else pertaining to the group. Since my appointment, there has been an increase in youth activity in the section.

Miles Seiver, KI6LDU, is the Santa Clara valley section's ASM for Youth. He is 17 and heavily involved in emergency communications.

Another responsibility of my position is to represent the SCV section at major ARRL events. (In June) I participated in ARRL Field Day; it was a lot of fun. I made HF contacts at the GOTA station and met new hams in my area. Since emergency communications doesn't require much use of HF bands, I haven't received much experience working those frequencies. Field Day was the ideal opportunity for me to learn about and experiment with HF under the guidance of experienced operators.



Nick Esposito, KC2ONP, age 16, Net Control, New Providence Amateur Radio Club Youth Net, operating at his station in New Jersey.

Miles Seiver, 17
Assistant Section Manager for Youth
Santa Clara Valley, California Section

In addition to the work being done by the young leaders who hold positions in their ARRL sections, there is a lot of support given by kids without some sort of official leadership position. Young amateurs who take initiative must also be recognized for their hard work and dedication to amateur radio. Because although the positions such as Assistant Section Manager for Youth take a lot of dedication, it is really the average kids, who love and just can't get enough of the hobby, who are the face of young amateurs. Without the kids who take the initiative to start nets, clubs, or events for kids in amateur radio, it would be a lot harder for the other young amateurs who hold leadership positions because they wouldn't have the support needed.

Nick Esposito, KC2ONP, the founder of the New Providence Amateur Radio Club Youth Net, goes in depth on his approach to getting more youth into amateur radio.

I am currently 16 years old and I am a junior at New Providence High School in New Providence, New Jersey. I hold a General Class license, but continue studying for the Extra Class exam, along with trying to learn Morse code. I am a member of the New Providence Amateur Radio Club (NPARC) and the ARRL. I got involved in ham radio when I was in fourth grade. I received a flyer one day that the New Providence Amateur Radio Club was going start a radio club for kids and one of my teachers was going to be the advisor. I joined, thinking that it would be a great experience. I remained in the club up to when I left the elementary school after sixth grade. In that time I had been on HF talking to people in Europe, the Caribbean, and the Americas. I built a Morse code oscillator that required no soldering and was loads of fun to play with. I learned more geography than I knew existed. It was all so exciting.

Along the way I had become great friends with another leader of this club, Dr. Barry Cohen, K2JV, who has become my outstanding mentor. I had been enjoying this club for two years, and right as I left, I found out the real purpose of it all: We were going to have a conversation with the astronauts on the International Space Station! It was too bad I was leaving, though. Barry pulled me aside later and gave me the best excuse to stay in the club: Get my ham license! So over the summer I set a date in mid-July and studied feverishly for the test. I passed and the rest is history. I went to all of the meetings after school and even got a contact in with International Space Station (with the first space tourist, Greg Olsen). I have been the control operator for four ARISS contacts (soon to be five). I have

On the Cover

2009 Young Ham of the Year Andrew Koenig, KE5GDB

Andrew Koenig, KE5GDB, of Houston, Texas, has built his own IRLP (Internet Radio Linking Project) node into his bedroom closet. He has used the node to connect an astronaut at the Johnson Space Center with two schools in Canada, and to allow Hurricane Ike evacuees to keep track of events near their homes (see Zero Bias on page 8 for more). Andrew is 15 years old and is starting 10th grade. He is active in Scouting—a Life Scout working toward Eagle—and is a member of his high school's marching band and his local Community Emergency Response Team (CERT). He has also been active in recruiting and training other young people to ham radio and has set up a ham-radio-for-kids website at <http://www.thathamkid.com>. In addition, Andrew has set up a complete mobile station on his bicycle and has helped train astronauts for future ham radio contacts from space.

Andrew was named the 2009 Newsline Young Ham of the Year. This program, operating for more than two decades, honors the country's most outstanding young amateurs. It is sponsored by Amateur Radio Newsline, with corporate support from Vertex-Standard (Yaesu), which pays for the winner's trip to the ceremony at the Huntsville Hamfest and provides equipment gifts, and *CQ* magazine, which gives each year's winner an expense-paid week at SpaceCamp. *(Cover photo by Larry Mulvehill, WB2ZPI)*

operated emergency communications at the New York City Marathon and other local events as a member of NPARC's emergency response team. Now I mostly operate HF and run my kids' net.

What I enjoy about ham radio is contesting and operating DX because of the thrill of it, but talking to local hams is great in a different sense. The sense of camaraderie that hams share just from a quick contact is great. Everyone enjoys being a ham and enjoys carrying on a conversation.

For years, Barry has been coordinating kids' activities in my area, and one day I felt that I had grown old enough to start one myself and see where it went. I began the kids' net in early 2008 but failed to keep it running through the summer. I let it go but then restarted once 2009 began. I sent an e-mail to as many hams as I knew in my division and hoped it would get some new kids. Unfortunately it did not, but other means have brought us new members. A regular net is usually five kids including myself. We have a pool of about a dozen. I ask questions of the others, they ask questions back, and sometimes I relay questions from one person to the next. It is, in essence, a roundtable net and it is a good format. Personally, I conduct the net and give my weekly report. We are on VHF, though, on the W2LI repeater, so we are limited to about a 50-mile radius. It is good because anyone with a license can get on, but bad because we cannot really expand. Though it started off as a flop, with patience and drive, I restarted the net and met some great kids in the area who were willing to spend some time with me on the air every Sunday at 8 PM. Over the weeks this year we have had several new check-ins and met some great kids. The idea is that if you have a license or a parent does, get on the air! It is that simple. My net is just one recurring opportunity for them to take advantage of.

I believe youth getting involved, however possible, is integral. I had never participated in a kids' net before my own, but I knew it couldn't be too hard. Our club sponsors Kids' Day twice a year and I think that is the best exposure for kids. It is a great "contest" that any kid, even one who hasn't been exposed to amateur radio before, can enjoy. Also, parents who are hams need to expose their kids to ham radio. It should never be forced on a child if he or she doesn't like amateur radio, but they should at least have the opportunity to enjoy it. Amateur radio has limitless possibilities and connections. Young operators should learn the traditions and practices of good operating from older hams but embrace the new forms of the hobby as well. I recently experimented with digital communications and found it to be a great experience. Radio using the internet is another new method that is interesting. Software defined radios and the kits to build them are another interesting aspect. Kids should try and expose themselves to as much as possible and then pick the routes they want to go.

You don't have to be recognized with awards or positions to be a good ham. Getting on the air and being an active member of a radio club are the most important things a kid in radio can do. Challenge yourself to go above and beyond what you thought you knew and could do. Push your knowledge and see where it takes you.

Nick Esposito, 16
Net Control
New Providence ARC Youth Net

If you're in the New York City/New Jersey area, Nick's kids' net is on the W2LI repeater, 147.255 MHz + repeater shift and tone of 141.3 every Sunday at 8:00 PM. The repeater covers much of northern and central New Jersey as well as parts of New York City.

So, with June's Kids' Korner and this one, I think we have a pretty complete road map of what to do to help amateur radio "age backwards." It is pretty clear that we are hearing the same themes from all the young amateurs. Although there are some who are actively trying to progress with these things in mind, it is time to get everyone of all ages on board. Let's see how far we can go with this map and how successful we are in the end. Since the past two issues have combined a multitude of ideas from young amateurs all around the country, my guess is it hits the nail right on the head.

73, Brittany, KB1OGL

antennas

BY KENT BRITAIN,* WA5VJB

CQ Reviews: Super Antennas YP-3 Six (Seven) Band Yagi Plus Questions from and for our Readers

Well, it has been interesting to collaborate with Gordon West, WB6NOA, this time, as we both evaluated the new "Super Antennas" YP-3 Yagi (See "Super Antenna at Field Day" for Gordon's portion of the review). The YP-3 is a 6-band (well, maybe 7; more on this in a bit) 3-element beam that fits in its own bag. As you can see in photo A, this bag is designed to easily fit in the overhead bin as you fly to your DXpedition.

First, I completely agree with Gordo on the manual for the Super Antenna. It's pretty bad and the most important information is the hardest to read. However, I had a nice chat with Vern Wright, W6MMA, the owner of Super Antennas, and the manual issues should be cleared up by the time this column comes out.

The antenna is extremely well made of burnished aluminum with stainless-steel hardware and brass fittings. In photo B, I have the antenna in the 6-meter configuration. Yes, it's much more impressive assembled as a 20-meter antenna, but a heck of lot harder to photograph! Speaking of photos, that burnished aluminum confused my digital camera. The spirals on the elements are an artifact of my camera and not some kind of linear loading.

*1626 Vineyard, Grand Prairie, TX 75052
e-mail: <wa5vjb@cq-amateur-radio.com>

My only suggestion is to dig out a 12-mm or 1/2-inch open end wrench and throw that in the bag, using one of the many pockets for the tools and accessories that already come with the antenna. The 12-mm wrench is handy for tightening down the U-bolts on the mast clamps.

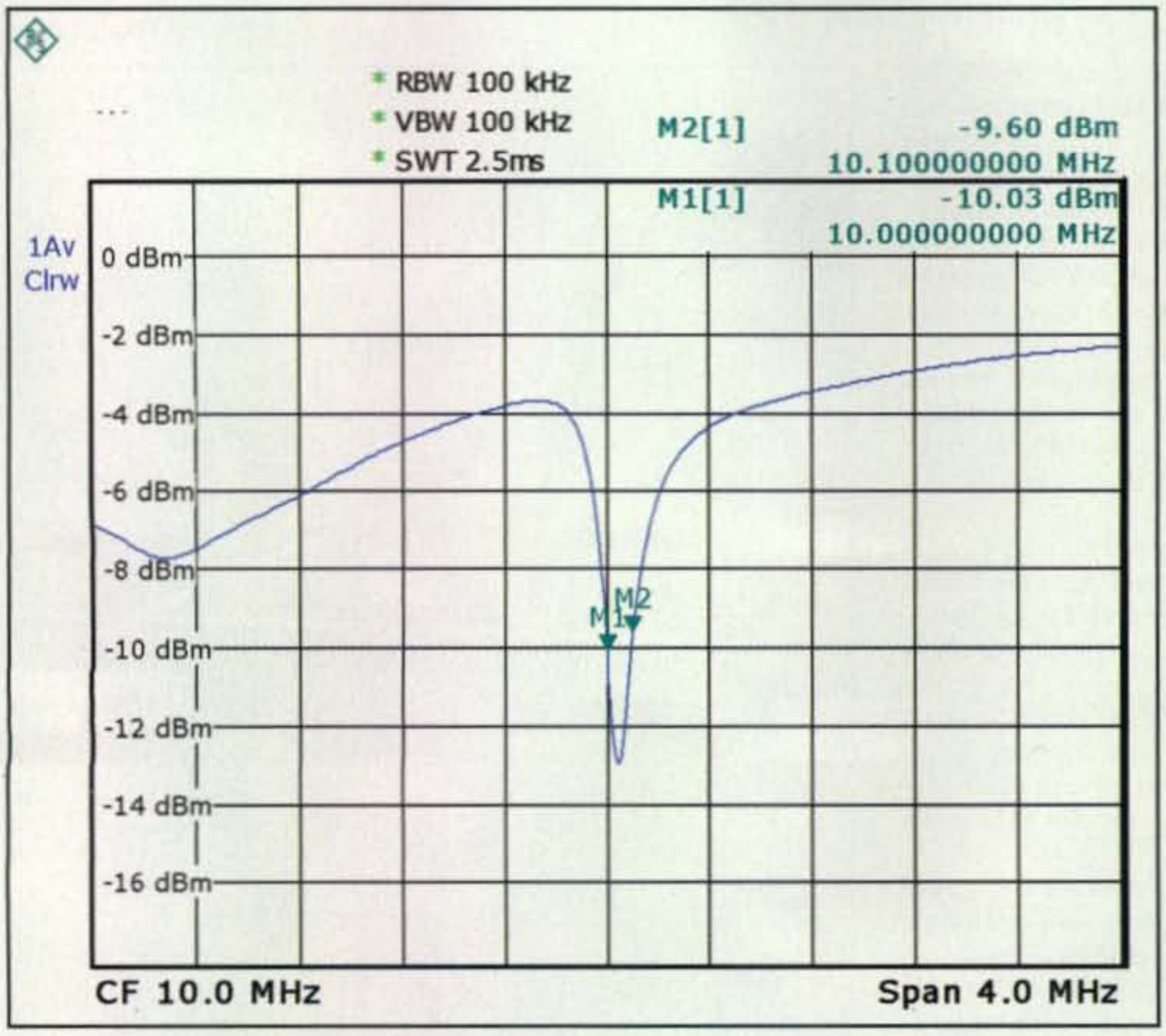
A 7th Band

I mentioned six vs. seven bands. According to the book, this is a 6-band antenna. But ... me, do everything by the book? Hardly. Plot 1 shows the Super Antenna on a network analyzer. The –10 dB return loss graph shows the antenna having a less than 2:1 SWR over the entire 30-meter ham band. Again, it was not exactly assembled by the book, which doesn't even mention the 30-meter band, so here's how I added 10 MHz: In photo C are some bits of All-Thread. These are the same threads used on many mobile antenna accessories. You need to find four of them and four of the nuts that go over the All-Thread. It just so happens that the nuts used to mount older-style toggle switches and volume controls have the same thread. These will make assembling the coils much easier. Now, dig out four of the 20-meter or 7-µH loading coils and two of the 17/15/12-meter or 3.5-µH loading coils. Put them together 7-7-3.5 to build a 20-µH loading coil.

Photo A– Super Antenna YP-3 6-band portable beam (or is it 7?).

Oh, I can see the inbox full of e-mail now: "Third grade math says 7 + 7 + 3.5 = 17.5!" Ah, but these are coils placed end to end, so we have mutual inductance between the windings! Screw your piece of All-Thread about half-way into one loading coil. Now use that nut to hold it in place while you screw on the next coil. Without the nut, the All-Thread tends to disappear into the first coil. Repeat for all the other coils. With the three coils on each end of the dipole, just adjust the tunable tips to full length, minus about 12 inches and you now have a 7th band for your portable antenna!

In photo D, I have the antenna configured using ther kit parts plus the pieces of All-Thread in the air as a 30-meter rotatable dipole. Now all Super Antennas needs to do is make some optional loading coils with about 50 μH



Plot 1– Super Antenna YP-3 on 30 meters.

Photo B– Super Antenna in 50-MHz configuration.

of inductance and you can have a 40-meter rotatable dipole as well. Overall, this is a well-designed and excellent-performing portable antenna.

A Rotator, Too

What next? The Super Antenna has a very versatile mechanical/electrical design. There is no reason it cannot be adjusted to just about any frequency between 10 MHz and 60 MHz, making it handy for a variety or commercial, scientific, or industrial applications in addition to amateur radio use. At Dayton, the company had a prototype antenna rotator that is now going into production. This rotator is so carefully balanced, and so carefully geared, that it only needs about .3 amps at 12 volts to turn this 3-element Yagi. A regular alkaline AA battery has about 1 amp-hour of power, so just a pack of AAs could power your rotator for a whole weekend of swinging the beam.

Super Antennas YP-3 at Field Day

By Gordon West, WB6NOA

Mechanically amazing—a lightweight 3-element beam that breaks down into a 35-inch Cordura® pouch! It gets better yet! This Yagi can work on six individual bands *(although Kent has found a way to make it seven—ed.)* with telescopic boom, telescopic elements, and some precision 3.62-µH and 7.52-µH coils included.

This 3-element 6-band Yagi is from a retired dentist, Dr. Vern Wright, W6MMA. That callsign should sound familiar, because he is also the one who invented the multiband Super Antenna vertical.

This new Yagi is called model YP-3, and out of the box—er, bag—it provides decent forward gain and directivity on all bands from 20 meters through 6 meters. The antenna expands to a maximum side-to-side width of 220 inches, and a maximum boom length of 120 inches, with the boom featuring spring-loaded buttons and the elements featuring thumb-tightening knobs.

On 6 meters and 10 meters, the antenna is full-size, and no coils are required. On 17 and 12 meters, mid-element coils are added for resonance, with a fair front-to-back ratio on both bands. On 20 and 15 meters, you add higher inductance coils, and you favor either the CW or voice portion of each band.

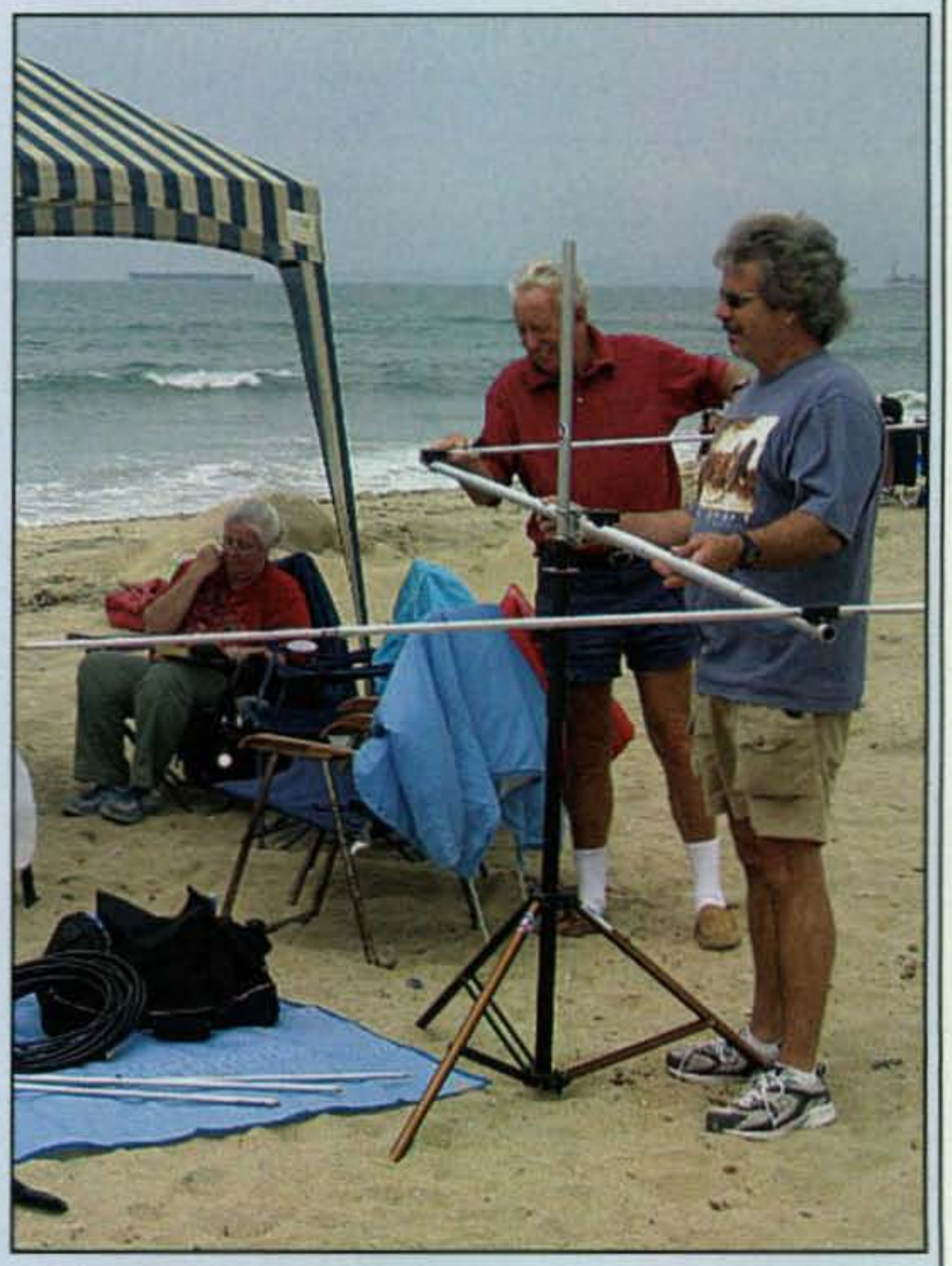
When you open up the bag, the coils are held in Cordura® pockets, and a quick eyeball tells you which coils have the most windings and greatest inductance. Since we were going to use the antenna on 6 and 10 meters for Field Day 2009, we left the coils in the pockets and began working with the boom.

The boom features rigid spring-loaded buttons, and the supplied "dimension sheet" allowed us to quickly snap in the desired length from driven element-to-director and driven-to-reflector. The length calculations are from antenna expert Mike Staal, K6MYC, of M^2 Electronics. Mike came up with the recommended boom and element lengths, and someone else attempted to illustrate the process in print in the poorly detailed assembly instructions. The manual on the mechanics of putting the beam together takes for granted that the assembler is good around beam antenna projects, but I see this antenna a natural for the beginner, who may not know a hairpin from a banana jack without some sort of full-antenna pictorials. The manual needs some serious revision! Fortunately, as Kent has noted, those revisions are under way and should be completed by the time you see this in print.

As for assembly itself, a felt-tip marker for each successful band assembly will greatly speed things up the second time, but the first time around it's a learning curve, even for those who regularly put together antennas.

We repeated the process, using some of our General class students, six times for six bands, and the SWR dropped in as advertised! I remember Dr. Vern setting up the 20-meter antenna in the wind at Quartzsite, Arizona, and I think he had it down to 20 minutes flat! He didn't need to use the included tape measure, but we did, the first time! If you decide to felt-tip your settings for each band, I strongly suggest individual color felt-tip markers, one color per band.

The quality of the materials is excellent. No burrs in the polished aluminum, and the boom push-buttons mean business when they snap into position. You must work hard to push them all the way in for a new boom length. After a few assemblies on the same couple of bands, you can probably have it together in the ten minutes that Vern suggests.



Gordon West, WB6NOA (standing, in red shirt), and Chip Margelli, K7JA, set up the Super Antennas YP-3 on the beach in California for Field Day fun in the sun!

Our operating results from the beach on Field Day:
6 meters, 12 states in 30 minutes !
10 meters, anyone we could hear S-3, we could work!

In the under-36-inch carry bag, this will be my operating antenna system when I next head out to Christmas Island, T32, for our yearly medical radio system maintenance. An ultra-light set of pliers might be the only tool you way want to add, although during class we had it all firmly put together without any tools at all.

For class safety outside, we covered the ends of each telescopic element with a little rubber ball for eye safety when the antenna was still in the assembly stage. We would do this with any antenna using aluminum elements.

Our only recommendation, other than a rewrite of the manual, with copious illustrations, would be the inclusion of six different color permanent felt-tip makers, one color per band, to mark the element and boom lengths.

AMERITRON mobile *no tune* Solid State Amp

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

ALS-500M
$849
Suggested Retail

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

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

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

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

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

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

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

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

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

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

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

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

ARI-500
$119.95
Ship Code A

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

Programmable Screwdriver Antenna Controller

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

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

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

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

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

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

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

New!
SDC-102
$129.95
Suggested Retail

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

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

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

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

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

3½Wx3¼Hx1¼D inches.

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

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

1.2 kW Screwdriver Antenna

SDA-100
$409
Suggested Retail

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

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

SWP-100, $24.95. 6-ft stainless whip.
SDM-100, $99. Stainless steel mount.
Saves $16.85! **SDA-110, $509.95.** Includes SDA-100, SDC-100, SWP-100.

Flat Mobile Wattmeter

AWM-35
$159.95
Suggested Retail

Ultra-thin 1⅝ inch flat mobile SWR/ Wattmeter *flat mounts* on your dashboard wall or shelf for easy viewing. Lighted Cross-Needle meter and *active* electronics let you read *true* peak or average power in 3000/300 Watt ranges 1.8-30 MHz. "High SWR" LED. 5Wx3¼Hx1⅝D inches. *Remote sensor* with 25 feet thin, flexible cable is 3½Wx2¾Hx2¾D inches. Use 9V battery or 12 VDC.

Digital Screwdriver Controller

SDC-100
$99.95

4-digit *super bright* LEDs let you re-tune *exactly* -- fast, no guessing. Digital count range -999 to +999. On/off/reset switch for easy calibration. 4Wx1½H x2D". Use 13.8VDC.

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Photo C– All-Thread and nuts from old toggle switches are used to add 30 meters to the antenna's capabilities.

Photo D– The Super Antenna assembled as a 30-meter rotatable dipole.

The YP-3 retails for $395 plus shipping. To order, or for more information, contact Super Antennas, 212 Mariner Cir., Lincoln, CA 95648; phone: (916) 434-9936; fax: (916) 645-1586; web: <www.superantennas.com>; e-mail: <w6mma@superantennas.com>.

Hunting for a Manual

Now I am looking for your help again. In photo E is a Decitron Electronic 218-91143 antenna set. So far I have located four of us doing antenna and field-strength work who have one of these antenna sets. However, none of us has any instructions or manual for it.

You may ask, "Why don't you just look up its website on the internet?" Website? Hey, these guys don't even have a Zip Code! *Pre-1963*. Looks like it will be very handy for 10–100 MHz field-strength work. Please let me know if you have the paperwork.

Reader Question

We have space to answer one good question from a reader on Long Island about ground radials: "Why only 3 or 4 radials on a VHF ground plane, but they want you to have many on a ground-mounted vertical?"

Yes, the textbooks recommend 120 radials for a ground-mounted vertical. That's hardly the limit. I have about 300 radials under my HF vertical. But yes, there are typically only three or four radials on a VHF ground plane. The issue is the poor resistance and high losses of plain old dirt. If you mount a vertical with no additional ground radials (I'm giving you credit for the coax to the vertical as one radial), you have 80–90% of your RF just heating up the ground. One advantage of elevated radials vs. buried radials, until you try to mow the yard, is the lower loss for elevated radials. Also, most VHF ground planes are elevated above ground level. Putting more radials around your ground-mounted HF vertical lowers these ground losses and improves the efficiency of the antenna. I recommend placing the radials as near to the surface as practical without causing a tripping hazard. Plan B would be build your next house on a mountain of copper ore.

As always, we welcome your questions and topic suggestions. Just drop a snail mail to my QRZ.com address or an e-mail to <wa5vjb@cq-amateur-radio.com>. For other antenna articles and projects you are welcome to visit <www.wa5vjb.com>. 73, Kent, WA5VJB

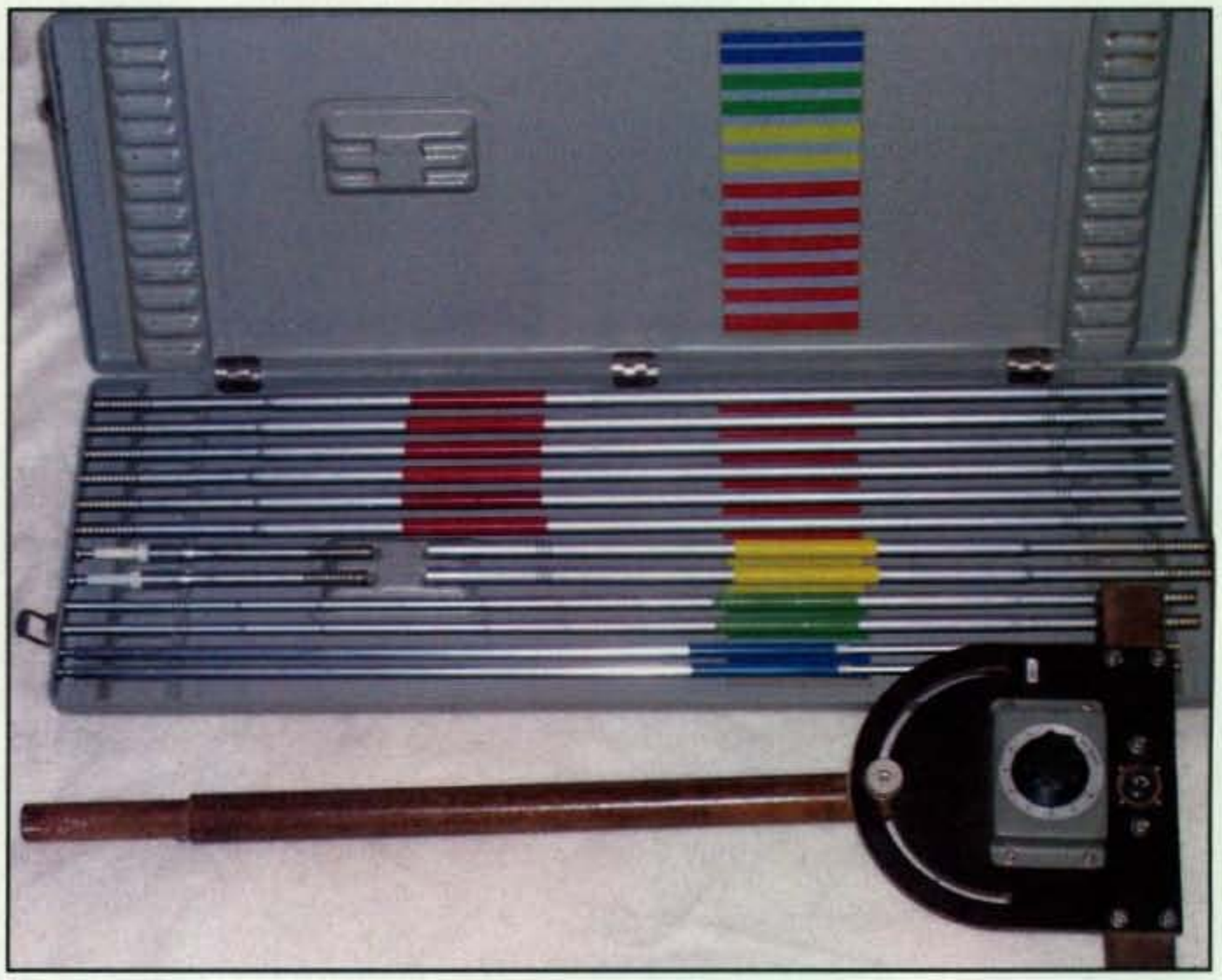

Photo E– Decitron Electronics field-strength antenna kit. Know where to get a manual?

HF'n with Class on a Budget

BY DAVE INGRAM,* K4TWJ

As Editor Rich Moseson, W2VU, recently mentioned to "Beginner's Corner" columnist Wayne Yoshida, KH6WZ, and me, slumping economic conditions have kindled interest in using older tube-type gear as an affordable means of getting on our globe-spanning HF bands. As Rich explained, an average of 20,000 new people enter our amateur radio world annually, and very few of them are familiar with vacuum-tube gear. Therefore, some helpful guidance via our *CQ* columns holds good merit.

We truly agree (tube gear is so warm, inviting, and enjoyable to use!), so Wayne took the "general info" approach and I took the "how to do it" approach. Consequently, my next few "How It Works" columns will share some tips and suggestions for choosing, checking out, and lightly refurbishing and repairing older gear for on-the-air use today. Before jumping to the details, however, we must add a word of warning all readers should heed.

Caution! High Voltages Lurk!

Newer amateurs should always be aware that exposed "reach in and touch" plate caps on power-amplifier tubes are "alive" with 700 to 800 volts that can produce vicious shocks. Exposed below-chassis wiring also carries 200 to 300 volts, and if an AC supply is built in, wandering (or shaky) fingers touching said wires or contacts (such as an on/off switch) can create the most dangerous shock of all. The seemingly safe(?) low voltages used in modern solid-state gear may have also caused old-pro amateurs to become lax in safety habits, so I emphasize again—to all, of any age—enjoy tube rigs, but *always respect their high voltages*. Always switch off and *unplug* all equipment before even removing one screw from its cabinet (that also allows time for filter capacitors to discharge so you will not get shocked). Another point: Unlike switch-on-and-operate solid-state rigs, vacuum-tube gear needs a couple of minutes warm-up time and must be tuned to resonance (minimum plate current) before being pronounced ready for operation. As I will explain later, the process is simple, vital, and takes only four or five seconds.

I am not trying to discourage or frighten anyone here. I only wish to make you a good and conscientious operator, plus explain the art of using heartwarming vacuum-tube gear.

Recognizing the Rigs

The wide array of old-style receivers, transmitters, and transceivers with their dazzling array of knobs, dials, and meters can easily overwhelm (intimi-

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

Photo A– Hamfest flea markets are quite crowded during their opening hour, but that is often the best time to find good deals on older gear. The more you know about various models—their operation, common problems, and what is involved in fixing them—the better your chances of making a good buying decision. Helping Elmer guidance can prove invaluable at this time.

date?) newer amateurs, but do not get sidetracked. Stay focused on the fun. Check with your local radio club and/or library's science and technology department. They usually have back years of amateur radio magazines and handbooks, and the ad sections in both are filled with "new rig advertisements" of ever-popular transceivers made by Kenwood, ICOM, Yaesu, Ten-Tec, Drake, Collins, National, Swan, Heathkit, and more. A brief "coming up to speed" study here is super-beneficial in recognizing rigs, their differences, and the models you personally find most appealing, knowledge you will really appreciate when searching for or just finding by surprise older transceivers.

Another clever idea is enlisting the aid of an old pro for recognizing and explaining the good and bad attributes of out-of-production gear. An old-timer may have used several of the rigs you find, knows their virtues and deficiencies, and can prove to be a fountain of knowledge on said gear. Everyone benefits here. Old pros enjoy passing along true tales of hamming with tube gear, and newer amateurs will (hopefully!) remember and likewise pass them on to newer amateurs later on. Through such endeavors, our proud legends and legacies can live on throughout the annals of time, and that is a most commendable accomplishment from any viewpoint.

Might I have inspired "old pro" readers to also start hunting down and restoring one of those "always wanted, but never owned" heartthrobs from eras past? Jolly good! There's nothing wrong with being a kid again. Go for it!

Digging for Gold

One of the best sources of golden oldie gear at this time is hamfest flea markets. Unlike e-Bay (and its sometimes exorbitant-bid prices), you can touch, feel, and closely inspect the gear; chat with the seller; and often test-tune a rig under consideration. Do not feel inferior or asking for guidance here. Many sellers are quite congenial and glad to help newcomers join our global community. If not, you may be best advised to look elsewhere (a sometimes tough move, but it may be necessary).

What should you look for when hunting for and checking out transceivers? Start with the obvious: a clean cabinet and front panel with original knobs and well-maintained dials. Is the matching AC power supply included or built in—and working? Peek inside: Are the

Photo B– Here is a nice flea market find at an affordable price: an R.L. Drake TR-4 transceiver with matching AC power supply in the accompanying MS-4 speaker cabinet. The original manual is included, and under the table there is a roll of blue-insulated wire for homebrewing a couple of antennas to boot.

Photo C– This classic Heathkit transceiver may also be a good flea market find, provided the original owner did a good job of building it. Look inside and under the chassis before purchasing, or take a chance. Notice, too, that Heathkit manual is for the power s upply. Where is the transceiver manual? Don't be shy. Ask!

Finding *WorldRadio Online*

To access the current issue of ***WorldRadio Online*** as well as past online issues, helpful downloading tips and other information, you'll need to go to the *WorldRadio Online Welcome Page* on the *CQ* website.

Here's how to do it:

(1) Go to the *CQ* magazine homepage at <www.cq-amateur-radio.com>.

(2) Find the *WorldRadio Online* logo to the left of the *CQ* magazine covers. Click on it. This will take you to the *WRO* Welcome Page, where you will have several options. There are links to a variety of informational pages. We recommend that you read the "Viewing and Downloading Tips" before doing anything else. The Back Issues link will take you to previous issues (beginning 2/09) to download and view. **Enjoy!**

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- Wire-cloning capability
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- EBP-72 Ni-MH 7.2 v 700 mAh battery
- EDC-165 Trickle charger
- EA-141 Flexible whip antenna

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- EDC -164 Li-ion charger.
- EME-12A Speaker Headset with VOX
- EME-13A Earphone Headset with VOX
- EMS-59, EMS-47 Speaker/Microphone
- EME-15A Tie Pin Microphone with VOX
- EME-21A Heavy Duty Earphone Microphone
- EME-23A Earphone Microphone
- EME-6 Earphone
- ESC-49 Soft Case
- ERW-4C/serial Computer interface cable
- ERW-7/USB Computer interface cable.

Dimensions: 2.28"(w) x 4.23"(h) x 1.43"(d) and weighs just 8.7 oz. with standard battery and antenna attached

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Photo D– Another time-proven HF transceiver favored by many amateurs is Kenwood's TS-520. Add new driver and power amplifier tubes, maybe new filter capacitors, a tweak or two, some cabinet cleaning, and you have a romping good transceiver at a fair-and-square price.

tubes, coils, and chassis clean or covered in dust and corrosion? Dirty? Move on. Conscientious owners take pride in their equipment, new and old, and you need successful operation without unnecessary problems.

Next, and most important, be sure you get the operating manual, including both the block diagram and circuit diagram, with the transceiver. Even if you do not understand a lot of electronic theory, these papers are vital for future maintenance/repairs by knowledgeable technicians. Remember, too, no one knows that transceiver better than the manufacturer that made it and produced its manual. That is the best guide you will ever find. Even newcomers without a helping Elmer can sit down alone in a quiet place with a transceiver and its manual and learn how to operate it. That ability to learn or understand assumed complex matters is what places us 10 dB above the general public.

On-The-Spot Checkout

As a simple first operating checkout, insert one end of a 10- or 20-foot wire in the rig's antenna socket and tune in some off-the-air signals (the transceiver can be on or off when you connect the antenna.). What frequencies? Both 7.0 to 7.3 MHz and 14.0 to 14.3 MHz are good choices. If the transceiver includes 30-meter operation or general-coverage reception, listen for WWV on 10.00 MHz; it is usually well received throughout the U.S. most hours of the day and night. Is the S-meter operational? The pointer movement on an analog meter is typically set in jewels, like a watch, but it is mechanical and prone to wear with time and trying to find a replacement can be a major challenge.

If your prized find passes these preliminary checks, tune in an SSB or CW signal and listen to the audio quality. Adjust the IF Shift, Passband Tuning, and/or filter width and note how the signal is affected (to ensure those controls/functions are operational). Also

Photo E– Purchasing new/extra tubes for your hamfest-obtained transceiver is always a good move, as they will never be more plentiful or less expensive than at the present time. Note that the stock of sweep tubes (power amplifier tubes for many older transceivers) tends to sell out fast.

adjust the RIT/Clarifier, RF Gain, and other receiver controls while listening to ensure they work.

Filter capacitors in power supplies occasionally dry out and become ineffective with age, so disconnect the antenna and listen for any hum in the receiver. If you hear hum and it does not change in level when you crank the (AF) volume up or down, the filters need replacing. This is not difficult, even for a new amateur if you do it one wire and one filter at a time (more details later).

Hopefully a dummy load, two short lengths of coax cable, and an SWR bridge or wattmeter will also be available so you can confirm the transceiver is producing output power. If you are not familiar with the tune-up/loading procedure of vacuum-tube rigs, get assistance here. An out-of-tune or off-resonance transmitter can quickly weaken or destroy its output tubes.

Bargains(?) Disappear Quickly

I assumed a "best case scenario" during the previous discussion. However, it is quite possible you may not be so fortunate—especially if you find a super-attractive rig during busy hamfest hours. Then it is a matter of making a quick (and educated) judgment, ensuring all the kibbles and bits (plus manual!) are included, and purchasing the rig before someone else plops down the cash and walks away with it.

After making your purchase, find a remote spot (your car?) and study the transceiver's manual and tube line-up. Make a shopping list of items needed to conduct a mild amount of rig refurbishing. I encourage doing this on the spot and at this exact moment because you are in the optimum position to find vintage tubes, filter capacitors, plugs, cables, and, well, everything imaginable at reasonable cost. Your shopping list typically will include a spare/replacement transmit driver tube plus RF power amplifier/output tubes, receive RF amplifier tube, and if you can find them, power-supply filter capacitors. You might also like to invest a couple of dollars in a new microphone preamp tube (and a good-quality Heil mic) to give your signal that glamorous "vacuum-tube sound" everyone envies. If your golden oldie does not feature built-in SWR metering (and few old rigs do), purchasing an SWR bridge also holds good merit. Just try to avoid off-brand units of unknown accuracy.

My logic in purchasing these items is simple. They can put your radio in the "closer to new again" category, they give you "use and enjoy" confidence, and they increase the rig's resale value. Unlike transistors, tubes wear out with use. That's why they have sockets for easy replacement. Further, tubes and other high-voltage-rated parts will never cost less than they do today. *Do not install new transmit RF power amplifier/output tubes yet, however* (unless there is no other alternative). Use the existing/old tubes to "get your feet wet" and learn exact tune-up procedures for each band. Note where load and tube controls are set for each band (dial number, etc.) and make a quick-reference chart so your new tubes will never be "out of tune" or off resonance when changing bands.

Conclusion

That overflows available space for this time, friends, but watch for more details on installing new tubes, the tune-up process, replacing filter capacitors, etc., in our November "How It Works" column. Meanwhile, look through all the magazines and books you can find and start planning your second antenna installation. I assume you quickly installed a dipole or vertical to use on the air immediately, right? 73, Dave, K4TWJ

beginner's corner

BY WAYNE YOSHIDA,* KH6WZ

Electrical Interference and Your Station

Did you ever wonder about the electricity that comes out of all those AC mains outlets just about everywhere you look? Electricity is amazing stuff, and coupled to labor-saving and life-enhancing inventions such as vacuum cleaners, washing machines, electric drills, television sets, air conditioners, and toasters, we should wonder how we would live without these items.

However, along with an increase in the quality of life these labor-saving inventions bring, there is also an increase of an annoying problem just about all hams experience—electrical interference. This may be the reason your HF radio S-meter deflects to S3 or higher, but there are no radio stations you can hear. This could also be one of the reasons why your VHF and UHF FM radio will "break squelch" and all you can hear is noise.

Recently, a guest speaker at our radio club was a representative from the local electric company. Brian Thorson, AF6NA, is an electric and magnetic fields (EMF) specialist, and he taught us some interesting things about electromagnetic interference, or EMI. The presentation was so interesting and included a lot of useful information that I thought I would share some of these facts with you.

This discussion is limited to the services provided by one of the largest electric utility companies serving southern California, but many of these concepts apply to other locations in North America, and similar situations exist in other parts of the world.

*16428 Camino Canada Lane, Huntington Beach, CA 92649
e-mail: <kh6wz@cq-amateur-radio.com>

Photo A– A cell phone interfering with a conference-room speaker-phone is an example of radiated interference.

EMI—Similar to the Three "Close Encounters"

There are several kinds of electromagnetic interference, depending on how it moves from one place to another, and how it is generated. "Interference" is any type of electrical signal entering electrical or electronic equipment that results in improper operation, degraded performance, or failure. Electromagnetic interference is an unwanted condition that impacts the proper operation of something.

EMI is further defined by the mode and type of interference being experienced.

The first type is *radiated interference*. In this case, the "junk signals" are propagated through the air, and include "intentional radiators," which are units designed to transmit some kind of signal, such as broadcast transmitters, cell phones, and wireless garage-door-opener controls. Many of us have experienced EMI from an intentional radiator: This is that irritating buzzing *noise you* hear when someone's cell phone or Blackberry device is held too close to your broadcast radio receiver or other equipment (see photo A).

An unintentional radiator is just like it sounds: Something is designed for a specific purpose and is not a transmitting device, and yet it transmits garbage signals through the air. There are many examples of this, including computers and their peripherals, home appliances, and industrial equipment such as plating and etching machines. You may have experienced this type of EMI if you ever ran an electric fan and placed it too close to a computer monitor using a cathode-ray tube (CRT). The wavy lines on the screen come from magnetic lines of force from the electric motor in the fan. Even though the fan is designed to move air, and not to transmit a radio signal, one can see the effects of the unintended energy influencing the computer screen.

Here is another example, and you can try this simple experiment if you have a digital camera and a hand-held transceiver (HT). Turn on each unit and slowly move them closer and closer to one another. At some point, you will hear some pretty loud "hash" from the HT. This is EMI from an unintentional radiator called the digital camera. The camera is designed to make digital images, and yet it is unintentionally a "transmitter."

Another type of EMI is *magnetic induction*, where interference is coupled by close proximity. This can take place under a desk where AC power and audio cables are parallel to one another. This type of interference does not usually impact the RF side of ham radio equipment, but could get into a microphone circuit, causing "AC hum" in the

transmitted audio. Very intense magnetic fields, on the order of 5000 milliGauss (mG) or more, can erase magnetic tapes and credit-card magnetic strips. High fields like this can be found within an inch or so of some appliances with motors.

In *conducted interference*, unwanted signals travel through electric-supply wiring. The interference is caused by items connected to the AC mains, and electronically switch on and off when they are operating, such as computer power supplies and home appliances. Modern computer power supplies are called switch-mode power supplies (SMPS), and are typically lightweight, efficient, and in production volumes, very inexpensive (see photo B). Electric motors in home appliances and other machines continuously switch on and off as their magnetic poles energize and repel and attract, which causes the motor shaft to turn.

Modern-Day Spark-Gap Transmitters

Both radiated and conducted interference include broadband noise, caused by electric arcs. This sparking is a common source of electrical interference. Arcing occurs when an electric field strength exceeds the air-gap breakdown voltage. Simply put, this means that an electric spark can jump across an open gap when the voltage is high enough. This is the basic principle of the spark-gap transmitter, used during the very early days of ham radio, from the late 1800s to about the 1920s. The result is a broadband burst of energy across a broad frequency spectrum, from around 200 kHz to potentially over 800 MHz. This covers almost all of the HF ham radio bands from 160 meters to 10 meters, and several VHF repeater and simplex bands. Most commonly, however, electrical arcing from utility distribution lines will be limited to the LF, HF and VHF bands, which include 30–300 MHz.

These spark generators are everywhere, and include household items such as thermostats, dimmer switches, air purifiers, motors, circuit breakers, fluorescent lamps, and ignition systems (such as the piezo igniter in a propane barbeque).

Outside the home, radiated electric-utility EMI generators include special electrical hardware on wood or metal poles such as insulators, tie wires, bonding wires, clamps, and other items. You should know that such EMI sources are actually somewhat rare, and utility-company experience has shown that loose hardware accounts for less than 20 percent of customer-reported interference problems, and dirty insulators account for less than 5 percent of customer-reported interference problems. On the other hand, the electric company estimates that more than 75 percent of customer interference complaints identify an in-home appliance or device as the source of interference.

The Electric Utility's RTVI Locating Service

A Radio and TV Interference (RTVI) service is often available to electric utility customers. The inspectors are experienced at locating radio and TV interference for a wide range of customer problems. Their goal is to discover and remedy interference caused by their service. Commercial engineering firms offer similar interference-locating services for a fee, usually at a rate of several hundred dollars per hour.

Some of the instruments used by RTVI technicians are very similar to hidden transmitter (fox- or T-) hunting equipment, and similar techniques are used to locate interference.

However, you can easily find sources of electrical interference using a com-

mon AM broadcast radio tuned to an open or unused frequency at the lowest or highest portion of the band, as shown in photo C. Move the receiver around and listen for the interference. Use the radio to guess where the noise is coming from. With the radio in front of you, move your body to the left and right to determine where the noise is coming from. Your body acts as a reflector that attenuates the signal coming from behind you.

Cleaning House

Since most electrical interference actually comes from something in your (or a neighbor's) house, it may be best to first check to see if your house is electrically noisy or quiet. Before starting your search, it may be best to figure out if the noise has some kind of pattern. Is it louder in the morning or evening? How strong is the noise? Does it change depending on the weather? Does it happen when it is humid or dry, hot or cold? Is it frequency related? For example, is it most noticeable on 10 meters or 160 meters? What about the VHF and UHF bands?

Use the AM receiver trick to find sources of noise. Check all outlets and appliances that are plugged in, as well as anything else that plugs into a wall outlet. Check all switches and any timers inside the house. Include a check on any outdoor electrical items, such as swimming-pool pumps, automatic sprinkler systems, and other items. Go to the circuit breaker or fuse box coming into your home and check that, too. Then do the same search at different times of the day and night, because some items may have internal timers or some other mechanism to make the unit turn on or off, such as the thermostat in an air-conditioning system or refrigerator.

If you find something noisy, please consider calling a licensed electrician to perform repairs. One easy thing you may be able to do yourself is to visually examine the suspect outlet, switch, or appliance. First remove power going to the outlet and or switch by turning off the circuit breaker or removing the fuse going to the circuit. Then remove the cover plate on the outlet or switch and take a look. Spider webs, corrosion, or loose wires inside can cause noise on the AC line. A common problem is a worn-out outlet. Don't fix it; just replace the bad outlet with a high-quality unit. Stay away from bargain-price-outlet items, since they will wear out easily and cause problems again.

It is very possible that the noise you hear in your station is coming from a neighbor's home or a utility pole somewhere near you. Quite often, the noise is not electric-utility-related, and instead is another type of interference.

Photo B– Almost anyone can easily see a source of conducted interference. Here are several possible sources, including a heater/fan unit and at least one computer switching power supply.

For example, a fellow radio club member was experiencing very strong interference to his UHF/-FM radio on several of his favorite repeater frequencies. The interference was so strong that no matter how far the squelch control was turned, the noise was still coming in. The noise was fairly constant, and after several weeks my friend noticed a pattern: It would be completely gone on weekends. This was a definite clue, and by using direction-finding techniques he traced the noise source to a camping trailer parked in a neighbor's driveway several blocks away. An extension cord ran from the trailer and into the garage. Just to be sure, the location was verified by walking very close to the trailer with a handheld UHF radio. Something inside the RV was creating some sort of wideband hash, but the only way to verify the specific cause was to actually go inside the trailer.

Knocking on the neighbor's door one evening wasn't as hard as he thought it could be, since my friend explained that his radio equipment was getting some kind of electrical interference, and so he was looking around the neighborhood for the source.

Then he asked a great question. He asked if the trailer owner noticed any interference to any of their stereo or TV sets. The RV owner said that their main TV set in the living room is connected to a satellite TV dish and seemed to get clear picture and sound all the time. However, they have an old TV set in their spare bedroom that almost never gets a clear picture.

My friend easily got permission to look at anything in and around the RV owner's home, since the neighbor

Photo C– An ordinary AM receiver can be used to find EMI. Tune the radio to a blank spot on the dial and listen for the buzzing interference. Move the unit from left to right and go forward in the direction of the l loudest noise.

understood that if the interference source was found, it would also cure their problem as well.

After a few minutes the noise source was located and verified: It was a preamplifier unit for the trailer's TV set. Disconnecting the power to the unit made all the noise go away. The technical guys in the club believe the noise was caused by a spurious oscillation in the amplifier circuit becoming unstable and beginning to oscillate.

The neighbor understood the situation, but did not want to spend any money to fix anything. The simple solution was to simply disconnect the preamplifier unit whenever the trailer was parked in the driveway. This cured the interference problems for both the RV owner and the UHF/FM ham station.

As another example, while operating a multi-operator effort on 80 meters late one night during one of the CQ World-Wide DX Contests, a very loud buzzing noise started coming in, making contacts on the 80- and 160-meter bands impossible. We used the AM radio trick to verify and locate the noise source. After several frustrating minutes searching the house, we finally decided to power the contest radio with a battery and turned each circuit breaker in the house, the barn and the garage off and then back on, listening for the noise to go away. The noise was traced to the deep-freezer in the garage, which apparently had never cycled to cold before during other contests. Simply unplugging the freezer eliminated the noise. After the contest, we plugged the unit back in and made a note in the station log to make sure to unplug the freezer when operating on 80 and 160 meters.

Reporting a Problem

If the noise is still present after checking your entire house and minimizing noise-generating items as much as possible, it is time to call your electric-utility company to see if they can help find the noise source.

Call your electric-utility's customer service number, usually listed on your electric bill. Tell the customer-service representative that you are experiencing "radio and TV interference." Answer any and all questions, but do not use technical or ham radio jargon. An electric-utility interference inspector will likely contact you with further questions and set an appointment to investigate the problem. The inspector's goal is to find and eliminate the problem, so that the electric-utility company can provide clean and reliable electricity to its customers.

If an electric-utility problem is located, service personnel will make repairs when possible. Remember, any electric-utility company can be extremely busy and must establish its priorities. A power outage or a damaged electric power line across a highway is much more important than your interference problem. Therefore, have patience and know that they are doing the best they can and will get to your issue when the time is right.

Electrical System Repairs

Only trained electric-utility service personnel qualified to work on high-voltage distribution systems are authorized to repair or replace loose or defective power-delivery hardware. Never attempt to touch anything on your neighborhood electric poles. Besides, this is at least one case when you get to watch someone else do some dangerous work for you, and it is done for free!

73,Wayne,KH6WZ

References and Resources

Radar Engineers, makers of interference-finding equipment: <http://www.radarengineers.com/rfitvi.htm>.

