Good Propagation Predicted for 2013

Amateur Radio

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

COMMUNICATIONS & TECHNOLOGY

CQ

JANUARY 2013

- Contesting from China, p. 13
- Results: 2012 CQ WPX SSB Contest, p. 18
- Route 66 On the Air, p. 34
- Marshmallows and DX, p. 83

On the Cover:
Mike Warren, WØWG,
of Eden Prairie, Minnesota.
Details on page 26

$6.99US/CAN

01>

0 74820 08223 2

2013 CQ WW
160-Meter
CW Contest
Jan. 25-27

EchoLink® Ready

TM-V71A

With the Kenwood TM-V71A you have a choice of where you want your speaker, on the top or on the bottom of the radio. Simply remove the faceplate and flip the main body, then reattach the face, it's that simple! Yet another Kenwood **1st**, this dual band transceiver has ten dedicated EchoLink® memory channels as well as EchoLink sysop-mode operation. EchoLink connection to your PC via the optional PG-5H cable kit is easy with no expensive interface needed.

EchoLink® is a registered trademark of Synergenics, LLC. For more information please see: www.echolink.org.

Large dual color amber or green thirteen segment LCD.

KENWOOD

Customer Support: (310) 639-4200
Fax: (310) 537-8235

Scan with your phone to download TM-V71A Brochure.

www.kenwoodusa.com

ISO9001 Registered

ADS#43412

Cushcraft R8 *8-Band Vertical*

Covers 6, 10, 12, 15, 17, 20, 30, and 40 Meters!

The Cushcraft R8 is recognized as the industry gold standard for multi-band verticals, with thousands in use worldwide. Efficient, rugged, and built to withstand the test of time, the R8's unique ground-independent design has a well-earned reputation for delivering top DX results under tough conditions. Best of all, the R8 is easy to assemble, installs just about anywhere, and blends inconspicuously with urban and country settings alike.

Automatic Band Switching: The R8's famous "black box" matching network combines with traps and parallel resonators to cover 8 bands. You QSY instantly, without a tuner!

Rugged Construction: Thick fiberglass insulators, all-stainless hardware, and 6063 aircraft-aluminum tubing that is double or triple walled at key stress points handle anything Mother Nature can dish out.

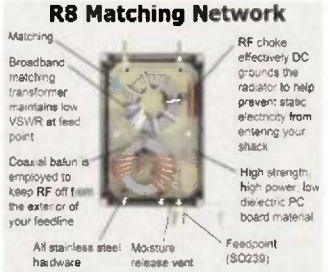
Compact Footprint: Installs in an area about the size of a child's sandbox -- no ground radials to bury and all RF-energized surfaces safely out of reach.

Legal-Limit Power: Heavy-duty components are contest-proven to handle all the power your amplifier can legally deliver and radiating it as RF rather than heat.

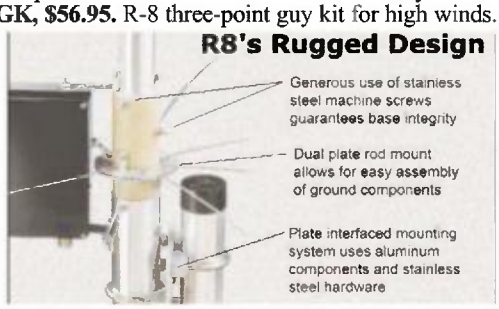
The sunspot count is climbing and long-awaited band openings are finally becoming a reality. Now is the perfect time to discover why Cushcraft's R8 multi-band vertical is the premier choice of DX-wise hams everywhere!

R-8GK, $56.95. R-8 three-point guy kit for high winds.

R8 Matching Network



R8's Rugged Design



MA-5B *5-Band* Beam

Small Footprint -- Big Signal

The MA-5B is one of Cushcraft's most popular HF antennas, delivering solid *signal-boosting directivity* in a bantam-weight package. Mounts on roof using standard TV hardware. Perfect for exploring exciting DX without the high cost and heavy lifting of installing a large tower and full-sized array. Its 7 foot 3-inch boom has less than 9 feet of turning radius. Contest tough -- handles 1500 Watts.

The unique MA-5B gives you 5-bands, automatic band switching and easy installation in a compact 26-pound package. On 10, 15 and 20 Meters the end elements become a two-element Yagi that delivers solid power-multiplying gain over a dipole on all three bands. On 12 and 17 Meters, the middle element is a highly efficient trap dipole. When working DX, what really matters are the interfering signals and noise you *don't hear*. That's where the MA-5B's impressive side rejection and front-to-back ratio really shines. *See **cushcraftamateur.com** for gain figures.*

Cushcraft 10, 15 & 20 Meter Tribander Beams

Only the best tri-band antennas become DX classics, which is why the Cushcraft World-Ranger A4S, A3S, and A3WS go to the head of the class. For more than 30 years, these pace-setting performers have taken on the world's most demanding operating conditions and proven themselves every time. The key to success comes from attention to basics. For example, element length and spacing has been carefully refined over time, and high-power traps are still hand-made and individually tuned using laboratory-grade instruments. All this attention to detail means low SWR, wide bandwidth, optimum directivity, and high efficiency -- important performance characteristics you rely on to maintain regular schedules, rack up impressive contest scores, and grow your collection of rare QSLs!

It goes without saying that the World-Ranger lineup is also famous for its rugged construction. In fact, the majority of these antennas sold years ago are still in service today! Conservative mechanical design, rugged over-sized components, stainless-steel hardware, and aircraft-grade 6063 make all the difference.

The 3-element A3S/A3WS and 4-element A4S are world-famous for powerhouse gain and super performance. **A-3WS, $499.95,** 12/17 M. **30/40 Meter** *add-on kits* available.

Cushcraft Dual Band Yagis

One Yagi for Dual-Band FM Radios

Dual-bander VHF rigs are the norm these days, so why not compliment your FM base station with a dual-band Yagi? Not only will you eliminate a costly feed line, you'll realize extra gain for digital modes like high-speed packet and D-Star! Cushcraft's A270-6S provides three elements per band and the A270-10S provides five for solid point-to-point performance. They're both pre-tuned and assembly is a snap using the fully illustrated manual.

Cushcraft Famous *Ringo* Compact FM Verticals

W1BX's famous *Ringo* antenna has been around for a long time and remains unbeaten for solid reliability. The Ringo is broad-banded, lightning protected, extremely rugged, economical, electrically bullet-proof, low-angle, and more -- but mainly, it just plain works! To discover why hams and commercial two-way installers around the world still love this antenna, order yours now!

***Free* Cushcraft Catalog**
and Nearest Dealer . . . 662-323-5803
Call your dealer for your best price!

Cushcraft
Amateur Radio Antennas
308 Industrial Park Road, Starkville, MS 39759 USA
Open: 8-4:30 CST, Mon.-Fri. *Add Shipping.*
• **Sales/Tech:** 662-323-5803 • **FAX:** 662-323-6551
http://www.cushcraftamateur.com

Prices/specifications subject to change without notice/obligation. © Cushcraft®, 2010.

Cushcraft . . . Keeping you in touch around the globe!

Visit www.cushcraftamateur.com

CQ Highlighted on "Conan"

There's an old saying in politics: "I don't care what they say about me as long as they spell my name right." The same sentiment applies here as well. ... At the end of October, comedian and talk show host Conan O'Brien did a segment on his TBS show "Conan" called "Real Magazines that Outlasted 'Newsweek' " ... and guess which magazine was featured first? Yes! *CQ*!

Of course he was making fun of us (that's his job), but our October cover was still splashed across national television! And the serious point of the whole segment (that he probably didn't realize he was making) was that even though general-interest magazines such as *Newsweek* are in trouble, niche magazines—such as this one and the others he featured—are still going strong. There is a future for print magazines and niche magazines are that future. The entire segment may be viewed on YouTube at <http://bit.ly/RsXRpV>.

Talk show host Conan O'Brien holds up the October issue of CQ *to lead off a segment on "Real Magazines that Outlasted 'Newsweek' " on his program "Conan," which airs weeknights at 10 PM eastern on TBS. (Internet screen grab)*

One Ham Killed, Another Rescued, in Sinking of *HMS Bounty*

One of the first casualties of Superstorm Sandy was the tall ship *HMS Bounty*, a replica of the British sailing vessel made famous when a band of crew members mutinied on a 1789 voyage to the South Pacific. Fourteen of the 16 crew members were rescued safely. However, the captain—Robin Walbridge, KD4OHZ—was never found and is presumed to have gone down with the ship. The second casualty was Claudene Christian, a descendent of mutineer Fletcher Christian.

A second ham on the crew, Ship's Electrician Doug Faunt, N6TQS, was rescued. He told the *ARRL Letter* that the ship's crew used various methods, including HF amateur radio, to try to get help but met with little success. Finally, they were able to use *Winlink* to e-mail a distress message to the Coast Guard. Faunt told the *Letter* that "ham radio got me into my position on the *Bounty*, and ham radio got me out alive!"

There was also a closer-than-comfortable link between the *Bounty* and the *CQ* "family." Former *CQ* Youth Editor Brittany Decker, KB1OGL, crewed aboard the ship last summer. Her father, Paul Decker, KG7HF, told *CQ* she had considered staying on through the fall, but thankfully decided to head off to college instead.

Post Office Wants to Phase Out IRCs

If the U.S. Postal Service has its way, International Reply Coupons (IRCs) will no longer be available for sale after January 27. According to the *ARRL Letter*, the postal service published a notice of its plans in the *Federal Register* on October 28, citing insufficient demand to continue providing the service. Comments were being accepted through November 23. Even if IRCs are no longer offered for sale by the postal service, Universal Postal Union (UPU) regulations require that post offices honor and redeem IRCs that have been purchased in other countries. IRCs are a form of prepaid postage, redeemable for a single unit of airmail postage in any UPU member country. Hams have long used them to provide return postage for QSL cards from DX countries.

W7EQI Re-Elected to Congress

Oregon Congressman Greg Walden, W7EQI, easily won re-election in the 2012 election. *Newsline* reports that Walden, who was chairman of the Communications Subcommittee of the House Energy and Commerce Committee in the 112th Congress, polled nearly 70% of the vote in his district. At press time, the 113th Congress had not yet convened, so it is not yet certain whether Walden, a Republican, will retain his subcommittee chairmanship or move up in the House hierarchy.

China Revamping Amateur Radio Regulations

Revised regulations on amateur radio are working their way through the bureaucracy of China's government and are expected to open the door for widespread licensing of individuals and clubs in the world's most populous nation. The new rules are also expected to expand recognition of amateur radio organizations in China from only the Chinese Radio Sports Association (CRSA) to include the relatively new Chinese Radio Amateurs Club (CRAC). [*See PY2QI's article, "Inside a Chinese Contest Station—B1Z in the WPX SSB Contest," on page 13 of this issue.*] According to *Newsline*, the CRAC is expected to become China's official representative to the International Amateur Radio Union.

New Data Mode Uses Chinese Characters

As the use of amateur radio grows in China, a new digital mode has been developed that uses Chinese characters rather than the Western European/American alphabet. *Southgate Amateur Radio News* reports that the new mode is called CP-16 and is based on the 16x16 dot-matrix display used to generate Chinese characters on computer screens. It uses 16 on-off keyed audio characters spaced at 17-Hz intervals, resulting in a total signal bandwidth of less than 400 Hz. Transmission speed is two-to-five characters per second and it can be received on any software defined radio (SDR) receiver or SSB receiver/computer combination running waterfall-display software. The characters will appear directly on the waterfall display. More information is available at <www.iaru-r3.org/15r3c/docs/056.doc>.

DX to be 2013 Hamvention® Theme

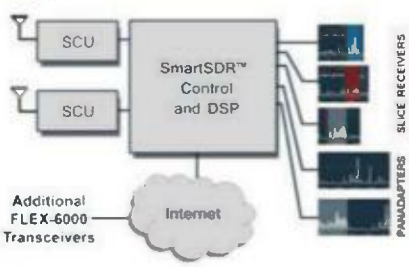
The Dayton Amateur Radio Association has decided on DX and DXing as the theme for the 2013 Hamvention®, calling this year's show "DX Hamvention." According to the *ARRL Letter*, General Chairman Charles Kaiser, KD8JZR, noted that Dayton "is often an important DX destination for amateurs from all over the world," adding in a message on the Hamvention website that "possibly nowhere on Earth can one experience first-hand the incredible diversity and worldwide reach of amateur radio as during this event." This year's Hamvention will be held May 17–19 at Hara Arena in Dayton, Ohio.

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.

FLEX-6000 Signature Series Direct Sampling HF/6m Transceivers with SmartSDR

Imagine a transceiver that changes Ham Radio - forever...

FlexRadio Systems, a pioneer in software defined radios for the amateur radio community, proudly introduces the FLEX-6000 Signature Series with SmartSDR - A revolution in SDR technology.
To learn more, visit www.flexradio.com



SIGNAL PROCESSING

The FLEX-6000 Signature Series packs more signal processing power into one radio than all other brands combined.

- Up to 317 GMAC & 121 GFLOPS
- ARM Cortex™ - A8/NEON™ CPU
- Xilinx® Virtex®-6 FPGA
- Reserve power for future apps

NETWORKING

Every radio is a network radio, whether across the shack or across the world.

- Ethernet interface
- Native remote capability
- Multi-user capable

SmartSDR

SmartSDR organizes all signal processing power into an advanced dynamically reconfigurable environment.

- Simple and elegant user interface
- Up to 8 Slice Receivers / Panadapters
- Hides complexity

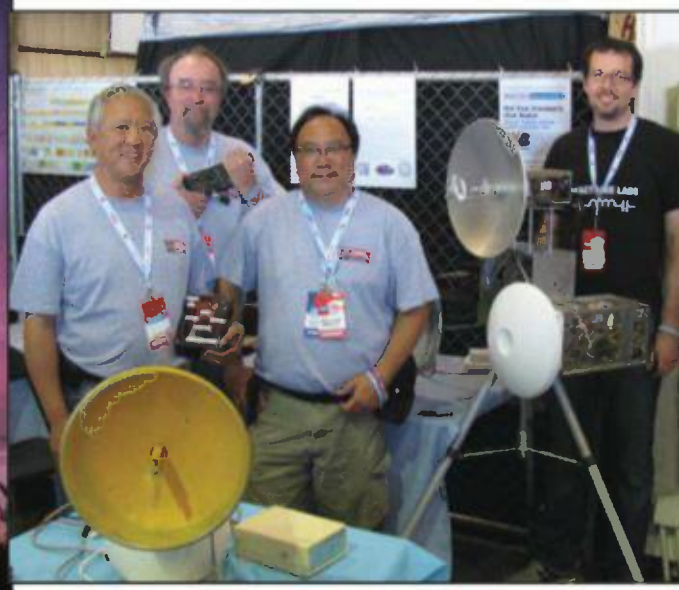
4616 W. Howard Lane, Ste. 1-150, Austin, TX 78728
Tel 512-535-4713 Fax 512-233-5143
Email sales@flexradio.com Website www.flexradio.com

FlexRadio Systems®
Software Defined Radios

Copyright 2012. FlexRadio Systems is a registered trademark and FLEX-6000 and SmartSDR are trademarks of FlexRadio Systems. All other marks are property of their respective owners. All rights reserved.

CQ contents

JANUARY 2013



p. 64

p. 18

features

Vol. 69 No. 1

13 **INSIDE A CHINESE CONTEST STATION:** B1Z in the WPX SSB Contest
By Irwin Hübsch Neto, PY2QI/KK4CGD, with José Martins da Rocha

18 **RESULTS OF THE 2012 CQ WW WPX SSB CONTEST**
By Randy Thompson, K5ZD

30 **ANNOUNCING: The 2013 CQ WW WPX RTTY Contest**

34 **ROUTE 66 ON THE AIR:** The 2011 "Whiskey-Six-Tango" adventure
By Larry Francis, KW7I, and Norman Vandiver, N7VF

39 **ANNOUNCING: 2013 Nominations open for the CQ Amateur Radio, DX, and Contest Halls of Fame**

44 **HEATHKIT VTVM V7, V7A, IM-18 SOLID-STATE MODIFICATIONS:** A modification eliminating the tubes and battery
By Burl B. Rogers, K4VYL

48 **TAKING IT TO THE FIELD IN MIDTOWN MANHATTAN:** An entirely self-contained operation 38 stories above the streets of New York City
By Rich Moseson, W2VU

52 **MATH'S NOTES:** More for the new home brewer
By Irwin Math, WA2NDM

62 **MAGIC IN THE SKY:** Going to extremes *By Jeff Reinhardt, AA6JR*

64 **THE HAM NOTEBOOK:** Social media, ham radio, and a generation gap
By Wayne Yoshida, KH6WZ

68 **LEARNING CURVE:** Becoming a beginner (and an expert)
By Rich Moseson, W2VU

71 **KIT-BUILDING:** The Emtech ZM-2 tuner kit *By Joe Eisenberg, KØNEB*

78 **ANTENNAS:** The new 40-meter Yagi adventure
By Bob Locher, W9KNI, Guest Columnist

p.48

p. 71

departments

28 **RILEY'S RAMBLINGS:** A close look at the FCC's newest licensing proposal *By Riley Hollingsworth, K4ZDH*

54 **PUBLIC SERVICE:** By any name, Hurricane Sandy tested our EmComm mettle—Part I *By Richard Fisher, KI6SN*

74 **WHAT'S NEW:** New mini-SSB rigs and running rings around your vertical
By John Wood, WV5J

83 **DX:** Marshmallows and chasing DX
By Randy Johnson, W6SJ, Guest Columnist

88 **VHF PLUS:** RF safety—a technical conversation *By Joe Lynch, N6CL*

92 **AWARDS:** Alaska—why judicial districts instead of boroughs? Plus awards from Scandinavia, Russia, and Indonesia *By Ted Melinosky, K1BV*

96 **CONTESTING:** Reviewing new CQ Contest reporting dates *By CQ Staff*

98 **PROPAGATION:** Good conditions predicted for 2013
By Tomas Hood, NW7US

2 HAM RADIO NEWS
8 ZERO BIAS
10 ANNOUNCEMENTS
67 READER FEEDBACK
114 HAM SHOP

Ameritron 1200 Watts Solid State Amplifier

1200 Watts PEP SSB/CW Output, 1.5-30 MHz. No Tune, Instant-On, Instant Bandswitching, Super Reliable, Whisper Quiet, Remote Controllable, QSK, Fully Protected, Fully Metered ...

Just select the band and transmit!

Ameritron's new solid state no-tune, instant-on, instant bandswitching ALS-1300 desktop linear amplifier gives you 1200 Watts PEP SSB/CW with less than 100 Watts drive. Covers 1.5 to 22 MHz (10/12 Meters with optional MOD-10MK). You'll bust through weak band conditions, heavy QRM and QRN because the ALS-1300 is less than 1 dB down from a full legal limit 1500 Watt amplifier.

New!

ALS-1300
$2899
Suggested Retail

Super Reliable!

Eight conservatively rated MRF-150 FETs mounted on two *huge* heat sinks spreads heat evenly. *Four* whisper quiet temperature controlled fans keep the FETs at a safe temperature. You get *unparalleled* Ameritron reliability and trouble-free service. Competing amplifiers using a single expensive device concentrate heat at a single hotspot that greatly reduces reliability.

50-Volt operation gives you highly linear operation with a superbly clean signal.

Put out-of-the-way and Remote Control

The ALS-1300 amplifier and its matching power supply can be placed out-of-the-way and controlled remotely. *Remote Control Head*, **ALS-500RC, $49.95**, lets you monitor data and manually switch bands. *Radio Interface*, **ARI-500, $119.95**, reads band data from your transceiver and automatically bandswitches the ALS-1300 as you change bands on your transceiver.

Features Galore!

An Operate/Standby switch lets you run "barefoot" and *instantly* switch to full power when you need it.

Fast 5 millisecond T/R relays (10 million operation lifetime specs) give you full QSK operation. The T/R relay sub-board is easily replaced if the relays ever fail.

Ameritron's *exclusive* front-panel ALC control prevents overdriving your transceiver.

The ALS-1300 can be keyed by any transceiver that can sink 15 mA at 12 VDC without requiring a special interface.

Super-clean modular construction makes service quick and easy.

Fully Protected!

The ALS-1300 is fully protected to prevent amplifier damage if you: switch to a band different from your transceiver, use the wrong antenna or have overly high SWR, if the heat sink temperature exceeds a safe level, if the dual 600 Watt modules are significantly RF unbalanced. Whenever the amplifier faults, it is automatically bypassed.

If output forward or reflected power exceeds a safe level, output power is automatically reduced to prevent amplifier damage by controlling ALC to the transmitter.

Fully Metered!

Two accurate Cross-Needle meters use *LEDs* with adjustable brightness for backlighting -- no more burned-out meter lamps.

The left meter continuously monitors DC current of both 600 watt amplifier modules.

The right meter is a multi-meter. Read antenna SWR, forward, reflected output power simultaneously (has adjustable PEP meter hold time) . . . amplifier balance . . . ALC between amplifier and transceiver . . . DC drain voltage of each power amplifier.

LEDs show which band is selected (manually bandswitched or automatically with optional ARI-500 Radio Interface) . . . ALC activity . . . when the amplifier is keyed . . . high SWR . . . power amplifier fault.

The desktop size amplifier is a compact 10½Wx6¾Hx19D in. Weighs just 23 lbs.

Hash-Free Switching Power Supply!

The *hash-free* fully regulated 50 VDC, 50 Amp switching power supply is wired for 220 VAC but can be rewired for 110 VAC. Includes six foot cable to ALS-1300. Draws 12 Amps at 220 VAC, 25 Amps at 110 VAC. Has inrush current protection, current-limited outputs, exceptional filtering and RFI suppression. Works on 50-400 Hz, 200-260/ 100-135 VAC making it ideal for remote DX-peditions. 10Wx6½Hx9½D inches. 12 pounds.

Options

MOD-10MK $39.95, low-pass filter assembly gives you 12 and 10 Meter operation. Requires FCC ham license.

QSK-5, $359.95, pin-diode T/R switch gives lightning fast silent QSK operation.

Inside the ALS-1300 Solid State Amplifier

Call your dealer for your best price!

Free Catalog: 800-713-3550

AMERITRON

. . . the world's high power leader!

116 Willow Road, Starkville, MS 39759
TECH (662) 323-8211 • **FAX** (662) 323-6551
8 a.m. - 4:30 p.m. CST Monday - Friday
For power amplifier components call (662) 323-8211
http://www.ameritron.com

Prices and specifications subject to change without notice. ©2010 Ameritron.

AMERITRON . . . The World's High Power Leader!

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

HF/50 MHz 100 W Transceiver

FT-950

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

Optional, YAESU Exclusive, Fully-Automatic μ -Tuning Preselector System!

Fully automatic, Ultra-sharp, External μ -Tuning Preselector (optional) features a 1.1" (28 mm) Coil for High Q

On the lower Amateur bands, strong signal voltages impinge on a receiver and create noise and intermod that can cover up the weak signals you're trying to pull through. YAESU engineers developed the μ (Mu) Tuning system for the FT DX 9000/FT-2000, and it is now available as an option for the FT-950. Three modules are available (MTU-160, MTU-80/40, MTU-30/20); these may be connected externally with no internal modification required! When μ -Tuning is engaged, the VRF system is bypassed, but the fixed Bandpass Filters are still in the received signal path.

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

Enjoy the ultimate in operating ease by adding the DMU-2000! Enjoy the same displays available with the FT DX 9000 and FT-2000: Band Scope, Audio Scope, X-Y Oscilloscope, World Clock, Rotator Control, Extensive Transceiver Status Displays, and Station Logging Capability. These extensive functions are displayed on your user-supplied computer monitor.

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

DMU-2000
Data Management Unit (option)

YAESU
The radio

YAESU USA
6125 Phyllis Drive, Cypress, CA 90630
(714) 827-7600

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

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

Field Gear That Goes The Distance!

FT-897D

HF/VHF/UHF Portable Operation Powerful Transceiver

- The Ultimate Emergency Communications Radio
- Rugged, Innovative Multi-Band
- Operates on the SSB, CW, AM, FM, and Digital Modes
- Wide Frequency Coverage
- 20-Watt Portable Operation Using Internal Batteries
- 100 Watts When Using an External 13.8-Volt DC Power Source

FT-857D

The World's Smallest HF/VHF/UHF Mobile Transceiver

- Ultra-Compact Package
- Ideal for Mobile or External Battery Portable Work
- Wide Frequency Coverage
- Optional Remote-Head
- High-Performance Mobile Operation

FT-817ND

The Ultimate Backpack, Multi-Mode Portable Transceiver

- Self-Contained
- Battery-Powered
- Covering the HF, VHF, and UHF Bands
- Provides up to Five Watts of Power Output
- SSB, CW, AM, FM, Packet, or SSB-based Digital Modes like PSK31

FT-450D

HF/50 MHz 100 W Easy to Operate All Mode Transceiver

- Illuminated Key Buttons
- 300Hz / 500Hz / 2.4 kHz CW IF Filter
- Foot Stand
- Classically Designed Main Dial and Knobs
- Dynamic Microphone MH-31 A8J Included

Join Us in Paradise!

ARRL Puerto Rico State Convention

January 26-27, 2013

www.arrlpr.org

YAESU
The radio
Platinum Sponsor

YAESU
The radio

YAESU USA
6125 Phyllis Drive, Cypress, CA 90630 Phone: (714) 827-7600 http://www.yaesu.com

zero bias – a CQ editorial

BY RICH MOSESON,* W2VU

Of Power and Propagation

Life is beginning to return to normal in most parts of New York and New Jersey affected last October by Hurricane Sandy. I am writing the first draft of this column on a train to New York City from my home in New Jersey—the first day of normal operations for my train line—three weeks to the day after the storm struck.

CQ's offices are right in the middle of the storm zone and all of us here were affected to one degree or another. All of our Long Island-based staff members were without power in their homes, some for as long as two weeks. Our office was closed for three days after the storm, knocking everything off schedule. Even when power began to return, though, things were hardly normal. First, there were long lines for gasoline, with many stations offline due to lack of power, closed ports for bringing oil and gas into the region, closed roads making it difficult for delivery trucks to reach gas stations, long lines of people with gas cans for their generators, and panic buying for cars wherever fuel was available.

The lines have disappeared now, thanks to a combination of more power coming back and odd/even rationing. Mail delivery continues to be erratic, even three weeks out. At home, we had no mail at all last Wednesday, then a ton on Thursday. My November issue of *CQ* arrived on November 17, as we were preparing to close this January issue. And these disruptions and inconveniences are absolutely nothing compared with the total devastation faced by families and businesses on the Jersey Shore, Staten Island, and many other parts of New York City and Long Island. Our prayers are with those families as they try to rebuild their homes, businesses, and lives. (Among those suffering considerable flooding damage was *CQ* Contesting Editor George Tranos, N2GA. He hopes to be able to resume his column next month.)

When All Else Failed (Yet Again)...

From our perspective as hams, all of this again points up the frailty of our society's wired and wireless lifestyle, as well as the resilience of the ham radio network. Without power, Wi-Fi didn't work, cell phones couldn't be charged. Cell sites that did work were often overloaded during the peak of the storm or ran out of battery backup power as the electrical outages dragged on.

For the first time in my memory, businesses that did have power offered "emergency charging stations" for cell phones and laptops. A society that is increasingly dependent on "mobile devices" grinds to a halt when none of those devices, be they electronic or mechanical, are able to function. (See AA6JR's "Magic in the Sky" column on page 62 of this issue for Jeff's take on our society's "addiction" to electrons in motion.)

But as always, that "old-fashioned" ham radio with its "outdated" analog transceivers kept on working, providing backup communications throughout the areas hit by the storm. As we prepared this issue, many of those support nets were still operating, so we haven't yet received detailed reports on activity in the New York-New Jersey area. Public Service Editor Richard Fisher, KI6SN, begins our coverage this month (page 54) with a report from Massachusetts. We hope to have reports from New Jersey and New York by the next issue.

The Joys of Unpredictability

One of the signs of returning normalcy was that I was able to spend much of this past Sunday afternoon and evening on the radio, operating Sweepstakes. As a casual contester, one of the things I most enjoy about contest operating is a high enough level of activity on multiple bands to actually observe differences and changes in propagation.

It was a delight to hear 10 meters open across the country (with a little bit of DX thrown in for good measure), and 15 meters accounted for more of my contacts than any other band. What surprised me, though, was how short the skip was on 20 meters in the middle of the afternoon, allowing me to work states I'd expect to hear on 40 at that time of day. I couldn't work California on 20 that afternoon, but I could (and did) work Ohio and Tennessee. I haven't checked yet, but I'm sure I picked up at least a few new, close-in states on 20 meters if I ever decide to pursue single-band states awards.

To me, this unpredictability of propagation is one of the most enduring appeals of ham radio. Propagation Editor Tomas Hood, NW7US, says to expect good conditions this year (see page 98), but predictions by their nature are general and a matter of percentages. About as precise as you can get is that, for example, there's a 60% chance that this band will be open to this location on this day, with the best chance at this time of day. But the bottom line is that you cannot know with certainty which band will be open to where from your location at a specific time until you turn on the radio. And you never know when Mother Nature will throw a curveball and present you with a delightful propagation surprise.

In This Issue

In addition to our Hurricane Sandy coverage, this issue begins our transition to the new contest reporting schedule that we announced in October (see full schedule on page 96 of this issue). The SSB results of last year's CQ WPX Contest appear in this issue (p. 18), along with a report (p. 13) by the editor and publisher of our Brazilian edition on operating the WPX Contest from China at B1Z.

In addition, Riley Hollingsworth, K4ZDH, takes a close look at the FCC's recent proposal to, among other things, allow former hams to be relicensed without retesting. We've also got a preview of this year's "Take it to the Field" special with articles on operating from Route 66 as well as the middle of New York City, a project to update a vintage Heathkit VTVM (Vacuum Tube Volt Meter), and the intriguing topic of "Marshmallows and DX."

Happy New Year

Best wishes from all of us at *CQ* to all of our readers for a very happy and healthy 2013. And may the weather this year be less exciting than the propagation.

73, W2VU

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

hy-gain HF BEAMS...

...are stronger, lighter, have less wind surface and last years longer.

Why? Hy-Gain uses durable tooled components -- massive boom-to-mast bracket, heavy gauge element-to-boom clamps, thick-wall swaged tubing -- virtually no failures!

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

The choice of top DXers. **With** 11-elements, excellent gain and 5-bands, the super rugged TH-11DX is *the "Big Daddy" of all HF beams!* **Handles** 2000 Watts continuous, 4000 Watts PEP. **Every** part is selected for durability and ruggedness for years of trouble-free service.

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

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

7-Elements gives you the *highest average gain* of any Hy-Gain tri-bander! **Dual** driven for broadband operation without compromising gain. SWR less than 2:1 on *all* bands. **Uniquely** combining monoband and trapped parasitic elements give you an excellent F/B ratio. **Includes** *Hy-Gain's* diecast aluminum, rugged boom-to-mast clamp, heavy gauge element-to-boom brackets, BN-86 balun. For high power, upgrade to BN-4000.

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

The broadband *five element* TH5-MK2 gives you outstanding gain. **Separate** air dielectric *Hy-Q* traps let you adjust for maximum F/B ratio on each band. **Also** standard is *Hy-Gain's* exclusive *BetaMATCH™*, stainless steel hardware and compression clamps and BN-86 balun.

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

The super popular TH-3MK4 gives you the *most gain for your money* in a full-power, full-size durable Hy-Gain tri-bander! **You** get an impressive average gain and a whopping average front-to-back ratio. Handles a full 1500 Watts PEP. 95 MPH wind survival. **Fits** on average size lot with room to spare -- turning radius is just 15.3 feet. Four piece boom is ideal for DXpeditions. Rotates with CD-45II or HAM-IV rotator. **Features** *Hy-Gain BetaMatch™* for DC ground, full power *Hy-Q™* traps, rugged boom-to-mast bracket and mounts on standard 2"O.D. mast. Stainless steel hardware. BN-86 balun recommended.

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

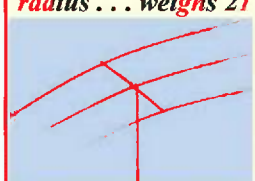
The 2-element TH-2MK3 is Hy-Gain's *most economical* full power (1.5kW PEP) full size tri-bander. **For** just $339.95 you can greatly increase your effective radiated power and hear far better! **Ruggedly** constructed, top-performing, compact 6 foot boom, tight 14.3 foot turning radius. Installs almost anywhere. Rotate with CD-45II or HAM-IV. BN-86 balun recommened.

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

Revolutionary 4-element compact tri-bander *lets you add 40 or 30 Meters!* Has 14 foot boom and tight 17.25 feet turning radius. Fits on roof tri-pod, mast or medium duty tower. **Hy-Gain's** *patented* broadbanding *Para Sleeve* gives you less than 2:1 VSWR. 1.5kW PEP. ***BetaMATCH™*** provides DC ground to eliminate static. Includes BN-86 balun. Easily assembled. ***Truly*** *competitive against giant tri-banders at half the cost!* **QK-710, $179.95.** 30/40 Meter option kit for EXP-14.

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

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



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

TH-3JRS, $359.95. Hy-Gain's *most popular* 3-element 10, 15, 20 Meter tri-bander fits on most lots! Same top performance as the full power TH3MK4 in a compact 600 watt PEP design. **Excellent** gain and F/B ratio let *you* compete with the "big guns". **Tooled** manufacturing gives you *Hy-Gain* durability with 80 MPH wind survival.

Model No.	No. of elements	avg gain dBd	avg F/B dB	MaxPwr watts PEP	Bands Covered	Wind sq.ft. area	Wind (mph) Survival	boom feet	Longest Elem. (ft)	Turning radius(ft)	Weight (lbs.)	Mast dia O.D.(in.)	Recom. Rotator	Sugg. Retail
TH-11DX	11	*For Gain and F/B ratio--See...*		4000	10,12,15,17,20	12.5	100	24	37	22	88	1.9-2.5	T2X	$1159.95
TH-7DX	**7**			**1500**	**10, 15, 20**	**9.4**	**100**	**24**	**31**	**20**	**75**	**1.5-2.5**	**HAM-IV**	**$869.95**
TH-5MK2	5	• www.hy-gain.com		1500	10, 15, 20	7.4	100	19	31.5	18.42	57	1.5-2.5	HAM-IV	$759.95
TH-3MK4	**3**	• Hy-Gain catalog		**1500**	**10, 15, 20**	**4.6**	**95**	**14**	**27.42**	**15.33**	**35**	**1.9-2.5**	**CD-45II**	**$469.95**
TH-3JRS	3	• Call toll-free 800-973-6572		600	10, 15, 20	3.35	80	12	27.25	14.75	21	1.25-2.0	CD-45II	$359.95
TH-2MK3	**2**			**1500**	**10, 15, 20**	**3.25**	**80**	**6**	**27.3**	**14.25**	**20**	**1.9-2.5**	**CD-45II**	**$369.95**
EXP-14	4			1500	10,15,20 opt. 30/40	7.5	100	14	31.5	17.25	45	1.9-2.5	HAM IV	$599.95

Tooled Manufacturing . . . Highest Quality Materials

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

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

3. Thick-wall *swaged* aluminum tubing

Tooled *manufacturing* is the difference between Hy-Gain antennas and the others -- they just don't have it (it's expensive!). **Die-cast** aluminum boom-to-mast bracket and element-to-boom compression clamps are made with specially *tooled* machinery. **Hy-Gain** antennas feature *tooled* swaged tubing that is easily and securedly clamped in place. All tubing is deburred and cleaned for smooth and easy assembly. **Durable** precision injection molded parts. ***Hy-Gain*** *antennas are stronger, lighter, have less wind surface area, better wind survival, need no adjustments, look professional and last years longer.*

Free Hy-Gain Catalog
and Nearest Dealer . . . 800-973-6572
Call your dealer for your best price!

hy-gain

Antennas, Rotators & Towers

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

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

WAUKESHA WISCONSIN — West Allis Radio Amateur Club, Inc. 41st Annual Midwinter Waukesha Swapfest, Saturday, January 5, Waukesha County Expo Center. Contact: WARAC Swapfest, P.O. Box 1072, Milwaukee, WI 53201. Phil, W9NAW, (414) 425-3649. Website: <http://www.warac.org>. (VE examsthe AMF Waukesha Lanes 9 to 11:15 a.m.)

LOCUST FORK, ALABAMA — Blount County Amateur Radio Club FreezeFest 2013, Saturday, January 5, Locust Fork High School. Contact: Bill Pond, AE4IE, (205) 647-5705. Website: <http://freezefest.w4blt.org/>. (Talk-in 146.700– [PL 91.5; exams t10 a.m.)

SPRINGFIELD, MISSOURI — Ozark Mountain Amateur Radio Ozark Mountain Hamfest, Saturday, January 5, Faith Lutheran Church. Contact: James, KCØTQD, (417) 425-9962; e-mail: <kc0tqd@gmail.com>; <http://www.w0omd.org>. (Talk-in: 147.015– [PL 162.2]; exams 10 a.m.)

WHITE PINE, TENNESSEE — Lakeway Amateur Radio Club 2013 Winter Hamfest, Saturday, January 5, Smoky Mountain Expo Center. Contact: Lakeway ARC, P.O. Box 1138, Morristown, TN 37887-1138. Website: <http://lakewayarc.org/2013-hamfest>.

GREENWOOD, SOUTH CAROLINA — Greenwood Amateur Radio Society Greenwood South Carolina Hamfest, Saturday, January 12, Piedmont Technical College Multipurpose Building. Contact: GARS, P.O. Box 2404, Greenwood, SC 29646 or Tedd Davison, AI4WN, phone: (864) 377-1872; <ai4wn@arrl.net>; <http://www. w4gwd.org>. (Talk-in 147.165+ or 443.900+ (PL 107.2); exams 10:30 a.m.)

MARATHON, NEW YORK — Skyline Amateur Radio Club January Winterfest 2013, Saturday, January 12 at the Lovell Field Civic Center. Indoor flea market, prizes. Contact: SARC, P.O. Box 5241, Cortland, NY 13045. E-mail: <k2iwr@arrl.net>. Website: <http://www.skylineradioclub.org>. (Talk-in 147.180 +0.600; exams 9 a.m.)

PHOENIX, ARIZONA — Thunderbird Amateur Radio Club & Amateur Radio Council of Arizona Thunderbird Hamfest 2013, Saturday, January 12 at the Northwest Community Church. E-mail: <hamfest@w7tbc.org>. Website: <http://www.w7tbc.org/>. (Talk-in 146.700 –600 [PL 162.2] or 446.150 –5 [PL 100]; exams 10 to 11:30 a.m.)

QUARTZSITE, ARIZONA — Annual RV Campout **Quartzfest,** January 15–25 at the Bureau of Land Management campsite located 10 miles south of Quartzsite on US 95 at La Paz Valley Road. Contact: Steve Weed, KO4QT, <organizer@quartzfest.org>; website: <http://www.quartzfest.org>. (Exams)

FORT WORTH, TEXAS — Lockheed Martin Recreation Association & W5SJZ Radio Club Cowtown Hamfest 2013, January 18 and 19 at the Lockheed Martin Recreation Area. Contact: David Forbes, KC5UYR, e-mail: <KC5UYR@compuserve.com>. Website:<http://www.cowtownhamfest.com>. (Talk-in 147.28 [PL 110.9]; exams).

FORT MYERS, FLORIDA — Fort Myers Amateur Radio Club Southwest Florida Hamfest & Computer Show 2013, January 19, Southwest Florida Public Service Academy. Contact: FMARC, P.O. Box 061183, Fort Myers, FL 33906. Drexel Turner, W4DHT, 7670 Eaglet Court, Fort Myers, FL 33912-1828. Phone: (239) 225-0826 or (239) 464-1350. E-mail: <dturner@embarqmail.com>. Website: <http://www.fmarc.net/hamfest.htm>. (Talk-in 147.345 [PL 136.5]).

HAMMOND, LOUISIANA — Southeast Louisiana Amateur Radio Club 32nd Annual Hammond Hamfest, January 19 at the Quality Inn & Conference Center. Contact: SELARC, P.O. Box 1324, Hammond, LA 70404. E-mail: <wb5net@arrl.net>. Website: <http://www.selarc.org/selarchamfest.htm>. (Talk-in 147.000 -600 [PL 107.2] or 145.130 -600 [PL 107.2] or 444.250 +5 [PL 107.2]; exams).

KANSAS CITY, MISSOURI — North Kansas City Hamfest & Emergency Communications Expo, January 19, Hillside Christian Church. Website: <http://www.northkchamfest.com>. (Exams)

ST. CHARLES, ILLINOIS — Wheaton Community Radio Amateurs Mid-Winter Hamfest , January 20 , Kane County Fairgrounds. Contact: WCRA, P.O. Box QSL, Wheaton, IL 60187-1055. Phone: (630) 604-0157. E-mail: <info@w9ccu.org>. Website: <http://www.w9ccu.org>. (Talk-in 145.31– [PL 107.2] or 146.52.; exams)

JACKSON, MISSISSIPPI — Jackson Amateur Radio Club 2013 Capital City Hamfest & Mississippi State ARRL Convention, January 25 and 26 at the Trade Mart Building, Mississippi State Fairgrounds. Website: <http://hamfest.msham.org/>. (Exams Saturday 8 a.m.)

COLINSVILLE, ILLINOIS — The St. Louis & Suburban Radio Club, Inc.Winterfest 2013, Saturday, January 26 at the Gateway Convention Center. Contact: Jim Glasscock, WØFF, (636) 584-888 or Bill Coby, KBØMWG, (314) 504-1104. E-mail: <bcoby@sbcglobal.net>. Website: <http:// slsrc.org>. (Talk-in 146.760)

PALM SPRINGS, CALIFORNIA — Desert RATS Palm Springs Hamfest, January 26 at KD6QLT's ranch. Contact: Peter Reinzuch, VE7REZ/W6, (760) 318-0186. E-mail: <palmsprings.hamfest@gmail.com>. Website: <http://desertrats.x.am>.

STRASBURG, OHIO — Tusco Amateur Radio Club 23rd Annual Tusco A.R.C. Hamfest, Sunday, January 27 at 965 North Wooster Avenue. Contact: Janice Green, KB8YDK, (740) 922-4454. E-mail: <k8wfn@ tusco.net>. Website: <http://www.tuscoarc. org>. (Talk-in 146.730–)

Please submit hamfest and special event announcements ***at least three months in advance*** *by e-mail to <hamfest@cq-amateur-radio.com> or <specialevent@cq-amateur-radio.com>, or by postal mail to: CQ Magazine, Attn: Hamfests (or Special Events), 25 Newbridge Rd., Hicksville, NY 11801. In addition, CQ's sister publication* WorldRadio Online *has extensive information on hamfests and special event stations months in advance of the events; go to <www.worldradioonline.com>.*

DX ENGINEERING

ICOM · Cushcraft · hy-gain · CQ · HUSTLER · MFJ · AMERITRON · BELDEN · Tigertronics · VIBROPLEX · PLASTI DIP · The BetterRF Company · VECTRONICS · PolyPhaser · ROHN · JSC WIRE & CABLE · LOCTITE · butternut · MIRAGE · LDG ELECTRONICS · HEIL SOUND · DIAMOND ANTENNA · BENCHER, INC. · STI · RADIO · COMTEK

And More!

Winter DX is Here—Upgrade Your Station Now!

IMPROVED Receiving!

100 kHz-30 MHz Receive Four-Square Packages

A patented*, sophisticated receiving system with time delay phasing for broadband performance. Optimized to produce wider and deeper rear nulls and a narrower main lobe. Noise and undesirable signals are greatly reduced by a superior front-to-rear ratio (F/R). Better control of phase and currents provides a cleaner pattern than found on available TX four-square arrays.

- Less susceptible to high angle signals compared to EWE, Flag, Pennant, and K9AY antennas
- Excellent directivity with better signal-to-noise ratio
- Switchable in four 90 degree-spaced directions
- Usable over a very wide frequency range with DXE-ARAV3 active elements
- Requires less area than a Beverage antenna
- Active elements require minimal ground system
- Enhanced relay contact reliability

The complete system includes all electronics, four ARA active antennas, TVSU sequencer, 1,000 feet of F6 flooded cable, connectors, and assembly tools.

DXE-RFS-SYS-4P	Complete System with antennas	$1,650.00
DXE-RFS-SYS-2P	Controller and Switch only	$389.95
DXE-RFS-SYS-3P	160/80/40M Electronics	$799.00

*US Patent Number 7,423,588

Full Size 75/80 Meter Quarter-Wave Vertical Antennas

These 68 foot tall, high-performance, full size antennas have rugged base sections (2, 3 or 4 inch diameter) made from aircraft-grade aluminum tubing. The VA-1 requires simple guying. The VA-2 and VA-3 models are very stout and don't require guying. The VA-2 and VA-3 antennas are supplied with a Heavy Duty Plus Stainless Pivot Base and can be lowered easily with the optional, DXE-VRW one-man, manual winch.

- 2:1 bandwidth up to 500 kHz
- DX Engineering structural design + high strength tubing custom manufactured to our rigid specifications = **Highest Wind Ratings**
- High strength, UV-protected Extren® insulator = **High Power Handling Capacity**
- Specially manufactured stainless steel and aluminum saddle clamps, stainless steel bolts, and precision machining = **Reliability Second to None**
- Specially manufactured Pivot Base supplied with VA-2 and VA-3 antennas = **Easy Tilt Up and Down**

DXE-7580FS-VA-1	Vertical Antenna, standard HD, 2 inch O.D. base section	$379.50
DXE-7580FS-VA-2	Vertical Antenna, Heavy Duty, 3 inch O.D. base section	$825.00
DXE-7580FS-VA-3	Vertical Antenna, Super Duty, 4 inch O.D. base section	$1,775.00

DXE-VRW-1 Manual Winch

A great option, this winch allows one person to easily raise or lower a VA-2 or VA-3 vertical antenna.

DXE-VRW-1 Manual Winch.....$169.99

Ameritron Amplifiers

Ameritron gives you the ability to command consistent and reliable power using these rugged units. Match these amplifiers to your transceiver and achieve impressive power and clarity. DX Engineering even stocks export models. For more Ameritron products at incredibly low prices visit DXEngineering.com.