Hidden Transmitter Hunting, a useful and interesting ham radio specialization: <http://www.homingin.com/SCalStyle.html>.

The CQ World-Wide DX Contest, an international HF radio contest: <http://www.cqww.com>. *(The results of the CW portion of the contest and the rules for the 2009 contest are elsewhere in this issue—ed.)*

BY JOE LYNCH,* N6CL

The 3-milliwatt Signal Heard Around the World

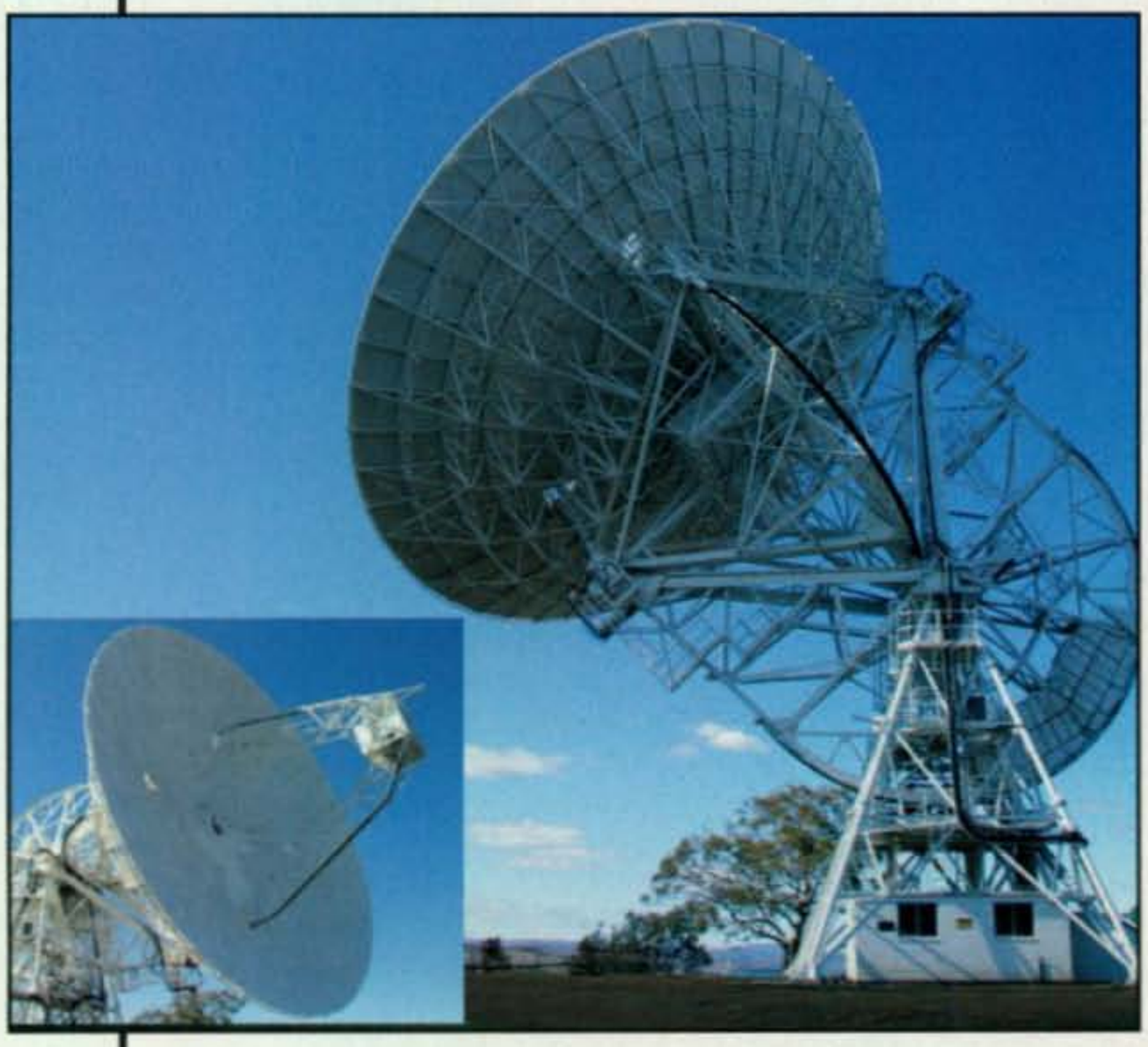
Numerous reports of successful EME contacts during the Echoes of Apollo event have been posted on the internet at various websites. However, no other contact seems to have carried the imagination and ingenuity for getting on the air as the contact between the 26-meter Mt. Pleasant dish in Tasmania, Australia and the 25-meter dish at Dwingeloo, Holland. What follows are stories from both sides of the connection.

Echoes of Apollo EME on 3 milliwatts!

The following article By Rex Moncur, VK7MO, and Justin Giles-Clark, VK7TW, appeared in Wireless Institute of Australia's *Amateur Radio* magazine, Volume 77, Number 8, August 2009. It is reprinted here courtesy of the authors:

The date 27 June 2009 was designated World Moon Bounce Day as an amateur radio contribution to the celebrations of the 40th anniversary of man's first landing on the moon. The event was organized by a US group of amateurs who had access to the Stanford University 45 metre dish and they sought the involvement of some of the larger radio astronomy dishes around the world. A key objective was to involve and interest school children in science and amateur radio by allowing children to hear voices from the moon. The event was supplemented by amateur Earth Moon Earth (EME) stations all around the world and particularly those with SSB capability on 23 cm.

*e-mail: <n6cl@sbcglobal.net>



Mt. Pleasant 26-meter dish, Tasmania, Australia. (VK7TW photo)

VHF Plus Calendar

Sept. 4	Full Moon.
Sept. 6	Moderate EME conditions.
Sept. 12	Moon last quarter.
Sept. 12–14	ARRL Sept. VHF QSO Party. See text for details.
Sept. 13	Poor EME conditions.
Sept. 16	Moon perigee.
Sept. 18	New Moon.
Sept. 19–20	ARRL 10 GHz and Above Cumulative Contest. See text for details.
Sept. 20	Moderate EME conditions.
Sept. 21	The 144 MHz Fall Sprint contest. See text for details.
Sept. 22	Fall equinox.
Sept. 26	Moon first quarter.
Sept. 27	Very poor EME conditions.
Sept. 28	Moon apogee.
Sept. 29	The 222 MHz Fall Sprint. See text for details.

—EME conditions courtesy W5LUU

Within Australia the University of Tasmania agreed to take part using their 26 meter dish which was originally used by NASA in the Orroral Valley near Canberra between 1964–1985 after which it was gifted to the University and transported to Mt Pleasant near Richmond in Southern Tasmania. Our involvement was to provide amateur EME equipment, help set up and test the system and operate the station on the day. As it eventuated the availability of large dishes provided the opportunity to explore QRP EME at as low a level as possible and we are pleased to report completion of a JT65 EME contact between the University of Tasmania's 26 metre dish and a Dutch 25 metre dish, PI9CAM, with the Tasmanian end running only 3 milli-watts.

Setting up the University of Tasmania Dish

While Dr Jim Lovell of the University of Tasmania willingly offered their dish and the support of their site technician Eric Baynes, VK7BB, it was first necessary to consider what was practical. At our first meeting it became clear that transmitting any sort of high power as required for SSB would be out of the question as the dish is fitted with five extremely sensitive liquid helium cooled receivers working from 4 to 22 GHz. There is no protection for RF and we could not risk damage to these receivers which are involved in ongoing international research programs. Accordingly, the Echoes of Apollo team was advised that we would contribute to the event but as a receive station only.

The feeds and receivers for the 26 metre dish are mounted in a small feed cabin (approx. 2 meter cube) behind a Teflon window approx 1 meter in diameter. Within the cabin there is a remotely controlled 3-axis focus frame that allows the feeds and receivers to be moved into the correct focal position depending on which feed is in use. There is space for a 2 GHz non-cooled feed and receiver which fortunately was not required around the time of the Echoes of Apollo event and the University agreed that this could be removed and replaced with a 23 cm antenna. Because of space limitations it was decided to use a small 3-turn helical. There is over 100 meters of LDF-4-50 coax between the dish

and the control building where we could operate and for this reason we decided to down-convert at the feed and receive on 144 MHz. Eric constructed a down-converter and the VK7MO EME station provided pre-amplifiers, 144 MHz receiver, GPS frequency reference, computer running WSJT, and bandpass filters at 1296 MHz and 144 MHz to limit interference from microwave systems at the nearby Hobart airport.

A few weeks prior to the event tests were conducted with Dave, VK2JDS, with JT65c signal levels much worse than expected at -9 dB and no prospect of copying SSB. A sun noise test gave around 18 dB compared to 27 to 28 dB determined with the VK3UM EME calculator. The time for testing was limited as this is an operational radio astronomy research facility but the system was gradually refined with additional pre-amps and filters and through adjusting levels at all stages—as well as resolving the occasional "Murphy" problem. Finally we decided that the helical feed must be the remaining limitation and did some estimates to see if a Septum feed and choke ring could be physically mounted. Initially it fouled other equipment but after a redesign of the mount is was successfully installed. In the end we achieved a sun noise of 25 dB which was within a few dB of what could be expected. Every time the system needed adjustment Eric had to don a safety harness and go up in a cherry picker (photo 3).

Tests were now conducted with Doug, VK3UM, who runs 400 watts and an 8.6 metre dish. Doug's SSB came through at 5/6 sufficient to be heard in a room filled with children—so with just four days to go we reported to the "Echoes of Apollo" team we were ready to go.

Could We Transmit QRP?

With the RX side resolved our minds turned to the possibility of transmitting QRP at a few tens of milli-watts to avoid any possibility of damaging the radio astronomy receivers. A quick calculation suggested that we should be able to work the 25 metre Dutch station PI9CAM at less than 10 milliwatts using JT65, and after an e-mail, Jan, PA3FXB, told us they would be delighted to try JT65 at 10 milliwatts. While we did not have time to test the system until the day of the event, WSJT echo testing on the day gave a signal level of –31 dB at 10 milliwatts and this was improved to –27.8 dB by careful adjustment of the focus of the feed.

The Day of the Event

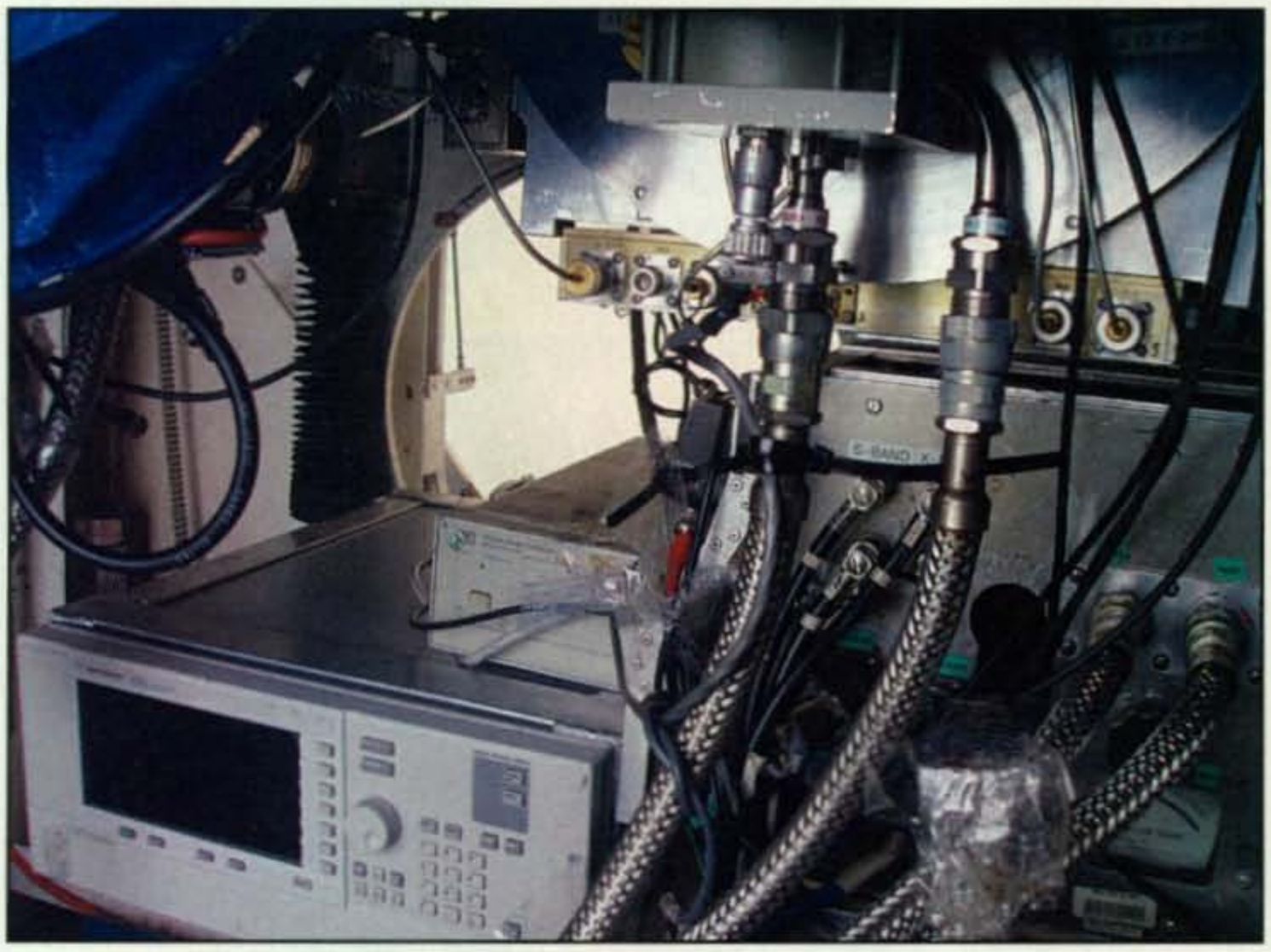
Because of uncertainty about working the Stanford group with SSB at an adequate level for a room full of children the university decided not to actively advertise the event to the public but agreed that we could advertise on the VK7WI broadcast for hams to come along with children and friends. Our first reception was from Doug, VK3UM, at 5/7 who we worded up by telephone to talk to the children. It was a joy to see the smiles when they heard their names off the moon. While as hams we could copy Dave,

VK2JDS, on SSB at 5/2 it was not quite strong enough for the children to resolve the voice, but using JT65 messages such as the following, Dave produced a great reaction from the children who then got out their cameras to photograph their names coming back from the moon.

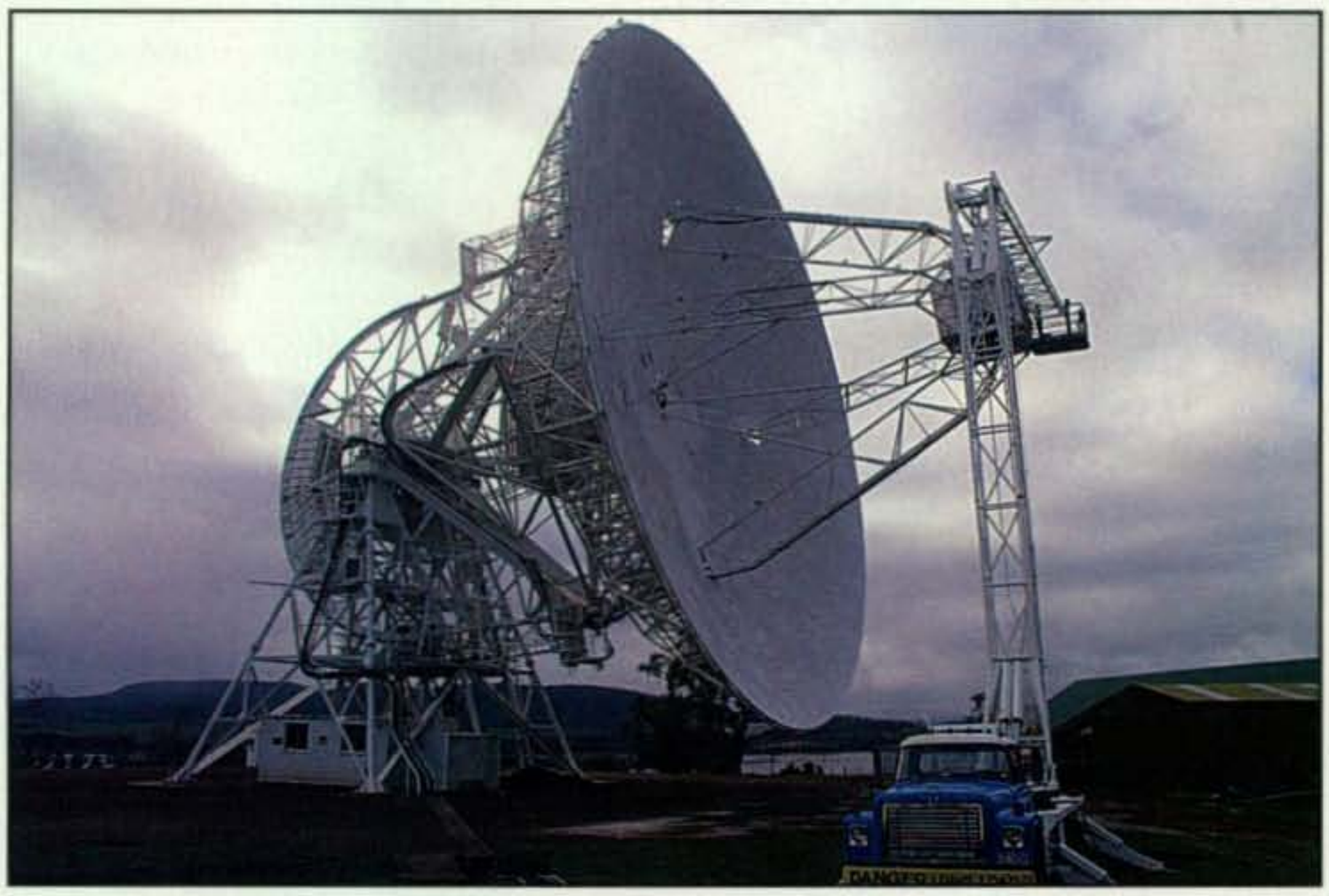
082700 7 -10 0.2 38 10 * HI JESSICA 1 0
082800 8 -8 0.1 30 11 * HI NICOLE 1 0
082900 9 -9 0.2 19 11 * MOON ECHOS 1 0
083000 6 -9 0.3 8 10 * MOON ECHOS 1 0
083100 9 -7 -0.3 -5 10 * HAVE FUN 1 0

The Stanford group was received at around 5/7 for a short period but then had to remove their feed to repair a pre-amp. Later we had various children and the media visit and arranged for Doug, VK3UM, to be the voice from the moon with great effect.

As the European window opened we could copy Dan HB9Q on his 15 metre dish calling CQ on JT65c at –1 dB. The university technician agreed we could up to power to 30 milliwatts and Dan responded to our call giving us a –23 dB report. Power was then reduced to 10 milliwatts and with some effort we again completed with Dan at –29 dB. It is noted that given the 18 dB isolation of the Septum feed we did not need to use a TX relay, as 18 dB down on even 30 milliwatts is quite safe for a low noise pre-amp.



Liquid-helium-cooled receivers. (VK7MO photo)



Access to feed cabin via cherry picker. (VK7TW photo)

The PI9CAM team using a 25 metre dish completed quickly with us at 10 milliwatts giving us –22 dB and again at 3 milliwatts with signal levels of –26 dB. An attempt at 1 milliwatt was not successful. Never-the-less, with a 3 milliwatt completion we were *"over the moon!"*

Other stations copied on SSB were VE3KEP, 4/1; W5J, 5/8; N6JMC, 5/8; VK5MC, 5/6; KF6JBP, 5/7; SP6JLW; 5/6; N6BDE, 5/8 and RD3DA at –5 on JT65. We also took many hours of video that will be cut into ATV presentations in the near future.

We acknowledge the support of the University of Tasmania and Dr Jim Lovell in providing access to the dish and especially the efforts of the site technician, Eric Baynes, VK7BB, in making this a very successful exercise which allowed us to explore the limits of QRP EME.

The Holland Connection

From the other side of the moon comes this very nice letter by Jan van Muijlwijk, PA3FXB, sent via EME between PI9CAM (Dwingeloo, Holland, CAMRAS 25-meter dish) and Mt Pleasant, (26-meter dish) Tasmania:

Echoes of Apollo June 27, 2009

Hello nice people at the Mount Pleasant observatory in Tasmania! Hello boys and girls "down under." And a special hello to Rex, who initiated this operation at Mount Pleasant.

Congratulations with this fantastic operation and our best wishes to you all from the Dwingeloo dish in the Netherlands. The signals you hear now have traveled nearly 800,000 kilometers. First nearly 400,000 kilometers from Dwingeloo to the moon and again 400,000 kilometers from the moon to your dish at Mount Pleasant.

Isn't it a miracle?

By doing a lot of moon bouncing today we honor the achievement of mankind 40 years ago. Because this year it is 40 years ago the first man set foot on the moon.

I myself was only 11 years old at that time, but I have very vivid memories of the event. Our family watched television during the night to witness the famous first steps on the moon. It was absolutely fabulous!

Some sentences spoken by the astronauts are engraved in the collective memory of mankind. Two of those sentences I would like to bounce off the moon now:

Tranquility base here. The eagle has landed.

And the most famous of them all: *It's one small step for man, but a giant leap for mankind!*

I was thrilled by the complete Apollo project anyway. Every launch of another huge Saturn V rocket was a big adventure. And as a little boy I dreamt about how it would be like to be in space and walking on the moon.

It was a time of great expectations. I read all about it. I watched every space item on television. What a joy it was to see the Apollo

Control room view. ((VK7TW photo)

11 mission become such a great success.

Let's not forget the other Apollo missions. Apollo 13 was a scary adventure with a happy end. But all the other Apollo's until Nr. 17 were very successful. What a time it was!

I am convinced that the Apollo project played a big role in the choices I and many others made for education and hobbies. And that it is one of the reasons I became a ham radio operator. And thanks to that I am now involved in the restoration of this big 53-year-old Dwingeloo Radio Telescope. And here we are, talking about Apollo and the moon, via the moon with this historic radio telescope. Full circle!

To conclude, back to the Apollo project. In total 12 brave men walked on the surface of the moon. To honor their courage and to the memory of this great achievement I now read their names to the moon to be bounced off to Tasmania: Neil Armstrong, Edwin Aldrin, Charles Conrad, Alan Bean, Alan Shepard, Edgar Mitchell, David Scott, James Irwin, John Young, Charles Duke, Eugene Cernan, Harrison Schmitt.

I hope you had good reception of our signals via the moon!

Thank you for listening and for taking part in this nice Echoes of Apollo project. And thanks to the moon for being such a nice reflector! Best regards to Mount Pleasant Tasmania from Dwingeloo The Netherlands. Good luck to you all.

PI9CAM end of transmission. Bye bye.

The Rest of the Holland Team Report

The following is from the Holland connection team, which included: W. F. Tak, PAØWTA, Rene Hasper, PE1L, John Lambo, PA7JB, and Jan van Muijlwijk, PA3FXB:

On June 27 we at PI9CAM had a wonderful day of EME with the 25 m Dwingeloo dish! We started with the incredible QRPPP JT65c QSO with VK7MO at the 26 m Mount Pleasant dish, 3 mW only! Rex, many thanks for this thrilling event!

The QSOs with the children at HB9MOON were very nice. Excellent show, Christoph and team!

We had nice SSB QSOs with the big ones and fine JT QSOs with the smaller ones. I think the smallest this time was RAØACM with one Yagi and 70 W. This EoA event sure initiated a lot of activity and it was a lot of fun.

We had limited TX permission. Normally we TX above 10 degrees elevation. Now, on our moonset we had a astronomical measurement facility in front of us. In that case we have to stop at 20 degrees elevation. That's the reason we missed a lot of the USA activity. We even missed the Stanford dish. Of course we heard them, but they were always very busy, so we thought we would try later.

Because we saw so many people logged in at our WebSDR we decided to go on tracking the moon and let the WebSDR run for the two hours after our TX stop until our real moonset. You find on our website (http://websdr.camras.nl:8901/) some of the WebSDR files in loop playback with lots of nice QSOs in it. Thanks everyone for the great activity!

Further Coverage of EOA in *CQ VHF* Magazine

Stories of the success of the Echoes of Apollo weekend are still being assem-

bled. Hopefully, we will publish some of the major stories in the Fall 2009 issue of *CQ VHF* magazine.

Suit-Sat 2 Loses its Suit

Before Suit-Sat 2 could become a reality, it lost its suit. In an announcement posted on the front page of the AMSAT-NA website (http://www.amsat.org), the author reported that because of storage considerations on the International Space Station (ISS), the two surplus Orlan space suits in storage on the ISS were discarded via the Progress Cargo Vessel. One of these suits was to be used for the upcoming SuitSat-2 mission. The batteries were to be inside the suit, while the solar panels were to be attached to the extremities and the electronics, video cameras, and antenna were to be mounted on the helmet by the ISS crew prior to deployment during an extra-vehicular activity (EVA). Unfortunately, that Progress vehicle returned to Earth late July.

Fortunately, however, the ARISS team was informed that there will be space available for shipping the SuitSat-2 electronics on the projected Progress cargo flight to the ISS in January 2010. Additionally, the EVA that is scheduled for April 2010 still has a "SuitSat-2" scheduled for deployment.

This new development has caused a bit of a scramble for the folks at AMSAT. With the anticipation of the deployment of the "SuitSat-2" still scheduled for spring 2010, the project managers have been working very hard to make sure that all of the electronics components are working properly so that it can be delivered to Russia this fall. Additionally, the experiment under development by Russia's Kursk State University is expected to be integrated into those electronics once the SuitSat-2 components have been delivered.

With the elimination of the Orlan space suits from ISS, the "Suit" nomenclature of the SuitSat-2 also has been eliminated. Sometime before the spring 2010 deployment a new project name will be selected that will reflect the change in the configuration. What has not been eliminated, however, is that for both ARISS and AMSAT this project remains very important.

For the members of ARISS, they see the mission as an important component of education outreach because "it will provide an opportunity for students around the world to listen for recorded greetings from space as well as learn about tracking spacecraft in orbit."

For the project managers at AMSAT, they see the mission as an opportunity to test the Software Defined Transponder (SDX) components, which represent a critical milestone in the development of future electronics components, in a space environment. Lessons learned from this deployment will be applied to future flights and deployments as AMSAT moves towards a "modularization approach" to spacecraft development. This modularization approach is driving the project managers, because they expect that future satellites could be constructed from off-the-shelf components. It is also expected that such future spacecraft missions will also utilize a derivative of SDX and its associated hardware.

Concerning the issues of the new structure and the integration work, in recent weeks discussions have taken place between the Russian ARISS members and the AMSAT project managers. These talks have centered on the design of the new structure (replacing the suit) and where the structure will be constructed.

Hopefully, the talk at next year's AMSAT-TAPR banquet will be about the successor to the SuitSat-2 satellite.

A 6- and 2-Meter Report

On the evening of July 9, while we were on our way to meet friends for dinner, my wife, Carol, W6CL, turned on the TS-480 and stated, "I wonder if 6 meters is open." Sure enough, it was. Among the three stations I worked was my friend

Mt. Pleasant dish at night. (VK7TW photo)

This is the 25-meter dish for the CAMRAS memorial station in Dwingeloo, Holland. (Photo courtesy of the CAMRAS organization; <http://www.camras.nl>) ⟶

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The famous G5RV antenna is the most popular ham radio antenna in the world! You hear strong signals from G5RVs day and night, 24/7.

And it's no wonder . . . it's an efficient, *all band* antenna that's only 102 feet long -- shorter than an 80 Meter dipole. Has 32.5 foot ladder line matching section ending in SO-239 connector for your coax feedline.

Use as Inverted Vee or Sloper, and it's even more compact and needs just one support.

With an antenna tuner, you can operate all bands 80 Meters through 10 Meters and even 160 Meters with an antenna tuner and a ground.

MFJ's fully assembled G5RV handles 1500 Watts. *Hang and Play™* -- add coax, some rope to hang and you're on the air!

MFJ-1778M, $39.95. *Half-size*, 52 foot *G5RV JUNIOR* covers 40-10 Meters with tuner. Handles full 1500 Watts.

MFJ All Band Doublet

MFJ-1777
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MFJ-1777 is a 102 foot *all band* doublet antenna that covers 160 through 6 Meters with a balanced line tuner. Super strong custom fiberglass center insulator provides stress relief for ladder line (100 ft. included). Authentic *glazed ceramic* end insulators. Handles full 1500 Watts.

MFJ *Dual Band* 80/40 *or* 40/20M Dipoles

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80/40 Meters

MFJ-17758 is a short 85 foot long *dual band* 80/40 Meter dipole antenna. It's *full-size* on 40 Meters and has ultra-efficient end-loading on 80 Meters. Handles full 1500 Watts. Super-strong injection-molded center insulator with built-in SO-239 connector and hang hole. Solderless, crimped construction. 7-strand, #14 gauge hard copper wire. Connect your coax feedline directly, no tuner needed.

MFJ-17754, $59.95. Short coax fed 42 foot long *dual band* 40/20 Meter dipole antenna. *Full-size* on 20 Meters, ultra-efficient end-loading on 40 Meters. Same construction as MFJ-17758.

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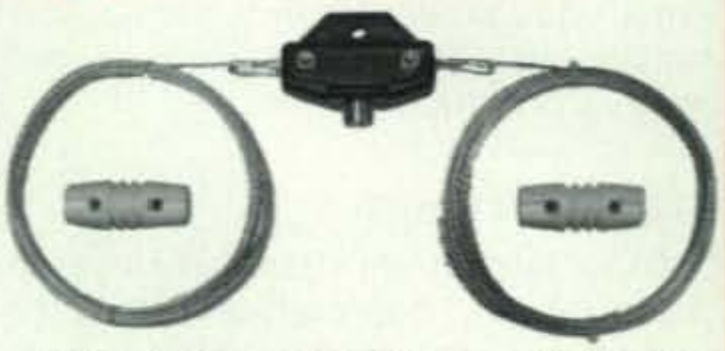
Ultra high quality center fed dipoles will give you trouble-free operation for years. Custom injection-molded UV-resistant center insulator has built-in coax connector and hanging hole. Heavy duty 7-strand, 14-gauge hard copper antenna wire. Extremely strong solderless crimped construction. Authentic *glazed ceramic* end insulators. Use as horizontal or sloping dipole or inverted vee. Handles full 1500 Watts. Simply cut to length for your favorite frequency with cutting chart provided.



MFJ-1779A **$69.95** 160M, 265 ft.
MFJ-1779B **$49.95** 80-40M, 135 ft.
MFJ-1779C **$29.95** 20-6M, 35 ft.

True 1:1 Current *Balun & Center Insulator*

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True *1:1 Current Balun/ Center Insulator* forces equal antenna currents in dipoles for superior performance. Reduces coax feedline radiation and field pattern distortion -- your signal goes where *you* want it. Reduces TVI, RFI and RF hot spots in your shack. *Don't build a dipole without one!* 50 hi-permeability ferrite beads on high quality RG-303 *Teflon®* coax and *Teflon®* coax connector. Handles full 1.5kW 1.8-30 MHz. Stainless steel hardware with *direct* 14 gauge stranded copper wire connection to antenna. 5x2 inches. Heavy duty weather housing.

RF Isolator

MFJ-915
$29.95

MFJ-915 *RF Isolator* prevents unwanted RF from traveling on the outside of your coax shield into your transceiver. This unwanted stray RF can cause painful RF "bites" when you touch your microphone or volume control, cause your display or settings to go crazy, lock up your transceiver or turn off your power supply. In mobile installations, stray RF could cause your car to do funny things even blow your car computer. Clear up these problems, plug an MFJ-915 between your antenna and transceiver. 5x2 in. Handles full 1500 Watts. Covers 1.8-30 MHz.

MFJ-919, $59.95. 4:1 current balun,1.5 kW.
MFJ-913, $29.95. 4:1 balun, 300 Watts.

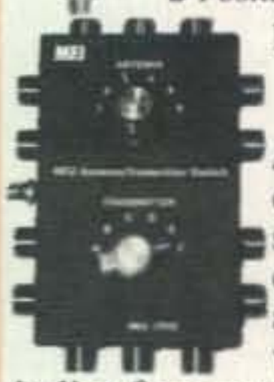
Antenna Switches

MFJ-1704
$79.95
4-Positions

MFJ-1704 heavy duty *antenna switch* lets you select 4 antennas or ground them for static and lightning protection. Unused antennas automatically grounded. Replaceable lightning surge protection. Good to 500 MHz. 60 dB isolation at 30 MHz. 2.5 kW PEP. Less than .2 dB insertion loss, SWR below 1.2:1. SO-239 connectors. Handy mounting holes. 6¼Wx4¼Hx1¼D inches.

MFJ-1702C
$39.95
2-Positions

MFJ-1702C Like MFJ-1704, but for 2 antennas. 3Wx2Hx2D"



MFJ-1700C
$99.95

MFJ-1700C *Antenna/ Transceiver Switch* lets you select one of six antennas and one of six transceivers in any combination. Plug in an antenna tuner or SWR wattmeter and it's always in-line for any antenna/transceiver combination. Has lightning surge protection. Handles 2 kW PEP SSB, 1 kW CW, 50-75 Ohm loads. Unused terminals are automatically grounded. 1.8 to 30 MHz. SO-239 connectors. 4¾W6½Hx3D inches.

MFJ-1701
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MFJ-1701 *Antenna Switch* like MFJ-1700C but lets you select one of six antennas only. 10Wx3Hx1½D inches.

33 ft. Telescoping fiberglass Mast

3.8 feet collapsed, 3.3 lbs.

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Super strong fiberglass mast has huge 1¾ inch bottom section. Flexes to resist breaking. Resists UV. Put up *full size* inverted Vee dipole/vertical antenna in minutes and get *full size performance!*

Make your own antennas

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MFJ-16C06, $4.56. 6-pack authentic *glazed ceramic* end/center antenna insulators.
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MFJ-18G100, $24.95. 100 ft. of flexible, 7-strand, 14-gauge solid copper antenna wire.
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Lightning Surge Protectors

Ultra-fast gas discharge tube shunts 5000 amps peak. Less than 0.1 dB loss. Up to 1000 MHz. SO-239s. **MFJ-270, $29.95.** 400W PEP. **MFJ-272, $39.95.** 1500W PEP.

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http://www.mfjenterprises.com for instruction manuals, catalog, info

Dave Olean, K1WHS. Here is his report of his recent 6-meter activity:

Here is a report of some sporadic-*E* on July 6–9, 2009. A day or so before I worked you on 6 meters I worked a few guys on 144 this time around and tried a few times on 222 MHz with no results. I did try 222 with W5LUA shortly after 2310 UTC on July 6. We both called and called on 222.100, but heard nil on each end. There were times when the skip on 144 was extremely weak. I could hear someone but could not pull him out. At other times, signals were quite loud. KØXXX was very loud. He called CQ and when I answered him, I scared him half to death. The signals were that good! In talking with W5LUA afterwards on the telephone, he was convinced that our QSO was a long single-hop QSO of about 1560 miles. That is awfully far for one hop, but the propagation map showed that it was a definite single hop. The path midpoints ranged from southeastern Ohio to the northern tip of Kentucky. I was watching 6 meters for awhile and noted very strong signals and high-angle radiation on many signals. What surprised me were a few Ohio stations that were weak with my array aimed at the horizon, but peaked up over S9 when I switched in some uptilt. The difference was around 30 dB. I had never noticed that before. Many 6-meter signals were better with uptilt even at longer distances. I had the 144 receiver running, and it was interesting to hear KI4ROF slowly build up out of the noise at 2245. All contacts made on July 6, 2009 (UTC time) as follows: 2250 KI4ROF EM55; 2255 KQ4NA EM65; 2256 KI4ROF again; 2257 KB5AAB EM51; 2258 K5RUS EM32; 2259 KI4OTG EM55; 2305 KØXXX EM46 very loud; 2306 N4LI EM55; 2308 WA4NVM EM55; 2309 K4JER EM65; 2310 W5LUA EM13, 1560 miles; 2315 Heard KØXXX and N4LI again calling CQ; 2318 Heard N4LI again; 2319 WA4HFN EM55; and 2330 K5RUS again 5x5. At 2332 heard KB5AAB again last signal heard here. No QSO. A few more QSOs were made south of me after this time up through 2345 or 2350.

The first fellow I heard was KI4ROF talking to KQ4NA at 2248 UT. They were ragchewing on 144.200 and I was going crazy waiting for the tube amp to warm up. It took me awhile to get their attention, but after a while, KI4ROF figured out the band was open! From then on there were lots of contacts being made on 144. I heard a few W2s in there. In New England, W1GHZ and KC1WJ made *Es* QSOs along with VE1AHM in New Brunswick who worked N4LI. I heard both ends of that QSO. I think the best QSO of the night was VE1AHM working KB5AAB. That is a long haul, even farther than my QSO with W5LUA!

On July 9, when I worked you mobile on six meters, I snagged almost 40 double-hop stations in the far west. When I quit at about 0200, there was still a bit of double-hop propagation. I am not sure how long it went. It was mostly confined to NM, AZ, CA, UT, and CO.

At the time I worked Dave and others in the far Northeast I was hearing the westward stations as well. As Dave testifies, it was truly a great opening.

Current Contests

The **ARRL September VHF QSO Party** is September 12–14. The second weekend of the **ARRL 10 GHz and Above Cumulative Contest** is September 19–20. The following are the dates for the **Fall Sprints**: The **144 MHz Fall Sprint** is September 21, 7 PM to 11 PM local time. The **222 MHz Fall Sprint** is September 29, 7 PM to 11 PM local time.

For ARRL contest rules, see the issue of *QST* prior to the month of the contest or the URL: <http://www.arrl.org>. For Fall Sprint contest rules, see the Southeast VHF Society URL: <http://www.svhfs.org>.

Current Conference

The 2009 **TAPR/ARRL Digital Communications Conference** will be held September 25–27, 2009, in Chicago, Illinois, at the Holiday Inn Hotel Elk Grove Village, Illinois. For more information, see their URL: <http://www.tapr.org/dcc.html>.

Calls for Papers

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

Microwave Update: A call for papers has been issue for the 2009 Microwave Update conference, to be held in Irving, Texas. The deadline for submission is August 31, 2008. If you are interested in submitting a paper for publication in their *Proceedings,* then, please contact Kent Britain, WA5VJB, at <wa5vjb @flash.net> for additional information.

Silent Keys

I regret to report the deaths of two amateur radio operators, Leon Carpenter, WB5NRI, and Tom McDuffie, KM6K. Leon was a fixture on 6 meters. Whenever the band was open, Leon would be there working DX. Tom was the manager of the HRO store in San Diego for 30 years. As a former resident of San Diego, almost every time I enteredthe HRO store, I would often see Tom cheerfully at work. I was always impressed by his gracious consideration of each customer, making sure that he or she was treated royally. Tom will be greatly missed by his many friends around the world.

And Finally . . .

The bulk of this column is about the fantastic QSO between VK7MO and PI9CAM. It will certainly be one for the history books. It came about thanks to the Echoes of Apollo event. That event would not have happened but for the hard work of Pat Barthelow, AA6EG. Publicity for the event included a major spread in *The New York Times,* as well as articles in the online version of *Wired Science* magazine (see: <http://www.wired.com/wiredscience/2009/06/moonbounce/> and <http://www. wired.com/wiredscience/2009/07/ham-operators-shoot-the-moon/).

Two of the articles were written by Lisa T. E. Sonne. Sonne traveled to the SRI site in Stanford and stayed there during the heart of the operation. Despite the times when Murphy visited (blown pre-amp, etc.), she chose to ignore those problems and instead wrote about the positives. Speaking of the positives, she was quite impressed with the SSB voice of Apollo 8 astronaut William Anders being bounced off the moon more than 40 years after he orbited the moon in December 1968. Writing in the second article, she stated the following: "The highlight for the World Moon Bounce participants was hearing the voice of Apollo 8 astronaut Bill Anders, one of the first three humans to orbit the moon and is famous for his Earthrise photo taken Christmas eve, 1968." That conversation can be heard at: <http://k5so.com/K5SO_W6SRI_D2000Hz_20090628_171651.wav>.

Because the EOA event was worldwide, there is no way that the impact—especially on young people—will ever be able to accurately be measured. Even so, preliminary stories of impressed, wide-eyed young people have been reported by operators of some of the various stations around the world.

Pat says that plans are in the works for further EOA events. As we learn of them we will publish them here and in *CQ VHF* magazine, as well as via tweets on Twitter.com. If you wish to follow me, you can find me under the tag JoeN6CL. I look forward to adding you to my list. Until next month...

73 de Joe, N6CL

The Most Wanted List 1988/2008

BY CARL SMITH,* N4AA

Time marches on. By the time this is being read by those in the U.S., summertime will be almost over. The contest season is just ahead, and we anxiously await the solar predictions. Please, oh please, give us something to work with. I barely remember when the solar flux was over 100. Back in early July one of the earliest sun spots gave everyone a jump in heart rate; the solar flux reached 72. It hadn't been there for months and months.

Most Wanted Countries!

This topic always sparks interest. I received an e-mail from a reader asking for the top ten Most Wanted from way back in 1965. Well, I don't have that data. It may be "somewhere," but I don't have it. However, it did cause me to go to *The DX Magazine* archives to see what I could find there. I could only go back to 1988, but it was an interesting exercise. The late Chod Harris, VP2ML (who wrote this column for many years), was the originator of *The DX Magazine* as well as the 100 Most Wanted Survey. Read on to see what Chod had to say in the February 1989 issue, with the survey results.

Key To 1988 Most Wanted Countries Survey

The 1988 *The DX Magazine* Most Wanted Countries Survey is on the facing page. The results are in order from the Most Wanted country down. On each line is: 1988 Rank, DXCC Country name, common prefix, percentage of DXers responding who 'need' the country, 1987 Rank and the change in position from 1987 to 1988, and 1980 Rank and change in position from 1980 to 1988. For example, Albania, ZA is the number 1 most wanted country, with 87% of respondents needing Albania. It was also number 1 last year (no change in position), and moved up 3 slots from 1980, when it was the number 4 most wanted country. A positive number in the change column means the country moved up in rank, ie., became more wanted. A negative figure in the change column means the country moved down in rank, and was less needed. An asterisk (*) means not applicable."

I am including in this month's column a copy of the top 15 from the listing. I am also including the top 15 from the 2008 survey.

You will notice right away that North Korea was not at the top, nor was it even on the 1988 list at all. Let's look at the ones that are still in that top 15: Bouvet was #2 in 1988, still high at #7 in 2008. Burma (Myanmar) was at #3 for 1988 but way down the list at #50 for 2008. PDR Yemen was at #4 and Yemen at #5 in 1988 is interesting because one of them was "deleted" and the other Is still ranked at #2 for 2008. Vietnam at #6 in 1988 was still coming out of the "conflict" years and subsequently took several years to come back, but it has seen huge amounts of activity driving the need all the way down to #88 in 2008. Afghanistan, like Vietnam, had years of little or no activity before seeing a lot of action since 2001 and it now stands at #75 for 2008. Laos at #8 some 20 years ago

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

	1988			1987		1980	
Rank	DXCC Country	Prefix	% Need	Rank	Chg	Rank	Chg
1	Albania	ZA	87	1		4	3
2	Bouvet	3Y	80	3	1	12	10
3	Burma	XZ	80	2	-1	3	
4	PDR of Yemen	7O	79	4		7	3
5	Yemen	4W	74	7	2	20	15
6	Vietnam	XV	74	5	-1	17	11
7	Afghanistan	YA	72	6	-1	19	12
8	Laos	XW	64	8		26	18
9	Spratly Islands	1S	63	10	1	53	44
10	Bangladesh	S2	61	9	-1	49	39
11	Bhutan	A5	61	11		55	44
12	Marion Islands	ZS2	58	17	5	*	*
13	South Georgia Is.	VP8	58	16	3	53	40
14	South Sandwich Is.	VP8	58	15	1	48	34
15	Laccadive Islands	VU	53	19	4	5	-10

↑ The DX Magazine *Top 15 for 1988.*

2008			2007
#	PREFIX	COUNTRY	#
1	P5	NORTH KOREA	1
2	7O	YEMEN	2
3	KP1	NAVASSA	3
4	FR-G	GLORIOSO	4
5	ZS8	MARION ISLAND	6
6	KP5	DESECHEO	7
7	3Y-B	BOUVET	5
8	VKØ-H	HEARD ISLAND	10
9	FT5W	CROZET	9
10	FT5Z	AMSTERDAM	11
11	VP8-O	SOUTH ORKNEY	13
12	VP8-S	SOUTH SANDWICH	15
13	SV-A	MT ATHOS	14
14	ZL9	AUCKLAND & CAMPBELL	18
15	VKØ-M	MACQUARIE	20

The DX Magazine *Top 15 for 2008.* →

has now been active by so many that it does not even appear in the top 100 for 2008. Spratly is one of those islands that does get much activity so it has only moved down from #9 in 1988 to #44 in 2008. Bangladesh is not the easiest place to get to, or to operate from apparently, but still it has dropped from the 1988 #10 spot to #55 in 2008. Bhutan gained a lot of attention in the 1990s after decades of no operation at all, and thus it has moved from #11 down to #67. Marion Island is one of those Antarctic islands that is difficult to get to and even harder to gain permission to operate from. Two operations in recent years have failed to diminish the need and Marion has actually *gained* 7 spots moving from # 2 in 1988 to #5 in 2008. South Georgia sees activity from time to time but never enough to cause it move far on the charts; South Georgia went from #13 in 1988 to #30 in 2008. South Sandwich was at #14 in 1988, and the island saw a major DXpedition in the mid-'90s which dropped it far down the list; however, with the influx of new DXers it has climbed back into the #12 spot for 2088. Last, but not least at all, the Laccadive Islands of India, now called Lakshadweep, saw major action in the early 2000s; thus, VU4 went from #15 in 1988 to #46 in 2008. The same major action was from the "other" Indian island group called Andaman, which

The WPX Program

CW

3228 .....EK6LP 3229 .....OH3MKH

SSB

3048.....KU4JZ 3050 .....OH3MKH
3049 .....KØDAN

Mixed

2059.....WF4W 2061.....KØDAN
2060 .....JA3GW 2062 .....OH3MKH

Digital

33.....VU2LBW 34 .....OH3MKH

CW: 450 EK6LP. 2550 IK3GER. 2650 W8IQ.
SSB: 350 KY6J. 400 N4GOA, KY4JZ. 650 WA5UA. 700 KØDAN.
Mixed: 500 WF4W. 700 KØDAN. 4900 N4NO.

80 Meters: OH3MKH
40 Meters: OH3MKH
20 Meters: N4GOA, KØDAN, OH3MKHK
15 Meters: OH3MKH
10 Meters: KØDAN, OH3MKH

Asia: KØDAN, OH3MKH
Africa: 7K3QPL, OH3MKH
Europe: KØDAN, OH3MKH
Oceania: OH3MKH
North America: OH3MKH
South America: OH3MKH

Award of Excellence: OH3MKH
Digital Bar: OH3MKH

Award of Excellence Holders: N4MM, W4CRW, K5UR, K2VV, VE3XN, DL1MDD, DJ7CX, DL3RK, WB4SIJ, DL7AA, ON4QX, 9A2AA, OK3EA, OK1MP, N4NO, ZL3GO, W4BQY, IØJX, WA1JMP, KØJN, W4VQ, KF2O, WB8CNL, W1JR, F9RM, W5UR, CT1FL, WA4QMQ, W8ILC, VE7DP, K9BG, W1CU, G4BUE, N3ED, LU3YL/W4, NN4Q, KA3A, VE7WJ, VE7IG, N2AC, W9NUF, N4NX, SMØDJZ, DK5AD, WD9IIC, W3ARK, LA7JO, VK4SS, I8YRK, SMØAJU, N5TV, W6OUL, WB8ZRL, WA8YTM, SM6DHU, N4KE, I2UIY, I4EAT, VK9NS, DEØDXM, DK4SY, UR2QD, AB9O, FM5WD, I2DMK, SM6CST, VE1NG, I1JQJ, PY2DBU, HI8LC, KA5W, K3UA, HA8UB, HA8XX, K7LJ, SM3EVR, K2SHZ, UP1BZZ, EA7OH, K2POA, N6JV, W2HG, ONL-4003, W5AWT, KBØG, HB9CSA, F6BVB, YU7SF, DF1SD, K7CU, I1POR, K9LJN, YBØTK, K9QFR, 9A2NA, W4UW, NXØI, WB4RUA, I6DQE, I1EEW, I8RFD, I3CRW, VE3MS, NE4F, KC8PG, F1HWB, ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, KC7EM, YU1AB, IK2ILH, DEØDAQ, I1WXY, LU1DOW, N1IR, IK4GME, VE9RJ, WX3N, HB9AUT, KC6X, N6IBF, W5ODD, IØRIZ, I2MQP, F6HMJ, HB9DDZ, WØULU, K9XR, JAØSU, I5ZJK, I2EOW, IK2MRZ, KS4S, KA1CLV, WZ1R, CT4UW, KØIFL, WT3W, IN3NJB, S50A, IK1GPG, AA6WJ, W3AP, OE1EMN, W9IL, I7PXV, S53EO, DF7GK, S57J, EA5BM, DL1EY, DJ1YH, KUØA, VE2UW, 9A9R, UAØFZ, DJ3JSW, OE6CLE, HB9BIN, N1KC, SM5DAC, RW9SG, WA3GNW, S51U, W4MS, I2EAY, RAØFU, CT4NH, EA7TV, W9IAL, LY3BA, K1NU, W1TE, UA3AP, EA5AT, OK1DWC, KX1A, IZ5BAM, K4LQ, KØKG, DL6ATM, VE9FX, DL2CHN, W2OO, AI6Z, RU3DX, WB9IHH, CT1EEN, G4PWA, OK1FED, EU1TT, S53MJ, DL2KQ, RA1AOB, KT2C, UA9CGL, AE5B, KØDEQ, DKØPM, SV1EOS, UAØFAI, N4GG, UA4RZ, 7K3QPL, EW1CQ., UA4LY, RZ3DX, UA3AIO, UA4RC, N8BJQ, UA3BS, UA9FGR, UT3UY, WA5VGI, UT9FJ, UT4EK, K9UQN, UR5FEO, LY2MM, N3RC.

160 Meter Endorsements: N4MM, W4CRW, K5UR, VE3XN, DL3RK, OK1MP, N4NO, W4BQY, W4VQ, KF2O, W8CNL, W1JR, W5UR, W8ILC, K9BG, W1CU, G4BUE, LU3YL/W4, NN4Q, VE7WJ, VE7IG, W9NUF, N4NX, SMØDJZ, DK5AD, W3ARK, LA7JO, SMØAJU, N5TV, W6OUL, N4KE, I2UIY, I4EAT, VK9NS, DEØDXM, UR2QD, AB9O, FM5WD, SM6CST, I1JQJ, PY2DBU, HI8LC, KA5W, K3UA, K7LJ, SM3EVR, UP1BZZ, K2POF, IT9TQH, N6JV, ONL-4003, W5AWT, KBØG, F6BVB, YU7SF, DF1SD, K7CU, I1POR, K9LJN, YBØTK, K9QFR, W4UW, NXØI, WB4RUA, I1EEW, ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, YU1AB, IK4GME, WX3N, W5ODD, IØRIZ, I2MQP, F6HMJ, HB9DDZ, K9XR, JAØSU, I5ZJK, I2EOW, KS4S, KA1CLV, KØIFL, WT3W, IN3NJB, S50A, IK1GPG, AA6WJ, W3AP, S53EO, S57J, DL1EY, DJ1YH, KUØA, VR2UW, UAØFZ, DJ3JSW, OE6CLD, HB9BIN, N1KC, SM5DAC, S51U, RAØFU, CT4NH, EA7TV, LY3BA, K1NU, W1TE, UA3AP, OK1DWC, KX1A, IZ5BAM, DL6ATM, W2OO, RU3DX, WB9IHH, G4PWA, OK1FED, EU1TT, S53MJ, DL2KQ, RA1AOB, UA9CGL, SM6DHU, KØDEQ, DKØPM, SV1EOS, N4GG, UA4RZ, 7K3QPL, EW1CQ, UA4LY, RZ3DX, UA3AIO, UA4RC, N8BJQ, UA3BS, UA9FGR, UT3UY, WA5VGI, UR5FEO, N3RC.

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

*Please Note: The price of the 160, 30, 17, 12, 6, and Digital bars for the Award of Excellence are $6.50 each.

2008 Rank	Country	Prefix	1988 Rank
1	North Korea	P5	N/A
2	Yemen	7O	5
3	Navassa	KP1	N/A
4	Glorioso	FT5G	31
5	Marion Is	ZS8	12
6	Desecheo	KP5	N/A
7	Bouvet	3YØB	2
8	Heard Is	VKØ--H	52
9	Crozet	FT5W	N/A
10	Amsterdam	FT5Z	67
11	S. Orkney	VP8-O	63
12	S. Sandwich	VP8-SS	14
13	Mt. Athos	SV/A	27
14	Auckland/Campbell	ZL9	73
15	Macquarie	VKØM	74

Comparison of the Most Wanted list of 2008 and 1988.

5 Band WAZ

As of July 1, 2009, 787 stations have attained the 200 zone level and 1638 stations have attained the 150 zone level.

New recipients of 5 Band WAZ with all 200 zones confirmed:
G4SOZ

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

S51U, 199 (27)
N4WW, 199 (26)
W4LI, 199 (26)
K7UR, 199 (34)
W2YY, 199 (26)
IK8BQE, 199 (31)
JA2IVK, 199 (34 on 40m)
IK1AOD, 199 (1)
GM3YOR, 199 (31)
VO1FB, 199 (19)
KZ4V, 199 (26)
W6DN, 199 (17)
W3NO, 199 (26)
RU3FM, 199 (1)
N3UN, 199 (18)
W1JZ, 199 (24)
W1FZ, 199 (26)
SM7BIP, 199 (31)
N4NX, 199 (26)
N4MM, 199 (26)
EA7GF, 199 (1)
N6HR/7, 199 (37)
JA5IU, 199 (2)
RU3DX, 199 (6)
N4XR, 199 (27)
HA5AGS, 199 (1)
VE3XN, 199 (26)
YU7GMN, 199 (10)
K7LJ, 199 (37)
RA6AX, 199 (6 on 10m)
RX4HZ, 199 (13)
KØGM, 199 (17)
S58Q, 199 (31)
KQØB, 199 (2 on 10)
K9OW, 199 (34 on 10)
N5AW, 199 (17)
EA5BCX, 198 (27, 39)
G3KDB, 198 (1, 12)
JA1DM, 198 (2, 40)
9A5I, 198 (1, 16)
K4CN, 198 (23, 26)
G3KMQ, 198 (1, 27)
N2QT, 198 (23, 24)
OK1DWC, 198 (6, 31)
W4UM, 198 (18, 23)
US7MM,198 (2, 6)
K2TK, 198 (23, 24)
K3JGJ, 198 (24, 26)
W4DC, 198 (24, 26)
F5NBU, 198 (19, 31)
OE2LCM, 198 (1, 31)
WK3N, 198 (23, 24)
W9XY, 198 (22, 26)
KZ2I, 198 (24, 26)
W7VJ, 198 (34, 37)
K9MIE, 198 (18, 21)
W9RN, 198 (26, 19 on 40)
W5CWQ,198 (17, 18)
I5KKW, 198 (31&23 on 20)
IV3MUC, 198 (1&31 on 40)
UA4LY, 198 (6&2 on 10)
UT9FJ (27, 29)

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

None

5 Band WAZ updates:

IV3GOW (200 zones)
OH2BCK (200 zones)
HA9PP (200 zones)

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

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

The CQ DX Field Award Program

Mixed

98 .....JA7OXR/M

Mixed Endorsements

200 .....F6HMJ/206
175 .....K2AU/183
175 .....ON4CAS/191

CW Endorsements

100 .....K2AU/135
100 .....GØDEZ/100

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.

The WAZ Program

10 Meter SSB

587 .....IV3GOW

80 Meter SSB

92 .....IV3GOW

All Band WAZ

Mixed

8588 .....US5CB
8589 .....UR4CWQ
8590 .....ND3R
8591 .....TF8GX
8592 .....DL6IAN
8593 .....WB4PPW
8594 .....N2WK
8595 .....IKØXBX
8596 .....W5ZR
8597 .....W4TUN
8598 .....N2BJ
8599 .....F8DZY
8600 .....S54A

SSB

5108 .....DL7FAZ
5109 .....G4SOZ
5110 .....VE3GYL

CW

570 .....UR2VA
571 .....G4SOZ
572 .....G4XRV

RTTY

202 .....JA7ZP

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CQ DX Awards Program

SSB

2529 .....TI8II

CW

1093 .....TI8II

SSB Endorsements

320 .....VE7EDZ/328
320 .....TI8II/324
320 .....WØROB/320
200 .....KT2C/213

CW Endorsements

330 .....WK3N/337
300 .....KT2C/304
275 .....TI8II/261

The basic award fee for subscribers to *CQ* is $6. For non-subscribers, it is $12. In order to qualify for the reduced subscriber rate, please enclose your latest *CQ* mailing label with your application. Endorsement stickers are $1.00 each plus SASE. Updates not involving the issuance of a sticker are free. All updates and correspondence must include an SASE. Rules and application forms for the CQ DX Awards may be found on the <www.cq-amateur-radio.com> website, or may be obtained by sending a business-size, self-addressed, stamped envelope to CQ DX Awards Manager, Billy Williams, N4UF, Box 9673, Jacksonville, FL 32208 U.S.A. Currently we recognize 339 active countries. Please make all checks payable to the award manager.

you, though, most of those places are quite inhospitable when it comes to the weather and very expensive to get to.

Glorioso Postponed

The DXpedition to Glorioso scheduled for mid-July was postponed by a series of events. An Airbus aircraft crashed into the Indian Ocean as it approached Comoros. There was only one survivor, a teenage girl, who clung to some wreckage for many hours before being rescued. Aircraft of the French military were involved in the search efforts. I understood that these were the same aircraft that were to have taken the DXpedition team to Glorioso. Obviously, these events were totally beyond the control of anyone associated with the Glorioso operation. Tentatively it was rescheduled for late August, but I won't know if that happened before this column must be in print.

September Events for DXers

This being the September issue of *CQ*, I have to mention two great events taking place two weekends of the month.

First, on the weekend of September 18–19 the 57th annual W9-DXCC Convention takes place in Chicago. On Friday the 18th, folks will start gathering at the Holiday Inn in Elk Grove

was at #46 in 1988; in spite of major action from Andaman, it still shows up at #34, an increase of 12 spots.

So what do we have today? Of those top 15 from 1988, four of them are either still there or were lower and came back up the chart. There is an accompanying chart of the top 15 for 2008 comparing those with the 1988 rankings. Perhaps you would like to volunteer to take on one of those top 15. I must warn

THE WPX HONOR ROLL

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

MIXED

6139 9A2AA	4150 I2PJA	3684 IK2ILH	3150 W9IL	2674 N8BJQ	2116 AE5B	1705 W2EZ	1322 AA4FU	682 AI8P
5552 K2VV	4147 VE3XN	3684 WA5VGI	3091 9A4W	2673 JN3SAC	2192 N2SS	1662 SV1DPI	1269 K5WAF	680 IWØHOU
5426 W1CU	4088 N6JV	3681 WB2YQH	3007 W2WC	2475 W6OUL	1951 KØKG	1651 KC9ARR	1016 RA1AOB	650 N3YZ
5031 W2FXA	3980 N9AF	3609 YU7BCD	2998 K9UQN	2440 K5UR	1891 W2FKF	1643 N1KC	976 KM6HB	644 KWØH
4669 EA2IA	3947 I2MQP	3522 ON4CAS	2965 OZ1ACB	2397 VE6BF	1891 VE9FX	1446 DF3JO	964 K8ZEE	636 ZS2DL
4592 9A2NA	3937 S53EO	3494 W9OP	2873 W2ME	2358 I2EAY	1858 W7CB	1362 WD9DZV	815 KL7FAP	
4501 N4NO	3930 KØDEQ	3325 SM6DHU	2752 K1BV	2353 W2OO	1820 KX1A	1359 N3RC	726 K5IC	
4430 YU1AB	3821 KF2O	3227 K9BG	2704 K2XF	2162 W3LL	1741 AB5C	1337 K6UXO	723 KØDAN	

SSB

4955 IØZV	3616 EA2IA	2857 4X6DK	2431 G4UOL	2094 I8LEL	1915 W2OO	1678 K9UQN	1386 IK4HPU	1031 IK8OZP
4505 VE1YX	3457 N4NO	2726 IN3QCI	2417 I3ZSX	2093 W2WC	1879 K3IXD	1649 N8BJQ	1385 AE9DX	978 EA7HY
4371 F6DZU	3323 OE2EGL	2711 LU8ESU	2326 CX6BZ	2076 K2XF	1877 DL8AAV	1623 VE9FX	1377 EA3NP	951 KU4BP
4273 K2VV	3186 CT1AHU	2709 KF7RU	2300 SM6DHU	2072 K5UR	1891 W2FKF	1611 W2ME	1258 N1KC	924 VE6BF
4123 OZ5EV	3133 KF2O	2642 YU7BCD	2297 W9IL	2071 N6FX	1795 KQ8D	1591 JN3SAC	1232 AG4W	875 K7SAM
4116 I2PJA	3108 I4CSP	2595 EA1JG	2209 IK2QPR	1946 W3LL	1756 KI7AO	1480 AB5C	1145 EA3EQT	717 KØDAN
3715 I2MQP	2914 KØDEQ	2477 WA5VGI	2201 NQ3A	1935 SV1EOS	1729 W6OUL	1464 VE7SMP	1083 KX1A	637 K5WAF
3669 9A2NA	2860 I8KCI	2451 EA3GHZ	2099 SV3AQR	1927 AE5B	1714 IK2DZN	1463 I2EAY	1042 IZØBNR	

CW

5181 WA2HZR	3607 EA2IA	2723 EA7AZA	2502 JA9CWJ	2227 IØNNY	1848 I2EAY	1334 RUØLL	1030 AA5JG	
5085 K9QVB	3223 9A2NA	2632 W2ME	2415 W2WC	2223 VE6BF	1804 EA7AAW	1317 K6UXO	915 N1KC	
4952 K2VV	3241 KØDEQ	2623 SM6DHU	2373 W9IL	2141 N8BJQ	1643 W2OO	1299 WA2VQV	842 WD9DZV	
4102 N6JV	3177 WA5VGI	2618 K9UQN	2324 OZ5UR	2089 K2XF	1497 AC5K	1223 KX1A	824 VE9FX	
4051 N4NO	2837 KF2O	2727 YU7BCD	2309 JN3SAC	2040 I2MQP	1445 EA2CIN	1220 AA4FU	749 AE5B	
3760 LZ1XL	2731 I7PXV	2621 KA7T	2308 N6FX	1979 K5UR	1407 WO3Z	1109 VE1YX	740 F5PBL	
3682 VE7DP	2727 YU7BCD	2532 W8IQ	2357 IK3GER	1927 W6OUL	1395 W9HR	1053 K5WAF	608 IK2SGV	

DIGITAL

1107 W3LL	1009 GUØSUP	909 N8BJQ	721 KØDEQ

Village. Early Friday evening the Welcome Reception will be hosted by DX Publishing. This is a great time to register for the convention activities and sit down with your fellow DXers for a few hours of casual conversation. This is followed by the late Friday Hospitality Suite hosted by the Northern Illinois DX Association. Early Saturday morning the formal activities will begin with Jim O'Connell, W9WU, again serving as the master of ceremonies. Prizes galore will be given away throughout the day. A Grand Banquet Saturday evening will feature Joel Harrison, W5ZN, President of the ARRL as the guest speaker. The grand prize of a Yaesu FT-2000 will be presented at the end of the program. Oh yes, after the banquet, a Saturday night Hospitality Suite will be hosted by the Greater Milwaukee DX Association. Please see website for more details: <http://www.w9dxcc.com>.

Then the following weekend, starting Friday afternoon September 25 and continuing on Saturday, September 26, there is the Ten-Tec Factory Hamfest in Sevierville, Tennessee, followed by SEDCO (SouthEastern DX & Contesting Organization, Inc) held at nearby Pigeon Forge, TN in the MainStay Suites. The MainStay has just recently opened an RV camp/park facility adjacent to its main facility. The SEDCO program opens at noon on Saturday, continuing through the afternoon. I will be serving at the emcee

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 32206.

Mixed

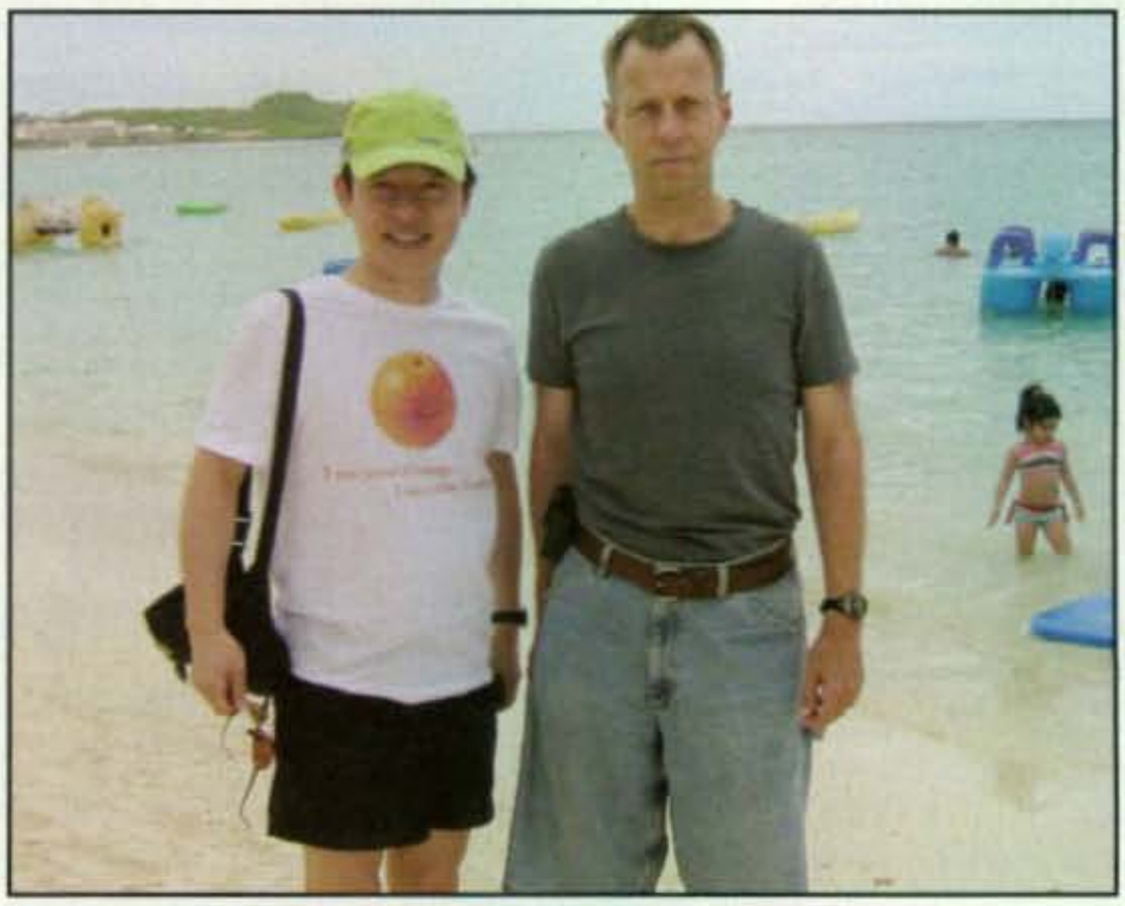
K2TQC 265	N4MM 201	9A5CY 187			
HAßDU 228	F6HMJ 201	RW4NH 187			
W1CU 228	VE3ZZ 201	K2SHZ 182			
HA1RW 220	JN3SAC 200	K2AU 182			
VE3XN 217	W4UM 198	K1NU 180			
N8PR 217	OK1AOV 195	ON4CAS 180			
KØDEQ 216	N4NX 192	W5ODD 177			
HA5WA 206	HA9PP 190	NØFW 176			
KF8UN 205	K8OOK 189				
W6OAT 205	BA4DW 188				

SSB

W1CU 209	VE7SMP 190	NØFW 176			
W4ABW 199	N4MM 184	DL3DXX 175			
KØDEQ 192	W4UM 182				

CW

DL6KVA 220	JN3SAC 194	N4MM 179			
W1CU 220	W4UM 191	N4NX 177			
KØDEQ 207	OK1AOV 186				
DL3DXX 203	OK2PO 184				



Lee, HL1IWD/AH2Y (left), and Harry, KH2/WX8C (right), joined forces for the recent WPX contest from Guam. Here they are just relaxing after the event. (Photo courtesy of Lee, HL1IWD)

for the DX part of the program and Ted, W4NZ, will do the contest section. The presentations are about DX- and contest-related expeditions or topics, presented by some of the "best of the best." After a short break, an outstanding buffet dinner catered by one of the best restaurants in the area, Damon's, will be available. Following dinner, some major prizes will be given and the drawing for the two separate raffles will be held. The separate raffles are for radios, with one being donated by ICOM America (IC-7600) and the other by Yaesu (FT-2000). As in past, the proceeds from these raffles go to support DX foundations (NCDXF and INDEXA), DXpeditions, and contesting activities. There is always one last presentation following dinner, and it is always a special treat for all those who attend. See the SEDCO website for more information: <http://www.sedco.homestead.com>.

Nestor Alonso, WP4BL (right), with Jorge Lleras, NP3HM (left), coaching him during Field Day 2009 in Barceloneta, Puerto Rico. They had very nice propagation, and Nestor had a blast making QSOs. He may sound almost like a seasoned DXer, but people don't know that he is blind (it was progressive since childhood, and he sees only blurry forms now). (Photo/information courtesy of Angel, WP3GW)

Until next time, enjoy the chase, but always remember to Have Fun!

73, Carl, N4AA

QSL Information

D44TXF via DG3KAF
D44TXI via DH2KI
D44TXO via DJ2VO
D44TXP via DL1COP
D44TXQ via DL3KBQ
D44TXR via DL2RSI
D44TXS via HB9EHQ
D4C via IZ4DPV
DRØ9ANT via DL5MHQ
DY1C via VE7DP
E21YDP via E2ØWXA
E51COF via K8NA
E51EME via ZL1RS
E51SIX via W5GJ
E51XBG via HB9XBG
E7DX via E77E
EA8BWW via NI5DX
ED5T via EA5ELT
ED8R via EA4RCH
EE2W via EB2BXL
EF8M via UA3DX
EG2ANT via EA2RC
EG9Z via EA9LZ
FJ/EB1HF via EC1AE
FM1II via NI5DX
FM5KC via F5VHJ
FO/F5PHW via F8BPN
FP/KV1J via KV1J
FT5WO via F4DYW
FT5WP via F4EFI
FT5XS via F4EFI

(The table of QSL Managers is courtesy of John Shelton, K1XN, editor of "The Go List," 106 Dogwood Dr., Paris, TN 38242; phone 731-641-4354; e-mail: <golist@golist.net>; <http://golist.net/>.)

awards

BY TED MELINOSKY,* K1BV

Golden Anniversary, EU States, Lakes, and Lighthouses Awards

Digital communications way back in 1959 was largely a matter of converting electromechanic surplus RTTY terminals to amateur service. The output was read on cheap yellow paper that came in rolls. The teletype devices were well built, but by the time they ended up in our hands, and after a lifetime spent in continuous military or commercial service, they were beaten up and needed tender loving care. Today's units are tiny, packed with integrated circuits, contain no moving parts, and display their output on LCD screens. Digital is no longer restricted to RTTY, but encompasses a large variety of formats including the very successful PSK systems.

We begin this month's column with a short-term award from the Bristish Amateur Radio Teledata Group (BARTG), which is celebrating its 50th anniversary by offering a special award.

BARTG Golden Jubilee Award

The BARTG celebrates its 50th anniversary by offering a special Golden Jubilee Award. The group invites all licensed amateurs and SWLs to join in the fun by making digital communications contacts from now until June 2010.

Submission of satisfactory proof of having earned 500 points between July 1, 2009 and June 30, 2010 using a data mode is required. Points values are as follows:

One RTTY QSO = 2 points;

One PSK QSO = 2 points;

One QSO (any other digimode) = 5 points;

Special event callsign GB50ATG within this period = 10 points per QSO.

Any band may be used, No cross-band, cross-mode, or satellite contacts allowed. Work at least five DXCC entities (ARRL list) from each of any five continents (AF, ANT, AS, EU, NA, OC, SA), plus at least one QSO with GB50ATG. Endorsements are available for RTTY, PSK-31, single band only. While the award is a paper certificate, this can be upgraded to a plaque at additional cost. Upgrade stickers are not available. The award is in recognition of attaining a minimum of 500 points.

Applications for this award may be made by any of the following methods:

1. Submission of QSL cards for the entities being claimed. These will be returned after checking. As an alternative, photocopies of these QSL cards will be accepted. Such copies must clearly show both sides if applicable, both callsigns, and establish beyond any doubt that a two-way datamode contact took place. If QSL cards need to be returned, please check with the BARTG Awards Manager for return cost before sending. Checks should be made payable to BARTG.

2. Submission of a check list containing the log extracts for the points being claimed. The check list should include date, time, band, callsign worked, mode, report, etc. This check list together with the

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

The BARTG celebrates its 50th anniversary by offering this special short-term Golden Jubilee Award.

USA-CA Special Honor Rol
Lajos Petermann, N6HH
USA-CA All Counties #1185
June 24, 2009

USA-CA Honor Rol

500
JA8BRD.....3472
MMØEAX.....3473
N6HH.....3474
WB4UHI.....3475

1000
N6HH.....1778
WB4UHI.....1779

1500
N6HH.....1495
WB4UHI.....1496

2000
N6HH.....1382
WB4UHI.....1383

2500
N6HH.....1301

3000
N6HH.....1185

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.

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E151765 E151765

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MODEL SS-10TK

MODEL SS-12IF

SPECIAL FEATURES:

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

PROTECTION FEATURES:

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

SPECIFICATIONS:

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

OUTPUT VOLTAGE: 13.8VDC

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

MODEL SS-18

DESKTOP SWITCHING POWER SUPPLIES

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SS-10	7	10	1⅛ x 6 x 9	3.2
SS-12	10	12	1⅛ x 6 x 9	3.4
SS-18	15	18	1⅛ x 6 x 9	3.6
SS-25	20	25	2⅞ x 7 x 9⅛	4.2
SS-30	25	30	3¼ x 7 x 9⅛	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 9⅛	4.2
SS-30M*	25	30	3¼ x 7 x 9⅛	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 9⅛	6.5
SRM-30	25	30	3½ x 19 x 9⅛	7.0

WITH SEPARATE VOLT & AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25M	20	25	3½ x 19 x 9⅛	6.5
SRM-30M	25	30	3½ x 19 x 9⅛	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 9⅛	10.5
SRM-30-2	25	30	3½ x 19 x 9⅛	11.0

WITH SEPARATE VOLT & AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25M-2	20	25	3½ x 19 x 9⅛	10.5
SRM-30M-2	25	30	3½ x 19 x 9⅛	11.0

MODEL SS-12SM/GTX

MODEL SS-10EFJ-98

CUSTOM POWER SUPPLIES FOR RADIOS BELOW

EF JOHNSON AVENGER GX-MC41
EF JOHNSON AVENGER GX-MC42
EF JOHNSON GT-ML81
EF JOHNSON GT-ML83
EF JOHNSON 9800 SERIES
GE MARC SERIES
GE MONOGRAM SERIES & MAXON SM-4000 SERIES
ICOM IC-F11020 & IC-F2020
KENWOOD TK760, 762, 840, 860, 940, 941
KENWOOD TK760H, 762H
MOTOROLA LOW POWER SM50, SM120, & GTX
MOTOROLA HIGH POWER SM50, SM120, & GTX
MOTOROLA RADIUS & GM 300
MOTOROLA RADIUS & GM 300
MOTOROLA RADIUS & GM 300
UNIDEN SMH1525, SMU4525
VERTEX — FTL-1011, FT-1011, FT-2011, FT-7011

CIRCLE 134 ON READER SERVICE CARD

NEW SWITCHING MODELS

SS-10GX, SS-12GX
SS-18GX
SS-12EFJ
SS-18EFJ
SS-10-EFJ-98, SS-12-EFJ-98, SS-18-EFJ-98
SS-12MC
SS-10MG, SS-12MG
SS-101F, SS-121F
SS-10TK
SS-12TK OR SS-18TK
SS-10SM/GTX
SS-10SM/GTX, SS-12SM/GTX, SS-18SM/GTX
SS-10RA
SS-12RA
SS-18RA
SS-10SMU, SS-12SMU, SS-18SMU
SS-10V, SS-12V, SS-18V

*ICS – Intermittent Communication Service

corresponding QSL cards should be examined by the awards manager of a national radio society, or by two officers of a recognized radio club/society. The signed check list and appropriate fee should then be forwarded.

3. Claims can also be accepted based on a contest log(s) submitted for any BARTG contest. The claim must be made within five years of the first contest log submission, and for all QSOs claimed you must have submitted a contest or check log at the appropriate time for that contest.

The cost of this award is: UK £6, US $10, or 10 Euros. PAYPAL accepted. Plaques can be purchased for £20 each. Apply to: BARTG Awards Manager, Phil Cooper, GUØSUP, 1 Clos au Pre, La Hougue du Pommier, Castel Guernsey GY5 7FQ, United Kingdom. Internet: <http://www.bartg.org. uk/gjaward.asp> (application form available); e-mail: <pcooper@guernsey.net>.

Poland Without Borders Award

The Polish National Amateur Association (PZK) offers a very popular series of awards that has been covered in this column in the past. In 2004, Poland joined the European Union, which provided cultural, economic, and political benefits that are celebrated with this relatively new award.

The Poland Without Borders Award is issued for confirmed HF or VHF/UHF QSOs with member states of the European Union on or after December 21, 2007. SWL OK.

The award can be earned on HF bands with a total of 85 HF QSOs:

Three contacts with different call areas in 23 EU countries (a total of 69 QSOs);

Sixteen contacts with all SP provinces (a total of 16 QSOs).

On VHF/UHF bands a total of 28 VHF/UHF QSOs is required as follows:

Two contacts with different call areas in 10 EU countries (a total of 20 QSOs);

Eight contacts with different SP provinces (a total of 8 QSOs).

Send GCR list and fee of 5 IRCs to: Award Manager PZK, Andrzej Buras, SQ7B, P.O. Box 12, 27-200 Starachowice, Poland.

European Union states: CT, DL, EA, EI, ES, F, G, HA, I, LX, LY, LZ, OE, OH, OK, OM, ON, OZ, PA, S5, SM, SP, SV, YL, YO, ZC4/5B4, 9H.

SP provinces (most Polish amateurs display their province abbreviation on their QSL card.):

The Poland Without Borders Award is issued for confirmed HF or VHF/UHF QSOs with member states of the European Union.

The Russian Lakes Award, instituted by the RZ1CWC Team, is avaiable to any amateur radio operator or SWL for two-way QSOs or SWL reports with radio stations operating from lakes and impoundments located in the territory of the Russian Federation.

SP1, Z; SP2, F, P; SP3, B, W; SP4, J, O; SP5, R; SP6, U, D; SP7, C, S; SP8 L, K; SP9, M, G.

Russian Lakes Award

One of the newer trends in awards is contacting of a certain number of lakes in a country. No, you don't have to contact a vessel or rowboat actually on the lake, but it usually involves contacting a mobile or portable station that is operating within a small distance from the lake itself. In the case of the Russian lakes Award, contacts must be from stations operating no farther than 100 meters from the water. This has to be a great warm weather activity, and an excuse to pack a small transceiver with the barbecue gear.

The Russian Lakes Award (RLA) was instituted by the RZ1CWC Team and is issued to any amateur radio operator or SWL for two-way QSOs or SWL reports with radio stations operating from lakes and impoundments located in the territory of the Russian Federation. Valid lakes must be designated on a map in scale 1:50000, have a proper name, and cover an area not less than one square kilometer. All QSOs/SWLs with /MM radio stations; radio stations located on reservoirs, islands, or on a coastal edge (no more than 100 meters from reservoir) are valid.

Each reservoir has an identification number "RL" (Russian Lake) + Russian oblast abbreviation + serial number starting with 001—for example: RL-LO-001, RL-KL-002, *etc.* Some reservoirs can have several numbers, as they are located in different areas (krai, oblast, republic). For example, Lake Baikal is located in Irkutsk oblast and Republic Buryatiya, and accordingly it has two identifiers—IR and BU. In this case Lake Baikal will have two numbers, for example, IR-001 and BU-001, but will be valid as one reservoir. This is specified in the list of the activated lakes (see below). QSOs/SWLs since January, 1, 2009 are valid. There are no restrictions of bands and type of mode. Each reservoir is valid only once.

There are three classes of the award:

Class 1—30 different reservoirs;

Class 2—15 different reservoirs;

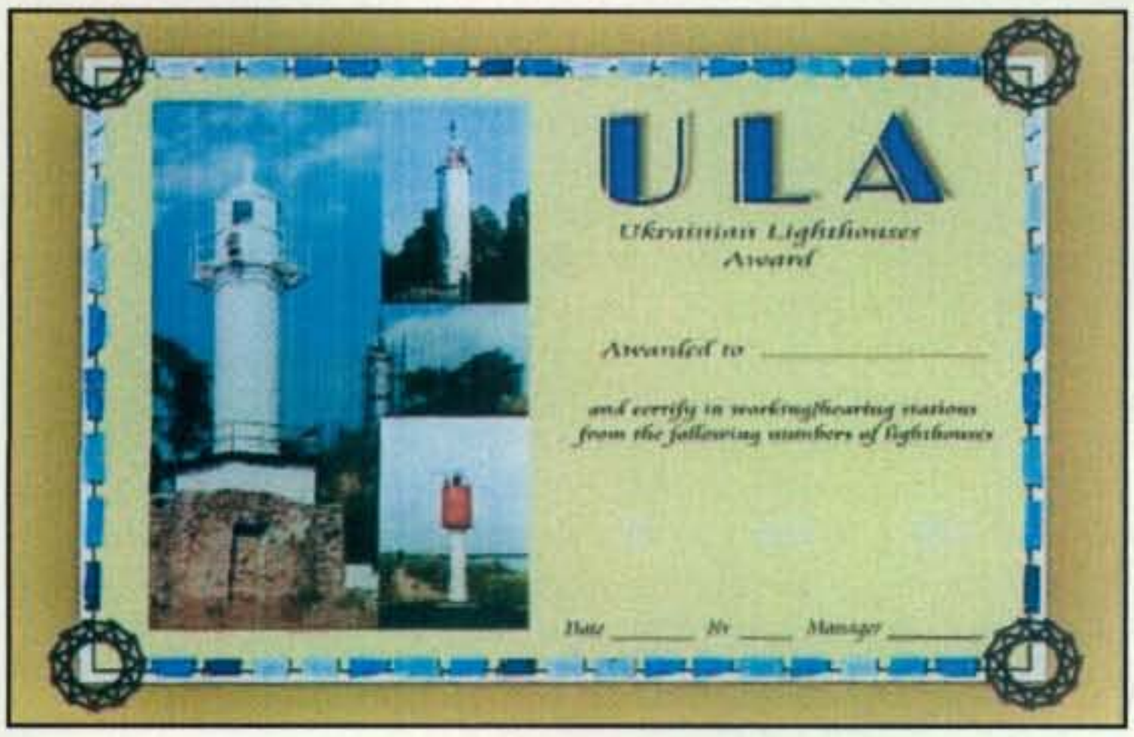
Class 3—5 different reservoirs.

Send GCR list and fee of $US8 for each class certificate; IRCs are accepted at $1 each. Payment through PayPal or Webmoney is accepted. Check the website for details. Apply to: Petushkov Andrey Aleksandrovich, RN1CW, P.O. Box

340/5, Sosnovy Bor, Leningrad -skaya oblast, 188540, Russia. Internet: <http://www.rz1cwc.qrz.ru/eng/index.html>. (The list of lakes can be downloaded in MS Excel format.)

Ukrainian Lighthouse Trophy

The southern portions of the Ukraine have extensive shorelines on the Black Sea as well the Sea of Azov. The Ukraine joins numerous countries that offer awards for contacting stations that operate on the premises or within a short distance of lighthouses. The fees for this award are higher than usual, but the award is a wooden trophy, not a paper certificate.



The Ukrainian Lighthouse Trophy is sponsored by the Southern Ukraine DX Foundation and is awarded for contacts with amateur radio stations working from Ukrainian lighthouses and visible beacons, or within 1000 meters of them.

The award is sponsored by the Southern Ukraine DX Foundation and is awarded for QSOs/SWL contacts with the amateur radio stations working from Ukrainian lighthouses and visible beacons, or within 1000 meters of them. The award uses the official list of the ARLHS (Amateur Radio Lighthouse Society), with lighthouses located on any island (sea, river etc.) and on the continental coast. There are no restrictions on date of QSO, band, or mode. Repeat QSO/SWL contact with same lighthouse OK. The award is available to activators using the same rules. The award consists of two different trophies, Silver and Gold.

Europeans and Asian stations need:
Silver Trophy—30 contacts;
Gold Trophy—50.

All others:
Silver Trophy—15 contacts;
Gold Trophy—25.

Send a list of the lighthouses contacted and copies of both sides of the received QSL cards and fee of $US35 for Ukrainian amateurs and $US50 for all others. IRCs are accepted as payment at a value of $0.60 each. The official number of the lighthouse on the ARLHS website must be included. The sponsor suggests the application be sent by certified mail. The manager reserves the right to request any original QSL. Apply to: Alexander Servianov, UR7GW, P.O. Box 112, Kherson 73000, Ukraine. Internet: <http://lights.in.us/ru/ula_awards.html>; e-mail: <ur7gw@mail.ru>.

We're always looking for new and interesting awards to feature in this column. If your club or special interest group has such award, please contact me at the e-mail address shown on the first page of this column. 73, Ted, K1BV

BY JOHN DORR,* K1AR

Staying Awake in Contesting!

September's Contest Tip

It is a good practice for you to send in your log for any contest, even when you only make a few QSOs and were not a serious entrant. Not only does it encourage the sponsors, it also helps to check logs ensuring, in some contests, that the guys you work receive credit for contacts that otherwise wouldn't count for their final score. *(Tnx to K4BAI)*

Calendar of Events

All year	**CQ DX Marathon**
Aug. 22–23	Ohio QSO Party
Aug. 29–30	SCC RTTY Championship
Aug. 29-30	YO DX HF Contest
Aug. 29–30	SARL HF CW Contest
Sept. 5	Russian RTTY WW Contest
Sept. 5–6	All Asian SSB Contest
Sept. 5-6	Colorado QSO Party
Sept. 5–6	IARU Region 1 Field Day
Sept. 5–6	RSGB SSB Field Day
Sept. 6–7	Tennessee QSO Party
Sept. 12–13	Worked All Europe SSB Contest
Sept. 12-14	ARRL September VHF QSO Party
Sept. 13	North American CW Sprint
Sept. 19–20	Scandinavian CW Activity Contest
Sept. 19–20	South Carolina QSO Party
Sept. 19-20	Washington Salmon Run
Sept. 19–20	QCWA QSO Party
Sept. 20	North American SSB Sprint
Sept. 26–27	**CQ WW RTTY Contest**
Sept. 26–27	Scandinavian SSB Activity Contest
Sept. 26-27	Texas QSO Party
Oct. 24–25	**CQ WW DX SSB Contest**
Nov. 28–29	**CQ WW DX CW Contest**

The clock reads 5:45 AM as I sit in front of my computer contemplating today's publishing CQ deadline, I'm thinking to myself, "Boy, am I tired." Thus, what better topic to discuss in the context of contest operating than lack of sleep?

For those of you who are scientifically inclined (and, other than a bit of experience and common sense, I am certainly not an expert on this particular subject), sleep is defined as the healthy state of reduced inertia and temporary loss of consciousness from which one can easily be aroused. Despite of all of the dedicated research on the subject over the years, there remains no single consensus that describes the function of sleep or its root physiological cause. In reality, the features of sleep are better understood than its functional use for the body.

There are two primary sleep categories: rapid-eye movement (REM) and non-rapid eye movement (NREM). These sleep types alternate during each sleep period, usually in 90- minute intervals beginning with drowsiness and then passing into the NREM and REM phases, respectively. Flaccid muscle groups and loss of reflexes characterize REM sleep periods. It is also the period of sleep in which your brain activity best approximates its wakened state and where the vast majority of dream activity occurs. Our NREM intervals, however, consist of periods of deep and intense sleep where brain activity is at a minimum. Lack of recall is often experienced during this state, particularly when someone is abruptly awoken during this period.

Adults generally require seven or more hours of sleep per night. There are rare instances for some people where only three or four hours suffices (I find it difficult to like these people!). The proper amount tends to be defined by an individual's specific biological needs. In general, the need for sleep is determined by many factors. The time of day is a key contributor as we become trained to sleep at certain times of the day. Of course, lack of sleep favors the need for sleep, as do other elements such as comfort, boredom, and satisfaction. Stress, unusual environments, and excitement all are contributors to a reduced need for sleep.

Sleep Deprivation

An issue for all contest operators is our ability to manage the lack of sleep. Scientists have been studying the effects of sleep deprivation since the late 19th century. In 1935 a subject was deprived of sleep for over 230 hours, resulting in hallucinations and extreme paranoia. Perhaps you can relate to this phenomenon as an occasional "sleep starved" contester. Modern advances in sleep research have shown that it is nearly impossible to totally deprive subjects from sleep for extended periods of time. In reality, the human body will engage in "micro sleeping" episodes that can last as little as a few seconds.

Sleep deprivation studies have shown a specific characteristic that is of great importance to contesters. In addition to the expected fatigue are properties of increased appetite, difficulty in focusing one's eyes, and poor performance/attention span. This lack of attention can often be a critical factor working against maintaining the intensity (and accuracy) level required for a full 48 hours of contest operating. Another common sleep deprivation characteristic I've heard discussed is the occasional time lapses (perhaps 30–60 seconds) that seem to occur on Sunday afternoon during a contest while you are working someone. Have you ever experienced that one? I've always found it amazing to log two or three stations and subsequently have absolutely no recall of the QSOs. A similar example is when you are so tired that you begin to send illogical text to another contest station, such as the rig you are running or the name of your dog, rather than the required signal repost. It's actually quite funny when you think about it.

For those of us who feel like pounding our chests after accomplishing 46+ hours of operating time in a contest weekend, take note of the record for

*2 Mitchell Pond Road, Windham, NH 03087
e-mail: <K1AR@contesting.com>

Update to the CQ WPX RTTY Results

The July issue of *CQ* contains the results for the 2009 February's WPX RTTY contest, for which a record high of 2080 logs were submitted as well as numerous record scores.

The Low Power category had a couple of very close finishes. P40R (N4RR) and D4C (YL2KL) both broke the SOLP world record, with claimed scores less than one QSO apart! The P40R score ultimately prevailed due to Roger's lower error rate.

In North America, another close finish occurred with Ted, HI3TEJ, squeaking by Jose, N1BAA, operating as KS1Y. Jose's lower error rate wasn't quite enough to close the gap, but he blew away the USA SOLP record set by Don, AA5AU, in 2005 by an incredible 64%. Watch out if Jose turns on his amplifier! Ted, HI3TEJ, still holds the North America record set in 2008, just a few percent higher than his and Jose's 2009 results. Unfortunately, this great story was inadvertently omitted from the final write-up. Everyone can take pride in the participation record and all the top scores because it takes all of us to fill up those bulging logs!

sleeplessness as documented by the *Guiness Book of World Records:* Mrs. Maureen Weston of Peterborough, England. Mrs. Weston is reported to have accomplished 449 continuous sleepless hours (18 days, 17 hours) during a rocking-chair marathon in 1977. As far as I can tell, Mrs. Weston is not a ham, but I sure would want her on my multi-operator team if she was, wouldn't you?

Some Sleeping Tips Before the Contest

What follows will transition from scientific reporting to practical experience as a contester. I have always viewed a 48-hour contest as a marathon. And just like marathon runners, the serious contester must prepare both mentally and physically. It's also important to note that the same preparation techniques that follow can apply for significantly scaled-back operating plans. Perhaps the most important area of preparation is before the contest even begins. I usually begin physically preparing for a contest at least one week before it starts. This means I consciously attempt to sleep for longer periods of time. Normal sleep habits for me are 6–7 hours/night, which becomes extended to 7–8 hours/night. Secondly, one to two nights immediately before the contest are set aside as special nights for sleep periods approaching 10–11 hours (i.e., 9:30 PM to 7:30 AM). Although many of us do not necessarily have the flexibility with our jobs and responsibilities of life in general, it is a significant advantage to avoid long work hours and stressful situations during the week leading up to a major contest.

The Friday preceding a contest weekend is the most pivotal day in contest preparation. Many experienced contesters recommend that you take this day as a vacation day from work. There are a variety of other techniques that I've used or heard over the years for "contest eve" which include a multi-hour nap during the afternoon. Others prefer an early Friday morning wakeup time as a means of short-term physical training for the Friday evening run. Despite our best intentions, a stressful Friday culminating with your arriving home and sitting in the operating chair at 2330Z is a sure cure for insomnia on Sunday morning.

Some Sleeping Tips During the Contest

During the contest, operating times often become specific to a person's physiological makeup as much as the result of planning around a recommended strategy. In my case, I easily benefit from short naps (30–45 minutes) and have little trouble waking up and heading for the operating chair in a manner of two or three minutes. Also, for reasons that mystify me, there are many operators, including myself, who set their alarm clocks for a specific time and possess the amazing ability to wake up a few minutes before the alarm sounds!

The relationship between eating and sleeping is another consideration for the contest operator. Imagine the feeling you experience after a large and filling meal. How many of us head directly for the family room couch as we eagerly anticipate an unconscious session in front of the television? Needless to say, this is hardly the physical state we should be experiencing before or during a contest. Small, high-energy meals are the order of the day for contesters lacking sleep.

While there are no hard and fast rules for maximizing your physical potential in contesting, and common sense seems to prevail. Even as I cracked through the 54-year-old physical barrier this summer, and I am still a proponent of 48-hour DX contests (although

the 12-hour IARU Radiosport contest is always a welcomed change!). No matter which side of the fence you sit on with this issue, the 48-hour DX contest lives on for the moment. Its existence requires deliberate and concentrated preparation to be a serious competitor, whether you are trying to win it all or satisfy personal goals.

Conclusions

You have heard me say this about contesting many times, but the subject of sleep also falls into one of my favorite considerations—common sense. If you think about what makes you tired, avoid it before and during a contest. It's not simply when you sleep, but it's also what you eat and drink, where you sleep, and how you balance operating time with rest periods. Unfortunately, the real solution to sleep deprivation is motivation and interest. I can stay up for very long times indeed if I'm busy working lots of stations during a contest. The same cannot be said when the rate is slow and boring (such as is the case at times with our wonderful solar conditions). Thus, if you're not pairing up your station's ability with your sleep needs, you've just lowered your potential in contesting.

Final Comments

Well, I'm tired and better go take a nap.There is a rumor that sunspots are coming back and I want to be prepared for the contest season! In the meantime, see you in the next contest!

73, John, K1AR

For More Information

There are literally hundreds of useful sites on the internet and other available resources that address the subject of sleep and techniques for dealing with sleep deprivation. Here is a small list: <http://en.wikipedia.org/wiki/Sleep_deprivation>; <http://www.sleep-deprivation.com/>; <http://www.sleepfoundation.org/>; <http://www.sleepquest.com/>; and <http://www.sleepnet.com/>.

Lastly, if you're really into the topic, check out this book authored by one of the subject's world authorities: *Sleep Deprivation* by Clete Anthony Kushida. More information can be found at <http://www.amazon.com/s/ref=nb_ss_gw?url=search-alias%3Daps&field-keywords=Sleep+Deprivation+by+Clete+Anthony+Kushida>

SUCH A HAM

I was going to get you a new C.W. key but none of them had a spell check feature. Here's a dictionary. Happy Birthday, Stan.

BY TOMAS HOOD,* NW7US

Speculation

A Quick Look at Current Solar Cycle Conditions

(Data rounded to nearest whole number)

Sunspots
Observed Monthly, June 2009: 3
Twelve-month smoothed, December 2008: 2

10.7 cm Flux
Observed Monthly, June 2009: 69
Twelve-month smoothed, December 2008: 69

***Ap* Index**
Observed Monthly, June 2009: 5
Twelve-month smoothed, December 2008: 5

One Year Ago: A Quick Look at Cycle 23 Conditions

(Data rounded to nearest whole number)

Sunspots
Observed Monthly, June 2008: 3
Twelve-month smoothed, December 2007: 5

10.7 cm Flux
Observed Monthly, June 2008: 66
Twelve-month smoothed, December 2007: 71

***Ap* Index**
Observed Monthly, June 2008: 7
Twelve-month smoothed, December 2007: 8

LAST-MINUTE FORECAST

Day-to-Day Conditions Expected for September 2009

	Expected Signal Quality			
Propagation Index.....	(4)	(3)	(2)	(1)
Above Normal: 1-13, 15-17, 19-30	A	A	B	C
High Normal: 18	A	B	C	C-D
Low Normal: 14	B	C-B	C-D	D-E
Below Normal: N/A	C	C-D	D-E	E
Disturbed: N/A	C-D	D	E	E

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

HOW TO USE THIS FORECAST

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

2. With the *propagation index*, use the above table to find the expected signal quality associated with the path opening for any given day of the month. For example, an opening shown in the Propagation Charts with a *propagation index* of 2 will be good (B) on Sept. 1st through the 13th, fair (C) to poor (D) on the 14th, etc.

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

A year ago in this column, we discussed the speculative talk going around various amateur radio blogs, forums, and in on-air roundtables regarding the current solar cycle activity—or more accurately, "non-activity." The speculation has not subsided too much since then. There is still talk by some of a mini-ice age, and that we're seeing unprecedented quiet on the Sun. In May 2009, the "official" panel of scientists issued yet another prediction regarding solar Cycle 24, calling for a rather low peak of the cycle with the highest smoothed sunspot count not reaching higher than 90.

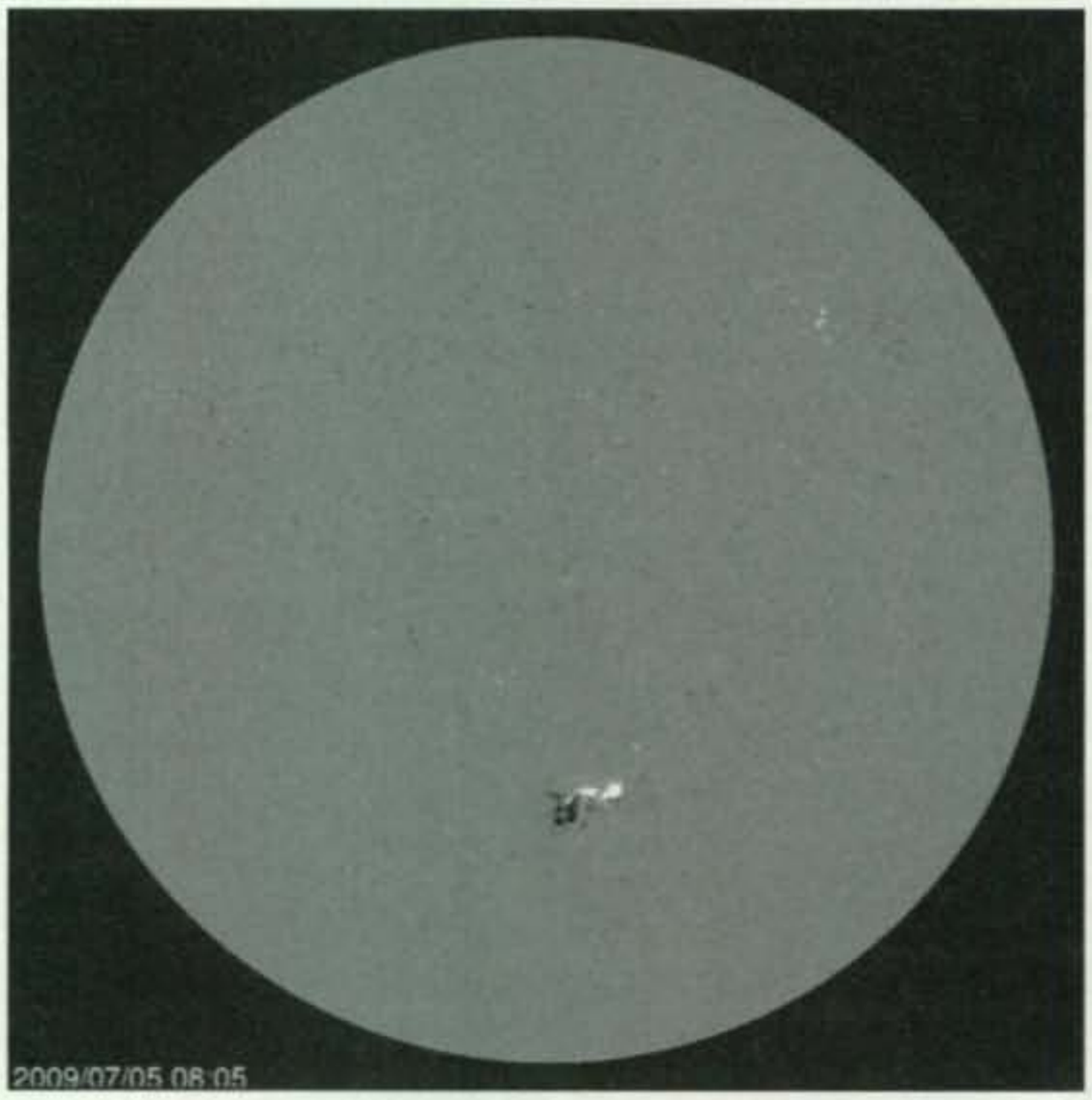
No one can postulate with any credibility just how intense the new cycle will be, because there is no direct correlation between this solar minimum and any regular pattern of past minimums. In 2008 and 2009, the Sun was quieter than any period during the "Space Age" (again, a very short time of reference in relation to the millions of years of solar history). During the last two years, we've seen low sunspot counts, weak solar wind, low solar irradiance, and a period without a significant solar flare.

Despite this seemingly longer-than-normal (what's normal in the context of a Sun that is millions of years old?) solar minimum, we're now seeing evidence that the Sun is waking up. With the slow, yet sure increase in solar activity during recent months as seen with the emergence of more frequent small sunspots (many of which are new cycle spots) and "proto-sunspots," there is hope that the Sun is finally awakening. Tiny but significant increases in solar radio emissions are being observed, as well. Further evidence that the Sun is experiencing an increase in solar cycle activity is the "zonal flows" (enormous currents of plasma on the Sun's surface) that are gaining strength and slowly drifting toward the Sun's equator. All these things are precursors of an awakening solar Cycle 24. The evidence is clear; we are seeing a real start of Cycle 24.

There's more than speculation. There is proof being offered by recent research that reveals a powerful dynamic deep inside the Sun. Scientists from the National Solar Observatory (NSO) in Tucson, Arizona,have discovered that deep inside the Sun a powerful solar jet stream migrates through the star's interior. During this current solar cycle minimum, this solar jet stream moved more slowly than in recent past minimum periods. This appears to be the underlying reason for the long period that lacked sunspots and prolonged the solar minimum.

Drs. Rachel Howe and Frank Hill, both of the NSO, used long-term observations from the NSO's Global Oscillation Network Group (GONG) facility to detect and track an east-to-west jet stream,

*P.O. Box 9, Stevensville, Montana 59870-0009
e-mail: <nw7us@arrl.net>



Sunspot group 1024 released the first C-class flare on July 5, 2009. (Source: Nasa/SOHO)

The very large active region 1024, a solar Cycle 24 sunspot group, seen in this Extreme Infrared Telescope (EIT) view taken on July 5, 2009. (Source: NASA/SOHO)

known as the "torsional oscillation," at depths of about 1000 to 7000 km below the surface of the Sun. The Sun generates new jet streams near its poles every 11 years; the streams migrate slowly, over a period of 17 years, to the equator, and are associated with the production of sunspots once they reach a critical latitude of 22 degrees.

Howe and Hill found that the stream associated with the new solar cycle has moved sluggishly, taking three years to cover a 10-degree range in latitude compared to two years for the last solar cycle, but has now reached the critical latitude. The new result both shows that the Sun's internal magnetic dynamo continues to operate and heralds the beginning of a new cycle of solar activity.