AME-ALS-600 **Only $1,269.00**

AME-ALS-500M **Only $779.00**

AME-AL-1200 **Only $2,999.00**
AME-AL-1500 **Only $3,299.00**

AME-AL-572 **Only $1,679.00**

AME-AL-811 **Only $709.00**

AME-AL-80B **Only $1,329.00**

AME-ALS-600	600 Watt Solid State Amplifier	$1,269.00
AME-ALS-500M	500 Watt Solid State Mobile Amplifier	$779.00
AME-AL-1200	1,500+ Watt Single-Tube Amplifier	$2,999.00
AME-AL-1500	1,500+ Watt Single-Tube Amplifier	$3,299.00
AME-AL-572	1,300+ Watt 4-Tube Amplifier	$1,679.00
AME-AL-811	600 Watt 3-Tube Amplifier	$709.00
AME-AL-80B	1,000 Watt Single-Tube Amplifier	$1,329.00

Low Sale Price!

SignaLink™ USB Unit from Tigertronics

- Software included on CD ROM
- Built-in low noise sound card
- USB port powered
- Works with ALL radios
- Easiest installation and setup—for Mac or PC
- Supports all sound card digital and voice modes, including MT63, EchoLink®, PSK-31, SSTV, CW and RTTY

TGR-SL-USB.....**$84.50**

•Requires a radio interface cable

Any radio interface cable is only **$12.95** when purchased with a SignaLink™ unit

Not Cheap Aluminum! Guarantees Best Radial System Conductivity Over Time

Stainless Radial Plate with Coax Attachment

Makes radial attachment a snap!

- Fits 3" pipe, 4x4 and 6x6 posts
- 0.125" thick 304 stainless steel
- Accommodates up to 120 radials
- Patented high current coax connection to radials

Now fits up to 3" O.D. mount

DXE-RADP-3	Complete with 20 stainless bolt sets	$54.50
DXE-RADP-1HWK	20 sets of 1/4" stainless hardware	$7.50
DXE-SSVC-2P	Stainless Saddle Clamp for attachment to steel tube 1" to 2" O.D.	$11.95

Coaxial Cable Prep Tools

- Precision, two-step operation
- No nicks or scratches to conductor
- Premium, long-lasting cutter blades
- For foam or solid dielectric cable preparation

DXE-UT-8213	Cable Stripper for RG-8, RG-213, etc	$39.95
DXE-UT-808X	Cable Stripper for RG-8X, 9258, etc	$39.95
DXE-UT-80P	PL-259 Assembly Tool	$22.95
DXE-UT-80N	2-Piece N Connector Tool	$22.95
CNL-911	Coax Cable Cutters	$23.75
DXE-170M	Precision Shear Side Cutters	$7.95

Now available in cost-saving tool kits with carrying case

DXE-UT-CASE	Molded carrying case only	$22.95
DXE-UT-KIT1	Basic Coax Cable Prep Kit	$99.95
DXE-UT-KIT2	Complete Coax Cable Prep Kit	$174.95

TOTALLY FREE SHIPPING ON COMTEK BALUNS*

COMTEK W2FMI Series Baluns

Better Performance, Lower Prices!

From just $49.95

World-Class Products Shipped Worldwide, Every Day!

Thousands More Ham Products at

DXEngineering.com

1.800.777.0703

8:30 am to 4:30 pm ET
1230 to 2030 UTC (March-October)
1330 to 2130 UTC (November-February)

Tech/International: 330.572.3200 Country Code: +1
Sale Code: **1301CQ**
Prices subject to change without notice.

Order by 4 pm ET (US) for Same-Day Shipping

We Will Beat Any Competitor's Prices—Call Us for Details!

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

BURBANK, CA
1525 W. Magnolia Bl., 91506
(818) 842-1786
(877) 892-1748
Eric, K6EJC, Mgr.
Magnolia between
S. Victory & Buena Vista
burbank@hamradio.com

OAKLAND, CA
2210 Livingston St., 94606
(510) 534-5757
(877) 892-1745
Mark, WI7YN, Mgr.
I-880 at 23rd Ave. ramp
oakland@hamradio.com

SAN DIEGO, CA
5375 Kearny Villa Rd., 92123
(858) 560-4900
(877) 520-9623
Jerry, N5MCJ, Mgr.
Hwy. 163 & Claremont Mesa
sandiego@hamradio.com

SUNNYVALE, CA
510 Lawrence Exp. #102
94085
(408) 736-9496
(877) 892-1749
Jon, K6WV, Mgr.
So. from Hwy. 101
sunnyvale@hamradio.com

NEW CASTLE, DE
(Near Philadelphia)
1509 N. Dupont Hwy., 19720
(302) 322-7092
(800) 644-4476
Bill, KA3IXF, Mgr.
RT.13 1/4 mi., So. I-295
delaware@hamradio.com

PORTLAND, OR
11705 S.W. Pacific Hwy.
97223
(503) 598-0555
(800) 765-4267
Bill, K7WCE, Mgr.
Tigard-99W exit
from Hwy. 5 & 217
portland@hamradio.com

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

PHOENIX, AZ
10613 N. 43rd Ave., 85029
(602) 242-3515
(800) 559-7388
Gary, N7GJ, Mgr.
Corner of 43rd Ave. & Peoria
phoenix@hamradio.com

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

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

SALEM, NH
(Near Boston)
224 N. Broadway, 03079
(603) 898-3750
(800) 444-0047
Peter, KI1M, Mgr.
Exit 1, I-93;
28 mi. No. of Boston
salem@hamradio.com

HRO Holiday Specials For You!

HAM RADIO OUTLET®
WORLDWIDE DISTRIBUTION

#1 Yaesu Dealer Worldwide

HRO mobile app available for Android & Apple
Download app at Google Play & Apple App Store

YAESU
The radio

Winter Classic Savings with Yaesu

FT-897D VHF/UHF/HF Transceiver

- HF/6M/2M/70CM • DSP Built-in
- HF 100W (20W battery)
- Optional P.S. + Tuner • TCXO Built-in

Call Now For Our Low Pricing!

FT-950 HF + 6M TCVR

- 100W HF/6M • Auto tuner built-in
- 3 roofing filters built-in
- DMU-2000 compatible

Call Now For Low Pricing!

FT-8800R 2M/440 Mobile

- V+U/V+V/U+U operation
- V+U full duplex • Cross Band repeater function
- 50W 2M 35W UHF
- 1000+ memory channels • WIRES ready

Call Now For Low Pricing!

FTM-350AR 2M/440 Dualband

- 50W 2m/440 - 1 watt 220Mhz
- TNC built-in, Bluetooth capable
- Band scope built-in • 500 Memories

FTDX5000MP 200W HF + 6M Transceiver

- Station Monitor SM-5000 (Included)
- 0.05ppm OCXO (Included)
- 300Hz, 600Hz & 3KHz Roofing filters (Included)

VX-7R/VX-7R Black

50/2M/220/440 HT
- Wideband RX - 900 Memories
- 5W TX (300mw 220MHz)
- Li-Ion Battery
- Fully Submersible to 3'
- Built-in CTCSS/DCS
- Internet WIRES compatible

Now Available In Black!

VX-6R 2M/220/440HT

- Wideband RX – 900 memories
- 5W 2/440, 1.5W 220 MHz TX
- Li-ION Battery - EAI system
- Fully submersible to 3 ft.
- CW trainer built-in

New Low Price!

VX-8DR/VX-8GR

50/144/220/440 (VX-8DR)
2M/440 w/built-in GPS (VX-8GR)
- 5W (1W 222 MHz VX-8DR only)
- Bluetooth optional (VX-8DR only)
- Waterproof/submersible (3' for 30 min)
- GPS/APRS operation optional
- Li-ion Hi-capacity battery
- Wide band Rx

FTDX-3000 New!

- 100 Watt HF/6 Meters
- Large and wide color LCD display
- High Speed Spectrum Scope built-in
- 32 bit high speed DSP /Down Conversion 1st IF

Call For Low Pricing!

FT-857D Ultra Compact HF/VHF/UHF

- 100w HF/6M, 50W 2M, 20W UHF
- DSP included • 32 color display
- 200 mems • Detachable front panel (YSK-857 required)

Call For Low Price!

FT-7900R 2M/440 Mobile

- 50W 2M, 45W on 440MHz • Weather Alert
- 1000+ Memories • WIRES capability
- Wideband receiver (cell blocked)

Call Now For Your Low Price!

FT-450D HF + 6M TCVR

- 100W HF/6M • Auto tuner built-in
- DSP built-in • 500 memories
- DNR, IF Notch, IF Shift

Call Now For Pricing!

✦ **HRO coupons expire 1/15/13. Contact HRO for promotion details.**

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

#1 in Customer Service

Come visit us online via the Internet at http://www.hamradio.com

COAST TO COAST FREE SHIPPING
UPS - Most Items Over $100
Rapid Deliveries From The Store Nearest to You!

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

If you were lucky enough to work B1Z in last year's WPX SSB Contest (results in this issue), here's a look at the operation from the other side, courtesy of CQ Brazil Editor PY2QI...

Inside a Chinese Contest Station
B1Z in the WPX SSB Contest

BY ERWIN HÜBSCH NETO,* PY2QI/KK4CGD, with JOSE MARTINS DA ROCHA
TRANSLATED BY THAIS CONDOLO HÜBSCH

This article originally appeared in the March/April 2012 issue of CQ Radioamadorismo, *the Portuguese-language edition of CQ, published in Brazil.*

In my childhood, licensed as PY2RNJ, I remember that making and confirming a contact with a ham radio station in China was very difficult. The few who could confirm a QSO with this mysterious and closed country were treated as real amateur heroes. That's because until the beginning of the 1990s, amateur radio activity was tightly controlled by the government, which would not allow free access by its citizens to the rest of the world. This is a little bit like what the Chinese government currently does with websites such as YouTube, Google, and Facebook, which are censored and blocked.

In my trip to China last March with my business partner Martins, I had the opportunity to verify that at least regarding amateur radio activity the situation is completely different today in that giant and prosperous country. After visiting many cities in China and Taiwan, I couldn't contain my excitement over meeting members of the CRAC—Chinese Radio Amateurs Club. I had made some earlier contacts with Chen, BA1HAM, and we agreed to meet on Saturday, March 24th, in a rural area about 18 miles east of Beijing. Many Chinese hams would be there on that weekend at the B1Z station to operate the 2012 CQ WPX SSB Contest.

There could not have been a better time to visit these ham buddies. We arrived in Beijing on a flight from Taipei (Taiwan) at about 12 pm. I called Chen, BA1HAM, to inform him we were on our way to meet him. He told me that the B1Z station was out of town and it wouldn't be so easy to get there. We spoke with a lot of taxi drivers in front of the hotel, but none wanted to drive us there. Because of the difficulty of the different language, without understanding the reason, we started to be a little bit suspicious that the place was unsecured, just as we see in Brazil.

*Editor/Publisher, CQ Brazil
e-mail: <erwin@cqmagazine.com.br>

A Scary Ride

After several tries, an old and badly preserved private car driven by a Chinese man wearing sunglasses stopped by.

Photo A– Author Erwin Hübsch Neto, PY2QI/KK4CGD, with his business partner, Jose Martins Da Rocha, outside the B1Z contest station in China. (All photos courtesy of the author)

Photo B– Author PY2QI with his Chinese ham hosts, Fan, BA1RB (left) and Chen, BA1HAM (center), at the 40-meter "run" station.

Photo D– One of five towers at B1Z. The station is located outside Beijing, on the grounds of a business owned by Mr. Lee, BG1BYV.

Photo C– Hams from around China were invited to B1Z to observe as well as participate in the WPX Contest.

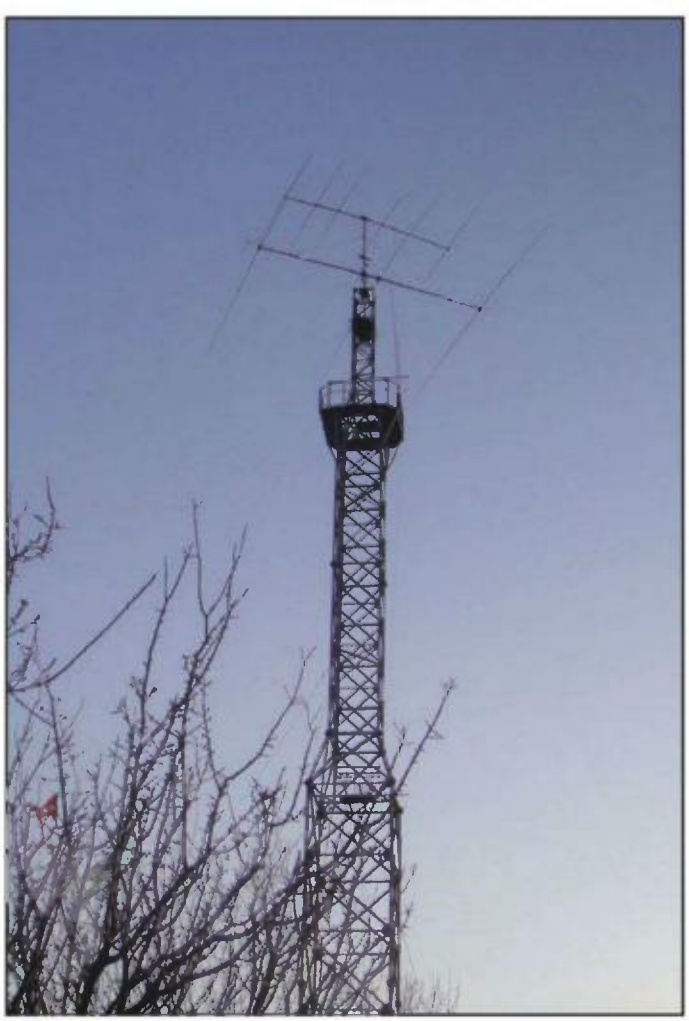


Photo E– Another one of B1Z's five towers. Each tower supports one or more monband Yagis.

The man read the B1Z address that had been written in Chinese on a little piece of paper and started to gesticulate frantically telling us to get into the car. He would charge 150 Renminbis, something like $25.00 US, to take us there. After we closed the deal with the driver, we realized we were in an old car, driven by a stranger who couldn't speak anything in a language other than his own.

Without knowing where we were going, we tried to situate ourselves using a map (written in Chinese) that Mr. Chen had sent by e-mail, and looking at some reference points such as rivers, bridges, and roads. Everything indicated that the driver was taking us to the right place. After ten minutes, on a kind of sinister and lonesome road, he called someone and then sharply stopped the car and quickly opened the glove

Photo F– If you've ever been to the ARRL Headquarters Station, W1AW, this should look familiar. Each operating position at B1Z is in a separate glass room, to minimize interference between stations. This is the 20-meter station.

Photo G– Operators at the 80-meter run station. Note that most of the ops at B1Z were considerably younger than typical contesters in other parts of the world.

Photo H– Another group of young ops at the 40-meter run station.

compartment. We immediately thought that he was going to pull a gun and we were going to be kidnapped or robbed.

With our hearts beating quickly (something like 200 wpm in CW...) we breathed a sigh of relief when we saw that all our driver took from the glove compartment was a GPS. Martins calmed down when he realized that he wouldn't have to use his "martial arts techniques." After another hour, I saw one of the big B1Z towers.

A Warm Reception

I couldn't hide how happy I was in that situation, seeing a ham radio station in China, especially on a special day: the 2012 WPX SSB Contest day (photo A). After a warm reception by Mr. Chen and Fan, BA1RB, we started our visit to the contest station (photo B).

At the moment we arrived there were more than 30 hams there (photo C), all curious about meeting a PY buddy from so far away. I gave them some *CQ Radioamadorismo* magazines (the Brazilian version of *CQ* magazine) and said that I was there not only as a ham, but also with the goal of writing a special article about amateur radio in China. I received a beautiful CRAC pin, a key holder from B1Z, and a VIP badge with my callsign.

The Station at B1Z

The station has an antenna farm for 160–10 meters and is set up a big rural area in space provided by the company of Mr. Lee, BG1BYV. This station has five big towers, each with monoband beams (photos D and E). One of the hams in the group coordinated each station that was operating during the WPX, working in a closed studio with glass to isolate each group (photo F). There are four studios: Three share one room, and the fourth is in a bigger room inside the company. The station can be used by many hams on weekends and was used as a special event station during the Olympic Games in 2008. It is also prepared to be used in emergency situations. For the contest, each studio contained a "run" station and crew for a specific band. *(In a large contest operation, a "run" station spends a good deal of time on one frequency, calls CQ, and works stations that answer, as opposed to a "search-and-pounce" station that tunes the bands in search of "run" stations calling CQ.—ed.)*

Ham Radio in China

Our Chinese buddies gave me a real lesson in organization and partnership. According to Chen's information, amateur radio activity appeared in China in the 1920s, and in 1947 there were around 400 ham stations. In 1949, ham activity was prohibited, and in 1958, only BY1PK was allowed to

CQ 2013-14 calendar

15 months of value
January 2013 through March 2014

Fifteen spectacular color images of some of the biggest, most photogenic shacks, antennas, scenics and personalities from across the country! This year's calendar is better than ever!

Includes dates of important Ham Radio events, major contests and other operating events, meteor showers, phases of the moon, and other astronomical information, plus important and popular holidays. CQ's 15-month calendar (January 2013 through March 2014) is a must have!

Order yours today!

Shipping charges: USA $3; CN/MX $5; All other countries $10.

CQ Communications, Inc.
25 Newbridge Road, Hicksville, NY 11801
Call 1-800-853-9797 or FAX 516-681-2926
http:store.cq-amateur-radio.com

Photo I– The 20-meter ops were intently focused on pulling copyable signals of the cacophony of the pileups.

operate. In 1966, all stations were suspended and amateur radio activity was again prohibited. In the 1970s, 30 ham stations controlled by government entities and schools were allowed and kept active until 1992. At the end of 1992, the government authorized individual amateur stations, and since then more than 40,000 hams have become licensed and active.

There are currently four license classes in China, each with different privileges:

Class 1: All bands (1kW HF); Class 2: All bands (100W HF); Class 3: VHF/UHF and part of the 10 meter band; and Class 4: VHF/UHF only.

Officially, amateur radio activity is represented by CRSA (Chinese Radio Sports Association), but as it is becoming more popular, it was necessary to have a new association, the CRAC. The Ministry of Industry and Information is the leading authority that regulates amateur radio activity in China, and it's working on the formulation of a new regulation in order to give more power to CRAC.

There are a lot of DX groups as well, such as B1Z, B4R, and B7P. The DX club B1Z started in 1997 and its organizer is Fan, BA1RB, who works for IBM in China. The club has two stations in Beijing, BY1TX and BY1RX (the one we visited). The contest group invited ham radio operators from all Chinese provinces to visit the WPX operation. According to Mr. Chen, the goal is to motivate more operators (of any class) to get active in DXing and contesting (photos G through I). The hams at B1Z did very well, finishing #2 in Asia in the multi-operator/multi-transmitter (multi/multi) category with more than 7.5-million points *(see contest report elsewhere in this issue for details—ed.).*

We left feeling satisfied because of this completely new experience, and feeling that we can still find some honest people in the world... We ended up contracting with the same mysterious driver to take us back to the hotel.

Study with the best!
License Study Materials by

Gordon West, WB6NOA & the W5YI Group

AMATEUR RADIO HAM IT UP! A NATIONAL RESOURCE

TECHNICIAN CLASS

***Technician Class* book**
for the 2010-2014 entry level exam! Gordo reorganizes the Q&A into logical topic groups for easy learning! Key words are highlighted in his explanations to help you understand the material for test success. Web addresses for more than 125 helpful, educational sites. Includes *On The Air* CD demonstrating Tech privileges. **GWTM-10 $20.95**

Tech Book & Software Package
Gordo's book with W5YI software allows you to study at your computer and take practice exams. Explanations from Gordo's book are on the software – answer a question wrong and his explanation appears to reinforce your learning. Includes free Part 97 Rule Book. **NCS-10 $29.95**

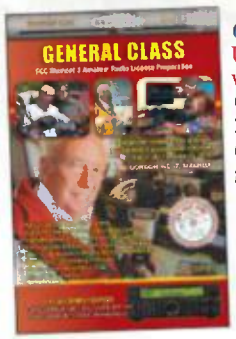
Tech Audio Course on CD
Welcome to Gordo's classroom! Technician audio theory course recorded by Gordo talks you through the Element 2 question pool. Follows the order of his ***Technician Class*** book, and is full of the sounds of ham radio operating excitement! An excellent study aid if you spend a lot of time in your car or pick-up! On 4 audio CDs. **GWTW-10 $29.95**

GROL + RADAR

Get your FCC commercial radio licenses and add valuable credentials to your resume! *GROL+RADAR* includes the new FCC Element 1 question pool for the Marine Radio Operator Permit (MROP), the Element 3 pool for the General Radiotelephone Operator License (GROL), and the Element 8 pool for the RADAR Endorsement. Many employers require these licenses for jobs in marine, aero, safety, and municipal positions. Gordo and his team have written clear explanations for all the Q&A to make studying for these exams educational and fun. If you're an Extra Class ham, many of the technical/math questions will look familiar to you. Fully-illustrated to aid your learning. Book includes a searchable CD-ROM with all FCC Rules for Parts 2, 13, 23, 73, 80 and 87. **GROL-09 $49.95**

GROL+RADAR book & software package
Enhance your learning experience using our practice exam software along with the ***GROL+RADAR*** book. Software includes answer explanations from the book – when you select a wrong answer, the explanation from the book appears to reinforce your learning. **GRSP-09 $79.95**

GENERAL CLASS



***General Class* book**
Upgrade to the HF bands with Gordo & W5YI! Gordo's manual for 2011-2015 reorganizes all the questions into logical topic groups for easier learning. His explanations include highlighted key words to help you remember the material for test success. Companion CD is full of great operating tips! **GWGM-11 $24.95**

General Book & Software Package
Study at your computer and take practice exams. Software includes explanations from Gordo's book, scores your results and highlights areas that need further study. Includes free Part 97 Rule Book. **GUS-11 $34.95**

General Audio Course on CD
General Theory Course recorded by Gordo is full of the sounds that bring ham radio to life! He talks you through the Element 3 theory to help you understand the material and get you ready for your upcoming exam. On 4 audio CDs. **GWGW-11 $29.95**

Ham Operator Software has All Exams

Want to study at your computer without tying up your internet connection? This value pack includes the Tech, General and Extra class exams (Elements 2, 3, and 4) along with a free Part 97 Rule Book. Software includes Gordo's answer explanations from his books! Everything you need to go all the way to the top!

Software only HOS-12 $29.95
Software with all 3 West Books HOSB-12 $89.95

Learn Morse Code for HF Fun!
In-depth CD audio courses recorded by Gordo:

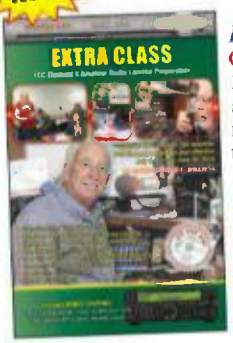
0-5 wpm on 8 audio CDs	GW05 $39.95
0-5 wpm CW refresher course on 2 audio CDs	GWCT $14.95
5-13 wpm on 8 audio CDs	GW13 $39.95
10-28 wpm on 8 audio CDs	GW20 $39.95

GW13 & 20 Special Order Only!

Learn all about electronics with our Basic books

Basic Electronics	BELC $19.95
Basic Digital Electronics	BDIG $19.95
Basic Communications Electronics	BCOM $19.95

NEW! EXTRA CLASS



***Extra Class* book**
Go to the top with Gordo! 2012-2016 book includes all Element 4 Q&A reorganized into logical topic groups. Gordo's fun, educational explanations with highlighted keywords, and great memory tricks for those tough theory questions! Wait 'til you meet "Eli the Ice Man!" **GWEM-12 $24.95**

Extra Book & Software Package
Study at your computer and take practice exams as the W5YI software scores your results and highlights areas that need further study. Includes explanations from Gordo's book. Free Part 97 Rule Book. **ECS-12 $39.95**

Extra Audio Course on CD
Extra Class Theory Course recorded by Gordo talks you through the difficult Element 4 theory to help you understand the material and get you ready for your upgrade to the top.
On 6 audio CDs. **GWEW-12 $39.95**

Getting Started in Electronics

by Forrest M. Mims
A great introduction for anyone who wants to learn the fundamentals of electronics. Includes 100 projects you can build, and great experiments that demonstrate how electricity works! **GSTD $19.95**

Engineer's Mini Notebooks

These Mims classics teach you hands-on electronics! Study and build 100s of practical circuits and fun projects. Each volume contains several of his famous Mini Notebooks. Terrific ideas for science fair projects and a great way to learn about electronics! Useful reference guides for your workbench!

Vol. 1: *Timer, Op Amp, & Optoelectronic Circuits & Projects* **MINI-1 $12.95**

Vol. 2: *Science & Communications Circuits & Projects* **MINI-2 $12.95**

Vol. 3: *Electronic Sensor Circuits & Projects* **MINI-3 $12.95**

Vol. 4: *Electronic Formulas, Symbols & Circuits* **MINI-4 $12.95/**

Order today from W5YI: 800-669-9594 or on-line: www.w5yi.org

The W5YI Group P.O. Box 200065 Arlington, TX 76006-0065 Mention this ad for a free gift.

Results of the 2012 CQ WW WPX SSB Contest

BY RANDY THOMPSON,* K5ZD

Expanded Results on the Web

As usual, QRM and operator lists accompany this article on the WPX Contest page of the CQ website <www.cq-amateur-radio.com>. In addition, this year the top scores for the U.S. and Europe are also on the web in order that we can once again provide you with a full "top-ten" list of world high scores in each category. —*W2VU*

Solar Indices During WPX SSB Contest 2009–2012

Year	Solar Flux Index	A Index	K Index
2012	103	10	2
2011	114	1	0
2010	88	7	2
2009	71	3	1

After a few weeks of disappointing conditions, expectations were hopeful for the 54th running of the CQ WPX SSB Contest in March 2012. Entrants watched the solar forecasts, plotted their strategies, and tried to anticipate which category would produce the most fun, highest score, or a new all-time record.

At the starting gun, the rates were excellent. Many stations reported more than 400 QSOs in the opening hours. Fifteen meters was best from the western USA, while 20 and 40 were the hot bands back east and in Europe. Something happened to the sun on Saturday, though, and the spell was broken. Conditions dropped to only fair, and squeezing most of the activity into 40, 20, and 15 meters made for a rough-and-tumble experience.

QRM was a popular topic in the chatter after the contest. Scott, K7ZO, said, "I am not sure I have ever heard 15 as packed as I heard it this weekend. It sounded like 20 at the bottom of the solar cycle." From Matija, S53MM, "QRM was killing me almost all of the time." Ed, K6CTA, enjoyed his experience: "Heavy rain on Saturday kept me inside, and what better way to spend the day than on the radio fighting QRM on SSB!"

Those who stuck it out saw conditions improve on Sunday. More than one entrant commented on having their best rates at the end of the contest! You just never know how a contest will play out, so it is important to stay in the chair all the way to the end, or maybe, like Dave, K6LL, you just can't resist: "I didn't plan to put in much time in this contest, but I had fun on Friday night and kept coming back to the radio like a moth to the flame."

In the end, much of the enjoyment of contesting is about the experience. Bill, K2PO, described it this way: "It's always fun to have an exotic station come back to a CQ when you're working US stations. 5X1D was the highlight in that category this time." Roberto, CE4CT, had some memorable moments, too: "...in the middle of the contest there were two earthquakes, 5.9 and 7.2, but in neither stop transmitting for no lose the rate."

"WPX is like a worldwide costume ball. You never know who may be behind the mask!"—Jim, AD1C

The WPX Contest counts prefixes as multipliers. This encourages activation of interesting special callsigns and some stations "borrowing" callsigns that have a less common prefix. The result is more fun, but never knowing to whom the voice behind the microphone belongs. Many Croatian stations added "20" to their prefix to celebrate the 20-year anniversary of the 9A prefix. LY22A was in honor of the 22nd anniversary of independence of Lithuania. The team at EI7M used EI100T to commemorate the 100th anniversary of the last (and first!) sailing of the *S.S. Titanic*. IY4FGM was the Marconi Memorial Station operating from the villa where young Guglielmo Marconi made his first experiments in wireless communications.

Steve, GW4BLE, operated single band 75 meters. You can listen to your QSO with him at <www.gw4ble.dxlixt.co.uk>.

The top prefix count among all entries was once again achieved by the big German multi-multi station DR1A, with 1841. This is 68 fewer prefixes than their record set one year ago. The best prefix total by a single-operator was CN2R with 1424. Special thanks to those stations who provided some of the more interesting prefix multipliers, including: 4GØLD, 5P12EU, 8J10SAI, 9A22P, HUØA, L59D, L60S, LZ12FDAY, LZ1784SIB, LZ40YE, SZ6P, TM22P, TM38O, TO7BC, UE85DRK, V55V, VP52V, YB8Y, and YE3J. Harley, K8BI, commented, "Some of these calls were so weird I had no idea what I was working and where to point the beam!"

Single-Operator All Band

The race for top Single-Operator All Band score was once again between perennial champions Jim, W7EJ, at CN2R, and Tom, W2SC, at 8P5A. Jim used his proximity to Europe to gain double QSO points on the low bands and set a new all-time record. Tom made 800 more contacts, mostly on 20 and 40, but it just wasn't enough. Andy, AE6Y, was close behind from P49Y. After wrestling with pulling QSO numbers out of the QRM all weekend, Andy suggested a new way of saying numbers: "...we should all use: *zero, uno, due, tres, quattro, cinco, six, siete, otto* or *ocho, nova* or *nueve* ... doing so would lessen necessary repeats and up the scores considerably." Should contesters create their own set of phonetic numbers?

Who says the guys in New England win everything? There was a battle of superstations with super ops for the top USA score. Kevin,

*e-mail: <k5zd@cqww.com>

2012 WPX SSB TROPHY WINNERS AND DONORS

SINGLE OPERATOR ALL BAND

WORLD: Stanley Cohen, W8QDQ Trophy. Won by: **CN2R operated by James P Sullivan, W7EJ**
WORLD Low Power: Caribbean Contesting Consortium Trophy. Won by: **P40W operated by John Crovelli, W2GD**
WORLD QRP: Phil Krichbaum, NØKE Trophy. Won by: **TI5N operated by Bill Parker, W8QZA**

USA: Atilano de Oms, PY5EG Trophy. Won by: **NN5J operated by Kevin Stockton, N5DX**
USA Low Power: Terry Zivney, N4TZ Trophy. Won by: **NV1N operated by Edward Sawyer, N1UR**
USA QRP: Doug Zwiebel, KR2Q Trophy. Won by: **Randy Shirbroun, NDØC**
USA Zone 3 High Power: Lauri "Mac" McCreary, KG7C Trophy. Won by: **KW7Y operated by Mitch Mason, K7RL**
USA Zone 3 Low Power: Buz Reeves, K2GL Memorial Trophy. Won by: **AD7JP operated by Bill Conwell, K2PO**
USA Zone 4 High Power: Society of Midwest Contesters Trophy. Awarded to: **George A. Demontrond III, NR5M**
USA Zone 4 Low Power: Society of Midwest Contesters Trophy. Won by: **Dave Cockrum, N5DO**
USA Zone 5 High Power: Paul Obert, K8PO Trophy. Won by: **K1LZ operated by Markovic Milovan, N8BO**

EUROPE High Power: Jim Hoffman, N5FA Trophy. Won by: **E7DX operated by Emir Memic, E77DX**
EUROPE Low Power: Ed Sawyer, N1UR Trophy. Won by: **UU7J operated by Andy Kotovky, UU4JMG**
EUROPE QRP: Rick Williams, VE9HF Trophy. Won by: **TM9K operated by Gerard Gendron, F5BEG**

AFRICA: Peter Sprengel, PY5CC Trophy. Awarded to: **TO7BC operated by Hartwig Kauschat, DL7BC**
ASIA: Chris Terkla, N1XS Trophy. Won by: **Vladimir Vinichenko, UPØL**
NORTH AMERICA: Albert Crespo, F5VHJ Trophy. Won by: **8P5A operated by Tom Georgens, W2SC**
NORTH AMERICA QRP: Phil Krichbaum, NØKE Trophy. Won by: **No entrant**
OCEANIA High Power: Phillip Frazier, K6ZM Memorial Trophy. Won by: **WH7M operated by Lou Cohen, K1YR**
OCEANIA Low Power: YB Land DX Club Trophy. Awarded to: **Holger Hannemann, ZL3IO**
SOUTH AMERICA: Andrew Faber, AE6Y Trophy. Won by: **P49Y operated by Andrew Faber, AE6Y**
SOUTHERN CONE (CE, CX, LU) Low Power: LU Contest Group Trophy. Won by: **Esteban Asenjo, XQ7UP**

CANADA High Power: Saskatchewan Contest Club Trophy. Won by: **VY2ZM operated by Jeffrey T. Briggs, K1ZM**
CANADA Low Power: Paul Cassel, VE3SY Memorial Trophy. Won by: **Dan M. Lazar, VE6EX**
JAPAN: Hamad Alnusif, 9K2HN Trophy. Won by: **Masaki Okano, JH4UYB**

SINGLE OPERATOR, SINGLE BAND

WORLD: Steve Merchant, K6AW Trophy. Won by: **PX5E operated by Sergio Lima de Almeida, PP5JR**
WORLD 28 MHz: Jorge Taboada, EA9LZ Trophy. Awarded to: **CE3CT operated by Roberto Ramirez, CE4CT**
WORLD 28 MHz Low Power: Six Stars Contest Station LS1D Trophy. Won by: **Guilherme Vaz, PU2LEP**
WORLD 21 MHz: Stuart Santelmann KC1F Memorial (W3UA/RA3AA sponsor) Trophy. Won by: **D44AC operated by Fabio Schettino, I4UFH**
WORLD 14 MHz: Jorge Taboada, EA9LZ Trophy. Won by: **Andreas Kretzschmar, 9Y4W**
WORLD 7 MHz: Jorge Taboada, EA9LZ Trophy. Won by: **Salim Gechem, HK1T**
WORLD 7 MHz Low Power: Neal Campbell, K3NC Trophy. Won by: **UZ7M operated by Yuri Prokhorov, UT9MZ**
WORLD 3.7 MHz: D4C Contest Team Trophy. Won by: **YT4A operated by Miroslav Vemic, YT1AA**
WORLD 1.8 MHz: UA2 Contest Club Trophy. Won by: **Tomislav Polak, 9A2AJ**

USA 28 MHz: Maurice Schietecatte, N4LZ Trophy. Won by: **WN1GIV/4 operated by Bob Patten, N4BP**
USA 21 MHz: Maurice Schietecatte, N4LZ Trophy. Won by: **KJ3X/4 operated by Bill Kollenbaum, K4XS**
USA 14 MHz: Charles Wooten, NF4A Trophy. Won by: **Carol Richards, N2MM**
USA 7 MHz: Yankee Clipper Contest Club Trophy. Won by: **Fred Reed, KK1KW**
USA 3.7 MHz: Bernie Welch, W8IMZ Memorial (WB8MRU sponsor) Trophy. Won by: **Steven Sussman, W3BGN**

EUROPE 28 MHz High Power: SKY Contest Club Trophy. Won by: **CR2T operated by Eduardo M. F. S. Machado, CU2AF**
EUROPE 21 MHz High Power: SKY Contest Club Trophy. Won by: **CS2C operated by Jiri Pesta, OK1RF**
EUROPE 14 MHz High Power: SKY Contest Club Trophy. Won by: **OHØX operated by Pertti Simovaara, OH2PM**
EUROPE 7 MHz High Power: SKY Contest Club Trophy. Won by: **YT8A operated by Dusan Ceha, YU1EA**
EUROPE 3.7 MHz High Power: SKY Contest Club Trophy. Awarded to: **Mikael Reijer, SM3M**
EUROPE 1.8 MHz High Power: SKY Contest Club Trophy. Awarded to: **Kurt Kawasch, OM7RU**

SINGLE OPERATOR ASSISTED

WORLD: Emir-Braco Memic, OE1EMS Trophy. Won by: **P41P operated by Helmut Mueller, DF7ZS**
USA: Alabama Contest Group Trophy. Won by: **Rick Davenport, KI1G**
EUROPE: Martin Huml, OL5Y Trophy. Won by: **YP9W operated by Tiberiu Tebeica, YO9GZU**

OVERLAY CATEGORIES

WORLD Tribander/Single-Element: Helmut Mueller, DF7ZS Trophy. Won by: **NXØX/4 operated by Paul H. Newberry, Jr., N4PN**
USA Tribander/Single-Element: Paul Newberry, N4PN Trophy. Awarded to: **Charles Wooten, NF4A**
USA Tribander/Single-Element Low Power: Al Josza, KG1E Trophy. Won by: **NR3X/4 operated by Nate Moreschi, N4YDU**
Europe Tribander/Single-Element: Roger Miner, K1DQV Trophy. Won by: **Igor Vachevsky, RT4RO**
WORLD Rookie: Val Edwards W8KIC Memorial (K3LR sponsor) Trophy. Won by: **UA5A operated by Oleg Prelovsky, RA3AKT**

MULTI-OPERATOR, SINGLE-TRANSMITTER

WORLD: Latvian Contest Club Trophy. Won by: **5D5A operated by IK2QEI, IK2SCG**
USA: Steve Bolia, N8BJQ Trophy. Won by: **WW2DX operated by W2RE, WW2DX, KB2HZI, K2TR**
AFRICA: Rhein Ruhr DX Association Trophy. Won by: **6V7Z operated by UA9CDC, RA9FW, 6W7RV**
ASIA: W2MIG Memorial (NX7TT Sponsor) Trophy. Won by: **P33W operated by 5B4AIE, RV3BA, RG6G, R3DCX, RW4WR, RA3AUU**
EUROPE: Tonno Vahk, ES5TV Trophy. Won by: **RL3A operated by RA3CO, UA3ASZ, RL3FT, RU3RQ, RT3DX, RN3DNM, RV3MA**
NORTH AMERICA: North Pole Contest Group Trophy. Won by: **WP2Z operated by K8MJZ, KP2MC, K9VV, NQ6N**

MULTI-OPERATOR, TWO-TRANSMITTER

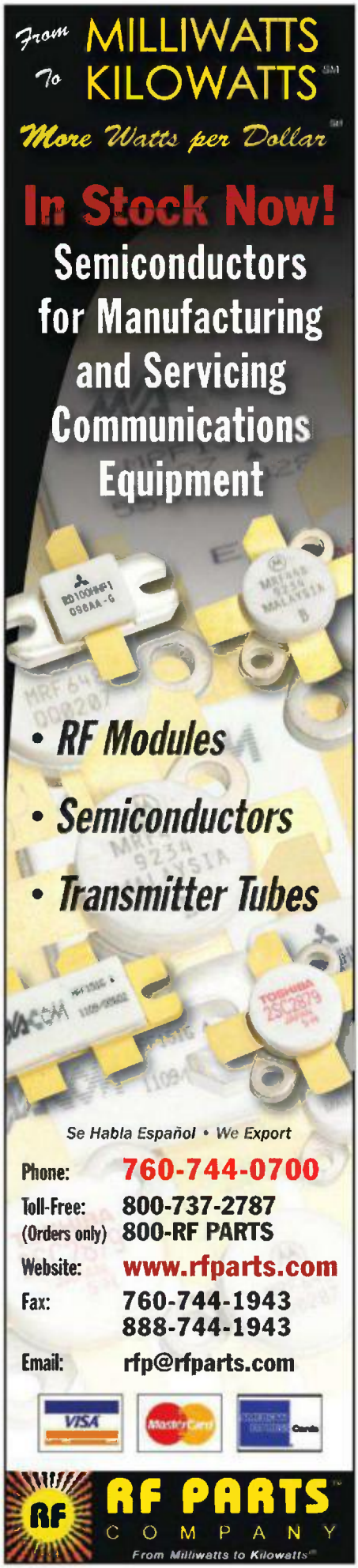
WORLD: Ken Adams, K5KA Memorial Trophy. Won by: **PJ4Z operated by K4BAI, WW4LL, N4OO, W4DXX**
USA: Florida Contest Group Trophy. Won by: **KE3X operated by KE3X, K3RA, W2CDO, N8II, K2YWE**
AFRICA: Walter Skudlarek, DJ6QT Trophy. Won by: **CR3A operated by CT3BD, CT3DL, CT3DZ, CT3EE, CT3EN, CT3IA, CT3KU, CT3KY, CT1EEB, CT1FFU, CT1FJO**
EUROPE: Bernd Och, DL6FBL Trophy. Won by: **EI100T operated by EI8IR, EI3JE, EI3JZ, EI3KD, EI4HQ, G4CLA, G3ZVW, G3TWC**

MULTI-OPERATOR, MULTI-TRANSMITTER

WORLD: Gail M. Sheehan, K2RED Trophy. Won by: **EB8AH operated by EA4BQ, EA5DY, EA8AH, EA8CAC, EA8ZS, ES2RR, ES7GM, ES5RW, IK1HJS, OH1MA, OH6RX**
USA: Dale Hoppe, K6UA Memorial Trophy. Won by: **NX5M operated by NX5M, KU5B, N5XJ, KJ5T, K5RT, AB5K, K5END, W5SE**
EUROPE: Rick Dougherty, NQ4I Trophy. Won by: **DR1A operated by DB5JG, DF6JC, DJ7EO, DK2CX, DL1QQ, DL5LYM, DL6FBL, JF3GAD, PA1TX, PC5A**

CONTEST EXPEDITION

WORLD: C6APR Memorial (PT7ZZ sponsor) Trophy. Won by: **V55V operated by V51W, DH1TW, DJ2HD, DK6XZ, DK9IP, DL3DXX, DL9NDS**



N5DX, was operating as NN5J from the K5GO/N5DX hilltop in Arkansas, and George, NR5M, was blasting away from his big station outside Houston. Both had almost identical multiplier totals. Kevin had 184 fewer contacts, but made up for it with extra DX on 40 meters to take the win. Markovic, N8BO, drove the big station at K1LZ to a close third-place finish. Mitch, K7RL, posted a very impressive fourth-place score from the Pacific Northwest using the callsign KW7Y.

The top 100 single-operator all band entrants in the world averaged more than 33 hours of operating time. Their average score reduction was only 6.5% after the log checking. No doubt many of them were chasing qualifying points for WRTC 2014.

Single-Operator Single Band

After winning the 15-meter single band category four out of the last five years, Sergio, PP5JR, moved up to 10 meters this year. Instead of his usual ZX5J callsign, he used PX5E to earn the highest of any single-band score with 17.7-million points. Imagine over 4500 contacts just on 10 meters! Sergio's effort set a new all-time record for the band by breaking the 10-year-old record of D44AC (op 4L5A).

The D44AC callsign was also active this year. Fabio, I4UFH, visited the Cape Verde Islands to go for a new record on 15 meters. Murphy had other plans, as Fabio experienced a generator failure just before sunrise. It took three hours to get someone up the mountain to diagnose and fix the problem—dirty gasoline. That short outage probably cost him the record.

Twenty meters is always a challenge, but even more so this year. During the day, all of the activity was on the higher bands. At night, everyone was on the low bands looking for double points. The competition was from South America with Andreas, 9Y4W, getting the win over Fernando, PY2LED, at ZV2V.

The third highest single band score in the contest was by Sal, HK1T, operating from the "Jumaji" antenna farm with stacked full-size 3-element Yagis. Dusan, YT8A, did his usual fine job to win Europe. Averaging the highest miles per QSO was third-place finisher Laurie, VK7ZX, all the way from Tasmania.

With propagation so good on the high bands, it was difficult for the challengers on 75 and 160 meters. Vemic, YT1AA, used six different Beverage listening antennas to earn the high score over Mikael, SM3M. Tomislav, 9A2AJ, fought the QRN for over 27 hours to win 160 meters. Ouch.

Single-Operator Low Power

The winner for the low power all-band trophy always seems to come from Aruba. This time it was John, W2GD, operating barefoot from P40W with his sights set on setting a new category record. The solar disturbance on Saturday was just enough to prevent that from happening, but still left him with a big lead. It was an intense competition for second place and top European score between UU7J, operated by Andy, UU4JMG, and IR4X, operated by Matteo, IZ3EYZ. Another perennial high scorer is Ed, N1UR, operating as NV1N. Ed's 5.4-million points pushed the USA all-time record up another 10%.

Single-Operator Assisted

With multipliers seemingly coming with each new QSO, there isn't as much advantage to using the DX Cluster in WPX compared to other contests. Even so, the competition in the Assisted category continues to increase as top operators enjoy the ability to run and still not miss anything that's happening on the bands.

After four years of operating from Madeira, Helmut, DF7ZS, headed to the magical WPX island of Aruba to chase the prize from the

Log Checking Honor Roll

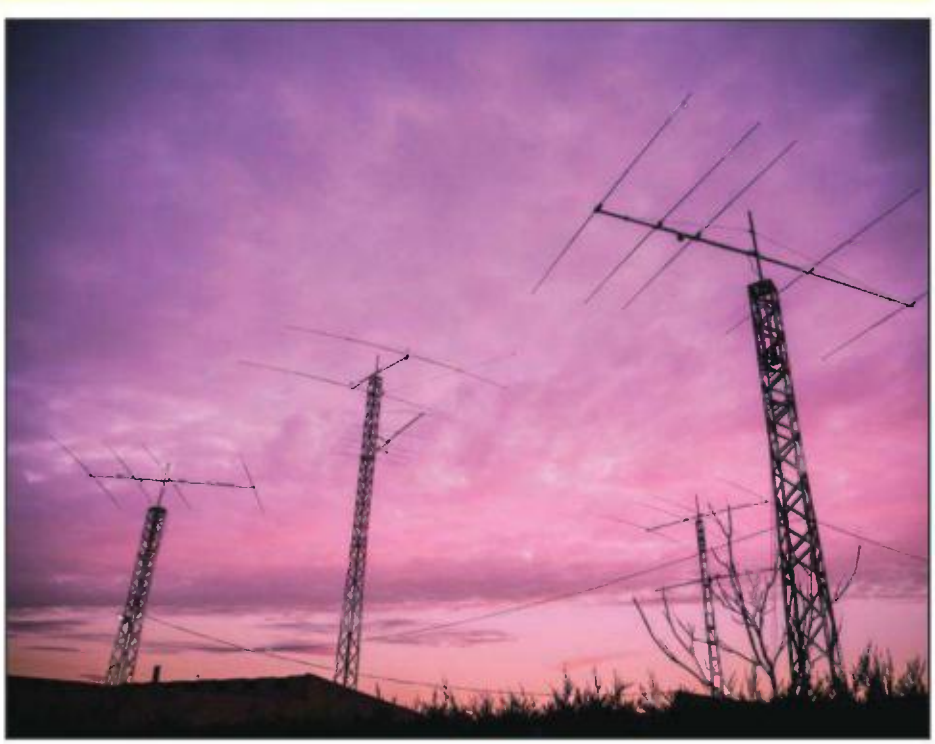
There were 2,866,408 total QSOs recorded in the 5,365 logs received for the 2012 edition of the WPX SSB Contest. More than 2.2 million, or 78%, of these contacts could be cross-checked against another log. An incredible 95.5% of the cross-checked QSOs were made without errors. That's rather amazing when you consider all of the QRM, QSB, and other distractions of a phone contest. The average score reduction for all logs was 11.6%. Score reductions usually are higher in WPX because many busted calls often have the added impact of being lost multipliers.