Now that this solar jet stream has reached the "critical" latitude, are we seeing a rise in number of sunspots? Yes, and the period between sunspot emergences is becoming shorter and shorter. For instance, starting on July 3, another new Cycle 24 sunspot emerged, daily growing in size and unleashing numerous flares. In the days following, many flares erupted from this very active group. Once a C-class flare, the largest yet recorded in the new cycle, exploded. By July 6th, it was clear that this sunspot group was influencing radio propagation, as the 10.7-cm flux rose above 70, and subtle changes in various modes of propagation were observed. This sunspot group provided proof that the new cycle is certainly alive and gaining in strength.

As this new cycle gains energy, which is clearly occurring, a rise is interplanetary storms and a resulting increase in geomagnetic activity will trigger a livelier autumnal auroral season this year. With the autumnal equinox occurring on September 22, the chance for auroral activity in the weeks leading up to and weeks after the equinoctial event will be higher than during the last few years.

September HF Propagation

September is a month of radical improvement in radio propagation conditions. On September 22, 2009, the Sun will be directly over the equator. This happens twice a year, in the spring and fall, and is called an "equinox." The fall, or "autumnal," equinox is the day on which the Sun will cross the equator, as it appears to travel from northern to southern skies. On this day, over much of the Earth the hours of daylight are equal to the hours of darkness. Sunrise should take place at approximately 6 AM local time and the Sun should set around 6 PM local time, except at the high latitudes.

This results in an ionosphere of almost similar characteristics over large areas of the world and is usually the best time of the year for long DX openings between the temperate regions of the northern and southern hemispheres on all HF bands. Expect improvement on 20 meters, with more frequent openings from mid-September through mid-October between North America and South America, the South Pacific, South Asia, and southern Africa. The strongest openings will occur for a few hours after sunrise and during the sunset hours.

Long-path openings improve during the equinoctial periods. A variety of paths are opening up on 20 meters. Expect a path to southern Asia around sunset, and daily morning openings to southern Asia and the Middle East, expanding to Africa. Also look for Antarctic short path, and signals from the Indian Ocean region long path over the North Pole. Afternoons will fill with South Pacific long path, and then extend to Russia and Europe. Look for possible long-path openings on 30, 40, and 80 meters for an hour or so before sunrise and just before sunset.

The winter DX season is about to open up, making for exciting DX conditions. While the weather is still warm and fair, tighten hardware on your antenna system, check coax cables, and fine-tune your radio station. Get ready to reap the DX.

The 15-meter band will supply day-path propagation even over the polar paths, although these polar openings

are rare during this lull in solar activity. A considerable improvement is expected for DX propagation on 17 meters, opening shortly after sunrise and remaining open until after sundown. Openings will be best toward Europe and the northeast before noon, and to the rest of the world during the afternoon hours. Openings toward the South Pacific, Australia, New Zealand, and the Far East should be possible well into the early evening. Remember, though, that openings are dependent on the strength of the ionosphere, which in turn is dependent upon an active Sun. During this part of the solar cycle activity is minimal. Openings may be rare and short-lived.

Twenty meters will be the best daytime DX band this month. Look for 20 to open for DX at sunrise and remain open in all directions for a few hours. It should be possible to work into many areas of the world throughout the daylight hours, with a peak in the afternoon. Nighttime conditions will favor openings toward the south and to tropical areas, but some openings will also be possible to other areas, especially during High Normal or better days. Look for polar gray-line propagation into Asia. Long-path is common on 20 to southern Asia, the Middle East, and northeastern Africa as well as the Indian Ocean region via the North Polar path.

Expect an improvement in nighttime DX conditions on 30 through 160 meters during September and October. This is due to the increasing hours of darkness and a seasonal decrease in the static level. Thirty and 40 meters should be best for worldwide DX from sunset to sunrise. Sixty meters should become more reliable for those farther contacts. Working all states on 60 is very possible during this season. Eighty and 160 meters will become hot bands during the hours of darkness, especially for an hour or so before local sunrise.

For short-skip propagation during September and early October, use 60 and 80 meters during the day for openings shorter than 250 miles, and either 80 or 160 at night. For distances between 250 and 750 miles, try 30, 40, and possibly 60 meters during the day and 80 meters at night. For openings between 750 and 1300 miles, 20 meters should work during the day, and 30, 40, and 60 from sundown to midnight, with 60 and 80 from midnight to sunrise. For openings greater than 1300 miles, try 15, 17, or 20 meters during the day, and 30, 40, and even 60 during the hours of darkness. Check 10 and 12 meters for some fairly good openings beyond 1300 miles in the afternoon hours, especially when conditions are High Normal or better, and for paths into South America and the south Pacific.

VHF Conditions

The month of September statistically has the lowest amount of sporadic-*E* propagation activity. Toward the end of September trans-equatorial (TE) propagation will begin to occur between southern North America and northern South America. Openings will generally occur in the late afternoon to early evening.

Troposcatter conditions are generally very good for many of the VHF bands up to 440 MHz during September with the appearance of different weather fronts. This will be the primary mode for working up to 300 miles. A very useful internet resource for viewing Tropospheric conditions is available at William Hepburn's "VHF/UHF Tropospheric Ducting Forecast" site: <http://www.dxinfocentre.com/tropo.html>.

Don't forget to check out *CQ VHF* magazine as well as the VHF column in this issue for a more in-depth look at VHF propagation. However, no matter what, get on the radio and try working the many modes. The more people active on the bands, the more we can unlock the mysteries of VHF propagation.

Current Solar Cycle Progress

The Royal Observatory of Belgium reports that the monthly mean observed sunspot number for June 2009 is 2.6. The lowest daily sunspot value recorded was zero (0) on June 6–20, and 25–30. The highest daily sunspot count was 11 on June 1 and June 2. The 12-month running smoothed sunspot number centered on December 2008 is 1.7. A smoothed sunspot count of 10, give or take 9 points, is expected for September 2009.

The Dominion Radio Astrophysical Observatory at Penticton, BC, Canada, reports a 10.7-cm observed monthly mean solar flux of 68.6 for June 2009. The 12-month smoothed 10.7-cm flux centered on December 2008 is 68.5. The predicted smoothed 10.7-cm solar flux for September 2009 is 70, give or take about 7 points.

The observed monthly mean planetary *A*-index (*Ap*) for June 2009 is 5. The 12-month smoothed *Ap* index centered on December 2008 is 4.9. Expect the overall geomagnetic activity to vary between quiet to active during most days in September.

Would you like to hear a weekly podcast about space weather and radio propagation? Check out <http://podcast.hfradio.org> for the "NW7US Space Weather and Radio Propagation Podcast" produced by this author. Additionally, if you are on Facebook, check out the Radio Propagation and Space Weather Group at <http://tinyurl.com/fb-spacewx>. As usual, I invite you to visit my online propagation resource at <http://propagation.hfradio.org/>, where you can get the latest space data, forecasts, and more, all in an organized manner. If you have a cell phone with internet capabilities, try <http://wap.hfradio.org/>.

Drop me an e-mail or send me a letter, if you have questions or topics you would like to see me explore in this column. Also, I'd love to hear any feedback you might have on what I have written. Until next month . . .

73, de Tomas, NW7US

Results of the 2008 CQ WW DX CW Contest (from page 24)

Number groups after call letters denote following: Band (A = all), Final Score, Number of QSOs, Zones, and Countries. An asterisk (*) before a call indicates low power. Certificate winners are listed in bold. (All country terminology reflects the DXCC list at the time of the contest.)

2008 CW RESULTS
SINGLE OPERATOR
NORTH AMERICA
UNITED STATES

K1LZ	**A**	**6,796,620**	**3922**	**133**	**486**
K5ZD/1	**"**	**6,666,975**	**3955**	**132**	**463**
K1DG	**"**	**5,751,568**	**3682**	**115**	**453**
WC1M	*	1,908,000	1616	101	323
W6PH/1	*	1,405,800	1247	123	303
W1WEF	*	1,307,982	1202	97	312
K1ZZ	*	1,254,336	1064	104	313
W1ECT	*	1,190,660	1166	80	290
W1ZT	*	1,005,585	872	95	332
K1KP	*	610,632	918	66	198
W1HIS	*	476,125	606	78	247
W1FM	*	274,649	425	70	199
AE1T	*	264,984	407	61	183
W1ZK	*	197,296	309	66	170
W1YRC	*	129,825	239	59	166
K1SEZ	*	99,280	239	39	131
K1ZE	*	95,178	203	46	128
W2QQ/1	*	89,835	224	39	120
KA1VMG	*	51,714	164	49	104
K1IR	*	46,565	244	12	55
W1OHM	*	33,858	131	34	80
W1BYH	*	23,125	94	39	86
K1SND	*	7,840	64	19	51
KQ2M/1	**14**	**965,125**	**2025**	**37**	**138**
K1RU	**"**	**720,800**	**1617**	**34**	**126**
NN1N	*	481,270	1021	35	135
K8PO/1	**7**	**558,600**	**1443**	**32**	**115**
W1XX	*	300,729	790	30	113
K1IM	*	110,684	381	28	106
KT1V	**3.5**	**423,654**	**1163**	**28**	**103**
W1MK	*	417,625	1247	27	98
***K1BX**	**A**	**2,301,420**	**1702**	**113**	**371**
***N1UR**	**"**	**2,274,316**	**1785**	**111**	**373**
***KS1J**	**"**	**1,266,027**	**1174**	**87**	**312**
*W1JQ	*	878,598	829	88	311
*N1IX	*	685,260	851	72	252
*K1IB	*	672,252	823	74	228
*KB1T	*	659,880	707	87	273
*K1HT	*	653,760	733	78	242
*W1AO	*	640,640	689	86	266
*K1BV	*	435,244	665	55	178
*W1EQ	*	348,192	513	62	186
*K1HI	*	252,250	414	66	184
*W2JU/1	*	216,000	332	64	186
*NJ1T	*	202,230	395	49	165
*W1CCE	*	180,930	319	55	167
*W1FA	*	108,962	245	50	131
*K1VSJ	*	100,962	230	40	118
*N1PGA	*	77,792	210	49	127
*KX1E	*	35,619	140	26	67
*K1HTJ	*	33,756	119	38	78
*K1PU	*	29,403	135	30	69
*NA1R	*	25,944	115	31	63
*N1NN	*	25,000	162	30	70
*AA1M	*	15,440	75	25	55
*N1LU	*	15,345	91	38	61
*AA1O	*	14,550	84	23	52
*W1DAD	*	13,494	72	25	53
*K1KNJ	*	13,440	89	21	63
*N1DS	*	9,198	66	22	41
*KR4OW/1	*	7,569	71	31	56
*K1YM	*	6,432	85	14	34
*K3EIN/1	*	420	27	8	12
***W1MU**	**14**	**482,980**	**1029**	**35**	**129**
*K1SM	*	10,100	82	13	37
*N4QX/1	*	180	11	6	6
***K1MM**	**7**	**52,316**	**191**	**25**	**91**
***W1NK**	**3.5**	**12,160**	**75**	**17**	**47**
N2LT	**A**	**3,655,708**	**2428**	**126**	**422**
W2RU	**"**	**2,320,928**	**1883**	**108**	**356**
K2NV	**"**	**1,695,479**	**1232**	**114**	**395**
N2GC	*	1,363,284	1061	108	360
K2Z	*	1,031,974	1297	70	228
			(OP: KD2RD)		
NX2X	*	844,905	795	88	307
W2TB	*	773,721	763	92	297
K2FU	*	710,400	679	92	292
AB3CX/2	*	690,345	723	73	272
K2XF	*	415,976	499	72	247
KW2J	*	334,521	444	76	203
W2GDJ	*	272,160	386	74	206
WA2ETU	*	256,690	426	65	201
N2YB	*	255,470	452	76	219
KE2WY	*	251,940	395	69	186
WS9M/2	*	203,867	396	60	179
K2MK	*	200,277	368	60	171
NP3D/W2	*	102,144	224	60	164
			(OP: EW1AR)		
W2FUI	*	101,600	215	45	124
KI2P	*	69,136	181	45	104
W2PA	*	59,909	151	36	103
W2FB	*	50,370	158	27	88
W2UDT	*	45,280	167	54	106
N2VM	*	40,194	137	40	86
N2CK	*	23,328	104	23	58
W2YJ	*	12,441	70	34	53
N2BA	**14**	**623,149**	**1364**	**33**	**130**
WW2DX	**"**	**460,183**	**1352**	**29**	**108**
N2MF	**7**	**620,740**	**1408**	**35**	**129**
W2XL	*	233,248	601	34	114
NT2A	*	128,478	377	30	117
KD2I	*	96,879	319	27	102
AI2N	**3.5**	**92,288**	**308**	**23**	**89**
***K2PS**	**A**	**1,074,827**	**1057**	**87**	**290**
***W2TZ**	**"**	**527,040**	**690**	**73**	**232**
*K2UF	*	433,734	532	81	241
*K1TN/2	*	263,925	412	59	196
*KD2MX	*	209,070	375	63	167
*WA2YSJ	*	168,276	286	58	164
*W2CVW	*	155,996	253	62	174
*K2ZC	*	124,662	301	33	125
*KC2TA	*	106,875	280	49	122
*WA2MCR	*	56,457	161	47	106
*N2LK	*	47,684	146	40	91
*W2XS	*	30,912	108	33	79
*K2RNY	*	17,302	92	26	56
*K2RET	*	7,480	60	13	31
*KR2D	*	6,771	42	23	38
*WA2JQK	*	5,544	267	57	174
*K2IZ	*	4,420	51	25	43
*WB2RIS	*	3,600	40	17	28
*K2HPV	*	2,946	36	19	32
*N3SY/2	*	1,760	26	19	25
*W2ARP	*	24	6	6	6
*W3EH/2	21	1,100	20	8	17
***K2MFY**	**14**	**165,710**	**420**	**28**	**118**
***KR2AA**	**"**	**149,172**	**464**	**23**	**101**
***W2AW**	**"**	**127,292**	**397**	**24**	**97**
***W2EG**	**7**	**96,801**	**296**	**28**	**95**
***NA2AA**	**"**	**51,600**	**149**	**27**	**102**
***W2LHL**	**"**	**28,160**	**143**	**22**	**66**
*W1TY/2	*	14,190	72	23	63
*WA2RY	*	4,838	59	10	31
***W2LC**	**1.8**	**17,094**	**120**	**16**	**50**
K3CR	**A**	**5,697,146**	**3403**	**133**	**465**
			(OP: LZ4AX)		
AA1K/3	**"**	**3,121,986**	**2226**	**122**	**396**
K3ZO	**"**	**2,729,524**	**1963**	**112**	**385**
N1WR/3	*	1,497,145	1344	100	303
N3UM	*	1,027,971	1176	80	253
K3TC	*	880,630	868	100	315
N3RJ	*	396,576	572	79	227
W3RJ	*	352,024	430	87	229
W3ZGD	*	186,582	300	70	172
KA1DWX/3	*	175,951	294	71	180
WY3A	*	102,837	214	51	126
N3RW	*	92,685	242	50	135
W3FVT	*	68,747	215	44	117
K4JLD/3	*	60,554	181	33	104
K3MRG	*	53,108	179	44	98
N3NZ	*	47,121	201	30	83
W3SQ	*	34,071	175	33	90
KB3P	*	27,528	98	31	80
K3ISH	*	11,600	89	25	55
K3YG	*	9,017	54	20	51
K3RM8	*	1,080	19	12	15
NY3A	**21**	**128,744**	**439**	**25**	**96**
K3NK	**14**	**257,920**	**744**	**25**	**103**
N3RR	**7**	**188,646**	**568**	**30**	**108**
K3SV	*	90,280	273	25	97
AD8J/3	*	9,720	74	13	41
K3RWN	*	4,512	53	14	34
W3NO	**3.5**	**169,344**	**428**	**33**	**111**
K3TM	*	72,660	268	24	81
W3GH	**1.8**	**24,244**	**134**	**15**	**61**
***W3EF**	**A**	**1,200,165**	**1082**	**103**	**342**
***K3AU**	**"**	**796,023**	**869**	**85**	**282**
			(OP: K2YWE)		
*NS3T	*	440,370	582	80	235
*W3IUU	*	364,515	492	77	208
*W3CQB	*	211,181	388	51	172
*WF3M	*	208,505	359	52	171
*NG3K	*	101,278	244	42	116
*WB8YYY/3	*	97,290	257	58	149
*N2US/3	*	93,969	218	37	122
*W3EQ	*	79,866	195	42	111
*ND3R	*	76,287	183	55	122
*WA1LWS/3	*	64,719	171	49	104
*N1SZ/3	*	37,672	106	41	95
*N3QE	*	23,184	112	30	62
*WA2VQV/3	*	13,317	74	19	50
*W3RT	*	11,124	101	33	70
*N3ME	*	432	22	7	17
*N3WZR	*	308	19	11	17
*N3JNX	*	39	7	6	7
*W3DF	21	5,474	52	14	32
***K3GW**	**14**	**91,214**	**308**	**24**	**94**
*K1EFI/3	*	70,702	242	19	87
*W3OD	*	10,780	67	19	51
***K3TW**	**7**	**63,765**	**257**	**24**	**85**
NN4TO	**A**	**5,366,740**	**3650**	**127**	**424**
			(OP: K1TO)		
K3ZM/4	**"**	**3,808,512**	**2709**	**122**	**400**
N4TB	**"**	**2,295,780**	**1809**	**119**	**379**
K4AB	*	1,590,280	1301	114	365
N6AR/4	*	1,541,736	1292	111	345
K4SSU	*	1,185,926	1140	105	301
			(OP: NA4BW)		
K1GU/4	*	1,036,924	939	100	306
W4QM	*	937,626	840	102	324
W4RX	*	931,383	879	106	327
K4LTA	*	859,177	935	104	303
K4PV	*	783,360	1159	90	230
W3BP/4	*	759,773	894	66	245
W2YE/4	*	628,728	582	103	305
WX4G	*	606,616	628	102	295
N4MM	*	492,315	511	87	258
KØZR/4	*	476,338	630	72	242
K4FX	*	468,438	628	88	215
N3CZ/4	*	461,300	558	92	258
KE1F/4	*	416,691	626	73	224
N4UU	*	377,748	757	68	184
NE4M	*	342,926	482	74	203
N4RA	*	342,770	450	83	219
W4YA	*	280,042	444	62	179
K7CS/4	*	271,082	458	58	180
AA4CF	*	267,045	406	76	209
W2OO/4	*	183,816	335	59	157
N4AAI	*	147,664	357	49	127
AD4IE	*	136,704	314	45	147
WX4TM	*	110,696	300	79	123
W4AEJ	*	101,637	184	60	147
AF4OX	*	86,584	246	35	102
AA3VA/4	*	70,004	209	41	107
AI4WW	*	68,120	201	34	96
KI4TZ	*	46,569	133	43	86
W4JAM	*	40,365	124	40	95
KY4P	*	37,720	140	34	81
NE8J/4	*	25,370	115	26	60
K4ADR	*	16,524	90	37	71
K4DZR	*	15,554	107	28	49
K4GM	*	14,664	75	24	54
NJ2F/4	*	10,730	58	29	45
K9IL/4	*	5,029	58	17	30
W4OJC	*	3,456	47	20	34
W4ATL	*	680	15	5	15
AE4EC	*	88	17	7	15
K4FJ	**21**	**96,990**	**332**	**27**	**95**
W4SO	**14**	**206,016**	**625**	**32**	**116**
K4AMC	*	131,824	429	24	88
NK3U/4	*	92,960	305	24	88
K4RDU	*	68,779	228	23	86
K9OM/4	**7**	**434,304**	**1185**	**35**	**121**
N4UA	*	112,068	304	31	101
W3TMZ/4	*	32,940	124	27	95
K1ZZI/4	**3.5**	**303,537**	**1031**	**29**	**100**
NA4CW	*	57,879	201	23	86
K4PI	**1.8**	**71,346**	**308**	**20**	**74**
W4ZV	*	62,600	292	21	79
***W3AU/4**	**A**	**986,164**	**905**	**95**	**309**
			(OP: K4GKD)		
***WJ9B/4**	**"**	**906,476**	**1099**	**85**	**249**
***N4YDU**	**"**	**879,255**	**991**	**99**	**306**
*WK2G/4	*	861,714	1186	73	221
*NJ4M	*	814,200	874	88	266
			(OP: WD4AHZ)		
*WA4DOU	*	708,327	714	86	287
*NA4K	*	665,496	707	86	265
*W4YE	*	528,751	641	78	245
*K4IE	*	456,621	598	81	222
*K4MF	*	401,580	516	71	220
*N4IG	*	287,039	460	61	178
*KI3O/4	*	237,056	360	67	189
*NB4M	*	205,226	484	75	199
*AB4GG	*	198,936	351	59	157
*W4RYW	*	177,384	329	56	172
*K4PG	*	165,640	353	57	145
*N4HXI	*	128,952	263	60	139
*N4AU	*	112,200	249	58	129
*WA3GNW/4	*	109,098	246	47	124
*N2AN/4	*	103,455	237	45	126
			(OP: WC4E)		
*N4WO	*	102,090	249	45	121
*W4RQ	*	97,536	210	54	138
*W3WL/4	*	76,670	214	51	119
*AA4FU	*	75,198	178	50	116
*N4LF	*	67,860	186	41	104
*W4ZYT	*	50,850	162	46	104
*K3MZ/4	*	47,250	139	43	92
*KN4Y	*	46,698	219	53	128
*N5IE/4	*	44,250	147	32	86
*N4UFP	*	43,766	172	50	108
*K1SA/4	*	39,644	140	32	74
*WD4SIG	*	39,165	162	34	71
*WF4W	*	38,864	131	27	85
*W3TB/4	*	38,624	127	44	92
*K4OD	*	35,926	136	44	98
*WB5NMZ/4	*	34,194	143	46	93
*KE4UNA	*	33,695	169	39	76
*N4JH	*	32,750	131	37	94
*KE4KY	*	31,920	107	36	78
*KT4PD	*	29,160	104	33	75
*K4BX	*	28,884	102	42	74
*W4EBA	*	24,960	115	33	71
*KI4QLN	*	24,304	90	41	71
*K6ETM/4	*	24,288	111	23	69
*NN4DF	*	23,712	119	35	69
*K4FTO	*	21,935	131	35	72
*NA4C	*	21,200	103	36	70
*NN4RH	*	20,564	83	33	64
*WA8OJR/4	*	17,139	77	30	57
*NU4I	*	14,940	93	29	54
*NQ4K	*	13,334	94	17	42
*N5VI/4	*	11,570	70	18	47
*N3UA/4	*	11,360	52	31	49
*KI4EZC	*	11,340	72	24	46
*W4ZPR	*	11,122	66	24	43
*N4MJ	*	10,648	67	33	55
*WA4FXX	*	9,472	66	18	46
*K2EUH/4	*	8,588	113	21	55
*KE4OAR	*	6,270	44	22	35
*KB4ZMR	*	6,174	54	22	41
*AB4SF	*	4,752	105	39	60
*AC4PQ	*	4,592	48	19	37
*K4LNN	*	4,565	51	20	35
*N4ARO	*	3,060	25	20	25
*K4LW	*	2,916	31	16	20
*KJ4WD	*	2,414	79	25	46
*K4RW	*	1,599	31	14	27
*WA4OSD	*	988	16	11	15
*K2VX/4	*	468	12	8	10
*WF7T/4	*	414	15	9	9
*W4NX	*	360	15	9	9
			(OP: W4BCG)		
*KJ4AOM	*	325	59	26	39
*K4DXV	*	221	7	6	7
***K4WI**	**28**	**2,784**	**44**	**9**	**15**
***WB4TDH**	**21**	**39,432**	**159**	**26**	**67**
*N4PQX	*	12,804	78	20	46
***WA1FCN/4**	**14**	**218,241**	**638**	**29**	**108**
*WA2ASQ/4	*	37,976	142	23	71
*K4NVJ	*	35,524	136	28	79
*W8KHP/4	*	5,586	49	16	33
*W4OGG	*	1,742	28	12	14
***K5RQ/4**	**7**	**132,600**	**425**	**31**	**99**
*K4MWB	*	62,941	230	26	87
*N3GD/4	*	20,698	161	21	58
*W2OR/4	*	9,880	74	14	51
***N2WN/4**	**1.8**	**7,392**	**92**	**14**	**34**
*NA4W	*	3,204	44	11	25
			(OP: K4WI)		
N2IC/5	**A**	**4,371,558**	**2713**	**149**	**440**
K5GO	**"**	**3,801,060**	**2661**	**138**	**402**
			(OP: N5DX)		
WXØB/5	**"**	**2,808,162**	**2156**	**130**	**383**
			(OP: AD5Q)		
KZ5D	*	1,071,322	1133	107	306
W5KFT	*	880,715	1181	105	230
			(OP: N1XS)		
N5AU	*	741,993	710	104	293
N5PO	*	460,152	581	84	224
N5CW	*	219,198	405	71	167
K7IA/5	*	189,091	379	70	157
NJØIP/5	*	157,300	295	71	171
K5KA	*	137,852	240	80	161
K5BG	*	131,937	241	63	136
WØZW/5	*	121,716	243	63	133
KD5JAA	*	98,280	248	62	106
N7FF/5	*	61,899	204	46	95
N5VU	*	49,096	180	49	103
N5DY	*	18,942	88	19	58
N7KA/5	*	17,908	130	47	86
W5KI	*	11,937	67	27	42
AA5VU	*	1,672	29	19	25
NI5F	21	7,896	68	17	39
W6PU/5	**7**	**226,192**	**592**	**32**	**100**
W5WMU	**3.5**	**54,353**	**203**	**25**	**88**
N5NU	*	32,980	158	24	73
W5FO	*	28,512	158	22	66
K5TA	*	22,253	115	23	54
K5NTT	*	19,270	107	22	60
K5RX	**1.8**	**8,925**	**71**	**12**	**39**
***N5AW**	**A**	**1,754,984**	**1307**	**134**	**384**
***K5KLA**	**"**	**701,337**	**704**	**94**	**273**
*WD5K	*	617,376	664	90	264
*N5DO	*	616,334	668	92	257
*W5GAI	*	333,940	505	79	204
*WA5SOG	*	302,302	443	79	207
*W5RYA	*	133,400	277	66	134
*KØGEO/5	*	103,761	236	54	129
*KF8GE/5	*	94,866	262	63	131
*K5NX	*	64,800	203	36	108
*K5JX	*	41,035	152	51	94
*K5IZO	*	16,472	104	44	72
*AA5JG	*	11,900	72	29	41
*K5BZH	*	3,913	50	20	23
*AD5VC	*	2,555	52	14	21
*KE5QDA	*	165	17	8	7
*N5ESA	*	120	9	7	8
***N4IJ/5**	**14**	**206,769**	**508**	**33**	**124**
*NØRB/5	*	8,448	87	21	45
***N5ER**	**7**	**32,121**	**150**	**20**	**63**
*WD5BJT	1.8	132	13	6	6
W6YI	**A**	**3,387,396**	**2507**	**143**	**394**
				(OP: N6MJ)	
K6XX	**"**	**2,177,980**	**1726**	**129**	**341**
N6TV	**"**	**2,120,760**	**1943**	**119**	**292**
W6RJ	*	1,846,992	1505	144	339
				(OP: N6TJ)	
K6NA	*	1,786,176	1496	129	319
W6YX	*	1,735,079	1604	117	302
				(OP: N7MH)	
W6UM	*	667,440	618	113	292
WØYK/6	*	490,399	862	90	131
WC6H	*	317,772	568	86	148
K6LRN	*	282,700	424	83	174
WA5VGI/6	*	267,540	372	94	179
K6YK	*	252,150	404	79	167
KF6T	*	197,286	314	85	166
AJ6V	*	180,266	405	69	104
N6IE	*	167,222	396	85	157
KI6T	*	120,270	250	73	138
N6XI	*	87,720	267	50	70
N6RZ	*	59,625	162	64	95
W6AYC	*	59,274	219	42	69
W6SX	*	59,236	189	49	69
K6CTA	*	38,564	151	42	82
K9JM/6	*	33,976	101	52	72
K6DGW	*	33,790	151	44	65
NK6A	*	31,410	133	34	56
W1RH/6	*	24,816	101	36	58
WW6D	*	13,690	68	32	42
KG6ZHC	*	9,275	68	25	28
W6ISO	*	2,278	25	15	19
AE6RF	*	1,176	22	12	12
W6YA	**21**	**57,340**	**242**	**28**	**66**
W4UAT/6	**14**	**125,477**	**410**	**29**	**92**
W6MVW	*	9,472	62	23	41
N6AW	**7**	**134,832**	**300**	**38**	**121**
W6OUL	*	3,774	38	14	23
***N6RV**	**A**	**289,280**	**489**	**86**	**170**
***KM6Z**	**"**	**224,660**	**403**	**83**	**152**
*N6YEU	*	143,824	300	55	123
*N6MU	*	132,927	287	63	114
*AA6EE	*	80,997	252	50	83
*K6AAB	*	78,374	209	63	86
*KD4HXT/6	*	78,030	254	60	93
*KQ6X	*	50,435	210	53	78
*N6NF	*	42,364	146	54	65
*K6LE	*	33,945	144	37	56
*N6MUF	*	29,757	146	39	52
*WA6KHK	*	28,579	178	51	81
*AF6EV	*	28,035	123	39	50
*KN6Y	*	26,760	151	52	68
*W6RFF	*	25,351	109	42	59
*K6WSC	*	22,560	110	44	50
*N6CMF	*	22,176	92	44	55
*WA6BOB	*	14,274	89	38	40
*K6CU	*	11,094	56	38	48
*N6QZS	*	7,440	70	20	20
*NA6G	*	2,272	42	17	15
*KI6NGN	*	1,740	51	15	14
***NT6K**	**1.8**	**2,530**	**59**	**12**	**11**
K7RL	**A**	**2,224,200**	**1946**	**130**	**310**
K7GK	**"**	**1,942,605**	**1697**	**132**	**309**
KO7AA	**"**	**1,885,505**	**1667**	**129**	**310**
N7TT	*	1,168,860	1343	110	253
K7WP	*	855,776	950	110	266
K7AR	*	769,230	794	114	271
KC7V	*	718,620	790	116	238
K7ZZ	*	676,350	1017	95	175
N7RO	*	640,233	782	101	218
K7ZA	*	550,620	634	105	240
K7HP	**"**	**456,909**	**610**	**94**	**195**
K7GQ	*	341,541	484	80	197
NW7E	*	330,000	418	99	201
W6AEA/7	*	265,680	437	85	155
KO7X	*	254,014	404	72	169
KN7T	*	187,771	430	65	114
N6TW/7	*	164,138	302	87	127
W9PL/7	*	115,064	278	55	97
KS7T	*	115,050	251	61	116
N5LZ/7	*	84,024	291	39	69
NI7R	*	72,009	216	44	83
W7YS	*	67,452	194	48	98
K7OX	*	62,745	191	54	87
K7DD	*	31,860	116	49	86
W7UG	*	31,411	244	35	66
NE9Z/7	*	30,885	116	54	91
W7IIT	*	29,880	120	34	56
KT7G	*	27,260	116	39	55
N6KW/7	*	25,000	96	39	61
N7RVD	*	17,784	99	30	42
KN7K	*	15,675	81	33	42
NW7DX	*	15,114	158	15	18
N7TL	*	3,168	45	23	25
WA7LT	**21**	**23,324**	**146**	**24**	**44**
W7RN	**14**	**352,944**	**889**	**35**	**117**
				(OP: K6KR)	
N7XY	*	1,020	21	8	9
W7WA	**7**	**496,557**	**1135**	**34**	**125**
K7ZS	*	110,580	443	31	83
W7AT	**3.5**	**101,520**	**400**	**30**	**78**
				(OP: W7EW)	
W8AEF/7	*	47,277	196	27	76
N7UA	**1.8**	**139,411**	**557**	**30**	**79**
K7BG	**"**	**41,840**	**280**	**23**	**57**
N6TR/7	**"**	**40,581**	**317**	**24**	**57**
W3AS/7	*	70	4	4	3
***KG7H**	**A**	**288,864**	**454**	**88**	**184**
***K7JE**	**"**	**283,514**	**435**	**79**	**184**
***N7ZG**	**"**	**276,208**	**452**	**89**	**155**
*K7ACZ	*	236,052	364	80	169
*NØAX/7	*	231,084	400	73	179
*NE7D	*	150,993	343	70	101
*K7GS	*	149,450	327	62	113
*W7RV	*	133,032	291	69	115
*W7TMT	*	130,032	297	71	101
*W3CP/7	*	102,087	236	65	106
*W7QN	*	85,973	237	63	86
*KI7Y	*	79,946	217	56	86
*N7EPD	*	57,596	182	53	68
*WAØWWW/7	*	50,046	179	50	64
*W7VXS	*	45,548	184	44	74
*K6UM/7	*	38,800	149	38	62
*WA7LNW	*	38,070	124	51	84
*W7CF	*	34,848	235	55	66
*N7EIE	*	33,798	149	37	49
*W7YAQ	*	31,860	98	56	79
*W4LSC/7	*	25,764	103	45	69
*K7ARJ	*	25,228	138	46	60
*W9CF/7	*	21,460	110	32	42
*K6CSL/7	*	18,779	119	42	47
*K7TR	*	17,576	111	45	59
*N7VS	*	17,424	112	33	39
*N7BAN	*	15,120	82	32	40
*K7XV	*	13,350	66	31	44
*K7SEX	*	9,782	81	31	36
*KE7DX	*	9,548	73	29	33
*N7QS	*	6,435	57	25	30
*W7GT	*	4,224	51	17	15
*WA7BME	*	3,510	40	17	22
*K7OVG	*	2,145	78	21	18
*N7WI	*	1,760	29	16	16
*K7BIY	*	463	14	12	7
***K9WZB/7**	**21**	**14,912**	**104**	**21**	**43**
*K7EIQ	*	18	3	1	1
***N7WA**	**14**	**117,317**	**437**	**27**	**76**
*KC7UP

*W9UM	*	20,223	93	39	68
*W9WE	*	14,746	152	38	63
*ND9E	*	14,448	73	34	52
*K9IJ	*	13,432	68	30	62
*WR9Y	*	11,315	68	27	46
*KB9YGD	*	4,233	42	23	28
*W9EEU	*	3,321	31	17	24
*N9LYE	*	1,363	19	14	15
*K9AIH	*	432	16	9	15
*WQ9T	*	140	5	5	5
***W9ILY**	**14**	**90,506**	**283**	**25**	**93**
*N9GBB	*	1,056	21	10	12
*N9WK	*	420	10	6	9
***N9XR**	**7**	**2,380**	**37**	**14**	**20**
***K9CS**	**3.5**	**47,334**	**188**	**24**	**74**
*KØPJ/9	*	23,870	126	17	60
*WO9S	1.8	1,806	51	7	14
KØSR	**A**	**1,596,624**	**1348**	**114**	**350**
KØOU	**"**	**990,760**	**1029**	**93**	**283**
WY7I/Ø	**"**	**954,100**	**1078**	**99**	**251**
KØFX	*	764,720	807	109	286
KØDEQ	*	647,460	739	90	237
K6XT/Ø	*	541,968	650	110	226
KEØUI	*	415,800	549	93	222
ABØRX	*	365,403	398	90	259
KØJPL	*	344,250	430	84	222
WØETT	*	338,550	481	92	213
KØRI	*	246,984	377	68	183
WØBH	*	205,606	402	68	155
KØJJR	*	161,006	293	66	157
WØHBH	*	154,872	293	62	154
WBØN	*	96,048	218	50	124
WØML	*	75,660	208	48	108
NØRN	*	59,780	173	42	98
WØZQ	*	34,272	132	30	66
NIØC	*	24,408	82	40	73
KØYR	*	12,060	77	19	41
KØHB	*	9,380	58	23	44
KSØT	*	8,192	50	22	42
WØTY	*	7,854	95	24	42
NØXM	*	4,836	45	25	37
KAØLL	*	4,743	43	20	31
KØFG	*	4,386	43	16	35
NAØBR	*	3,825	47	19	32
KØAV	**7**	**206,928**	**575**	**34**	**110**
KØCL	*	129,336	394	34	102
KØPK	*	79,492	278	30	89
NØKQ	*	8,379	89	18	31
NEØU	*	6,800	64	16	34
***KØOD**	**A**	**355,572**	**478**	**79**	**227**
***NØKK**	**"**	**336,729**	**429**	**92**	**229**
*KØAP	*	249,854	368	84	193
*WKØP	*	176,513	350	59	140
*NN7A/Ø	*	121,730	257	68	117
*KNØV	*	118,440	244	55	133
*KØALT	*	93,272	225	65	113
*KIØJ	*	82,203	207	58	101
*NØUY	*	64,980	195	62	109
*NGØT	*	50,694	156	32	87
*N1WQ/Ø	*	31,578	206	43	71
*WUØL	*	25,515	113	39	66
*KØLDS	*	24,824	116	44	63
*ACØW	*	22,816	110	51	73
*WØPC	*	21,483	98	41	58
*WAØBNX	*	16,016	129	31	57
*ACØE	*	14,190	77	30	56
*NO2D/Ø	*	9,324	57	27	36
*KØLWV	*	6,528	40	31	33
*WØAD	*	6,468	51	15	34
*WØRU	*	6,237	59	28	35
*KØHW	*	6,111	50	28	35
*KØWHV	*	3,416	33	24	32
*WØIS	*	2,660	30	15	20
*K2HT/Ø	*	2,552	42	22	36
***KSØM**	**14**	**20,046**	**138**	**21**	**57**
*NØGOS	*	2,834	48	12	14
*KFØIQ	*	1,768	28	11	15
*KCØEEP	*	3	1	1	1
***WØNV**	**7**	**25,886**	**124**	**24**	**62**
*KCØVKN	*	20,572	118	22	52
*N9HDE/Ø	*	468	13	7	11

Alaska

AL1G	**A**	**39,066**	**557**	**18**	**16**
KL8DX	**14**	**218,025**	**1205**	**28**	**57**
NL7G	**3.5**	**127,506**	**739**	**27**	**52**
*KL1JP	A	7,560	109	18	17
*KL1R	14	10,080	198	12	12
*AL3H	*	35	3	3	2

Antigua & Barbuda

***V26K**	**A**	**6,837,842**	**5392**	**118**	**399**
			(OP: AA3B)		

Bahamas

***C6AKX**	**14**	**876,561**	**2594**	**32**	**115**
			(OP: KE7X)		
***C6AQQ**	**7**	**449,150**	**1586**	**29**	**101**
***C6ATA**	**3.5**	**549,669**	**1794**	**26**	**103**
			(OP: K2KW)		

Barbados

8P5A	**A**	**8,856,694**	**6574**	**136**	**442**
			(OP: W2SC)		

Belize

V31WA	**A**	**8,387,400**	**6107**	**140**	**460**
			(OP: UT5UGR)		

Bermuda

***VP9I**	**14**	**641,792**	**2189**	**26**	**102**
			(OP: OH1VR)		

Canada

VY2ZM	**A**	**7,128,970**	**4632**	**129**	**461**
			(OP: K1ZM)		
VY2TT	**"**	**6,722,703**	**5217**	**107**	**430**
			(OP: K6LA)		
VA1MM	*	944,460	1379	78	240
VE1AI	*	553,891	741	68	243
VE1DT	**7**	**291,480**	**843**	**27**	**113**
VO1HE	*	111,104	337	27	101
VO1TA	**3.5**	**90,720**	**462**	**14**	**70**
VE1JS	*	527	11	7	10
VO1HP	**1.8**	**7,238**	**75**	**12**	**35**
***VE1NB**	**A**	**1,244,727**	**1410**	**82**	**281**
***VE1RGB**	**"**	**1,003,184**	**1151**	**81**	**283**
*VY2SS	*	438,058	962	54	160
*VE1MC	*	347,004	613	58	185
*VE1QY	*	5,076	42	21	33
*VY2LI	*	638	26	11	11
*VE1GW	14	11,908	95	14	38
VE2TZT	**A**	**393,084**	**1037**	**59**	**120**
VE2FK	*	146,412	362	45	121
VE2SB	*	107,387	298	50	111
***VE2XAA/2**	**A**	**2,988,643**	**3162**	**102**	**335**
*VA2SG	*	465,348	955	56	172
*CK2AWR	*	232,024	503	46	148
			(OP: VE2AWR)		
*VE2JCW	*	175,142	484	57	152
*VE2AXO	*	144,872	380	46	136
*VE2EZD	*	47,334	221	29	69
*VE2QY	*	22,407	178	28	49
*VE2LX	*	19,530	154	30	60
*VE2FFE	*	3,977	42	17	24
*VE2GHI	*	1,125	124	25	50
***VE2HLS**	**14**	**14,136**	**103**	**14**	**43**
CK3AT	**A**	**4,777,698**	**3829**	**119**	**415**
			(OP: VE3AT)		
VE3JM	**"**	**3,984,564**	**3698**	**107**	**339**
VE3TA	*	2,165,428	2341	103	285
VE3KZ	*	1,470,480	1414	102	338
VE3KF	*	1,066,752	1275	89	295
VE3YAA	*	657,536	738	78	274
			(OP: VE3DQ)		
VA3EC	*	389,088	550	70	218
VE3EBN	*	13,140	92	27	46
VE3FU	**14**	**429,769**	**1222**	**28**	**109**
VE3ZI	**1.8**	**116,840**	**589**	**22**	**70**
VE3PN	*	57,687	438	15	52
CK3CUI	*	8,160	229	8	12
			(OP: VE3CUI)		
***VE3XB**	**A**	**1,638,472**	**1660**	**107**	**326**
***VE3FDT**	**"**	**450,846**	**673**	**85**	**212**
*VE3EK	*	359,919	575	65	196
*VE3GSI	*	284,067	504	58	185
*VA3PL	*	266,952	490	56	171
*VA3ATT	*	180,170	403	57	158
*VE3TW	*	149,694	358	52	131
*VE3KAO	*	116,403	309	47	114
*VE3GLO	*	98,943	246	53	124
*VE3OM	*	73,776	195	39	120
*VE3FH	*	55,300	185	47	93
*VE3RER	*	50,264	199	38	84
*VE3RCN	*	30,640	180	30	50
*VE3NCQ	*	9,152	81	27	37
*VA3HUN	*	5,456	62	15	29
*VE3VO	*	5,029	53	22	25
*VA3RJ	21	3,724	45	11	27
***VE3XD**	**14**	**300,384**	**884**	**29**	**115**
*VE3/W4TAA	*	297,621	880	29	122
*VE3FJ	*	91,770	307	23	92
***VE3IAE**	**7**	**65,936**	**279**	**23**	**81**
***VE3OSZ**	**1.8**	**14,224**	**266**	**10**	**18**
VE4EAR	**A**	**21,648**	**111**	**36**	**52**
***VE4YU**	**A**	**119,884**	**314**	**52**	**112**
VE5ZX	**14**	**321,480**	**1111**	**30**	**111**
VE5UA	3.5	5,742	49	19	39
VE5UF	**1.8**	**17,853**	**282**	**14**	**19**
***VE5SF**	**A**	**126,945**	**520**	**44**	**73**
*VE5AAD	*	18,696	144	24	33
VE6EX	**A**	**940,200**	**2306**	**72**	**128**
VE6AID	*	7,480	69	26	29
VE6JY	**14**	**708,981**	**1915**	**34**	**125**
			(OP: VA7RR)		
VE6WQ	**7**	**439,953**	**1221**	**37**	**122**
***CK6BF**	**A**	**160,650**	**428**	**65**	**110**
VA7ST	**A**	**651,222**	**1572**	**70**	**128**
VA7RN	*	194,564	733	51	76
VA7DM	*	70,992	303	43	59
***VE7JKZ**	**A**	**125,796**	**427**	**57**	**75**
*VE7BZR	*	66,429	244	44	77
*VE7IO	*	61,854	473	39	39
*VE7IN	*	55,097	202	48	71
*VE7BGP	*	14,661	104	38	43
*VA7JC	*	663	35	7	6

Cayman Islands

ZF2AM	**A**	**6,809,354**	**5959**	**123**	**376**
			(OP: K6AM)		

Costa Rica

*TI2WMP	7	144	7	4	4

Cuba

CO2WF	**A**	**287,870**	**1271**	**28**	**82**
CO8ZZ	**3.5**	**197,610**	**899**	**21**	**84**
***CO8LY**	**A**	**513,536**	**1762**	**28**	**108**
***CO2JD**	**7**	**242,248**	**1142**	**23**	**84**
*CO6LP	*	149,786	908	21	70
***CM6RCR**	**1.8**	**83,348**	**597**	**14**	**53**

Dominican Republic

***HI3A**	**A**	**5,367,863**	**4412**	**120**	**401**
*HI8A	*	325,464	773	63	150
*HI3T	*	36,698	321	13	46
			(OP: HI3TEJ)		

El Salvador

***YS4RR**	**A**	**2,526,650**	**3296**	**99**	**251**
			(OP: K9GY)		

Grenada

J3/DL5AXX	**A**	**6,677,682**	**5490**	**116**	**382**
***J39BS**	**A**	**1,415,630**	**2582**	**80**	**185**

Guadeloupe

***TO2HI**	**A**	**466,050**	**992**	**70**	**169**
			(OP: F6AUS)		
*FG1PP	*	41,216	175	38	74

Guatemala

TG9/IV3IYH	**14**	**724,299**	**2518**	**30**	**101**
			(OP: IV3IYH)		

Honduras

*HR1RTF	7	1,407	56	8	13
***HQ9R**	**3.5**	**108,160**	**711**	**19**	**61**
			(OP: WQ7R)		

Martinique

FM5CD	**3.5**	**248,750**	**941**	**27**	**98**
***FM/F5IRO**	**A**	**567,150**	**1549**	**66**	**133**
			(OP: F5IRO)		

Mexico

XE1MM	**A**	**844,110**	**1786**	**66**	**160**
XE2S	**"**	**664,682**	**1503**	**83**	**135**
XE1V	*	188,710	601	56	111
XE2WWW	**3.5**	**221,190**	**1012**	**25**	**76**
***XE2MX**	**A**	**84,800**	**243**	**62**	**98**
*XE2AUB	*	72,696	405	43	61
*XE2FGC	*	9,408	107	25	24
*XE1AY	*	6,800	202	38	47
***XE1CT**	**14**	**356,640**	**1441**	**28**	**92**
*XE2AI	*	63,156	601	21	36
***XE1NW**	**7**	**78,475**	**526**	**18**	**55**
*XE2YWH	*	7,293	92	12	27

Montserrat

VP2MDG	**A**	**3,924,738**	**4028**	**105**	**321**

Nicaragua

***YN2Z**	**A**	**2,869,940**	**3632**	**98**	**269**
***H7A**	**7**	**173,865**	**796**	**20**	**78**
			(OP: (OP: YN4SU))		

Panama

***HP1AC**	**A**	**132,640**	**366**	**51**	**109**
*HP3TA	*	37,714	176	44	65
*HP1AVS	*	2,295	29	17	28

Puerto Rico

***NP3CW**	**A**	**53,640**	**344**	**35**	**55**

St. Barthelemy

***FJ/WJ2O**	**A**	**1,634,570**	**2819**	**68**	**198**

St. Kitts & Nevis

V47NT	**A**	**10,201,212**	**7233**	**135**	**453**
			(OP: N2NT)		

St. Lucia

J68V	**A**	**3,919,906**	**4395**	**95**	**299**
			(OP: K9VV)		
J6/WØSA	*	480,116	1327	49	133
			(OP: WØSA)		

St. Vincent

***J88DR**	**A**	**2,689,993**	**2976**	**99**	**310**

U.S. Virgin Islands

KV4FZ	**1.8**	**161,271**	**803**	**20**	**79**
***KP2B**	**A**	**113,364**	**432**	**42**	**92**
*KP2BH	*	84,550	216	63	115

AFRICA

Algeria

7XØRY	**A**	**941,535**	**1351**	**47**	**198**

Canary Islands

EA8MQ	**A**	**1,076,576**	**1533**	**68**	**204**
AN8R	*	1,024,899	2064	47	154
			(OP: EA8AY)		
EA8CMX	**3.5**	**1,003,160**	**2302**	**35**	**120**
			(OP: OH2BYS)		
***EA8CN**	**A**	**2,343,768**	**2059**	**84**	**308**
*EA8OM	*	1,466,002	1488	81	265
*EA8BMG	*	237,931	426	66	163
*EA8DA	*	27,348	120	28	58
*EA8CQW	*	8,321	63	19	34
***EA8NQ**	**7**	**83,848**	**309**	**19**	**75**

Chad

***TT8JT**	**A**	**55,242**	**303**	**16**	**46**

Egypt

***SU9HP**	**A**	**32,186**	**108**	**50**	**83**
			(OP: SC6A)		

Ghana

***9G5ZZ**	**14**	**344,720**	**921**	**33**	**106**
			(OP: DL1CW)		

Kenya

***5Z4/RW1AU**	**A**	**129,500**	**320**	**45**	**103**

Liberia

EL2DX	**A**	**410,763**	**551**	**85**	**184**

Madagascar

5R8FU	**A**	**29,637**	**100**	**40**	**71**

Madeira Islands

CT3NT	**A**	**10,883,558**	**6309**	**142**	**460**
CT3BD	*	26,923	113	39	70
***CT3AS**	**A**	**553,482**	**716**	**68**	**223**
*CT3EE	*	23,276	99	25	67
***CT3KN**	**14**	**89,565**	**298**	**21**	**84**
*CT3KU	3.5	8,624	93	9	47

Mauritius

***3B8/SM6GOR**	**A**	**43,030**	**181**	**48**	**82**
			(OP: SM6GOR)		

Morocco

CN2M	**14**	**2,026,725**	**3742**	**39**	**144**
			(OP: OH2MM)		
CN2R	**1.8**	**520,734**	**1535**	**25**	**93**
***CN8KD**	**A**	**269,352**	**421**	**71**	**190**
*CN8YR	*	64,297	224	24	89

Mozambique

C98LW	**7**	**108,072**	**479**	**20**	**59**
			(OP: UY5LW)		

Namibia

***V51YJ**	**A**	**214,599**	**349**	**71**	**160**

Senegal

6W1SE	**21**	**490,504**	**1290**	**32**	**101**
***6V7N**	**A**	**6,300,198**	**4434**	**118**	**380**
			(OP: DL1EFD)		

South Africa

ZS4TX	**A**	**5,796,672**	**3844**	**135**	**397**
ZS1EL	*	1,566,872	1895	78	214
***ZS4JAN**	**7**	**14,943**	**120**	**14**	**37**

Tanzania

5H3EE	**A**	**3,916,305**	**3122**	**108**	**327**
			(OP: DL4SM)		

Tunisia

3V8BB	**A**	**12,150,138**	**7245**	**142**	**436**
*3V8SS	A	22,507	119	17	54

Uganda

***5X1NH**	**A**	**778,070**	**1096**	**75**	**215**

Zambia

***9J3A**	**A**	**3,582,670**	**3253**	**102**	**301**
			(OP: S53A)		

Zimbabwe

***Z29KM**	**A**	**509,172**	**715**	**85**	**196**

ASIA

Armenia

EK3SA	**A**	**335,643**	**549**	**51**	**180**

Asiatic Russia

UA9CLB	**A**	**5,068,842**	**3791**	**127**	**372**
RT9S	*	1,915,200	1519	116	359
			(OP: UA9SP)		
UA9OG	*	1,549,404	1677	96	290
RK9AWT	*	1,537,424	1579	87	284
			(OP: RX9AF)		
UA9MC	*	1,286,085	1286	112	303
RA9UN	*	526,824	968	66	177
UA9JLL	*	526,084	692	92	210
RK9CZO	*	515,475	911	55	182
			(OP: UA9CTT)		
RX9TX	*	420,508	749	60	149
UA9WIK	*	409,032	659	48	180
UA9FM	*	364,151	595	59	182
RV9AZ	*	289,625	675	44	131
RU9UC	*	212,730	394	50	160
RA9WW	*	102,096	295	37	107
UA9CGL	*	95,250	254	39	111
RA9YN	*	57,255	149	54	111
RU9MX	*	47,520	137	59	117
RV9XO	*	41,895	126	57	90
RA9FLW	*	41,302	152	32	75
RW9UX	*	26,838	133	51	91
RZ9YF	**21**	**41,760**	**186**	**23**	**64**
RA9AE	**14**	**369,225**	**1032**	**30**	**105**
RW9CW	**"**	**368,830**	**973**	**34**	**120**