Everyone who submitted a log to the WPX Contest should have received an e-mail with a link to their log checking report. The report shows all errors found in the logs and how the final score was calculated. The report also shows how others may have miscopied your callsign or exchange. This is a great tool for learning how to improve your operating skills. If you did not receive the message with the link, send an e-mail to <director@cqwpx.com> to request your report.

There were 347 "Golden Logs" with no score reductions at all! Top golden logs (with QSOs made) includeVR2XLN (487), WN2O (341), KIØI (300), VA5LF (270), and G6NHU (244). Nice work!

Interestingly, there were 339 entries that were Golden on the transmitting side. They caused no busted calls, no exchange errors, and no Not-In-Log busts. This elite group included KT2G (100), W4EF/6 (66), OL7Y (56), AA4KD (54), and N3GJ (52).

Carlos, PT7ZT, enjoyed operating as PV7M during the contest.



Sunrise at the antenna farm of ED1R.

Introducing the CrankIR Antenna Series!

(International patent pending)

A lightweight, high performance, extremely portable vertical antenna rated at 2000 watts key-down with fully manual operation (no electrical power or controller required); Patented folded design allows for 40% reduction in size with only a 0.3dB reduction in performance compared to a full length vertical.

Imagine the possibilities!

- Lightweight and extremely portable, the CrankIR is also a great option for stealth installations (CC&R) or for the ham that is on a budget.
- Install and break down in minutes!
- Continuous coverage on all frequencies within specified range.
- Simple operation – change bands with a turn of the crank.
- 2000 watt power rating.
- Patented folded design allows for 40% shorter element with only 0.3dB reduction in gain compared to a full length vertical.
- Ideal for DXpeditions, hiking, Field Day, boating or home QTH use.
- No controller or electric power required – fully self contained manual operation.
- 20m – 2m CrankIR weighs approximately 5.5 lb; telescoping support is 9 ft when fully extended, retracts to 26".
- 40m – 2m CrankIR weighs approximately 8.5 lb; telescoping support is 18 ft when fully extended, retracts to 30".
- 80m – 2m version will be available; more information as we develop it.

Why settle for compromises?
you can have high performance AND portability with the CrankIR Series Vertical!

The CrankIR will be available in Spring 2013

SteppIR **www.steppir.com**

2012 WPX SSB WORLD TOP SCORES

SINGLE OPERATOR HIGH POWER ALL BANDS

CN2R (W7EJ)	27,280,992
8P5A (W2SC)	24,809,505
P49Y (AE6Y)	22,182,251
VY2ZM (K1ZM)	18,863,406
UPØL	18,541,055
E7DX (E77DX)	16,982,770
C4W	16,750,800
LT1F (LU1FAM)	16,704,753
PT5T (PP5XX)	16,578,468
CW5W (CX6VM)	15,933,607

28 MHz

PX5E (PP5JR)	17,785,368
CE3CT (CE4CT)	8,812,826
PJ2T (AC8AP)	4,853,292
PY5QW	4,643,936
H2T (5B4XF)	3,839,844
ZY5Y (PP5BS)	3,215,668
CR2T (CU2AF)	1,621,312
JO3JIS	1,540,045
ZS6EE	1,283,660
TM4W (F5HRY)	1,272,700

21 MHz

D44AC (I4UFH)	17,356,864
PR5B (PY2LSM)	11,236,625
KJ3X/4 (K4XS)	8,588,114
CS2C (OK1RF)	8,004,231
YT5W (YT7AW)	6,010,788
E77A	5,608,691
TM1W (F1HAR)	5,601,827
NH6P (KH7Y)	4,121,650
XE1L	3,636,370
CX2DK	3,551,292

14 MHz

9Y4W	9,177,904
ZV2V (PY2LED)	7,101,512
D4C (IZ4UEZ)	6,534,990
VC7R (VA7RR)	5,664,204
OHØX (OH2PM)	5,195,988
RT5Z	4,914,560
SSØK	4,833,312
EA5DFV	3,898,378
UZØU (UY5ZZ)	3,250,640
YL2BJ	2,611,614

7 MHz

HK1T	14,512,230
YT8A (YU1EA)	6,557,886
VK7ZX	4,303,684
YL3FT	2,824,356
KK1KW	2,407,000
R8MC	2,329,002
PS2T (OH2MM)	1,977,880
9A8DX	1,854,949
OQ7T	1,454,976
IK3UNA/1	738,700

3.7 MHz

YT4A (YT1AA)	1,243,200
SM3M	1,001,151
S54K	849,420
IC8WIC	834,968
W3BGN	808,920
4M5W (YV5MSG)	491,301
SP3GTS	390,375
RU4SS	370,596
UX1VT	243,168
EA1AAW	199,867

1.8 MHz

9A2AJ	465,864
OM7RU	340,599
UT5UGR	299,882
LY2OU	228,285
SP4JCP	172,500
IR1A (IK1GPG)	97,709
EA6SX	41,340
RN4HJQ	40,125
RW3SY	30,193
UT5ECZ	19,950

SINGLE OPERATOR LOW POWER ALL BANDS

*P4ØW (W2GD)	13,062,600
*UU7J (UU4JMG)	6,531,670
*IR4X (IZ3EYZ)	6,328,036
*ZL3IO	6,182,904
*NV1N (N1UR)	5,451,950
*RWØA (RAØAM)	5,171,096
*LY1R (LY9A)	4,803,825
*SSØA	4,732,052
*HI8LAM/3	4,354,011
*KU2M	4,318,160

28 MHz

*PU2LEP	5,134,649
*LW8DQ (LW7DX)	3,011,602
*LU6FOV	2,837,100
*LU7EC	2,525,888
*PY2MTS	2,242,880
*CX1DP	1,510,083
*PU5FJR	1,463,405
*AY8A (LU8ADX)	1,070,913
*CA3SOC	1,056,088
*RV9DC	1,016,880

21 MHz

*5K3R (HK3R)	2,819,245
*YV5KG	2,177,872
*HI3K	2,070,445
*JR3RIY	1,203,184
*4M1F (YV1JGT)	978,040
*LZ2JA	918,517
*R9RA	856,215
*CO2CW	804,804
*UAØSOX	798,930
*VE5ZX	634,920

14 MHz

*PY1ZV	1,287,453
*SP5GRM	1,255,130
*EA8VD	990,416
*UA6LUQ	867,064
*YB9WZJ	675,540
*S52WW	674,245
*LR1H	665,660
*LY8O	618,838
*YL5W	569,016
*IZ2ACD	559,035

7 MHz

*UZ7M (UT9MZ)	2,561,598
*S57DX	2,270,452
*UY2UQ	1,214,292
*UU2CW	1,042,317
*Z33F	651,651
*UA6YE	641,079
*EI6JK	625,820
*F4GTD	592,724
*LY5I	488,824
*PV2P (PY2DY)	325,040

3.7 MHz

*DF2DJ	923,832
*YT8WW	683,648
*YL2GUV	336,980
*SP4SHD	274,920
*R3LC	224,548
*S53N (S58G)	220,792
*OMØCS	213,030
*US2IZ	169,596
*HK6P	164,104
*HG8YKO	155,350

1.8 MHz

*EU2EU	74,304
*OK1JOK	60,060
*ER2RM	33,408
*SM6FJY	20,592
*VE3EDY	8,140

SINGLE OPERATOR ASSISTED HIGH POWER ALL BANDS

P41P (DF7ZS)	23,229,884
RC9O	17,536,244
H22H (5B4MF)	13,617,600
ZZ2T (PY2MNL)	12,663,156
KI1G	11,971,296
YP9W (YO9GZU)	11,956,764
HA8JV	9,654,390
EC2DX	9,440,957
IW2HAJ	9,061,152
VE9HF	8,789,700

28 MHz

LR2F	7,746,093
LU3HS	4,503,842
KG6DX	4,406,832
4XØA (4X1VF)	2,609,750
PP5JN	1,398,132
CT3HF	1,351,386
II9X (IT9SPB)	1,243,772
PY1EW	1,078,740
XV1X	957,190
RXØAE	833,316

21 MHz

NS1L/4 (W4SVO)	5,364,639
5B4KH	5,336,788
LY5E (LY2IJ)	5,203,000
DF9ZP	4,976,624
OQ4U	4,685,949
YT7Z (YT5M)	4,608,128
EI2CN	4,331,998
YU5A (YU1EW)	4,178,944
9A5Y (9A3NM)	4,054,290
OH1F (OH1NOA)	3,683,488

14 MHz

SO2R (SP2FAX)	7,181,838
GW9T (MWØZZK)	6,915,090
US1 (UX2IO)	6,520,784
S53F	5,149,956
OL9Z	5,014,488
PT2CM (PT2IC)	4,830,602
RJ3FF	4,334,240
EO3Q (UR3QCW)	3,768,498
DA2C (DK3DM)	3,441,925
S5ØG (S57AW)	2,891,904

7 MHz

YW5T (YV5JBI)	6,849,684
4L5O	5,963,804
S56X	3,454,297
OK1UG	1,742,959
R3KM	1,600,225
LR9D (LU9ESD)	1,296,297
RA6XV	595,059
EC7ZK	582,400
J42T (SV2DCD)	303,222
K4KZZ	299,184

3.7 MHz

SN2M (SP2XF)	1,740,188
IQ4RA (I4AVG)	1,693,584
DM5ØUEA (DL3BQA)	1,358,934
E73ESP (E72SIE)	1,094,100
YU1ARC (YU1YV)	968,856
OH9W (OH2FPK)	966,264
UW5ZM	853,461
YL6W	852,867
9A2R	784,665
EA7EU	622,566

1.8 MHz

IO4C	688,170
LY7M	376,957
EU3AR	328,308
IZ5MOQ	253,968
UA6AIW	35,916

SINGLE OPERATOR ASSISTED LOW POWER ALL BANDS

*RV9UP	4,626,720
*S5ØXX	3,156,849
*RL6M	3,010,144
*IB1B (IW1QN)	2,966,194
*UN7MMM	2,947,204
*YTØZ (YU1ZZ)	2,597,188
*UA9AL	2,556,440
*YV8AD	2,390,775
*RW4WA	2,349,000
*LZ12FDAY (LZ1UK)	2,213,099

28 MHz

*PR3A	4,639,460
*LU8EOT	4,400,685
*YV5JF	1,330,662
*PY3FJ	1,323,552
*PU8WWW	1,248,566
*PU2STZ	853,549
*PY2HT	839,300
*PY2TKB	774,204
*HGØR (HAØNAR)	469,080
*PU1KGG	396,198

21 MHz

*HA4XH	2,442,462
*PY9MM	1,069,932
*N9TGR	1,001,616
*ED8D (EA8MT)	935,520
*R9MC	925,688
*UAØWY	831,833
*IR8M (IZØEYP)	650,886
*UT5LO	526,128
*SP4DZT	511,936
*YL3AGV	318,763

14 MHz

*YT5CT	1,511,433
*YT8T	1,142,580
*KG1E	1,036,630
*ZM3T (W3SE)	1,036,074
*UT7Y (USØYW)	724,895
*YO8SSB	640,920
*NP4G	497,377
*EF7W (EC7KW)	425,898
*OK6RA	371,840
*RA6GW	357,840

7 MHz

*EI4CF	892,012
*EN1C	845,435
*VY2MGY/3 (VE3MGY)	685,640
*NY6DX/2	632,818
*2E1FVS	419,692
*EA5HSI	345,779
*VE9ML	255,387
*UA2FT	128,554
*YTØA	112,658
*DS5TOS	110,522

3.7 MHz

*9A1JSB (9A7ZZ)	527,050
*LY7Z	521,968
*S53NW	243,837
*DR2K (DL5OCR)	163,226
*IT9JDH	139,200
*EA3AKA	94,500
*YB1AR	15,386
*EA1GWM	4,988
*UR8IDX	552

1.8 MHz

*E7CW (E74WN)	320,458
*Z36N	205,905
*SP8LBK	121,208
*UR5IFB	96,114
*W2MF	54,730

SINGLE OPERATOR QRP ALL BANDS

TI5N (W8QZA)	1,449,725
TM9K (F5BEG)	953,680
LU7HZ	756,646
DL8LR	749,700
NDØC	641,600
IZ8JFL	541,250
OO4O	500,148
RN4HAB	496,353
HG6C (HA6IAM)	485,204
E77TA	482,466

28 MHz

LU3HFA	120,330
ON6NL	92,105
I5KAP	79,977
R2AD	30,680
YO5OHY	27,730

21 MHz

EI4II	117,898
EA1CJJ	109,068
SP4LVK	92,571
WA6FGV	91,455
IH3DMQ	79,325

14 MHz

YT1CS	131,108
SP3DRM	81,468
ON3DI	50,220
RU4SM	43,792
UAØA	38,350

7 MHz

S57SU	609,329
9A2ØL (9A9L)	217,722
SP2QOT	180,576
SP4GFG	172,125
HA8V	57,961

3.7 MHz

UX9Q (UR9QQ)	36,010
K9JWV/7	4,272

3.8 MHz

9A4AA	1,984
R3VA	91

MULTI-OPERATOR SINGLE TRANSMITTER

5D5A	38,510,454
P33W	37,798,352
RF9C	29,872,318
6V7Z	27,788,120
UP2L	27,522,568
3V8BB	26,263,647
RL3A	22,523,280
CQ9T	21,845,680
ES9C	21,585,315
WP2Z	21,335,538

MULTI-OPERATOR TWO-TRANSMITTER

PJ4Z	57,741,867
CR3A	50,282,186
PW7T	44,052,624
V55V	36,092,544
EIØØT	33,721,072
ED9Z	31,118,395
OL4A	29,159,072
A73A	28,885,818
CQ3L	28,737,382
9A7A	25,898,786

MULTI-OPERATOR MULTI-TRANSMITTER

EB8AH	76,018,024
DR1A	51,608,753
LP1H	47,996,898
9A1A	38,960,724
OT5A	34,489,028
LZ9W	34,413,120
HG1S	26,861,948
VC6Z	19,953,621
NX5M	19,565,898
KL7RA	19,449,164

ROOKIE HIGH POWER ALL BANDS

UA5A (RA3AKT)	11,307,639
S59ABC (S56AA)	7,429,512
RN3DMU	3,146,094
HZ1TT	2,504,568
UD3D (UB3DAY)	2,221,128

28 MHz

PY1EW	1,078,740

21 MHz

AK3S	155,178
BY1CW (BD1GXH)	134,596

14 MHz

D4C (IZ4UEZ)	6,534,990

ROOKIE LOW POWER ALL BANDS

*EA2LMI	1,090,100
*ED7R (EA7IZJ)	1,009,125
*OH3FOG	998,037
*YO5LDI	818,100
*W4DTB	529,968

28 MHz

*CX1DP	1,510,083
*PU8WWW	1,248,566
*PU2STZ	853,549

21 MHz

*YL3AGV	318,763
*DO3KMF	94,127
*UB6ACR	22,040

14 MHz

*LR1H	665,660
*IIØK (IZØUME)	85,008
*IV3CTS	25,452

7 MHz

*F4GTD	592,724
*EA5HSI	345,779
*YO2MJZ	150,332

TRIBANDER/SINGLE ELEMENT HIGH POWER ALL BANDS

NXØX/4 (N4PN)	8,815,183
RT4RO	7,517,104
KP2MM (N2TTA)	6,621,256
NF4A	4,729,318
LZ2DF	4,606,848
EE3A (EA3ATM)	4,514,610
OQ5M (ON5ZO)	4,205,362
SV5DKL	4,178,160
UA4FEN	4,097,236
EW2A	3,889,458

28 MHz

4XØA (4X1VF)	2,609,750
WN1GIV/4 (N4BP)	903,378
9A2U (9A3ZA)	576,240
KU8E/4	349,875
WP4WW (KP4JRS)	339,756

21 MHz

4X9A (4Z4OQ)	3,505,614
SV9GPV	2,878,092
K6LL/7	2,080,880
VY1EI	917,889
KZ5J	724,710

14 MHz

9A2ØJB (9A1AA)	2,720,133
RY3D	2,187,516
S51CK	1,913,330
8SØC (SMØMPV)	1,889,264
UP5P (UN7PL)	1,207,524

7 MHz

9A8DX	1,854,949
IK3UNA/1	738,700
RA3OA	501,421
LY2UU	485,000
W5ELR	294,118

3.7 MHz

DM5ØUEA (DL3BQA)	1,358,934
YT4A (YT1AA)	1,243,200
9A2R	784,665
EA7EU	622,566
EA1EA	134,829

3.8 MHz

IZ5MOQ	253,968
SV1GRD	7,257

TRIBANDER/SINGLE ELEMENT LOW POWER ALL BANDS

*ZL3IO	6,182,904
*RT9S	3,285,816
*TO7BC (DL7BC)	3,172,628
*IB1B (IW1QN)	2,966,194
*E21EIC	2,846,340
*NR3X/4 (N4YDU)	2,439,441
*XQ7UP	2,216,865
*IQ2Z (IK2DZN)	2,028,285
*KT4ZB	1,949,935
*NX6T (K6AM)	1,920,810

28 MHz

*LU7EC	2,525,888
*AY8A (LU8ADX)	1,070,913
*LU8DCF	985,150
*LU3DR	779,833
*HQ2N (UA6WFM)	292,608

21 MHz

*R9MC	925,688
*UAØSOX	798,930
*RU4SO	602,922
*KM4HI	425,632
*EE1B (EA1YB)	387,045

14 MHz

*PY1ZV	1,287,453
*KG1E	1,036,630
*ZM3T (W3SE)	1,036,074
*S57U	453,840
*XR1I (CE1KR)	445,284

7 MHz

*EN1C	845,435
*VY2MGY/3 (VE3MGY)	685,640
*OK2ILD	312,180
*IQ1BD (IZ1DGG)	283,976
*VE3SWS	146,190

3.7 MHz

*YL2GUV	336,980
*S53NW	243,837
*R3LC	224,548
*S53N (S58G)	220,792
*OMØCS	213,030

1.8 MHz

*VE3EDY	8,140

** Low Power*

N5AW at his operating station.

station of P40V. You can get a feel for the experience by watching Helmut's excellent video blog (see WPX Activity on the web). Rick, KI1G, continued his mastery of WPX and the Assisted category by dominating the competition in the USA.

One of the closest races was for world high on 15-meter single band assisted high power. Mark, W4SVO, operated as NS1L and got by George, 5B4KH, by just 0.5%. There was another competitive race on 75 meters between SN2M (operated by Mac, SP2XF) and Franco, I4AVG, at IQ4RA.

Things really tighten up on low power. Look at the 20-meter scores of KG1E and ZM3T—just 500 points apart for third place in the world. Niall, EI4CF, and Maxim, EN1C, had a spirited battle for tops on 40 meters. Niall was enjoying his new SteppIR DB36 antenna at 75 feet.

Single-Operator QRP

You have to admire the spirit and determination it takes to wade into heavy QRM with just 5 watts. It seems that Bill, W8QZA, does so every year with very good results. This year he visited TI5N to take the world high score for all bands. Gerard, F5BEG, did a very nice job from TM9K to finish second. Randy, NDØC, did a fantastic job to win the USA from his modest station in the propagation "black hole" of Minnesota.

Overlay Categories

We had 228 entries in the Rookie category (for operators who have been licensed less than three years). The entries are divided into high and low power. Oleg, RA3AKT, and Vito, S56AA, battled it out for the top spot in high power. The top two Rookies on low power were operating single band 10 meters with Fernando, CX1DP, coming out ahead of Fabio, PU8WWW. It is always great to see the Rookie operators improve their skills each year.

In the Tribander/Single-Element category, the top high power score went to Paul, N4PN, operating as NXØX from near Atlanta.

radiosport headsets
www.arlancommunications.com
Our most popular headsets for modern Dual-Watch Dual-Receive HF Radios
deluxe "dream" editions
radiosport RS20S
$159 includes detachable cable
radiosport RS60CF
$355 includes Mic & Headset-To-Radio cable
At Last... Professional Quality Listen-Only & Boom-Mic Headsets for Ham Radio
see our reviews at: eHam.net
hear the difference
feel the difference
ARLAN Communications
Cal Poly Tech Park, Bldg 83, Suite 1A-105, San Luis Obispo, CA 93407
805 504-3944 M-F 9AM-6PM Pacific Time Zone

ELECTRIC RADIO MAGAZINE
In circulation over 20 years, ER is a monthly publication celebrating classic equipment that was the pride of our shacks just a few years ago. Send $1 for a sample:
ER, PO Box 242
Bailey, CO 80421-0242
720-924-0171
WWW.ERMAG.COM

Eliminate noise and inteference in 2013
With a bhi or HEAR IT
DSP Noise Canceling Product!
bhi
HEAR-IT Speaker
HEAR IT DSPKR
HEAR IT INLINE MODULE
Superb 10 watts Audio!
- New "Quick Adjust" DSP filter control
- 8 DSP filter levels 9 to 35dB
- 3.5mm mono headphone jack
- On/off audio bypass switch
- 2.7W Amplified DSP speaker
- 12 to 24 V DC (500mA)
- Supplied with Fused DC power lead and full user guide
- 7 DSP filter levels - Superb 10 Watts rms audio - Easy to use controls - Sleep mode - Filter level store function
- Volume control - Input overload LED
- Mono headphone jack - Supplied with Fused DC power lead and instructions
- Amplified DSP In-line module - Use with a loudspeaker or phones
- 8 filter levels 9 to 35dB
- Separate input level & volume controls - line level input and output
- Audio bypass mode
- Requires 12 to 24 VDC (500mA)
Available as bhi from W4RT & "HEAR IT" from GAP.
DSP modules also available to fit inside your radio or speaker
W4RT Electronics fax: 256 880 3866 www.w4rt.com info@w4rt.com
GAP Antenna Products Inc. 99 N. Willow St, Fellsmere, FL 32948 Tel: (772) 571 9922 www.gapantenna.com
Products designed and manufactured in the UK by bhi Ltd
www.bhi-ltd.com

The NEW EZ HANG Square Shot Kit
www.ezhang.com
Suggestions from thousands of HAM'S and Cable installers around the world, led to a complete redesign of the EZ Hang. Custom designed for YOU, the user in mind. Now safer and easier to use, you will hit your mark every time, with less chance of misfires hitting the yoke.

OVER 9500 SOLD AROUND THE WORLD!
$99.95 + $9.05 for shipping when paying by check
540-286-0176
www.ezhang.com
EZ HANG
32 Princess Gillian Ct.
Fredericksburg, VA 22406

HamTestOnline™
Online courses for the ham exams
- Quick way to learn — most students pass easily after 10 study hours for Tech, 20 for General, 30 for Extra.
- Study material, practice exams, and a cyber-tutor, all rolled into one. An intensely effective learning system. Just ask our students!
- Rated 4.9 out of 5 in 250+ reviews on eHam.net.
- 100% guaranteed — you pass the exam or get a full refund!
- Try our free trial!

www.hamtestonline.com

Hobby books, cds, dvds & calendars!

CQ Communications, Inc. Online Store!
http://store.cq-amateur-radio.com

ADVANCED SPECIALTIES INC.
Orders/Quotes 1-800-926-9HAM
www.advancedspecialties.net
BIG ONLINE CATALOG

VX-8GR
Dual-Band HT with Built-in GPS

FT-7900R
Dual-Band Mobile 50/45W Transceiver
AMATEUR RADIO EQUIPMENT & ACCESSORIES • SCANNERS
ANLI • ALINCO • COMET • UNIDEN • YAESU
(201)-VHF-2067
114 Essex Street, Lodi, NJ 07644
Closed Sunday & Monday

WPX Activity on the Web

In addition to the cqwpx.com website, there are other places on the Internet where you can enjoy the contest. Join the nearly 3000 people who have "liked" the contest on the Facebook fan page at <www.facebook.com/cqwpx>; follow the latest announcements on Twitter at <www.twitter.com/cqwpx>.

Many operators and groups like to share their contest experiences on YouTube. Visit <http://www.youtube.com> and type "CQ WPX 2012 SSB" into the search box.

We asked Facebook fans to recommend some videos and received the following suggestions:

EB8AH MULTI MULTI: <http://youtu.be/I_MzDkdRRxY>
DF7ZS at P41P: <http://youtu.be/pSkxQHEnzrI>
IY4FGM: <http://youtu.be/YuD_vPIunY0>
DP6T: <http://youtu.be/xZ18-IFdDeI>
PQ5B by 12-year-old PU5DCB: <http://youtu.be/eUnBUvkCxZ0>
EI4GYB: <http://youtu.be/jKFbyhms77M>
LN8W contest audio: <http://la8w.com/contestaudio/wpx-ssb-2012/>

CQ WW WPX SSB CONTEST ALL-TIME RECORDS

The contest is held each year on the last full weekend of March. The All-Time Records will be updated and published annually. Data following the calls: year of operation, total score, and number of prefix multipliers.

WORLD RECORD HOLDERS

Single Operator

1.8	CN2R('07)	1,613,955	399
3.5	CN2R('06)	11,849,076	894
7.0	CN2R('05)	14,724,696	931
14	CN2R('08)	15,778,840	1199
21	CN2R('11)	20,704,164	1443
28	PX5E('12)	17,785,368	1368
AB	CN2R('12)	27,280,992	1424
QRP/p	HC8A('94)	7,520,562	714
Assisted	P41P('12)	23,229,884	1303

Multi-Operator Single Transmitter

5D5A('12)		38,510,454	1601

Multi-Operator Two Transmitter

EB8AH('11)		68,072,520	1765

Multi-Operator Multi-Transmitter

EB8AH ('12)		76,018,024	1784

U.S.A. RECORD HOLDERS

Single Operator

1.8	K1ZM('95)	327,712	308
3.5	K1UO('10)	2,161,782	602
7.0	WU3A/1('11)	4,731,424	796
14	KQ2M('09)	7,034,082	1082
21	KQ2M/1('11)	9,591,670	1210
28	NY4A('00)	6,006,573	877
AB	K1LZ('11)	15,921,388	1246
QRPp	KR2Q('00)	2,688,158	649
Assisted	KI1G('11)	13,075,616	1268

Multi-Operator Single Transmitter

WW2DX('12)		19,167,080	1373

Multi-Operator Two Transmitter

K1LZ('10)		30,393,480	1560

Multi-Operator Multi-Transmitter

KM3T('00)		29,338,460	1355

CLUB RECORD

Contest Club Finland ('00) 250,320,141

QRPp RECORD

HC8A('94) 7,520,562

WPX (Prefix) RECORD

DR1A('11) 1909

CONTINENTAL RECORD HOLDERS

AFRICA

1.8	CN2R('07)	1,613,955	399
3.5	CN2R('06)	11,849,076	894
7.0	CN2R('05)	14,724,696	931
14	CN2R('08)	15,778,840	1199
21	CN2R('11)	20,704,164	1443
28	D44AC('02)	15,707,401	1123
AB	CN2R('12)	27,280,992	1424

ASIA

1.8	*YMØT('05)	486,846	222
3.5	H2T('10)	3,067,296	534
7.0	5B/KC2TIZ('10)	6,761,872	754
14	P33W('10)	8,004,130	1030
21	JA6GCE('11)	7,055,664	996
28	H22H('00)	9,092,146	931
AB	UPØL('12)	18,541,055	1235

EUROPE

1.8	SN3R('07)	835,884	434
3.5	EI7M('10)	3,527,075	731
7.0	EI7M('11)	10,787,690	1054
14	TM77M('10)	8,271,768	1046
21	CS2C('11)	9,479,430	1245
28	GM7V('00)	8,305,756	982
AB	E7DX('11)	20,438,120	1322

NORTH AMERICA

1.8	VA1A('99)	535,225	271
3.5	ZF1A('08)	2,269,344	462
7.0	TI4CF('05)	8,057,479	751
14	KP2A('95)	7,088,976	912
21	VP2EH('11)	14,899,185	1305
28	KP2A('00)	11,385,710	1046
AB	8P5A('12)	24,809,505	1385

OCEANIA

1.8	KH6ND('07)	26,432	59
3.5	WH7Z('03)	1,208,900	308
7.0	ZL3A('08)	8,200,800	816
14	KH6ND('03)	6,493,727	887
21	AH7DX('00)	7,645,990	890
28	TXØDX('00)	12,049,422	847
AB	KH7X('11)	20,676,524	1244

SOUTH AMERICA

1.8	HK1KYR('10)	44,814	77
3.5	P4ØA('96)	1,715,076	426
7.0	HK1T('12)	14,512,230	1062
14	HK1X('11)	13,783,532	12599
21	ZX5J('10)	16,746,977	1369
28	PX5E('12)	17,785,368	1368
AB	HC8A('01)	25,180,199	1199

MULTI-OPERATOR SINGLE TRANSMITTER

AF	5D5A('12)	38,510,454	1601
AS	P33W('12)	37,798,352	1556
EU	TM6M('11)	28,016,921	1541
NA	VP2EC('92)	24,409,580	1115
OC	KH7X('12)	19,038,120	1180
SA	HC8A('93)	32,502,677	1107

MULTI-OPERATOR TWO TRANSMITTER

AF	EB8AH('11)	68,072,520	1765
AS	A61AJ('04)	30,157,650	1255
EU	EI100T('12)	33,721,072	1616
NA	K1LZ('10)	30,393,480	1560
OC	VK4KW('11)	26,528,482	1369
SA	PJ4Z('12)	57,741,867	1641

MULTI-OPERATOR MULTI-TRANSMITTER

AF	EB8AH('12)	76,018,024	1784
AS	P3A('00)	53,554,592	1456
EU	DR1A('11)	63,397,890	1909
NA	WL7E('00)	42,013,215	1395
OC	KH7R('02)	32,806,032	1304
SA	HC8N('03)	60,703,452	1476

BUDDIPOLE

Made in USA

ANTENNAS & MORE

From beaches to mountaintops, condos to RV parks and everywhere in between, the Buddipole line of portable HF antennas and accessories is ideal for both novice and expert operators alike.

We manufacture all of our antennas using custom CNC parts and injection molds with carefully selected materials.

We also manufacture A123 Nanophosphate battery packs for all portable radios. These power packs provide unparalleled performance in the field. See our website for more details.

BUDDIPOLE FEATURES

- Multi-band design works 9 bands (40 meters thru 2 meters) with one set of adjustable coils!
- Rated from QRP to 250 watts PEP
- Modular Design – create dozens of different antennas with interchangeable parts
- Rotatable/Directional
- Lightweight, rugged components
- Rotating Arm Kit allows users to instantly change antenna configurations
- Used by Emergency Services Groups throughout the world

WHAT IS THE BUDDIPOLE?

The Buddipole™ Portable Dipole fits in your travel bag and assembles in minutes. The Buddipole is more than an antenna, it's a versatile system for launching your signal. Optimized for transmit power and proven for DX work, the Buddipole is the secret weapon used by HF portable operators all over the world.

Secure online ordering at:
www.buddipole.com

See our videos
www.youtube.com/buddipole

3028 SE 59th Court, Suite 600
Hillsboro, OR 97123

tel: (503) 591 8001
fax: (503) 214 6802

info@buddipole.com

Jojo, DU1VHY, watches over Art, DV1SOV, and Rey, DV1SUT, as they make their first contest QSOs from DU1HR.

Helmut, DF7SZ (left), and Carl, AI6V/P49V, are showing the spirit of ham radio contesters worldwide.

Both Paul and Igor, RT4RO, managed over 3200 contacts with simple antennas. On low power it was Holger, ZL3IO, taking the t op spot.

Multi-Operator

The Multi-Operator Single-Transmitter category continues to grow, with 249 entries, and this year offered one of the most exciting races. The team at P33W has developed a very sophisticated switching scheme that allows multiple stations to share the same band without transmitting at the same time. They are very effective at weaving running QSOs and searching for QSOs at the same time. The two-operator team at 5D5A in Morocco pursued a more traditional operating style. P33W was way ahead at the halfway point, but it was extra 6-point contacts on 40 meters that ultimately earned the victory for 5D5A. 5D5A also had the extra satisfaction of taking the all-time record from P33W! RL3A had the highest score that wasn't from Africa or Asia. The WW2DX team in eastern New York completely demolished the USA record set in 2011.

The winning team in the Two-Transmitter category was PJ4Z in Bonaire. You can hear what a great signal this station has by searching for PJ4Z on YouTube and listening to some of the recordings!

On the Cover

Snowy Minnesota winters will soon be a thing of the past for Mike Warren, WØWG, of Eden Prairie. Since the passing of his wife last fall, Mike has decided to begin selling off his extensive collection of "boat-anchors"—heavy tube-type radios from the mid-20th century—and prepare to move to Virginia to be closer to his daughter. Mike has lived in Minnesota since 1979, where he moved to begin a second career with Control Data after spending 20 years in the Navy repairing radios and other electronic gear and becoming a repair instructor for cryptography equipment. At Control Data Mike was a repair depot manager until his retirement at the end of 2000.

Repairing, restoring, and operating "boat-anchors" has been a longtime passion for Mike, who has kept his soldering gun warm even after retirement, working on old tube gear for himself and his friends. He keeps some of the old gear on the air, working locals on 75 meters most mornings and running AM phone on weekends. Most of Mike's on-the-air time, though, is devoted to DXing, mostly using single sideband. He also enjoys interfacing modern rigs with computers for logging and spotting. Mike says he'd also like to learn more about remote station control but says he "hasn't quite gotten (his) arms around it yet."

In our cover photo, Mike is in his front yard and over his shoulder is his 38-foot tower with a Tennadyne T6 log-periodic for 20–10 meters on the top, as well an off-center-fed dipole for both 80 and 40 meters. Anyone interested in knowing more about Mike's boat-anchor collection can find his contact information on his page on QRZ.com. *(Cover photo by Larry Mulvehill, WB2ZPI)*

The operating team of world high Multi-Multi entry EB8AH. Left to right: ES2RR Toivo; EA8EW (OH1MA) Jakko; EA8AH Pekka; EA8CAC Juan; ES5RW Rein; OH6DX Jusy Pekka; IK1HJS Carlo; EA8ZS Manolo; ES7GM Kristjan; and EA5DY Salva.

Anibal, 5K3R, operated single band 15 meters low power.

The group at EI100T set a new European record score.

The highest score in the history of the contest was accomplished by EB8AH in the Multi-Multi category. Over 11,000 QSOs and a final score over 76-million points will be hard to beat. DR1A outscored the other challengers from Europe. The third-place finish by LP1H was also very impressive, being so far from the major contesting population centers.

Final Thoughts

One interesting score was the single operator all band effort of CQ8X by Toni, OH2UA/CU2KI. Toni worked over 4300 contacts and 1200 prefixes from the Azores, but he did it from 4500 kilometers away while watching the Northern Lights outside of his operating position in Finland!

This is one of the top contest efforts ever using a remote station. It should be noted that regulations covering remote operation vary from country to country. The WPX accepts remote scores based on the location of the station. Please be sure that your operation meets the local regulations and the rules of the contest.

Once again there were plenty of comments about poor signals and splatter. One of the biggest threats to the health and future of contesting is the disrespect shown by certain high-power stations that do not follow the doctrine of fair play. Please use peer pressure to help these operators see how they are hurting our sport.

It takes a team to compile the results of so many logs. We could not have done it without the software development efforts of Ken, K1EA. The 48 paper logs received by mail were converted into Cabrillo format by AL1G, EA4KD, K1PX, K2DSL, K8PO, KN3A, N1XS, N2ZN, VA3UG, and W2JU. Log checking help was provided by Jim, WI9WI. Thanks to Barry, W5GN, for printing and mailing the nearly 1900 certificates that were earned. Doug, K1DG, coordinates the plaque sponsors and distribution.

The 2013 WPX SSB Contest will be held on March 30 and 31. The log deadline is now only **five days** after the contest, on **April 6**. Please read the rules carefully, as there are some changes. Rules can be found in the February issue of *CQ*, on the CQ website <www.cq-amateur-radio.com>, and on the CQ WPX Contest website <www.cqwpx.com>. Hoping to see everyone again in 2013! 73, Randy, K5ZD

(Continued on page 101)

HF

VHF

UHF

IC-7410 HF + 6m

100 Watt Output (40W AM)
RX: 0.030–60.000MHz*
32 Bit Floating Point DSP Unit
+30 dBm 3rd Order Intercept Point*
Double Conversion Superheterodyne System
Built-in 15kHz 1st IF Filter (Optional 3kHz/6kHz)
USB Port for PC Control and Audio In/Out

IC-7200 HF + 6m

100 Watt Output (25W AM)
RX: 0.030–60.000MHz*
32 Bit IF-DSP + 24 Bit AD/DA Converter
Digital Twin Passband Tuning
USB Port for PC Control and Audio In/Out
Flexible Selectable Filter Width and Shape
USB Port for PC Control and Audio In/Out

IC-7000 HF/6m/2m/70cm

100W (40W AM),
50W on 2M (20W AM),
35W on 70CM (14W AM)

RX: 0.03–199.999,
400–470MHz*

Digital IF Filters

Digital Voice Recorder

Front Panel Separation
with Optional 3.5m
or 5m Cable (As Shown)

IC-9100 HF + 6m + 2m + 70cm + 23cm[1]

100/100/100/75/10[1] Watt Output[3]

RX: 0.030–60.000[2], 136.000–174.000[2],
420.000–480.000[2], 1240.000–1320.000[2,3]MHz

AM[3], FM, SSB, RTTY, CW, & DV[1]

Satellite (Mode B/J/L[1])

+30dBm TOI[2]

Two Independent 32-bit DSP Systems

3kHz/6kHz 1st IF "Roofing" Filters[1] (HF/6m)

Double Conversion Superheterodyne
with Image Rejection Mixer

USB Port for PC Control and Audio In/Out

Information & Downloads

AMATEUR TOOL KIT | COMIC BOOKS | VIDEOS | WWW.ICOMAMERICA.COM

Electronic advertisements feature active links for each radio.

Official Amateur Radio Transceiver Supplier

BOY SCOUTS OF AMERICA®

ICOM®

*Frequency coverage may vary. Refer to owner's manual for exact specifications.
[1]Optional UX-9100 required. [2]HF (14MHz) [3]See manual for AM output power.
©2013 Icom America Inc. The Icom logo is a registered trademark of Icom Inc.
All specifications are subject to change without notice or obligation. 30802

Riley's ramblings

BY RILEY HOLLINGSWORTH,* K4ZDH

A Close Look at the FCC's Newest Licensing Proposal

In this column I will summarize the Notice of Proposed Rule Making and Order (NPRM) released by the FCC, published in the Federal Register October 24, 2012. The date of Federal Register publication is crucial because comments were due December 24, 60 days later, and reply comments are due on January 22, 2013. If you did not file comments and still want to, you have the opportunity to reply to comments already filed. Please read the instruction for doing so starting on page 12 of the NPRM (WT Docket No. 12-283).

When you stand back and look objectively at the entirety of the rules applying to the Amateur Radio Service, the thing that stands out is how streamlined they are in comparison to all our privileges in frequency, power, modes, and activities. I think it's amazing that such a small number of rules can handle a service as broad as ours and last so long before amendment. Of course, the rules folks realize that stupid can never be regulated, and they don't even try to do that; but there are several reasons why we are gifted with such a practical set of rules.

One is the care and concern that the rule writers have for the service and the talent they have for writing sound rules that last such a long time. Another is the fact that they periodically tweak and update the rules, either on their own motion or pursuant to petitions asking for rule changes or additions. At the FCC I worked on a couple of rule-making projects in the land mobile services, and I can tell you that such a job is far more difficult than most people realize.

I urge you to read the NPRM even if you didn't file comments and don't anticipate any reply comments. Countless hours go into these things. They are very well written and far more interesting than you might think. This NPRM, like most, in itself is a little history of amateur radio. At least read the introduction. I won't go over it in much detail since the comment period is over, but let's review what the NPRM proposes and why.

It proposes changes to the amateur rules in the areas of: (1) credit for examinations and validity of Certificates of Successful Completion of Examination (CSCEs); (2) credit for expired licenses; (3) grace period for license renewal; (4) waiting period for vanity callsigns; (5) administration of examinations—i.e., the required number of Volunteer Examiners (VEs) and remote testing; and 6) emission types. It also accomplishes a little housecleaning by amending the rules to eliminate the requirement for a Morse code examination. Those rule changes, or most of them, were adopted in the Morse code order but were inadvertently omitted from the Federal Register summary and never took effect. Lastly, it dismisses a petition filed by the ARRL requesting a blanket waiver of certain rules regarding emission types pending the outcome of this rule making.

A Little Background

Why are these changes proposed? The Anchorage Volunteer Examiner Coordinator (Anchorage VEC) filed a petition for rule making to grant examination credit for expired licenses (instead of requiring former licensees to retest). The Anchorage VEC argued that it is unfair that after the grace period for renewal ends a licensee loses all credit for having passed an examination and would have to start over to get back in to amateur radio.

The Anchorage VEC argues that since a person who continuously renews his license is not required to take an examination, it cannot be argued that the passage of time invalidates the knowledge of that person. The Anchorage VEC therefore argues that the same reasoning should apply to people who just haven't renewed their licenses. Comments already make the point that allowing credit for old licenses would encourage former licensees to become involved in amateur radio again.

The NPRM goes a step further and proposes to extend the validity of CSCEs, which now expire after a year. Here, however, the FCC is concerned that since a CSCE provides temporary operating authority, it may be confusing to create a difference between the period during which a CSCE allows temporary operating authority and the period during which it is valid for examination credit. The FCC asks for comments on whether there should be a limit on how long an applicant should receive credit for a CSCE.

As a logical extension of that proposal, the FCC on its own proposes to shorten the grace period during which a license may be renewed and to revise the vanity call system accordingly. In addition the FCC seeks comments on amending the rules to allow remote testing administration. "Seeking comments" is different from proposing a rule. In this instance the FCC wants to gather information to determine if a rule making to allow remote testing administration may be a good idea.

The section of the NPRM about emission types is in response to a petition for rule making filed by the ARRL. The present rules do not appear to allow the transmission of single-slot TDMA (Time

*C/O CQ magazine
e-mail: <k4zdh@cq-amateur-radio.com>

Domain Multiple Access) emissions on amateur service frequencies above 30 MHz—i.e. , Part 97 does not authorize any phone or data emission designators with X as the second symbol. Was all that on my test? I wish I could remember, but TDMA most likely hadn't been invented then!

Grace Period

The FCC reasons that since the principal purpose of a two-year grace period is to allow amateur licensees to restore their operating privileges without having to pass an examination, then the two-year grace period may no longer be necessary if an amateur gets permanent credit for having passed an examination. Thus, it proposes a six-month grace period, and since it is doing that, it proposes that the waiting period for a vanity callsign also be reduced from two years to six months. The FCC seeks comment on those proposals and on whether the grace period should be shorter than six months (such as sixty or thirty days) or even be eliminated altogether.

The NPRM also seeks comment on whether to simply extend the grace period for a much longer time, such as ten years, instead of amending the rules to allow examination credit for all expired licenses. Extending the grace period to a substantially longer period would provide the same relief, the FCC suggests, but points out that extending the grace period could also affect the vanity callsign system.

Examination Procedures

The NPRM also proposes to reduce the number of VEs required for a testing session from three to two and seeks comments on whether to permit remote testing administration. The FCC explains that the reason for the requirement of three VEs was to provide cross checking to assure correctness of answers, to ensure proper completion of applications and to minimize the likelihood of fraud.

It further explains that since the VE system was established, VEs have developed procedures that have almost eliminated examination grading and application errors, and that fraud and abuse have been minimal. From an enforcement perspective, I would have to agree with that, although there were a couple of spectacular exceptions in my tenure. Overall, however, the VE system is splendid. Of course, those of us who took the examination in a federal building never forgot it and remember what the weather was, where we parked, and what we wore, but that is a thing of the past. It sure made a permanent impression, though, on those of us for whom the examination was our first experience in a federal building. However, all that went the way of rotary switches for TV channels and carbon paper. On the other hand, when I was last in the Carolinas I did go by the old federal building. The parking place I used when I took the Morse code exam was still there.

Dropping the requirement of three VEs to two would increase the availability of examination opportunities without compromising the examination process, the FCC says, as would allowing remote testing supervision. It seeks comments on whether VEs may comply with the rules by being "present and observing" through an audio and video system that can assure the necessary supervision. Such a system would provide more licensing opportunities for potential amateurs in remote locations. The FCC points out that in the years since the VE system was established, methods such as audio and video links—either hard wired, wireless, or through satellite—have been developed and are commonly used by colleges to provide courses and businesses for teleconferencing.

I have to admit that I'm concerned about expanding the universe of potential opportunities for fraud. Technology changes, operating habits change, and rules change, but does human nature change? Although I felt the VE system was great, I saw too many cases of fraudulent "former callsign" requests. Is it reasonable to assume that the VEs are equipped to help prevent or seriously suppress identity theft? Is enforcement ready to do it, either through random audits or on a case-by-case basis? Maybe those instances of fraud are so minimal that it would not be a factor in all this, but I hope someone is thinking about it. Every week in the news we see that rules don't enforce themselves.

I hope that if you filed comments you read the proposed rule making thoroughly, but regardless of that there is still time to review it and file replies to comments already sent if you want. It is difficult to do justice to the NPRM in the space allowed here. The main thing is to read the proposed rule making carefully and see both the petitioners' and the FCC's reasoning behind the proposed changes. At least read it to enhance your knowledge of the history of our amateur radio heritage. ... -.- K4ZDH

Announcing:

The 2013 CQ World-Wide WPX RTTY Contest

February 9–10, 2013

Starts: 0000 UTC Saturday Ends: 2359 UTC Sunday

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

II. Period of Operation: 48 hours. Single Operator stations may operate 30 of the 48 hours—**off times must be a minimum of 60 minutes** during which no QSO is logged. Multi-operator stations may operate the full 48 hours.