RV9LM	*	145,400	570	26	74	
RW9DX	*	142,621	487	29	98	
UA9KZ	*	58,275	208	32	79	
RW9USA	**7**	**1,053,876**	**2228**	**38**	**148**	
UA9TQ	**"**	**654,585**	**1601**	**33**	**118**	
UA9ONJ	*	261,216	758	37	107	
UA9QQ	*	82,628	374	22	69	
RX9FW	*	50,592	204	25	77	
RX9LW	*	1,320	26	8	14	
UA9CMQ	**3.5**	**239,042**	**961**	**23**	**71**	
UA9BA	**1.8**	**233,200**	**824**	**26**	**80**	
UA9KAA	*	41,600	246	13	51	
***RA9FTM**	**A**	**1,785,240**	**1660**	**100**	**305**	
***RX9AM**	**"**	**1,610,817**	**1668**	**96**	**305**	
***RV9CX**	**"**	**1,588,104**	**1446**	**100**	**314**	
*RU9WZ	*	1,120,068	1526	76	248	
*UA9AOL	*	764,166	1007	71	232	
*UA9TF	*	594,042	634	94	268	
*RW9RA	*	552,326	721	80	234	
*RZ9OJ	*	526,103	847	66	175	
*UA9OLD	*	457,662	765	62	187	
*UA9CAX	*	367,425	633	49	176	
*RW9QA	*	364,828	629	54	169	
*UA9AX	*	327,925	433	85	240	
*UA9QA	*	326,390	589	63	191	
*RA9AAA	*	319,019	569	69	194	
*RZ9HG	*	307,116	525	60	168	
*UA9FGJ	*	301,484	506	57	169	
*UA9WZ	*	286,598	412	79	223	
*RV9MZ	*	282,751	571	62	155	
*RA9SN	*	273,768	532	46	158	
*UA9XS	*	217,958	501	34	132	
*RU9AZ/9	*	198,704	446	47	129	
*RZ9AZ	*	195,228	481	35	118	
*UA9XF	*	170,488	324	48	154	
*RU9UG	*	170,200	353	61	139	
*RV9UP	*	167,844	352	70	143	
*RX9DJ	*	140,672	367	38	119	
*UA9XW	*	138,904	445	36	143	
*RV9FT	*	89,496	269	35	97	
*RW9UY	*	75,468	317	28	86	
*RU9BS	*	65,484	233	41	112	
*RA9FEU	*	60,384	232	25	86	
*UA9KB	*	44,000	156	39	86	
*RU9YF	*	38,164	154	30	86	
*UA9OR	*	37,576	203	21	56	
*RA9YAI	*	34,170	135	30	72	
*RA9SAS	*	25,132	125	39	64	
*UA9XBJ	*	18,252	148	20	58	
*UA9CIM	*	15,015	88	28	63	
*UA9OV	*	14,592	110	23	41	
*UA9LT	*	12,717	66	34	47	
*RZ9UO	*	11,266	98	10	33	
*UA9UFL	*	6,710	48	20	35	
*UA9MW	*	2,451	33	19	24	
*UA9FEG	*	2,009	75	14	35	
*RW9WW	*	270	9	9	9	
						(OP: RT9W)
***UA9AFS**	**21**	**15,616**	**103**	**17**	**47**	
*UA9QF	*	10,374	101	16	41	
*RW9DW	*	8,476	82	15	37	
*RV9YK	*	7,285	74	15	32	
***RW9OW**	**14**	**238,280**	**905**	**25**	**90**	
*RA9XF	*	127,968	551	20	66	
*RW9RW	*	114,920	466	25	79	
*RW9SZ	*	48,640	249	20	60	
*RA9ULK	*	21,357	170	16	47	
*RA9FN	*	19,992	118	16	52	
*UA9JKM	*	19,635	186	10	41	
*RA9AFZ	*	17,632	129	15	43	
*RX9SL	*	14,144	113	11	41	
*RU9CWG	*	13,048	98	13	43	
*UA9BZ	*	3,230	70	9	29	
***RA9AP**	**7**	**357,500**	**1009**	**28**	**97**	
*UA9AB	*	283,282	752	34	105	
*UA9QM	*	229,368	795	31	83	
*UA9JJG	*	84,348	355	25	74	
*RZ9OP	*	6,656	78	15	37	
***UA9BX**	**3.5**	**104,085**	**477**	**19**	**62**	
*RV9YW	*	54,432	388	16	56	
*RZ9AE	*	43,008	312	11	45	
*RA9MX	*	34,432	216	15	49	
***UA9CBM**	**1.8**	**56,883**	**313**	**14**	**53**	
RWØCWA	**A**	**2,674,464**	**2920**	**134**	**282**	
						(OP: N5ZO)
UAØYAY	**"**	**710,622**	**997**	**96**	**237**	
UAØAZ	*	609,520	942	86	218	
RKØUT	*	441,330	910	71	164	
UAØIDZ	*	436,572	1238	79	122	
UAØZAM	*	224,170	741	62	83	
RKØSK	*	203,520	610	47	112	
UAØYM	*	102,384	337	53	109	
UAØUV	*	69,432	292	43	89	
UAØBA	*	31,746	121	37	74	
UAØFDX	*	27,118	211	40	51	
RVØCD	*	21,462	145	45	53	
UAØCA	*	12,768	101	23	33	
UAØLS	*	3,483	54	19	24	
RUØAE	*	228	7	5	7	
RAØQC	**14**	**116,449**	**751**	**25**	**58**	
RAØUF	*	104,041	644	23	66	
UAØCM	**7**	**183,348**	**663**	**36**	**96**	
RWØBG	*	151,584	743	24	72	
RAØFU	**3.5**	**97,824**	**600**	**31**	**65**	
RZØSR	**1.8**	**46,254**	**319**	**20**	**58**	
UAØACG	*	24,766	230	13	45	
***UAØSDX**	**A**	**483,160**	**902**	**70**	**187**	
***UAØOD**	**"**	**281,820**	**699**	**64**	**146**	
*UAØAKY	*	234,036	548	57	141	
*UAØCNX	*	228,384	829	63	93	
*UAØABB	*	223,328	405	58	166	
*RZØSO	*	57,420	283	27	72	
*RKØUN	*	49,500	275	48	77	
*RNØSA	*	47,625	155	47	78	
*RWØAA	*	44,368	203	30	88	
*UAØLNO	*	2,380	71	17	17	
*RWØUB	*	1,242	33	11	12	
***UAØSAD**	**28**	**160**	**9**	**5**	**5**	
***RUØUQ**	**21**	**11,088**	**195**	**16**	**26**	
*RUØSU	*	6,552	92	13	23	
*RNØCW	*	3,936	57	14	18	
***RAØCL**	**14**	**13,300**	**249**	**17**	**21**	
*UAØSBQ	7	140	6	5	5	
***RWØAJ**	**3.5**	**46,152**	**274**	**16**	**56**	
*UAØDC	*	28,514	313	19	34	
***UAØANW**	**1.8**	**19,082**	**132**	**14**	**44**	
Asiatic Turkey						
YM2W	**21**	**205,821**	**632**	**26**	**95**	
						(OP: OK1MU)
TC4X	**7**	**1,333,164**	**2795**	**37**	**140**	
						(OP: OH2PM)

TA4ZA	**3.5**	**536,151**	**1652**	**26**	**95**	
						(OP: OH2BH)
***TA3J**	**21**	**15,400**	**118**	**17**	**38**	
*TA3BN	7	3,584	48	6	26	
***TA3D**	**3.5**	**267,410**	**1227**	**15**	**70**	
***TA2RC**	**1.8**	**105,960**	**645**	**10**	**50**	
Azerbaijan						
4K8M	3.5	6,762	72	9	37	
***4K9W**	**A**	**161,186**	**359**	**45**	**121**	
China						
BA1AN	**A**	**1,402,866**	**2105**	**95**	**218**	
BD7IXG	28	52	16	2	2	
BA4KA	**14**	**16,728**	**247**	**18**	**33**	
BA4T	**3.5**	**38,160**	**483**	**19**	**41**	
						(OP: BA4TA)
BSTT	**1.8**	**14,194**	**201**	**14**	**33**	
						(OP: BA5TT)
***BD5WW**	**A**	**680,565**	**1208**	**90**	**205**	
***BD7MVZ**	**"**	**443,695**	**996**	**76**	**169**	
***BD8AIB**	**"**	**192,228**	**497**	**64**	**129**	
*BD4IBW/4	*	148,920	724	51	85	
*BA3AX	*	133,489	669	50	81	
*BD6IVX	*	114,704	576	54	80	
*BA4II	*	113,388	740	45	87	
*BD5CFY	*	85,894	316	49	85	
***BD1FBV**	**"**	**79,508**	**314**	**52**	**91**	
*BD1TCC	*	40,788	332	33	66	
*BD1AQH	*	13,321	76	32	45	
*BD1ISI	*	12,513	212	23	20	
*BD5CFB	*	8	2	2	2	
***BG7NWF**	**28**	**765**	**29**	**7**	**10**	
***BA4SI**	**21**	**20,088**	**223**	**21**	**33**	
*BD7IN	*	17,877	233	22	37	
***BG4DVK**	**14**	**90,909**	**459**	**25**	**65**	
***BA6QD**	**"**	**86,070**	**400**	**26**	**69**	
***BD7MSN**	**7**	**63,900**	**358**	**25**	**65**	
*BG1POP	*	104	15	4	4	
***BA8AG**	**1.8**	**11,778**	**179**	**13**	**25**	
Cyprus						
C4W	**A**	**6,541,392**	**4656**	**122**	**406**	
						(OP: 5B4WN)
C4M	**3.5**	**344,551**	**1053**	**28**	**99**	
						(OP: 5B4AGM)
***C4Z**	**14**	**412,135**	**1161**	**35**	**104**	
						(OP: 5B4AIZ)
Georgia						
***4L6QC**	**7**	**294,259**	**855**	**28**	**99**	
Hong Kong						
VR2DS	**1.8**	**9,384**	**165**	**17**	**29**	
India						
VU2PTT	**A**	**1,210,055**	**1273**	**102**	**283**	
VU2PAI	*	555,169	773	77	212	
***VU2BGS**	**A**	**87,352**	**242**	**59**	**120**	
*VU2NKS	*	45,593	136	39	88	
*VU2UR	*	10,296	71	21	45	
Israel						
4X1VF	**28**	**1,794**	**29**	**8**	**15**	
4X2M	**14**	**894,057**	**2119**	**37**	**122**	
						(OP: 4X4DZ)
*4Z5QQ	21	4,620	43	17	27	
***4XØB**	**7**	**159,080**	**828**	**18**	**64**	
*4Z5TK	*	130,647	565	25	82	
*4X/SM8A	*	104,976	400	28	80	
Japan						
JF1SQC	**A**	**1,485,507**	**1648**	**112**	**235**	
JK1OPL	**"**	**985,525**	**980**	**126**	**269**	
JI1ALP	*	478,676	756	90	163	
JH1FSF	*	308,736	507	90	178	
JF1SEK	*	305,944	553	80	149	
JA1BNW	*	267,759	544	74	137	
JA1AYO	*	248,110	519	80	135	
JH1EVD	*	155,376	363	62	104	
JA1HGY	*	143,590	314	68	98	
JO1SIM	*	115,840	329	59	101	
JA1HP	*	113,956	418	46	78	
JA1HMK	*	85,785	254	45	84	
JR1LEV	*	50,925	197	46	59	
JH1APK	*	46,488	137	67	89	
JN1RQV	*	42,408	149	50	64	
JA1BPN	*	35,400	136	37	63	
JF1AZQ	*	31,122	161	38	53	
JJ1WWL	*	21,805	102	29	60	
7N4KDU	*	14,850	84	24	42	
JH1OVY	*	4,732	38	25	27	
JO1NLN	**14**	**36,556**	**219**	**26**	**50**	
JK1LUY	*	420	20	4	3	
7J1AAI	**7**	**541,030**	**1654**	**34**	**97**	
						(OP: W1NN)
JE1ZWT	**"**	**300,900**	**1132**	**29**	**73**	
						(OP: JJ1RJR)
JH1OGC	**3.5**	**397,848**	**1129**	**32**	**105**	
JS1OYN	**"**	**10,176**	**91**	**19**	**29**	
JK1GKG	*	5,248	56	25	39	
JA1KVT	**1.8**	**3,904**	**64**	**13**	**19**	
JE1LFX	*	2,220	44	12	18	
***JF1NHD**	**A**	**1,053,756**	**1447**	**104**	**193**	
***JI1RXQ**	**"**	**962,337**	**1254**	**99**	**192**	
***JH1RNI**	**"**	**502,044**	**736**	**98**	**178**	
*JP1JFG	*	460,835	690	86	179	
*JP1QDH	*	400,554	678	86	152	
***JG1TVK**	**"**	**250,040**	**425**	**87**	**148**	
*JA1SKE	*	221,325	399	87	140	
*7K1MAG	*	163,450	379	71	104	
*JA1HNW	*	145,706	376	68	111	
*JA1PS	*	122,112	296	65	94	
*7K4QOK	*	120,541	313	55	94	
*JA1XPU	*	86,867	259	62	87	
*JA1EM	*	85,902	240	54	85	
*JP1EWY	*	83,475	237	62	97	
*JP1SRG	*	82,597	227	62	89	
*JA1AZR	*	66,960	220	51	69	
*7J1AQH	*	56,870	214	50	71	
						(OP: VE7HA)
*JA1BFN	*	49,749	216	38	65	
*JA1PJS	*	43,602	205	39	47	
*JM1KNI	*	39,006	157	43	56	
*JRØKVU/1	*	37,433	190	36	47	
*JA1KEV	*	36,768	214	41	55	
*JK1NSR	*	35,700	165	41	59	
*JA1IZ	*	33,573	156	38	55	
*JA1OHP	*	33,088	139	38	56	
*JJ1MZH	*	27,900	155	34	41	
*JF1QQK	*	27,612	152	50	67	

*JR1ATA	*	24,360	113	36	48	
*JA1CP	*	23,112	161	30	42	
*JI1HFJ	*	22,616	110	39	49	
*JA1EMQ	*	21,164	123	30	44	
*7N4QCQ	*	20,960	122	35	45	
*JA1XMS	*	20,952	121	43	54	
*JA1CPZ	*	18,360	111	31	41	
*JH1FNU	*	17,679	102	33	38	
*JK1SDQ	*	17,640	115	32	38	
*JA1HFY	*	17,017	147	34	43	
*JA1ISA	*	16,786	105	29	48	
*JA1WHG	*	16,724	110	34	40	
*JA1HG	*	15,680	100	26	38	
*JK1OXU	*	15,326	75	31	48	
*JE4ICX/1	*	14,784	103	31	35	
*JA1PTO	*	14,560	97	31	39	
*JH1OLB	*	13,746	114	24	34	
*JI1UDD	*	13,737	99	26	31	
*JA1WQX	*	11,816	88	25	31	
*JK1GMB	*	11,592	81	26	37	
*JE1REU	*	7,314	73	24	29	
*JI1AVY	*	7,300	67	19	31	
*JA5INF/1	*	6,320	66	19	21	
*JA1FRQ	*	4,386	42	23	28	
*JH1HGF	*	4,284	48	21	21	
*JA1ANG	*	4,176	64	18	18	
*JG1FGL	*	1,344	22	13	11	
*7N4CLI	*	1,314	25	9	9	
*JI1BDQ	*	1,066	17	13	13	
*JA1MVK	*	286	13	11	11	
*JA1PKS	*	216	11	4	4	
***JE1RZR**	**28**	**348**	**12**	**5**	**7**	
*JA1WWE	*	108	6	2	4	
***7K4XNN**	**21**	**24,420**	**161**	**26**	**40**	
*JA1CTB	*	13,770	120	21	33	
*JP1IXV	*	9,120	83	21	27	
*JA1DBG	*	3,161	52	12	17	
*JL7FBV/1	*	1,620	33	9	11	
*JI1BBN	*	1,377	22	13	14	
*JA1AAT	*	1,220	25	10	10	
*JI1DSO	*	812	26	11	18	
*JS1IFK	*	117	5	4	5	
*JI1LAI	*	24	2	2	2	
*JP1EHC	*	6	1	1	1	
***JA1YAI**	**14**	**23,482**	**159**	**21**	**38**	
*7K1EOG	*	17,702	130	21	32	
*JI1FLB	*	15,846	133	20	37	
*JE1RRK	*	14,994	131	19	30	
*JF1TEU	*	13,860	121	24	39	
*JE1JAC	*	5,699	62	18	23	
*7L3DGP	*	3,762	58	15	18	
*JA1ANF	*	2,117	29	13	16	
*JR2TMB/1	*	1,275	23	13	12	
***7N2DAB**	**7**	**202,476**	**569**	**35**	**106**	
*JHØNVX/1	*	17,507	123	24	37	
*JA1IWP	*	6,519	59	15	26	
*JH1DMC	*	855	21	9	10	
*7N2JNN	*	812	14	8	6	
***JH1APZ**	**3.5**	**27,945**	**153**	**27**	**54**	
*JG1OWV	*	5,733	51	21	28	
***JE1SPY**	**1.8**	**782**	**41**	**11**	**12**	
JN2AMD	**A**	**894,842**	**1508**	**95**	**159**	
JF2FIU	*	163,594	432	68	89	
JA2FJP	*	24,804	236	20	33	
JE2LPC	7	6	1	1	1	
JE2OTM	**1.8**	**775**	**36**	**13**	**12**	
***JA2AXB**	**A**	**566,552**	**808**	**106**	**196**	
***JA2CUS**	**"**	**416,560**	**698**	**85**	**169**	
*JA2KVB	*	415,989	611	97	182	
*JH2NWP	*	309,301	562	82	141	
*JA2VZL	*	191,384	427	67	121	
*JA2KKA	*	190,665	464	57	114	
*JA2QVP	*	45,936	195	46	70	
*JE2DJC	*	37,730	137	48	62	
*JA2KPW	*	34,740	156	35	55	
*JQ2EHD	*	9,250	65	19	31	
*JF2OHQ	*	4,753	45	23	26	
*JI2TNT	*	3,080	43	12	16	
***JH2MYN**	**28**	**1,173**	**27**	**7**	**10**	
*JQ2OUL	21	658	20	6	8	
***JA2MOG**	**14**	**80,700**	**340**	**31**	**69**	
*JL2LPX	*	33,950	206	22	48	
***JA2PFO**	**7**	**24,360**	**171**	**21**	**37**	
*JH1HTQ/2	*	15,736	136	19	37	
*JQ2SAI	*	1,495	31	11	12	
*JR2SQU	*	300	13	6	4	
***JE2UFF**	**3.5**	**41,195**	**226**	**25**	**52**	
*JF2WXS	*	10,140	73	22	38	
JA3OOK	**A**	**837,375**	**1351**	**90**	**185**	
JN3SAC	*	277,084	518	70	142	
JS3CTQ	**21**	**93,884**	**400**	**31**	**67**	
JH3AIU	**14**	**518,296**	**1363**	**35**	**113**	
JA3DAY	*	59,508	266	28	59	
JA3ZKK	*	13,984	131	20	26	
						(OP: JH4PUL)
JA3ETD	*	5,828	93	16	31	
JH3GCN	**7**	**98,420**	**353**	**35**	**98**	
JL3SBE	*	17,784	136	19	38	
JF3LOP	**3.5**	**21,608**	**151**	**24**	**49**	
JI3KDH	**1.8**	**2,945**	**47**	**14**	**17**	
***JH3PTC**	**A**	**280,368**	**538**	**79**	**137**	
***JH3CUL**	**"**	**225,535**	**432**	**80**	**135**	
*JA3JM	*	168,470	429	60	110	
*JA3BLN	*	115,188	266	63	111	
*JA3AA	*	83,166	315	62	104	
*JG3SVP	*	65,286	304	46	71	
*JF3KQA	*	64,500	231	51	78	
*JG3LGD	*	57,348	185	46	72	
*JL3RNZ	*	48,504	158	54	75	
*JA3AVO	*	40,494	166	40	62	
*JH3EQP	*	29,610	142	42	52	
*JM3PLL	*	27,264	127	43	53	
*JH3JYS	*	18,333	93	46	51	
*JR3PKO	*	18,312	113	39	45	
*JA3EOE	*	15,444	109	30	36	
*JO3PXY	*	912	20	9	10	
***JL3MCM**	**28**	**1,240**	**23**	**8**	**12**	
***JR3EOI**	**21**	**70,844**	**339**	**29**	**60**	
*JI3MCM	*	559	17	5	8	
***JA3UWB**	**14**	**45,864**	**257**	**24**	**54**	
*JA3GW	*	13,197	108	20	33	
*JK3GWT	*	4,797	55	18	23	
*JO3EVM	*	1,073	40	13	16	
***JF3IYW**	**7**	**16,992**	**121**	**20**	**39**	
*JR3RIY	*	11,712	100	16	32	
*JA3RK	*	2,716	51	12	16	
*JA3DX	*	1,914	58	15	18	
*JG3EHD	*	570	19	5	5	
***JA3GN**	**3.5**	**29,625**	**163**	**25**	**50**	

***JF3BFS**	**"**	**27,246**	**199**	**21**	**36**	
*JG3WCZ	*	16	2	2	2	
JH4UYB	**A**	**4,463,355**	**3428**	**147**	**340**	
JM4WUZ	**3.5**	**17,892**	**140**	**20**	**43**	
***JE4MHL**	**A**	**375,741**	**610**	**86**	**163**	
*JH1MTR/4	*	66,875	229	50	75	
*JA4AQR	*	52,358	244	35	59	
*JA4EE	*	25,573	88	44	63	
*JI4WHS	*	3,431	66	20	27	
*JA4CBX	*	494	10	9	10	
***JR4GPA**	**14**	**79,789**	**428**	**23**	**50**	
***JR4URW**	**7**	**14,000**	**114**	**20**	**30**	
*JH4FUF	3.5	999	26	11	16	
***JH4CES**	**1.8**	**684**	**24**	**9**	**9**	
*JJ4CDW/4	*	16	2	2	2	
JA5IVG	A	44,226	180	50	76	
JA5FBZ	**14**	**430,388**	**1227**	**34**	**99**	
JA5APU	*	88,367	522	31	66	
JE5JHZ	7	4,956	46	13	29	
JA5JGV	**1.8**	**1,034**	**24**	**9**	**13**	
***JR5HXU**	**A**	**94,010**	**227**	**62**	**108**	
*JA5SUD	*	48,574	193	57	92	
*JA5GSG	*	690	79	22	24	
***JG5DHX**	**14**	**43,488**	**252**	**21**	**51**	
*JR5YBH/5	*	114	19	10	9	
***JA5ATN**	**7**	**43,875**	**236**	**23**	**52**	
JA6SRB	**A**	**355,266**	**625**	**84**	**174**	
JH6NBW	*	38,192	186	50	74	
JA6WIF	**28**	**8,944**	**93**	**15**	**28**	
JS6RGY	**21**	**216,135**	**663**	**35**	**100**	
JA6SHL	**7**	**473,817**	**1307**	**37**	**102**	
JA6BZI	*	259,584	725	36	120	
JA6LCJ	**1.8**	**23,052**	**188**	**21**	**47**	
***JA6CYL/6**	**A**	**172,260**	**419**	**57**	**107**	
*JR6GHN	*	40,608	200	35	61	
***JH6WHN**	**28**	**1,584**	**31**	**7**	**11**	
***JA6DU**	**14**	**103,712**	**393**	**32**	**80**	
*JA6FFK	*	61,992	306	27	57	
*JA6TWS	*	10,626	113	16	30	
*JA6WW	*	10,200	125	22	38	
*JS6RTJ	*	3,068	42	12	14	
*JQ1AHZ/6	*	2,160	47	13	14	
***JL6IPK**	**7**	**7,956**	**83**	**18**	**33**	
***JO6EDO**	**1.8**	**805**	**37**	**10**	**13**	
*JR6CF	*	225	9	4	5	
JA7DLE	**A**	**1,741,510**	**2054**	**111**	**238**	
JA7IC	**"**	**827,400**	**1179**	**103**	**177**	
JH7XMO	**"**	**803,068**	**1128**	**117**	**205**	
JA7COI	*	709,520	1014	106	174	
JA7BME	*	671,784	941	97	179	
JA7EU	*	312,471	594	77	136	
JH7QXJ	*	111,506	356	51	76	
JA7KY	*	83,356	159	89	140	
JA7WQJ	*	31,680	123	38	58	
JR7MAZ	*	5,856	37	26	35	
JH7XGN	**21**	**8,400**	**87**	**19**	**29**	
JA7FTR	**14**	**273,045**	**937**	**33**	**76**	
JA7NVF	*	251,552	927	32	80	
JA7MJ	**7**	**99,498**	**384**	**30**	**73**	
JA7NI	**1.8**	**91,719**	**425**	**21**	**58**	
***JA7LMZ**	**A**	**181,831**	**415**	**74**	**123**	
*JH7IXX	*	25,156	140	32	44	
*JA7SSB	*	14,592	123	26	38	
*JA7VEI	*	9,576	70	26	30	
*JI7VBW	*	112	8	8	8	
*JA7EDZ	21	2,352	36	12	16	
***JH7CUO**	**14**	**104,465**	**518**	**26**	**59**	
*JE7LKG	7	8,575	100	17	18	
JH8SIT	**14**	**21,000**	**159**	**23**	**37**	
JA8NFV	**1.8**	**7,004**	**87**	**14**	**20**	
***JH8SLS**	**A**	**1,007,952**	**1198**	**107**	**225**	
*JA8HSC	14	480	19	11	9	
*JH8DHV	7	1,526	45	6	8	
JF9JTS	**A**	**188,850**	**490**	**58**	**92**	
JA9BGL	*	94,615	270	56	93	
JH9KVF	**21**	**27,090**	**175**	**26**	**44**	
JA9CWJ	**14**	**114,800**	**413**	**28**	**72**	
***JF9KVT**	**A**	**50,803**	**212**	**40**	**61**	
*JH1TXG/9	*	25,276	124	37	52	
*JA9LX	*	22,230	119	35	43	
*JA9APZ	*	3,038	44	14	17	
***JR9NVB**	**7**	**60,325**	**234**	**29**	**66**	
JAØUMV	**A**	**640,484**	**1195**	**79**	**147**	
JJØJML	*	193,254	440	76	110	
JAØLHU	3.5	2,444	60	19	33	
JAØDAI	**1.8**	**16,820**	**127**	**19**	**39**	
***JHØNEC**	**A**	**420,879**	**749**	**92**	**147**	
*JHØCCK	*	75,705	200	57	90	
*JAØBJY	*	27,738	155	27	42	
*JJØOAP	*	3,792	31	25	23	
*JGØGGI	*	2,829	50	21	20	
*JRØBUL	*	1,539	23	12	15	
***JRØEOQ**	**21**	**11,123**	**110**	**21**	**28**	
***JHØEPI**	**14**	**120,602**	**500**	**30**	**64**	
*JAØIOF	*	26,666	193	24	43	
*JAØNFP	7	6,120	60	19	26	
*JAØDOW	*	2,430	35	11	16	
***JAØADQ**	**3.5**	**5,535**	**74**	**18**	**27**	
Kazakhstan						
UN9L	**A**	**2,205,372**	**2056**	**103**	**319**	
UO1P	**"**	**1,663,938**	**2204**	**75**	**216**	
						(OP: UN7PL)
UN7QF	*	31,341	176	26	67	
UN7PL	*	24	2	2	2	
UN5J	**21**	**123,640**	**478**	**26**	**84**	
UN7GCE	**14**	**44,300**	**196**	**23**	**77**	
UP8A	**7**	**453,492**	**1529**	**27**	**87**	
UN2E	*	246,030	822	29	89	
UN4L	**3.5**	**695,898**	**1841**	**35**	**112**	
U

EW3LN	*	435,202	775	82	252
EW7LO	*	370,500	1621	34	116
EW7BR	*	244,512	501	64	224
EW7EW	*	226,083	770	50	171
EW8CF	*	54,290	285	34	88
EW6GL	*	5,656	41	23	33
EU7SA	*	1,188	25	19	25
EW4AA	**21**	**30,362**	**178**	**26**	**68**
EW8EW	**14**	**474,582**	**1332**	**38**	**143**
EW8DX	*	245,000	926	32	108
EW8OM	*	64,845	362	26	73
EW2DN	**3.5**	**57,104**	**579**	**18**	**65**
EU1FC	**1.8**	**134,636**	**1216**	**22**	**75**
***EU2MM**	**A**	**911,874**	**1391**	**89**	**312**
*EU6AA	*	428,766	982	68	231
*EU4LY	*	372,465	1002	57	210
*EW7DK	*	224,182	636	55	184
*EU4CQ	*	127,335	488	43	152
*EW6MM	*	62,880	401	23	97
***EW6AF**	**21**	**17,787**	**126**	**23**	**54**
***EU1DX**	**14**	**184,522**	**584**	**32**	**119**
*EW1IP	*	8,228	57	23	45
***EV6Z**	**7**	**110,916**	**680**	**25**	**92**
*EU1DZ	*	31,360	285	16	64
***EU1CL**	**3.5**	**126,658**	**949**	**24**	**85**
***EV6M**	**"**	**73,554**	**708**	**17**	**65**
*EU1AI	*	20,130	313	9	46
*EW1KT	*	2,508	76	7	31

Belgium

OP4A	**A**	**444,125**	**983**	**59**	**216**
OP4B	*	24,100	208	25	75
OT4A	**7**	**694,620**	**2432**	**37**	**143**
OQ5A	*	27,264	307	17	54
***ON4CAS**	**A**	**695,742**	**1182**	**69**	**254**
***ON3ND**	**"**	**435,500**	**1069**	**52**	**208**
*ON4BHP	*	290,085	800	56	193
*ON4CT	*	210,393	522	65	176
*ON4ON	*	153,090	402	60	183
*ON5WL	*	60,129	284	40	91
***OSØS**	**21**	**15,555**	**132**	**19**	**42**
***OT4P**	**14**	**82,926**	**448**	**22**	**80**
			(OP: ON4LDP)		
*ON8LDS	*	13,800	139	12	38
***OT5W**	**7**	**258,750**	**1222**	**35**	**115**
			(OP: ON4RU)		
***ON4ALY**	**3.5**	**30,600**	**340**	**13**	**55**
*ON5JD	1.8	231	24	3	18

Bosnia-Herzegovina

E76AQ	**21**	**241,984**	**911**	**34**	**118**
E71DX	**7**	**63,210**	**367**	**20**	**85**
E77A	**3.5**	**270,429**	**2068**	**25**	**84**
***E73XL**	**A**	**174,610**	**489**	**52**	**138**
*E74X	*	73,154	470	67	91
*E77O	*	61,304	210	45	113
*E74AA	*	12,792	127	35	88
*E71M	21	799	21	8	9
***E79D**	**7**	**240,838**	**968**	**33**	**124**
*E74Y	*	175,938	828	33	109
*E76ØFDE	3.5	4,674	95	8	33
			(OP: E77AR)		
***E77CFG**	**1.8**	**95,920**	**1130**	**14**	**66**
			(OP: 9A2AJ)		

Bulgaria

LZ1GL	**A**	**984,517**	**2025**	**85**	**268**
LZ1BJ	*	948,996	1851	80	244
LZ2JR	*	301,857	739	73	166
LZ1ND	*	115,776	492	46	98
LZ1NG	**28**	**1,368**	**50**	**7**	**17**
LZ1QN	**14**	**38,960**	**274**	**17**	**63**
LZ1QZ	*	1,750	39	10	15
LZ9A	**3.5**	**152,865**	**944**	**29**	**100**
***LZ9R**	**A**	**1,387,146**	**1935**	**104**	**334**
			(OP: LZ3YY)		
***LZ5XQ**	**"**	**889,975**	**1733**	**93**	**274**
*LZ2DF	*	446,545	624	107	246
*LZ1IKY	*	291,980	766	62	198
*LZ1ONK	*	208,864	610	54	160
*LZ1PJ	*	146,804	378	56	140
*LZ1IA	*	51,653	243	39	118
*LZ1NY	*	24,360	186	27	78
*LZ3PZ	*	14,690	118	36	77
*LZ3TL	*	6,142	106	22	61
*LZ1KZ	*	2,124	35	15	21
*LZ5ZI	*	1,394	33	8	9
***LZ1AG**	**28**	**684**	**28**	**6**	**12**
***LZ2JA**	**21**	**35,640**	**160**	**29**	**79**
*LZ2HA	*	35,405	187	29	68
***LZ6W**	**14**	**494,725**	**1523**	**38**	**137**
			(OP: LZ4ZP)		
*LZ1FH	*	62,010	418	22	68
*LZ2MW	*	5,440	82	14	18
***LZ2PS**	**7**	**148,479**	**745**	**28**	**101**
*LZ1DNY	*	12,935	100	19	46
*LZ2FM	*	7,889	59	17	32
*LZ2CE	*	5,376	73	10	38
***LZ2AB**	**3.5**	**24,495**	**187**	**27**	**88**
***LZ2SC**	**1.8**	**22,320**	**335**	**10**	**52**

Corsica

TK5EP	**A**	**2,352,301**	**2607**	**114**	**383**

Crete

SV9CVY	**A**	**6,152,727**	**5876**	**142**	**467**
			(OP: DL6FBL)		
***SV9COL**	**A**	**94,724**	**254**	**60**	**139**

Croatia

9A3ST	**A**	**77,900**	**318**	**47**	**117**
9A7R	**21**	**140,185**	**598**	**31**	**84**
9A9A	**14**	**755,494**	**2078**	**38**	**143**
9A5D	*	486,522	1861	37	114
			(OP: 9A5DU)		
9A5MT	**7**	**563,014**	**1960**	**38**	**140**
9A5Y	**3.5**	**719,476**	**2615**	**37**	**135**
			(OP: 9A3NM)		
***9A5ST**	**A**	**227,835**	**566**	**62**	**187**
*9A2BW	*	110,372	411	44	120
*9A3SM	*	97,798	225	69	145
*9A6NNS	*	49,700	214	42	100
*9A3QB	*	45,902	211	37	81
*9A4U	*	38,227	174	47	80
			(OP: 9A6KKD)		
*9A6C	*	33,360	174	36	84
***9A3VM**	**28**	**1,029**	**51**	**4**	**17**
***9A3B**	**14**	**465,365**	**1357**	**35**	**128**
			(OP: 9A1AA)		
*9A2CW	*	77,376	353	29	75

***9AØAA**	**3.5**	**267,570**	**1390**	**30**	**105**
			(OP: 9A6M)		
*9A4QV	*	25,596	427	11	43
*9A3TU	*	5,661	67	11	40

Czech Republic

OL1M	**A**	**1,047,342**	**2411**	**81**	**265**
			(OP: OK1EW)		
OL4M	**"**	**535,231**	**1136**	**70**	**241**
OK2PDT	*	495,118	1025	69	209
OK1FRO	*	440,401	1055	60	187
OK2ABU	**"**	**338,778**	**789**	**59**	**202**
OK1AYY	*	283,360	634	60	193
OK5XX	*	239,412	581	68	213
OK2QA	*	215,556	466	64	189
OK7FL	*	184,470	808	28	102
OK1SI	*	172,437	550	47	182
OK2SAR	*	164,269	536	48	169
OK4BX	*	144,801	439	41	132
OK2KFK	*	63,218	337	36	110
			(OP: OK2PDE)		
OK4RQ	**21**	**74,549**	**299**	**27**	**100**
OL9Z	**14**	**359,744**	**1110**	**33**	**121**
			(OP: OK2PVF)		
OK1FZM	*	267,597	745	35	124
OK1AOV	**7**	**71,000**	**285**	**30**	**112**
OK1EP	*	29,832	111	30	102
OK1AY	**3.5**	**461,155**	**1839**	**31**	**118**
OK1NE	*	30,217	402	13	54
OK1DOF	*	25,661	328	12	55
OK1NY	**1.8**	**86,850**	**740**	**22**	**68**
OK1VD	**"**	**50,102**	**462**	**21**	**73**
OK1XC	*	38,608	490	16	60
OK1DWJ	*	11,242	85	15	62
OL8M	*	3,010	64	8	27
***OL6P**	**A**	**1,775,565**	**1925**	**116**	**379**
			(OP: OK2WTM)		
***OK6Y**	**"**	**1,084,132**	**1421**	**103**	**331**
			(OP: OK2PTZ)		
***OK1JOC**	**"**	**908,579**	**1442**	**83**	**288**
*OK2QX	*	632,097	1046	89	280
*OK4N	*	589,202	1195	70	232
*OK2MBP	*	538,412	1314	56	231
*OK1DKR	*	517,140	793	81	259
*OK2PTS	*	462,264	994	75	234
*OK1HX	*	348,480	712	68	220
*OK1GS	*	270,070	780	47	179
*OK1DKO	*	268,986	644	60	194
*OK1HEH	*	247,307	752	50	173
*OK1HCG	*	191,200	742	42	158
*OK1BMW	*	185,000	502	49	201
*OK1MKU	*	173,320	391	69	211
*OK2PBG	*	151,524	420	49	158
*OK2SGY	*	148,856	574	47	137
*OK1MNV	*	132,512	302	56	146
*OK2BRV	*	128,316	420	51	171
*OK1DM	*	119,641	564	38	143
*OK1FCA	*	115,924	579	30	116
*OK2BNC	*	93,101	405	34	123
*OK2VX	*	86,526	360	34	104
*OK1TFH	*	82,450	323	48	146
*OK1MZO	*	73,312	308	34	124
*OK1BLU	*	68,820	307	43	143
*OK2KG	*	55,584	294	36	108
*OK2BND	*	46,620	251	29	111
*OK2HIJ	*	46,618	225	32	111
*OK2TRN	*	43,407	219	28	89
*OK2BJ	*	31,080	108	40	65
*OK2SWD	*	30,780	217	21	74
*OK7N	*	25,725	147	31	74
*OL1B	*	25,344	143	26	73
*OK2AJ	*	23,384	262	14	65
*OK1UKV	*	22,940	164	28	96
*OK2HBY	*	16,380	125	19	44
***OK2N**	**21**	**59,653**	**218**	**31**	**90**
			(OP: OK2NN)		
***OL9M**	**14**	**50,922**	**307**	**19**	**63**
			(OP: OK1MMN)		
***OK2TBC**	**"**	**49,305**	**250**	**25**	**70**
*OK2CSU	*	45,501	237	26	61
*OK1JVT	*	7,449	106	12	27
***OK2BRS**	**7**	**59,499**	**404**	**22**	**77**
*OK1DDQ	*	26,228	279	17	66
*OK2BWC	*	9,856	95	22	34
*OK1DJS	*	920	21	8	15
***OK1KMU**	**3.5**	**95,285**	**856**	**19**	**76**
			(OP: OK1HFP)		
***OK1CRM**	**"**	**90,432**	**864**	**19**	**77**
*OK2VWB	*	87,792	700	18	75
*OL3X	*	57,372	529	20	64
			(OP: OK1FC)		
*OK2PWJ	*	37,544	345	13	63
*OK1IBP	*	30,885	336	14	57
*OK2BIU	*	30,418	450	11	56
*OK5AD	*	17,574	304	11	47
*OK6TW	*	13,630	204	12	46
*OK1DDV	*	2,368	91	6	31
***OK1IW**	**1.8**	**36,544**	**535**	**11**	**53**
*OK1JOK	*	12,838	263	8	41
*OK1ARO	*	6,120	130	8	37
*OK1KZ	*	1,922	64	4	27
*OK1KI	*	456	25	4	15

Denmark

OZ1LO	**A**	**1,981,525**	**2603**	**114**	**355**
OZ8SW	*	167,328	406	62	162
OZ7EA	*	94,224	425	38	113
OV1A	*	23,040	152	29	99
OZ1AXG	*	5,916	45	27	41
OZ7RQ	**3.5**	**109,354**	**805**	**20**	**87**
OZ2RH	*	10,788	70	20	38
OZ4O	1.8	3,116	67	8	30
***OZ5UR**	**A**	**144,486**	**449**	**51**	**156**
***OZ7TTT**	**"**	**128,184**	**495**	**40**	**156**
			(OP: OZ5WQ)		
*OZ4RT	*	117,810	455	38	160
*OZ7HAM	*	66,432	320	46	146
			(OP: OZ1ETA)		
*OV3X	*	26,656	140	34	102
			(OP: OZ8AE)		
*OZ3SM	*	18,876	275	33	110
*OZ4FF	*	1,472	26	12	20
*OZ5RM	*	1,148	38	6	22
***OZ1JVX**	**7**	**6,944**	**79**	**13**	**49**
*OZ7AEI	*	4,200	96	9	41

Dodecanese

SX5R	**21**	**149,242**	**714**	**31**	**111**
			(OP: SV5DKL)		

England

GØMTN	**A**	**1,278,400**	**1987**	**82**	**318**
G4MKP	**"**	**458,934**	**1271**	**49**	**174**
G3LZQ	*	299,982	543	68	221
G4SGI	*	248,272	611	52	184
G4HZV	*	207,336	481	52	160
G4OWT	*	182,500	449	67	183
MØVBY	*	169,099	493	42	161
G3KLH	*	134,289	933	27	102
G3PSM	*	116,440	301	53	152
GØAZH	*	85,289	389	38	135
G4LDL	**"**	**67,781**	**306**	**42**	**119**
G4DBX	*	59,532	236	33	88
G3LUW	*	41,760	210	31	59
G4LPD	*	27,900	175	26	74
G3ZHE	*	12,000	181	26	74
MØAAC	*	6,800	114	23	57
G4FAL	**14**	**201,966**	**827**	**30**	**93**
G4KFT	*	54,487	242	26	77
G4BXT	**7**	**49,780**	**343**	**18**	**77**
G3LET	**1.8**	**140,790**	**1075**	**18**	**77**
M4T	*	15,925	354	8	41
			(OP: GØVQR)		
G3GLL	*	9,960	155	12	48
***G3KKP**	**A**	**353,496**	**742**	**63**	**223**
***G4DDX**	**"**	**266,086**	**732**	**47**	**186**
*G3RSD	*	250,245	683	53	196
*G3VQO	*	180,540	625	41	163
*GØHDB	*	170,130	420	52	162
*G4DDL	*	164,971	557	42	157
*G4EBK	*	156,420	589	44	154
*GØHVQ	*	146,464	486	45	139
*MØVAA	*	133,510	409	41	128
*G3VYI	*	97,361	331	46	121
*G3WRR	*	74,088	290	34	113
*MØRYB	*	71,967	413	39	122
*G3MPB	*	71,779	301	46	133
*G3KNU	*	48,671	289	30	89
*G3NKS	*	47,838	204	30	89
*GØGDU	*	39,032	238	29	107
*G4OGB	*	28,569	177	25	82
*G3SVL	*	26,036	122	30	62
*MØCOP	*	24,000	170	27	93
*MØBUY	*	17,630	146	20	62
*GØTMX	*	17,487	161	22	65
*2EØFFQ	*	15,633	107	22	59
*G4LMX	*	9,702	116	18	48
*G2HDR	*	5,400	90	14	31
*GØMRH	*	3,440	63	10	33
***G3ZRJ**	**14**	**121,968**	**582**	**23**	**76**
*G4ERW	*	66,930	377	19	50
*G4ILO	*	17,646	179	14	37
*GØDAY	*	16,445	192	12	43
***GØCKV**	**7**	**185,579**	**792**	**32**	**119**
*M/YO4RDW	*	70,296	439	19	82
*G4IUF	*	47,145	272	21	84
*G6CSY	*	5,124	66	12	30
***G4FKA**	**3.5**	**78,409**	**680**	**16**	**73**
*G4ZOB	*	33,069	318	16	57

Estonia

ES5TV	**A**	**3,397,441**	**4052**	**124**	**397**
ES4RD	**14**	**157,437**	**558**	**30**	**117**
ES1A	**7**	**372,642**	**1382**	**36**	**137**
			(OP: ES1GE)		
***ES7GM**	**A**	**771,200**	**1407**	**94**	**306**
*ES5DB	*	77,099	305	39	124
*ES8DH	*	51,993	354	27	82
*ES5JR	*	45,066	381	22	89
***ES4MM**	**21**	**8,176**	**71**	**16**	**40**
***ES6CO**	**3.5**	**10,080**	**102**	**13**	**47**
***ES2MC**	**1.8**	**42,770**	**585**	**12**	**53**
*ES3RF	*	26,202	346	11	55

European Russia

RA3CM	**A**	**2,086,444**	**2648**	**126**	**377**
RD4WA	**"**	**1,739,095**	**2148**	**123**	**422**
RW1ZA	*	1,272,150	1519	118	332
UA6GP	*	1,059,380	1284	102	358
RU3UR	*	927,943	1353	101	330
RV4LC	*	896,724	1309	105	309
RV3FI	*	807,240	1526	79	293
RU3UN	*	757,218	994	103	344
RA3AUM	*	627,598	1226	74	237
RA1AGL	*	571,764	1250	89	229
RK3ZZ	*	569,160	973	86	286
UA3DGG	*	531,737	956	94	285
RV1CC	*	487,944	909	84	240
RA6MQ	*	472,056	984	76	236
UA3QFU	*	319,638	497	93	241
UA3LEO	*	302,120	645	70	210
RU6MD	*	290,766	526	80	242
UA3QGT	*	257,554	603	69	184
RW6CF	*	255,474	985	35	127
UA3DAM	*	254,944	633	63	194
UA3RAG	*	205,458	429	63	179
UA3AGW	*	205,183	399	80	173
RX4WX	*	188,124	627	57	200
RN1NU	*	187,005	387	67	206
RU4WD	*	179,423	490	75	194
UA3ICK	*	167,160	573	47	163
RX3OM	*	165,242	580	44	159
RV6YB	*	164,822	561	42	151
UA6GF	*	163,761	594	50	171
RV3WD	*	156,177	530	44	157
UA4LA	*	147,112	371	70	214
RL3AB	*	137,388	383	55	159
UA3PPP	*	135,405	536	43	134
RA3TT	*	129,485	610	37	108
RA3ANI	*	123,640	281	78	203
RX3AGD	*	111,471	271	74	145
RV3NB	*	104,838	500	37	136
RA1QX	*	102,660	339	43	131
RU3LA	*	100,098	391	45	121
UA3QIX	*	97,378	261	56	125
RA4PO	*	72,625	301	47	128
UA4NCI	*	62,530	263	54	115
RA1OD	*	55,384	144	55	117
UA6HMM	*	50,689	154	61	112
RA6AR	*	47,894	158	56	98
UA3DUJ	*	36,740	247	29	81
RW4NN	*	34,428	109	52	99
RD3AB	*	21,960	192	30	90
UA3DPM	*	19,928	78	35	71
RZ3LWW	*	16,833	118	29	64
			(OP: UA3LQQ)		
UA6AGK	*	16,170	83	29	37
RA4LBS	*	15,456	100	24	68
UA3TCJ	*	14,415	69	37	56
RA3SX	*	13,130	69	39	62
UA4FJ	*	11,627	127	17	60
UA3EAY	*	10,004	62	29	53
UA1ORK	*	4,576	30	22	30
UA4NC	*	3,087	62	16	47
UA6JFG	*	1,025	18	10	15
RZ6HX	**21**	**59,301**	**410**	**24**	**75**
RW4PY	*	18,018	130	23	54
RX6AM	**14**	**363,069**	**1325**	**35**	**118**
RW6ATJ	*	220,353	866	31	116
UA3QBL	*	6,072	52	18	26
UA4FGO	7	1,624	28	9	20
UA6LCN	**3.5**	**217,464**	**1188**	**30**	**106**
RZ3AV	*	91,155	690	24	79
UA4SAW	*	32,838	248	22	56
RL3AF	*	11,110	158	10	45
RF3C	**1.8**	**75,285**	**536**	**20**	**85**
RW6FO	*	18,998	267	10	49
RA3UT	*	10,528	135	11	45
***UA3BS**	**A**	**1,677,740**	**1924**	**145**	**451**
***UA6GO**	**"**	**1,364,895**	**2139**	**103**	**338**
***RZ4AG**	**"**	**1,013,886**	**1512**	**96**	**318**
*RV3QX	*	588,924	1209	77	265
*RV3ZN	*	508,095	1045	80	235
*RZ6BU	*	503,172	953	79	245
*UA4ALI	*	495,078	981	79	248
*RZ3QZ	*	465,963	795	93	288
*RW6AHO	*	424,080	981	75	229
*RA6GW	*	415,831	631	101	276
*RU3PU	*	407,880	761	81	249
*RL3ZI	*	404,586	1049	64	202
*RX6LD	*	361,564	800	62	197
*RZ4AO	*	355,568	785	72	212
*RW1AI	*	345,340	729	72	238
*RU3FF	*	334,712	863	69	209
*RN1NW	*	326,648	967	56	210
*RA1QD	*	325,800	680	73	227
*RW1CX	*	308,644	636	67	235
*RN4SS	*	279,006	870	54	219
*UA6GR	*	278,668	496	82	217
*RK3AQW	*	266,772	808	63	195
*RA3NC	*	257,301	684	61	192
*UA3AKI	*	248,236	579	60	211
*UA1CEC	*	239,068	896	50	186
*UA4QK	*	233,160	504	52	216
*RU3XY	*	233,047	664	52	189
*RW4AD	*	227,408	743	51	182
*RA3ST	*	226,248	545	68	196
*RV3WT	*	213,934	497	65	194
*UA4PAQ	*	212,400	580	53	187
*RU6HJ	*	210,630	707	52	186
*RX3ZX	*	202,720	461	62	162
*RA6FV	*	193,142	406	61	208
*RX6AY	*	190,848	509	57	167
*RA3MB	*	178,728	440	61	203
*RK6ASY	*	167,348	605	46	168
*RV3FU	*	166,110	658	43	167
*RN3ZC	*	161,700	393	70	175
*UA1ZZ	*	158,746	716	36	167
*RN4SN	*	156,975	331	94	205
*UA4HJ	*	155,555	337	78	187
*RV3QO	*	154,350	383	62	183
*UA3AMZ	*	154,093	534	47	176
*RA6YJ	*	152,424	342	64	168
*RW3TA	*	145,926	562	43	155
*RA4ST	*	142,636	549	45	166
*RA3OO	*	138,720	344	69	171
*UA4YJJ	*	130,368	456	42	126
*UA3AQB	*	125,171	307	56	143
*UA3RW	*	119,380	294	59	176
*UA3UNP	*	113,035	332	56	179
*RX3VF	*	112,400	369	48	152
*RK4PB	*	112,236	421	49	150
***UA4FRL**	**"**	**111,000**	**379**	**59**	**163**
*RL3KO	*	106,743	552	35	126
*RW3WX	*	103,680	314	56	136
*UA4FUW	*	103,170	390	44	137
*RW3XB	*	100,956	399	41	138
*UA4PT	*	99,981	260	65	142
*UA3VLO	*	97,300	319	38	137
*UA4FTA	*	95,782	389	42	124
*RU3XB	*	93,744	405	44	142
*RZ1OK	*	90,804	327	45	143
*UA1AFT	*	90,118	230	40	117
*RV3YR	*	87,606	315	51	135
*RK6AQM	*	86,580	346	38	147
*RU3MW	*	85,902	422	28	111
*UA1OM	*	83,433	265	48	155
*RA3QN	*	83,032	470	48	146
*UA6HFI	*	82,998	354	37	122
*UA3UBT	*	79,857	296	43	128
*UA3WT	*	78,890	394	36	125
*RU3XF	*	78,050	215	48	175
*RA3YC	*	77,608	308	47	131
*RX3MM	*	76,590	235	50	135
*RW4NQ	*	75,477	254	46	135
*UA4WAV	*	73,755	340	37	112
*RD3AD	*	73,005	367	33	124
*UA3DSS	*	70,884	218	53	126
*UA3DFM	*	68,425	335	37	124
*UA3TN	*	68,400	330	38	106
*RA4ACX	*	64,874	270	41	122
*RZ6HV	*	63,940	279	39	100
*RV3MR	*	63,195	271	34	131
*RZ3QS	*	60,480	254	38	106
*RA6FUZ	*	59,020	322	30	100
*RU3WR	*	57,218	294	36	98
*RZ3DC	*	56,800	199	38	104
*UA3ACL	*	56,784	351	34	134
*RK6FZ	*	52,744	268	43	109
*UA4AMM	*	52,440	197	45	107
*RN4LL	*	51,084	301	27	102
*RU3DM	*	48,515	136	53	102
*RA4NCC	*	44,722	209	31	87
*RA1QN	*	42,244	304	26	92
*RW3VI	*	40,950	313	24	102
*RW6BD	*	40,014	281	22	59
*RN3AAB	*	38,676	250	29	103
*RA3VE	*	36,295	266	22	97
*RW3DA	*	36,010	245	27	103
*UA1ORL	*	35,990	236	22	96
*RA3XO	*	35,211	107	50	71
*UA3UHZ	*	33,264	192	37	107
*RK3DU	*	32,000	248	27	101
*RK6MY	*	29,853	204	25	82
*UA4AQL	*	29,568	265	19	65
*RA3BQ	*	29,478	120	37	65
*UA6FQ	*	26,703	117	45	84
*UA4FCO	*	25,753	263	20	71
*RV3IC	*	23,970	198	19	66
*RA6AAW	*	22,264	98	38	54
*UA3QFY	*	20,088	166	37	87
*RU1AT	*	19,110	146	23	75
*RL3DR	*	16,720	131	29	81
*RA4SE	*	14,484	144	21	50
*RW4LQ	*	13,612	65	33	49
*RW4HM	*	13,468	69	30	61
*RA4HL	*	12,960	83	33	47
*RZ3OV	*	12,792	112	23	59
*RN4CA	*	12,008	103	24	52
*RD3DT	*	11,815	71	31	54
*RV3MI	*	11,242	100	21	56
*RA3IS	*	11,120	106	23	57
*RX3MX	*	9,672	88	31	62
*UA6YH	*	9,063	66	27	30
*RW3FX	*	8,190	69	21	42
*RA6FSZ	*	7,208	109	15	53
*RA3FH	*	6,305	43	26	39
*RU3TC	*	5,940	79	20	40
*RZ3DX	*	4,617	35	25	32
*RU4CS	*	2,691	23	17	22
*RX6AOB	*	2,610	31	17	28
*RA6XB	*	2,442	31	16	21
*UA3QLQ	*	2,432	26	16	16
*RU4LM	*	2,331	23	15	22
*UA1CHJ	*	2,296	33	13	28
*RN6DR	*	2,021	32	15	28
*RK4PC	*	1,833	33	15	32
*UA9QCP/3	*	1,430	47	6	20
*UA4WAG	*	875	28	8	17
***UA6AK**	**28**	**3,924**	**79**	**5**	**31**
***RD3BE**	**21**	**18,792**	**106**	**24**	**63**
*RV6LX	*	14,904

*OH1XY	*	33,677	177	38	81
*OH6M8Q	*	29,456	226	24	88
*OH1TS	*	19,305	286	29	106
*OH3DP	*	14,025	144	22	63
*OH8VQ	*	2,964	34	15	23
*OH6RC	21	6,954	52	19	38
*OH7FF	*	1,288	33	8	15
***OH5K**	**14**	**22,165**	**259**	**16**	**49**
			(OP: OH5JTI)		
***OH2BPA**	**7**	**44,717**	**314**	**21**	**76**
*OH2LU	3.5	888	33	5	19
		France			
TM6X	**A**	**3,444,525**	**3285**	**120**	**405**
			(OP: F5VHY)		
F5BBD	*	349,504	956	51	203
F5UMP	*	225,453	343	80	257
F5JFU	*	114,151	296	62	149
F2QH	*	75,717	372	34	107
F5IN	*	28,842	171	33	81
F5RAB	*	20,706	151	23	79
F6ARC	**3.5**	**649,887**	**2510**	**33**	**114**
F8BPN	**1.8**	**38,617**	**505**	**14**	**59**
***F5PHW**	**A**	**712,620**	**1120**	**86**	**284**
***F6FTB**	*****	**705,647**	**1165**	**77**	**276**
*F5VV	*	403,914	761	77	249
*F5INJ	*	318,928	741	52	196
*F8EEQ	*	294,126	692	75	207
*F5PLC	*	274,219	550	67	190
*F5LCU	*	162,006	455	46	155
*F6DYX	*	158,839	495	40	153
*F5ODA	*	156,264	583	51	153
*F5SGI	*	144,837	439	39	132
*F5AQB	*	142,484	548	48	151
*F5LVL	*	38,220	190	31	74
*F6DZD	*	34,776	208	30	96
*F8DFP	*	34,553	261	29	80
*F8DZY	*	31,688	126	39	97
*F6JOE	*	31,415	227	25	78
*F6CZV	*	27,089	155	28	75
*F5TGR	*	25,515	225	35	100
*F8DNX	*	24,096	120	32	64
*F1ICS	*	23,520	130	28	70
*F5KAR	*	8,091	137	24	63
			(OP: F8CVB)		
*F5GGL	*	4,233	43	20	31
*F8FQJ	*	3,528	66	17	46
*F8DYD	*	2,520	54	17	28
***F4FDA**	*****	**414**	**22**	**6**	**17**
*TM2OFL	*	144	56	9	15
			(OP: F5TRK)		
*F4OHA	*	100	25	7	18
***F5JY**	**21**	**40,800**	**186**	**38**	**66**
***F5PAL**	**7**	**29,204**	**188**	**23**	**75**
*F5NEP	*	3,783	47	10	29
		Germany			
DJ5MW	**A**	**4,427,990**	**3688**	**137**	**458**
DL3YM	*****	**3,301,200**	**3378**	**126**	**399**
DJ5QV	*****	**1,977,070**	**2360**	**112**	**310**
DLØUM	*	1,333,056	1702	98	295
			(OP: DL7FER)		
DL8SCG	*	1,289,484	1469	119	357
DL2DX	*	1,163,786	1215	110	332
DL5YM	*	954,986	1346	106	316
DK3KD	*	692,562	1211	75	263
DL3OBQ	*	673,766	1529	69	205
DL4ME	*	669,578	1405	77	261
DL5WW	*	603,072	772	97	252
DL2DXA	*	576,240	823	86	257
DL1RG	*	529,433	837	78	271
DF1IAQ	*	511,086	977	74	235
DJ6QZ	*	489,846	853	67	260
DL5XAT	*	440,998	839	68	243
DL2MDU	*	430,578	766	77	265
DL8KJ	*	413,340	730	75	257
DK1KH	*	294,550	661	62	212
DK8EY	*	285,318	634	55	207
DL4JYT	*	233,104	594	63	209
DL1LOD	*	231,572	645	60	217
DL1DTC	*	222,208	508	52	204
DL1VDL	*	199,946	400	73	184
DD4DA	*	166,400	556	46	154
DJ3XD	*	156,148	616	46	160
DL5AWI	*	145,416	438	52	167
DL5ST	*	145,152	324	63	193
DL5KUA	*	124,074	353	53	173
DL2ZA	*	110,952	483	39	145
DL1GKC	*	104,796	354	47	117
DL8YR	*	103,115	328	53	152
DJ2SL	*	101,728	289	53	134
DL2HRE	*	76,860	246	44	136
DK4RL	*	73,800	255	42	108
DL9AWI	*	72,375	271	42	83
DH6BH	*	71,001	341	36	111
DL8EAQ	*	69,874	330	36	125
DL6EZ	*	67,088	256	31	81
DL2RTL	*	57,934	252	44	122
DL3YA	*	46,720	213	31	97
DL9JON	*	44,676	133	58	88
DK5EZ	*	40,936	155	39	97
DL2RU	*	27,816	102	48	74
DL8UNF	*	22,040	207	18	77
DL2KUF	*	21,728	110	38	74
DKØED	*	16,287	110	31	58
			(OP: DJ5CL)		
DL1VRL	*	15,840	87	21	51
DL9EO	*	14,652	93	29	70
DK1LRS	*	13,328	100	18	38
DJ4PI	*	11,844	74	35	49
DL3ARM	*	11,730	117	21	64
DJ1XT	*	6,698	73	13	21
DL8OBF	*	3,588	52	25	44
DL8USA	*	816	12	12	12
DL4LBK	**21**	**30,324**	**172**	**22**	**62**
DK5JM	*	29,624	188	25	67
DM3MM	**14**	**291,876**	**899**	**37**	**119**
DK7AN	*	54,372	270	24	68
DL2VK	*	1,485	19	10	17
DJ1YFK	**7**	**751,128**	**2335**	**37**	**131**
DF6RI	*	14,818	143	13	49
DD2D	**3.5**	**375,590**	**1692**	**33**	**109**
			(OP: DK8ZB)		
DK2CF	*	106,810	787	20	90
DJ5EU	*	88,063	858	15	68
DL7BA	*	18,023	234	12	55
DJØMDR	**1.8**	**217,116**	**1338**	**25**	**86**
DJ2BC	*	15,447	279	11	46
***DD5M**	**A**	**1,050,800**	**1719**	**88**	**282**
			(OP: DJ8ZY)		
***DL1NKS**	*****	**779,220**	**1356**	**82**	**288**
***DL7UMK**	*****	**440,800**	**984**	**67**	**237**
*DL6UNF	*	425,088	890	67	221
*DL2SWW	*	354,603	756	70	219
*DL5YL	*	305,184	786	60	204
*DL5ARM	*	299,547	879	55	194
*DL1SAN	*	293,090	683	66	199
*DJ8UV	*	292,005	759	67	242
*DK3DUA	*	276,330	547	75	227
*DL3EBX	*	272,406	650	46	203
*DF4TD	*	271,872	547	57	199
*DL8UKE	*	271,272	533	77	190
*DL3ZAI	*	264,420	627	50	176
*DL3VZL	*	259,831	606	71	228
*DL5JRA	*	252,712	635	58	190
*DJ2IA	*	246,874	539	74	200
*DJ9CN	*	220,248	603	56	196
*DM3FZN	*	212,636	597	52	160
*DA2U	*	207,708	645	49	179
***DJ4PT**	*****	**193,494**	**444**	**59**	**179**
*DL1ET	*	184,644	436	55	152
*DM5ØKWF	*	176,144	656	42	160
			(OP: DL3KWF)		
*DL1TS	*	174,900	531	44	168
*DK8NT	*	165,288	386	50	163
*DL8ULO	*	163,323	593	42	165
*DL8ZAJ	*	160,527	422	57	162
*DL1VJL	*	156,520	431	51	164
*DF6QC	*	149,295	630	34	151
*DL2F	*	148,333	758	58	153
			(OP: DL2FDL)		
*DK2BJ	*	147,911	501	44	167
*DL5CL	*	136,578	482	50	171
*DL5CD	*	132,459	588	42	159
*DF2PH	*	121,550	468	38	132
*DL1RTL	*	121,338	358	50	139
*DJ3XA	*	116,620	431	43	153
*DK5DQ	*	115,740	383	40	140
*DL2ANM	*	111,554	397	48	145
*DKBAX	*	108,368	308	64	144
*DL8DAS	*	108,031	367	43	118
*DL5ASK	*	103,530	268	46	164
*DL4SL	*	102,960	405	39	141
*DL3WKG	*	101,935	344	47	138
*DL3KWR	*	95,557	388	46	141
*DF5AN	*	93,280	313	40	136
*DJ5TT	*	87,204	404	36	120
*DM2RN	*	85,003	377	32	135
*DM3PKK	*	84,150	280	41	112
*DK3WN	*	83,782	338	38	125
*DH2URF	*	81,909	276	41	130
*DL7FCQ	*	80,556	379	35	112
*DL8HK	*	80,256	325	42	150
*DL1THB	*	77,284	396	30	109
*DL1KUR	*	74,592	309	40	108
*DK3WJ	*	74,235	266	35	112
*DL4AC	*	72,960	402	34	118
*DL3XM	*	70,800	304	36	114
*DF5BM	*	70,064	255	42	109
*DL7ULM	*	70,016	249	36	92
*DJ5IR	*	66,750	295	33	117
*DH3RB	*	66,640	356	28	108
*DK7GH	*	62,886	227	38	103
*DL2AWA	*	61,102	255	37	100
*DL1IA	*	60,621	229	47	120
*DL4JNB	*	60,552	309	37	137
*DL5KM	*	59,348	272	35	113
*DL8NBJ	*	55,224	281	34	122
*DL1EAL	*	53,448	196	32	99
*DL9SEV	*	51,480	224	32	85
*DL1AKZ	*	49,657	209	39	88
*DF3HD	*	48,384	314	28	80
*DF6WE	*	48,372	322	44	130
*DL8DWW	*	44,759	228	35	108
*DK5PF	*	42,840	237	26	94
*DL5KUR	*	42,372	189	29	70
*DL3FBB	*	39,498	274	24	63
*DJ2FR	*	38,812	273	29	95
*DJ2AX	*	38,263	208	28	55
*DK3WW	*	37,570	132	44	86
*DL6RBH	*	37,281	204	33	96
*DG4YGW	*	35,746	215	29	93
*DJ2GM	*	32,472	197	29	59
*DL8CKL	*	30,752	147	32	92
*DL6UM	*	30,537	214	28	89
*DJ2SX	*	30,104	178	39	103
*DLØNG	*	29,456	195	30	82
			(OP: DK8NC)		
*DL7FA	*	29,193	230	26	85
*DL1ATR	*	28,680	173	33	87
*DL7BW	*	28,644	171	30	94
*DL6DCD	*	28,625	156	32	93
*DL3YEE	*	27,068	129	41	93
*DJ1HF	*	23,660	197	18	52
*DL6BQE	*	23,220	202	20	88
*DL2AL	*	21,755	156	28	67
*DL8DXL	*	20,116	155	27	80
*DL1TPY	*	19,800	209	19	91
*DL1NUX	*	19,080	150	21	69
*DK4DS	*	18,920	119	28	60
*DL3DRN	*	17,199	155	17	74
*DJ7A	*	16,055	223	17	78
*DL3DBY	*	15,980	190	19	66
*DL7VRG	*	15,048	137	29	85
*DL4EAX	*	13,968	109	24	73
*DL2FK	*	13,816	87	25	63
*DL2AXM	*	13,395	144	22	73
*DL4VQ	*	12,931	123	25	42
*DL3JRA	*	12,376	96	20	48
*DL8JDX	*	12,012	77	25	53
*DL9GWD	*	11,438	129	23	63
*DL1DBR	*	11,220	103	27	58
*DL8CA	*	10,704	82	19	29
*DL5EBF	*	10,608	89	20	48
*DL4NT	*	10,089	102	17	40
*DF3IS	*	9,396	93	24	50
*DK8NI	*	9,196	105	18	58
*DO1UZ	*	8,631	156	11	52
*DO1AYJ	*	8,512	75	21	43
*DK7CH	*	8,400	119	17	58
*DL2IAN	*	8,378	62	22	37
*DO6SR	*	8,265	168	14	43
*DC3FR	*	8,050	64	18	32
*DL2ØØBBY	*	6,380	71	17	41
			(OP: DL5EBF)		
*DL1DOW	*	5,985	60	21	42
*DL1VTL	*	5,544	60	20	36
*DF7JC	*	5,187	59	15	24
*DL3DXF	*	4,929	60	24	29
*DJ8ES	*	4,818	45	28	45
*DL8UGF	*	4,700	67	13	37
*DL1AWM	*	4,514	70	20	54
*DK3PM	*	4,485	55	15	54
*DO1YCL	*	2,856	98	8	43
*DM2BPG	*	2,040	53	10	41
*DC2IP	*	1,927	41	15	26
*DJ6UP	*	1,800	36	9	15
*DKØIU	*	1,634	33	8	11
			(OP: DJ4KW)		
*DL6UAM	*	1,564	50	6	28
*DO1SAJ	*	1,368	40	7	29
*DL3AZI	*	924	26	13	20
*DC9AM	*	689	29	6	7
*DL6UOF	*	100	96	12	48
*DKØNK	*	24	2	2	2
			(OP: DJ2IA)		
***DO4DXA**	**28**	**80**	**13**	**3**	**7**
***DL4UL**	**21**	**20,400**	**110**	**23**	**62**
***DL3DTH**	**14**	**149,193**	**511**	**30**	**107**
***DL4AAE**	*****	**129,720**	**500**	**26**	**94**
*DL9LM	*	90,906	437	24	85
*DKØBM	*	32,266	221	19	54
			(OP: DD5KG)		
*DL4XU	*	24,180	239	14	46
*DL2BBV	*	13,900	132	9	41
*DM4WL	*	11,439	129	13	28
*DH8MS	*	9,310	114	12	26
*DL2MIH	*	5,624	66	15	23
*DL1ARD	*	3,675	64	15	34
*DJ5CL	*	825	27	7	8
***DL5KUD**	**7**	**130,340**	**561**	**30**	**110**
***DL4FN**	*****	**122,130**	**631**	**25**	**90**
***DF7GG**	*****	**121,448**	**530**	**27**	**109**
*DF3AX	*	84,900	574	21	79
*DJ2XC	*	79,323	417	27	110
*DL4HWI	*	60,606	256	26	91
*DF3OL	*	57,291	296	27	86
*DK3WM	*	55,096	309	18	79
*DL6KWN	*	49,200	337	19	81
*DL4HG	*	38,632	382	20	68
*DL2LRT	*	35,247	258	20	73
*DGØDG	*	20,368	146	17	59
*DJ4IC	*	3,588	61	10	42
***DABCA**	**3.5**	**107,994**	**1041**	**16**	**66**
			(OP: DL1REM)		
***DL7BY**	*****	**83,566**	**790**	**17**	**77**
*DJ6BQ	*	48,970	491	16	67
*DL6MTA	*	41,116	385	17	59
*DL2RUG	*	40,108	429	13	61
*DL9CW	*	34,790	434	12	58
*DH9SB	*	15,808	219	11	53
*DL2MLU	*	342	26	4	14
***DL6UAA**	**1.8**	**24,418**	**414**	**9**	**49**
***DK3UA**	*****	**17,484**	**235**	**11**	**51**
*DL7VMM	*	15,120	245	9	47
*DL1ROJ	*	8,960	200	10	46
*DL2KDW	*	3,560	95	6	34
*DL8UAA	*	115	33	4	19
		Greece			
SV1ENG	**A**	**783,104**	**1908**	**68**	**236**
SV1JA	*	142,688	343	63	145
J43J	**7**	**479,408**	**2052**	**36**	**130**
			(OP: DJ5JH)		
SV1GRD	**1.8**	**4,692**	**116**	**9**	**37**
***SV1JFT**	**7**	**10,512**	**97**	**23**	**50**
		Guernsey			
***MUØFAL**	**A**	**395,010**	**1065**	**47**	**184**
*MUØGSY	*	493	26	9	20
***GU4YOX**	**7**	**185,112**	**1041**	**23**	**85**
		Hungary			
HA7PL	**A**	**550,298**	**968**	**76**	**246**
HA7LW	*	222,250	615	66	184
HAØLC	*	43,676	161	41	81
HA3GJ	**21**	**13,300**	**86**	**23**	**53**
HA3GQ	*	4,700	39	18	32
HA1YI	**14**	**327,558**	**1039**	**34**	**120**
HAØLP	*	218,550	721	34	107
HA8VK	*	199,048	735	31	108
HA7PO	*	53,227	252	24	77
HA8FM	**7**	**312,004**	**1219**	**35**	**119**
HA8JV	**3.5**	**476,112**	**1986**	**35**	**121**
HA8BE	*	230,036	1298	29	102
HA8A	*	162,720	986	26	94
			(OP: HA8DZ)		
HG6V	*	110,960	1060	21	74
HA8IB	**1.8**	**170,274**	**1234**	**26**	**92**
***HA5LZ**	**A**	**489,084**	**797**	**75**	**243**
*HA3OD	*	43,818	219	29	80
*HA7AVU	*	14,694	139	28	65
*HA6XA	*	100	22	8	14
***HA6IAB**	**28**	**1,890**	**30**	**11**	**24**
***HA3JB**	**21**	**22,800**	**144**	**24**	**52**
*HA6ZQ	*	684	14	7	11
***HA8IH**	**14**	**417,186**	**1397**	**35**	**112**
*HG8C	*	240,732	701	35	127
			(OP: HA8EK)		
*HA1VE	*	103,831	501	28	63
***HA3MU**	**7**	**143,906**	**657**	**28**	**105**
*HA2MN	*	47,405	318	20	75
*HA4YO	*	26,572	258	18	55
***HA6NL**	**3.5**	**159,372**	**1142**	**25**	**89**
***HA8GY**	**1.8**	**24,255**	**258**	**17**	**60**
		Iceland			
TF3CW	**7**	**288,672**	**1592**	**27**	**97**
***TF3GB**	**A**	**293,760**	**911**	**36**	**124**
*TF8SM	*	108,054	428	38	136
*TF8GX	*	40,690	190	32	98
***TF2JB**	**3.5**	**14,416**	**243**	**9**	**44**
		Ireland			
EI5DI	**A**	**1,965,378**	**2564**	**94**	**308**
EI4DW	*	63,618	282	34	104
EI2CN	**1.8**	**141,723**	**1066**	**17**	**70**
***EI6JY**	**A**	**88,290**	**506**	**33**	**129**
***EI4CF**	**21**	**32,480**	**243**	**19**	**61**
***EI4HQ**	**7**	**54,544**	**363**	**25**	**87**
***EI6DX**	**3.5**	**110,732**	**900**	**16**	**78**
		Isle of Man			
***GDØAMD**	**A**	**12,848**	**151**	**19**	**69**
		Italy			
IU2R	**A**	**3,039,120**	**3146**	**138**	**438**
			(OP: IK2QEI)		
IZ8EDL	*	232,794	535	63	180
IK3SWB	*	121,440	240	74	190
IR7A	*	71,040	193	54	131
			(OP: I7ALE)		
IK8SEU	*	64,184	297	40	102
IK3OII	*	44,811	207	38	79
IV3DYS	*	39,250	218	30	95
IU1A	*	32,195	177	44	93
			(OP: IK1SPR)		
I2TFJ	*	20,928	184	23	73
I5JFG	*	7,820	58	27	41
IZØGYP	*	3,075	35	18	23
IK3SSO	**21**	**22,040**	**172**	**25**	**51**
IZ8GCB	**14**	**468,688**	**1437**	**38**	**138**
IK2SND	**3.5**	**183,648**	**1442**	**25**	**71**
I1NVU	*	118,706	756	25	97
IQØOS	**1.8**	**13,328**	**278**	**7**	**49**
***IK2AHB**	**A**	**360,800**	**903**	**51**	**169**
***IN3FHE**	*****	**249,260**	**726**	**48**	**172**
***I2AZ**	*****	**200,184**	**492**	**58**	**170**
*IK4UNH	*	169,074	499	46	156
*IK2CFD	*	128,304	395	40	122
*I6FDJ	*	104,652	458	36	126
*IZ8DBJ	*	95,151	366	56	141
*IK5FKF	*	75,894	296	35	104
*IZ1DXS	*	72,501	287	38	105
*IK2NUX	*	71,222	227	40	109
*IZ3DVU	*	57,845	230	41	74
*IZ5GRS	*	44,880	222	33	87
*IZ5HQB	*	43,778	221	36	70
*IZ3EAX	*	40,584	221	32	82
*IK1DPA	*	34,544	200	38	98
*IK1WEG	*	31,968	197	34	62
*IK2NCF	*	30,537	197	24	63
*IK2ECP	*	29,376	163	30	66
*IK1CCS	*	25,197	143	34	77
*IK2UJF	*	22,610	164	24	71
*IKØZSN	*	20,900	165	25	70
*IV3IFN	*	20,176	92	41	56
*IK2CZQ	*	18,761	127	22	51
*IK2YXP	*	17,475	122	27	48
*IZØKBW	*	16,188	132	24	52
*IZ3ETC	*	15,138	106	29	58
*IK3MLF	*	15,066	126	31	62
*IK5PVX	*	14,432	142	28	54
*IK1TJK	*	12,561	74	27	52
*IW1GAL	*	12,218	111	26	56
*IK7RVY	*	11,534	120	20	53
*IZ3NVR	*	9,039	98	24	45
*IZ2GMT	*	8,413	75	19	28
*IK1WJN	*	7,440	71	30	50
*IZ7EUB	*	6,834	51	23	44
*IK6ZDE	*	4,368	55	14	34
*IK2IKW	*	4,160	60	20	45
*IZØFVD	*	1,836	55	9	42
*IK7WPD	*	552	21	10	13
***IZ3DBA**	**14**	**19,030**	**216**	**18**	**37**
*IZ3KMY	*	1,768	34	9	25
***IV3AZV**	**7**	**72,930**	**508**	**29**	**81**
*IK2AOO	*	21,804	239	10	59
*IK1YED	*	9,880	132	12	53
*IC8FBU	*	5,760	127	18	62
*IZØGXM	*	740	13	8	12
***I0JO**	**3.5**	**89,544**	**795**	**16**	**66**
			(OP: IZ3ALF)		
***IK2HDF**	*****	**59,427**	**744**	**14**	**57**
*I4JEE	*	14,100	222	9	51
*IØYDV	*	8,316	192	10	44
*IV3TQE	*	4,402	88	13	49
*IK8YJQ	*	3,290	98	6	29
		Kaliningrad			
UA2CZ	**A**	**212,298**	**497**	**60**	**186**
***RA2FN**	**A**	**48,576**	**220**	**30**	**108**
*UA2FT	*	35,332	122	41	80
***RA2FB**	**14**	**67,776**	**338**	**21**	**75**
*RK2FWN	*	36,766	210	14	48
***UA2FL**	**7**	**171,000**	**1221**	**23**	**91**
*UA2FGY	3.5	54	6	3	3
		Latvia			
YL6W	**A**	**2,683,086**	**2819**	**133**	**446**
			(OP: YL2GD)		
YL2PP	*	12,998	60	39	58
YL2GQT	**7**	**311,084**	**1333**	**37**	**129**
YL2SM	**1.8**	**231,297**	**1301**	**30**	**99**
***YL2CV**	**A**	**665,984**	**1227**	**78**	**274**
***YL5M**	*****	**564,570**	**1274**	**62**	**244**
			(OP: YL2UZ)		
*YL2TQ	*	370,728	533	91	251
*YL2TB	*	361,530	1034	52	182
*YL3DX	*	261,870	941	47	168
*YL2CR	*	105,225	580	34	149
*YL2NK	*	60,502	311	39	140
*YL9ØCP	*	53,562	293	41	117
			(OP: YL2CP)		
*YL2PJ	*	46,920	228	32	83
*YL2HK	*	26,160	213	25	84
*YL2IP	*	18,252	110	27	81
*YL3GGX	*	8,970	110	13	56
***YL3FT**	**7**	**251,158**	**908**	**35**	**131**
***YL5W**	*****	**146,861**	**728**	**32**	**111**
***YL3IZ**	**3.5**	**82,712**	**803**	**20**	**78**
*YL2EC	*	17,873	236	11	50
		Liechtenstein			
HBØ/DK9TN	**14**	**374,396**	**1353**	**32**	**102**
HBØ/DK4YJ	**7**	**639,210**	**2269**	**36**	**129**
		Lithuania			
LY7Z	**A**	**3,017,846**	**3437**	**133**	**400**
LY2MM	*****	**975,256**	**1481**	**92**	**312**
LY2VA	*	413,295	1023	68	227
LY3ID	*	350,424	821	72	242
LY7ØX	*	309,100	908	63	212
			(OP: LY3X)		
LY2BKT	*	264,701	885	45	178
LY3BG	*	253,000	758	46	174
LY2DX	*	179,536	610	60	169
LY3M	*	9,176	146	18	44
LY2NK	*	1,829	57	9	22
LY1G	**21**	**26,600**	**158**	**26**	**69**
LY2T	**14**	**160,902**	**633**	**30**	**96**
LY2X	*****	**156,890**	**522**	**33**	**112**
LY2FN	**7**	**216,081**	**922**	**35**	**124**
LY2F	*	81,529	339	29	104
LY3BY	**3.5**	**419,604**	**1950**	**32**	**114**
LY4G	*	79,230	643	20	75
LY2IJ	**1.8**	**329,372**	**1581**	**30**	**104**
***LY4T**	**A**	**811,966**	**1468**	**82**	**280**
*LY2TS	*	256,480	787	49	180
*LY2DX	*	225,360	656	56	184
*LY1BA	*	155,480	293	57	203
*LY2DV	*	145,318	444	57	169
*LY1BX	*	140,262	548	45	149
*LY2OM	*	42,228	262	33	105
*LY2N	*	11,022	71	25	41
***LY2OU**	**14**	**133,420**	**540**	**31**	**109**
***LY2KZ**	**7**	**106,671**	**812**	**23**	**88**
*LY2AT	*	41,195	257	23	84
***LY2GW**	**3.5**	**90,386**	**870**	**17**	**69**
*LY2BBF	*	6,437	155	7	34
		Luxembourg			
***LX9EG**	**A**	**15,792**	**100**	**30**	**54**
*LX1ER	*	3,968	45	23	39
***LX1NO**	**1.8**	**24,453**	**415**	**8**	**49**
		Macedonia			
Z35T	**14**	**500,742**	**1693**	**37**	**125**
Z37M	**7**	**822,976**	**2817**	**37**	**139**
Z35X	**1.8**	**17,596**	**286**	**9**	**44**
***Z35F**	**A**	**89,980**	**609**	**30**	**80**
		Moldova			
ER3AU	**A**	**246,480**	**659**	**67**	**173**
***ERØFEO**	**A**	**703,584**	**1612**	**77**	**272**
					(OP: UR5FEO)
*ER5DX	*	278,502	566	63	203
*ER1RR	*	77,924	210	53	101
*ER3DX	*	51,150	143	50	100
*ER3ZZ	*	12,626	79	27	32
*ER1DAC	*	7,670	59	22	43
***ER100**	**28**	**176**	**10**	**4**	**7**
***ER1WK**	**14**	**54,837**	**340**	**20**	**61**
***ERB/UTØFT**	**7**	**79,704**	**523**	**25**	**83**
					(OP: UTØFT)
***ER2RM**	**1.8**	**28,352**	**420**	**10**	**54**
		Montenegro			
4O3A	**A**	**6,425,418**	**5575**	**147**	**459**
***4O3Z**	**A**	**73,120**	**426**	**36**	**124**
		Netherlands			
**PA3A

***LA5FH**	**7**	**12,060**	**182**	**12**	**48**
*LA7GIA	*	10,540	108	15	53
*LA6ZFA	3.5	5,243	98	10	39
Poland					
SP2LNW	**A**	**1,055,844**	**1518**	**95**	**322**
SN5N	**"**	**860,024**	**1584**	**83**	**254**
			(OP: SP5KP)		
SP3LPG	*	562,358	1141	81	236
SP5ATO	*	376,941	599	69	254
SP4BEU	*	196,988	497	57	185
SP9RI	*	186,507	522	44	163
SQ7B	*	128,331	515	35	154
SP6IEQ	*	111,296	351	44	144
SP9JZU	*	88,308	273	58	140
SP2FGO	*	74,106	312	46	133
SN2M	*	59,166	221	56	117
SP2FWC	*	10,507	58	32	47
SP6AEG	*	408	10	7	10
SP6T	*	48	5	4	4
SP1GZF	**21**	**28,930**	**149**	**28**	**82**
SP9DTH	*	8,645	85	24	41
SN7C	**14**	**337,295**	**980**	**35**	**126**
			(OP: SP7CHS)		
SP9DLY	*	81,096	399	28	81
SP4TKR	**7**	**301,875**	**1079**	**37**	**138**
SP5ELA	**"**	**293,654**	**1192**	**35**	**131**
SP3GTS	*	205,199	807	33	124
SN7F	*	61,692	323	24	82
			(OP: SP7LFT)		
SP9RQH	*	30,345	211	23	82
SN7Q	**3.5**	**649,952**	**2512**	**33**	**119**
SP7JQQ	*	78,351	685	20	71
SP3OCC	*	39,500	320	21	79
SP5CFD	*	6,720	47	24	40
SP3GEM	*	3,234	36	15	18
SN4L	*	2,541	84	7	26
			(OP: SP4JCP)		
SP3BQ	**1.8**	**296,320**	**1527**	**28**	**100**
			(OP: SP3HLM)		
SN3R	**"**	**270,125**	**1487**	**27**	**98**
			(OP: SP3HRN)		
SQ1K	*	32,802	454	13	53
SQ7FPD	*	12,691	239	8	41
SP5GH	*	9,306	78	11	57
SP2GJV	*	2,380	50	9	25
***SP1AEN**	**A**	**593,946**	**1294**	**59**	**247**
***SP3LWP**	**"**	**570,468**	**1108**	**81**	**266**
***SP7JOA**	**"**	**381,728**	**868**	**73**	**243**
*SP3VT	*	372,232	994	62	227
*SP2AYC	*	296,960	783	53	203
*SN9U	*	256,850	605	64	211
			(OP: SP9UMJ)		
*SP6A	*	184,410	462	61	209
*SP3DOF	*	171,072	521	51	165
*SP3HC	*	155,595	555	40	165
*SP2IU	*	145,977	399	53	144
*SP9BGS	*	133,076	436	50	156
*SP5CGN	*	131,928	503	40	144
*SP6MLX	*	109,394	370	44	122
*SP6BEN	*	97,148	282	42	121
*3Z8Z	*	96,148	301	51	121
			(OP: SP8AJC)		
*SQ6NES	*	83,997	319	41	112
*SP9CV	*	79,297	315	47	132
*SP3XR	*	73,568	242	46	130
*SP2IW	*	67,297	234	46	127
*SP3DIK	*	67,250	209	48	77
*SP9FT	*	65,610	252	39	96
*SP5CQI	*	60,187	269	35	104
*SP9BNM	*	56,290	404	30	100
*SP9IBJ	*	54,684	326	26	100
*SP8YB	*	51,689	245	35	92
*SP4DZT	*	31,110	101	42	80
*SP9CXN	*	29,430	212	28	81
*SN1A	*	29,052	214	28	80
			(OP: SP1EG)		
*SP4AVG	*	27,412	171	23	66
*SP9IHP	*	26,640	126	26	46
*SO9R	*	16,767	129	21	60
*SP4AAZ	*	15,435	125	29	76
*SP2MHC	*	12,717	155	23	58
*SP7TES	*	11,319	80	26	51
*SQ1EUG	*	9,720	78	19	35
*SQ8LEC	*	7,791	88	16	37
*SP3GRQ	*	4,620	63	15	20
*SP9MZH	*	4,173	59	15	24
*SP7SZW	*	4,160	214	11	69
*SQ6NTE	*	2,160	59	15	39
*SP7EXJ	*	2,016	24	17	19
*SQ6YP	*	10	5	5	5
***SP2GCE**	**21**	**13,390**	**85**	**22**	**43**
*SP8BVN	*	3,280	37	14	26
***SQ9UM**	**14**	**233,631**	**668**	**35**	**118**
*SQ2GXO	*	102,102	392	30	89
*SP2JLR	*	89,870	370	27	83
*SP3FYX	*	59,772	291	28	74
*SN9N	*	59,452	322	24	65
			(OP: SQ9ZM)		
*SP3JUN	*	44,308	269	20	56
*SP9DUX	*	39,680	239	21	59
*SP2AVE	*	33,930	197	22	56
*SP8BAB	*	26,207	157	20	53
*SP8HDP	*	24,747	178	22	51
*SQ8JLU	*	21,660	184	17	43
*SP9DNO	*	18,788	143	18	43
*SP6DMI	*	18,560	183	14	44
*SP2AEK	*	17,864	195	20	57
*SP3AZO	*	11,050	82	17	48
*SQ5BUO	*	5,900	64	15	35
*SQ2AJI	*	4,305	71	11	24
*SP2MKI	*	2,990	50	11	15
***SQ9C**	**7**	**365,378**	**1165**	**37**	**132**
***SP6OJE**	**"**	**242,811**	**1054**	**33**	**120**
*SP2QG	*	181,336	714	34	118
*SP5CNA	*	137,408	530	33	119
*SP7DCS	*	114,840	682	26	94
*SP9JZT	*	87,377	377	30	101
*SQ9BDN	*	76,260	370	26	98
*SP7OGP	*	72,118	529	24	83
*SP6EIY	*	57,040	387	24	91
*SP5GDY	*	55,440	326	25	85
*SP5MBA	*	22,446	171	19	67
*SP4BOS	*	20,262	245	13	53
*SP8BWE	*	16,827	234	16	55
*SP9GKM	*	15,240	162	14	46
*SP6TRH	*	5,544	72	13	31
*SP3FPF	*	5,459	63	12	41
*SP9HZW	*	2,701	25	14	23
***SQ5M**	**3.5**	**58,548**	**605**	**18**	**66**
***SQ3BDQ**	**"**	**45,724**	**408**	**20**	**72**
*SP9FZC	*	43,450	484	15	64
*SP3CYY	*	38,528	363	16	70
*SQ1DWR	*	34,768	345	15	67
*SP8LZC	*	14,560	267	8	44
*SQ9MZ	*	13,780	179	11	54
*SQ8HNB	*	234	22	3	10
*SP3JIA	*	36	3	1	3
***SP8NR**	**1.8**	**37,855**	**513**	**11**	**56**
*SN5J	*	23,187	373	9	50
			(OP: SP5JXK)		
*SP4GL	*	15,550	299	9	41
*SP3IOE	*	7,228	120	11	41
*SN5Q	*	6,669	249	5	34
			(OP: SQ5RDX)		
*SP5CJY	*	4,400	107	7	33
Portugal					
CT1ENQ	**A**	**158,543**	**471**	**44**	**159**
CT1JLZ	**14**	**905,905**	**2563**	**39**	**142**
			(OP: OK1RF)		
***CS2T**	**A**	**4,579,659**	**4194**	**117**	**450**
			(OP: CT1ILT)		
***CT1BWW**	**21**	**22,144**	**139**	**21**	**43**
Romania					
YO7BGA	**A**	**362,648**	**790**	**84**	**233**
YO7LGI	*	143,184	435	63	165
YO7ARY	*	92,916	468	46	132
YO5CUQ	*	85,750	263	47	128
YR9ØU	*	54,210	706	20	58
			(OP: YO8AXP)		
YO3FF	*	44,288	299	35	93
YO2R	**21**	**37,100**	**191**	**30**	**70**
			(OP: YO2RR)		
YO9CWY	**14**	**55,537**	**349**	**21**	**58**
YO8KIS	**7**	**128,977**	**1004**	**22**	**79**
***YO4CAH**	**A**	**334,839**	**860**	**53**	**186**
***YO5DAS**	**"**	**218,943**	**565**	**56**	**187**
*YO4SI	*	198,360	501	69	192
*YO3CVG	*	134,550	390	60	165
*YO2QY	*	107,200	242	65	135
*YO8BPY	*	70,692	266	43	129
*YO8RFS	*	44,688	241	41	106
*YO7AWZ	*	44,640	366	32	128
*YO4ASG	*	38,916	171	46	95
*YO6HSU	*	31,218	185	37	92
*YO4DW	*	18,400	156	31	69
*YO5BXI	*	10,287	89	32	49
*YO7BGB	*	1,024	33	10	22
*YO4BTB	*	552	18	10	14
***YO2AOB**	**28**	**3,264**	**62**	**11**	**37**
*YO2AOB	*	50	8	5	5
***YO8DDP**	**21**	**13,394**	**92**	**22**	**52**
*YO4ATW	*	12,155	83	22	43
*YO9CXE	*	7,644	70	24	28
***YQ5Q**	**14**	**195,822**	**776**	**32**	**106**
			(OP: YO5OHO)		
*YO9OC	*	102,242	522	28	81
*YO4BEX	*	16,352	204	12	44
*YO8BFC	*	13,845	132	17	48
***YO6VCB**	**7**	**116,724**	**484**	**30**	**112**
*YO9AGI	*	68,714	713	19	75
*YP5Z	*	60,792	418	25	77
*YO9SW	*	13,200	156	14	46
*YO6AEI	*	9,920	177	12	52
*YO2ARV	*	2,772	51	18	26
*YO3GW	*	120	12	3	7
***YR6M**	**3.5**	**33,201**	**488**	**11**	**52**
			(OP: YO6MT)		
***YO9BPX**	**"**	**27,588**	**409**	**10**	**56**
*YO4MM	*	13,776	200	11	45
*YO5NY	*	6,864	153	7	37
*YO5CCX	*	4,620	137	8	34
***YO3FRI**	**1.8**	**49,932**	**674**	**12**	**61**
*YO2IS	*	32,627	568	9	50
*YO5AJR	*	28,655	516	8	47
*YO3FFF	*	22,098	338	9	49
*YO5BTZ	*	8,685	201	6	39
Sardinia					
***ISØHQJ**	**A**	**165,624**	**552**	**57**	**144**
*ISØOMH	*	53,196	251	38	105
***ISØ/OLØA**	**21**	**34,125**	**200**	**21**	**54**
			(OP: OK1CZ)		
Scotland					
GM4YXI	**A**	**1,461,700**	**3111**	**76**	**235**
GM3WUX	*	840,716	2159	62	206
GM4SID	*	352,800	955	56	196
GM4FAM	**7**	**374,352**	**1363**	**38**	**138**
***GMØNBM**	**A**	**200,880**	**653**	**41**	**175**
*GM3NHQ	*	99,355	426	33	122
*MMØYEC	*	26,775	267	18	87
*MMØRKT	*	24,705	191	17	64
*GM7TUD	*	16,695	120	27	78
*GM4UBJ	*	8,424	122	18	60
***GMØIIO**	**14**	**95,100**	**557**	**21**	**79**
***GM3YEH**	**7**	**73,723**	**508**	**20**	**87**
*MMØDHQ	*	340	18	4	16
Serbia					
YT2AA	**A**	**265,176**	**588**	**59**	**195**
YU1JF	*	86,229	272	44	99
YTØZ	**21**	**144,540**	**566**	**31**	**101**
			(OP: YU1ZZ)		
YT1BB	**14**	**692,716**	**2145**	**36**	**131**
YU7KW	**7**	**691,680**	**2358**	**37**	**139**
YT2W	*	632,548	2475	37	127
			(OP: YU1WS)		
YU7U	*	494,736	1523	36	140
YT5A	**3.5**	**382,690**	**1841**	**33**	**121**
			(OP: YT3W)		
YT8T	*	219,904	1416	30	98
YU1DW	*	95,703	1221	12	61
***YT2RX**	**A**	**924,768**	**1202**	**109**	**347**
*YU5W	*	473,671	997	68	221
			(OP: YU1QW)		
*YT2U	*	294,318	724	52	197
*YU1FG	*	154,985	718	30	109
*YU7LS	*	131,750	534	45	110
***YT2T**	**28**	**180**	**14**	**5**	**10**
***YT8A**	**21**	**32,560**	**182**	**23**	**65**
			(OP: YU1EA)		
*YU7EE	*	6,380	46	21	34
***YT5C**	**14**	**257,012**	**941**	**34**	**103**
			(OP: YU7WW)		
*YU8NU	*	11,592	184	14	32
*YU1ADO	*	3,337	204	20	51
*YU1SZ	*	92	42	17	29
***YU5T**	**7**	**142,803**	**814**	**28**	**95**
			(OP: YU1JU)		
*YU1CC	*	68,094	339	25	92
*YT2PFR	*	4,802	133	11	38
***YUØA**	**3.5**	**105,522**	**999**	**17**	**69**
			(OP: YU1RA)		
*YT4A	*	60,333	551	19	72
*YU1ED	*	52,744	625	14	62
*YU7DP	*	16,860	228	10	50
Shetland and Faire Isle					
*MMØXAU	21	1,020	19	7	13
***GZ5Y**	**14**	**22,440**	**269**	**13**	**38**
			(OP: MMØXAU)		
***MZ8A**	**7**	**18,998**	**263**	**14**	**45**
			(OP: MMØXAU)		
***MSØZET**	**3.5**	**20,888**	**296**	**10**	**46**
			(OP: MMØXAU)		
Sicily					
***IT9RZU**	**A**	**193,016**	**819**	**46**	**138**
***IW9GUR**	**21**	**26,013**	**141**	**26**	**61**
*IT9LKX	*	25,899	132	28	61
*IR9X	*	17,496	130	28	53
***IT9GAC**	**14**	**11,985**	**107**	**13**	**34**
Slovakia					
OM3OM	**A**	**655,368**	**1303**	**75**	**254**
OM7PY	*	330,456	603	74	207
OMØWR	**7**	**245,160**	**1233**	**34**	**101**
***OM7AG**	**A**	**386,232**	**1019**	**57**	**209**
*OM8ON	*	335,203	449	90	251
*OM4DN	*	273,312	808	51	183
*OM3PQ	*	199,980	600	49	149
*OM4J	*	190,890	337	74	241
			(OP: OM4JD)		
*OM3BA	*	141,006	456	43	170
*OM8LA	*	130,977	467	63	180
*OM4DA	*	106,741	489	34	139
*OM6AL	*	96,875	620	31	124
*OM3IAG	*	87,720	301	51	119
*OM5UM	*	85,280	458	31	129
*OM7AT	*	38,243	419	28	76
*OM4DU	*	33,408	217	35	93
*OM3TPN	*	27,260	209	31	85
*OM8AQ	*	14,168	88	24	53
*OM5MX	*	8,748	91	17	37
*OM4AY	*	3,294	89	14	47
*OM1TD	*	2,378	48	13	28
***OM3TB**	**14**	**43,956**	**311**	**19**	**55**
*OM5LR	*	35,340	303	17	43
*OM8RA	*	5,022	58	13	18
***OM3CDN**	**7**	**14,105**	**144**	**14**	**51**
***OM3RDX**	**3.5**	**172,816**	**1211**	**25**	**87**
			(OP: OM6KW)		
*OM4W	*	97,110	1062	16	67
			(OP: OM4KW)		
*OM6MW	*	25,718	270	16	61
*OM8HG	*	18,975	301	9	46
*OM3TLE	*	15,070	255	10	45
*OM6TX	*	9,840	193	8	40
***OMØTT**	**1.8**	**55,918**	**696**	**12**	**61**
Slovenia					
S5ØA	**A**	**4,426,425**	**3877**	**146**	**427**
S52OP	**"**	**2,059,695**	**2319**	**125**	**370**
S53XX	*	296,689	714	63	164
S53FO	*	242,638	547	71	198
S59T	**"**	**650**	**23**	**9**	**17**
S57S	**28**	**10,478**	**154**	**14**	**48**
S57AL	**14**	**689,040**	**1844**	**37**	**139**
S54X	*	339,450	1008	34	121
S59EIJ	*	351	19	5	8
S52AW	**7**	**864,280**	**3174**	**37**	**118**
S53DIJ	*	330	22	3	12
S53MM	**3.5**	**499,204**	**2174**	**34**	**114**
S51NZ	*	107,525	1142	17	68
S53O	**1.8**	**149,226**	**1122**	**27**	**87**
S58Q	*	45,100	496	16	66
***S51F**	**A**	**1,577,148**	**1750**	**111**	**390**
***S59AA**	**"**	**1,087,616**	**1209**	**111**	**353**
***S57U**	**"**	**894,040**	**1267**	**98**	**314**
*S58P	*	411,554	920	70	216
*S51MF	*	236,520	465	69	201
*S53AU	*	208,559	372	74	189
*S59MA	*	91,601	570	30	109
*S58RU	*	64,128	411	48	144
			(OP: S57RU)		
*S5ØB	*	2,508	34	16	22
***S54A**	**21**	**34,307**	**170**	**26**	**65**
*S53AK	*	20,560	134	26	54
			(OP: S53AK)		
***S57L**	**14**	**239,454**	**735**	**35**	**124**
*S52GO	*	76,986	408	21	73
***S53F**	**7**	**309,442**	**1278**	**35**	**126**
***S51W**	**3.5**	**86,564**	**1015**	**14**	**54**
*S58MU	*	30,820	372	11	56
*S57NAW	*	22,043	268	12	55
*S55Z	*	20,358	363	10	48
***S52W**	**1.8**	**54,054**	**684**	**14**	**64**
*S51NM	*	22,288	378	9	47
Spain					
EA5FV	**A**	**2,175,765**	**3361**	**93**	**272**
EF1A	**"**	**899,990**	**1612**	**70**	**231**
			(OP: EA1XT)		
EA7MT	*	493,494	789	87	266
EA3CEC	*	129,564	296	69	167
EA3JW	*	97,790	571	35	92
EA1FBU	*	74,921	330	37	102
EA2IF	**14**	**371,250**	**1526**	**32**	**103**
EE7X	**7**	**158,270**	**1022**	**22**	**76**
EA5ABH	3.5	5,600	144	10	46
***EA7WA**	**A**	**443,898**	**828**	**63**	**210**
***EA1JO**	**"**	**387,816**	**695**	**69**	**243**
*EC1AIJ	*	239,969	402	68	249
*AN1A	*	232,362	554	53	181
			(OP: EA1AST)		
*EB3EPR	*	172,975	494	50	135
*EA5AWJ	*	171,700	472	50	152
*EA4/UY7CW	*	169,168	535	48	146
*EA4BF	*	152,880	582	41	141
*EA4DRV	*	147,888	716	36	120
*EC7AMY	*	112,200	359	54	133
*EA3AVV	*	101,803	294	51	140
*EA4AYD	*	75,240	255	42	90
*EC5EC	*	74,520	346	42	120
*EA7OR	*	73,678	336	48	139
*AM5Q	*	71,501	323	34	93
			(OP: EA5QB)		
*EA4IP	*	51,471	287	29	100
*EA3BOW	*	46,854	308	29	108
***AO3K**	**"**	**46,728**	**257**	**31**	**101**
			(OP: EA3GHZ)		
*EA3FAR	*	37,632	218	31	97
*EA4IJ	*	35,442	180	27	72
*EA3AXM	*	34,986	191	29	90
*EB5CNK	*	33,696	226	28	89
*EA3FHP	*	26,016	175	22	74
*EA7CWA	*	21,186	108	33	66
*EA7VJ	*	20,470	106	29	60
*EA5FL	*	19,836	121	28	59
*EA1AUS	*	15,264	66	38	58
*EC5AGM	*	14,304	98	26	70
*EA1CBX	*	13,032	93	25	47
*EA2BVV	*	12,608	187	15	49
*EA4WD	*	10,864	159	32	65
*EA1DIW	*	10,320	91	27	59
*EB2CYQ	*	4,125	59	17	38
*EA7BJ	*	3,976	38	21	35
*EA3CZR	*	3,848	53	11	26
*EA3NA	*	2,193	58	15	28
*EA2AVM	*	1,892	45	13	31
*EA4BGM	*	1,794	54	11	28
*EA1CRL	*	864	24	9	15
*EA3KN	*	315	8	7	8
*EA5TD	*	84	4	3	4
***EA2AZ**	**21**	**65,932**	**380**	**28**	**78**
*EA5EN	*	22,991	127	24	59
*EA4MA	*	18,330	95	24	54
*EA3NT	*	18,204	105	22	52
*EA2BNU	*	6	1	1	1
***AO7T**	**14**	**157,550**	**923**	**26**	**89**
***EE2K**	**"**	**147,888**	**811**	**27**	**77**
			(OP: EA2SS)		
*EA3NO	*	76,104	438	19	65
*EA1ND	*	20,935	201	17	36
*EA3GYK	*	3,800	63	7	31
			(OP: DK7TM)		
***EA7OT**	**7**	**184,786**	**852**	**29**	**105**
*EA3GXJ	*	182,240	808	30	106
*AN3N	*	99,234	570	26	85
			(OP: EA3DU)		
*EA1BTX	*	41,571	321	18	75
*EA1BHR	*	6,812	129	8	44
*EA3LA	*	2,548	58	8	18
*EA5DM	*	1,530	43	7	23
***EA7GSU**	**3.5**	**52,866**	**450**	**18**	**71**
*EA3ALV	*	8,584	161	8	50
*EA3EU	*	7,965	183	7	52
***EA7NW**	**1.8**	**5,304**	**98**	**8**	**43**
*EA2SW	*	1,760	59	6	26
*EA3AKA	*	420	100	6	29
*EA1DFP	*	336	17	4	12
Svalbard					
***JW1CCA**	**A**	**93,600**	**232**	**56**	**88**
Sweden					
SM7YEA	**A**	**790,088**	**1882**	**65**	**219**
SM5Q	**"**	**656,451**	**945**	**81**	**288**
SE6Y	*	585,302	1381	68	243
			(OP: SM6DED)		
SM6E	*	462,510	1282	66	204
SM5AOG	*	245,888	425	66	206
SM6BGG	*	236,052	662	63	186
SM7C	*	124,656	407	54	158
			(OP: SM7CFZ)		
8SØW	*	120,384	295	70	139
SM2JEB	*	90,306	346	38	136
SM5QU	*	17,710	122	22	55
SM4TU	*	14,696	83	32	56
SMØXG	*	72	7	6	6
SLØW	**14**	**224,046**	**625**	**34**	**128**
			(OP: SMØAJU)		
SM3PHM	**7**	**104,405**	**360**	**36**	**121**
SJ2W	**3.5**	**366,705**	**1533**	**34**	**111**
			(OP: SM2WMV)		
SM5CEU	**1.8**	**124,639**	**856**	**26**	**87**
SM6CPY	*	39,096	493	15	57
SM7GIB	*	10,921	139	15	52
SM7BCX	*	400	16	9	11
***SM6NET**	**A**	**175,845**	**444**	**70**	**215**
***SM3RL**	**"**	**100,646**	**411**	**37**	**121**
*SMØBSO	*	89,960	376	39	134
*SM6DER/7	*	70,704	371	31	113
*SM7BJW	*	68,552	255	45	107
*SMØBDS	*	57,510	270	29	113
*SM7EH	*	56,502	289	32	114
*SKØHB	*	33,384	159	30	126
			(OP: SMØBYD)		
*SE6C	*	31,096	207	24	68
			(OP: SM6CDN)		
*SM5SIK	*	18,430	188	20	75
*SM7CWI	*	17,480	106	30	65
*SM5AQI	*	15,440	95	28	52
*SM7CIL	*	15,311	91	22	39
*SM3KIF	*	10,094	90	29	69
*SM7RPU	*	9,135	75	24	39
*SM7GUY	*	6,384	65	12	30
*SM5BJT	*	5,415	123	25	70
*SK5AA	*	2,475	45	16	29
***7S7V**	**14**	**21,888**	**163**	**15**	**49**
*SM4PBT	*	14,500	98	20	38
*7S5C	*	9,408	81	17	39
			(OP: SM5CBM)		
*SM7BQX	*	4,536	75	12	30
*SJ4F	*	3,924	79	8	28
			(OP: SM4DHF)		
***SM4F**	**7**	**35,883**	**337**	**20**	**61**
			(OP: SM4DHF)		
*SM5BAX	*	30,510	147	24	66
*SM2JUR	*	29,904	341	20	64
*SM2EKA	*	23,068	222	16	63
*SM6Q	*	8,400	123	13	47
			(OP: SM6UQJ)		
*SG3O	*	500	16	10	15
			(OP: SM3AGO)		
*SMØY	3.5	3,393	73	7	32
			(OP: SMØOY)		
*SI7T	*	288	18	6	18
***7S2E**	**1.8**	**19,910**	**338**	**9**	**46**
			(OP: SM2DMU)		
*SM5MX	*	17,024	284	9	47
*SM5CSS	*	4,838	112	7	34
Switzerland					
HB9LCW	**A**	**882,441**	**1166**	**116**	**325**
HB9CIC	*	227,205	654	58	185
HB9CPS	*	159,786	488	48	150
***HB9ARF**	**A**	**657,360**	**1099**	**80**	**252**
*HB9SVT	*	101,265	479	35	122
*HB9DDE	*	40,188	242	28	74
*HB9CSM	*	31,581	282	28	93
*HB9QA	*	20,972	103	40	67
*HB9BNK	*	2,091	39	15	26
Ukraine					
UW1M	**A**	**1,352,560**	**2221**	**99**	**325**
UU2J	**"**	**851,760**	**1611**	**88**	**276**
			(OP: UU5JIB)		
UR3IQO	*	836,766	1153	94	312
UT7EZ	*	758,133	1133	90	297
UR6QS	*	509,760	985	78	242
UT5EO	*	417,525	1246	70	223
UR8RF	*	233,814	493	72	194
UU5JZ	*	228,227	519	71	170
UT3WX	*	140,686	509	50	132
US3WD	*	106,971	288	63	118
UR4EI	*	91,800	393	36	134
UR7VA	*	82,797	186	63	130
UTØRM	*	80,625	435	37	92
UU6JJ	*	40,280	173	63	89
UU4JC	*	32,868	185	33	66
UT2IW	*	28,222	181	33	70
UT4ZX	*	19,260	109	33	74
UT4PZ	*	9,936	50	28	41
UU