III. Bands: Only the 3.5, 7, 14, 21, and 28 MHz bands may be used. **Observance of established band plans is strongly encouraged.**

IV. Terms of Competition for All Categories:

(a) All entrants must operate within the limits of their chosen category when performing any activity that could affect their submitted score. Only the entrant's callsign may be used to aid the entrant's score.

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

(c) Do not exceed the total output power limitation of your chosen category on any band. Total output power on any band at any time is measured at the output of the active amplifier(s).

(d) Self-spotting or asking other stations to spot you is not allowed.

(e) Use of QSO alerting assistance is permitted in all categories.

(f) All operation must take place from one operating site. Transmitters and receivers must be located within a 500-meter diameter circle or within the property limits of the station licensee, whichever is greater. All antennas must be physically connected by wires to the transmitters and receivers used by the entrant. Use of any IP network for remote receiving, including web-controlled receivers, is not permitted.

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

(h) When two or more transmitters are present on a band, a hardware device MUST be used to prevent more than one signal at any one time. Using two or more transmitters on a band with alternating CQs (soliciting contacts) is not allowed.

(i) Post-contest correcting of call signs by using any database, recordings or other method of confirming QSOs is not allowed.

V. Entry Categories:

A. Single Operator Categories: All operating and logging functions are performed by one person (the operator). Only one transmitted signal is permitted at any time.

(a) Single Operator High (All Band or Single Band): Total output power must not exceed **1500 watts.**

(b) Single Operator Low (All Band or Single Band): Total output power must not exceed **100 watts.**

(c) Single Operator QRP (All Band or Single Band): Total output power must not exceed **5 watts.**

B. Single Operator Overlay Categories: Single Operator entrants may **also** submit their log for **one** of the categories shown below by adding an additional line in the Cabrillo log file header called CATEGORY-OVERLAY. All Overlay entries are grouped into high power and low power in the results.

(a) Tribander/Single Element (TB-WIRES): During the contest an entrant shall use only one (1) tribander (any type, with a single feed line from the transmitter to the antenna) for 10, 15, and 20 meters and single-element antennas on 40 and 80 meters.

(b) Rookie (ROOKIE): To enter this category the operator must have been licensed as a radio amateur three (3) years or less on the date of the contest. Indicate the date first licensed in the SOAPBOX field.

C. Multi-Operator Categories (All Band, High power only): More than one person can contribute to the final score during the official contest period. Select category based on number of transmitted signals. Total output power of each transmitted signal must not exceed **1500 watts.**

(a) Single-Transmitter (MULTI-ONE): Only one transmitted signal is permitted at any time. A maximum of ten (10) band changes may be made in any clock hour (00 through 59 minutes). For example, a change from 20 meters to 40 meters and then back to 20 meters counts as two band changes. Use a single serial number sequence for the entire log.

(b) Two-Transmitter (MULTI-TWO): A maximum of two transmitted signals is permitted at any time on two different bands. Both transmitters may work any station. A station may only be worked once per band regardless of which transmitter is used. **The log must indicate which transmitter made each QSO** (column 81 of CABRILLO QSO template for CQ contests). Each transmitter may make a maximum of eight (8) band changes in any clock hour (00 through 59 minutes). Use a separate serial number sequence for each band.

(c) Multi-Transmitter (MULTI-UNLIMITED): A maximum of five transmitted signals, one per band, at any one time. Five bands may be activated simultaneously. Use a separate serial number sequence for each band.

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

VII. Contact Points:

(a) Contacts between stations on different continents are worth three (3) points on 28, 21, and 14 MHz and six (6) points on 7 and 3.5 MHz.

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

(c) Contacts between stations in the same country are worth 1 point on 28, 21, and 14 MHz and two (2) points on 7 and 3.5 MHz.

VIII. Prefix Multipliers: The prefix multiplier is the number of valid prefixes worked. Each PREFIX is counted only

MFJ *Speech Intelligibility* Enhancer

. . . makes barely understandable speech highly understandable!

MFJ-616
$189.95

"What did you say?" Can you hear but . . . just can't always understand everything people are saying?

As we get older, high frequency hearing loss reduces our ability to understand speech. Here's why . . .

Research shows that nearly *half* the speech intelligibility is contained in 1000 to 4000 Hz range, but contains a miniscule 4% of total speech energy.

On the other hand, the low frequencies, 125 to 500 Hz have most of the speech energy (55%) but contribute very little to intelligibility -- only 4%.

To dramatically improve your ability to understand speech, you must:

First, drastically increase the speech energy above 500 Hz, where 83% of the speech intelligibility is concentrated.

Second, drastically reduce speech energy below 500 Hz where only 4% of speech intelligibility lies.

The MFJ-616 splits the audio speech band into four overlapping octave ranges centered at 300, 600, 1200 and 2400 Hz. You can boost or cut each range by nearly 20 dB.

A balance control and separate 2½ Watt amplifiers let you equalize perceived loudness to each ear so both ears help.

By boosting high and cutting low frequencies and adjusting the balanced control, speech that you can barely understand become highly understandable!

Even if you *don't* have high frequency hearing loss, you'll dramatically improve your ability to understand speech. You'll get an edge in contesting and DXing and enjoy ragchewing more.

Here's what *QST* for April, 2001 said . . . *"I expected a subtle effect at best, but I was astonished . . . The result was remarkably clean, understandable speech without hissing, ringing or other strange effects . . . made a dramatic improvement . . ."*

Immuned to RFI. Has phone jack, on/off speaker switch, 2 inputs, bypass switch. 10Wx2½Hx6D". Needs 12 VDC.

MFJ-1316, $21.95. For 110 VAC operation. Provides 12 VDC/1.5 Amps.

MFJ-72, $69.80. *All-in-one MFJ-616 Accessory Pack.* Includes MFJ-392 headphones, two MFJ-281 speakers and MFJ-1316 power supply. ***Save $7!***

Try it for 30 Days

Order from MFJ and try it -- No obligation. If not delighted, return it within 30 days for refund less shipping.

MFJ Contest Voice Keyer

Transformer-coupled -- No RFI, hum or feedback . . . 75 seconds total, 5-messages . . . Records received audio . . .

MFJ-434B
$199.95

Let this *new* microprocessor controlled MFJ *Contest Voice Keyer*™ call CQ, send your call and do contest exchanges for you in your own natural voice!

Store frequently used phrases like "CQ Contest this is AA5MT", "You're 59" . . . "Qth is Mississippi" . . . Contest by pressing a few buttons and save your voice.

Record and playback 5 natural sounding messages in a total of 75 seconds. Uses *eeprom* -- no battery backup needed. Use your mic or its built-in mic for recording.

You can repeat messages continuously and vary the repeat delay from 3 to 500 seconds. Makes a great voice beacon and calling CQ is *so* easy.

You can also record and play back off-the-air signals -- great help if you didn't get it right the first time! No more "*Please repeat*".

A playing message can be halted by the *Stop Button*, your microphone's PTT/VOX, remote control or computer.

Has jack for remote or computer control (using CT, NA or other program). Lets you select, play and cancel messages.

Your mic's audio characteristics do not change when your MFJ-434B is installed.

All audio lines are RF filtered to eliminate RFI, audio feedback and distortion. An audio isolation transformer totally eliminates hum and distortion caused by ground loops.

New! **It's** easy to use -- just plug in your 8 pin round or modular mic plug, set the internal jumpers for your transceiver and plug in the appropriate (included) cable for your rig.

Built-in speaker-amplifier. Speaker/phone jack. Use 9 Volt battery, 9-15 VDC or 110 VAC with optional MFJ-1312D, $15.95. 6½Wx2½Hx6½D in.

MFJ-73, $34.95. MFJ-434B Remote Control with cable.

60 dB Null *wipes out* noise and interference

MFJ-1026
$199.95

Wipe out noise and interference *before* it gets into your receiver with a 60 dB null!

Eliminate all types of noise -- severe power line noise from arcing transformers and insulators, fluorescent lamps, light dimmers, touch controlled lamps, computers, TV birdies, lightning crashes from distant thunderstorms, electric drills, motors, industrial processes . . .

It's *more effective* than a noise blanker! Interference much stronger than your desired signal can be completely removed without affecting your signal.

It works on *all modes* -- SSB, AM, CW, FM -- and frequences from BCB to lower VHF.

You can null out strong QRM on top of weak rare DX and then work him! You can null out a strong local ham or AM broadcast station to prevent your receiver from overloading.

Use the MFJ-1026 as an *adjustable phasing network.* You can combine two antennas to give you various directional patterns. Null out a strong interfering signal or peak a weak signal at a push of a button.

Easy-to-use! Plugs between transmitting antenna and transceiver. To null, adjust amplitude and phase controls for minimum S-meter reading or lowest noise. To peak, push reverse button. Use built-in active antenna or an external one. MFJ's exclusive *Constant Amplitude Phase Control*™ makes nulling easy.

RF sense T/R switch automatically bypasses your transceiver when you transmit. Adjustable delay time. Uses 12 VDC or 110 VAC with MFJ-1312D, $15.95. 6½x1½x6¼ in.

MFJ-1025, $179.95. Like MFJ-1026 less built-in active antenna, use external noise antenna.

MFJ *tunable* Super DSP filter

MFJ-784B
$279.95

Only MFJ gives you *tunable* and *programmable* "brick wall" DSP filters.

You can continuously *tune* low pass, high pass, notch and bandpass filters and continuously *vary* bandwidth to pinpoint and eliminate interference.

Only MFJ gives you 5 factory pre-set and 10 programmable pre-set filters you can customize. **Automatic** notch filter searches for and eliminates multiple heterodynes. Advanced adaptive noise reduction silences background noise and QRM.

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

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

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

Prices and specifications subject to change. (c) *2010 MFJ Enterprises, Inc.*

http://www.mfjenterprises.com *for instruction manuals, catalog, info*

once regardless of the band or number of times the same prefix is worked.

(a) A PREFIX is the letter/numeral combination which forms the first part of the amateur call. Examples: N8, W8, WD8, HG1, HG19, KC2, OE2, OE25, LY1000, etc. Any difference in the numbering, lettering, or order of same shall count as a separate prefix. A station operating from a DXCC entity different from that indicated by its call sign is required to sign portable. The portable prefix must be an authorized prefix of the country/call area of operation. In cases of portable operation, the portable designator will then become the prefix. Example: N8BJQ operating from Wake Island would sign N8BJQ/KH9 or N8BJQ/NH9. KH6XXX operating from Ohio must use an authorized prefix for the U.S. 8th district (/W8, /AD8, etc.). Portable designators without numbers will be assigned a zero (Ø) after the second letter of the portable designator to form the prefix. Example: PA/N8BJQ would become PAØ. All calls without numbers will be assigned a zero (Ø) after the first two letters to form the prefix. Example: XEFTJW would count as XEØ. Maritime mobile, mobile, /A, /E, /J, /P, or other license class identifiers do not count as prefixes.

(b) Special event, commemorative, and other unique prefix stations are encouraged to participate. Prefixes must be assigned by the licensing authority of the country of operation.

IX. Scoring: A station may be worked once on each band for QSO point credit. Prefix credit may be taken only once.

(a) Single-Operator:

(i) All-Band score is total contact points from all bands multiplied by the number of different prefixes worked.

(ii) Single-Band score is total contact points on the band entered multiplied by the number of different prefixes worked on that band only.

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

X. Awards: Only logs submitted in electronic format are eligible for awards. A single-band log will be eligible for a single-band award only.

To be eligible for an award, a Single Operator station must show a minimum of 4 hours of operation. Multi-operator stations must operate a minimum of 8 hours.

(a) Plaques are awarded to recognize top performance in a number of categories. View the current list of plaques and sponsors at <http://www.cqwpxrtty.com/plaques.htm>.

Only one plaque will be awarded per entry. A station winning a World plaque will not be considered for a sub-area award. That award will be given to the runner-up for that area if the number of entries justifies the award.

(b) Certificates will be awarded to the highest scoring station in each category listed under Section V . . .

(i) In every participating country.

(ii) In each call area of the United States, Canada, Russia and Japan.

(iii) At the discretion of the contest director second- and third-place awards may be made.

XI. Club Competition: A plaque will be awarded each year to the club that has the highest aggregate score from logs submitted by its members. To be listed in the results, a minimum of three logs must be received from a club.

(a) The club must be a local group and not a national organization (e.g., ARRL or DARC).

(b) Participation is limited to members residing in or operating from a local geographic area (except for DXpeditions conducted by members living within the defined club geographic area). Club contributions from DXpedition scores are a percentage of the number of club members on the DXpedition.

(c) Single-operator entries can only contribute to one club. Multi-operator scores may be allocated to multiple clubs as a percentage of the number of club members participating in the operation. Please spell out the full club name in your entry.

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

(a) The log MUST show the following for each contact: correct time in UTC, frequency (or band), call, exchange sent, and exchange received. A log without all required information may be reclassified to checklog.

(b) Single band entrants are required to include all contacts made during the contest period, even if on other bands. Only contacts made on the band specified in the Cabrillo header or summary sheet will be considered for scoring purposes. Logs with contacts only on one band will be classified as single band entries.

(c) The CABRILLO file format is the standard for logs. For detailed instructions on filling out the CABRILLO file header, see the WPX RTTY Contest Web site <www.cqwpxrtty.com>. Failure to fill out the header correctly may result in your entry being placed in the wrong category or reclassified as a checklog. Note: U.S. stations must indicate the location of where you operated from in the CABRILLO header (e.g., LOCATION: OH).

(d) E-mail or Web upload is the expected method of log submission. Logs in CABRILLO format should be sent to <rtty@cqwpx.com>. Include only your call sign in the "Subject:" line of your e-mail. Web upload of logs is available on the CQ WPX RTTY Web site at <www.cqwpxrtty.com>. All logs received via e-mail will be confirmed via e-mail. A listing of logs received can be found on the CQ WPX RTTY Web Site.

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

(f) Instructions for paper logs: All paper logs should be sent to Paper Logs, P.O. Box 481, New Carlisle, OH 45344 USA. Each paper log entry must be accompanied by a Summary Sheet listing all scoring information, the category of competition, and the entrant's name and mailing address in BLOCK LETTERS.

XIII. Rule Violations: Violation of amateur radio regulations or the rules of the contest; unsportsmanlike conduct; taking credit for excessive unverifiable QSOs or multipliers; use of any non-amateur means of communication to SOLICIT, ARRANGE, or CONFIRM any contacts during or after the contest will be deemed sufficient cause for disqualification.

An entrant whose log is deemed by the Contest Committee to contain rule violations may be issued a Yellow or Red card depending on the seriousness of the infraction. If the entry is in a multi-operator category, all listed operators, the station owner, the station and the callsign are so affected.

YELLOW card: Any entrant or operator issued a yellow card is not eligible for an award and will be listed at the end of the published results.

RED card: Any entrant or operator issued a red card is not eligible for an award, will be listed at the end of the published results, and will be ineligible for any CQ-sponsored contest award for a period of one year beginning with the publication of the violation in *CQ* magazine.

XIV. Declaration: By submitting an entry in the CQ WPX RTTY Contest you agree that: (1) you have read and understood the rules of the contest and agree to be bound by them, (2) you have operated according to all rules and regulations of your country that pertain to amateur radio, (3) your log entry may be made open to the public, and (4) all actions and decisions of the WPX RTTY Contest Committee are official and final.

XV. Deadline: All entries must be emailed or postmarked NO LATER than February 15, 2013. Logs emailed or postmarked after the deadline may be ineligible for any awards.

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

The #1 Line of Autotuners!

LDG ELECTRONICS

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

AT-100ProII

This desktop tuner covers all frequencies from 1.8 – 54 MHz (including 6 meters), and will automatically match your antenna in no time. It features a two-position antenna switch with LEDs, allowing you to switch instantly between two antennas. The AT-100ProII requires just 1 watt for operation, but will handle up to 125 watts. Includes six foot DC power cable. ***Suggested Price $229.99***

radio not included

AT-897Plus for the Yaesu FT-897

If you own a Yaesu FT-897 and want a broad range automatic antenna tuner, look no further! The AT-897Plus Autotuner mounts on the side of your FT-897 just like the original equipment and takes power directly from the CAT port of the FT-897 and provides a second CAT port on the back of the tuner so hooking up another CAT device couldn't be easier. ***Suggested Price $199.99***

NEW! AT-600ProII

Building on the success of the AT-600Pro, we refined and expanded the model with an optional external 4.5" analog meter. The new AT-600ProII keeps many of the same features of the previous model, but simplifies the operation. With the two-position antenna switch, there are 2,000 memories that store tuning parameters for almost instantaneous memory recall whenever you transmit on or near a frequency you've used before. Includes six-foot DC power cable.

Suggested Price $369.99

Optional M-600 external analog meter $129.99

radio not included

Z-817

The ultimate autotuner for QRP radios including the Yaesu FT-817(D). 2000 memories cover 160 through 6 meters. Also functions as a general purpose antenna tuner with other QRP radios. Powered by four AA internal Alkaline batteries (not included), so there are no additional cables required. ***Suggested Price $129.99***

IT-100

Matched in size to the IC-7000 and IC-706, for either manual or automatic tunes, and status LEDs. 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. For your Icom radio that is AH3 or AH-4 compatible.

Suggested Price $179.99

AT-200ProII

The AT-200ProII now includes LEDs to show antenna position and if the tuner is in bypass. A two position antenna switch stores 2000 memories per switch. Handles up to 250 watts SSB or CW on 1.8 to 30 MHz and 100 watts on 54 MHz. Rugged and easy to read LED bar graphs simultaneously show RF power and SWR. Includes a six foot DC power cable. ***Suggested Price $259.99***

AT-1000ProII

LDG Electronics' new flagship 1KW tuner features: 5 to 1,000Watts PEP; RF Sensing; Auto and Semi Tuning Modes; 1.8 to 54 MHz range; 6 to 800 ohm range (15 to 150 on 6M); simplified operation; and an optional external 4.5" analog meter. With the two position antenna switch, there are 2,000 memories that store tuning parameters for almost instantaneous memory recall whenever you transmit on or near a frequency you've used before. Includes six foot DC power cable.

Suggested Price $539.99

Optional M-1000 external analog meter $129.99

Z-100Plus

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

Your Favorite Dealer has these tuners in stock NOW! Don't Miss Out - Call or visit them TODAY!

Visit our website for a complete dealer list ***www.ldgelectronics.com***

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

Operating ham radio from "the open road" has a special appeal for many amateurs. And no highway is more emblematic of "the open road" than Historic Route 66, where KW7I and N7VF spent a week and a half on the air last September.

Route 66 on the Air
The 2011 "Whiskey-Six-Tango" Adventure

BY LARRY FRANCIS,* KW7I, and NORMAN VANDIVER,† N7VF

Photo A– KW7I's motor home all set up at Memorial Point on Old Route 66 in Arizona.

For the past dozen years, the Citrus Belt Amateur Radio Club of San Bernardino, California has been sponsoring an annual amateur radio event each September commemorating Historic Route 66, the iconic highway from Chicago to Los Angeles. In 2011, there were 18 stations operating along Route 66 between September 10 and 18, with 17 of them operated by members of various clubs along the route. The special event one-by-one callsigns began with Whiskey-Six-Alpha (W6A) in Santa Monica, California, and ran through Whiskey-Six-Quebec (W6Q) in Chicago, Illinois; our assigned call was Whiskey-Six-Tango (W6T). We were the "Lone Rover" station, operating from a motor home in Arizona (photo A).

Our operating location was right on Old Route 66, about 25 miles west of Kingman and four miles east of the old mining town of Oatman. The place where we parked is called Memorial Point and is right at the summit of Sitgreaves Pass in the Black Mountains. About nine miles east of the pass is a tourist place named Cool Springs; in years gone by this was a service station stop (photo B).

In order to last the full ten days in moderate comfort, I (KW7I) brought my motor home down from Oregon. We made it up the steep grade, navigating the 10-mile-an-hour switchbacks from Cool Springs to Sitgreaves Pass by having Norman, N7VF, go ahead with our car and use the mobile radios to let me know of any oncoming traffic.

*1315 Joplin St. S., Salem, OR 97302
†1862 Arena Del Loma, Camp Verde, AZ 86322
A longer version of this article, with many more photos, can be found online at <http://www.w6jbt.org/public_html/images/route66photos/2011/W6TStory.pdf>.

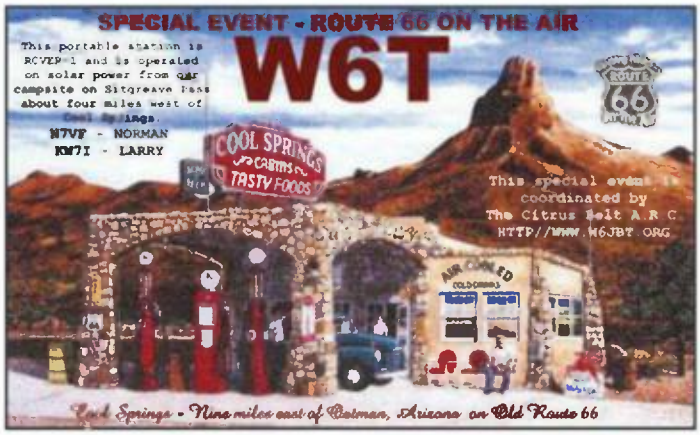


Photo B– The W6T QSL card. (Photos courtesy of the authors)

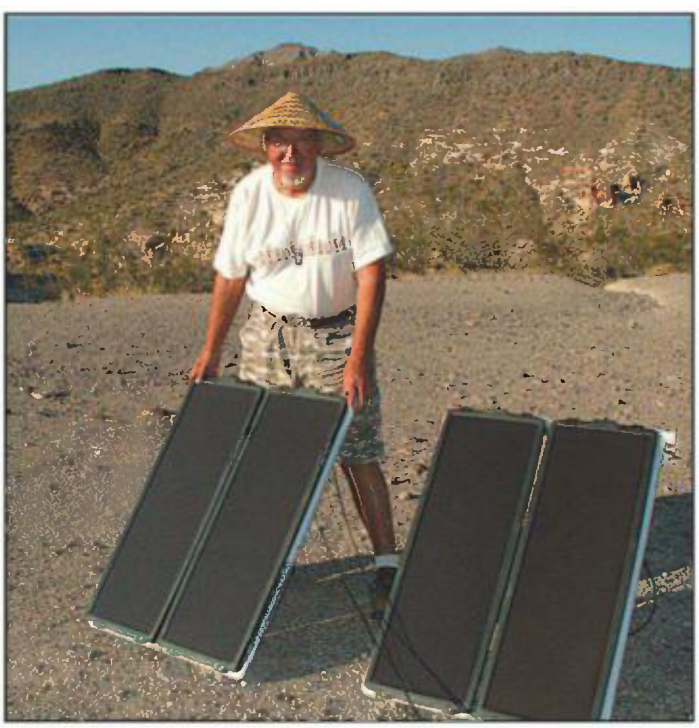


Photo C– Co-author Larry Francis, KW7I, adjusting the portable solar panels.

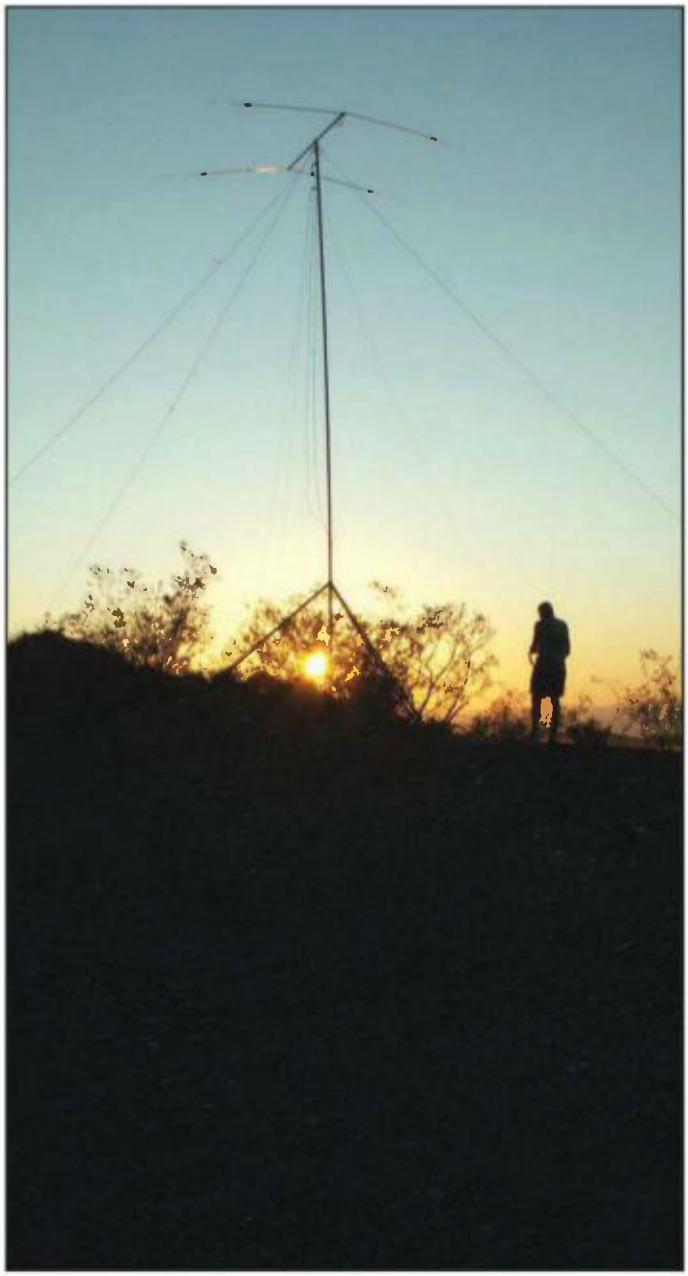


Photo D– Our main antenna mast with co-author Norman Vandiver, N7VF, doing a final visual inspection at sunset.

The panoramic view from Memorial Point was extraordinary, as we could look down across the Colorado River and see Laughlin, Nevada to the northwest and Needles, California to the southwest. Due west we could look out across the Mojave Desert. At night we could see the lights of the towns along the river between Laughlin and Needles, but they weren't bright enough to disturb the wonderful nighttime view of the sky.

We arrived on Thursday, September 9, the day before the event officially began, and then set up the radio station under the awning to shade us from the sun. We basically ran the station on emergency power. Small arrays of solar panels (photo C) were used to charge our gel cell batteries, and with the solar panels on the motor home we had plenty of power for the radio, miscellaneous peripherals, and the computer. We called this our "Mini-DX Expedition and International Field Day."

On Friday we erected our little antenna farm which included Norman's homemade 20-meter directional antenna (photo D), and wire antennas for 10, 15, 17, 20, 40, and 80 meters. Everything seemed to be in order . . . or so we thought. During the night we had a strong wind storm that caused a couple of the wire antennas to come loose, twisting them together like we had run them through an eggbeater.

By 9 o'clock Saturday morning we were untangled and on the air, with our first contact being K6RPM in California on 80 meters. At this point we discovered that the computer and radio were not talking to one another, which forced us to use a paper log for several days. We had over 600 contacts on paper before I got the computer logger going. We never did determine the problem. Then on Sunday evening we had another logging problem: A strong wind gust came through just ahead of a big thunderstorm, ripping several pages out of our paper log! We thought those pages were gone forever, but several days later we spotted them scattered along the mountainside below us. Norman carefully worked his way down and retrieved the wrinkled, water-faded, but still usable pages.

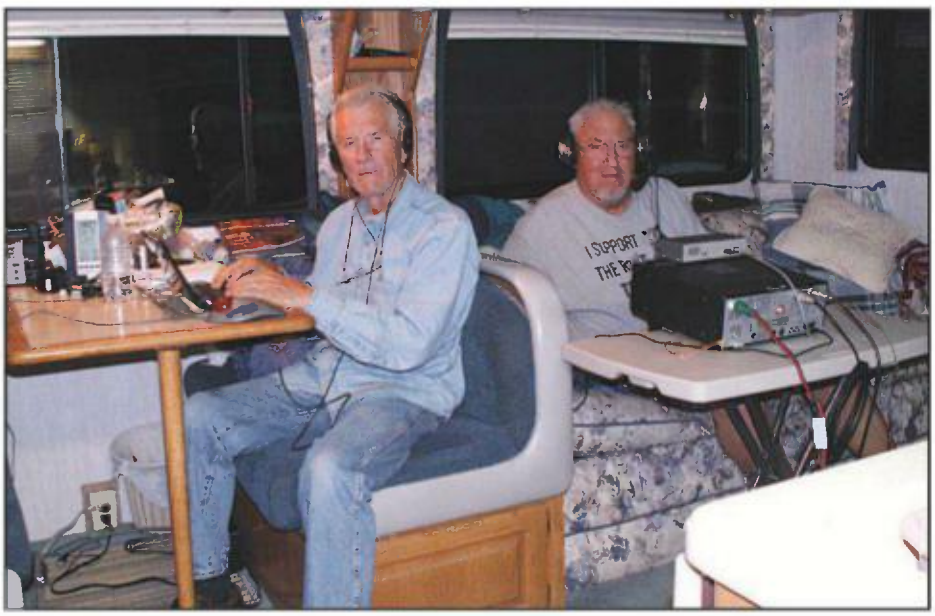


Photo E– Norman logs while Larry operates from inside the motor home during the heavy rainstorm. (The outlet under the table is connected to the inverter that runs off the batteries.)

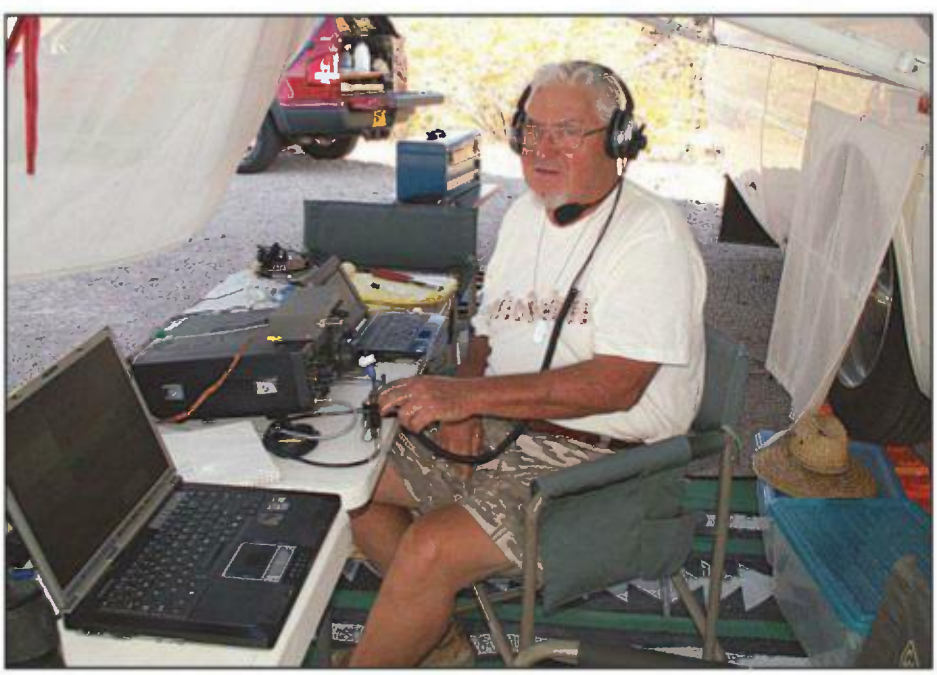


Photo F– Larry operating W6T outside under the awning after the weather cleared.

The thunderstorms were quite spectacular as seen from the mountaintop. They were very slow-moving and pounded us with lots of rain. It was good that we routinely brought all of the electronic equipment into the motor home at night, because by daylight everything outside was soaked, even leaving a small river running under the motor home.

All day Monday the rain came down, while wild winds rocked the motor home. By nightfall there were some pretty good ruts washed out in the parking area. The river under the motor home was sometimes six inches deep and six feet wide as the water ran towards the road. Needless to say, we moved the radio station inside (photo E). Due to the lack of sun we ran the motor-home generator to keep the batteries charged.

The storm finally blew itself out overnight and Tuesday was a better day, although the 65°F temperature was much cooler than the 100° we had expected! As the week progressed, our outside temperatures climbed back to closer to normal for Arizona, and by Saturday and Sunday it was near 95°F with clear blue skies.

We did lose nearly two full days while Norman was in the hospital at Kingman. Fortunately, it turned out to be nothing serious, but it kept us off the air for most of Thursday and Friday.

Saturday morning we had bright sun and full batteries, and we were raring to go on the radio (photo F). We had a good day, everything went well, and we logged over 180 contacts. The people playing the "Route 66 On The Air" had been looking for us, so for the remainder of the event we tried to be as available as we could, operating on the most productive bands. By Sunday evening our count totaled 1534, including 14 of the other "Whiskey-Six" 1x1 stations. Overall, we contacted all 50 states plus the District of Columbia, seven Canadian provinces, three Mexican states, and nine other DX countries.

Getting Personal

The "Mini International Field Day" part of this event included numerous visitors who stopped by. Many expressed great interest in our amateur radio adventure, and for these people we provided demonstrations such as the bands would allow (photo G). People from all over the world come to the United States to travel Route 66, and they found our location at Memorial Point a good viewing area. People stopped to look at the scenery and gave us a great opportunity to visit with them. Thankfully, most spoke English well enough that we could carry on an enjoyable conversation.

We also had many groups of motorcycles come through, ranging from a single bike to over forty bikes, most with pillion riders (passengers sitting behind the driver). Many of them had started at one end or the other of Route 66 and were riding the entire route. The larger groups were accompanied by support teams and were well organized. Some of the smaller groups were just a few folks out enjoying the world, such as the five hearty fellows from Finland who looked like they were from the credit-card advertisement on TV with the band of Vikings. At times we would hold up on radio contacts because of the noise made by passing motorcycles. There were also several car clubs driving their vintage cars through the area.

One young couple from Switzerland stopped by for a rest and very nice visit. They were doing the entire route *on their bicycles*! They were headed west to Santa Monica, having left Chicago

TIMEWAVE TECHNOLOGY INC.

Available at:
- Universal Radio
- AES
- HRO
- Radio City
- R&L Electronics

New! - PK-232SC with Sound Card, Rig Control, USB - All built-in!

PK-232SC Multimode Data Controller*

Sound Card, Rig Control, USB, Pactor, RTTY, CW Packet & more!

100,000 sold - All-time top selling data controller!

New PK-232SC Now shipping!

- Single USB connection to computer
- USB Sound Card built-in
- 3-Way Rig Control built-in - logic level, RS-232 & USB!
- Computer isolated from radio

New Lower SC + DSP Upgrade Combo Pricing!

As Always- Upgrade any PK-232 ever made to the PK-232SC!

Customize your PK-232 with our complete line of upgrades and accessories.

The incredible PK-232SC again expands its role in your radio station. Now it connects to your computer with a single USB cable - no audio cables, no RS-232 cables! It has a built-in USB sound card with isolated audio I/O to your radio to prevent ground loops. The new logic level and RS-232 rig control is optically isolated for your Icom CI-V, Yaesu CAT, Kenwood and other radios. You never have enough downstream USB ports so we even added a pair for that new radio with USB rig control and other accessories.

Need Software? Check the new Ham Radio Deluxe & Radio Operating Center bundle!
Optimized for the PK-232SC and other Timewave/AEA TNCs www.ham-radio-deluxe.com

Signal Processing, Antenna Analysis, Data & Remote Control

DSP-599zx Audio Signal Processor*

Now shipping with new bigger & brighter display!

Noise Reduction, precision highpass, lowpass, bandpass & notch filtering for audio, CW & data.

TZ-900 Antenna Analyzer

Once you use the TZ-900 - you'll never want to use any other!

Sweep and analyze antennas in seconds. Zoom, Compare & Store Data. Sunlight-visible color graphics, handheld, rechargable batteries, no computer required.

ANC-4 Antenna Noise Canceller

See & hear a demo on YouTube!

Kill Noise before it reaches your receiver! Great for supressing power line noise, plasma TV noise & many other local electrical noises.

DSP-232+ Multimode Data Controller*

Sound card interface, USB, Pactor, 1200/9600 Packet

PK-96/100 TNC - 1200/9600 Packet*

Available with USB or RS-232

HamLink™ Wireless and USB Remote Control & Audio

HamLinkUSB™ Rig Control Plus

C-IV, CAT, RTS (PTT, FSK or CW) for sound card software

PK-232 RS-232-to-USB Adapter*

Use the PK-232 with your new computer!

HamLinkBT-BTH+™ Bluetooth® Adaptor

Use a standard cellphone Bluetooth® headset to keep your hands free for driving and operating. Includes USB rig control for your station. Audio, VOX & PTT - Fixed & Mobile.

**From the Timewave Fountain of Youth* - Upgrades for many of our DSP & PK products. Call Us Now!

www.timewave.com
sales@timewave.com

Timewave Technology Inc.
27 Empire Drive, Suite 110
St. Paul, MN 55103 USA

651-489-5080
Fax 651-489-5066

The Bluetooth® word mark is a registered trademark owned by Bluetooth SIG, Inc. and any use of the mark by Timewave is under license.

YouTube is © 2012 YouTube, LLC

two months earlier, enduring the summer heat as they traveled through the heartland of North America.

One of our more unusual visitors was Leon Zhang from Shanghai, China. He was involved with *AutoCar* magazine in China and was doing research for an article on Route 66. Leon's companion was the trip photographer. They spent an hour interviewing Norman about Route 66 and the amateur radio connection. Leon said he was amazed at the number of visitors from around the world who were here touring Route 66.

On Monday, after "Route 66 On The Air" was over, we had another couple stop by to admire the view. Their vehicle (photo H) was very interesting; it was an off-road thing with tandem axles and looked like European military surplus. It turned out that they were from Austria and were traveling the world with their vehicle. They had come from South America and were headed generally for Alaska. They had traveled all over Africa, Asia, and Australia in this compact and very specialized motor home. The lady, Johanna, asked if she could look in our bigger motor home, thinking maybe she would talk to Guenther about one like ours for some of their travels. However, Guenther said he still preferred theirs, because they could go anywhere they desired with it. Guenther, by the way. is also an amateur radio operator, OE5NMM.

As Norman and I were finishing breaking camp, another couple from Berlin, Germany drove in. I introduced them to Gunther and Johanna, gave them chairs and water, and the four of them carried on a nice visit in German while Norman loaded the last of our equipment and prepared to head back east on Route 66 for Kingman, Congress, and Camp Verde, Arizona. And that's how another of our memorable adventures came to an end.

Photo G– Norman demonstrating our station to some ladies who stopped by. We had visitors from all over the world during our 10-day stay at Memorial Point.

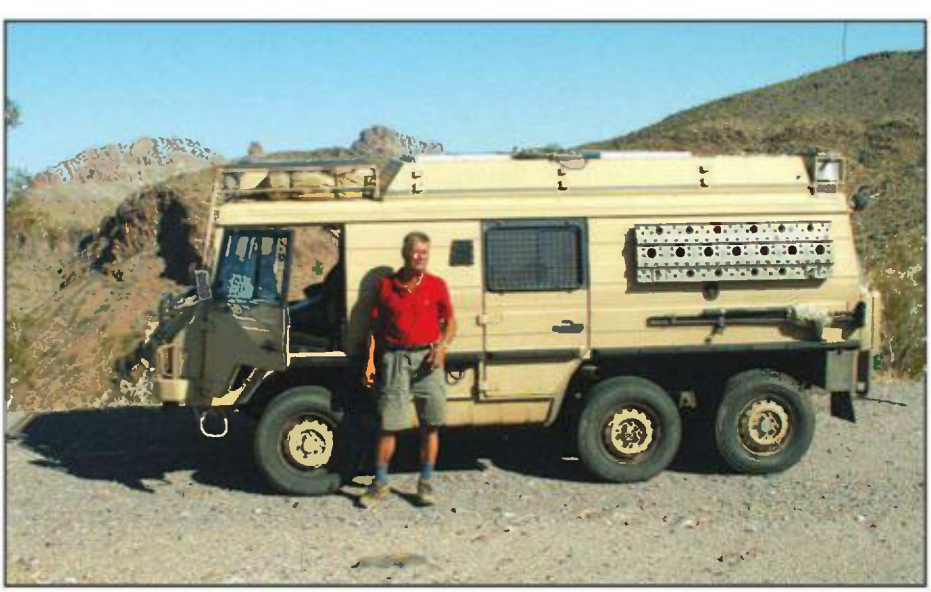


Photo H– One of our visitors, Guenther Wurm, OE5NMM, and his multi-use vehicle from Austria. He and Johanna were on a road trip from South America to Alaska.

Getting Your Kicks . . . on Route 66

U.S. Route 66 is the iconic American highway. Officially, it no longer exists, but its heritage is being preserved by groups including California's Citrus Belt Amateur Radio Club <http://www.w6jbt.org/index.html>, which sponsors the annual Route 66 On The Air event.

The road between Chicago and Los Angeles was officially opened in 1926, running through eight states and covering nearly 2500 miles. It was immortalized in a song written in 1946 by Bobby Troup and turned into a hit by Nat King Cole the same year. **[Watch and listen:** Video of Nat King Cole performing "Route 66": <http://www.youtube.com/watch?v=dCYApJtsyd0>; video with photos along the road today, over audio of Nat King Cole: <http://www.youtube.com/watch?v=kbQXalTGu-8>] and by a TV show that aired between 1960 and 1964.]

Construction of the Interstate Highway System eventually turned Route 66 into more of a byway than a highway (in fact, parts have been designated as National Scenic Byways—see <http://byways.org/explore/byways/2489>), and the route was formally decommissioned by the federal government in 1985.

The Citrus Belt Amateur Radio Club has sponsored the Route 66 On The Air event each September since 2000; the 2012 event is scheduled for September 8–16. See <http://www.w6jbt.org/index.html>.

Announcing:

2013 Nominations Open for the *CQ* Amateur Radio, DX, and Contest Halls of Fame

Each year *CQ* recognizes those who have made significant contributions to amateur radio in general, and to DXing and contesting in particular, creating three categories of awards. Nominations are now open and will close on **March 1, 2013 for all three Halls of Fame**.

CQ Amateur Radio Hall of Fame

Amateur radio operators have been responsible for many advances in communications technology, and entire industries have been built on the foundation of amateur radio experimentation and activity. In an effort to recognize outstanding amateurs and their achievements, and help the public appreciate the far-reaching and long-standing value of amateur radio in our society, we have established the *CQ* Amateur Radio Hall of Fame. Nominations for the 2013 "class" are now open.

The *CQ* Amateur Radio Hall of Fame honors those whose technical or other accomplishments have helped propel amateur radio forward, or whose achievements in other areas of life have helped improve ham radio's reputation simply through association. Nominees for the *CQ* Amateur Radio Hall of Fame will be judged on the basis of qualifying in one of two broad areas: those individuals—whether licensed amateurs or not—who have made significant contributions to the amateur radio hobby; and those radio amateurs who have made significant contributions to society in general. Nominees must have made *significant* contributions of nationwide or worldwide impact.

In order to be consistent with the nomination deadline for the CQ Contest and DX Halls of Fame, the nomination deadline for the CQ Amateur Radio Hall of Fame is March 1. Nominations received after that date will be considered for future selection. Nominations for the Amateur Radio Hall of Fame may be made by clubs, organizations, or individuals. State your candidate's name, where to contact him/her if still living, for which category you are nominating him/her, and a brief one- to two-paragraph description of this person's accomplishments. Please include your name and contact information as well. E-mail to <hall-of-fame@cq-amateur-radio.com> or mail to *CQ* Amateur Radio Hall of Fame, 25 Newbridge Rd., Hicksville, NY 11801. The official nomination form is on the *CQ* website <www.cq-amateur-radio.com>. If you feel someone has earned this recognition, please submit a nomination. Please *don't* assume that someone else will nominate the person you may have in mind.

We will announce this year's selections at the Dayton Hamvention® in May 2013. Please help us recognize these "ham radio heroes" whose contributions have helped shape our hobby, our nation, or our world.

CQ DX and Contest Halls of Fame

Nominations for the CQ DX Hall of Fame and the CQ Contest Hall of Fame recognize those amateurs who have made major contributions to DXing and contesting, respectively. The activities and accomplishments that qualify one for membership in these elite groups involve considerable personal sacrifice and can usually be described by the phrase "above and beyond the call of duty." Nominations for the Contest and DX Halls of Fame are made **by contesting or DX clubs or national organizations**, and must be submitted by **March 1** of each year to be considered.

A maximum of two (2) people may be inducted into each hall of fame (DX and contest) each year. Nominations for the CQ Contest and DX Halls of Fame should be directed to CQ (Contest or DX) Hall of Fame, c/o CQ Communications Inc., 25 Newbridge Rd., Hicksville, NY 11801; or via e-mail to <hall-of-fame@cq-amateur-radio.com>. Please specify to which hall of fame the nomination is submitted.

What You've Told Us...

Our October survey asked about your recent hamfest experiences. Hamfests remain popular with *CQ* readers, as eight in ten of our survey respondents attended at least one last year. Nearly half of you (47%) attended 2–5 hamfests , while 27% went to just one and 5% visited six or more. Asked how last year compared to recent years, 56% said it's about the same, 31% said they've cut back on hamfests, and 10% said they'd been to more than usual. Local hamfests continue to be big, as 62% of you went to at least one last year, followed by small regional hamfests (37%), large regionals (29%), none (20%), large national hamfests (such as Dayton) (19%), and specialty conventions (8%).

Your hamfest purchases reflect the country's overall economic uncertainty, as 41% of you spent less than usual at hamfests last year, while 36% held the line and only 9% spent more. Flea market bargains continue to be the biggest hamfest draws (32%), followed by socializing (20%), used gear (19%), forums (15%), new gear (13%), and other (5%).

Finally, we asked how you feel hamfests have changed in recent years. One third of you think attendance is generally down (13% say "up," leaving 54% at about the same); 36% feel the number of vendors is down (vs. 5% up and 59% the same); 20% say flea market offerings are generally worse than in the past (vs. 9% better and 71% the same); 15% say fewer good deals vs. the Internet (5% say more, and 80% see no change).

This month's free subscription winner is Howard Pepper, AC4FS, of Palm Coast, Florida.