*UT5UDK	*	551	13	8	11
***UR5ZRL**	**28**	**33**	**12**	**4**	**7**
***UTØEA**	**21**	**7,155**	**55**	**22**	**31**
*UR7UJ	*	924	18	9	13
***UT5PW**	**14**	**96,866**	**382**	**27**	**92**
*US1PM	*	73,140	343	26	80
*UX7QD	*	67,599	495	23	64
*UT5EL	*	58,504	312	26	77
*UXØUW	*	30,310	222	17	53
*UT4UP	*	28,050	188	20	55
*UR5PG	*	25,058	188	17	50
*UR5EU	*	18,411	162	18	39
*UR3PDQ	*	16,008	155	16	42
*UT5ZY	*	14,718	123	21	45
*UR5WMM	*	7,067	75	14	23
*UR4QX	*	5,590	105	9	34
*US5LAE	*	1,080	45	6	6
***UTØEU**	**7**	**239,751**	**996**	**33**	**120**
***UY7C**	*****	**160,020**	**704**	**31**	**109**
*UX1UF	*	118,944	571	27	99
*UX7U	*	118,580	679	27	94
*UTØL	*	79,287	535	24	83
*UR8IDX	*	69,948	317	29	105
*US5MUW	*	63,975	681	17	58
*UT3EK	*	59,620	343	25	85
*UX1QQ	*	58,864	344	24	80
*UU7JX	*	42,959	394	30	103
*UY7LM	*	16,443	249	20	67
*UR4WG	*	1,400	70	13	32
***UT3L**	**3.5**	**87,120**	**974**	**17**	**63**
					(OP: UR5LO)
***UU2CW**	*****	**70,557**	**680**	**17**	**70**
*US2WU	*	66,163	513	23	86
*UR3LPM	*	55,590	490	17	68
*UR5IHQ	*	18,360	310	9	45
*UR5WX	*	15,989	245	10	49
*US5EEK	*	7,172	139	7	37
***UR4CWQ**	**1.8**	**39,280**	**398**	**18**	**62**
***UX5NQ**	*****	**22,173**	**394**	**9**	**48**
*UT4EK	*	12,915	253	7	38
*USØZZ	*	10,440	166	12	46
*UT5ZA	*	3,774	112	6	28
Wales					
GW3NJW	**A**	**229,341**	**736**	**47**	**154**
GWØRYT	**14**	**22,401**	**170**	**14**	**43**
GW7X	**3.5**	**323,988**	**1968**	**25**	**91**
					(OP: GW3SQX)
GW3JXN	*	34,438	392	13	54
***GW3KDB**	**A**	**575,289**	**1223**	**65**	**232**
*MWØCWJ	*	37,250	201	29	96
					(OP: MMØCWJ)
*MWØIDX	*	23,443	114	35	84
*MWØCRI	*	12,360	78	34	69
***GW3YDX**	**14**	**413,362**	**1494**	**34**	**108**
*GW4EVX	1.8	2,294	79	4	27
OCEANIA					
Australia					
VK2IA	**A**	**2,840,224**	**2624**	**114**	**277**
VK6DXI	*****	**2,267,319**	**2263**	**109**	**244**
VK4EMM	*****	**1,774,491**	**1905**	**107**	**224**
VK4YN	*	692,259	1174	85	134
					(OP: VK4FW)
VK7GN	*	639,450	973	88	173
VK6IR	*	28,116	99	55	77
VK4BUI	**14**	**120,768**	**435**	**27**	**75**
VK5LW	**7**	**809,620**	**2010**	**34**	**106**
VK3TDX	*	134,228	521	27	65
VK8AV	*	55,505	243	25	60
***VK2BJ**	**A**	**1,001,072**	**1171**	**100**	**204**
*VK2GR	*	197,550	435	87	138
*VK4XY	*	111,848	296	71	93
*VK6HG	*	109,395	254	58	107
*VK2PN	*	88,977	339	51	82
*VK4TT	*	74,936	246	48	68
*VK4TI	*	18,245	94	39	50
*VK2XF	*	1,128	22	10	14
***VK2NA**	**28**	**1,719**	**75**	**4**	**5**
***VK4EJ**	**14**	**50,148**	**235**	**24**	**60**
East Malaysia					
9M6XRO	**A**	**324,171**	**573**	**76**	**123**
9M8YY	**21**	**271,845**	**912**	**30**	**75**
					(OP: JR3WXA)
9M6NA	**3.5**	**309,282**	**959**	**32**	**82**
					(OP: JE1JKL)
***9M6YBG**	**14**	**58,320**	**437**	**19**	**29**
*9M8DXX/6	*	2,418	35	13	18
					(OP: DL2QT)
Guam					
WH2D	**A**	**362,544**	**791**	**70**	**98**
					(OP: K3UOC)
Hawaii					
KH7B	**7**	**1,222,634**	**2638**	**39**	**122**
					(OP: K4XS)
***KH6FI**	**A**	**120,912**	**333**	**60**	**72**
***KH6CO**	*****	**22,248**	**150**	**35**	**37**
					(OP: KH6OO)
Indonesia					
YC1KIZ	**A**	**1,470**	**28**	**16**	**19**
YCØLOW	*	42	5	2	4
***YB1ALL**	**A**	**246,540**	**522**	**63**	**147**
*YB2UTX	*	28,704	127	29	67
*YB3JBJ	*	25,984	152	47	81
*YC2EUZ	*	21,850	116	39	56
*YB2DDL	*	20,746	107	23	59
*YB3XM	*	16,826	105	34	60
*YD2LEV	*	3,519	54	26	43
*YB2LSR	*	2,356	32	18	20
*YB1MBA	*	2,252	28	13	15
***YD1HUH**	**21**	**95,574**	**376**	**27**	**75**
*YD1BJX	*	6,200	68	15	35
***YBØECT**	**14**	**196,535**	**628**	**33**	**82**
*YB3BOA	*	432	12	5	11
***YC2BG**	**7**	**14,245**	**100**	**18**	**37**
*YD3KWR	*	9,856	83	14	30
*YC6EN	*	1,674	32	8	19
*YC1DOL	*	132	7	5	6
***YC2WWW**	**3.5**	**5,400**	**64**	**14**	**31**
*YC2MXV	*	3,102	37	13	20
*YB6INU	*	720	18	8	10
*YC1COZ	1.8	18	3	1	2
Mariana Islands					
AHØBT	**A**	**2,789,598**	**2808**	**120**	**237**
					(OP: JE1CKA)
***WHØS**	**21**	**80,360**	**602**	**17**	**32**
Marshall Islands					
***V73NS**	**A**	**163,619**	**510**	**62**	**69**
New Zealand					
ZM3A	**7**	**866,880**	**1938**	**34**	**126**
					(OP: ZL3WW)
ZM2B	*	458,055	1422	32	85
					(OP: ZL2BR)
ZL1AZE	**3.5**	**7,644**	**101**	**13**	**15**
ZL1KMN	*****	**2,120**	**30**	**13**	**27**
***ZM4M**	**A**	**296,600**	**569**	**80**	**120**
*ZL3PAH	*	444	37	15	22
***ZL3TE**	**21**	**145,250**	**631**	**26**	**57**
					(OP: W3SE)
Palau					
T88CI	**A**	**192,141**	**662**	**43**	**68**
					(OP: HA5AO)
***T88CJ**	**A**	**1,151,892**	**1779**	**88**	**164**
					(OP: HA7TM)
Philippines					
DU3NXE	**A**	**355,217**	**1234**	**49**	**52**
DU1EV	*	46,494	236	31	50
***DX1ARM**	**A**	**16,575**	**154**	**22**	**29**
					(OP: DV1SDT)
*DV1JM	*	13,608	74	29	34
***4F1AL**	**21**	**38,532**	**410**	**18**	**34**
*DV1UBY	*	224	54	11	17
Solomon Islands					
***H44MY**	**A**	**288,866**	**573**	**83**	**111**
					(OP: KM9D)
Vanuatu					
***YJØMM**	**A**	**98,648**	**346**	**49**	**69**
					(OP: DL4RDJ)
SOUTH AMERICA					
Antarctica					
R1ANR	7	16,356	132	13	34
					(OP: ZS1ANF)
Argentina					
LO2F	**A**	**1,135,160**	**1439**	**95**	**201**
					(OP: LU1FAM)
LW5HBR	*	557,019	1180	60	117
LU3DOC	*	9,515	101	22	33
LU8QT	*	7,178	75	16	21
LU1HF	**28**	**77,691**	**368**	**23**	**64**
***LW5EE**	**A**	**721,996**	**1091**	**77**	**167**
*LW1E	*	161,069	396	59	90
					(OP: (OP: LU1EWL))
*LU5YF	*	36,045	165	54	81
***LU1EJ**	**28**	**7,056**	**80**	**15**	**34**
*LW6DW	*	5,644	80	11	23
***LU5OM**	**14**	**29,592**	**160**	**23**	**49**
*LU7YZ	*	7,936	135	15	17
Aruba					
P4ØW	**A**	**8,358,899**	**5351**	**136**	**421**
					(OP: W2GD)
P43JB	*	1,397,070	1550	95	247
P49V	**14**	**887,832**	**2667**	**30**	**88**
					(OP: AI6V)
P49Y	**7**	**1,495,350**	**3550**	**32**	**118**
					(OP: AE6Y)
***P4ØQ**	**A**	**7,959,549**	**5582**	**122**	**377**
					(OP: KØDQ)
Brazil					
PY2NDX	**A**	**5,075,301**	**3417**	**137**	**382**
ZY7C	*****	**4,364,256**	**3298**	**125**	**413**
					(OP: PY8AZT)
PW2D	*****	**4,065,870**	**3327**	**112**	**321**
					(OP: PY2ZXU)
PS2T	*****	**3,640,308**	**2941**	**121**	**332**
					(OP: PY2NY)
PT2ZHA	*	1,005,212	1198	96	242
PP1CZ	*	987,178	1457	78	200
PY3CAL	*	28,032	182	46	82
PY2KP	*	2,006	32	16	18
PY2MTV	*	648	19	13	14
PR7AR	**14**	**107,604**	**578**	**22**	**62**
PV8DX	**7**	**423,974**	**1315**	**24**	**94**
PY2WC	**3.5**	**33,101**	**170**	**23**	**56**
***PY2NA**	**A**	**1,030,731**	**1224**	**87**	**234**
*PY5BLG	*	256,320	524	61	117
*PY7OJ	*	42,120	125	46	84
*PY4ZO	*	7,540	54	25	33
*PP7LL	*	124	22	15	16
*PP5JY	*	6	2	1	1
***PU2MTS**	**28**	**13,572**	**114**	**17**	**41**
***PY2HL**	**21**	**12,320**	**106**	**20**	**36**
***PP5BI**	**14**	**78,645**	**355**	**28**	**77**
*PY3AU	*	61,692	255	25	72
*PY2SRB	*	17,025	106	22	53
*PR7GY	*	14,706	104	16	41
***PY2SEX**	**7**	**251,712**	**667**	**35**	**109**
*PT8CWA	*	4,992	57	14	25
Chile					
CE3BFZ	**A**	**184,824**	**507**	**59**	**77**
***CE1U**	**A**	**109,120**	**347**	**50**	**74**
Colombia					
HK3O	**A**	**992,205**	**1441**	**75**	**180**
***HK1AA**	**A**	**257,445**	**714**	**46**	**89**
*HK3UA	14	403	47	12	19
***HK3TU**	**7**	**316,940**	**1052**	**24**	**91**
*HK1N	*	21,942	153	17	52
Easter Island					
***CEØY/SM6CUK**	**A**	**78,617**	**530**	**72**	**111**
Ecuador					
***HCSWW**	**A**	**1,791,044**	**2468**	**89**	**179**
*HC2AD	14	7,093	85	13	28
Netherlands Antilles					
***PJ4LS**	**A**	**478,000**	**924**	**59**	**129**
Paraguay					
ZPØR	**A**	**1,400,940**	**1500**	**111**	**251**
					(OP: N3BNA)
Peru					
OA4WW	**A**	**5,485,800**	**4052**	**125**	**367**
					(OP: HP1WW)
OA4SS	*****	**1,702,210**	**2140**	**87**	**282**
Suriname					
PZ5TT	**A**	**9,617,985**	**5789**	**142**	**443**
					(OP: VE3DZ)
Uruguay					
CX9AU	**A**	**1,858,945**	**1920**	**103**	**262**
Venezuela					
YW4D	**A**	**4,571,568**	**2760**	**133**	**466**
					(OP: YV1DIG)
YW4B	*	12,155	118	22	43
***YV5AAX**	**A**	**104,904**	**283**	**41**	**100**
*YW7A	*	36,864	193	48	80
					(OP: YV7QP)
*YV5NWG	*	15,288	72	35	56
*YV4BCD	*	2,494	42	23	35
***YV5KG**	**21**	**30,130**	**382**	**17**	**29**
***YV1FM**	**7**	**253,620**	**1054**	**20**	**70**
*YY5EBV	*	30,837	279	16	41
QRP					
TI5N	**A**	**1,154,937**	**1868**	**83**	**218**
					(OP: NØKE)
UA9SG	*****	**712,725**	**924**	**78**	**247**
KR2Q	*****	**664,699**	**709**	**78**	**275**
UA4FER	*****	**659,296**	**1144**	**82**	**270**
US2IZ	*****	**615,942**	**1258**	**80**	**262**
OK7CM	*****	**594,580**	**1147**	**76**	**234**
YO8WW	*****	**512,426**	**987**	**97**	**249**
OM7DX	*****	**502,560**	**940**	**82**	**278**
UR5LAM	*	460,252	807	85	249
IK8EJN	*****	**457,808**	**995**	**68**	**216**
HA5IAM	*****	**422,244**	**920**	**69**	**248**
N1TM	*****	**378,000**	**527**	**66**	**214**
JR4DAH	*****	**373,728**	**688**	**80**	**149**
DF1DX	*****	**341,601**	**810**	**56**	**191**
UA6LCJ	*	315,436	765	57	211
G4DBW	*****	**298,770**	**780**	**49**	**181**
VA3DF	*****	**296,462**	**543**	**59**	**168**
RW3AI	*	289,792	891	53	203
W6JTI	*****	**266,684**	**426**	**82**	**160**
G3LHJ	*	217,899	596	46	167
W8QZA/8	*****	**207,580**	**382**	**71**	**143**
OZ7BQ	*****	**202,840**	**648**	**42**	**178**
HB9CBR	*****	**193,434**	**497**	**55**	**151**
RW4AA/9	*	187,335	406	51	130
KT8K	*****	**184,830**	**355**	**57**	**145**
S59D	*****	**177,096**	**600**	**67**	**215**
OK1VPU	*	173,646	540	45	153
IØZUT	*	162,328	428	53	153
UX8ZA	*	155,268	484	58	169
RK4FB	*	140,767	541	47	144
PG2AA	*****	**138,425**	**542**	**36**	**139**
JA2IVK	*****	**134,100**	**385**	**70**	**110**
UT5UUV	*	129,084	546	38	148
LZ7H	*****	**126,294**	**469**	**46**	**140**
EA7AAW	*****	**121,280**	**423**	**36**	**124**
EI8FH	*****	**115,522**	**476**	**34**	**144**
RA3AN	*	112,030	497	37	133
YO4AAC	*	105,347	537	30	127
HA5BA	*	104,368	449	41	135
NN7SS	*****	**95,178**	**265**	**61**	**113**
					(OP: K6UFO)
AA1CA	*	92,800	244	60	140
NU4B	*****	**89,838**	**186**	**52**	**134**
NDØC	*	88,752	220	58	114
SP6LV	*****	**84,150**	**458**	**32**	**133**
ISØ/OK1CZ	*****	**83,268**	**294**	**43**	**119**
					(OP: OK1CZ)
HB9OAX	*	75,650	351	42	128
KIØG	*	72,618	244	58	124
SM5LWC/7	*****	**62,880**	**251**	**34**	**126**
OK2BWJ	*	61,204	361	28	115
K8ZT	*	61,047	173	47	106
LY7ØFE	*****	**60,444**	**272**	**38**	**108**
					(OP: LY2FE)
RU3RM	*	59,469	258	30	99
DF2OK	*	58,164	374	28	120
VE3KQN	*	57,840	422	27	53
ER3MM	*****	**56,340**	**197**	**49**	**131**
PD5CW	*	55,935	227	28	85
YO4RST	*	49,206	192	47	92
JA1KEB	*****	**48,355**	**200**	**43**	**52**
MMØDWF	*****	**44,472**	**272**	**26**	**110**
N6WG	*	43,416	193	51	57
LZ1IQ	*	43,358	294	32	101
UT5DJ	*	42,149	250	25	88
K7TQ	*	40,685	190	45	58
PA1B	*	37,089	275	22	95
SM6CRM	*	33,904	203	24	80
IK2UZQ	*	33,855	212	30	81
RX3PR	*	32,742	203	24	83
K8CN/1	*	31,680	113	32	78
N2JNZ	*	30,888	128	27	72
YO3DAC	*	30,784	248	31	73
N7IR	*	29,680	114	51	55
F5UKL	*****	**28,381**	**190**	**32**	**69**
OK1FAQ	*	28,080	229	25	95
K2JT	*	27,536	188	43	100
DHØJAE	*	26,448	221	25	91
KØCD/9	*****	**26,030**	**118**	**32**	**63**
K5ZE	*****	**23,183**	**107**	**33**	**64**
AA4W	*	22,288	147	37	75
RV3DBK	*	20,995	252	14	71
LZ2SX	*	20,808	123	28	44
HA5OB	*	19,866	175	18	68
UY3QT	*	18,326	137	24	74
PY5MJ	*****	**17,835**	**105**	**36**	**51**
RD4HD	*	17,328	168	35	79
HB9AYZ	*	17,088	171	22	67
ON7CC	*****	**17,072**	**168**	**23**	**65**
JAØIND/1	*	16,786	92	34	43
IW3ILM	*	16,598	163	18	68
CK3CW	*	15,477	121	27	40
USØYA	*	14,195	65	34	51
K2QO	*	13,725	86	23	52
DJ6QT	*	12,322	98	26	75
AA4Q/7	*	12,120	80	27	33
IZ1GLX	*	11,880	116	24	42
PAØATG	*	11,868	158	14	55
PAØRBO	*	11,781	145	25	74
DL4DOA	*	11,550	102	24	51
RV3GM	*	10,318	134	15	62
N9GG/3	*****	**9,855**	**61**	**27**	**46**
VA3WPV	*	9,462	89	21	36
SP6QKP	*	8,845	105	19	42
JK1TCV	*	8,832	61	30	34
DL3NGN	*	8,374	86	24	55
F5IQJ	*	8,296	64	23	45
2EØBFJ	*	7,832	172	19	69
DJ5QK	*	7,372	97	15	61
N7RN	*	6,780	99	26	34
SM5CJW	*	6,700	79	18	49
AF4PP	*	6,500	44	28	37
KG4HTT	*	6,480	48	20	40
UUØJQ	*	5,280	52	22	26
RX3ALL	*	5,130	68	16	41
KI4FW	*	4,628	39	20	32
AA4SD	*	4,472	45	13	30
ON4LCI	*	4,356	91	16	50
K6MI	*	4,144	42	29	27
UY9IX	*	3,105	31	18	27
DL1AQU	*	3,021	70	13	44
EU1SA	*****	**2,926**	**45**	**11**	**27**
KA6SGT/9	*	2,860	40	23	32
URØEG	*	2,613	47	13	26
DK5CS	*	2,470	54	15	23
DL3BVA	*	1,815	42	12	21
SM6AHU	*	1,599	48	11	28
K6DBG	*	1,479	22	14	15
IK3TZB	*	1,440	24	14	18
MØCEF	*	1,404	30	12	24
JA1HII	*	1,363	30	13	16
W2JEK	*	1,334	20	12	17
RZ4AA	*	1,260	20	13	17
W8VE	*	960	31	17	15
DD3D	*	912	21	8	16
					(OP: DL2WJT)
NQ2W	*	754	24	13	16
KD9B/4	*	729	16	11	16
EA7HC8	*	568	100	22	49
JG2CNS/3	*****	**496**	**13**	**7**	**9**
JA1BVA	*	456	11	9	10
AC2N/4	*	400	12	10	10
WØEB	*	340	14	12	8
W7ARF/4	*	325	9	6	7
PE2KP	*	224	16	6	10
LW3EX	**28**	**7,350**	**73**	**14**	**28**
YO5ALI	*****	**513**	**20**	**7**	**12**
PY2EL	*****	**306**	**17**	**8**	**10**
WO2N	*****	**243**	**13**	**4**	**5**
JL3OXR/1	*****	**220**	**8**	**4**	**7**
YO4XT	*	144	14	3	6
VR2AAW	*****	**117**	**21**	**4**	**5**
DL2TM	*****	**2**	**1**	**1**	**1**
SQ3ET	*****	**2**	**1**	**1**	**1**
HA8KW	**21**	**43,500**	**187**	**29**	**71**
K4RV	*****	**34,656**	**148**	**24**	**72**
EC7AKV	*****	**11,368**	**83**	**20**	**38**
JH7RTQ	*****	**9,600**	**95**	**20**	**30**
JR1NKN	*****	**5,285**	**75**	**14**	**21**
YB4IR	*****	**4,606**	**46**	**21**	**26**
SP4GFG	*****	**3,164**	**41**	**11**	**17**
WA6FGV	*****	**2,464**	**32**	**14**	**18**
UT2UZ	*****	**1,950**	**30**	**11**	**19**
ES1CR	*****	**1,404**	**22**	**12**	**14**
JA1KPF	*	112	6	3	4
YC2USB	*****	**36**	**7**	**4**	**5**
SP2FMN	*	9	2	1	2
LYØO	**14**	**198,352**	**614**	**32**	**122**
DL9ZP	*****	**149,898**	**550**	**30**	**99**
UA6JGG	*****	**116,160**	**494**	**27**	**93**
HA7UG	*****	**103,320**	**363**	**32**	**91**
LZ1MG	*****	**100,596**	**523**	**26**	**75**
HA1ZH	*	79,600	391	26	74
YO5AIR	*****	**79,288**	**416**	**25**	**81**
CT/LZ3ND	*****	**55,076**	**315**	**20**	**78**
LZ1VB	*	53,133	329	22	67
HA1RS	*	50,808	311	23	64
OE3GSA	*****	**49,755**	**216**	**28**	**79**
K7SS	*****	**49,413**	**238**	**28**	**63**
EW6DX	*****	**48,735**	**241**	**23**	**72**
G3YMC	*****	**46,282**	**338**	**16**	**57**
9A2EY	*****	**44,988**	**351**	**18**	**51**
RNØJX	*****	**33,396**	**245**	**18**	**48**
YT2B	*****	**32,396**	**158**	**26**	**63**
I4KRF	*****	**32,154**	**298**	**15**	**54**
FM5FJ	*****	**31,808**	**232**	**19**	**52**
F5UL	*****	**29,852**	**214**	**20**	**48**
US5VX	*****	**29,481**	**133**	**24**	**69**
GØDCK	*	28,917	294	14	49
E77J	*****	**28,308**	**150**	**24**	**60**
LY4BF	*	17,219	152	15	52
SP5XO	*****	**16,940**	**96**	**21**	**56**
ON7SS	*****	**15,043**	**194**	**11**	**38**
W7JI/Ø	*****	**12,900**	**103**	**23**	**52**
RA3XEV	*	10,250	132	11	39
SP9AJM	*	8,064	107	13	35
US3QW	*	7,452	92	12	34
DF3SM	*	7,310	62	7	20
K8DSS/4	*****	**6,854**	**54**	**11**	**35**
N7OU	*	6,106	59	18	25
JE1CAC	*****	**5,440**	**68**	**16**	**18**
GWØVSW	*****	**4,945**	**84**	**8**	**35**
PP5VX	*****	**3,924**	**57**	**16**	**20**
JH8DBI	*****	**3,434**	**45**	**16**	**18**
LA1ENA	*****	**2,448**	**55**	**8**	**26**
RU2FM	*****	**2,418**	**40**	**11**	**20**
YO5OAG	*	2,088	49	10	19
OK1FAO	*****	**1,584**	**40**	**10**	**12**
SN8M	*	1,221	57	12	21
IZ2FME	*	1,170	37	8	18
9A8MM	*	940	41	7	13
IK3JBP	*	703	79	11	26
JG6QPX	*****	**418**	**11**	**10**	**9**
JK3AHS	*****	**221**	**7**	**6**	**7**
UA4FGY	*****	**34**	**16**	**5**	**12**
IK8YFW	*	12	2	1	1
PY1WW	*	10	6	5	5
YU1LM	**7**	**58,805**	**440**	**18**	**77**
DL1DQY	*****	**57,225**	**309**	**25**	**84**
E77BA	*****	**54,945**	**327**	**25**	**86**
JQ2UOZ	*****	**48,110**	**226**	**24**	**61**
HB9CEY	*****	**39,846**	**309**	**16**	**71**
LY3QA	*****	**39,688**	**408**	**17**	**65**
HA8GK	*****	**38,280**	**304**	**20**	**68**
DL9SXX	*	34,799	303	18	71
G4CWH	*****	**33,680**	**317**	**15**	**65**
LU4MHQ	*****	**26,588**	**168**	**20**	**48**
N5AN	*****	**23,162**	**119**	**25**	**48**
S57T	*****	**19,941**	**209**	**13**	**56**
YT6TT	*	12,152	98	16	46
DL7GEM	*	12,025	138	12	53
YO8RIX	*****	**11,700**	**152**	**12**	**48**
WG5J	*****	**10,020**	**88**	**18**	**42**
JF2IWL	*	9,456	78	20	28
UA3AAP	*****	**8,789**	**148**	**8**	**39**
DL7HT	*	7,992	144	9	45
RAØAY	*****	**6,615**	**78**	**16**	**29**
LY2LF	*	5,499	126	6	33
RV4AP	*	4,950	78	8	42
SP7BCA	*****	**4,800**	**103**	**8**	**40**
JH8FAJ	*****	**3,640**	**60**	**12**	**16**
IKØHBN	*****	**1,575**	**29**	**10**	**11**
OM4PD	*****	**1,536**	**34**	**9**	**23**
MM5FUN	*****	**924**	**36**	**6**	**22**
TE2M	*****	**312**	**22**	**9**	**15**
					(OP: TI2KAC)
N3TL/4	*****	**289**	**27**	**8**	**9**
N2EE	*****	**0**	**20**	**3**	**1**
					(OP: K3BU)
EU8RZ	**3.5**	**79,953**	**801**	**17**	**70**
UU7JF	*****	**29,040**	**392**	**11**	**55**
UA9UHN	*****	**23,352**	**166**	**14**	**42**
SP4JFR	*****	**20,250**	**365**	**10**	**44**
HA6VA	*****	**13,737**	**195**	**10**	**47**
JA6GCE	*****	**7,820**	**72**	**16**	**30**
JF2MBF	*****	**3,886**	**60**	**13**	**16**
SN3B	*	1,240	75	5	26
					(OP: SQ3JPV)
UT5UQV	*	1,092	39	4	22
DQ3SH	*****	**182**	**20**	**4**	**13**
VK2CCC	*****	**90**	**9**	**4**	**5**
E76C	**1.8**	**36,000**	**489**	**14**	**58**
GW8GT	*****	**26,520**	**421**	**10**	**50**
					(OP: GW3YDX)
GØIDA	*****	**17,010**	**331**	**10**	**44**
SP3PL	*****	**14,210**	**217**	**11**	**47**
DK5WL	*****	**12,545**	**254**	**8**	**43**
VE3MGY	*****	**10,274**	**263**	**9**	**13**
RNØAUF	*****	**8,804**	**111**	**7**	**24**
HA7MW	*****	**8,575**	**174**	**8**	**41**
DJ3GE	*	3,026	98	3	31
SP4TBM	*	2,945	97	5	26
F5VBT	*****	**2,664**	**77**	**5**	**32**
SP5DDJ	*	1,593	69	4	23
IZ1DGG	*****	**722**	**49**	**2**	**17**
K3BU/2	*****	**78**	**13**	**2**	**1**

ASSISTED

NORTH AMERICA

United States

W1HR	**A**	**2,602,839**	**1761**	**118**	**419**
					(OP: K1FWE)
KI1G	*****	**2,083,725**	**1374**	**128**	**439**
K2TE/1	*	2,034,648	1635	100	362
N1DG	*	2,006,510	1153	134	495
W1CSM	*	1,760,116	1241	119	405
W1RM	*	1,321,352	956	111	388
K1JB	*	1,266,367	997	98	363
K1EO	*	1,264,690	1149	98	347
K1LI	*	1,240,122	985	115	392
AA1V	*	1,015,054	748	117	386

NG2P	*	24,479	103	25	66
AI2I	*	22,099	107	20	57
WB2TPS	*	20,808	81	31	71
AK2P	*	17,808	93	34	78
N2MUN	*	9,928	66	19	49
WA3AFS/2	*	7,740	51	42	48
KS2G	*	4,428	40	20	34
K2DBK	*	1,782	20	13	20
WR2G	**14**	**94,361**	**318**	**26**	**101**
K3WW	**A**	**5,011,460**	**2946**	**135**	**485**
N3AD	**"**	**3,414,870**	**2277**	**129**	**441**
K3PH	**"**	**2,536,800**	**1745**	**117**	**408**
K3OO	**"**	**2,525,587**	**1541**	**134**	**459**
K2PLF/3	*	1,466,756	1277	101	327
N3AM	*	1,393,020	1201	98	328
K3ZZ	*	1,365,018	1080	118	380
W2UP/3	*	1,258,512	991	105	366
K3ND	*	1,108,256	887	108	364
N3ZA	*	889,525	763	107	348
W3CF	*	830,877	834	91	328
W3KB	*	811,603	741	101	318
W3KL	*	733,200	763	99	291
K3PP	*	616,875	613	90	285
W3GK	*	566,694	645	78	264
KC3WX	*	489,600	642	77	211
W6AAN/3	*	474,727	466	108	311
W3FW	*	389,640	613	81	259
W3CC	*	356,832	363	99	314
AA3DF	*	289,152	375	85	180
NE3H	*	285,784	431	67	190
NA3M	*	272,484	415	62	199
N3ST	*	184,255	313	61	154
K3II	*	183,658	322	61	168
K3MQ	*	174,680	296	60	160
N3GNW	*	173,240	302	57	187
W9GE/3	*	162,816	289	51	161
N3QW	*	133,278	276	48	146
KD3TB	*	125,370	241	57	153
K3PG	*	69,300	193	42	112
WB3FIZ	*	69,008	502	71	233
K3NM	*	45,792	119	44	115
WX3B	*	44,388	124	34	103
W3AG	*	26,442	91	50	67
W3GNQ	*	18,414	93	31	68
N3MX	*	16,055	76	31	64
N3NR	*	2,580	29	21	22
W6NRJ/3	*	1,320	29	16	28
WA3AAN	**14**	**54,586**	**213**	**20**	**78**
W2CDO/3	**7**	**87,352**	**267**	**25**	**97**
W3UTD	*	42,619	226	25	84
WT3Q	**1.8**	**26,136**	**139**	**20**	**68**
N4BP	**A**	**1,984,444**	**1544**	**104**	**372**
N4ZC	**"**	**1,571,748**	**1032**	**136**	**441**
N2TU/4	*	1,086,016	884	115	363
W3OA/4	*	977,552	850	103	325
WØYR/4	*	966,482	973	89	305
N4DW	*	938,859	789	106	343
KG4W	*	864,018	796	95	319
AA4S	*	843,228	826	99	298
N4KG	*	793,104	629	120	376
W3YY/4	*	786,422	704	100	306
N4ZZ	*	776,020	890	83	239
N3MK/4	*	763,930	835	88	307
N4VV	*	723,385	678	92	311
W4NZ	*	708,039	580	114	339
N4CJ	*	692,367	654	106	327
W4CU	*	679,878	731	89	264
N4RV	*	675,757	685	93	286
K5EK/4	*	594,845	548	117	322
KR4F	*	594,496	538	108	340
W4PM	*	521,280	529	86	276
K1PT/4	*	504,708	469	97	314
K3IE/4	*	488,034	588	84	258
K4DJ	*	483,000	596	72	228
K8AC/4	*	408,617	523	85	222
K4FPF	*	370,059	489	69	224
K1KO/4	*	369,525	469	85	240
N3JT/4	*	362,355	512	69	186
NQ4U	*	316,480	521	92	252
K4SAV	*	313,929	393	82	215
NO9E/4	*	301,794	437	83	198
K5AUP/4	*	291,074	481	56	182
N6VX/4	*	287,488	435	72	184
W6UB/4	*	277,548	353	78	225
N4GG	*	257,333	353	74	203
K4PB	*	224,282	351	69	185
K4WY	*	216,320	412	45	163
K3KO/4	*	206,948	294	57	209
WK5X/4	*	190,260	361	55	155
WB4ROA	*	167,596	292	64	222
NM4M	*	157,680	300	64	176
N4QS	*	152,675	277	51	146
W4XO	*	143,429	272	60	161
W4TMO	*	138,240	300	59	157
K8KI/4	*	122,912	295	52	132
N4VA	*	117,216	225	62	136
K4HAL	*	114,858	260	48	114
W4IR	*	112,700	200	53	143
WB4MAK	*	101,500	255	62	188
K4WW	*	100,230	199	59	136
N4EMG	*	97,944	231	45	123
N3BM/4	*	91,953	240	38	115
K4GMH	*	89,121	193	48	135
N4NM	*	88,088	197	53	129
W4TVG	*	81,774	200	45	109
W4SUL	*	76,486	205	48	119
NW4V	*	61,932	149	50	106
KØCOP/4	*	52,852	152	35	111
N4LZ	*	50,688	140	45	99
N4GU	*	45,758	123	36	101
N4DXI	*	44,000	157	42	83
W4VIC	*	39,000	140	40	85
K4BQP	*	36,249	144	36	93
WD4LUR	*	32,504	109	51	85
N3KN/4	*	30,008	104	46	78
W4KAZ	*	29,376	110	29	73
AD4YQ	*	27,144	107	38	79
NU4Y	*	24,150	97	33	82
ND4V	*	21,840	85	37	67
N4EEB	*	18,308	83	31	61
W4WNT	*	7,705	61	23	44
W4SEC	*	7,326	94	36	63
NN4K	*	2,065	56	16	43
KO4OL	*	189	13	10	11
KC4HW	21	1,500	18	13	17
W4NL	**14**	**116,572**	**332**	**32**	**119**
N4DL	*	2,232	27	5	26
W4ZW	**7**	**134,125**	**346**	**34**	**111**
AA4VV	*	94,815	242	32	115
WA2BCK/4	*	46,718	184	23	71
KZ1A/4	*	9,009	66	18	45
N4CC	*	7,918	39	38	36
W6IZT/4	**3.5**	**100,584**	**305**	**28**	**104**
K4XD	*	58,344	228	22	82
K4CZ	*	25,418	128	15	56
AA4NC	*	24,150	131	19	56
K4SV	**1.8**	**35,280**	**163**	**20**	**70**
K5YA	**A**	**2,106,368**	**1545**	**126**	**386**
KN5O	**"**	**1,319,712**	**1092**	**111**	**355**
W5GA	*	638,078	702	112	271
N5JR	*	630,000	587	96	304
AC4CA/5	*	465,465	559	87	254
AA5AM	*	303,646	395	95	227
K5LH	*	167,684	574	62	144
K5TQ	*	146,888	241	70	174
K5GM	*	142,552	294	67	139
K5HDU	*	97,093	257	44	107
AD5VJ	*	95,836	232	56	138
W8FN/5	*	92,944	232	37	111
N1CC/5	*	83,764	200	53	119
W5OV	**"**	**52,705**	**166**	**43**	**84**
WBØRUR/5	*	20,758	97	38	69
WB5TUF	*	14,168	98	32	56
WT5U	*	11,115	69	17	48
N5NA	*	10,266	63	20	39
NC7I/5	*	3,762	43	16	22
N5JB	**21**	**27,540**	**145**	**24**	**57**
WØVX/5	**"**	**27,520**	**129**	**24**	**56**
N5ZK	*	18,557	109	23	54
			(OP: W5ASP)		
W5ZO	**7**	**96,624**	**293**	**31**	**101**
K6ANP	**A**	**927,775**	**897**	**125**	**300**
K9YC/6	**"**	**754,552**	**815**	**110**	**257**
N6JV	*	697,544	705	113	278
K6TA	*	594,612	561	117	281
K6RIM	*	524,900	569	100	262
N6DA	*	461,469	573	90	213
W6TK	*	444,448	536	101	222
N6QQ	*	442,200	547	101	229
W6SR	*	420,576	519	104	233
AD6WL	*	417,180	482	112	228
N2NS/6	*	391,860	498	96	219
KC6X	*	356,697	465	87	210
K6MM	*	316,250	457	83	192
N6WS	*	231,420	322	85	181
N6KI	*	195,320	313	82	175
K6III	*	137,456	304	66	110
N6NC	*	109,928	260	67	115
WA6L	*	96,216	194	77	134
K6GEP	*	90,459	224	64	107
WN6K	*	82,983	268	54	85
WB6JJJ	*	82,698	208	60	94
KA6NGR	*	73,392	212	61	78
N6VH	*	72,704	218	46	82
WB6BFG	*	53,098	197	48	91
W6RBA	*	47,328	234	46	70
K6RR	*	34,250	151	46	79
K6SRZ	*	32,116	101	42	82
N6RK	*	27,960	95	38	82
K6NV	*	27,807	125	37	56
W6SJ	*	22,572	91	46	62
KA3DRR/6	*	13,776	93	28	28
KF6I	*	13,260	101	21	30
KM6I	*	12,508	86	26	27
N6ED	*	7,590	62	19	27
K6XC	*	7,452	58	22	24
N6WM	*	6,726	56	24	33
K6RM	*	5,600	48	23	27
N6AJR	*	5,406	52	24	27
W6RKC	7	11,025	79	23	26
N6RO	**1.8**	**24,765**	**174**	**21**	**44**
N7CW	**A**	**1,177,600**	**947**	**131**	**329**
W7ZR	**"**	**825,480**	**930**	**112**	**248**
K7UA	*	776,798	883	102	239
W7CT	*	561,044	684	98	213
NQ7R	*	422,025	501	100	231
K7MM	*	421,059	626	100	167
K7UT	*	412,920	631	89	244
N6SS/7	*	377,508	439	99	227
W7SW	*	337,946	560	91	148
N7RK	*	293,314	403	91	196
N7FO	*	280,833	366	91	220
			(OP: KN5H)		
W7MD	*	257,536	432	65	191
N7NM	*	238,040	425	78	142
K7ABV	*	213,750	359	73	152
K7HC	*	201,960	389	73	197
K7EG	*	183,600	365	62	142
WAØKDS/7	*	126,126	270	77	154
KF7E	*	107,415	195	87	144
W7WHY	*	59,264	185	48	80
K7VIT	*	43,575	153	45	60
K2PO/7	*	42,768	161	43	56
N7JB	*	39,840	155	42	54
W7XA	*	36,632	129	53	99
WU9B/7	*	35,760	122	48	72
K7MY	*	15,840	104	35	45
W3ZZX/7	*	15,750	93	38	52
AD7KG	*	13,776	77	37	47
W6SA/7	*	10,736	67	27	34
K7LU	*	3,672	38	10	26
W7LKG	*	2,754	30	15	19
W7SST	*	2,048	26	16	16
N6MZ/7	*	832	14	12	14
WR7Q	*	450	13	9	9
W8TK/7	*	280	7	7	7
N7DD	**14**	**357,435**	**806**	**37**	**132**
NG7Z	*	40,908	200	26	58
N6MA/7	**7**	**290,110**	**857**	**33**	**101**
W6XI/7	*	177,452	520	36	112
K8BN/7	*	98,118	257	35	103
N8BJQ	**A**	**1,535,500**	**1125**	**119**	**381**
N8TR	**"**	**568,854**	**440**	**116**	**391**
NX2PX/8	*	252,912	388	70	194
W7PP/8	*	248,576	426	70	186
W8HC	*	217,686	377	48	165
W3IQ/8	*	183,897	354	46	143
W8MJ	*	158,679	275	66	177
KA8HOK	*	130,835	251	51	140
K8GT	*	98,362	200	55	132
AA8LL	*	97,555	208	56	123
AJ1M/8	*	30,193	103	31	78
K8QKY	**21**	**37,422**	**198**	**25**	**74**
K8DD	**14**	**338,751**	**757**	**35**	**136**
AC8W	**7**	**112,203**	**330**	**32**	**105**
K8AQM	**3.5**	**168,222**	**487**	**30**	**108**
W8CZN	*	8,601	55	12	49
W8UVZ	**1.8**	**40,734**	**218**	**22**	**71**
NF8J	*	20,367	292	16	57
WI8A	*	6,786	61	15	43
WB9Z	**A**	**2,132,310**	**1635**	**127**	**383**
K9CT	**"**	**1,902,603**	**1297**	**135**	**416**
W9IU	**"**	**1,887,930**	**1512**	**114**	**381**
WE9V	*	1,691,052	1128	129	428
K9IMM	*	1,384,554	1122	111	363
N9CK	*	1,065,552	832	117	357
KS9W	*	958,160	996	101	312
WE9R	*	711,711	664	100	329
N2BJ/9	*	663,636	739	88	260
NS9I	*	547,474	636	80	251
N9UA	*	403,650	513	76	223
KI9A	*	400,734	461	98	264
K9OR	*	280,665	343	82	233
NZ9R	*	213,013	328	79	198
KA9O	*	133,131	273	51	148
K9NN	*	58,350	168	48	102
W9IL	*	49,545	132	41	94
N9IO	*	38,194	136	33	80
K9GS	*	19,635	90	27	58
WW9R	*	12,180	74	24	46
KA9FOX	*	9,324	48	32	42
N7US/9	*	5,952	45	28	36
KG9IL	*	5,225	41	19	36
N9BT	*	1,820	25	16	19
N9SDT	*	954	12	8	10
KK9V	**7**	**16,709**	**89**	**17**	**60**
W9SZ	*	12,660	74	14	46
W9SE	**3.5**	**57,138**	**217**	**21**	**86**
KØKX	**A**	**2,056,561**	**1356**	**139**	**420**
NØAT	**"**	**1,096,320**	**876**	**119**	**361**
WAØMHJ	*	864,838	816	104	299
KØRC	*	781,014	743	103	300
NØHR	*	564,102	609	94	269
KØOB	*	283,152	417	73	199
N5IN/Ø	*	279,375	292	105	270
WØTT	*	218,700	338	77	193
NØSTL	*	198,770	283	75	203
NØHF	*	188,775	349	70	155
KØAD	*	180,264	335	68	164
KEØL	*	176,180	311	69	161
AD1C/Ø	*	166,563	340	57	142
KØUK	*	163,850	319	73	153
KØMPH	*	149,800	302	65	149
KØEU	*	114,695	216	56	147
NØIM	*	99,180	215	55	135
NØBK	*	98,049	243	53	108
WØBM	*	92,378	170	63	158
NØHJZ	*	78,584	181	57	131
KØBX	*	68,508	201	38	94
NØAH	*	60,900	203	57	117
ACØDS	*	48,960	177	42	78
WØGJ	*	43,818	140	48	86
KØTG	*	37,392	123	41	82
W4RK/Ø	*	34,398	117	45	81
WØLM	*	14,534	68	33	53
NRØL	*	13,524	65	36	56
WB8ZRL/Ø	*	12,213	74	16	43
AAØAW	*	5,610	51	20	35
AAØA	*	5,589	53	24	45
WØRO	*	3,430	45	20	29
KCØRET	*	1,938	31	15	23
WB5MFI/Ø	21	714	16	8	13
KVØQ	**14**	**521,619**	**1115**	**37**	**140**
KØKT	**3.5**	**180,228**	**494**	**31**	**107**
KIØF	*	13,992	106	18	48
NTØV	**1.8**	**10,880**	**79**	**16**	**48**
W7IZL/Ø	*	6,678	80	19	34
K7RE/Ø	*	2,142	39	13	21
Alaska					
KL2R	**A**	**219,112**	**821**	**50**	**72**
				(OP: N1TX)	
AL9A	*	83,860	229	55	85
Canada					
VE1OP	**A**	**1,995,239**	**1790**	**106**	**381**
VO1MP	*	1,035,606	999	100	326
VE1ZA	*	108,460	247	53	134
VE1JF	1.8	220	8	4	6
VA2WDQ	**A**	**1,351,042**	**1358**	**105**	**329**
VA2AM	*	457,470	522	89	301
VE3UTT	**A**	**2,252,146**	**1943**	**116**	**378**
				(OP: W1AJT)	
VE3CX	*	877,006	1084	98	281
VA3DX	*	647,148	733	102	296
VE3MM	*	635,697	969	77	256
VE3CFK	*	443,232	673	80	244
VE3ZZ	*	143,464	289	62	165
VE3XAT	*	29,526	117	28	83
VE3SS	*	27,950	95	37	93
VE3RZ	**7**	**198,832**	**652**	**27**	**109**
VA3KA	**1.8**	**9,420**	**62**	**15**	**45**
VE5MX	**A**	**161,816**	**389**	**63**	**116**
VE6LB	**A**	**205,920**	**487**	**80**	**128**
VE6TN	**14**	**47,340**	**222**	**26**	**64**
VE7UF	**A**	**1,539,590**	**2135**	**108**	**230**
VA7KO	*	251,850	528	81	149
VE7KS	**7**	**34,464**	**167**	**29**	**67**
VY1EI	**A**	**108,896**	**641**	**35**	**48**
Martinique					
TO5X	**A**	**2,786,355**	**2861**	**99**	**330**
				(OP: K5UN)	
Mexico					
XE1ZVO	**A**	**64,768**	**298**	**50**	**78**
XE1MW	*	19,572	123	32	52
Puerto Rico					
NP4Z	**A**	**5,980,898**	**4776**	**130**	**417**
San Andres/Providencia					
HKØB/HK3JJH	**A**	**88**	**6**	**5**	**6**
AFRICA					
African Italy					
IG9W	**7**	**1,332,738**	**2904**	**35**	**124**
				(OP: IZ1GAR)	
IG9X	**3.5**	**666,125**	**1859**	**30**	**95**
				(OP: IK1QBT)	
Canary Islands					
ED4R/8	**A**	**331,760**	**654**	**57**	**151**
				(OP: EA4SV)	
ASIA					
Armenia					
EK6LP	**A**	**53,788**	**419**	**26**	**87**
Asiatic Russia					
RG9A	**A**	**4,961,385**	**3178**	**138**	**447**
				(OP: UA9AM)	
RX9SA	**"**	**1,828,837**	**1376**	**123**	**386**
RM9RZ	*	1,032,775	1096	100	279
RA9DZ	*	953,912	1093	86	258
UA9LAO	*	677,705	918	70	219
RU9AC	*	633,726	858	82	245
UA9BS	*	583,464	715	77	245
RU9CI	*	302,400	598	57	168
RA9KM	*	279,720	589	48	132
RA9AC	*	177,617	320	71	170
RQ9I	*	144,624	417	32	99
UA9UCK	*	116,958	247	53	149
RU9TO	*	116,112	294	39	125
RU9UN	*	74,024	228	44	108
RU9HM	*	58,480	257	22	63
RZ9IR	*	44,748	158	35	78
UA9YAD	*	38,595	144	48	107
RA9JG	*	28,910	134	30	68
RV9UB	*	20,485	146	26	59
UA9YJI	*	7,540	64	20	38
UA9UR	**28**	**242**	**14**	**5**	**6**
UA9HR	**21**	**45,672**	**256**	**24**	**64**
RA9JR	**14**	**318,384**	**1085**	**29**	**103**
RV9CP	**"**	**299,744**	**906**	**32**	**104**
RA9JM	*	240,185	821	27	94
RK9AX	**7**	**494,605**	**1225**	**36**	**119**
RK9AD	**"**	**454,116**	**1215**	**34**	**122**
UA9MA	**1.8**	**170,688**	**754**	**23**	**73**
UA9YAB	**"**	**149,783**	**664**	**25**	**76**
RN9AA	*	102,312	502	19	65
RX9FM	*	64,042	347	16	55
UA9CR	*	8,466	101	6	28
RXØAW	**A**	**824,832**	**1192**	**76**	**212**
RWØUM	*	333,632	816	65	143
RUØAW	*	333,077	520	68	183
RAØACM	*	154,350	336	69	156
RKØSA	*	122,694	310	49	120
UAØWL	*	87,669	293	41	112
RAØANO	*	9,047	71	31	52
RWØAR	*	6,006	37	30	36
UAØAGI	**14**	**266,240**	**1011**	**32**	**98**
RUØUA	*	22,494	198	21	48
RUØLL	**3.5**	**166,549**	**844**	**28**	**73**
UAØSR	*	34,290	194	23	67
China					
BD4KUU	**A**	**12,852**	**195**	**25**	**29**
BD4AGK	*	9,450	72	28	47
BA7IO	**1.8**	**6,460**	**149**	**15**	**23**
BD7JSQ	*	3,658	84	12	19
Cyprus					
5B4AII	**A**	**9,026,464**	**5416**	**142**	**480**
				(OP: RW3QC)	
5B/AJ2O	**3.5**	**638,248**	**1588**	**34**	**118**
				(OP: RN3QY)	
Hong Kong					
VR2KW	**28**	**1,188**	**95**	**5**	**7**
VR2YYW	7	3,160	43	15	25
VR2PX	**1.8**	**28,896**	**290**	**15**	**41**
Israel					
4Z5TA	**A**	**984,555**	**1158**	**92**	**259**
4X/DL3PS	**7**	**170,544**	**677**	**23**	**79**
Japan					
JA1SJV	**A**	**103,463**	**258**	**64**	**93**
JI1CQA	*	49,088	185	37	67
JE1NVD	*	32,307	170	40	49
JA1XRH	*	15,444	84	33	45
JS1KQQ	*	6,726	44	27	30
JR1UMO	*	4,400	42	17	23
JO1WIZ	*	3,708	47	15	21
JH1GUO	*	544	13	6	10
JO1WKO	**3.5**	**68,432**	**271**	**29**	**75**
JA1BPA	*	46,460	213	28	64
JM1NKT	**1.8**	**4,655**	**66**	**14**	**21**
JR2PMT	**A**	**306,033**	**471**	**96**	**177**
JA2FSM	*	127,725	330	76	119
JK2VOC	*	35,960	155	55	61
JA2XCR	*	35,919	132	40	77
JA2BQX	*	18,527	83	28	69
JH2FXK	**1.8**	**37,488**	**252**	**20**	**46**
JH3PRR	**A**	**2,370,740**	**1986**	**129**	**323**
JA3VUI	*	93,399	242	65	98
JA3IKG	*	78,537	223	52	89
JI3OGI	*	9,128	61	24	32
JI3KXB	*	1,792	29	15	17
JN3DSH	**14**	**53,679**	**263**	**29**	**58**
JL3RDC	*	8,694	98	17	25
JH4UTP	**28**	**3,105**	**60**	**11**	**16**
JN4MMO	**3.5**	**112,104**	**425**	**29**	**79**
JA6VU	**1.8**	**7,176**	**81**	**17**	**29**
JA7ZP	**A**	**131,240**	**305**	**74**	**119**
JA7OWD	**28**	**656**	**22**	**6**	**10**
JH7MEX	3.5	2,604	30	14	17
JAØFVU	**3.5**	**10,868**	**100**	**21**	**31**
Kazakhstan					
UN4PG	**21**	**55,924**	**281**	**21**	**61**
UP2L	**14**	**939,816**	**2246**	**37**	**134**
				(OP: UN7LZ)	
UP1G	**7**	**617,364**	**1890**	**32**	**100**
				(OP: UN7QX)	
UN9FB	**3.5**	**6**	**1**	**1**	**1**
UN1F	**1.8**	**30,562**	**308**	**12**	**47**
Kuwait					
9K2HN	**A**	**155,548**	**407**	**35**	**113**
Laos					
XW1B	**7**	**292,934**	**822**	**35**	**114**
Mongolia					
JT1DA	**A**	**123,510**	**676**	**47**	**91**
JT1BV	*	110,726	472	54	100
South Korea					
DS5DNO	**A**	**26,344**	**132**	**37**	**52**
Taiwan					
BU2AI	**A**	**886,820**	**1591**	**93**	**197**
Thailand					
HSØZED	**14**	**43,992**	**194**	**27**	**77**
EUROPE					
Austria					
OE3ZK	**A**	**677,358**	**1110**	**89**	**274**
OE8SKQ	*	376,278	975	57	160
OE4VIE	*	373,456	963	74	198
OE1H	*	19,902	108	26	67
				(OP: OE1TKW)	
OE3CHC	*	6,120	68	21	51
OE5OHO	**14**	**549,250**	**1433**	**37**	**132**
OE3DSA	**7**	**514,779**	**1766**	**39**	**144**
Belarus					
EV1R	**A**	**1,052,183**	**1547**	**97**	**354**
				(OP: EU1PA)	
EW4DX	**"**	**83,559**	**244**	**37**	**124**
EW6CU	*	11,466	93	20	43
EW2AO	14	7,020	99	11	34
EV1Z	**7**	**322,000**	**1225**	**36**	**139**
				(OP: EU1UN)	
EW6OO	1.8	7,065	138	8	37
Belgium					
OO5M	**A**	**2,237,158**	**2626**	**111**	**400**
				(OP: ON5ZO)	
OQ4B	*	512,356	776	82	252
				(OP: ON4BHQ)	
ON5KQ	*	183,144	723	36	120
ON6AB	*	176,362	489	50	168
ON6FC	*	44,548	377	42	130
OR2T	**14**	**327,376**	**1003**	**36**	**122**
				(OP: ON4ATW)	
OR2A	**3.5**	**106,495**	**856**	**18**	**77**
				(OP: ON7YX)	
OT1A	*	73,704	649	18	65
ON4UN	**1.8**	**266,600**	**1486**	**28**	**96**
ON4WW	*	183,770	1210	24	91
Bosnia-Herzegovina					
E7DX	**A**	**4,096,300**	**3610**	**146**	**504**
				(OP: E77DX)	
E73TTT	**7**	**38,272**	**252**	**22**	**70**
Bulgaria					
LZ8A	**A**	**3,136,212**	**3230**	**138**	**501**
				(OP: LZ2BE)	
LZ2ZG	**"**	**211,452**	**448**	**70**	**193**
LZ1QV	**7**	**106,730**	**507**	**32**	**98**
LZ7J	**3.5**	**410,130**	**2033**	**36**	**119**
				(OP: LZ1YQ)	
Croatia					
9A1P	**A**	**6,510,080**	**5248**	**146**	**494**
				(OP: 9A1UN)	
9A7A	**"**	**6,038,824**	**4634**	**158**	**494**
				(OP: 9A5X)	
9A2HQ	*	67,497	240	48	101
9A3KS	*	26,956	135	27	65
9A2U	**28**	**9,860**	**163**	**13**	**45**
				(OP: 9A3ZA)	
9A4W	**21**	**179,487**	**646**	**33**	**114**
9A1CMA	*	15,695	99	21	52
				(OP: 9A5TO)	

MØBPQ	*	42,884	207	37	105
G3SVD	*	28,274	136	39	95
G4EDG	*	27,072	179	33	63
G4RKO	*	23,115	238	26	89
MØFCR	*	23,088	153	27	84
G6OKU	*	11,730	108	17	52
MØOKT	*	9,272	115	16	45
G4EHT	*	4,704	45	17	25
G3VKW	*	1,938	45	17	34
G3YBY	**21**	**34,470**	**179**	**23**	**67**
M2X	**14**	**249,776**	**1011**	**31**	**103**
			(OP: G4RCG)		
G3RTE	*	75,810	294	22	92
G6AY	*	21,276	113	22	86
			(OP: G3RTE)		
G3XVR	**7**	**87,904**	**399**	**29**	**105**
G3WW	**3.5**	**16,632**	**229**	**13**	**53**
G3WPH	**1.8**	**79,632**	**753**	**17**	**67**
G5LP	*	65,286	677	16	65

Estonia

ES5Q	**A**	**761,110**	**1195**	**96**	**319**
			(OP: ES5RY)		
ES7ABD	*	24,472	107	35	57
ES2DJ	*	6,624	37	33	36
ES5NC	**1.8**	**109,920**	**912**	**20**	**76**

European Russia

UA4WKW	**A**	**2,465,521**	**2825**	**135**	**442**
RT3T	**"**	**2,279,745**	**2660**	**135**	**450**
			(OP: UA3TU)		
UA3SAQ	**"**	**1,575,974**	**1461**	**141**	**478**
UA4PN	*	710,656	1479	86	261
RV2FW/1	*	696,925	880	100	357
RZ6HF	*	695,016	1070	99	295
RX3AT	*	642,026	944	93	286
UA1NFA	*	562,275	917	93	264
RA3RN	*	436,396	904	82	234
UA6AA	*	408,626	695	86	260
RZ3DA	*	289,800	499	77	245
RA3FD	*	230,175	709	53	172
UA6GM	*	218,385	612	56	155
RN1ON	*	218,232	501	60	192
UA6EED	*	141,919	630	31	108
RA6EE	*	112,646	446	44	107
RA3DNC	*	111,110	340	54	151
UA4HIP	*	108,744	408	40	144
RX3AEX	*	95,147	371	40	129
RZ6AK	*	68,052	402	32	127
RN6FA	*	58,918	552	19	70
UA1OAM	*	45,314	204	41	122
UA4RZ	*	39,349	257	30	79
UA4NF	*	37,389	217	24	97
RK3QS	*	35,952	241	24	83
RU3UM	*	35,245	292	19	76
RW3DOX	*	23,250	240	13	49
RV1AC	*	6,984	54	25	47
RZ4FWA	*	5,332	83	15	47
			(OP: UA4FGO)		
UA3YQL	*	1,782	27	12	21
RW4WZ	*	1,640	23	20	21
UA4ARL	*	80	4	4	4
RN4AO	**21**	**11,036**	**161**	**16**	**46**
UA6LV	**14**	**619,796**	**1943**	**39**	**139**
UA1ANA	*	132,992	641	28	100
UA6ATG	*	204	13	4	13
RN4AAD	*	72	5	3	5
RW4PL	**3.5**	**411,640**	**1630**	**34**	**130**
RX4HZ	*	345,234	1455	38	125
RZ3DJ	*	165,125	938	27	98
RU6FA	*	69,286	489	24	77
UA3MIF	*	30,096	338	12	60
RU4PU	**1.8**	**105,074**	**649**	**26**	**81**
UA6LFQ	*	86,815	587	25	72
RX3APM	*	73,320	568	21	73
RL3FO	*	11,956	193	8	41

Faroe Islands

OY1CT	**A**	**693,312**	**1866**	**57**	**219**
OY3JE	*	89,648	314	44	164

Finland

OG6N	**A**	**1,596,000**	**1963**	**123**	**409**
OH8L	**"**	**1,235,392**	**1966**	**96**	**302**
			(OP: OH8LQ)		
OH6MW	*	863,148	1462	92	337
OH2XX	*	655,408	1133	81	287
OH6DX	*	488,448	503	118	394
OG7X	*	295,776	416	99	317
OH2BEN	*	288,400	465	95	255
OH6RE	*	261,970	508	71	264
OH3OJ	*	231,600	948	45	155
OH2LNH	*	159,120	597	45	176
OH3LQK	*	49,680	244	31	84
OH2FS	*	17,952	77	32	64
OH8CW	*	8,990	104	12	46
OH3BU	**28**	**143**	**14**	**3**	**8**
OH2BN	**21**	**11,880**	**89**	**18**	**54**
OG5B	**14**	**440,640**	**1559**	**35**	**127**
OH2PQ	*	184,106	639	31	115
OH6M	**7**	**402,570**	**1600**	**36**	**126**
			(OP: OH6LBW)		
OH2BAH	*	124,992	448	31	113
OH2CI	*	8,378	103	12	47
OG4X	**1.8**	**181,484**	**1005**	**27**	**91**
OH2BO	*	149,199	667	27	96
OH3FM	*	44,265	591	13	52

France

F5UFX	**A**	**852,929**	**1115**	**81**	**290**
F6FLU	*	15,488	80	34	54
F4EIZ	*	12,000	76	26	70
F8CIL	**14**	**254,760**	**879**	**30**	**102**
F4DNW	**3.5**	**88,984**	**699**	**21**	**77**

Germany

DC4A	**A**	**3,465,924**	**2512**	**143**	**508**
			(OP: DL4NAC)		
DL1IAO	**"**	**3,333,651**	**2699**	**137**	**480**
DJ2YA	**"**	**2,512,275**	**1805**	**143**	**502**
DK3GI	*	2,251,440	1890	140	450
DM1TT	*	1,583,560	1826	108	380
DD1LD	*	1,292,218	1559	103	363
DL6KVA	*	960,372	1117	106	338
DL8DAZ	*	953,496	996	105	351
DF1LON	*	952,110	1253	96	330
DL6NCY	*	900,125	982	116	359
DHØGHU	*	856,855	1096	93	316
DK4A	*	829,192	1427	85	279
			(OP: DL3BPC)		
DL1NEO	*	824,466	1069	90	321
DJ8QP	*	737,334	1081	96	315
DL5CF	*	722,304	834	94	324
DL4RCK	*	719,339	884	97	334
DF5ZV	*	675,428	929	97	322
DFØBV	*	655,844	787	95	302
			(OP: DL1MAJ)		
DH8VV	*	581,504	750	92	260
DJ8EW	*	579,715	1006	85	270
DK1KC	*	556,738	1047	76	246
DL5JS	*	458,325	916	64	227
DL3KUM	*	449,920	744	77	293
DK1FW	*	418,488	545	98	278
DK3W	*	375,130	711	74	248
			(OP: DL6MHW)		
DL2AA	*	357,084	847	61	212
DJ4EY	*	326,170	503	77	261
DL1EJA	*	307,230	364	94	324
DL1DXA	*	303,620	502	86	254
DL2RMC	*	299,298	650	64	185
DL7YS	*	287,144	600	70	216
DL7UIO	*	284,200	632	58	187
DK7VW	*	280,864	642	61	201
DJ1AA	**"**	**264,040**	**548**	**68**	**219**
DM5Z	*	255,960	679	51	186
			(OP: DM5JBN)		
DKØAE	*	236,040	540	66	215
			(OP: DJ1AA)		
DJ3WE	*	223,851	491	61	188
DF8AA	*	211,314	504	54	192
DL3ZM	*	204,102	538	57	204
DF2CH	*	200,088	534	56	196
DL7DZ	*	197,490	346	76	151
DK6CQ	*	190,300	418	59	161
DJ4KW	*	186,390	390	72	213
DL4NER	*	158,712	393	47	157
DF2UU	*	156,816	273	67	257
DL9NDV	*	152,325	330	61	164
DL7UXG	*	141,249	503	43	154
DJØIF	*	136,770	576	44	150
DF6QV	*	132,664	333	42	164
DL5XJ	*	131,544	274	61	171
DJ7YT	*	131,376	404	47	157
DK7ZH	*	118,628	443	41	147
DM9KT	*	109,600	408	47	153
DG7RO	*	106,774	339	45	152
DL5MO	*	105,124	296	41	123
DL5MEV	*	103,950	177	80	151
DJ7EC	*	102,450	407	32	118
DL5AN	*	73,564	199	57	155
DL1ECG	*	60,175	244	39	106
DM5TI	*	60,060	191	50	132
DK8RE	*	56,784	275	38	131
DG8VE	*	54,349	207	39	100
DF2RG	*	50,318	186	39	100
DL2SWN	*	41,899	132	45	98
DL9NCR	*	40,880	159	51	95
DL9GTI	*	36,112	117	40	82
DF2QZ	*	34,902	144	36	90
DK5IR	*	34,188	147	39	93
DL1EHR	*	30,098	206	29	72
DM3VL	*	29,869	98	48	71
DL4KUG	*	25,536	145	26	88
DF2AP	*	23,845	198	20	75
DK4VY	*	22,748	139	28	66
DK1AX	*	21,836	171	21	85
DG9MDM	*	20,352	129	25	81
DL1SBF	*	18,424	151	14	42
DF2HL	*	17,112	91	29	64
DJ6OL	*	16,590	132	20	50
DL4FDI	*	14,685	133	20	69
DD1JN	*	13,940	117	18	50
DLØMFX	*	12,905	111	19	70
			(OP: DL4ZZ)		
DJ3EF	*	5,874	55	26	40
DL8UAT	*	3,744	34	18	30
DH8WE	**28**	**4,836**	**163**	**11**	**41**
DQ4Q	**21**	**98,745**	**390**	**32**	**113**
			(OP: DF9ZP)		
DK6XZ	*	17,538	107	23	51
			(OP: E77XZ)		
DL1LH	**14**	**317,046**	**925**	**36**	**123**
DL9GS	*	34,830	194	23	67
DK9IP	**7**	**795,932**	**2297**	**39**	**154**
DK1BN	*	509,436	1390	38	140
DL2ZAE	*	193,028	898	35	129
DF3GY	*	109,430	449	32	123
DL8OH	*	64,386	259	33	113
DJ2MX	*	12,675	145	15	50
DL7ON	**3.5**	**466,368**	**1741**	**37**	**131**
DM4M	**"**	**388,824**	**1720**	**32**	**104**
			(OP: DF9OX)		
DJ6TK	**"**	**95,004**	**653**	**27**	**90**
DK5WN	*	4,368	79	10	42
DF2LH	*	3,740	54	11	33
DL8QS	**1.8**	**100,016**	**704**	**23**	**89**
DL4CF	**"**	**94,500**	**743**	**20**	**80**
DK2GZ	*	56,355	626	17	68
DK2FG	*	52,626	403	21	77
DO9ST	*	2,772	81	4	32

Greece

SV2HRT	**A**	**185,350**	**440**	**67**	**208**
SV1CQN	*	98,700	766	22	83
SV2BOH	**14**	**292,189**	**1211**	**33**	**116**
SV2FWV	*	96,129	803	24	75
SV2BFN	**3.5**	**41,616**	**592**	**10**	**58**

Hungary

HG1A	**A**	**1,576,052**	**2315**	**114**	**349**
			(OP: HA1ZN)		
HAØHW	**"**	**1,130,300**	**1580**	**103**	**342**
HA3LI	**"**	**992,869**	**1563**	**93**	**340**
HA3OU	*	452,832	780	88	268
HA6M	*	445,284	756	92	280
			(OP: HA5PT)		
HA8CQ	*	80,325	331	43	110
HA8TP	**14**	**171,496**	**616**	**31**	**105**
HG3DX	**7**	**924,920**	**3049**	**38**	**152**
			(OP: HA5BWW)		
HA5KDQ	*	617,788	2149	38	126
			(OP: HA8LLK)		
HG4I	*	458,500	1490	38	137
HA8QZ	*	261,855	1074	35	130
HG3R	**3.5**	**589,897**	**2284**	**35**	**128**
			(OP: HA3NU)		
HG5A	**"**	**322,259**	**1819**	**29**	**104**
			(OP: HA7AP)		
HGØA	*	320,060	1543	24	106
			(OP: HA5JI)		
HA5X	*	60,258	689	15	68
HA5UY	*	19,648	279	10	54

Iceland

TF3AO	A	2,871	44	10	23

Ireland

EI6IZ	**A**	**611,665**	**1080**	**84**	**271**
EI/W5GN	**"**	**525,810**	**1296**	**56**	**199**
			(OP: W5GN)		
EI7CC	*	203,352	563	50	179

Italy

I2SVA	**A**	**1,116,596**	**1328**	**102**	**334**
I1EIS	**"**	**937,200**	**1307**	**96**	**304**
IZ3KKE	*	386,958	719	75	211
IK8UND	*	364,044	810	68	208
IZ5EKV	*	257,642	885	50	104
IZØEHL	*	129,498	348	56	170
IK2SAI	*	45,994	205	38	84
IK5AFJ	*	23,896	182	30	73
IK4AUY	*	17,388	106	28	64
IK2AIT	*	15,604	122	25	58
IV3XZG	*	12,920	105	21	55
IV3NVN	*	12,750	67	31	44
IZ2CSX	*	4,012	38	26	33
IWØGYC	*	2,867	34	21	26
IK1VEK	*	2,244	48	15	29
IZ8DVD	**28**	**1,035**	**19**	**9**	**14**
IR2C	**14**	**627,456**	**1668**	**37**	**135**
			(OP: IK2PFL)		
I2GPT	*	96,800	441	22	88
IØQM	*	71,500	295	25	85
I1BAY	*	53,110	326	25	69
IKØTUM	7	13,192	99	16	52
I4HRH	*	12,350	132	13	52
IK1YDB	**3.5**	**376,808**	**1707**	**32**	**116**
II2ØCJ	**"**	**316,416**	**1562**	**26**	**102**
			(OP: IK2JUB)		
IO3N	*	203,580	1256	27	89
			(OP: IV3RLB)		
IKØXBX	*	80,304	558	24	88

Latvia

YL2KO	**A**	**2,884,690**	**2918**	**145**	**465**
YL5T	*	281,010	573	75	180
			(OP: YL3DQ)		
YL9T	*	123,327	386	49	164
			(OP: YL2TW)		
YL2KF	*	55,275	213	45	120
YL7A	**14**	**135,150**	**458**	**34**	**125**
YL2VW	**1.8**	**157,140**	**1146**	**24**	**84**

Lithuania

LY3BN	**A**	**1,027,890**	**1245**	**105**	**365**
LY1CX	**"**	**987,168**	**1264**	**102**	**350**
LY3W	*	369,460	493	82	295
LY3CY	*	258,742	795	47	162
LY1R	*	31,624	143	40	94
LY2GV	**7**	**208,788**	**1090**	**32**	**105**
LY1C	*	24,024	276	17	61
LY7M	**3.5**	**276,801**	**1484**	**34**	**113**
LY2CO	*	147,952	1049	23	89
LY2W	*	138,672	1092	29	79
LY5W	**1.8**	**238,682**	**1432**	**33**	**98**

Macedonia

Z33A	**A**	**97,940**	**942**	**20**	**63**

Malta

9H1XT	**A**	**25,669**	**227**	**35**	**98**

Moldova

ERØWW	**A**	**6,073,268**	**5044**	**150**	**511**
			(OP: UT5UDX)		
ER5WU	**3.5**	**89,585**	**779**	**19**	**76**

Netherlands

PF6WW	**A**	**964,160**	**1599**	**80**	**288**
			(OP: PA1CC)		
PF5X	**"**	**389,364**	**604**	**78**	**206**
PA3C	*	292,576	510	79	249
PA5TT	*	254,464	552	56	200
PE7T	*	198,220	585	52	168
PA1TX	*	175,743	470	57	150
PA3FKN	*	148,850	554	48	181
PA7RA	*	84,240	358	42	138
PA3HGF	*	60,114	256	31	98
PAØBWL	*	9,384	50	25	44
PE1MMZ	*	7,695	99	16	29
PA1M	*	7,348	68	15	29
PA1AW	**14**	**610,896**	**1572**	**38**	**140**
PB2JJ	*	100,984	539	22	82
PA3EWP	**3.5**	**273,350**	**1429**	**27**	**115**
PA2AWU	*	32,435	508	10	55
			(OP: PA6Z)		
PA5A	**1.8**	**12,116**	**186**	**13**	**39**

Northern Ireland

GI4NKB	**A**	**508,648**	**1122**	**56**	**192**

Norway

LA5LJA	**A**	**216,381**	**566**	**52**	**185**
LA8AW	*	123,410	343	50	155
LA4RT	*	58,515	325	31	110
LA1BFA	*	24,752	156	26	86
LA2QM	**14**	**95,200**	**439**	**29**	**107**

Poland

SP4Z	**A**	**3,238,332**	**2775**	**147**	**494**
SN8F	**"**	**2,303,964**	**2498**	**129**	**418**
			(OP: SP8FHK)		
SP2GWH	*	413,328	701	82	245
SN9Z	*	311,310	710	68	202
			(OP: SP6EQZ)		
SP9LAS	*	257,922	628	63	204
SQ3RX	*	243,180	662	51	159
SP2IKP	*	185,856	423	59	205
SP7FRO	*	53,862	237	46	95
SP4GHL	*	52,050	211	38	112
SQ9NRY	*	35,100	217	31	86
SP8HXN	*	33,670	114	52	78
SP6GNJ	*	30,821	131	35	84
SP1MHZ	*	19,516	132	22	60
SP5CIB	*	12,180	94	21	63
SP5ELW	*	7,056	48	23	33
SP9CTS	*	5,073	74	19	38
SP7JLH	*	4,661	52	21	38
SQ2HNA	*	3,835	67	23	42
SP5ADX	*	3,060	26	20	25
SP8SW	*	2,379	35	16	23
SP6JOE	*	1,488	62	4	4
SQ3WW	*	96	4	4	4
SP2CA	*	54	3	3	3
SN3A	**28**	**5,194**	**140**	**9**	**40**
			(OP: SP3J)		
SP3GXH	21	11,700	77	22	43
SP5ES	*	91	5	3	4
SN2K	**14**	**445,686**	**1128**	**38**	**139**
			(OP: SP2JKC)		
SN3C	*	141,780	453	33	106
			(OP: SP3ASN)		
SP4JTJ	*	65,604	207	34	98
SP2UKB	*	35,721	190	20	61
HF9ØPR	*	1,113	31	8	13
SN8R	**7**	**791,104**	**2516**	**38**	**150**
			(OP: SP8ONZ)		
SN5G	*	244,568	1092	34	118
SO7O	*	5,247	38	18	35
			(OP: SP7DQR)		
SP8TJU	*	3,201	44	14	19
SQ8LSC	*	2,449	138	21	58
SO8A	**3.5**	**441,324**	**1762**	**35**	**121**
			(OP: SP8BRQ)		
SN3X	*	433,202	1843	35	119
SP1NY	*	147,986	930	24	98
SP2FAP	*	115,024	981	18	73
SP1S	*	5,700	53	19	41
SP4K	**1.8**	**16,380**	**123**	**21**	**70**

Portugal

CT1IUA	**21**	**100,240**	**445**	**29**	**83**

Romania

YQ9W	**A**	**3,753,580**	**3857**	**136**	**454**
			(OP: YO9WF)		
YR9P	**"**	**3,344,800**	**3137**	**146**	**446**
			(OP: YO9HP)		
YO3APJ	*	1,411,056	1596	109	369
YQ6A	*	1,307,878	1792	111	331
			(OP: YO6BHN)		
YO2MAX	*	464,405	833	65	228
YO4KCC	*	319,748	1063	69	217
YO9BXC	*	90,517	343	52	141
YP2U	*	77,350	248	54	116
YO2GL	*	25,146	185	27	72
YP3A	**21**	**77,140**	**377**	**30**	**86**
			(OP: YO3HAE)		
YO5BBO	*	22,725	149	24	51
YO5CBX	**14**	**207,545**	**666**	**34**	**121**
YO5OED	*	42,768	277	22	59
YO3JW	**7**	**94,500**	**431**	**32**	**103**
YR5N	**3.5**	**174,427**	**1444**	**26**	**75**
			(OP: YO5PBF)		
YR5O	*	62,567	669	19	70
			(OP: YO5BRZ)		

Sardinia

ISØ/K7QB	**A**	**1,112,319**	**1892**	**79**	**272**
			(OP: IN3QBR)		
ISØAFM	*	564,536	1476	65	173
ISØ/IT9VDQ	*	39,960	241	28	83

Scotland

GM7R	**A**	**1,186,606**	**2149**	**74**	**240**
			(OP: GMØNAI)		
MM3T	*	538,486	1266	67	231
			(OP: GMØELP)		
MMØBQI	*	28,602	118	33	93
GM4UYZ	14	5,060	81	11	33

Serbia

YT9A	**A**	**1,438,416**	**1609**	**117**	**387**
YT1T	**14**	**255,346**	**882**	**37**	**124**
YU1LA	**7**	**1,039,740**	**2972**	**39**	**156**
YT7AW	**"**	**614,008**	**1978**	**38**	**150**
YT1VP	*	546,282	1973	39	139
YU6DX	*	522,720	1950	37	139
YT1BX	*	73,038	377	28	83
YT3A	**3.5**	**439,757**	**1851**	**36**	**121**
YT1R	*	218,790	1479	26	84
			(OP: YU1UN)		
YT1TA	*	17,052	301	8	50

Sicily

IT9FGA	**A**	**51,450**	**150**	**53**	**97**
IT9LNH	*	16,632	76	38	61

Slovakia

OM7CW	**A**	**2,361,018**	**2957**	**111**	**320**
OM3AG	**21**	**56,144**	**228**	**30**	**86**
OMØM	**7**	**965,888**	**2776**	**39**	**157**
			(OP: OM3CGN)		
OM7YC	**"**	**74,018**	**405**	**27**	**92**
OM5M	**3.5**	**469,962**	**1833**	**34**	**128**
			(OP: OM2IB)		

Slovenia

S57DX	**A**	**3,682,656**	**3405**	**146**	**462**
S59ABC	**"**	**3,041,472**	**2475**	**136**	**448**
			(OP: S51DS)		
S5ØR	*	2,784,672	3121	129	399
S56A	*	1,465,632	1513	117	387
S54O	*	259,548	715	57	201
S5ØK	*	185,130	537	49	121
S57SU	*	173,665	477	57	178
S52AU	*	157,290	443	58	152
S55OO	*	90,835	308	53	132
S52P	**14**	**69,776**	**358**	**22**	**76**
S53M	**7**	**893,772**	**2759**	**38**	**145**
			(OP: S51FB)		
S56X	**"**	**740,784**	**2218**	**39**	**144**
S55M	*	492,139	1543	38	143
S57Z	*	462,000	1624	37	128
S58M	**3.5**	**233,856**	**1343**	**27**	**101**
S51DX	**"**	**23,004**	**423**	**9**	**45**
S57M	**1.8**	**113,145**	**984**	**20**	**75**

Spain

EA4KA	**A**	**1,385,685**	**1564**	**92**	**323**
EB5KB	**"**	**352,490**	**1206**	**51**	**151**
			(OP: EA5DWS)		
EA3EJI	*	191,890	337	82	228
EA1WX	*	191,022	409	66	171
EA5DKU	*	187,590	430	59	163
EA7ZY	*	95,942	388	37	117
EA3/EA8TL	*	53,320	242	34	90
EA3EYD	*	19,776	107	29	74
EA5EU	*	11,440	101	21	67
EB5RR	*	1,440	37	9	23
EA5GVZ	*	480	30	13	17
EA5HT	**21**	**160,083**	**633**	**31**	**90**
EA5GS	*	24,479	115	28	63
EA2LU	**14**	**141,792**	**632**	**20**	**76**
EA1CS	*	7,200	112	11	37
AO1T	**7**	**36,158**	**264**	**19**	**82**
			(OP: EB1TR)		
EB3CML	*	238	15	4	10
EA4KD	**3.5**	**155,642**	**888**	**23**	**95**
EA5BM	**1.8**	**68,805**	**603**	**18**	**81**

Sweden

SM6CNN	**A**	**1,472,403**	**1517**	**117**	**402**
SM6A	**"**	**596,480**	**1129**	**81**	**239**
			(OP: SM6BGA)		
SE2T	*	592,324	1005	86	311
SEØX	*	491,180	934	98	312
			(OP: SMØMDG)		
SM6V	*	318,166	949	59	198
			(OP: SM6VAO)		
SM6WET	*	224,334	495	73	236
SA1A	**"**	**171,252**	**597**	**52**	**149**
			(OP: SM1TDE)		
SM7E	*	169,650	485	54	171
			(OP: SM7BHM)		
SMØQ	*	116,762	524	30	128
			(OP: SMØOGQ)		
SMØKV	**21**	**2,744**	**58**	**14**	**35**
SM2M	**1.8**	**108,056**	**754**	**21**	**83**
			(OP: SM2LIY)		

Switzerland

HB9TMW	**A**	**431,553**	**685**	**69**	**222**
HB9HFN	*	6,954	43	24	37
HB9IQB	**14**	**75,106**	**434**	**28**	**66**
HB9CZF	**3.5**	**72,409**	**469**	**20**	**83**
HB9FBS	*	41,536	537	12	52

Ukraine

EM9F	**A**	**1,820,960**	**1798**	**142**	**466**
			(OP: UT9FJ)		
USØKW	**"**	**1,009,980**	**1304**	**107**	**358**
UU2JQ	*	642,783	737	114	387
UR2VA	*	589,248	938	85	256
UR5QA	*	575,616	865	93	291
UT7UJ	*	348,432	581	96	261
UY5ZI	*	305,492	680	68	194
UX2MF	*	284,727	596	81	240
US3IZ	*	265,684	808	61	193
UT8NT	*	261,360	791	52	190
UR5MA	*	205,860	599	61	174
US7IY	*	175,602	585	55	167
UR5FEL	*	147,312	326	71	208
UTØIG	*	140,970	395	54	168
UY5QZ	*	125,960	360	63	172
UT7MA	*	65,360	687	18	68
UXØFF	*	39,087	158	45	84
UT3UV	*	37,845	235	37	108
USØMF	*	24,192	109	39	69
UXØZL	*	13,000	124	28	72
UT5PH	*	6,966	188	6	37
UR5IFB	**21**	**37,224**	**202**	**25**	**69**
UW5Q	**14**	**601,407**	**1907**	**38**	**133**
UT8L	*	206,815	999	30	103
			(OP: UY5LQ)		
UT1IA	*	119,915	412	29	116
UUØA	**7**	**804,565**	**2485**	**38**	**147**
			(OP: UUØJX)		
UR5IKN	*	39,693	150	31	100
UU1CW	*	37,730	191	27	83
UW5U	**3.5**	**338,895**	**1603**

Chile

CE3AA	**A**	**1,767,647**	**1779**	**104**	**269**
			(OP: XQ4CW)		
CE6SAX	**28**	**2,047**	**64**	**9**	**14**
CE6TBN	7	345	13	6	9

Colombia

HK1X	**A**	**568,890**	**1671**	**28**	**101**

Uruguay

CW7T	**A**	**1,505,048**	**1336**	**110**	**309**
			(OP: CX7TT)		
CX2CC	7	9,853	94	19	40

MULTI-OPERATOR SINGLE TRANSMITTER NORTH AMERICA

United States

W3UA/1	**5,991,040**	**3564**	**135**	**505**
W1TM	486,315	606	73	248
W1SRG	108,540	254	42	120
W2FU	**6,377,626**	**3332**	**153**	**545**
NA2U	2,670,486	1930	113	398
WQ2N	992,670	851	101	334
W2YR	585,312	618	92	324
AA2DC	436,840	487	81	254
W2AU	395,064	582	61	218
N2KPB	235,625	567	77	248
K9RS/3	**5,162,400**	**2916**	**147**	**528**
W3BGN	**3,956,046**	**2223**	**140**	**514**
K3MD	1,729,817	1403	114	389
W3LJ	249,486	397	66	192
KT3Y/4	**5,053,658**	**2999**	**138**	**508**
AD4ES	725,539	854	83	276
AC4TT	487,968	549	93	275
KJ4BIW	172,270	280	67	163
K5NA	**5,097,456**	**2848**	**164**	**564**
W5VX	1,097,656	939	123	353
W7DR/6	**940,950**	**892**	**126**	**324**
W7VJ	**2,267,190**	**1795**	**137**	**349**
AB7E	**1,621,580**	**1512**	**117**	**328**
W9NGA/7	1,265,922	1105	126	333
K8AZ	**5,452,970**	**2924**	**154**	**541**
K8CC	**4,759,812**	**2717**	**147**	**507**
K8DO	406,980	555	92	265
NØNI	**4,794,744**	**2599**	**158**	**538**

Alaska

KL7CQ	**989,938**	**1964**	**82**	**157**
KL7WV	732,505	1511	84	131
NL7Z	508,475	1191	86	129

Canada

CK2DWA	**1,760,148**	**1646**	**101**	**367**
VE3EJ	**8,167,428**	**4547**	**156**	**583**
VE3MIS	730,050	1108	78	236
VC6R	**2,791,740**	**2753**	**141**	**369**
VE6AO	583,884	1108	72	180
VE7GL	**3,302,584**	**3129**	**130**	**342**

San Andres/Providencia

5KØT	**5,146,680**	**5331**	**120**	**320**

Turks & Caicos

VP5W	**7,859,724**	**5314**	**141**	**477**

AFRICA

Canary Islands

EA8ZS	**6,177,888**	**3921**	**137**	**471**

Morocco

5C5T	**1,602,510**	**2035**	**65**	**208**

Reunion

TO3R	**4,699,538**	**3801**	**109**	**349**

ASIA

Asiatic Russia

RT9W	**7,094,766**	**4078**	**155**	**518**
RN9S	**5,027,666**	**3557**	**135**	**439**
UA9UZZ	4,214,016	3220	127	404
RX9CAZ	1,495,139	1346	104	327
RK9CWW	1,435,336	1075	118	379
RK9JWW	1,108,905	1560	75	220
RK9CYA	802,414	1124	70	232
RK9XWO	793,548	1179	64	204
RZ9UWZ	305,490	801	39	131
RWØA	**6,172,986**	**4374**	**153**	**473**
RWØLT	1,700,898	1943	119	275
RKØSXF	802,277	1164	93	250
RZØLWA	630,885	1048	99	208

Asiatic Turkey

TA3KZ	**6,481,512**	**5847**	**114**	**330**
TA3KM	70	6	4	6

China

B5A	**2,007,792**	**2568**	**113**	**269**
B4TB	**1,264,392**	**2027**	**94**	**212**
B1C	323,632	1209	62	117
B4VE	112,320	637	45	72
B1P	46,000	499	32	48

Cyprus

C4N	**12,825,008**	**6944**	**148**	**540**

India

AU5JCB	23,180	119	33	62

Japan

JA2ZJW	**1,916,732**	**2059**	**114**	**244**
JF2QNM	956,610	1370	100	170
JA8RWU	**2,239,815**	**2181**	**133**	**302**
JAØQNJ	**2,853,395**	**2488**	**138**	**311**

Qatar

A73A	**7,472,626**	**4962**	**139**	**463**

EUROPE

Austria

OE2S	**4,473,189**	**3518**	**156**	**547**

Belarus

EW2WW	660	20	6	16

Belgium

OP4K	**2,275,135**	**2888**	**113**	**372**
OT5P	1,009,268	1983	84	254

Bosnia-Herzegovina

E73M	**7,279,794**	**5456**	**158**	**571**
E73ESP	**15,340**	**394**	**9**	**43**

Bulgaria

LZ5K	**3,827,040**	**3781**	**138**	**457**
LZ1ABC	531,288	951	71	243

Crete

J49I	**2,853,450**	**4086**	**110**	**400**

Croatia

9A8M	**2,214,171**	**2635**	**119**	**352**
9A4J	553,265	1117	65	218
9A1CIG	96,188	526	48	125

Czech Republic

OK5W	**6,899,152**	**4181**	**176**	**633**
OL7R	**5,433,384**	**4040**	**154**	**572**
OL1C	3,355,744	3403	131	437
OK6DX	1,624,005	2174	112	341
OL2U	615,036	1321	77	244
OL6M	367,500	881	69	225
OK5SWL	2,106	31	13	26

Denmark

OZ2AR	**550,564**	**1075**	**82**	**289**

England

M6T	**8,352,822**	**5564**	**168**	**618**
G5W	**5,883,462**	**4730**	**142**	**521**
G6PZ	**5,012,055**	**4196**	**138**	**497**
GØORH	454,584	1217	54	194

European Russia

RU1A	**6,612,015**	**4658**	**171**	**624**
RT6A	**6,239,790**	**4911**	**175**	**604**
RL3A	**6,122,732**	**4671**	**172**	**600**
RT4M	4,264,008	3463	166	548
RK3DZB	3,479,532	3618	138	506
UA3R	3,317,244	3948	136	470
RT4D	2,696,294	3055	134	473
RK3MWD	2,069,496	2587	122	414
RK3GWW	1,890,568	2069	132	430
RZ3TZL	1,209,920	2135	103	295
RZ3TZZ	965,650	1492	103	331
RK3QWM	932,670	1499	101	329
RZ4HWS	889,540	1948	85	231
RK4FWX	732,240	1779	89	235
RK3RWA	557,375	1390	78	247
RK3DZF	432,248	1036	71	213
RK1QWX	403,614	983	70	236
RK3DZH	272,205	893	66	197
RK3DXS	202,672	528	61	178
RK3AWA	127,400	470	41	155
RK3SWB	39,648	209	42	76
RZ3AWM/3	26,780	200	22	81
RF3T	15,811	123	31	66
RZ4SWM	9,975	132	18	57

Finland

OH5Z	**3,894,228**	**3520**	**154**	**535**
OH1O	679,808	953	104	348

France

TM6M	**8,436,540**	**5534**	**159**	**583**
TM2Y	**6,379,269**	**4393**	**160**	**581**
TM2S	4,535,468	4150	135	467
F6KNB	4,316,409	3936	131	442
TM4Q	4,215,218	3866	134	489
F6PTT	550,854	958	65	238
F6CEL	342,888	1075	60	213
F6KDL	222,640	796	53	167
F5KSE	49,350	278	42	108

Germany

DF3CB	**4,683,345**	**3234**	**148**	**537**
DP9A	**4,105,471**	**3369**	**141**	**520**
DR4A	3,664,089	3150	146	511
DL1QQ	2,806,657	2823	123	424
DA3A	1,853,850	2014	114	396
DFØCI	1,444,896	1661	119	400
DL1WA	1,384,944	1846	104	369
DR8M	664,506	1270	81	261
DM5A	129,482	477	48	154

Hungary

HG6N	**6,895,708**	**4499**	**167**	**612**
HA6KZS	94,815	475	35	112

Iceland

TF4M	**1,499,987**	**2963**	**72**	**265**

Ireland

EIØW	**1,186,513**	**2554**	**75**	**298**

Italy

IR4M	**8,128,603**	**4951**	**171**	**626**
IO4T	4,550,960	3883	143	509
IO3X	543,484	763	104	228

Kaliningrad

RW2F	**7,699,328**	**5099**	**181**	**651**

Latvia

YL1S	**987,001**	**1253**	**108**	**353**

Lithuania

LY6A	**3,726,828**	**3583**	**138**	**505**

Netherlands

PI4TUE	**2,507,995**	**2543**	**124**	**423**
PI4D	**1,745,988**	**1956**	**106**	**392**
PI4Z	1,386,877	2152	91	300
PI4ZOD	13,280	160	27	56
PI4CG	2,736	98	9	15
PI4VHW	1,568	51	6	8

Norway

LN8W	**4,202,816**	**3823**	**147**	**530**
LN3Z	**3,783,000**	**3861**	**135**	**465**
LA2AB	703,950	1642	76	249
LA1TUR	14,443	166	21	80

Poland

SO9Q	**4,535,687**	**3526**	**150**	**539**
SN1I	984,642	1453	105	328
SP1KRF	490,758	1051	65	246
SN2S	175,720	609	52	178
SP9KRT	166,551	513	55	176
SP3KPN	10,656	103	20	74

Romania

YR1C	**3,445,326**	**3919**	**130**	**424**
YR8B	1,057,341	2213	91	248
YR9F	282,988	798	60	209
YR2X	215,808	964	46	146
YO6KNY	8,004	82	20	49
YO5KOP	5,460	60	24	36

Scotland

GMØEGI	**795,874**	**1308**	**86**	**297**

Serbia

YTØA	**6,199,872**	**4308**	**171**	**613**
YT6T	1,549,565	2188	119	360
YT7T	408,558	924	66	232
YU3W	247,095	860	71	214
YU7FN	20,832	141	21	63

Sicily

IR9Y	**3,767,776**	**3581**	**137**	**471**
IT9GSF	1,439,211	1363	142	451

Slovakia

OM8A	**9,946,342**	**5911**	**180**	**677**
OM7M	**8,170,184**	**5093**	**173**	**645**
OM3RJB	2,132,080	2151	132	448
OM3KWZ	992,325	1669	85	308
OM3RRC	953,344	1785	87	305

Slovenia

S550	7,018	87	17	41

Spain

EA5RS	**6,351,000**	**5030**	**157**	**568**
ED2R	1,030,782	2149	70	228
EA4DAT	239,575	620	62	197

Sweden

SI9AM	**683,100**	**1727**	**63**	**237**
SM3D	326,235	915	59	180

Switzerland

HB9EP	**398,412**	**980**	**60**	**178**

Ukraine

UZ2M	**7,501,694**	**5382**	**179**	**638**
UT7L	**3,161,980**	**3043**	**144**	**484**
UZ1H	1,756,867	2616	108	311
UTØAZA	1,036,758	2157	100	302
UX4E	532,576	860	89	263
UWØL	293,820	721	68	227
UR6GWZ	145,740	532	52	158
UU4JWC	25,088	212	27	71

OCEANIA

Guam

AH2R	**6,947,512**	**4364**	**154**	**418**

New Zealand

ZM2M	**1,273,767**	**1521**	**110**	**209**
ZM4A	**1,106,050**	**1548**	**94**	**181**
ZL2AGY	639,471	994	92	167

SOUTH AMERICA

Argentina

LS1D	**2,183,922**	**2296**	**93**	**273**
LU3DKV	723,975	1203	76	169
AY7X	271,836	747	45	117
LU4DQ	212,098	540	64	109

Brazil

ZW5B	**7,602,706**	**4769**	**150**	**472**
PR1T	**6,880,425**	**4348**	**137**	**460**
PY3MHZ	503,936	1091	79	169
PP5BZ	92,991	257	53	86

Netherlands Antilles

PJ4A	**13,571,652**	**7262**	**146**	**515**

Uruguay

CW5W	**5,764,412**	**3575**	**153**	**475**
CX1CCC	271,760	780	61	111

MULTI-OPERATOR TWO TRANSMITTER NORTH AMERICA

United States

K1AR	**9,801,726**	**5027**	**153**	**573**
K1KI	**8,369,448**	**4215**	**152**	**571**
K2LE/1	**6,118,125**	**3699**	**137**	**488**
KØTV/1	**4,952,524**	**2970**	**133**	**481**
KB1H	**4,570,893**	**2738**	**132**	**501**
K2AX	**3,349,486**	**2225**	**125**	**446**
W2CG	**3,282,732**	**2114**	**133**	**470**
W2YC	2,734,060	1952	130	460
WE3C	**10,750,157**	**5183**	**162**	**595**
NE3F	2,891,955	2101	122	439
K3DI	479,332	518	97	274
NY4A	**7,478,809**	**4220**	**140**	**513**
N4WW	**4,364,488**	**2725**	**144**	**508**
W3GQ/4	2,436,000	1668	124	436
KZ5P	**366,600**	**527**	**83**	**217**
W6OAT	**3,383,650**	**2324**	**155**	**435**
W6FA	691,352	744	111	245
N7AP	**2,218,939**	**1718**	**137**	**384**
N7BV	1,036,142	1276	108	239
NØIJ/9	**2,258,960**	**1459**	**143**	**461**
W9SN	1,135,680	1098	109	346
AA6DY/9	1,013,412	880	121	353

Canada

VE9ML	**244,422**	**502**	**58**	**164**
VE7SV	**5,378,930**	**4837**	**141**	**361**

Greenland

OX5AA	**4,909,240**	**4927**	**84**	**310**

U.S. Virgin Islands

KP2M	**14,804,065**	**9376**	**145**	**522**

AFRICA

Cape Verde

D4C	**31,955,086**	**13008**	**178**	**675**

ASIA

Asiatic Russia

RXØQA	**1,292,808**	**1720**	**95**	**259**

Asiatic Turkey

YM3A	**9,943,768**	**6493**	**133**	**451**

China

B1Z	**3,492,808**	**4076**	**123**	**295**

Cyprus

P3F	**17,276,832**	**8886**	**157**	**560**

Japan

JA1YPA	**3,221,991**	**3005**	**128**	**295**
JA1ZGP	738,840	1225	92	170
JA3AOP	**1,371,738**	**1662**	**118**	**216**

Maldives

8Q7DV	**10,693,344**	**6553**	**157**	**511**

EUROPE

Croatia

9A7T	**1,997,154**	**1749**	**142**	**471**

Denmark

5P3WW	**3,463,632**	**4440**	**121**	**415**

England

G5O	**2,882,868**	**3723**	**104**	**370**

European Russia

RC3W	**1,993,782**	**3105**	**123**	**395**
RK3XWO	812,442	1452	89	313

Finland

OG2U	**5,790,440**	**4873**	**159**	**563**

Germany

DQ4W	**6,969,048**	**5122**	**156**	**588**
DLØAO	**5,323,135**	**4143**	**148**	**537**
DR5N	4,709,106	4482	131	476
DP9I	255,712	843	49	195

Hungary

HG1S	**7,466,250**	**5895**	**160**	**590**

Italy

IR4X	**9,297,256**	**6532**	**168**	**608**
IQ5AE	862,922	1593	87	239

Luxembourg

LX7I	**9,006,194**	**7023**	**160**	**559**

Netherlands

PB2X	**72,072**	**313**	**32**	**111**
PD2EDR	16,212	174	20	64

Poland

SN3T	**1,324,864**	**1567**	**121**	**387**

Scotland

GM6NX	**100,061**	**393**	**39**	**140**

Serbia

YT3M	**5,591,922**	**5471**	**141**	**490**

Slovenia

S52ZW	**5,468,040**	**4802**	**149**	**515**

Spain

EA5CW	**5,200,542**	**5469**	**134**	**488**

Switzerland

HB9CA	**6,698,660**	**5713**	**150**	**520**

Wales

GWØGEI	**2,467,161**	**3678**	**106**	**361**

OCEANIA

Hawaii

KH6LC	**7,103,112**	**5619**	**145**	**311**
AH6XX	**6,005,544**	**4864**	**145**	**299**

New Zealand

ZM1A	**4,728,372**	**4192**	**140**	**312**

Philippines

DX1DBT	**256,266**	**719**	**55**	**83**

SOUTH AMERICA

Argentina

LU8YE	**2,100,744**	**2267**	**106**	**252**

Netherlands Antilles

PJ2T	**19,313,427**	**9470**	**156**	**565**

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W3LPL	**13,084,806**	**6330**	**167**	**631**
K1TTT	**9,769,104**	**4904**	**160**	**598**
W1KM	**9,707,721**	**4835**	**152**	**571**
N3RS	**9,409,104**	**4843**	**157**	**565**
NQ4I	**9,028,396**	**4884**	**159**	**595**
NR4M	**7,103,471**	**4140**	**152**	**557**
NR5M	**6,927,048**	**4072**	**162**	**550**
W3PP	6,620,229	3576	149	550
K1RX	6,368,838	3587	142	552
KØRF	**5,749,386**	**3511**	**158**	**511**
WØAIH/9	**4,506,436**	**2792**	**155**	**516**
W8AV	**3,411,720**	**2125**	**145**	**503**
K7RST	41,538	186	55	83

Canada

VE7FO	**387,904**	**752**	**80**	**152**

French St. Martin

TO4X	**11,136,840**	**8193**	**137**	**453**

AFRICA

Guinea

3X5A	**29,423,646**	**12880**	**171**	**626**

Madeira Islands

CT9L	**22,783,077**	**11033**	**161**	**570**

ASIA

Asiatic Russia

RA9A	**7,083,540**	**4574**	**136**	**454**

Japan

JA5FDJ	**11,023,824**	**6143**	**180**	**508**
JA3YBK	**8,948,905**	**5249**	**174**	**491**
JA6ZPR	331,650	587	85	140

EUROPE

Bulgaria

LZ9W	**12,613,560**	**9091**	**170**	**648**

Czech Republic

OK2RRR	**1,309,623**	**2107**	**105**	**348**

European Russia

RL6YXX	**1,602,886**	**2217**	**110**	**392**
RK6YZZ	**1,264,724**	**2109**	**110**	**356**

Finland

OG5ØF	**5,906,460**	**5626**	**146**	**540**

Germany

DFØHQ	**13,161,400**	**9005**	**174**	**676**
DR1A	**10,795,902**	**7686**	**167**	**626**

Lithuania

LY7A	**5,691,378**	**5967**	**146**	**533**

Luxembourg

LX8M	**6,508,644**	**6931**	**130**	**504**

Poland

SO6I	**1,230,984**	**1332**	**122**	**434**

Sardinia

ISØA	29,868	170	36	95

Serbia

YTØT	**293,370**	**1267**	**39**	**115**

Spain

EE2W	**11,126,400**	**8752**	**168**	**592**

Sweden

SK3W	**8,615,376**	**6627**	**167**	**610**

OCEANIA

Hawaii

KH7X	**10,626,552**	**6881**	**172**	**386**

SOUTH AMERICA

Ecuador

HD2M	**9,373,526**	**5986**	**145**	**421**

Galapagos Islands

HC8N	**32,378,115**	**13197**	**192**	**675**

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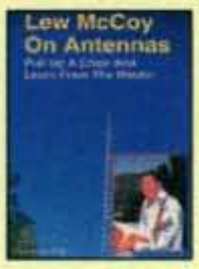

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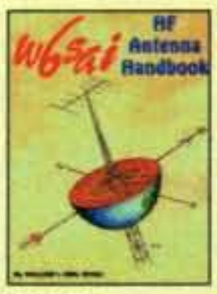

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