Reader Survey January 2013

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*.

We still have Hurricane Sandy on our minds as we wrap up this issue, so our questions this month will be about your personal emergency preparedness.

Please answer by circling the appropriate numbers on the reply card or by going to the following web link <www.surveymonkey.com/s/CQJan13> [From the digital edition, just click on the link].

1. How would you rate your level of personal and family emergency preparedness?
- Complete 1
- Excellent 2
- Good 3
- Poor 4

2. Do you have a power generator at home?
- Yes, whole house, with automatic transfer switch 5
- Yes, permanently wired for key circuits (e.g., refrigerator, ham station) 6
- Yes, portable, with outdoor extension cords 7
- No 8

3. What is the fuel source for your generator?
- Diesel 9
- Gasoline 10
- Liquid propane 11
- Natural gas 12
- Other 13
- No generator 14

4. How many days' fuel supply do you have on hand for your generator?
- Less than one day 15
- 1–3 days 16
- 3–5 days 17
- More than 5 days 18
- No generator 19

5. Do you have backup power for your home ham station?
- Yes, generator 20
- Yes, batteries 21
- Yes, solar 22
- No 23

6. Do you have a backup method of recharging handheld batteries?
- Yes, generator 24
- Yes, car battery 25
- Yes, other batteries 26
- No 27

7. For how many days do you have food, water, batteries and candles on hand in the event of a prolonged power outage?
- Less than 1 28
- 1–3 29
- 3–5 30
- More than 5 31

8. Do you have a family emergency plan including a predetermined contact person and meeting point in case you become separated?
- Yes 32
- No 33

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

MFJ *Pocket size* Morse Code Reader™

Hold near your receiver – it instantly displays CW in English! Automatic Speed Tracking… Instant Replay… 32 Character LCD… High-Performance Modem… Computer Interface… Battery Saver… More!

Is your CW rusty?

Relax and place this tiny pocket size MFJ Morse Code Reader near your receiver's speaker…

Then watch CW turn into solid text messages as they scroll across an easy-to-read LCD display.

No cables to hook-up, no computer, no interface, nothing else needed!

Use it as a backup in case you mis-copy a few characters - - it makes working high speed CW a breeze - - even if you're rusty.

Practice by copying along with the MFJ-461. It'll help you learn the code and increase your speed as you instantly see if you're right or wrong.

Eavesdrop on interesting Morse code QSOs from hams all over the world. It's a universal language that's understood the world over.

MFJ *AutoTrak*™ automatically locks on, tracks and displays CW speed up to 99 Words-Per-Minute.

Simply place your MFJ-461 close to your receiver speaker until the lock LED flashes in time with the CW. Digs out weak signals. Phase-Lock-Loop even tracks slightly drifting signals.

MFJ-461 **$89.95**

Of course, nothing can clean up and copy a sloppy fist, especially weak signals with lots of QRM/QRN.

The MFJ-461's serial port lets you display CW text full screen on a bright computer monitor -- just use your computer serial port and terminal program.

When it's too noisy for its microphone pickup, you can connect the MFJ-461 to your receiver with a cable. A battery saving feature puts the MFJ-461 to sleep during periods of inactivity. It wakes up and decodes when it hears CW.

Uses 9 Volt battery. Fits in your shirt pocket with room to spare - smaller than a pack of cigarettes. Tiny 2¼x3¼x1 inches. 5½ ounces.

Super easy-to-use! Just turn it on -- it starts copying instantly!

MFJ-26B, $9.95. Soft leather protective pouch. Clear plastic overlay for display, push button opening, strong, pocket/belt clip secures MFJ-461.

MFJ-5161, $16.95. MFJ-461 to computer serial port cable (DB-9).

MFJ-5162, $7.95. Receiver cable connects MFJ-461 to your radio's external speaker 3.5 mm jack.

MFJ-5163, $10.95. Cable lets you use external speaker when MFJ-461 is plugged into radio speaker jack. 3.5 mm.

MFJ Morse Code *Reader and Keyer* Combination

Plug MFJ's CW Reader with Keyer into your transceiver's phone jack and key jack.

Now you're ready to compete with the world's best hi-speed CW operators -- and *they won't even know you're still learning the code!* Sends and reads 5-99 WPM.

Automatic speed tracking. Large 2-line LCD shows send/receive messages. Use paddle or computer keyboard.

Easy menu operation. Front panel speed, volume controls. 4 message memories, type ahead buffer, read again buffer, adjustable weight/sidetone, speaker. RFI proof.

MFJ-464 **$199.95** *(Keyboard, paddle not included.)*

MFJ-551, $39.95. RFI suppressed keyboard, a must to avoid RFI problems.

MFJ Iambic Paddles

MFJ-564 Chrome
MFJ-564B Black
$69.95

MFJ *Deluxe Iambic Paddles*™ feature a full range of adjustments in tension and contact spacing. Self-adjusting nylon and steel needle bearings, contact points that almost never need cleaning, precision machined frame and non-skid feet on heavy chrome base. Works with all MFJ and other electronic keyers.

***Miniature* Travel Iambic Paddle**

MFJ-561, $24.95. 1¾Wx1¾D x¾H inches. *Formed* phosphorous bronze spring paddle, stainless steel base. 4 ft. cord, 3.5 mm plug.

MFJ Code Oscillator

MFJ-557 **$39.95**

MFJ-557 Deluxe Code Practice Oscillator has a Morse key and oscillator unit mounted together on a heavy steel base -- stays put on your table! Portable. 9-Volt battery or 110 VAC with MFJ-1312D, $15.95. Earphone jack, tone and volume controls, speaker. Adjustable key. Sturdy. 8½x2¼x3¾ inches.

MFJ-550, $14.95. Telegraph Key Only with adjustable contacts. Handsome black.

MFJ *Pocket* Morse Tutor

Learn Morse code anywhere with this tiny *MFJ Pocket-sized Morse Code Tutor*™! Practice copying letters, numbers, prosigns, punctuations or any combination or words or QSOs. Follows ARRL/VEC format. Start at zero code speed and end up as a high speed *CW Pro!* LCD, built-in speaker.

MFJ-418 **$89.95**

MFJ *ClearTone*™ Speaker

MFJ-281, $12.95. Makes copying easier, enhances speech, improves intelligibility, reduces noise, static, hum. 3" speaker, 8 Watts, 8 Ohms.

MFJ 24/12 Hour Station Clock

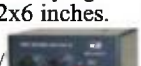
MFJ-108B, $21.95. Dual 24/12 hour clock. Read UTC *and* local time *at-a-glance*. High-contrast 5/8" LCD, brushed aluminum frame. Batteries included. 4½Wx1Dx2H in.

MFJ Deluxe CW Keyer

Deluxe MFJ Keyer has all controls on front panel for easy access -- speed, weight, tone, volume knobs, and tune, semi/auto, on/off push-buttons. You get all keyer modes, dot-dash memories, self completing dots/dashes, jam- proof spacing, sidetone, built-in speaker, type A /B keying. RF proof. Solid state keying. 7x2x6 inches.

MFJ-407D **$79.95**

MFJ-401D, $69.95. Econo Keyer II has front-panel volume/speed controls (8-50 wpm), tune switch. Internal adjust weight, tone. Solid state keying. Tiny 4x2x3½ inches.



Keyer/Paddle Combo

MFJ-422D **$189.95**

Best of all CW worlds -- a *deluxe MFJ Curtis*™ *keyer* that fits right on *Bencher paddle*! Adjustable weight and tone, front panel volume and speed controls (8-50 WPM), built-in dot-dash memories, speaker, sidetone, semi-automatic/tune or automatic modes. Use 9V battery or 110 VAC with MFJ-1312D, $15.95. 4⅛x2⅝x5¼ in.

MFJ-422DX, $99.95.

MFJ *Curtis*™ Keyer only, fits on your Bencher paddle or MFJ-564 (chrome) or MFJ-564B (black) paddles above.

Free MFJ Catalog

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

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

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

Prices and specifications subject to change. (c) *2010 MFJ Enterprises, Inc.*

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

Many owners of Heathkit VTVMs have, at times, probably wished that they did not have the bother of needing to change tubes and the battery. Plus, 12AU7 tubes are getting scarcer these days. Realizing this, I thought it might be of interest to some hams to suggest a solid-state modification (or four), thereby eliminating the tubes and battery.

Heathkit VTVM V7, V7A, IM-18 Solid-State Modifications

BY BURL B. ROGERS,* K4VYL

I have read some articles in magazines that portrayed projects of new construction, or upgrading of older circuits, which left me ... uninspired? That was somewhat because while the finished item might look nice and function properly, it often seemed it had been built with a number of esoteric components that the average ham would be unlikely to have in his junk box. I thought it might be nice to build these modifications as much as possible with common parts that one might already have, using some of the existing VTVM (Vacuum Tube Volt Meter) parts and using parts that are easily available if you must resort to purchasing. Here's hoping, of course, that you have a good ham friend who is also an expert scrounger.

I have included four different circuits (Mark I–Mark IV) so that you may have some choice of components, depending on what's easiest for you to get. I chose to use the original power transformer supplied with the VTVM along with the input filter and rectifier diode (see fig. 1), then to build onto that.

Most VTVMs utilize the differential amplifier circuit in some form as the input circuit. Since the input resistor stack must be ten times the possible load resistance, then to be of good use the stack resistance should be about ten megohms .That being the case, the actual meter movement resistance must be about one-hundred megohms. Therefore, if you were to choose to build a circuit with bipolar transistors or a transistorized op-amp, the differential amplifier would require a higher input impedance.

A junction FET (JFET) will provide the necessary impedance between the resistor stack and the amplifier input. I built one amplifier circuit with bipolar transistors and one with a 2N2902 (2N124 series) op-amp. The FET I had in house was a 2N5638 made by National Semiconductor. It worked well with a source resistor providing a self-bias of approximately one half the drain voltage.

Note: The 2N5638 FET I was able to order from Mouser Electronics was of Fairchild construction. When received and tested in the breadboard, it showed a much higher value of source voltage bias. That is the reason for the two source resistors using the Fairchild FET transistor in modifications Mk I and III. This allows for an output voltage within the transistors' operating range.

In the Mark I schematic (fig. 2), the amplifier transistors should have betas closely matched. The 2N2222 transistors will suffice if you so match. Please note the pair of 2N2222 transistors reverse-connected with open bases. These are for the protection of the input units.[1] While it is hoped that a

The Heathkit IM-18 is one of three models for which the modifications in this article are designed to work. (Photo courtesy Hans Gatu, SA7AUY, from his website, <http://www.heathkit.nu>, used by permission)

*c/o CQ magazine

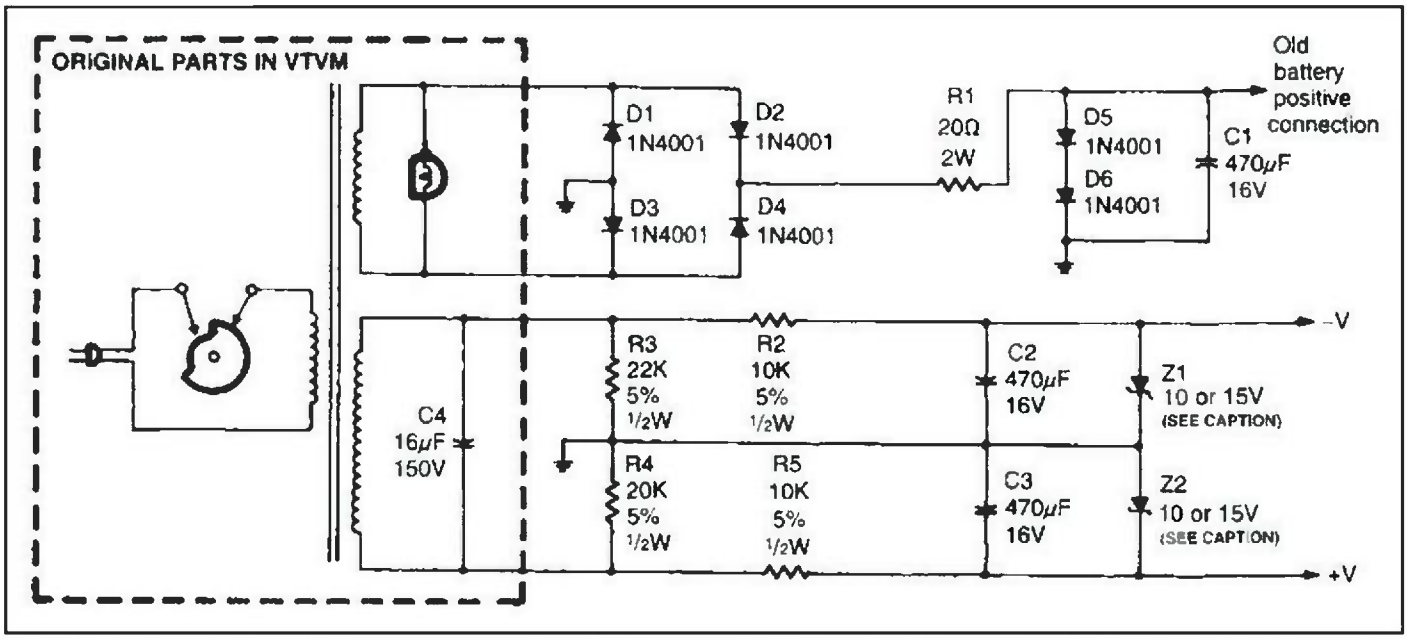


Fig. 1– Modified Heathkit VTVM power supply unit, to be used with any of the four possible circuit modifications in this article. Note: The Zener diodes should be 15V for modifications Mark I, II, and III; 10V for Mark IV.

person will always put the voltage range knob in the proper range position for the voltage being measured, it is not chiseled in granite that one will always be that careful. The reason why the VTVM circuit did not provide that protection was because of the very high impedance of the vacuum tube.

Alternative options are in figs. 3, 4, and 5 (Mk II, III, and IV). For the Mk IV modification, I chose the LF-353N FET op-amp. It might prove helpful to provide an eight-pin socket for this unit in case you want to remove the chip for any reason.

I have constructed the four different circuits into four VTVMs and all showed comparable accuracies.

Tips on Assembly

You will need to refer to the original VTVM schematic as well as those included with this article.

1. Remove the tubes and battery. Commend them for their past service and say goodbye.

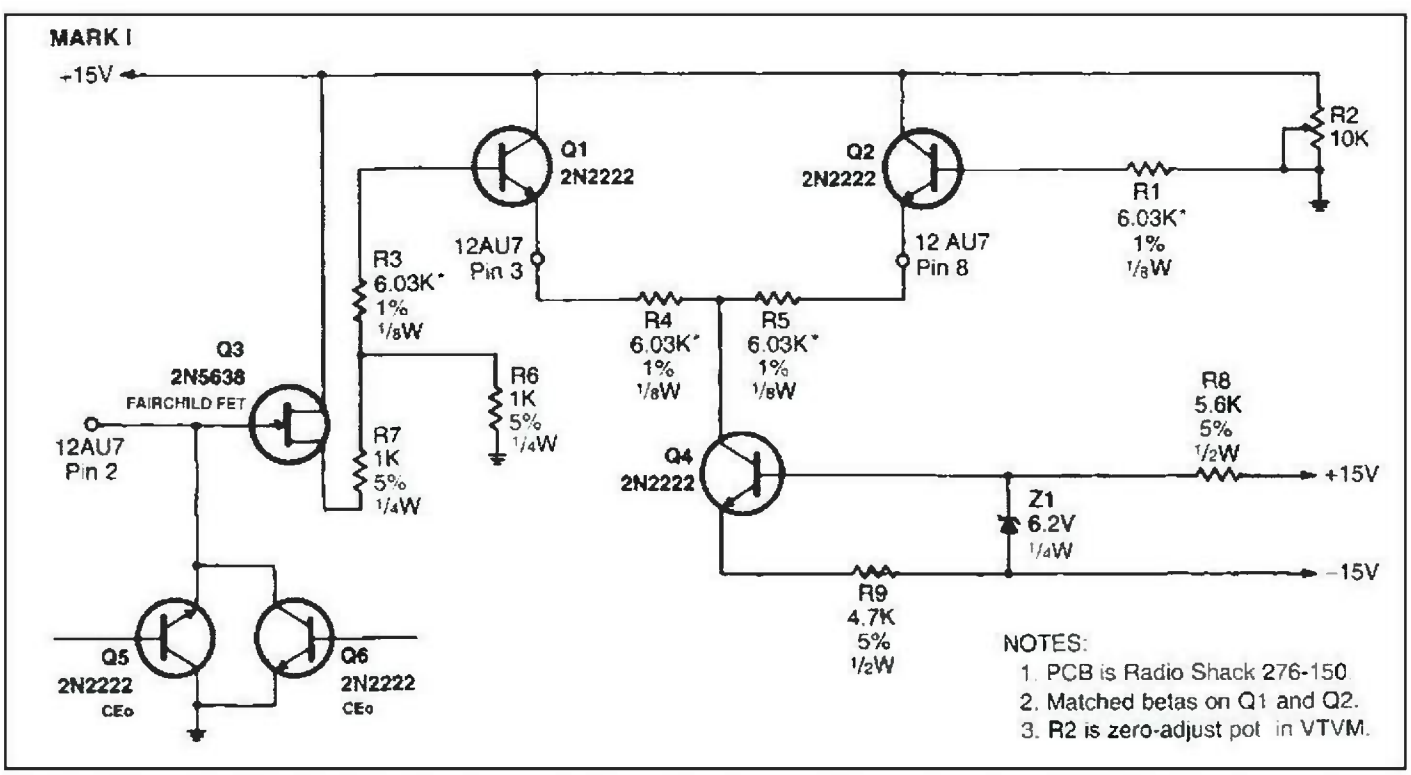


Fig. 2– Schematic of the Mark I option (see text). Notes: See footnote 1 for explanation of "CEo" designation on Q5 and Q6 if you are not familiar with it; the 6.03k value on R1, R3, R4, and R5 is not critical. Any 1% 1/8-watt resistor value between 5k and 9k should work (but make them all the same value).

Mil Spec Radio Gear
Korean to Present Day
by Mark Francis, KIØPF

You'll find detailed write-ups for many familiar sets: PRC-25/-77, RT-68, PRC-1099, GRC-106, GRR-5, R-392 and many more.

Includes over 230 pages of operating, modification and maintenance tips and information. Also includes over 200 illustrations!

Super Sale! Originally selling for ~~$27.95~~
Order today for only $15

Shipping & Handling: U.S. & Possessions - add $7 for first item, $3.50 for second and $2 for each additional. **CN/MX**- $15 for 1st item, $7 for 2nd and $3 for each add'l. **All Other Countries** - $25 for 1st, $10 for 2nd and $5 for each add'l.

CQ Communications, Inc.
25 Newbridge Rd., Hicksville, NY 11801
1-800-853-9797
http://store.cq-amateur-radio.com

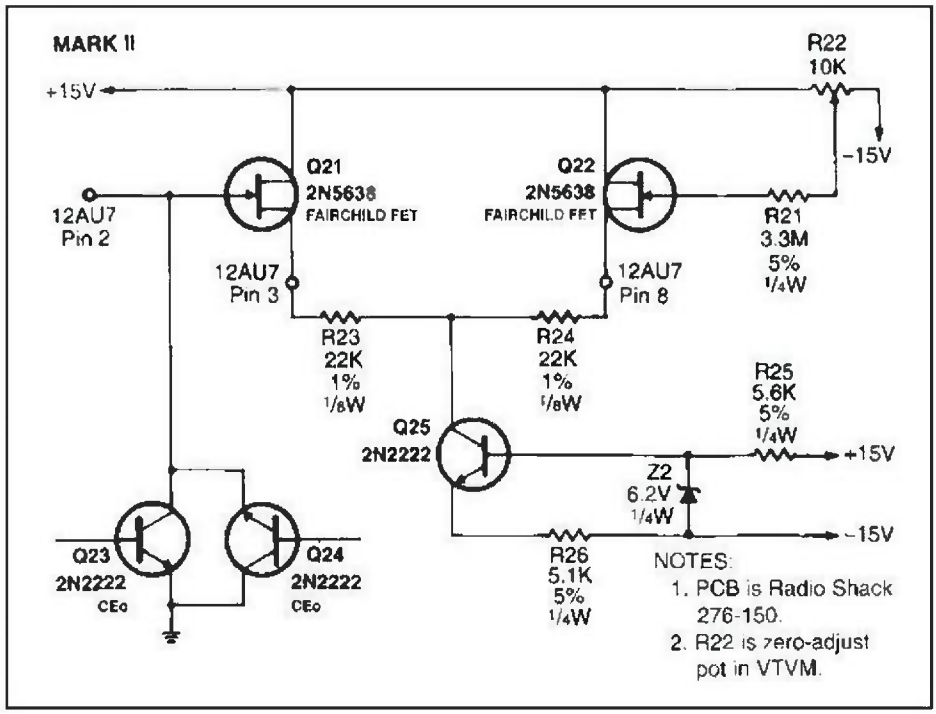


Fig. 3– Mark II schematic. All of the different options will produce the same results. The different choices are provided by the author to help you make best use of parts you may already have available.

2. Remove the metal bracket. Remove the two 150k and the 220k resistors from the zero potentiometer area of the VTVM PCB. Remove the 27k, 10k, and 100-ohm resistors from the power supply area near the AC BAL pot. Disconnect the leads from the AC BAL pot.

3. Unscrew the nuts from the meter's positive and negative terminals so the VTVM PCB can be examined from both sides.

4. It might be helpful to preassemble the new circuits on a pegboard where you could test them before assembling them on the Radio Shack 276-150 PCB. Assemble the power supply circuit first, and when it checks out to be good, assemble it onto one end of the PCB.

5. Install a 3/4-inch to 1-inch through-hole standoff insulator in the old battery hole of the VTVM PCB. If none is readily available in your "someday" box, you can make one by cutting a section out of an old, used BIC® pen.

6. Sever the VTVM PCB filament trace (yellow wires connection) just beyond the lamp. Solder new leads from the lamp connection to diode bridge per schematic. Make the leads long enough to be able to work on both sides of the PCB.

7. Solder a ground lead to pin 8 of the 12AU7 socket.

8. Sever the lead between the .01-µF

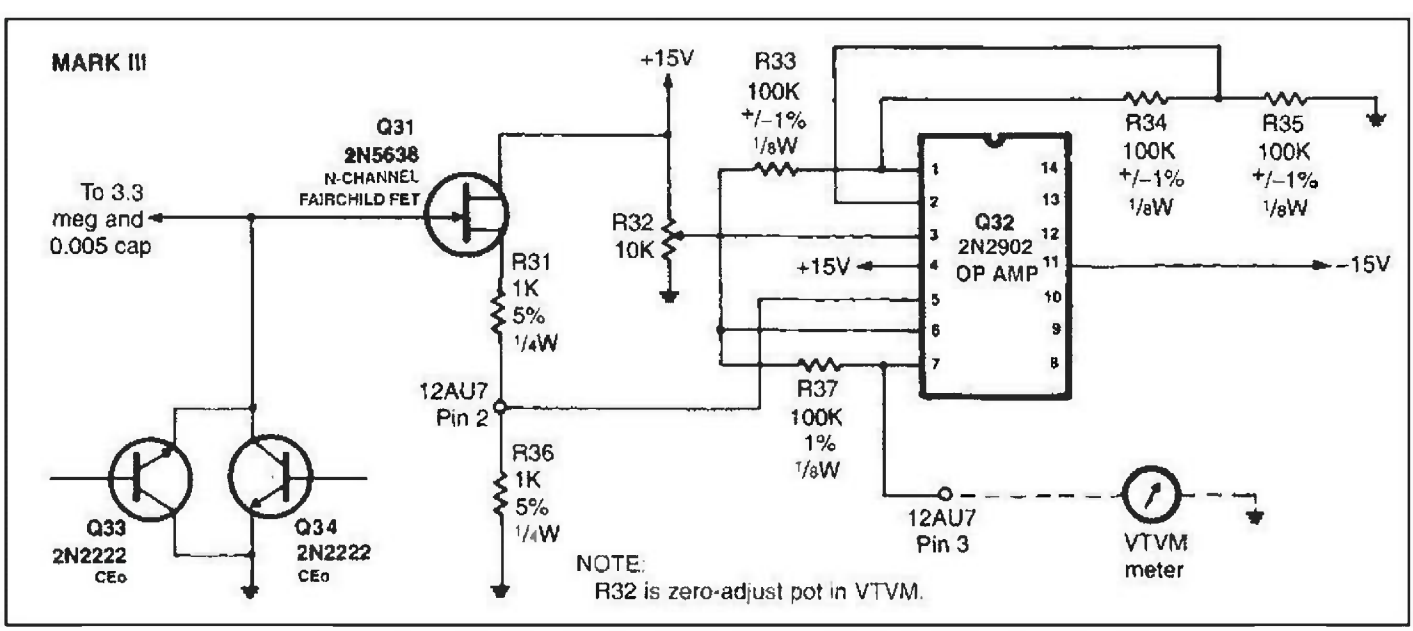


Fig. 4– Schematic of option Mark III. This circuit uses an op-amp, as does Mk IV.

1600-volt capacitor and the range switch. Remove lead from pin 4, #1 deck (F) on the original PCB.

9. Assemble the chosen amplifier circuit on your breadboard and test for performance. If satisfactory, assemble circuit on other end of the PCB. Attach leads to zero pot as per schematic.

10. Reconnect VTVM PCB to meter terminals. Assemble the PCB to standoff terminal using one of the corner holes on board. Make all necessary connections as per schematic.

11. Set voltage range knob to +1.5 DCV position. Clip a test lead from the DC test lead to ground. Adjust the zero adjust pot for zero output on the meter.

12. Adjust calibrations of plus and minus voltage on the 1.5-volt range using a variable voltage supply input. Monitor the voltage with a known accurate voltmeter, either VTVM or digital. Calibrate the AC on the 150-volt range using your AC line voltage.

13. Assemble total unit and forget about tubes and batteries.

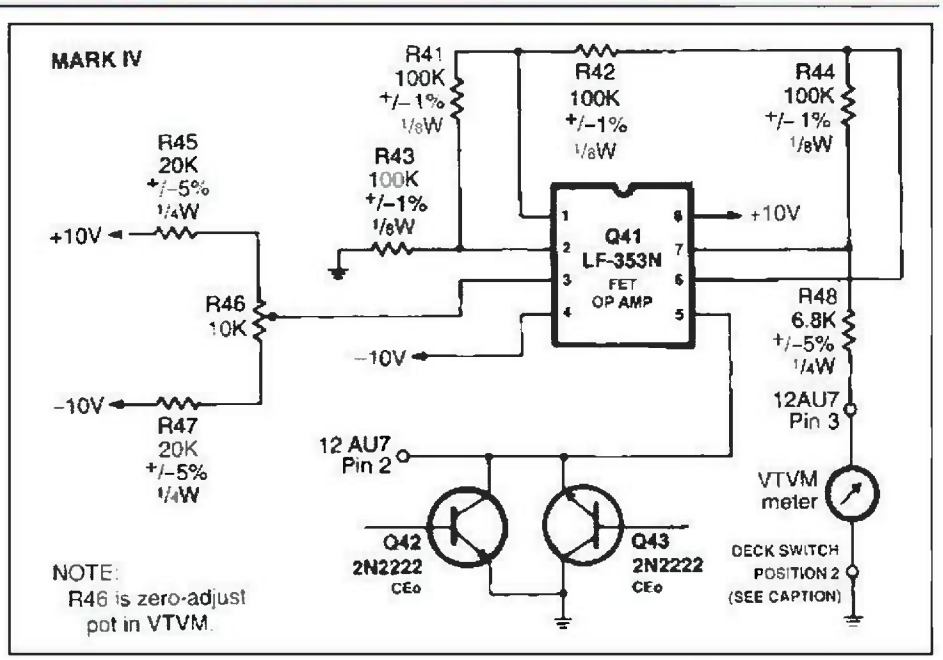


Fig. 5– Mark IV schematic. Note that the output of the meter (lower right) connects to the #2 deck switch position on the VTVM schematic.

Note

1. If you are not familiar with the "CEo" designation on certain of the 2N2222 transistors in the schematics, that refers to "Collector to Emitter, base open circuited configuration." When the NPN, for example, is connected that way it will be using the base-to-emitter junction in reverse as a Zener diode. The current will then pass through the base to collector junction with little voltage drop added to the base-to-emitter breakdown voltage. Ergo, Zener action, and when you connect another similar transistor in reverse parallel, you now have a negative Zener as wll. It's a nice way to inexpensively get matched Zeners for input voltage protection.

You don't need grass and trees to take ham radio to the field. This entirely self-contained operation was 38 stories above the streets of New York City.

Taking it to the Field in Midtown Manhattan

BY RICH MOSESON,* W2VU

Most of our "take it to the field" stories involve some sort of actual *field*, whether it's a grassy park or a field of boulders on top of some remote mountain. But the N3Y special event station last November was about as *un*remote as you could get ... smack in the middle of midtown Manhattan (New York, not Kansas), on a balcony 38 floors above the street at the New Yorker hotel (photo A), across from Macy's, Penn Station, and Madison Square Garden. However, the operation was fully self-contained and "off the grid," just as it might have been on some mountaintop.

Members and friends of NYC Resistor, the New York maker/hacker group, put together three separate stations for the event, including two HF stations and one VHF/UHF satellite station (for more on the special event, see "TeslaGRAM: A Multinational Special Event for a Nearly-Forgotten Laboratory," in the February 2012 issue of *CQ*). Here's a rundown of the equipment at each station:

HF Station #1

The main HF station for the operation was provided by Alain DeCarolis, WW3WW, who described it as follows: "The HF setup I operated for N3Y is the usual setup I have "on call" here under my desk. I usually operate from the NYC parks and the entire station is designed to be easily transported on my bicycle. (I have no car). When I decide to go QRP I use my FT-817ND, but when I feel like going stronger, I take out my inseparable TS-50S (I have had it since high school)."

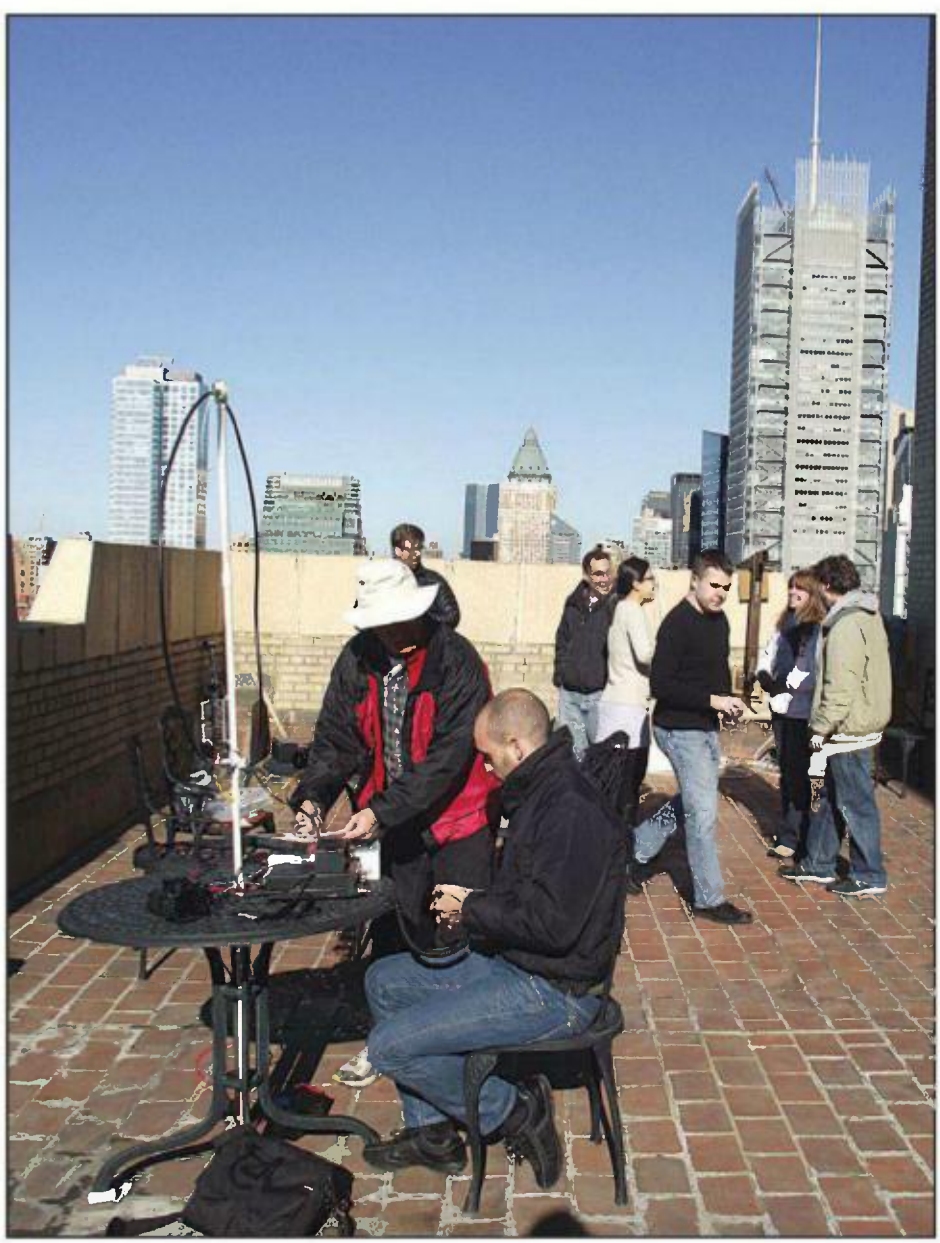


Photo A– The N3Y "field" operation was conducted entirely on a 38th-floor balcony of the New Yorker hotel in the middle of New York City.

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

The TS-50 was the rig of choice for the N3Y operation, running at about 30 watts PEP on single sideband through an MFJ travel tuner. Alain's antenna was a homebuilt magnetic loop, about three feet in diameter (photo B). It's designed to operate on 20 and 15 meters, but Alain says it also works on 40, although with some loss of efficiency. Alain added: "Some portable antennas of the same sort are also being sold commercially, but I believe that mine has two important advantages: The first is that if you need to you can go full power on it (100W CW), and the second is that my antenna costs only $20 to build (much, much less than the commercial counterparts). Since I built it with a rudimentary toolset inside a New York City apartment, at first it might seem a bit 'Spartan.' However, the antenna performs great and it's giving me tremendous satisfaction."

Alain's battery was a sealed acid 12Ah purchased on eBay "for probably $10 or $15."

"I know it's heavy," he noted, "but given the price difference between an old-style battery and a new one (including the necessary charger), I decided it's not time yet for me to switch to something more exotic."

Alain was somewhat displeased with the results, which he noted were more a function of propagation than his equipment. "Unfortunately," he said, "the short skip propagation of Saturday afternoon only made it possible to contact North American stations ranging from California to Prince Edward Island to New Orleans. Normally I have much better luck but ... what can you do: This is exactly what makes shortwaves and QRP so special."

HF Station #2/Satellite Station #1

The second HF station—which was also pressed into service for satellite contacts and is seen in photo C—was built around a Yaesu FT-857D provided by Diana Eng, KC2UHB, and her husband, Dave Clausen, W2VV. For HF work it was hooked up to a Buddipole dipole (set up for 10 meters) and mast, which was mounted on a tripod, and the satellite antenna was a homebuilt WA5VJB "Cheap Yagi" with two elements on 2 meters and five elements on 70 centimeters.

Power was supplied by Tom Tumino, N2YTF, in the form of a Lithium Iron Nanophosphate Polymer custom battery, which allowed the FT-857 to run a full 100 watts out on HF as well as 50 watts to the FM satellites.

"I prefer lithium cells for mountain-topping, where low temperatures can be tough on other chemistries," Tom explained, "and the iron nanophosphate cells are supposedly more stable then the regular lithium ion cells. The pack I brought along," he added, "is good for sustained current draws above 20 amps."

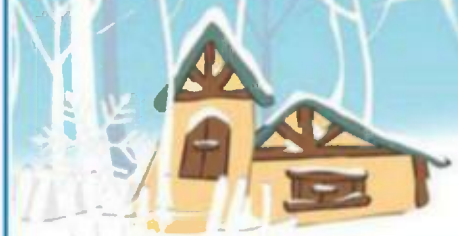
Tom also pointed out that the 20Ah battery has built-in protection and separate connections for charging, discharging, and balancing. Plus, he said, he always uses a "Watt's Up" wattmeter to keep track of power usage.

Satellite Station #2/ APRS Station #1

A Yaesu VX-8GR VHF/UHF handheld provided by Bill Ward, KD4ISF, wrapped up the setup on the 38th floor. It was used alternatively as a backup satellite rig (photo D) and for an APRS beacon provided by Tom to alert nearby hams and anyone monitoring the worldwide APRS map website (http://aprs.fi/) of the special event operation.

The original plan was to have the satellite station be the focus of the operation, since it was assumed that the station's location so close to so many strong RF sources in midtown Manhattan would make HF a QRM nightmare. Plus, the 38th-floor balcony had an unobstructed sky view to the west, so any satellite pass west of New York City should have been fair game. As it turned out, the hotel building itself provided a significant amount of shielding and QRM was never much of a problem on HF. Plus, the satellite contacts were not easy to come by.

Hobby Books and Cds!



Reflections III

by Walt Maxwell, W2DU

All the info in Reflections I and II and more! This completely revised and updated, 424-page 3rd edition is a must-have!

8.5 X 11 Paperback $39.95
***New!* CD Version $29.95**
Buy both for only $59.95

The Quad Antenna

by Bob Haviland, W4MB

Comprehensive guide to the construction, design and performance of Quad Antennas. General Concepts, Circular-Loop & Arrays, Rectangular & Square Loops, Multi-Element Quads and more!

8.5 X 11 Paperback $19.95
***New!* CD Version $14.95**
Buy both for only $29.95

The NEW Shortwave Propagation Handbook

by W3ASK, N4XX & K6GKU

This authoritative book on shortwave propagation is your source for easy-to-understand information on sunspot activity, propagation predictions, unusual propagation effects and do-it-yourself forecasting tips.

8.5 X 11 Paperback $19.95
***New!* CD Version $14.95**
Buy both for only $29.95

Shipping & Handling: USA - $7 for 1st book, $3.50 for 2nd, $2 for each additional. **CN/MX** - $15 for 1st, $7 for 2nd, $3.50 for each additional. **All Other Countries** - $25 for 1st, $10 for 2nd, $5 for each additional.

CQ Communications Inc.
25 Newbridge Rd., Hicksville, NY 11801
516-681-2922; Fax 516-681-2926
http://store.cq-amateur-radio.com

Photo B– The prime operating position at N3Y was a Kenwood TS-50, MFJ travel tuner, and a homemade magnetic loop antenna, provided by Alain De Carolis, WW3WW, center, adjusting the antenna. Watching at the right is Tom Tumino, N2YTF, while Bill Ward, KD4ISF (left), talks with other group members at the second operating position.

Photo C– NYC Resistor member and ham radio blogger Diana Eng, KC2UHB, listens as author W2VU calls CQ on the second station (see text for details).

W4RT Electronics
www.w4rt.com

Proven Performance Accessories
for YAESU, ICOM, and KENWOOD Radios
W4RT Sells ALL LDG Electronics Products

W4RT Electronics
www.w4rt.com

Incredible Software-Defined Antenna Analyzer

The miniVNA PRO is an extraordinary and unique handheld vector network analyzer that makes available a multitude of new features and capabilities which are perfect for checking antennas and RF circuits for hams and commercial users. Together with your PC/Laptop, you can add to your laboratory the further advantages of having this first-class VNA instrument. This is the world's first wireless analyzer capable of scanning and sending the data using an integrated Bluetooth module to a remote PC/Notebook up to 100 meters from the miniVNA PRO's location.

Excellent software for Windows, MAC, and LINUX (32 & 64-bit)
Also available is the miniVNA that covers 0.1-180 MHz.
Software under development to run miniVNA PRO using Symbian S60 3rd ed. PHONE.

- Calibration using open-short-load for accurate results
- Range of Z from 1 to 1000 ohm
- Two ports VNA
- I/Q DDS Generator
- Two separate RF output I/Q
- Built in Bluetooth Class 1 for remote measurements
- Internal Battery Li-ion with 1000 mAh (4 hours full- scan operation)
- Built-in battery charger (up to 400 mA)
- Power save mode
- SMA connectors for better isolation
- Extended dynamic range up to 90 dB in Transmission & 50 dB in Reflection
- Integrated Smith chart in software

COLLINS MECHANICAL FILTERS

DUAL-FILTERS for IC-703 & IC-718

300,500 & 2300 Hz Filters
FT-817(ND), 857(D) & 897(D)
FT-2000, IC-703 & IC-718

Desk Top Speaker • Great Mobile Speaker

OUTSTANDING
DSP Noise Cancelling Speakers
9-35 dB Noise Reduction in 7 Selectable Levels
4-65 dB Tone Reduction

bhi 10 W RMS

W4RT Filters are new Collins filters
Prices are the best anywhere!

Visit the W4RT Web Site
www.w4rt.com
Easy to Find What You Need & Lots of Helpful Information

LDG ELECTRONICS MASTER DEALER

Z-11 Pro Ultra
QRP to QRO
8000 Memories to Handle Up to 4 Antennas
Includes Batteries
Steel Cover Option
Available for Holding Magnetic Paddles, Mics, etc.

Noise Cancelling DSP
bhi Ltd. dynamically-adaptive neural-network technology achieves remarkable noise and tone reduction. Fits most radios incl. FT-817, IC-736/738, IC-706MKIIG, TS-50,TS-440, DX-394, FRG-100, FT-897, FT-847, and more

Install Yourself or let W4RT

Prices & Specifications Subject to Change Without Notice

Photo D– Dave Clausen, W2VV, uses a "Cheap Yagi" satellite antenna to listen for signals from SO-50 on the VX8R handheld, while Bill Ward, KD4ISF, stands by to log any contacts and Chuck Pettis, W7AUM, listens. (Additional photos are at <http://bit.ly/tbQPbh>, courtesy of KD4ISF)

An attempt while I was there to work SO-50 with the VX-8GR handheld was unsuccessful (too much competition from stations with stronger signals, and FM's "capture effect" assures that a weak signal will not be heard when stronger signals are present). A later effort using the FT-857 netted a half-dozen contacts on the late AO-51. Several dozen contacts were made on HF using Alain's station full-time and the 857 in between satellite passes.

Fun On and Off the Air

Overall, I would say that enough contacts were made for everyone to feel the effort had been worthwhile. However, like any radio operation "in the field" (with or without an actual field), what happens on the radio is only half the fun. Whether it's the splendor of the natural world in a forest clearing or on a mountaintop, or the splendor of the manmade world as you gaze at skyscrapers all around you from a New York hotel balcony, getting out "in the field" connects you with your world in a way that just doesn't happen while sitting in your attic or your basement. And if you happen to do it with a bunch of fellow hams, all the better…

BY IRWIN MATH,* WA2NDM

More for the New Home Brewer

You will remember that last month we tried to entice you to build something and actually gave you enough information so that you would not have an excuse to not do so. Well this month we would like to continue in that vein. Last month the simple field strength meter was intended to let you know when you were transmitting. Now it is time to build something that will allow you to check on your receiver so this month we will show you a simple signal generator that should enable you to do just that.

Fig. 1 is a circuit using a low cost color-burst crystal based oscillator at 3.58 MHz which is right in the 80-meter band. The crystal is connected as the feedback element for two of the gates in a common 7400 TTL Quad NAND IC and results in a TTL level square wave output signal. The other two gates are used as output amplifiers. This arrangement produces a square wave signal with enough harmonics to be heard all the way up to the 10 meter band. Power is supplied by a common 6 volt lantern battery and a series 1N4002 silicon diode which drops the voltage to about 5.3 volts for a fresh battery. Although a bit high the TTL gate still operates with no problems and as the battery ages the voltage stays in the TTL operating voltage range for a long time.

As we did last month, fig. 2 is a pictorial diagram for those who need it and a list of components is also presented at the end of the column. As you can see this project is really quite simple and again there is really no excuse for not building it. You will have to do some soldering but not very much and all components are large enough to easily handle, even by the novice.

*c/o CQ magazine

You should build the circuit in a metal mini-box (with the battery) available at RadioShack and other similar outlets. As with the case of last month's field strength meter you should also add a low cost whip antenna (insulated from the housing through a rubber grommet) to adjust the output level. When using such a signal generator keep in mind that it is also a low power transmitter. Always be sure to use only the lowest output you can (shortest antenna length) to obtain reasonable readings and do not leave it running for any longer than necessary either.

When you build this device there are a couple of uses that should be of interest, even to the non-technical amateur. The first is obviously is as a check of frequency. The chart below shows the various harmonic frequencies that are present. As you tune your receiver from band to band you should be able to find the signal at the proper point. Since color-burst crystals are fairly accurate the harmonics you detect should give you a very good idea of the state of calibration of your receiver.

Band	Frequency
80 meters	3.58 MHz
40 meters	7.16 MHz
20 meters	14.32 MHz
10 meters	28.64 MHz

Another application, and one that we mentioned more than 15 years ago in our November 1996 column, is to find out how directional your antenna system is. To do this you would place the signal generator a wavelength or more away from your antenna and adjust the output of the unit by adjusting how much of the whip antenna protrudes out of the case. Set the output to get a mid scale reading on the S meter of your receiver. Now move the

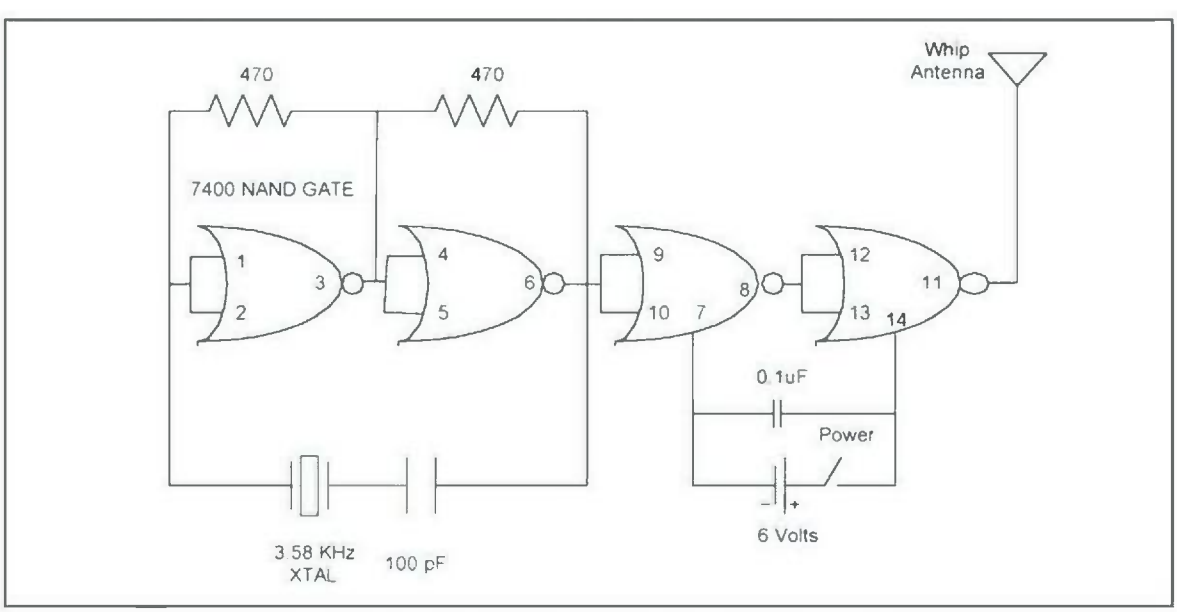


Figure 1– Simple signal generator discussed in text.

generator in a circular path around the antenna every 45 degrees from your original point. Try to keep the distance from the antenna as constant as possible for best results. Take a reading of the signal strength at each point (which is why we used a larger battery—for longer life) and plot them on a sheet of polar graph paper. The results will resemble fig. 3. Since an antenna is a symmetrical device, whatever is received is a pretty good approximation of what will be transmitted (by the same antenna). If you have a beam antenna the job is even easier. In this case you only need to keep the signal generator at a fixed point and rotate the antenna in 45 degree steps. When doing this test do not change bands. The fundamental output at 3.58 MHz is fixed but at the second, third and fourth harmonics however the output levels will be different.

In conclusion, once again, I want to wish all of you a very Happy New Year and hope that all of your hopes and dreams really do come true in 2013.

73, Irwin, WA2NDM

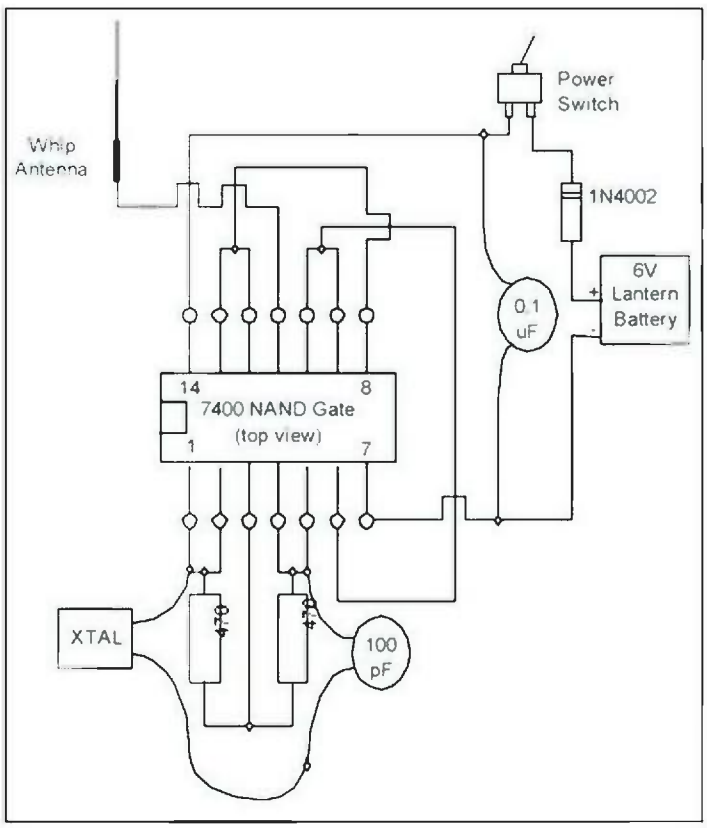
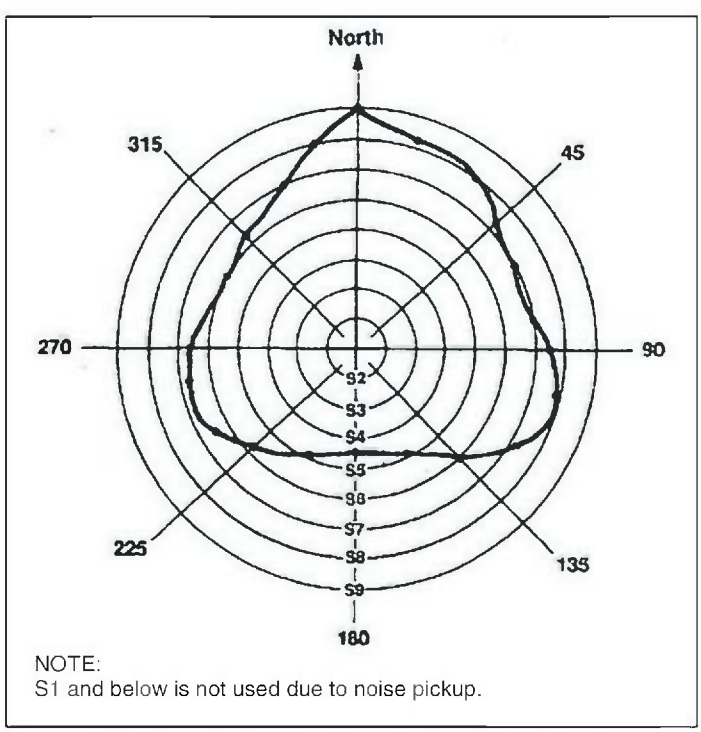


Fig. 2– Pictorial parts layout of fig. 1.



NOTE:
S1 and below is not used due to noise pickup.

Fig. 3– Typical data chart discussed in text.

Components for test oscillator

1	6 volt Lantern Battery (Local Hardware Store)
1	0.1 µF ceramic capacitor (Mouser 80-C350C104J1G)
1	100 pF ceramic capacitor (Mouser 80-C322C101J1G)
2	470 ohm 1/4- watt resistors (Mouser 30BJ250-470)
1	3.58 MHz Color Burst Crystal (Mouser 744-MP036S)
1	7400 Quad NAND Gate IC (Mouser 512-74AC00PC)
1	1N4002 silicon diode (Mouser 512-1N4002)
1	Toggle Switch (Mouser 612-100-A1421)
1	Whip Antenna (RadioShack 270-1405)
1	Aluminum housing (RadioShack 270-238)

Rubber grommet, solder and wires (misc.)

Note that these sources are only suggestions. You can save quite a bit if you simply shop around on the internet. That is a standard "feature" of home brewing.

BY RICHARD FISHER,* KI6SN

By Any Name, Sandy Tested Our EmComm Mettle

Part I: Amateur Radio's Role in Southern New Jersey and Massachusetts

Thousands of radio amateurs up and down the U.S. eastern seaboard underlined the critical and robust role amateur radio plays in emergency communications last October when Sandy—variously referred to as *tropical storm, hurricane, Superstorm, Frankenstorm,* and *post tropical storm*—reminded us of how deadly serious our EmComm responsibilities are. At press time, we're in the midst of gathering reports from more than a dozen states that felt Sandy's wrath.

In this first of two parts, *CQ*'s "Public Service" begins with a focus on the herculean efforts of radio amateurs in the ARRL Southern New Jersey (SNJ) section, many just a geographic stone's throw from Hurricane Sandy's landfall at Point Pleasant Beach, south of Atlantic City (photo A). Much like Sandy, we then move north to eastern and western Massachusetts, where the actions of EmComm operators in the face of remarkable damage were no less heroic. Next month we'll wrap up with reports from other regions.

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

Photo A– The Weather Channel chronicled Hurricane Sandy's damage where the storm made U.S. landfall, Point Pleasant, New Jersey. Watch the video at <http://bit.ly/SozIRW>. (Internet screen grab)

Southern New Jersey: "We Fight the Way We Plan"

"While the recovery will take a long time, the communications emergency is ending in the nine counties of the SNJ Section," Assistant Section Manager Gary Wilson, K2GW, said in early November, fully a week after Hurricane Sandy ravaged the state. "Commercial communications systems are being restored in most parts of the SNJ section. Amateur radio emergency operations continue in Ocean and Atlantic counties under the direction of their emergency coordinators (ECs)." It had been a harrowing and challenging time for the SNJ section's EmComm volunteers. K2GW reported radio amateurs were called upon for:

- Weather spotting and reporting via SKYWARN® <http://www.SKYWARN.org>
- Communications assistance at emergency evacuation shelters
- Support of the American Red Cross <http://www.RedCross.org>
- Office of Emergency Management (OEM) support
- Damage assessment reporting

More than two-hundred amateurs held down communications posts in SNJ during Sandy's onslaught. They spanned across 2-meter and 222-MHz FM, APRS messaging networks, and high-frequency single-sideband phone.

"Each county runs its own emergency net," Wilson noted, "linked at the higher level by the SNJ ARES® (Amateur Radio Emergency Service) Resource Net and New Jersey State RACES® (Radio Amateur Civil Emergency Service) Net, mostly on the NJ2EM 220 repeater."

K2GW said one of the reasons New Jersey is "a little better prepared than other states (in EmComm) is that the New Jersey Office of Emergency Management won't approve a county emergency management plan unless it includes a RACES® annex. As a result, *every* county Emergency Operations Center (EOC) has permanent amateur radio capability on 2-meter simplex, a 222-MHz radio aimed at the NJ2EM 222-MHz repeater (covering the entire state), 2-meter APRS for text messaging, and 75-meter SSB. These are tested once each month on statewide nets."

Each Red Cross chapter tests its 2-meter capability monthly with the central Red Cross station at N2ARC in Princeton, as well, which then links to the State EOC in West Trenton. Each county has

ALINCO®
Quality. Style. Performance!
Distributed in North America by GRE

The World's FIRST 222/902MHz Dual-band HT!

Start working two of the "fastest growing" bands with these great features:

- 5 Watts - 222 MHz / 2.5 Watts - 902 MHz dual band handheld transceiver
- Selectable full duplex system allows operation of main band and sub band simultaneously
- Independent dials for main and sub band
- Rugged polycarbonate body resists dirt and dust
- High-grade water-resistant materials compatible to IPX7
- Alinco's unique user-selectable PTT delay option eliminates the annoying squelch tail noise that some repeaters retransmit at the end of receiving non-reverse burst tone-encoded CTCSS signals
- Easy-to-read backlit alphanumeric display
- Large screen full-matrix LCD with easy-to-read icons and battery charge level
- Patented ChannelScope function allows visual monitoring of nearby signals
- "Wild key" lets you quickly change to frequently used setting
- 39 CTCSS tone squelch (encode + decode) and 104 DCS
- Keypad selectable wide / narrow bandwidth and mic gain
- Cloning capability between DJ-G29T units or through PC (optional cable needed)
- Quick-write memory channels
- Direct frequency input through illuminated keypad
- 500 Memories with memory banks
- Automatic repeater-setting function
- Multiple scan functions: VFO, Memory, Program, Tone, DCS & Sweep
- Crossband repeater feature

IPX7 Water-resistant

NEW

222.000~224.995 MHz
902.000~927.995 MHz
Dual Band FM
Handheld Transceiver

DJ-G29T

···Add Our DJ-G7T Tri-band 2M/70cm/23cm HT to Operate Five V/UHF Bands with Only Two Radios!

GRE America, Inc., 425 Harbor Blvd, Belmont, CA, 94002 USA.
Ph: (650) 591-1400 Fax: (650) 591-2001 email: alinco-sales@greamerica.com Website: http://www.greamerica.com

Products intended for properly licensed operators. Required products are FCC part 15/IC certified. Specification subject to change without notice or obligation. ALL warranty claims and requests for repair/technical assistance for Alinco products should be sent to GRE America regardless of contact information found on the warranty certificate packed with the product.

a 2-meter repeater designated for its own work at the county level.

"We fight the way we plan and practice every month," Wilson said. "That's why the state and county OEMs pay for permanent amateur radio stations in every county EOC and most Red Cross chapters."

At this writing, Wilson said, "John Zruba, K2ZA, SNJ Section Emergency Coordinator (SEC) and Incident Commander, was running a Section Resource Net on the SNJ ARES® repeater at 7 a.m., 1 p.m., and 7 p.m. each day to provide support to the county ECs. He

Photo B– Casino Pier at Seaside Heights in New Jersey's Ocean County, is a soggy mess in the aftermath of Hurricane Sandy. (Courtesy of Wikimedia Commons)

Photo C– Eastern Massachusetts ARES® activated its amateur radio command center in the Clay Center Observatory at the Dexter-Southfield School in Brookline. (Courtesy of Marek Kozubal, KB1NCG)

was coordinating requests for sending about six relief operators each to Atlantic and Ocean counties," (See photo B.)

K2ZA was "in contact with Eastern Pennsylvania, Northern New Jersey, and Western Massachusetts sections about their eventually providing relief operators as well."

Ocean County EC (Emergency Coordinator) Bob Murdock, WX2NJ, reported that in Sandy's aftermath six emergency shelters were being consolidated into one and that communications needs could be managed by Ocean County ARES® members. *(NOTE: WX2NJ reported he believed "the one last shelter might remain operational for about a week. The ARRL HamAid VHF radios are working great there."—K2GW)*

"The Atlantic County EC reported the need for six relief operators to give his operators a needed rest," Wilson said. "Both shoreline counties will continue to determine their long-term amateur radio needs daily, based on Red Cross sheltering plans, and the state of commercial communication restoration."

"Thanks go out to all of the ARES®/RACES® operators in the SNJ Section who showed that planning, regular monthly tests, and dedication pay off when it comes to helping their fellow citizens in a communication emergency," Wilson said. "When all else fails, there's amateur radio."

Eastern and Western Massachusetts: No Lull Before the Storm

By Rob Macedo, KD1CY
ARRL Eastern Massachusetts Section Emergency Coordinator

The level of EmComm support required during a monster weather system such as Sandy doesn't just magically happen. There was certainly *no lull before the storm.*

Eastern and Western Massachusetts ARES® started preparatory conference calls for Hurricane Sandy on Thursday October 25, as the threat from this behemoth became significant.

Western Massachusetts Section Emergency Coordinator (SEC) John Ruggiero, N2YHK, joined conference calls held by Eastern Massachusetts ARES® with planning for activation for both the response and recovery phases began.

Eastern Massachusetts ARES® (http://ares.ema.arrl.org/) was put on standby Friday evening, October 26, to identify radio amateurs who would be deployed to various Emergency Operations Centers and shelters. Western Massachusetts ARES® (http://wma.

Photo D– Sandy's storm surge soon took over the observation area on Long Wharf in Boston (http://bit.ly/VO7rFu). (Courtesy of Nick Snow, KB1YMY)

The Elecraft K-Line

A powerful performance you won't want to miss

Elecraft's world-class trio is now complete. It all started with the K3 transceiver, which tops the charts in nearly every receive category. Then we added an exciting visual dimension with the versatile P3, our fast, full-color panadapter. And now, we're proud to introduce the KPA500: a 500-watt solid-state amp that's so well-integrated you'll think it's reading your mind.

The KPA500 features 160-6 m coverage, instant RF-based band switching with any radio, alphanumeric status display, bright LED bar graphs, and a rugged, built-in linear supply. The amp's manual band switches can be used to change bands on the K3. The K3 can even select per-band amplifier drive levels automatically when the amp is placed into operate mode, so you'll rarely need to adjust power output.

The K3 already gives you the competitive edge, with its optional high-performance sub receiver, roofing filters as narrow as 200 Hz, new audio peaking filter (APF), and one of the cleanest SSB signals around. Adding the P3 and KPA500 will take you, and your station, to the next level.

ELECRAFT®

Elecraft is a registered trademark of Elecraft, Inc.

www.elecraft.com 831-763-4211

P.O. Box 69, Aptos, California 95001-0069

arrl.org/) went on standby Saturday evening, October 27.

Eastern Massachusetts ARES® activated its amateur radio command centers at the Acushnet Emergency Management Agency in Acushnet and the Clay Center Observatory, co-located at the Dexter-Southfield School in Brookline (photo C). This assured the section would stay connected if widespread 2-meter repeater outages occurred. It was clear Sandy's impact would be significant (photo D).

The city of Boston Emergency Operations Center (EOC) requested amateur radio support, as did the Red Cross for several regional shelters within the Eastern Massachusetts section.

Cape Cod ARES® supported several regional shelters, had radio amateurs at several area hospitals, and ran net control for its district net out of the American Red Cross Chapter in Hyannis under the callsign K1PBO.

The Massachusetts Emergency Management Agency (MEMA) Region Two office in Bridgewater was active as WC1MAB (http://www.WC1MAB.org) through the efforts of Region Two RACES® Radio Officer Mike "Sparky" Leger, N1YLQ, and John Miller, N1UMJ.

WX1BOX, the SKYWARN® amateur radio station at the National Weather Service office in Taunton (http://www.WX1BOX.org) was active for a 22-hour period from 3:30 a.m. Monday through 1:30 a.m. Tuesday. As Eastern Massachusetts ARES® SEC, I staffed the (WX1BOX) station along with Assistant SEC Carl Aveni, N1FY.

In Western Massachusetts, N2YHK reported that several Red Cross shelters were open in his section. One in Northampton was staffed with a radio amateur. Operators were not requested for others.

The Worcester Emergency Communications Team (WECT) established a resource net and supported SKYWARN® operations with damage reports across Worcester County. Tim Mongeau, KB1LZF, provided updates from portions of Worcester County for the duration of Sandy's impact on the region.

Eastern Massachusetts ARES® remained on standby for several days after Superstorm Sandy's impact on the region in case a Mutual Aid Team (ARESMAT) was required. Coordination with the SECs of Connecticut, New Jersey, and New York City/Long Island continued in case needs arose.

By the end of the week most Eastern Massachusetts ARES® teams stood down. The standby was lifted at midday Saturday. It is estimated that more than one-hundred radio amateurs participated in operations in Eastern Massachusetts, with a similar number in the Western Massachusetts section—particularly when factoring in those who gave SKYWARN® reports during Sandy's onslaught.

WX1BOX handled several hundred reports of wind damage. The dispatches included reports of structural damage in some areas, as well as many trees and wires down (photo E). The station also gathered wind and rainfall measurements, as well as storm surge and urban flooding reports from heavy rainfall.

This utilized more than a dozen local area VHF/UHF repeaters with liaisons, as well as the New England Echolink/IRLP Reflector system—*IRLP 9123/Echolink conference *NEW_ENG* node: 9123*—which was combined and linked with the VoIP *Hurricane Net IRLP 9219/Echolink conference WX_TALK* Node: 7203 system.* This created one large hurricane net covering from the Delaware-Maryland-Virginia region into New Jersey, New York, and New England.

The amateur radio station at the

Photo E– High winds toppled a tree onto a mobile home in Holbrook, southeast of Boston. (Photo courtesy of Rick Reuss, KA1LKB)

National Hurricane Center, WX4NHC, was linked into this network, as well. The damage and meteorological information was shared with other agencies such as the Red Cross, local and state emergency management, and the media to provide up-to-the-minute updates during Sandy's march across the region. This has become a very critical role for amateur radio and is viewed as equally important to providing communications *when all else fails.*

At the height of the storm, many wind gusts exceeding hurricane force (74 mph) were recorded across southeastern New England, and as high as 70 mph in the interior of southern New England.

NOW ON SALE!

2013 World Radio Handbook

SUPER SALE!

The world's most comprehensive and up-to-date guide to broadcasting!

This great directory offers the most comprehensive guide to broadcasting on the planet. Completely revised and updated, this 2012 edition is the most accurate guide to national and international SW, MW and FM broadcasting available.

Divided into a number of sections covering numerous topics, from National Radio - which looks at the world's domestic radio services, listed by country and including contact details, to International Radio - featuring full facts about all broadcasters transmitting internationally; and from Television Broadcasts - which details the world's main national broadcasters and large regional networks to frequency lists of all MW and international and domestic SW broadcasts.

Also included is a reference section containing listings of international and domestic transmitter sites, standard time and frequency transmissions, DX Club info and more!

Now only! $35.00 + Shipping

CQ Communications, Inc., 25 Newbridge Rd., Hicksville, NY 11801
516-681-2922 - http://store.cq-amateur-radio.com

Ham Radio Magazine on CD-ROM

HOT Item!

Enjoy quick and easy access to back issues of Ham Radio Magazine!

These sets include high quality black and white scanned pages which are easy to read on your screen or when printed.

30,000 pages in all!

Enjoy this enormous stockpile of material including construction projects, theory, antennas, transmitters, receivers, amplifiers, HF through microwave, test equipment, accessories, FM, SSB, CW visual & digital modes. All articles, ads, columns and covers are included!

This collection is broken down into 3 sets - by year.

Each set includes 4 CD-ROMs: SALE! $54.95 each

1968 - 1976	Order No. HRCD1	~~$59.95~~
1977 - 1983	Order No. HRCD2	~~$59.95~~
1984 - 1990	Order No. HRCD 3	~~$59.95~~

Order all 3 sets and save $49.90!

All 3 Sets - Order No. HRCD Set ~~$149.95~~ $129.95

Shipping & Handling: USA - $7 for 1st book, $3.50 for 2nd, $2 for each additional. **CN/MX** - $15 for 1st, $7 for 2nd, $3.50 for each additional. **All Other Countries** - $25 for 1st, $10 for 2nd, $5 for each additional.

CQ Communications, Inc.
25 Newbridge Rd., Hicksville, NY 11801

Order Today! 1-800-853-9797

Array Solutions Your Source for Outstanding Radio Products

Professional Grade Equipment from Array Solutions

Introducing the ACOM 1500

NEW!

FCC Approved

- Frequency coverage: All amateur bands 1.8 – 54 MHz
- Power output: 1500W PEP SSB, 1200W all other modes
- Manual band switching and tune up
- 3 antenna outputs
- Maximum output SWR: 3:1
- SWR protection: automatic switching to STBY
- Tube: 4CX1000 Ceramic tetrode
- Power supply: 240V - single phase

Introducing the OM Power OM2500A*

- Frequency coverage: All amateur bands 1.8 – 29.7 MHz
- Power output: 1500 W PEP All modes - no time limit
- Fully Automatic bandswitching and tune up
- Integrates with all popular transceivers
- Maximum output SWR: 2:1
- SWR protection: automatic switching to STBY
- Tube: GU84b Ceramic tetrode
- Power supply: 240 V - single phase

*This product has not been approved by the FCC. This device may not be sold or leased, or offered for sale or lease, until FCC approval has been obtained.

NEW!

Announcing the New

AS-419 "Bandpasser" Economical Integrated Bandpass Filter System.

The AS-419 bandpass filter unit provides bandpass filters for 160, 80, 40, 20, 15, and 10 meters. Each filter can be selected manually through the use of convenient pushbuttons per band. The Bandpasser can also be controlled automatically via our 4-wire network or through a sourcing band decoder.

New from Array Solutions

4-square Vertical Array System

NEW!

New pushbotton

Integrated Controller

NEW!

For 8-pak and 4x8-pak systems.

Introducing the

VNA *uhf* two-port Vector Network Analyzer

NEW!

Operates from 5 kHz to 600 MHz. For details on this new product, see the Array Solutions webpage.

AS-309-H Surge Arrestor

NEW!

For use with open wire / ladder line feeders and long wire antennas. See also our AS-303 and AS-302 coaxial arrestors and our AS-XSP control cable arrestors as well as the complete line of Hofi professional arrestors.

Check our webpage for more new products!

Other top-quality brands represented by Array Solutions...

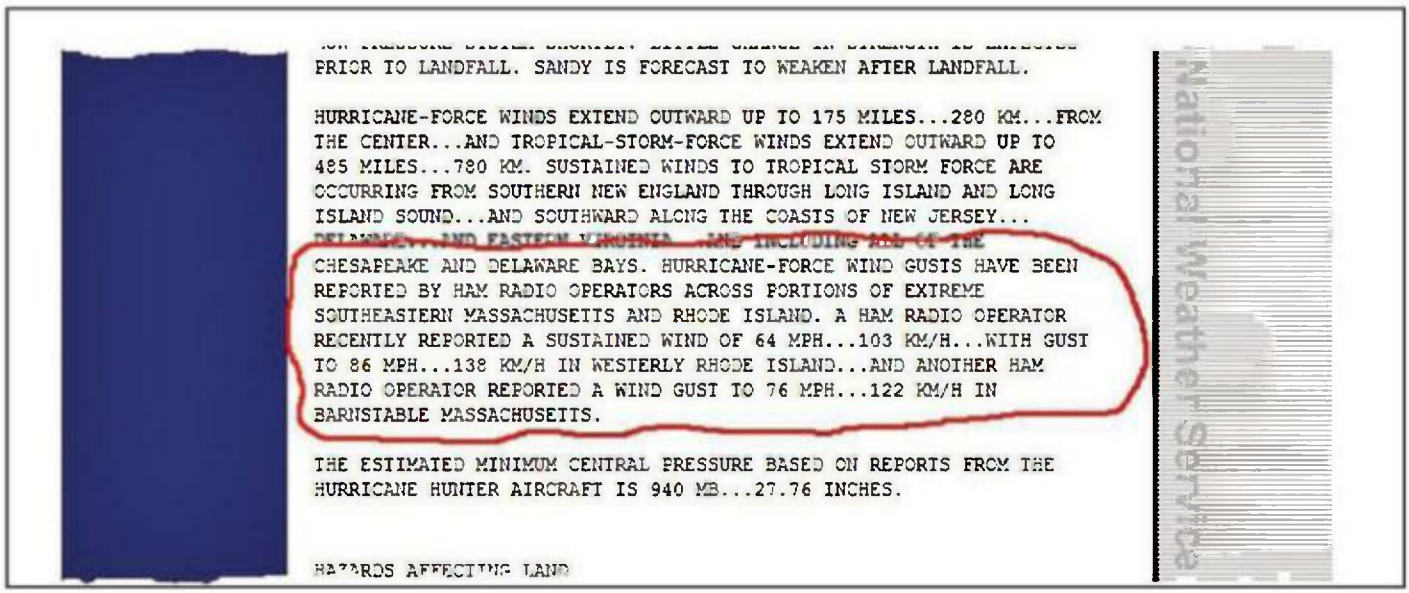
ACOM · AY · Custom Metalworks · FRITZEL · hofi · M² · OM Power · OPTIBEAM · PHILLYSTRAN · Pro.Sis.Tel. · REX · SSB · W3NQN

ARRAY SOLUTIONS

www.arraysolutions.com

Sunnyvale, Texas USA
Phone 214-954-7140
sales@arraysolutions.com
Fax 214-954-7142

Happy New Year!


PRIOR TO LANDFALL. SANDY IS FORECAST TO WEAKEN AFTER LANDFALL.

HURRICANE-FORCE WINDS EXTEND OUTWARD UP TO 175 MILES...280 KM...FROM THE CENTER...AND TROPICAL-STORM-FORCE WINDS EXTEND OUTWARD UP TO 485 MILES...780 KM. SUSTAINED WINDS TO TROPICAL STORM FORCE ARE OCCURRING FROM SOUTHERN NEW ENGLAND THROUGH LONG ISLAND AND LONG ISLAND SOUND...AND SOUTHWARD ALONG THE COASTS OF NEW JERSEY... [illegible] CHESAPEAKE AND DELAWARE BAYS. HURRICANE-FORCE WIND GUSTS HAVE BEEN REPORTED BY HAM RADIO OPERATORS ACROSS PORTIONS OF EXTREME SOUTHEASTERN MASSACHUSETTS AND RHODE ISLAND. A HAM RADIO OPERATOR RECENTLY REPORTED A SUSTAINED WIND OF 64 MPH...103 KM/H...WITH GUST TO 86 MPH...138 KM/H IN WESTERLY RHODE ISLAND...AND ANOTHER HAM RADIO OPERATOR REPORTED A WIND GUST TO 76 MPH...122 KM/H IN BARNSTABLE MASSACHUSETTS.

THE ESTIMATED MINIMUM CENTRAL PRESSURE BASED ON REPORTS FROM THE HURRICANE HUNTER AIRCRAFT IS 940 MB...27.76 INCHES.

HAZARDS AFFECTING LAND

National Weather Service

Photo F– Vital storm information provided to WX1BOX and relayed to the the NHC's WX4NHC, appeared in a National Weather Service Advisory October 29. (Internet screen grab)

Sustained winds of 64 mph, with a gust to 86 from the western region of Rhode Island, were reported to WX1BOX and relayed to WX4HNC. Cape Cod ARES® District Emergency Coordinator (DEC) Frank O'Laughlin, WQ1O, reported a gust of 76 mph in the Marstons Mills section of Barnstable, which was also relayed to the NHC.

These bits of vital information appeared in a NHC Advisory issued at 5 p.m. on Monday, October 29. (See photo F.)

Power outage statistics were staggering across the region:

- 386,000 in Massachusetts
- 122,000 in Rhode Island
- 630,000 in Connecticut

More than 1.1-million people were powerless in southern New England at Sandy's height. The region's power statistics paled, however, when compared to those from New York City, Long Island, and New Jersey, where more than three

CQ 2013-14 calendar

15 months of value
January 2013 through March 2014

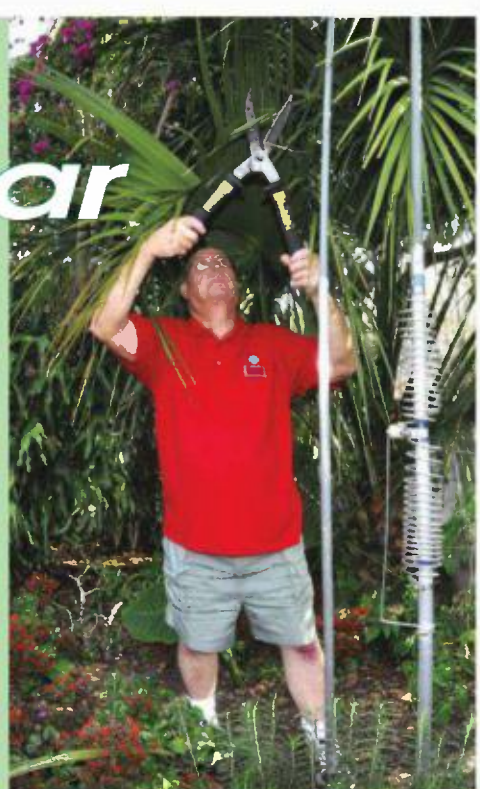
$10.95 + S/H

Fifteen spectacular color images of some of the biggest, most photogenic shacks, antennas, scenics and personalities from across the country! This year's calendar is better than ever!

Includes dates of important Ham Radio events, major contests and other operating events, meteor showers, phases of the moon, and other astronomical information, plus important and popular holidays. CQ's 15-month calendar (January 2013 through March 2014) is a must have!

Order yours today!

Shipping charges: USA $3; CN/MX $5; All other countries $10.



CQ Communications, Inc.
25 Newbridge Road, Hicksville, NY 11801
Call 1-800-853-9797 or FAX 516-681-2926 • http://store.cq-amateur-radio.com

million were affected for a significantly longer period of time.

Flooding from Sandy's storm surge in southern New England was heaviest from the Westport, Massachusetts area westward through southern Connecticut, where damage was worse than that left in the wake of Hurricane Irene in August 2011.

In southern Rhode Island, storm-surge flooding was the worst since Hurricane Bob in 1991. Beach erosion left sand as deep as four feet, covering nearby roads. In Charlestown, Rhode Island, homes sustained major damage in the surge and in some cases were knocked off their foundation.

South coastal areas were restricted to residents-only and required a pass to get in. But amateur radio operators, embedded with local Emergency Management and Public Safety officials, provided reports and photographs of structural damage and storm surge when their responsibilities for the NWS Taunton SKYWARN® program had ended.

While most of Sandy's impact had faded by early Tuesday morning, a line of rogue thunderstorms associated with *Post Tropical Storm Sandy* affected portions of the ARRL's Eastern Massachusetts section that evening.

A microburst with wind speeds as high as 90 mph was recorded in the Wareham-Onset area, downing 100 trees and capsizing and knocking over boats at Point Independence in Wareham and at the Onset Bay Marina.

Scattered trees and wires were down in Plymouth and Kingston, and all the way up into Lynn, north of the metro Boston area.

One-inch diameter hail was observed in Melrose, along with flash flooding of many streets from the New Bedford-Wareham area to the metro Boston area.

SKYWARN® self-activated on several local area repeaters as the line of rogue storms passed through with reports sent to NWS-Taunton. A complete listing of reports can be seen at the WX1BOX web site in *Post-Hurricane Sandy Coordination Messages* posted there: <http://www.WX1BOX.org>.

Overall, this was another excellent operation for a significant weather-related event and the second hurricane to affect southern New England in two years, although the full force of the hurricane was felt just to the south.

Hopefully, this will drive further preparedness into the amateur radio community and into the agencies across Massachusetts.—*Rob Macedo, KD1CY*

POWER TO GO

RUGGED, DEPENDABLE BATTERY PACKS

DAYSAVER.COM/COMMUNICATIONS.ASPX

email sales@daysaver.com

phone (925) 292-5339

PROMOTING THE USE OF TEN METERS SINCE 1962

Ten-Ten International Net, Inc.

Awards · QSO Parties · Special Events · Paperchasing

NETS DAILY (except Sunday) on 28.380 and 28.800 at 1800z

CHECK US OUT ON THE WEB

www.ten-ten.org / www.10-10.org

1349 Vernon Ter San Mateo CA 94402-3331

Decisions. Decisions.

HEIL SOUND

The Pro Set Elite is the ultimate boomset for active amateur radio operators, featuring extreme comfort, ruggedness, and excellent fidelity on both transmit and receive. Available with the HC-6 dynamic element or iC electret element.

The HM 12 brings high output, full fidelity and great speech articulation which works with just about every low impedance amateur radio transceiver.

www.heilsound.com

magic in the sky

BY JEFF REINHARDT,* AA6JR

Going to Extremes

As this is being written, we are in the immediate aftermath of Hurricane Sandy. Due to the lead time needed in magazine publishing, you now know things I do not know as this piece is being composed.

What *is* known is that Sandy brought yet another large-scale emergency that affected millions. In addition to lost lives, many injuries, catastrophic property losses, massive power outages, and a disruption to the economy, once again the vulnerability of our communications networks made its presence known during an emergency.

In just the last year, the USA has experienced drought, flooding, severe storms, an East Coast earthquake, extensive wildfires in the west, and more. Politics aside, the "new normal" seems to find more severe events occurring and fewer responders in position to render assistance. Of course, more folks are impacted because our national population is now over 311 million and growing. The other reality is that many state and local governments are financially strapped, and some have even gone bankrupt. The upshot is they are not likely to be adding to their portfolios of emergency responders. Some are simply struggling to maintain basic coverage.

*5904 Lake Lindero Drive, Agoura Hills, CA 91301
e-mail: <aa6jr@cq-amateur-radio.com>

Our Dependence

Let's face it: As a society we're "hooked" on a substance and the habit is hard to kick. That item is one of the smallest known, but like David facing Goliath, sometimes the smallest item carries a big impact. I'm referring to the lowly electron, incredibly tiny, yet it makes much of our modern lifestyle possible. From the macroeconomics of the stock exchanges to the light bulb on your nightstand, and seemingly everything in between, we depend on electrons moving about on some mission to serve us. When they stop moving, as in power outages, we begin to get an idea of how dependent we really are.

With Hurricane Sandy, we again learned the cellphone system is vulnerable to disruption from damaged or powerless cell sites to individual phones that were unable to be recharged. However, that should come as no surprise, because time and again the cell network and its infrastructure has shown itself to be fragile due to causes ranging from simple demand through power failures and physical damage caused by storms or accidents. Following Hurricane Isaac earlier in 2012, New Orleans and surrounding areas again experienced

Like this portion of the historic boardwalk in Atlantic City, New Jersey, many cell phone sites were destroyed by the fierce winds of Hurricane Sandy. Amateur radio remains one form of communications that works "when all else fails." (Photo by Liz Roll/FEMA)

cell phone and public safety communication outages even after building more robust systems following the Katrina disaster only a few years earlier, and thankfully, while still serious, Isaac was a much smaller event.

If you need an additional measure as to our dependency, take a look at the cell phone charging stations at airports, coffee shops, and other public places. They're always busy. One of the many compelling photos in New York City following Hurricane Sandy showed a location with daisy-chained power strips being used to recharge hungry cell phones. Each device represented a user eager to communicate with loved ones or simply obtain updates on how quickly conditions might improve.

It isn't just cell phone systems that are fragile. Across the country, communities large and small are converting to digital radio systems that are dependent upon linked repeaters, often encrypted transmissions and seemingly vulnerable to their increasing layers of complexity and proprietary components. Contrast that with ham radio, which is still largely analog, using simple freestanding repeaters to serve a given area, equipment dispersed over wide areas (owned by individual operators), and robust. When the chips are down, it's often found that simpler is better. I'm also baffled at the notion that some public safety agencies keep a stockpile of cell phones to use as part of *their* contingency plans.

What's the Mission?

As ham radio operators, our DNA seems to be encoded with the willingness to use our skills and equipment to benefit others. The immediate protection of life and property top the list, followed by general health-and-welfare traffic. So far, so good.

However, in trying to accomplish those missions, whom do we communicate with? Unless you can answer that question, all the equipment in the world is of little use. That's where a structured response comes into play. To be sure, many emergency-preparedness organizations have established robust links with the ham community. The Red Cross and Salvation Army are among them. ARES, RACES, and SKYWARN groups are found in many areas, but sadly, many regions are not as well-served. Time and again over the last year, several of these well-trained units have proven their value. What is also evident is that structure and practice are the keys to having ham radio operators poised as an effective backup system for stationary communication systems that are subject to fail. From supporting your local first-responders up through links to FEMA, there's a role to be filled and a job to be done.

I Want You!

The stern face of Uncle Sam pointing at you from a recruitment poster encouraged countless numbers of recruits to step forward in defense of the nation. He is calling again, only this time, he seeks your communication skills, equipment, and common sense to provide a strong network of trained operators to face future emergencies. We know they will happen; we just don't know where or when. By joining a communications response organization, you add strength to the system. On one hand, you may never be called. On the other hand, yours could be the radio that helps save a life, protect property, or bring comfort to just one person.

Don't rely on old skills and training or past relationships as your cushion against taking action today. Over the last few years a lot has changed in emergency management. Every new event is a learning experience, and those lessons are quickly incorporated into the operating structure. There's a lot to learn and importantly, new relationships to be established. It's far better to get to know the folks at your supported agency well in advance of an emergency. Through training and drills, capabilities are on display and trust is established.

But Wait, There's More

Perhaps it was a coincidence, but as Sandy raged, I received an e-mail from a group seeking to find a class that would help several people obtain training for the Technician exam. The appeal of emergency communications is a strong recruiting tool for bringing new people into realm of licensed operators. Too often, though, we lose track of them once they're licensed. There's no substitute for a good ham-to-ham support network that engages in teaching and communicating both on and off the air. If you have a local club that can support these objectives, great; if not, it only takes two persons to form a club that can devote its energy toward the goals we speak of in this article.

Here's hoping 2013 brings the nation a needed respite or at least a reduction from the many disasters we've faced over the last few years. Nevertheless, your ability is a great way to respond through being prepared—24/7/365—ready to put a little "Magic In the Sky."

73, Jeff, AA6JR

RFspace SDR-IQ

The **RFspace SDR-IQ™** offers unprecedented performance from 500 Hz to 30 MHz in 1 Hz steps with high resolution spectrum display. It comes with the latest version of SpectraVue™ supporting AM, WFM, USB, LSB, N-FM, DSB and CW with fully adjustable DSP Filter bandwidths and FFT sizes of 2048 to 262144 points. The resolution bandwidth is as low as 0.031 Hz. The SDR-IQ™ is the smallest SDR with RF DSP that samples the entire HF band at once and performs the initial filtering at a 67 MHz sample rate with 23 bit accuracy. The rear panel has a USB port, serial port and BNC antenna jack. The SDR-IQ is USB powered so no power supply is required. Works great with laptops running on batteries. Made in U.S.A.

Order #0106 **$499.95** (+$9.95 UPS)

Visit **www.universal-radio.com** for details!

universal radio inc.

Universal Radio
6830 Americana Pkwy.
Reynoldsburg, OH 43068
◆Orders: 800 431-3939
◆Info: 614 866-4267
www.universal-radio.com

Be an FCC LICENSED RADIO TECHNICIAN!

Earn up to $100 an hour and more!

Get your Commercial FCC License!

This FCC License is your "ticket" to thousands of exciting jobs in Radio-TV, Communications, Avionics, Maritime, Radar, Municipal & more... even start your own business!

The Original Home-Study course prepares you to get the **"FCC General Radiotelephone Operator License"** at home in your spare time.

- **No costly school. No classes to attend!**
- **A proven course: Easy, fast and low cost!**
- **No experience needed!**
- **GUARANTEED TO PASS - You get your FCC License or money will be refunded.**

Call now for FREE info:

800-932-4268 ext 206

Or, email us: fcc@LicenseTraining.com

www.LicenseTraining.com

COMMAND PRODUCTIONS • FCC LICENSE TRAINING
PO Box 3000 • Sausalito, CA 94966-3000

Social Media, Ham Radio, and a Generation Gap

BY WAYNE YOSHIDA,* KH6WZ

It's official. I am an "old man." Besides getting a seemingly continuous stream of junk mail from the AARP (formerly the American Association of Retired Persons), now teens and pre-teens refer to me as "some old guy." This really hit me while waiting in the check-out line at the hardware store. I overheard a group of young kids behind me talking about online bill-paying and self-checkout, and one of them said something like, "Have you noticed that people over 30 are too old to pay bills online and always have trouble in the self-checkout line?"

I wasn't sure who he was talking to, since most of his group was busy punching keys on their cell phones and laughing at something, and the others were staring at something else at the other end of the store.

I almost turned around to give this kid a piece of my mind, but decided to just grit my teeth and say nothing. I realized that I have become an old man and made a mental note about yet another difference between the generations today.

That same week I came across an article mentioning social media in the online radio communications magazine Urgent Communications. The article is called "Embrace Social Media—But Don't Try to Control It." It includes some useful tips for emergency response communicators and how to take advantage of the power of social media to help spread information to the community.

Reading the article made me think about ham radio and social media. Ham radio and social media have a lot in common. Both are global in scope. Ham radio and social media are ways to communicate to others immediately under most circumstances. Most of the time, such communications are not private, but public.

Another thought for the day: Regardless of how you feel about social media, it is here to stay. Like cell phones and smart phones, I tried to avoid adopting them, but failed to resist. Take a look at two videos made by Erik Qualman on his Socialnomics website: "Technology Will Kill," and "Is Social Media a Fad?" The URL is listed in the References section.

New and Old Crash in the Same Space

Many people think social media is something new and different, but as hams, we should consider ourselves among the first users of social media. After all, isn't ham radio all about connecting with strangers as well as friends and family on an international scale?

Speaking of new versus old, here is a chance for us old dudes to teach the younger generation a thing or two. If you are a CW operator or traffic-handler, you already know how to shorten messages to increase efficiency and accuracy. Have you brought this practice to text messaging, e-mail, or Twitter on your smart phone or other communication appliance?

For non-CW operators, I am talking about using ham radio abbreviations and prosigns in text messages and other social-media venues. Many of these radio abbreviations go back to the telegraph days in the 18th and 19th centuries. I think it would be very interesting if we added ham radio abbreviations into the newest social-media communications. The concept of using the same phrase as a question and as an answer (Q-signals) is particularly intriguing. By the same token, wouldn't it be interesting if Twitter and other text users started to adopt "our" abbreviations?

Space does not allow me to include a table of abbreviations for hams and Twitter users, but take a look at the abbreviations lists mentioned in the References section and compare them. On Twitter, abbreviations are mandatory; the maxi-

Photo 1– In an effort to expand ham radio awareness into non-ham radio venues, my small group entered a display called "Not Your Grandpa's Ham Radio" at the Bay Area Maker Faire last year. This narrowband 10-GHz system certainly wasn't something hams used in my grandpa's day.

*28181 Rubicon Court, Laguna Niguel , CA 92677
e-mail: <kh6wz@cq-amateur-radio.com>

Visit Our Web Site

Everything Goes With
Ham Radio Deluxe
Every Radio
Every Interface
"The latest version is more 'rock solid' than any other versions ever released." *Simon Brown, HB9DRV*
Preorder at $69.95
Sales 813-381-7714
www.ham-radio-deluxe.com
sales@hrdsoftwarellc.com

mum character count on a "tweet" is 140 or less. I am not an extensive Twitter user, but there is a great online publication called "The Simple Twitter Book," by Brent Ozar. Go to Brent's website and download a free copy if you are interested in this new and fast text communication media many kids are using these days.

Expanding Our Universe

How do we leverage social media to help improve and grow interest in ham radio?

Let's take YouTube for this example. Before YouTube, there was television. However, unlike TV, YouTube enables just about anyone in the world with a video camera, a computer, and an internet connection to become an actor, producer, director, promoter, and cameraman. Anyone can become an instant celebrity—sometimes accidently—and even make money in the process of having fun.

This is the core difference between traditional broadcast content and YouTube: The majority of the people making and posting YouTube videos are doing this for fun. There is a certain air of dedication and a different attitude (let's call this passion) when people do things on their own time and without remuneration.

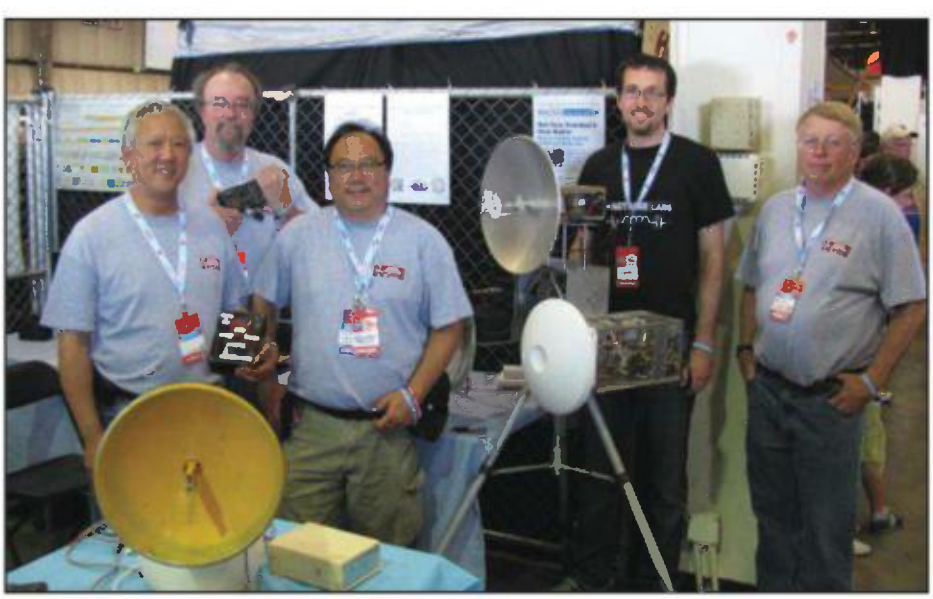


Photo 2– The Bay Area Maker Faire 2012 team, left to right: Brian Yee, W6BY; Dennis Kidder, W6DQ; Wayne Yoshida, KH6WZ; Tony Long, KC6QHP; and Mike Lavelle K6ML.

If you have not discovered Jeri Ellsworth by now, go to YouTube and search for her. She is a YouTube star, making electronics-related videos of all kinds, and she has thousands of followers. Although she is not a ham, several of us are encouraging her to become one.

In a related vein, Make: magazine has a ham radio columnist who also posts on YouTube and other social media outlets. Diana Eng, KC2UHB, is a New York area YL who is also a fashion designer. She incorporates electronics

WorldRadio
ONLINE

• DX World
• Rules & Regs
• DX Predictions
• Propagation
• Aerials *and more!*

A general interest online only ham magazine with a special focus on the human side of amateur radio and on projects and activities accessible to the average ham. Regular topics include DXing, emergency communications and "trail friendly" radio!

SUBSCRIBE TODAY!

1 year Subscription only $19.95
2 years $29.95
3 years $39.95

View on your PC, Mac, iPad, iPhone or Android (2.0+)

WorldRadio Online
25 Newbridge Road
Hicksville, NY 11801
1-800-853-9797
www.worldradiomagazine.com

or some technology aspect into her clothing and other items. Diana is a great example of a young 21st century artist—and radio ham.

By making and posting videos and creating content for their blogs and other social media venues, ham radio can get a positive publicity boost beyond our network of ham radio people, a great recruitment and teaching tool. And best of all, the content is free.

Along the same lines, last year I headed a small team of hams and displayed at the Bay Area Maker Faire (San Mateo, CA, in the Silicon Valley). The theme was "Not Your Grandpa's Ham Radio" and was dedicated to show creative and technically minded people what hams are doing today. Our 20-foot display space was filled with our latest microwave frequency projects, an APRS demonstration, ham radio microprocessor-control projects, and other things that did not exist in my grandpa's day (see photo 1).

Although we did this totally for the fun of just doing it, we managed to have some impact on the local college crowd—both students and faculty—to gain an interest in ham radio. Just like the Star Trek Original Series episode "Space Seed," I was not sure what I started when I combined ham radio with the Maker movement. So far, it is all good.

It's a Generation Thing

The younger generation seems to be much more "open" than many of us older folks. For example, I heard about a dating function on FaceBook, in which all of your friends can follow your comments to and from your guy or girlfriends. Talk about an open network, where is the privacy aspect of dating someone these days?

One thing we should keep in mind when talking on the radio or texting or tweeting a message is that the information is not only public, but it is also global and instantaneous. Remember, depending on the settings (or, quite often, the default settings) on your application, that everyone can see what you are saying and your messages are spread around the globe instantaneously.

Personal security should be a concern to you and your family when communicating via either social media or ham radio. When I was growing up and on the ham bands, my radio tutor would always remind me to talk about things after they happened, rather than talking about things before they happened. For example, since hams can be found by doing simple search on a callsign, you really should not talk about your three-week vacation overseas before you leave, especially after you mentioned that new computer system or big screen TV you just purchased. Instead, wait until you come home and talk about the fun times and the things you did after the event.

A Useful, but Double-Edged Tool

As an "old guy," I am just starting to use social media, but only as time allows. My new day job and new projects are filling my free time, and I actually would rather do something with real things and real people, rather than writing and documenting these events on my computer. However, I must confess that I believe this self-promotion is mandatory and should be part of everyone's lifestyle today.

My recent bout of unemployment forced me to use social media to uncover job opportunities, perform company research, and get connected to new friends and colleagues. At first I was very concerned about the lack of privacy and feared identity theft. However, as my job search continued without success, I had to do something different. I needed to try some new things, because my previous strategies did not work. Social media (and LinkedIn in particular) became one of my most fruitful job search tools.

As they say about today's job market, it is no longer what you know. It is no longer who you know. It is who knows you. Leveraging the power of social media is the only way to make this happen.

Summary

I hope this article has inspired you to at least become aware of social media and how it is used. It is another way of communicating and can supplement what we do on the ham bands. It can be a way to reach beyond our network of ham friends and also connect with younger, equally interesting people—and possibly recruit them onto the ham bands.

If you have kids who are active on social media, you may want to monitor their online activities, since they may not know the impact of what they are doing even while engaging in casual "conversation" with their groups and friends.

I am just starting my venture into social media (LinkedIn, WordPress, YouTube), so if you run into me, I would be glad to connect with you. Also don't forget to "like" CQ magazine on FaceBook and join the CQ Group on LinkedIn!

TNX es 73 and BCNU . . .
Wayne, KH6WZ

References

"Embrace Social Media—But Don't Try to Control It," by Glenn Bischoff, September 14, 2012: <http://www.UrgentComm.com>

Socialnomics: Erik Qualman's comments on social media and its impact on society: <http://www.socialnomics.net>

Q Codes: <http://en.wikipedia.org/wiki/Q_code>

CW Abbreviations: <http://en.wikipedia.org/wiki/Morse_code_abbreviations>

"The Simple Twitter Book." by Brent Ozar, available online (free download): Brent Ozar Unlimited, 15500 Jay Street #45799, Beaverton, OR 97006; <http://www.brentozar.com>

"Top Twitter Abbreviations You Need to Know," posted May 22, 2012. Caution: Several entries are not suitable for children. <http://socialmediatoday.com/node/512987>

Wayne Yoshida KH6WZ YouTube: <http://www.youtube.com/user/kh6wz>

Wayne Yoshida KH6WZ WordPress: <http://wayneyoshida-kh6wz.com>

LinkedIn: <www.linkedin.com/in/waynetyoshida>

In Defense of W2OY and Other Curmudgeons

BY JANIS CARSON,* AB2RA

In the September 2012 *CQ* magazine, the "Zero Bias" editorial mentions Mike Premus, W2OY. I am writing in his defense. I have been active as a ham in central New York since 1959, and did a lot of listening and CW because I did not have effective antennas downtown. I became interested in pursuing a career in electronics as a result of Sputnik and ham radio, so I was a space cadet like a lot of young people at the time. I had a wonderful opportunity to spend part of my career working on satellites later on.

Mike really was not a totally bad guy. The technical excellence of his station set an example for good engineering. He did speak out for proper operating practices and against such things as "phony phonetics"—not sticking to proper word lists on phone. But he was *never* boring. Maybe he did not do it in the most persuasive way. You cannot say that about many stations you can listen to on 75 meters after dark these days. Squabbles over rights to a frequency detract from the impression outsiders have of the hobby. In those days, SSB was relegated to the upper few kc of the 75-meter band, AM and CW were pervasive, and the "frequency wars" happened on the boundaries. In these squabbles you had your real "lids."

AM often attracts attention because it is so accessible to SWLs. The contemporary AM community has iconic members such as WA1HLR, W2VJZ, and W8VYZ, whose voices are also preserved in audio clips on the internet. Each, like Mike, contributed to the colorful history of the hobby. Some, such as Tim (HLR), have contributed to the preservation and operation of vintage equipment. Others have tweaked less than perfect solid-state gear to reasonable performance. People who have happened on the scene recently have made contributions to the state of the ham radio art by even marketing Class E AM rigs. Wouldn't it be great to see more homebrewing as a result of fresh ideas? Check it out at <http://www.classeradio.com/>.

Another well-known ham of that era was Clara, W2RUF, who was active in the CW traffic nets. I was fortunate to have known her when a friend encouraged me give to the nets a try. A memorial is on the net at <http://hamgallery.com/Tribute/W2RUF/w2ruf.pdf>. She would not fall into the category of curmudgeons, since her work was more positive in presentation. And contrary to popular opinion, women *were* active contributors to ham radio in those days.

What I am trying to say is, there is—and always should be—a tension between the past and the future. This is why I am a member of FISTS, but supported the work of No Code International. FISTS does a lot of valuable training and promotes the use of CW. Riley Hollingsworth, K4ZDH, makes a brief reference to this past conflict. Sadly, the work of W5YI (Fred Maia, SK), Bruce Perens, and Guy Matzinger (now W1GUY) on behalf of the hobby through NCI has almost been forgotten. In this case, the ARRL was the curmudgeon, fighting to the very end the best path to a new resurgence in the hobby. Another legendary icon is Wayne Green, W2NSD, publisher of *73 magazine* as well as a number of computer-related journals. His diatribes on the ARRL were a force for positive change and provided a refreshing contrarian take on a number of topics. Ham radio has benefited from all of the voices being heard.

In defense of a curmudgeon, the ARRL has done a lot of good for the hobby such as the WARC bands and protecting our access to the spectrum. It just made a bad call on the Morse testing issue.

We need a W2OY memorial site for good phone operating practice. So let's let W2OY rest in peace. He surely left a mark on the hobby. Good memories, too. 73, Janis, AB2RA

*e-mail: <AB2RA@htva.net>
web: <wireless-girl.com>

The Radio Club of Junior High School 22

Bringing Communication to Education Since 1980

DONATE YOUR RADIO

Radios You Can Write Off - Kids You Can't

- Turn your excess Ham Radios and related items into a tax break for you and a learning tool for kids.
- Donate radios or related gear to an IRS approved 501(c)(3) charity. Get the tax credit and help a worthy cause.
- Equipment picked up anywhere or shipping arranged.

PO Box 1052
New York NY 10002
E-mail: crew@wb2jkj.org
www.wb2jkj.org
Call 516-674-4072
Fax 516-674-9600

WB2JKJ

learning curve

BY RICH MOSESON,* W2VU

Becoming a Beginner (and an Expert)

Thank You and 73 to K7SZ

"Learning Curve" editor Rich Arland, K7SZ, has decided that after 10 years of writing various columns for *Popular Communications*, *CQ VHF*, and *CQ*, it's time to do something else with his free time. So we bid Rich a fond farewell and 73, with our gratitude for a decade of service to our readers. I will be filling in until a new "Learning Curve" editor has been named. — *W2VU*

I've got a secret for you … I've been a ham for more than 40 years, and I'm still a beginner. And so are you. According to our reader surveys, on average, one *CQ* reader in 10 has been licensed less than five years; and roughly six in 10 have been licensed for more than 25 years. But 100 percent of our readers either are, or can become, beginners at some aspect of amateur radio. In my 40+ years as a ham, I have never met a single amateur who has done absolutely everything the hobby has to offer or who has mastered all of ham radio's different activities and adventures.

Many of us, of course, *are* experts—but in one or two selected areas. If you take a "big gun" in HF contesting and sit him down in front of a satellite station, or a portable microwave setup on some hilltop, chances are he will not intuitively know what to do in order to make contacts. In some cases, he might not even know how to program a VHF/UHF handheld.

What is an expert, anyway? To most of us, anyone who knows more about a subject than we do

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

Tom Tumino, N2YTF, of the Hall of Science Amateur Radio Club, talks with a young fairgoer at the 2012 World Maker Faire in New York City about home-built low-power ham gear. W2VU's "tuna tin" station is on the table behind the hand key. (W2VU photos)

Once again, learning to solder was a big hit at the New York Maker Faire. This time, RadioShack® sponsored the activity as part of its return to its roots as a source for builders. We need activities like this at our hamfests, and not just in areas reserved for kids. There were as many adults as children trying their hands with soldering irons here, and at least as many women as men.

is an expert in that subject. If that contesting big gun who's never programmed a handheld before just got one for Christmas, and you—who are perhaps one of our 10 percent of readers licensed less than five years, but have a fair amount of experience in programming handhelds—offer to help, then you are an expert in his eyes. Another ham may be a "tower jockey" who's great at 150 feet, but who knows little about running a wire antenna in an attic. And one of the great things about ham radio is that there's an endless supply of new things to try, to learn about, to fail at, and to reach out to our fellow hams for help in learning to succeed. We are all beginners. But most of us are also experts ... even if we don't realize it.

A Beginner and an Expert

I have spent the past year or so learning about low-power (QRP) operating "in the field" and slowly putting together a portable HF station with the goal of being able to hike to some remote location, pull a radio, battery, and antenna out of my backpack, and get on the air from "off the grid." I have had (and needed) help at every turn from more experienced QRP/"Trail-Friendly" radio ops.

So far, I've gotten as far as a local park (one contact) and the Hall of Science Amateur Radio Club booth at the 2012 World Maker Faire in New York City, where I set up my kit-built "tuna-tin" station and end-fed halfwave dipole antenna. I made no contacts there but had learned enough about what I was doing to be able to demonstrate the station and talk about its capabilities. In that setting, I was an "expert," because I knew more about it than the average attendee, even though I still consider myself very much a beginner overall. So in this case, I was both a beginner and an expert simultaneously. One other thing ... I had a blast! (Thank you again to the HOSARC folks for the opportunity to share your booth.)

Become a Beginner

One of the problems ham radio has faced for a very long time is that some people have a tendency to think that whatever it is they do with the hobby and have done for a long time—whether it's DXing, contesting, public service, or operating QRP portable—is what the hobby is all about. And if they start getting tired of what they do, they decide that ham radio is no longer interesting for them. This afflicts newer hams as well as old-timers. Many a new ham who started out on a local repeater and grew bored with it has dropped out rather than seeking out some other aspect of our tremendously diverse hobby.

This is where clubs and magazines are incredibly valuable, because they expose us to the many varied parts of amateur radio. Read about the different

Listening is only half the fun...

POPULAR COMMUNICATIONS

is the other half!

The World's most authoritative monthly magazine for Shortwave Listening and Scanner Monitoring.
Read by more active listeners world-wide.

You'll find features on scanner monitoring of police, fire, utility, and aircraft communications; international shortwave listening; CB radio; amateur radio; FRS; GMRS; monitoring radio digital communications including CW, RTTY, SITOR, etc; AM/FM commercial broadcasting; weather and communications satellites; telephone equipment and accessories; radio nostalgia; alternative radio; and military radio.

Choose the PRINT Edition or New DIGITAL Edition!

Buy both at a SPECIAL price!

Combo Sale!

1 year	Print	Digital	Both!
USA	$34.95	$24.00	$49.95
CN/MX	$44.95	$24.00	$59.95
Foreign	$5495	$24.00	$69.95

Popular Communications
25 Newbridge Road, Hicksville, NY11801
Phone: 516-681-2922; Fax 516-681-2926
Visit our web site: www.popular-communications.com

"Getting Started" DVD Paks

CQ Ham Radio Welcome Pak
1 DVD contains 3 programs:
Ham Radio Horizons
Getting Started in Ham Radio
Getting Started in VHF
Order # HAMDVD ~~$24.95~~ **$16**

SALE!

CQ HF Specialty Pak
1 DVD contains 2 programs:
Getting Started in DXing
Getting Started in Contesting
Order # HFDVD ~~$24.95~~ **$16**

Buy any combination of DVDs and save!
1 Pak for $16
2 Paks for $30
3 Paks for $45

CQ VHF Specialty Pak
1 DVD contains 3 programs:
Getting Started in Satellites
Getting Started in VHF
Getting Started in Packet
Order # VHFDVD ~~$24.95~~ **$16**

CQ DVD 3 Pak - one of each of the 3 DVDs above
Order # 3DVD ~~$65.95~~ **$45**

Shipping & Handling: U.S. & Possessions-add $7 for the first item, $3.50 for the second and $2 for each additional item. FREE shipping on orders over $100 to one U.S. address. CN/MX-$15 for 1st item, $7 for 2nd and $3 for each add'l. All Other Countries-$25 for 1st item, $10 for 2nd and $5 for each additional.

CQ Communications Inc.
25 Newbridge Rd., Hicksville, NY 11801
516-681-2922; Order Toll-Free 800-853-9797
http://store.cq-amateur-radio.com

As usual at a Maker Faire, it wasn't hard to find a fellow ham. Here, Robert Fitzsimons, EI2GQB, of the Dublin hackerspace TOG (note the radio antenna in the logo) demonstrates a giant-sized Arduino Uno. Also on hand were the Antique Radio Club of New Jersey (with a program on radio building for the 21st century) and the Brooklyn, New York-based NYC Resistor hackerspace, whose membership includes some of the Maker movement's leading hams.

things people are doing with ham radio, from high-altitude balloon launches to remotely-operated HF stations and so much more; go to club meetings where members and guests talk about the different ways they're using ham radio; discover something new that sounds interesting to you.

Once you've identified that new area of interest, look for books and articles on the topic. The Internet can be a tremendous follow-up resource as well. There are websites and groups for virtually everything that people do with ham radio and they're as close as the nearest search engine. Getting help, getting educated, and making new friends both on and off the air can be just a mouse click away.

So for the new year ... whether you're a new ham or an old-timer looking for a new challenge ... why not become a beginner again and try some new ham radio activity? And remember, once you learn just a little bit more about it than the other folks in your club or on your repeater, then you'll be not only a beginner but an expert as well!

Happy New Year and happy hamming! 73, Rich, W2VU

Visit Our Web Site

The Emtech ZM-2 Tuner Kit

BY JOE EISENBERG,* KØNEB

First, I'd like to wish all of my readers a very Happy New Year. With the coldest time of the year upon us in the Northern Hemisphere, many of us find it is our favorite time to spend inside working on kits. Remember that when it is cold outside, it is important to keep in mind proper ESD procedures to protect your static-sensitive parts when building. When dealing with kit radios, the question often comes up about what antenna tuner to use. After all, having a monster-size kilowatt tuner will suffice, but it is not as desirable as one designed for low-power portable use. A reliable tuner that can handle the wide variety of impedances presented by various types of antennas is important to kit builders, and having a tuner that is a kit is even better!

The Emtech ZM-2 tuner kit meets the requirements of impedance flexibility and portability, as well as having indication of SWR that is not hard to work with. The ZM-2 will tune all kinds of antennas, including random wires, balanced open-wire feedlines, and coax-fed antennas. It is the proverbial "wet noodle" tuner, but for QRP power levels. The instructions for the ZM-2 are very detailed and suggest winding the two toroids first to get that task out of the way. What is even more interesting is that for those who are adverse to winding toroids, Emtech has an option to buy the kit with the toroids already wound for an extra $9.25. If you choose to wind them yourself, winding the two toroids is not difficult, as the toroid cores are relatively simple. Just take your time to read the directions and double-check your work each time you add a wire. One of the toroids serves as the coupling transformer to measure SWR, while the other serves to perform impedance-matching duties. The LED SWR indicator in the ZM-2 is taken from the original design by Dan Tayloe, N7VE, which has become popular in many other kits.

*7133 Yosemite Drive, Lincoln, NE 68507
e-mail: <k0neb@cq-amateur-radio.com>

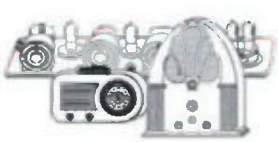
Kit contents as packaged. Notice the large toroid and multiple colors of wires.

Licensed Before 1988?

QCWA invites you to join with those distinguished amateurs licensed 25 or more years ago. Request an application from:

QCWA, Inc., Dept. C
PO Box 2088
Malakoff, TX 75148-2088
USA
www.qcwa.com

Kanga US
KK7B – microR2, microT2, R2Pro
6 and 2 meter converters, CW TX's
Improved microR1, UQRP TX MKII
Spectrum Analyzer Kit is back
TiCK and CWTouch Keyers/Paddles
PICEL3 PIC Trainer, AADE L/C Mtr
Si570 VFO/Sig Gen Project
www.kangaus.com



ANTIQUE RADIO CLASSIFIED

Antique Radio's Largest Monthly Magazine – 4,000 Subscribers!

Classifieds - Ads for Parts & Services
Articles - Auction Prices
Meet & Flea Market Info.
Radios, Ham Equip, Telegraph, Hi-Fi
TV, Books, Art Deco, 40s & 50s Radios

U.S. Rates: 1 year
$36 ($48 by 1st Class)

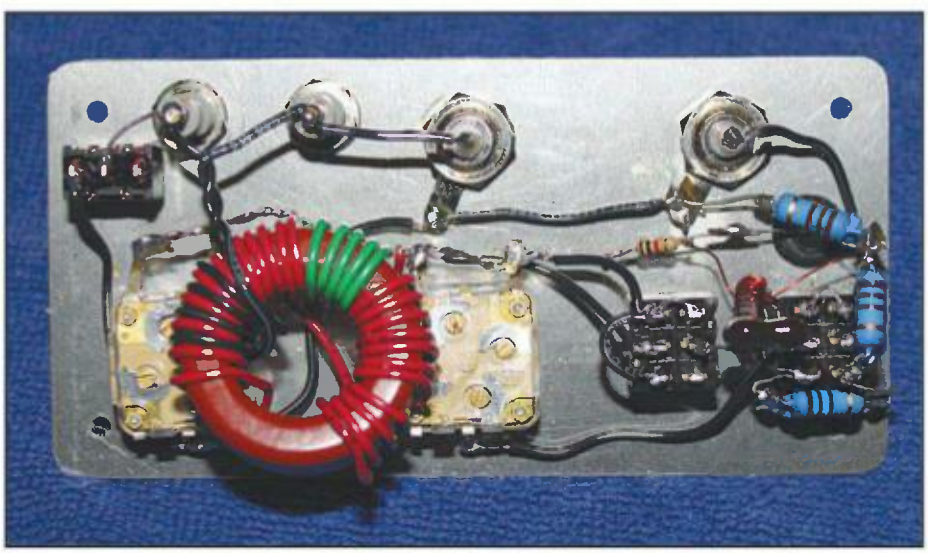
A.R.C., PO Box 1558
Port Washington, NY 11050
Web: www.antiqueradio.com
Email: arc@antiqueradio.com
Toll Free: (866) 371-0512
Fax: (516) 883-1077

PayPal VISA

Unlike most antenna tuners, there are no switchable inductors in the ZM-2. There are just the two variable capacitors and a switch that allows you to switch in additional capacitance, if needed on 80 meters. Another switch allows you to tune a random wire instead of a balanced line.

The kit comes with an adhesive decal for the front-panel markings, and a spare decal is provided should you mess things up, like I did, by scratching one of the markings off when installing a switch. The case and front panel come pre-drilled and punched and ready to go. Since there is no PC board in this kit, all of the wiring is point-to-point. After the toroids are wound, you place the decal on the front panel and then mount the components needed on the front panel. The other parts mount to the front-panel components, and you use the extra black wire supplied to make the rest of the connections. These connections do not need to be made in any particular order, but pay close attention to the diagrams to see where each part needs to be to prevent shorts when placing the finished front panel in the case. I simply followed the three supplied diagrams in their order to get the parts mounted and wiring completed. You will spend about an hour winding the two toroids and preparing their leads and a few minutes more preparing the front panel for the label and trimming the label and holes once installed. Be sure to have a sharp X-acto® type hobby knife to work with the label.

The final assembly for me was plac-



Front panel completely wired with the large toroid in place.

The Emtech ZM-2 completed in the supplied case.

ing the large toroid behind the two tuning capacitors. I recommend that being the last part of the project, as it covers a lot of connections that need to be made. Also, you might find yourself soldering a wire over one already in place as you make your connections. I minimized this by looking ahead at the diagrams to see where the large toroid, as well as other components and wires, was to be placed.

I believe that this kit can be completed by many builders in one evening, but if you take your time, it might take two evenings or a nice afternoon. I recommend taking your time and enjoying the process of building this tuner. Once completed, follow the directions carefully when using this tuner, as it is designed to be used exactly as directed. This includes being careful to turn the link switch to ground when tuning coax-fed antennas and turning it off when tuning a balanced feedline. The tuning is rather sharp, so be careful when turning the knobs, knowing that they interact, so retune each after the other is tuned to get your best match. I got mine into the ballpark by using receiver noise and then followed with the quick tune-up procedure. The best match is indicated when the LED dims or goes out with 5 watts or less signal on the input.

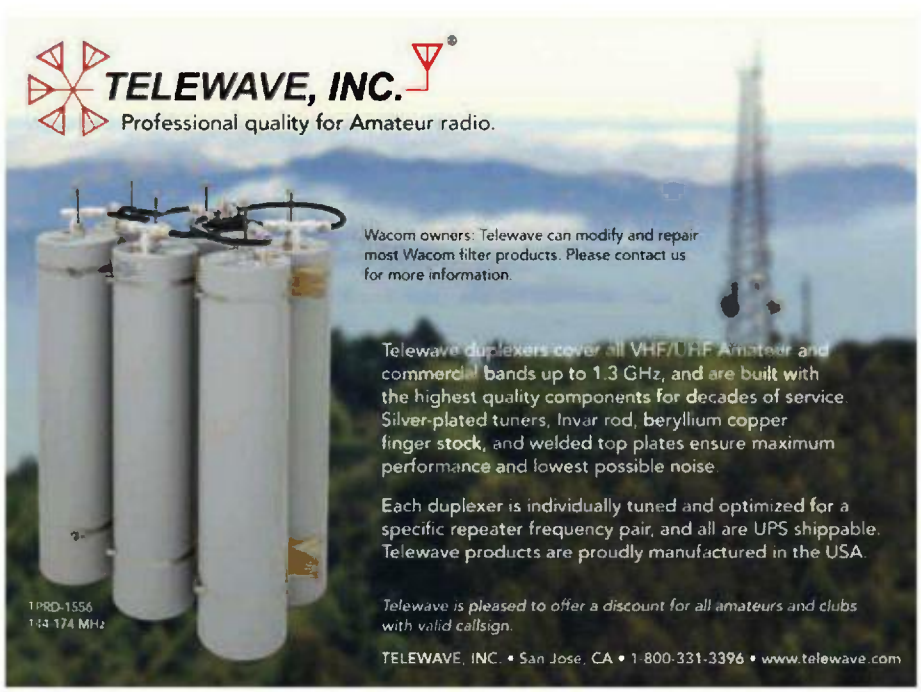
Without a switched inductor, this tuner tunes very quickly and also always presents at least a 2:1 SWR in the tune mode to your transmitter to protect sensitive QRP output stages. Also keep in mind that although a tuner makes your transmitter happy by presenting a correct load to it, you may not be radiating as much RF as you can. Always be sure your antennas are tuned and you have good feedline and a good ground or counterpoise for best results.

The ZM-2 is available from Emtech at <http://emtech.steadynet.com> for $65 including shipping in the U.S. and Canada. You have a choice of BNC or SO-239 connectors, and for $9.25 extra you can have the toroids pre-wound.

Finally, when building a kit, be sure to always keep your parts safe from being disturbed by unwanted visitors, pets, and other hazards. There is nothing worse than coming back to a kit under construction with a cat nearby and finding your parts strewn all over.

If you have any suggestion for currently available kits that should be covered in this column, let me know and I'll look in to them. Enjoy all of the fun winter contests and keep building!

73 de Joe, KØNEB



BY JOHN WOOD,* WV5J

New Mini-SSB Rigs and Running Rings Around Your Vertical

Happy New Year and I hope you found some new radio toys under the tree to get 2013 off to a good start. We'll get started this month with a couple of new portable SSB transceivers, followed by help for guying vertical antennas, components for builders, an interactive catalog, and a hands-on kit for learning about digital logic.

MFJ Adventure Radios™

MFJ has added two new bands to its Adventure Radios™ line of not-quite-QRP portable single-band HF transceivers. The MFJ-9417 (photo A) gives you 12 watts PEP of single-sideband (SSB) voice on 17 meters (18 MHz) as well as CW capability; and the MFJ-9412 is the 12-meter version, delivering 20 watts PEP on 24 MHz. Both radios feature MFJ's exclusive "ConstantCurrent"™ syllabic speech processing for extra audio punch on transmit, as well as a superhet receiver with a double-balanced mixer and low-noise front end to reduce intermod.

The radios are lightweight and tiny, measuring just 6.5 inches wide by 2.5 inches high and 6 inches deep. However, the receive audio is anything but tiny, with a half-watt of audio delivered through a 3.5-inch speaker mounted on the radios' top side. These little rigs also feature an analog S-meter (which doubles as a speech processing level meter on transmit), analog tuning, and an FET switch to key an external amplifier. If you're not running an amp, then the radios can be powered by a 2-amp AC supply or a 12-volt DC battery. A handheld dynamic microphone is standard, along with a jack for plugging in your favorite key for working CW.

As with everything else from MFJ, the 9417 and 9412 are covered by the company's *NoMatterWhat*™ one-year limited warranty. List prices for these little transceivers are $269.95 for the MFJ-9417 and $289.95 for the MFJ-9412. For more info, visit the MFJ website at <www.mfjenterprises.com>.

*1870 Alder Branch Lane, Germantown, TN 38139
e-mail: <wv5j@cq-amateur-radio.com>

Photo A– The MFJ-9417 is one of two new additions to MFJ's Adventure Radio™ line of portable low-power SSB transceivers. It covers the 17-meter band, while the MFJ-9412 operates on 12 meters. (Photo courtesy MFJ Enterprises)

DX Engineering Guy Rings

Have you ever wondered how you can securely guy a vertical antenna made from telescoping sections without affecting the antenna's performance? DX Engineering has an answer, with its new set of non-conductive guy rings (photo B) designed for rope guying of most verticals made from aluminum tubing, including DX Engineering, Hustler, and others.

The guy rings are made from glass-reinforced, UV-resistant black poly-resin material that the company says is "virtually impervious to extreme outdoor conditions and mechanical stress." Each ring has holes for up to six guy ropes, with no sharp

Photo B– A set of guy rings from DX Engineering makes it easy to secure vertical antennas made from telescoping aluminum tubing elements. (Photo courtesy of DX Engineering)

Photo C– Installing the DX Engineering guy rings is easy. Simply slide each one over the appropriate-sized element and let it rest on top of the next larger section. (Photo courtesy of DX Engineering)

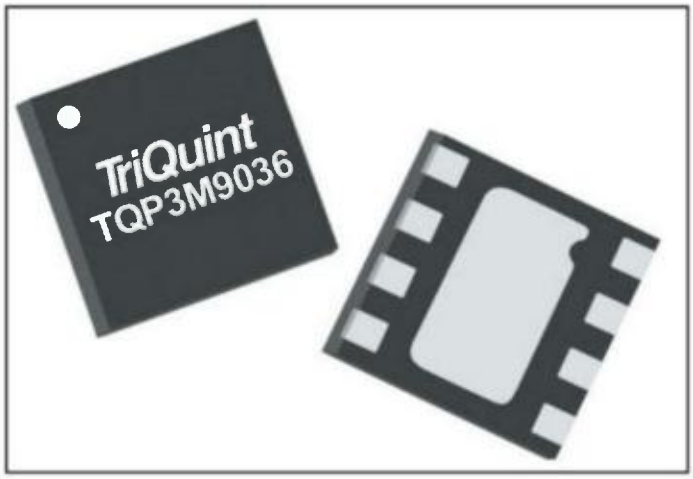


Photo D– The TriQuint Semiconductor TQP3M9036 low-noise amplifier is one of three new products introduced recently by RFMW, Ltd. (Photo courtesy RFMW, Ltd.)

edges to cause catches in the ropes. The set contains five rings, with one each designed to fit 0.75, 1.0, 1.25, 1.50, and 2.0-inch outside diameter (OD) aluminum tubing, so you can use whichever ones are appropriate for the thickness of your antenna. They simply slide over their respective tubing size and seat firmly against the top of the larger section below (photo C). List price is $7.95 per kit of five rings. For more information, go to <www.dxengineering.com>.

New Components from RFMW

RFMW, Ltd., has added a new transistor, a low-noise amplifier, and an RF switch to its ever-growing line of microwave components. The transistor is the T1G4003532-FL from TriQuint Semiconductor. It operates from DC to 3.5 GHz and puts out up to 37 watts. The FL is a flanged package that can be bolted down. There is also an FS model without the flanges. RFMW says the 3532 is ideal for radars and communications systems requiring high gain and high efficiency.

Also coming from TriQuint is the TQP3M9036 low-noise amplifier (photo D), covering 400–2000 MHz and producing 19 dB of gain with a 0.45-dB noise figure. It requires only bypass/blocking capacitors and a bias inductor for operation—no matching components needed.

Finally, the RFSW1012 switch from RFMD is a single-pole, double-throw (SPDT) RF switch that operates between 5 MHz and 6 GHz and can handle up to 4 watts of RF power (over 500 MHz). Designed to operate in either 50- or 75-ohm environments, the switch has an insertion loss of only 0.3 dB and features 37 dB of isolation.

More information on these products is available at <www.rfmw.com>, or you can contact the company by postal mail at 90 Great Oaks Blvd., #107, San Jose, CA 95119, by phone at (408) 414-1450, or by e-mail at <info@rfmw.com>.

Pastenack Interactive Catalog

Another supplier of RF and microwave products—Pasternack Enterprises, Inc.—has introduced an interactive version of its product catalog. The company says the interactive catalog contains all of the same content as the print version but has added features to make searching and purchasing easier. For example, you can zoom in on a product photo or link directly from a catalog listing to the respective product page on the Pasternack website. Viewers may also move freely back and forth between the catalog and their online shopping cart. Pasternack Marketing Manager Shaun Gameroz tells *CQ* that the interactive catalog "is proving to be very useful to our growing population of online and mobile customers," and he says it is "simply another helpful tool we are offering our customers." The catalog may be accessed from Pasternack Enterprises' home page at <http://www.pasternack.com/> or viewed directly at <http://www.pasternackcatalog.com>.

LogicBlocks Kit for Computer Education

SparkFun Electronics has introduced the LogicBlocks Kit, designed to help students and beginners learn the basics of digital logic, the basis of digital computing. Understanding digital logic is essential to understanding how circuits and hardware communicate within a computer, according to the company.

SparkFun says the kit includes various blocks—such as Input, AND, OR, and NOT blocks—that snap together to create different strings of logic. Lindsay Levkoff, the company's director of education, says, "The different sequences of the blocks' orientations allow students to actually *see* the logic rather than just having it be a conceptual building block." The kit is priced at $39.95 and can be ordered from <https://www.sparkfun.com/products/11006>. Additional information is available at <www.sparkfun.com/LogicBlocks>.

App of the Month

VHF Rovers and other hams who want to know their precise locations and how that translates into the Maidenhead Grid Square system should check out the *HamSquare* app for iPads and iPhones. This free app uses the GPS receiver in your mobile device to pinpoint your location and displays your six-character grid locator (e.g. FN20vs) as well as your latitude and longitude and a margin of error on your screen. It is very handy for VHF contesters, microwave hilltoppers, and others who depend on grid locators for contacts and determining distances covered. HamSquare is available in the iTunes App Store.

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

Digital Editions

Available on all magazines!

Viewable on your PC, Mac, iPad, iPhone and Androids 2.0 and higher.

CQ Communications • 25 Newbridge Rd.
Hicksville, NY 11801 • www.cqcomm.com

antennas

BY BOB LOCHER,* W9KNI, GUEST COLUMNIST

The New 40-meter Yagi Adventure

A beautiful view ... and mountains, too! The view across the Rogue River valley from the base of W9KNI's 40-meter tower, showing his second tower supporting a 30-meter Yagi and a Bencher Skylark. (Photos courtesy of the author)

About five years ago, I put up a 40-meter Yagi at my new QTH in Grants Pass, Oregon. The Yagi had three elements, each about 47 feet or 15 meters long, using high "Q" loading coils. Boom length was about 36 feet, or 8.5 meters. The basis of the design had been developed by W6ANR and had been rendered into reality by my close friend and neighbor Rich, K7ZV. The 40-meter design had been scaled down from Rich's spectacularly successful 80-meter Yagi.

The combination of the antenna and the QTH quickly proved to be very good. Especially in the fall and winter months, Dawn Patrol provided some fascinating DX, both long path and short path. Most of the time, when paths peaked for me, I was hearing the weak DX signals better than anyone else on the West Coast. I did not always win in the pile-ups; several stations often beat me out. I was running an Amertron AL-1200 with 1500 watts output and being beaten out by one or two "S" units, but the other stations typically had a lot more trouble copying the DX than I did.

However, as one friend put it, the stations beating me out were known to be using final amplifier tubes that had "handles." (Tubes with handles start at 5000 watts plate dissipation and go up from there.). Needless to say, I was well satisfied with the antenna.

Before I go further, let me also describe the site. Grants Pass lies in southwestern Oregon, along the banks of the Rogue River. The river valley is surrounded by mountain peaks, some of our front range going to as high as 4700 feet (1800 meters) above sea level, with taller peaks behind them. The floor of the valley is at about 850 feet (275 meters) above sea level. My home is on the side of a hill coming up from the valley floor, with the home site being about 1400 feet (450 meters) above sea level, and thus about 550 feet (175 meters) above the valley floor. The top of the hill is about another 50 feet (16 meters) higher behind the house, and the tower for the Yagi is on top of the hill. While the mountains surrounding my hill do go much higher, they are six or seven miles (about ten km) away, so they do not trap my signals. While I have no negative horizon, neither do I have significant obstructions.

The tower is a US Tower motorized crank-up, a magnificently engineered and manufactured tower that retracted is about 24 feet (7.5 meters) high and is 89 feet (28 meters) high when fully extended, and capable of holding large antennas such as 40-meter Yagis.

Since the feed line is about 650 feet (200 meters) from the shack, I use 7/8-inch (22 mm) cable TV hard line for a feed line. This coax has very low loss at HF frequencies, 72-ohm impedance, and was made up of roll ends obtained from a cable TV operation in California. Homemade splices give me the needed length. Broadband impedance transformers at each end, purchased from Array Solutions, convert the impedance to 50 ohms.

* *e-mail: <bob@thelochers.net>*

Winter Finds at the CQ Store

FREE shipping on orders of $100 or more!

DX World Guide

by Franz Langner, DJ9ZB

This 384-page DXer's guidebook is the first edition using color throughout and the first to be entirely in English.

Includes info on well over 300 DX entities. Geographical info, WAZ and ITU zones, ITU callsign allocations, amateur prefixes and more!.

6 X 9 Paperback $42.95
***New!* CD Version $22.95**
Buy both for only $60.95

HEATHKIT

A Guide to the Amateur Radio Products
by Chuck Penson, WA7ZZE

Back by popular demand!

This 328-page Second Edition is a must-have for collectors and Ham history buffs alike.

Order No. HEATH $32.95

Mouse Code

by Joel Thurtell, K8PSV

A great book for the kids in your life! When humans start plowing up North Field and cutting down trees, two field mice (re-)invent radio to warn the animals of danger, using a form of Morse code that can only be called... Mouse Code!

Order No. Mouse $12.95

MIL SPEC Radio Gear

Korean to Present Day
by Mark Francis, KIØPF

Detailed write-ups for many familiar sets: PRC-25/-77, RT-68, PRC-1099, GRC-106, GRR-5, R-392 and more. Over 230 pages of ops, mods, and maintenance tips 200+ illustrations.

Sale!

Order No. MILSPEC ~~$27.95~~ $15

Understanding, Building & Using Baluns & Ununs

by Jerry Sevick, W2FMI

The successor to the popular and authoritative Baluns and Ununs. Great deal of new tutorial material, and designs not in previous book, with crystal clear explanations of how and why they work.

8.5 X 11 Paperback $19.95
***New!* CD Version $14.95**
Buy both for only $29.95

The Short Vertical Antenna and Ground Radial

by Sevick, W2FMI

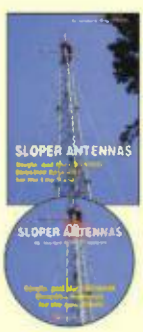
This small but solid guide walks you through the design and installation of inexpensive, yet effective short HF vertical antennas. With antenna restrictions becoming a problem, it could keep you on the air!

6 x 9 Paperback $10.00

Sloper Antennas

By Juergen A. Weigl, OE5CWL

Single- and Multi-Element Directive Antennas for the Low Bands



With calculations and practical experience, this book shows which basi concepts have to be considered for sloper antennas for the low bands.

6 X 9 Paperback $24.95
***New!* CD Version $18.95**
Buy both for only $36.95

Reflections III

by Walter Maxwell, W2DU

Includes all the information in Reflections I & II and much, much more! This fully revised and updated, this 424-page, third edition is truly a must have!

8.5 X 11 Paperback $39.95
***New!* CD Version $29.95**
Buy both for only $59.95

2013 World Radio TV Handbook

The most up-to-date info on mediumwave, shortwave, FM broadcasts and broadcasters. Articles, reviews of the latest equipment, maps, and more. Due in mid-Dec. You will not be charged until it ships!

Order No. WRTH $35.00

HF Antennas for Everyone

Edited by Giles Rad, G1MFG RSGB

No matter the size of your available space - you'll find antenna designs that will help yo get your signals in and out!

Order: RSHFAE $27.95

HF Amateur Radio

RSGB 2007 Second Edition

This full revised and expanded second edition guides you through setting up an efficient amateur radio station, equipment to choose, installation, the best antenna for your location and MUCH more.

Order: RSHFAR $23.00

Collins Radio Repair & Tune-Up DVD Guides

From Hi-Res Communications, Inc., these well-produced, authoritative DVDs cover all the most common repair and tune-up subjects on these classic radios. It's like having an experienced professional right next to you!

Collins KWM-2
2 disc set, 236 minutes
Order No. C-KWM
$89.95

Collins 75S-3/32S-3
2disc set, 226 minutes
Order No. C-75S
$89.95

Collins 30L-1
Single Disc, 61 minutes
Order No. C-30L
$39.95

Shipping & Handling: U.S. add $7 for the first item, $3.50 for the second and $2 for each add'l item. FREE shipping on orders over $100 to one U.S. address. CN/MX-$15 for 1st item, $7 for 2nd and $3 for each add'l. All Other Countries-$25 for 1st item, $10 for 2nd and $5 for each additional. Buy Both=single item!

CQ Communications, Inc., 25 Newbridge Road, Hicksville, NY 11801
***Call:* 1-800-853-9797 • *Fax:* 516-681-2926 • *website:* http://store.cq-amateur-radio.com**

The only real problem with my antenna was its bandwidth. It was good for about 75 kilohertz, making it almost unusable for SSB. Since 40-meter SSB has become an active DX band, this was becoming something of a handicap.

A New Design

Rich, K7ZV, developed a new design for 40 meters using EZNEC-4. This antenna would use the same style of elements, with the high-Q loading coils, but have a longer boom and an additional element. The primary purpose of this added element was to act as a second driven element, fed out of phase with the other driven element to broaden the bandwidth of the antenna. Further, the boom would be lengthened by about 6 feet (2 meters). The antenna model that Rich developed would offer wide bandwidth and slightly more gain than the existing three-element antenna. We decided to modify my antenna to the new design. Additional materials were procured, and Rich built the new additional element.

Last fall Rich and I took down the 40-meter Yagi. We retracted the tower and then lowered the antenna using a rope going through a pulley set on top of the mast. The antenna came down fairly easily.

Events then intervened, though. The weather began to deteriorate, with a good deal of rain. In the end, it was several weeks before we were able to get the modifications effected and installed.

Finally, during the third week of November the modifications were finished and the antenna was ready to go back up. While the weather was generally not very good for tower work, thanks mainly to a series of rainstorms we finally got a day of fairly clear and dry weather. We set up the antenna at the base of the tower and attached the rope, bringing it down from the pulley to another pulley at the bottom of the tower and away. Rich owns a small tractor, and we set that up to do the actual pulling on the rope. We had a steering harness attached to the antenna. My son Rob, W7GH, helped with the steering.

We started to pull the antenna up. The rope was not running smoothly. At least a part of the problem was that the rope had to run over itself due to the arrangement of the pulley, which could not easily be changed. However, we were confident everything would hold. Nonetheless, Rich, who was driving the tractor and also acting as team leader, cautioned us to be sure we were not immediately under any of the elements, and also cautioned me to stand clear of the rope coming away from the tower.

Slowly the antenna went up, jerking in response to the binding on the rope. At a height of about 20 feet (6 meters), suddenly the rope broke! In an instant the antenna was on the ground. My glasses had gone flying. I looked around and everyone was OK. Rob had gotten slapped with the tip of an element as it went by but had no personal damage other than a little smarting. Rich was entirely clear. I eventually figured out that my glasses must have been caught by the broken rope as it went by me at a very considerable velocity. I never felt anything, and fortunately my glasses and I were undamaged.

We stood there in shock for several minutes. Frankly, we were very fortunate that there was no injury. One or more of us could easily have been severely injured or killed. Obviously, we were quite dismayed.

After a few minutes of calming ourselves down, we inspected the damage to the antenna. Actually, it was amazingly minor. All four element tips on one side needed replacement, as well as one interior portion of a single element. None of the loading coils were damaged at all, nor were the boom, the mounting hardware, and the feed system. One thing had helped. We had stuck a 4" ×4" (10 cm × 10 cm) post though the tower to support the boom of the antenna before it went up and that was still in place. The post was aged and weathered and not in the best of condition but served our purpose.

The new 40-meter Yagi where it belongs—high in the air!

When the antenna came down, the boom-to-mast plate struck that post and broke it. The broken part of the post then slammed down to the ground at an angle, forcing the antenna boom away from the tower just a little, but enough that the boom did not strike the concrete base of the tower, and at the same time significantly cushioned the impact of the antenna. In every possible respect we were extremely fortunate.

Needless to say, we were a bit shaken by the turn of events and called a halt to any further antenna work for the day, other than to take an inventory of what pieces of aluminum tubing would be required to replace the damaged pieces.

And then the rains began.

Six days and 3 inches (7.5 cm) of rain later, weather conditions improved, with a dry day and minimal morning fog that was slowly clearing. Rich showed up with some extra aluminum tubing and we began repairs. Two hours later everything was finished. The weather continued to improve. After a break for lunch, Rich and I set out to raise the antenna. Rob was unavailable to help us that day.

Rich in particular had done a lot of thinking on how to set up the raising procedure. He has had a good deal of experience using ropes, blocks, and pulleys. Also, he had a replacement rope that was heavier and stronger, a nylon or Dacron rope with a 9/16-inch diameter (14 mm) and a braided cover, offering more than twice the strength of the original. This time the rope was routed differently using a tree stump on the other side of the tower to hold a block, which both evened the downward pressures on the mast and, more importantly, kept the rope from binding on itself.

An hour after we had finished lunch, the antenna was on top of the tower.

The rest of the job went very smoothly, although it was a bit time-consuming. Bolts were tightened, boom strut wires were adjusted and then safetied with wire through the turnbuckles, coax was looped, etc., and the job was finished. The ropes were removed, the ladder to the top of the tower was unlashed, and down I came, tired for sure but in very good spirits. We did a partial cleaning of the site, raised the tower—motorized towers are a *wonderful* invention—and then headed for the shack for that first critical test.

On the Air

First, SWR—outstanding! Less than 1.5:1 across the whole 40-meter band (7.0 to 7.3 MHz). The CQ WW CW contest was on, so I turned the antenna to Europe and listened. I was hearing European signals, but frankly they were not all that good. I called several stations with limited success. My first QSO with the new antenna was an eastern European, and he was not easy, but he made me feel better. He was 579 here, and I know for a fact that contest stations in his country often use "Tubes

Amplifiers with a PhD!

160M thru 6M – Full output
Fully automatic and solid state
Internal ATU & Power Supply
Expert 1K & 2K
✦Expert Amps USA✦
Come see us at Belton, Visalia, Dayton, Plano & Huntsville
www.expertampsusa.com

DZKit
The new leader in high performance and great-looking kits that are fun to build and use.

Sienna HF Transceiver
Modular, serviceable, easy to use, great specs, unique features.
Models range from $1200 to $4000

Or build the unique HT-7 40M AM HT!
See review in Nov. 2012 QST.

The DZ Company, LLC
4321 W. Eisenhower Blvd.
Loveland, CO 80537
sales@dzkit.com • 970-667-2254
www.dzkit.com

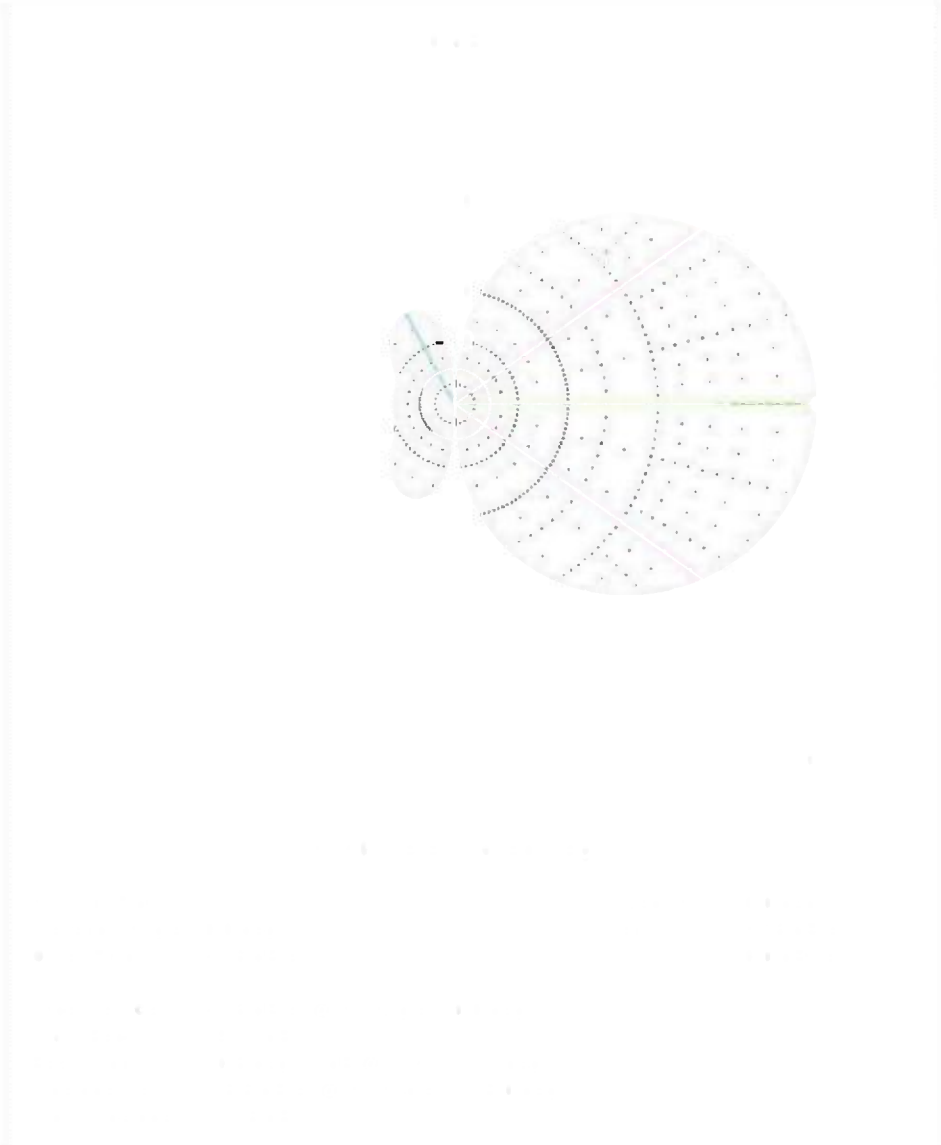
with Large Handles." The band sounded a bit strange, and I suspected a bit of a solar issue.

And so it proved to be: A contest wrap-up complained about the poor band conditions on Saturday afternoon, which was right when I was testing the antenna.

In any case, I am beginning to develop some experience with the antenna. It is still very much "early days" with the Yagi, but my limited experience thus far has entirely validated Rich's design. Front-to-back and front-to-side checks show about 20 dB front-to-back ratio, and about 25 dB front-to-side. Compared with a lot of antennas, these numbers would not seem all that spectacular; however, this antenna was designed to optimize forward gain, *not* front-to-back or front-to-side. Also, significantly, the numbers are very close to the predicted model, which further validates Rich's design.

I have now made some QSOs with the antenna, including excellent long-path QSOs into Europe, as far west as Ireland, with fine strong signals. I had success working 8Q7DV in a big pile-up, and even better, easily worked 5Z4HW in a simplex pile-up. (OK, I admit it; I did move off frequency 200 Hertz.) The antenna is working very well.

The real point of this article, however, is *Safety First.* We were very fortunate indeed that the rope break did not lead to serious injuries. We were being careful up to a point, but frankly we also had a good deal of luck. We could easily have been injured, maimed, or killed.



EZ-NEC plot of predicted performance for Bob's new 40-meter Yagi. On-the-air results show the antenna operates very close to the predictions.

Post-Incident Analysis

A post-incident analysis: The original rope was a 3/8-inch (or about 10 mm) rope made of some poly material in a three strand configuration. The rope had been stored carefully in a container and not exposed to sunlight when not in use. It had been used successfully before in raising and lowering the earlier 3-element 40-meter Yagi, and had been regularly used with my Yagis for higher bands, none of which, however, weighed more than about 70 pounds (32 kg). At this point, the supplier of the rope was unknown, as was the exact material from which it was fabricated. However, some internet research suggests it had a safe load rating of about 250 pounds (115 kg), at least when new. The exact weight of the new 40-meter Yagi is not known, but my estimate is that it is in the area of 150 pounds (70 kg).

Frankly, had I done this research on the rope strength earlier, I am not sure I would ever have used it for the 40-meter Yagi. I can guarantee I never will again! The margin of the safe load was simply too close to the actually load. The jerking of the load caused by the rope having to run over itself undoubtedly caused peaks in the stress load that led to the failure.

Another aspect of rope load safety is confusing. Most rope is rated for tensile strength—the ultimate steady-state load it will carry without breaking. Unfortunately, this number, while important, can be very misleading. It offers no room whatsoever for binding, jerks, or any kind of deterioration. In fact, industry standards derate the tensile strength rating by a factor of better than seven times for a safe load! Therefore, a rope with a tensile strength of 1,000 pounds is considered to be safe to use for a load of about 135 pounds! To be safe, you should always add an additional safety factor.

It was a very sobering experience, one I know I learned from, and I hope all who read this will gain from it as well. *If you are working on a tower project—trust nothing!*

However all's well that ends well. To say my thanks to Rich, K7ZV, simply does not do my friend justice. This antenna is his creation. I feel like the pilot of a plane. I know how to fly it well, but it would never have flown at all without the efforts of all the people who built it and those who maintain it. For this project, Rich is all those people.

73, Bob, W9KNI

Marshmallows and Chasing DX

BY RANDY JOHNSON,* W6SJ, GUEST COLUMNIST

Forty years ago, psychologists gathered a group of 4-year-old kids.[1] The kids were given a choice between getting one marshmallow immediately or waiting 15 minutes and getting two marshmallows. This was basically a test of the desire for immediate gratification versus the ability to enable delayed gratification for a greater long-term reward. Psychologists now realize that self-control and willpower are interrelated and just part of the series of personality traits that end up determining a person's character.

One learns correct social behavior from some "controlling influence." Parents, teachers, bosses, peers, and the like all are there to tell you when your behavior has strayed beyond the acceptable. What you learn then is that negative behavior has negative consequences. Paraphrasing Aristotle, the only way human beings develop true character is through constant practice, until the ethical virtue itself becomes habit. Ultimately, he said people engage in virtuous behavior even if no one is watching.

However, it doesn't always work out that way. Many of us have noticed that peoples' inability to self-regulate their behavior, including the need for immediate gratification, is a major social problem today. We hams are not immune to those same forces.

In a hobby such as ham radio, there really is no similar controlling influence. We rely upon the ability of the other guy to regulate his own behavior. A ham may be a perfect gentleman, courteous and polite, on the job and in social situations, but when he gets in a DXpedition pileup, the self-control he exhibits elsewhere in his life may disappear. He gives into the impulse for the immediate gratification of a contact—right now—regardless of what it takes to get it. That is what adds to the chaos of a pileup.

Unless the DX operator disciplines the pileup through his/her techniques, many of those calling lack the control mechanism that we get from various authority figures in our lives. If you act like a jerk in a pileup, propagation is generally such that the people who know you best, the ones in your local club who might tell you to shape up, can't hear you. They don't know you are being a jerk. The people who *can* hear you being a jerk are one skip away and they probably don't know you. Thus, bad behavior does not result in negative consequences.

You would think that the characteristics of intelligence and grit required to learn the technical aspects of radio and to get a license should mean that most hams' innate characters would have strong willpower. Why, then, is it that enough hams "fall off the wagon" so as to make pileup behavior a problem?

How Your Behavior is Perceived by Others

It has been noted before that, as a group, hams sometimes tend to be less sensitive to the feelings of others than the overall population. Those who fit that description simply may not have the built-in social mechanisms of seeing their own behavior and understanding, or caring, how that behavior is perceived by others.

Consider this, though: Would you act differently if you knew that your calling in a pileup was being recorded and would be played at your next club meeting? Would the later embarrassment of peer pressure be a motivating factor to change your behavior?

Unfortunately, as much as we would like to think so, rational thinking has relatively little to do with the way humans actually make decisions. Neuroscientists and brain physiologists have learned more about the actual operation of the brain in the last two decades than they did in the last two millennia. No one in Michelangelo's time

*e-mail: <w6sj@arrl.net>

thought that our brains could process millions of small chunks of data every second. On a conscious level, we can't, but on a sub-conscious level, we can.

The rational brain understands that certain operating behaviors are counter-productive. However, it's not in control. Ultimately these subconscious decisions coalesce into habits based upon what behavior has led to success in the past. Sadly, for many, immediate gratification has ruled and has resulted in habits of poor operating practices, just as when it wanted the marshmallow immediately. Even when hams who are guilty of poor behavior read this sentence, they won't think I am talking to or about them. *Wrong!*

Absent a force such as the ham police to "write tickets" when they see impolite, rude, or inconsiderate behavior, we have to rely upon each individual making decisions for himself. People with a strong sense of honor and self-control can say, "Maybe no one else will ever know what I am doing, but *I* will." It is that sense of character, of personal integrity, that results in proper operating procedures.

Changing Perceptions

Psychologists have also shown an effective way to change this behavior: Develop a different perception of the norms that govern our behavior. Widespread agreement about what is acceptable behavior can, with time and energy, change habits.

It is the desire to harness that energy that resulted in the *DX Code of Conduct* based upon encouraging a high standard of ethical behavior. If we all do our jobs right and get

CQ DX Awards Program

SSB

2591 ..... W9RPM	2594 ..... LA5UJ
2592 ..... WA4RD	2595 ..... AB7LA
2593 ..... SM7ZDC	

CW

1135 ..... W9RPM

Digital

63 ..... W9RPM

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, Please make checks payable to the Award Manager, Keith Gilbertson. Mail all updates to Keith Gilbertson, KØKG, 21688 Sandy Beach Lane, Rochert, MN 56578-9604. We recognize 342 active countries. Please make all checks payable to the award manager. Photocopies of documentation issued by recognized national Amateur Radio associations that sponsor international awards may be acceptable for CQ DX award credit in lieu of having QSL cards checked. Documentation must list (itemize) countries that have been credited to an applicant. Screen printouts from eQSL.cc that list countries confirmed through their system are also acceptable. Screen printouts listing countries credited to an applicant through an electronic logging system offered by a national Amateur Radio organization also may be acceptable. Contact the CQ DX Award Manager for specific details.

W2IHY Technologies

Outstanding Transmit Audio Is Our Specialty

8 Band EQ

W2IHY 8 Band EQ & Noise Gate Thousands of Satisfied Users Worldwide

Add the legendary W2IHY 8 Band Equalizer And Noise Gate to your shack and get ready for great audio reports! From smooth rag-chew audio that makes them ask what you're running ... to penetrating DX/Contest audio that gets results, wide-range adjustability is at your command. Noise Gate reduces background noise for a cleaner, more effective signal. Universal Interface lets you use most any microphone with any radio including classics. I-K-Y selector for plug-n-play with popular brand micro-phones. Switched outputs for 2 radios. Headphone Monitor. RFI protection.

EQplus By W2IHY

Premium Audio Processing

Did you turn on an amplifier? Your signal is loud and squeaky-clean. EQplus users hear that report all the time. Compressor/Limiter increases talk power without the distortion and restricted frequency response of ordinary speech processors. Dual Band EQ, Downward Expander for noise reduction, Effects for psychoacoustic magic. LED Bar Graph. Front panel controls. Universal Interface matches most all mics, all radios. I-K-Y mic selector. Switched outputs for 3 radios. Headphone Monitor. RFI protection. Powerful stand alone system or combine with W2IHY 8-Band EQ for maximum adjustability.

Products purchased from W2IHY include 30 Day Money Back Guarantee and 3 Year Parts/Labor Warranty. Top-rated Product Quality, Technical Support and Customer Service.

Awesome Audio Demonstrations www.w2ihy.com

845-889-4253
email: julius@w2ihy.com
order online at www.w2ihy.com

W2IHY Technologies Inc.
19 Vanessa Lane
Staatsburg, NY 12580

Sigma-80 Vertical Dipole

- 40' tall ~95% Efficiency
- No Radials!
- With optional Tornado Drive, remotely tune entire 80M band and engage T-bar loaded full size 40M Vertical Dipole

Force 12

940.683.8371 www.texasantennas.com

the support of the worldwide amateur radio community, individuals, their clubs, and the national societies, we can hope that the presence of a strong, widely accepted standard of conduct will reaffirm that norm. Ultimately it will have a positive effect on those hams who are tempted to do something less than honorable. I encourage you to read the *DX Code of Conduct* at <www.dx-code.org> and make a conscious decision to abide by it.

It is also important to consider new hams, the ones who will replace us. How will they learn to behave? Hopefully they will learn from the best operators that being honorable is a more pleasurable experience than whatever pleasure is derived from giving into the impulse for immediate gratification. It is better to be honorable today, even if that means having to wait until tomorrow for the QSO.

Ironically, scientists recently have discovered that the chemical that feeds the brain and is responsible for higher willpower is glucose. When glucose levels are low, the brain will not function well in a process requiring mental effort. Thus, if you feel your willpower sagging, maybe you ought to have a marshmallow. With your willpower enabled, you will certainly feel a greater sense of pride when ethical operating practices get you into that DXpedition's log.

DX News

Norman Banks, 5B4AIF, plans to operate as E51E from Aitutaki Island (IOTA OC-083) between December 10, 2012 and January 5, 2013. He will be operating SSB and RTTY from 6 meters up to 80 meters with full legal power. There will be a 6-meter beacon active when Norman is not on the band, sending his phone number for texting him when the band opens. For more information, visit <www.aitutaki2012.com>.

Note

1. See References below.

References

The Stanford Marshmallow experiment was published in 1972 in the *Journal of Personality and Social Psychology* and may be downloaded (for $11.95) from <http://psycnet.apa.org/index.cfm?fa=buy.optionToBuy&id=1972-20631-001>. There are also many references to the study on the Internet, notably <http://en.wikipedia.org/wiki/Stanford_marshmallow_experiment> and it has been used as the basis for lots of work since then.

The comment by Aristotle came from a *New York Times* article, <http://www.nytimes.com/2012/03/13/opinion/cultivating-character.html?scp=5&sq=david%20brooks&st=cse>.

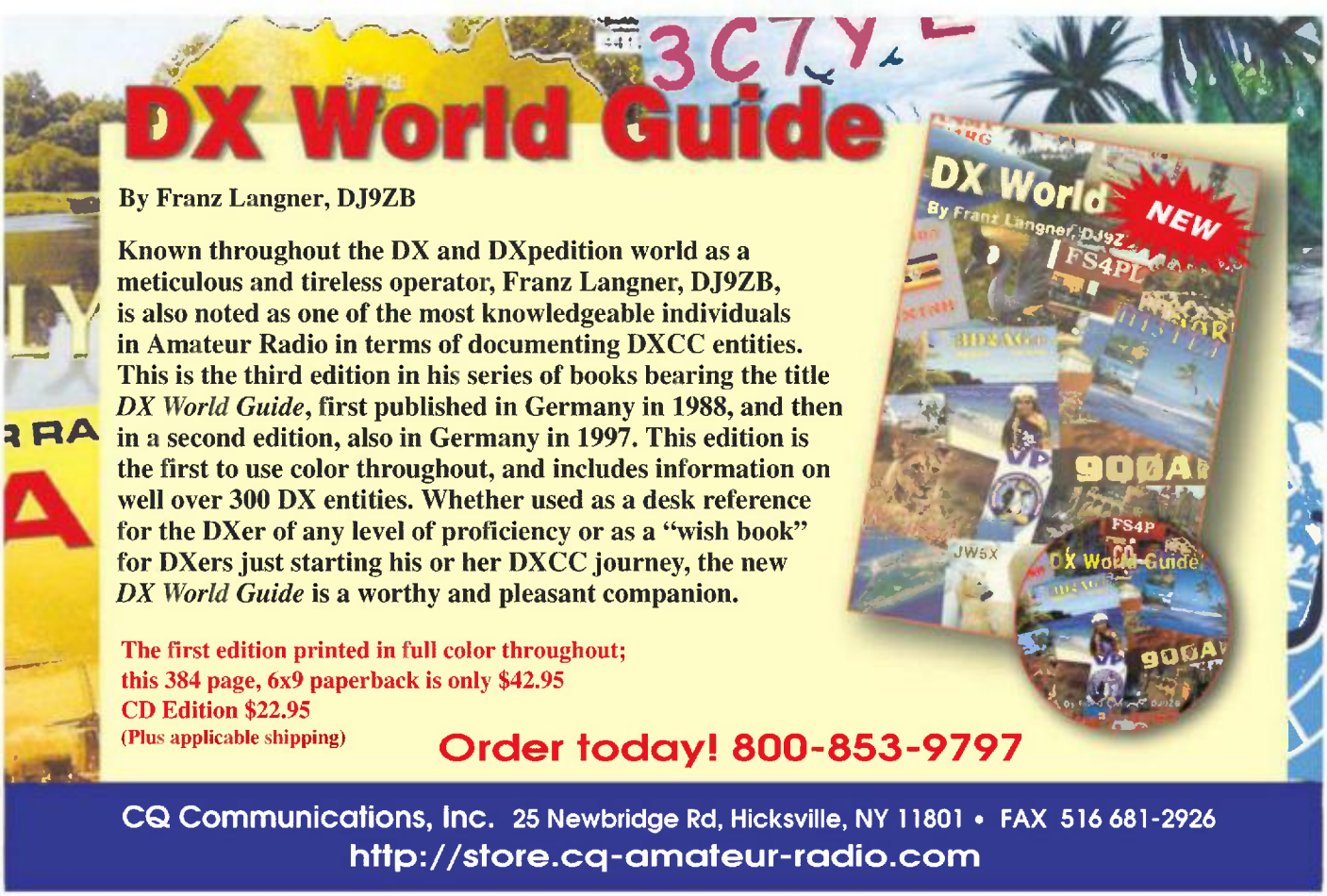
Other resources include the following books:

Willpower: Rediscovering the Greatest Human Strength, by Roy F. Baumeister and John Tierney **(Penguin, 2011)**

The Social Animal: The Hidden Sources of Love, Character, and Achievement, by David Brooks **(Random House, 2012)**

Thinking, Fast and Slow, by Daniel Kahneman **(Farrar, Straus and Giroux, 2011)**

The Power of Habit: Why We Do What We Do in Life and Business, by Charles Duhigg **(Random House, 2012)**



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

6607 9A2AA	4228 N6JV	3412 9A4W	2499 VE6BF	1961 W7CB	1347 K6UXO	924 IW9HII	682 N8HM	620 PI4DHV
6331 K2VV	4216 WA5VGI	3379 K1BV	2493 I5RFD	1918 NXØI	1329 DK8MCT	908 K4JC	670 WW3QB	616 DL5JH
5956 W1CU	4187 KØDEQ	3305 JH8BOE	2477 WD9DZV	1862 VE9FX	1322 AA4FU	825 KD4W	662 JA7OXR	607 K3CWF
5303 9A2NA	4173 W9OP	3276 K9UQN	2476 K5UR	1818 KX1A	1269 K5WAF	815 KL7FAP	662 SP8HKT	600 IK1RKN
5142 EA2IA	4129 S58MU	3252 W9IL	2445 AB1J	1722 VE6BMX	1233 K4HB	808 W6PN	653 KK3Q	600 KB9OWD
4866 N4NO	4074 YU7BCD	3231 W2OO	2428 N6QQ	1667 SQ7B	1201 IT9ABN	781 V51YJ	650 N3YZ	600 K9OHI
4722 YU1AB	4022 N9AF	3184 JN3SAC	2338 I2EAY	1655 SV1DPI	1116 YU7FW	726 K5IC	649 RA9OO	
4646 VE1YX	3967 ON4CAS	3007 W2WC	2289 N3RC	1593 S55SL	1107 PY2MC	725 WK3N	647 PAØQRB	
4413 KF2O	3966 IK2ILH	2946 YO9HP	2116 AE5B	1463 NE6I	1075 N6OU	723 KØDAN	644 KWØH	
4407 S53EO	3816 WB2YQH	2922 OZ1ACB	2192 N2SS	1462 DL4CW	1066 9A3ST	712 ISØEBO	636 ZS2DL	
4344 VE3XN	3811 N8BJQ	2820 W3LL	2133 KØKG	1446 DF3JO	1066 JA1CKE	707 W1/E74OF	634	
4313 I2MQP	3628 SM6DHU	2544 W6OUL	2100 AG4W	1400 NKØS	976 KM6HB	684 FG4NO	UA3LMR/QRP	
4290 I2PJA	3540 KC9ARR	2532 N3XX	2004 W2FKF	1383 IWØHOU	964 K8ZEE	682 AI8P	629 WB4SON	

SSB

5169 IØZV	3323 OE2EGL	2652 I3ZSX	2310 KI7AO	1971 W2FKF	1712 N3RC	1386 IK4HPU	1031 IK8OZP	802 N6OU
4851 K2VV	3294 CT1AHU	2595 EA1JG	2275 IK2DZN	1935 SV1EOS	1661 PT7ZT	1386 NXØI	1022 NW3H	758 IV3GOW
4638 OZ5EV	3108 I4CSP	2529 W3LL	2209 IK2QPR	1927 AE5B	1641 AE9DX	1258 N1KC	1012 KU4BP	724 W3TZ
4584 F6DZU	3101 KØDEQ	2497 S58MU	2201 NQ3A	1889 N6QQ	1623 VE9FX	1221 WD9DZV	1007 VE6BMX	717 KØDAN
4566 VE1YX	3022 I8KCI	2470 N8BJQ	2159 DL8AAV	1879 K3IXD	1611 W2ME	1189 NKØS	1004 K4HB	691 K5CX
4238 I2PJA	2903 IN3QCI	2459 W2OO	2156 YO9HP	1825 KQ8D	1550 IK2RPE	1146 SQ7B	978 EA7HY	690 W6PN
4208 9A2NA	2877 YU7BCD	2451 EA3GHZ	2131 N6FX	1805 EA3NP	1480 AB5C	1145 EA3EQT	976 NE6I	640 UA9YF
4033 I2MQP	2857 4X6DK	2449 SM6DHU	2098 K5UR	1799 JN3SAC	1464 VE7SMP	1089 IZ8FFA	965 VE6BF	637 K5WAF
3825 EA2IA	2817 KF7RU	2376 W9IL	2094 I8LEL	1782 W6OUL	1463 I2EAY	1089 IT9ABN	883 WA5UA	600 WA2BEV
3593 KF2O	2794 WA5VGI	2326 CX6BZ	2093 W2WC	1778 AG4W	1410 S55SL	1083 KX1A	875 K7SAM	
3557 N4NO	2711 LU8ESU	2315 SV3AQR	2076 K2XF	1719 K9UQN	1408 N3XX	1042 IZØBNR	833 DK8MCT	

CW

5704 WA2HZR	3722 9A2NA	3025 SM6DHU	2502 JA9CWJ	2010 K5UR	1480 WO3Z	1186 NXØI	794 LA5MDA	600 IK2SGV
5696 K9QVB	3676 S58MU	2804 K9UQN	2478 W9IL	2008 YO9HP	1447 EA2CIN	1165 VE6BMX	753 F5PBL	
5589 K2VV	3662 WA5VGI	2763 JN3SAC	2424 W2WC	1990 W6OUL	1424 N6QQ	1135 VE1YX	749 AE5B	
4395 N4NO	3471 KØDEQ	2730 IK3GER	2381 N6FX	1983 EA7AAW	1341 WA2VQV	1125 IØWOK	743 JA5NSR	
4228 N6JV	3347 KF2O	2723 EA7AZA	2373 VE6BF	1968 N3RC	1326 K6UXO	1097 NE6I	732 SQ7B	
4024 LZ1XL	3317 W8IQ	2721 IØNNY	2365 W2OO	1848 I2EAY	1247 IT9ELD	1049 K5WAF	706 AG4W	
3918 VE7DP	3226 YU7BCD	2720 KA7T	2245 W9HR	1827 AC5K	1223 KX1A	891 DK8MCT	695 S55SL	
3864 EA2IA	3106 N8BJQ	2638 OZ5UR	2215 I2MQP	1802 WD9DZV	1220 AA4FU	821 HB9DAX	629 IV3GOW	
3750 VE7CNE	3042 I7PXV	2632 W2ME	2139 N3XX	1549 AF5CC	1210 DL4CW	813 VE9FX	615 JH6JMM	

DIGITAL

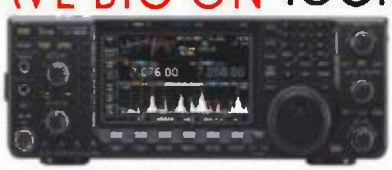
1809 W3LL	1481 WD9DZV	1133 N6QQ	1049 W2OO	1009 GUØSUP	929 N3RC	866 SQ7B	670 IV3GOW	643 K9AAN
1627 N8BJQ	1333 YO9HP	1054 KF2O	1047 RW4WZ	970 AG4W	886 KØDEQ	685 EA2IA	669 JN3SAC	

The DX Store

No BS. Just good old fashioned customer service.

SAVE BIG ON ICOM

90 Day ICOM Warranty



Discounted Prices

Factory repacked radios/receivers are covered by a full ICOM warranty for 90-Days and have been graded, completely tested and calibrated by ICOM factory service technicians.

sales@dxstore.com

www.dxstore.com

BY JOE LYNCH,* N6CL

RF Safety: A Technical Conversation

This past October Daniel Koch, DL3IAE, posted the following query on the Microwave (mw) listserve:

A question to the experts: I have been working on some 10 GHz amps at 10 watt level lately. Although I haven't been feeling uncomfortable, longer lasting exposure to microwaves should not be underestimated, mainly due to the heating effects inside the human body, especially in the eyes.

I try to do most of the snowflaking at low levels to minimize radiation coming out of the open amplifier but placing little copper foil bits close is expensive [Editor's note: The term snowflaking is adding tiny pieces of copper foil in order to increase the power amplifier gain.] Power FETs isn't easy as we all know and sometimes my head has to come pretty close so I can see what I am doing.

I use one of those desk lamps that has a big magnifying glass built in. It will not attenuate radiation in a big way but at least it helps to increase the working distance a bit. I wonder how others tackle this problem and how would it be done professionally in RF labs or so?

Nearly 20 posts were logged on the listserve in response to Daniel's query. Here are many of those responses:

Paul Wade, W1GHZ, wrote:

Years ago, when I was tuning RF amps professionally, we would take an RF sniffer and probe around the amp. Actual levels are hard to measure, but I remember one we had that was pretty bad, so we built a cover of copper mesh screen and poked holes in the screen where the tuning tools went. Output power went up significantly (1/2 dB) with the screen in place, so a fair amount was lost to radiation.

At 10 GHz, a small horn on a power meter will be enough to find harmful radiation. Even a small horn has a capture area of several square cm, so a power level of 1 mw/cm^2 or less is easy to detect. Less than that is probably safe for short exposures.

If the radiation is bad, you are wasting power. Some impedance matching structures are worse than others. Caution is good.

Barry Malowanchuk, VE4MA, wrote:

I was exposed to high RF while working on 432 antenna arrays back in the 1970s. I felt my eyes "dry out" and I got the heck out of there! It took a month for the dry eyes feeling to disappear.

I have also done a bunch of snow flaking here and had others doing tuning at work without covers on and with a long enough exposure your eyes start to feel tired. At work I had tuning covers made, as Paul describes, and the technician complained about tired eyes when he was not using the covers!

I have used a small old RadioShack® microwave oven "sniffer" to check out hot spots and get an idea of how much stray RF is present. I am not sure how good it is at 10 GHz, but it is probably still a good relative indicator.

Certainly limit your exposure time and proximity if possible. I have considered making and using a metal screen face mask. Caution is good.

e-mail: <n6cl@sbcglobal.net>

VHF Plus Calendar

January 4	*Quadrantids* meteor shower
January 5, 2013	Last quarter Moon
January 10	Moon apogee
January 11	New Moon
January 18	First quarter Moon
January 19-21	ARRL VHF Sweepstakes
January 22	Moon perigee
January 27	Full Moon

—EME conditions courtesy W5LUU

Jerry Johnson, KØCQ, wrote:

Perhaps it's time to plan tuning a bit better and make the tuning elements adjustable from outside a closed box. Snowflaking is too expensive when eye damage can be a result.

Perhaps something like 3 piston trimmers at 1/8- or 1/4-wave intervals on input and output lines. One thing about trimmers is that they aren't likely to short, which is a hazard while snowflaking. Sure, the half-dozen trimmers will raise the cost, but the first effect of too much RF in the eyes is documented in MIT Rad Lab, where they reported 10 mw from WR90 was enough when close to a rabbit's eye to cause a cataract.

Cataracts are correctable these days, at a cost of $6,000 or so per eye, plus months of healing. So far all the costs have been covered by Medicare and my supplemental insurance except for prescription drugs. My cataract was caused by old age, but made much worse by the laser treatment for a detached retina and the eye drops following that treatment. Turned the lens into a fuzzy thing that wouldn't focus light. I've recovered well enough to build a DEMI 3-watt PA to which I didn't apply RF power with the cover off.

I typically have used those three shunt trimmers with minimum reactance about 1/2 the line impedance. That would be like tuning screws in waveguide where such a three-screw tuner is reputed (in MIT Rad Lab series) to tune most any load. If 1/8th wave is too close, 5/8th wave ought to work just as well, though it may lengthen the enclosure. Usually in such a three-screw tuner all three screws are not needed; two nearly always should work and sometimes one is enough. Or like Barry's 24-GHz waveguide preamp, a series of holes at close intervals needs only one screw in the right hole. I think a screw won't be enough capacitance in a coax line even at 10 GHz without getting the gap uncontrollably small. The commercial version might be a slot with a carrier for one screw to achieve the same result with more waveguide machining.

Chip Taylor, W1AIM, wrote:

My work in the Health Physics filed was all with ionizing radiation. But our professional organization, the Health Physics Society, is also involved with RF radiation and there have been some excellent articles in our monthly journal, *Health Physics, The Radiation Safety Journal,* as well as on the Health Physics Society's web site.

The scientific consensus is that the only harmful effect of RF on the human body is heating, and it takes very high levels of RF to produce heat that one can actually feel. (YouTube videos aside, you can't make popcorn

Visit Our Web Site

with a cell phone!) Itching or dry eyes, headaches, and such are not necessarily due to RF exposure. Correlation is not the same as causation. My eyes sometimes itch and get dry just watching TV, and I'm not convinced TV watching is the cause. (Although I suspect it may cause one's brain to atrophy!) Even the link to cataracts is not all that strong; very high levels of microwave radiation can sometimes cause cataracts but it's not a certainty by any means. Most of us who eventually develop cataracts will get them for reasons other than RF exposure. (My cataract was caused by steroids used to treat iritis [an irritation of the iris], not from playing with microwaves.)

As low as the risk is (pretty close to zero for the power levels most of us work with), Paul's advice is good. The mantra for those of us in the HP field is "As low as reasonably achievable." It's not hard to limit or reduce exposure (remember the Inverse Square Law?) and worth doing so.

Barry Malowanchuk, VE4MA, responded to Chip:

Hi Chip, with all respect to the professionals in the field, the "drying of eyes" was real, although I know it was doubted by the professionals contacted by Joe Reisert, W1JR, at the time also. This was an effect that appeared in tens of seconds, not hours or days later. Perhaps dry eyes is a poor way to describe it. It was like you had been awake for 30+ hours or you had been working in a dusty area...eyes really wanted to be closed.

We don't work in high power levels necessarily, but at the frequencies we are dealing with (10 GHz in particular) the power density from small apertures (feedhorns and point-source radiator striplines) can be quite significant.

Ed Cole, KL7UW, wrote:

Several years ago I worked in a commercial 2-way radio shop which also serviced marine radar. Some of the techs were lazy and ran the magnetrons with open waveguide for testing until I complained of getting a headache from that (came on in about 15-min of exposure). Most run about 3 kw peak on 3 GHz. I could tell when anyone did this in short time every time. Dummies! We had waveguide loads.

Jerry Johnson, KØCQ, added:

Strip lines radiate like antennas. Not efficiently but primarily from the current in the line. And when an amplifier enclosure is broad enough to act as a waveguide (over 1/2 wavelength) the conversion from strip line to waveguide mode can couple from the output line to the input line and cause the amplifier to oscillate, only when the case is covered. That's often cured with cross- or length-wise baffles and/or chunks of some RF lossy material glued to the cover.

Besides incorporating tuners adjustable from outside the closed case, we might use a scope and diode detector for relative output instead of a thermal power meter and then pulse the drive to only apply drive for a short time, like a millisecond or less after moving the snowflake. With 100-MHz bandwidth scopes and diode detectors with 1-GHz detected bandwidth, a few microseconds should be enough time to see it with the scope. For existing amplifiers we could add on external tuners for input and output, but not inter-stage tuning.

Doug McGarrett, WA2SAY, responded to Jerry:

Interesting ideas, Dr. Jerry, but I think an open-ended cable with a very small series C at the end connected to a spectrum analyzer is really what you need, so as to see if the signal you're measuring is the same frequency as what you're driving with, and that there aren't any others there—oscillation. Or, of course, with your padded-down SA at the output port. With the path loss of the microwave signal so high, I think that the radiation from a circuit is small enough to ignore.

Let's take a 100W amplifier, and let's say (as another contributor to this thread has) that the radiation is about –0.5 dB. At 10 inches, that's about 42 dB path loss, so the effective power at that range is about 0.7 mW, total, much less than that in 1 cm^2, which is how the standard is written. So keep your eyes about 10 inches above the circuit, and you should be OK.

Jerry Johnson, KØCQ, responded to Doug:

At 10 GHz 1 pF is not small, but for HF work it's tiny. Perhaps a small loop or link would be better at loose coupling.

A spectrum analyzer is a super deluxe tool, and the good ones today cost about the same as an Escalade, like a house did 20 years ago. The old spectrum analyzers don't have the designed capability of looking over the whole spectrum that might come from an amplifier oscillating way outside its expected band with LO leakage, stray mixer products, and harmonics. The earliest spectrum analyzers were intended only to show the spectrum of a signal, generally a pulsed signal, so their dispersion is a small fraction of their center frequency. They didn't sweep from DC to light in one pass, not even from fundamental to the third harmonic of the carrier frequency. Only carrier frequency plus or minus a few or tens of MHz. Some had only slightly reduced sensitivity for harmonics of their swept oscillator, making it a task to determine what some stray signal found was, whether harmonic of the DUT or harmonic spur generated in the SA.

Not all of us are willing to put money in a non-communication device such as test equipment, so we have to do with power and diode detectors, augmented by band-pass filters. So we can peak with the indicator seeing through that band pass filter, then compare the unfiltered detection with the filtered level, allowing for filter loss to see if the amplifier is putting out power at other than the desired frequency. And we can look unfiltered for power with no drive to the transverter.

One thing I've noticed about ham band microwave amps is that there isn't much in the way of harmonic filtration, perhaps some even harmonic reduction in push-pull amps, but less so in quadrature coupled stages and some inherent in the active devices internally matched with single pi low-pass filters, two shunt Cs, and the bond wires making a series L. Sometimes when driven to clipping, I'm sure there is more than trivial power at the harmonics, as well as radiated as splatter in the ham band of interest.

Doug wrote:

Let's take a 100W amplifier, and let's say (as another contributor to this thread has) that the radiation is about –0.5dB. At 10 inches, that's about 42 dB path loss, so the effective power at that range is about 0.7 mW, total, much less than that in 1 cm^2, which is how the standard is written. So keep your eyes about 10 inches above the circuit, and you should be OK.

Jerry responded:

You presume hemispherical or spherical radiation which may be true in some cases and not in others. The free space 1 wave traveling wave wire radiates more concentrated than a dipole, for sure a narrower pattern than a hemisphere. The free space several wave wire has many lobes and nulls and quite a bit of gain in the lobes, the greatest gain closest to the wire and rising the longer the wire. Making that wire part of a microstrip, stripline, or coplanar coaxial circuit affects the radiation pattern significantly, but doesn't eliminate it. The asymmetry of the macrostrip and coplanar conductors with dielectric next to ground but the low dielectric constant air above makes for complicated wave propagation along the conductor at two speeds, which can enhance radiation.

Doug wrote:

By the way, the free and easy use of the word "stripline" always annoys me. What you're talking about is microstrip. Stripline is bounded by a top and bottom ground plane. I think it's worthwhile respecting the difference, especially in the presence of younger RF folks who may never have encountered actual stripline. And who may not know that in order to make a decent directional coupler, or anything that demands good isolation, like a filter, you really need stripline.

Jerry responded:

True enough about strip line, but like I said above there is as much difference in vintage to modern spectrum analyzers that just calling for a spectrum analyzer to test for stray products out of an amplifier can also be a similarly excessive simplification. Stripline came before microstrip and coplanar.

Joe Hopster, WB8DNO, wrote:

A glass lens doesn't block microwaves. In fact, I used to send 20 mw AM from a klystron across the basement to a crystal detector. When I held an 8-inch glass lens in front of the detector, it would focus the signal much like it would for light. Didn't measure the gain but it seemed to be several dB.

I may have read that the lens of the eye will frost over from heat much like an egg white. Ten GHz will not have to penetrate very deeply to do that.

Mike Sapp, WA3TTS, wrote:

I recall the metalized Low-E glass in my house windows doing a good attenuation number on my 10 GHz test beacon a few years ago when cobbling my 10 GHz transverter together. I would suggest testing a few pieces of the adhesive metalized window film products used for improving window insulation efficiency. One may be able to apply such a metalized film to a standard set of polycarbonate safety glasses. Even an extra 6 or 10dB of attenuation would be a prudent optical safety precaution. If the tint is too dark, turn the lights up.

I did a quick look online for "RF safety glasses" and "EMI Safety Glasses," but nothing popped out of Google that was very obvious. Laser safety glasses are out there, so some company likely makes RF shielded safety glasses as well.

Michael Fletcher, OH2AUE, wrote:

Ten watts at 10 GHz is plenty to feel thermally by the back of the hand (so as not to accidentally damage the more important side of your hand...) not very far from the feedhorn. Of course this kind of power can be radiated elsewhere if not actually terminated and converted to heat.

A good friend of mine mildly burned the other side of his face while tuning a home brew high-power solid-state 23-cm PA (he was looking sideways at the power meter most of the time.).

The real primary risk is thermal, and the most sensitive part in our case is the eye. The retina has no blood vessels to regulate temperature, but is protein rich. If you want to simulate your eye, separate the yolk from a chicken egg and use the albumen (e.g., in a glass test tube) as a very sensitive detector for coagulation (yes, a non-reversible process that will happen to your eye, too). Better yet, spread a thin layer of albumen on a dark low thermal conductor to witness the coagulation.

On the other hand RF is often used in special suits for treating hypothermia: <http://adsabs.harvard.edu/abs/2002SPIE.4916...95J>.

Another item is your magnifying glass lamp. If this is a fluorescent lamp, you should be aware of the UV radiation, especially if the lamp (bulb) itself does not have a secondary envelope. The British Health Protection Agency recommends max. One hour/day if this kind of single envelope CFL is closer than 30 cm to human skin (e.g., the hopefully still functional backside of your hands). See: <http://www.hpa.org.uk/NewsCentre/NationalPressReleases/2008PressReleases/081009Emissionsfromcompactfluorescentlights/>.

The general sensitivity of RF especially in the decametric wavelength region is not uncommon: Getting a type of headache from RF from open waveguides is something I saw repeatedly in some of my former colleagues. This involved typically 5–20W being radiated from an open waveguide or small dish at C band. They clearly identified after a period of time an open waveguide in the vicinity, but out of sight. I am pretty sure this has some bearing on the relationship between cranial dimensions and the wavelength in question. Or maybe some nerve structure is resonant at C or X band? Wish I had the time and resources to measure the S21 of *my* head.

Another aspect is the energy waveform envelope, such as pulsed RF (e.g., radars etc.). I have many times heard directly from microwave professionals their auditory experience of PRF frequencies.

Now then, to put all this into some kind of perspective frame, I hope everybody understands by now that the solar spectrum that reaches the Earth still contains a decent part of the electromagnetic spectrum even after some selective filtering of the atmosphere. And at pretty appreciable levels, after all. We do use the darn thing to generate electricity. And who has not witnessed the discoloration of objects lying in the sun, or even your CFL lamp. Or even a filament bulb for that matter. I can easily detect my 60W incandescent lamp noise at X band from 15 cm away: <http://www.kolumbus.fi/michael.fletcher/incand.gif>.

So, hands up, who has ever suffered from sunburn or worse?

Down under in Oz, there are rules and regulations for clothing and headware of children in order to minimize radiation effects of the sun.

Anyway, if you are really seriously concerned about excessive uncontrolled RF levels, this is the way to go: <http:// www.w4dex.com/microwave/safe_microwaving.jpg>.

There are all kinds of stuff out there. It all is a question of where to set the limits and to enjoy the rest. So, time for some more coffee, despite the increased risk of pancreatic cancer.

By the way, years ago I was involved in testing and calibrating test equipment and sensors at HF frequencies. Fairly interesting to witness several amps of shortwave RF propagating through your torso (yup, measured with a current clamp around my neck and another pair around each leg for verification). And once again, I have never been quite the same since that day.

Jerry Johnson, KØCQ, added:

An Iowa lawyer/electrical engineer by the name of Barbara K. Lunde about 20 years ago began to offer a mesh union suit for RF protection, but it was designed for VHF/UHF protection and didn't include the head or hands. I don't know if it is still offered. Technicians required to work on tall building roofs with many two-way radio antennas at roof level liked the idea because they couldn't turn of the radios that belonged to the public services or competitors while working in their near fields. Lunde's husband Paul (WØLHE) owned a central Iowa FM station in those days.

There is one other solution I've already mentioned and that is to arrange the PA to be tuned while enclosed working into a dummy load, either with internal tuners, like a string of capacitors along the input and output lines, or external enclosed tuner boxes on the input and output connectors. Keep the RF contained, and then there's no need to keep the RF out of the body during the adjustments.

Brian Yee, W6BY, wrote:

I simply use the minimum RF drive to get the tuning done. No need to run full RF power out except to verify the snowflaking was correct, and then I do that with the covers on anyway to see if there are any oscillations. Even then I ramp up the power gradually to be able to back out of a problem. Also, I am careful to reposition the snowflake only with power off, then apply DC and RF power to verify the effect of tuning.

Ben Lowe, K4QF, wrote:

Decades ago, there was a government program for High Power Microwave (HPM). As I recall, they published some handbooks, maybe through SRI that are probably around somewhere. One area addressed was the effects of HPM on sensitive parts of the human body, the eyes being one of the most sensitive areas. I believe they designated safe levels as 10 mw/cm^2 but not for too long of a period. The safe level is probably somewhat frequency sensitive, as there's a reason microwave ovens operate around 2.6 GHz. Water is apparently more absorptive at that wavelength than other microwave frequencies, and in spite of what others may think, you and other flesh are basically comprised of 80% water; hence the best cooking frequency. So is foliage.

In reading electronic warfare history, I saw somewhere that watchmen on ships in the North Atlantic during WW II would stand on the bow of ships and get the radar operators to beam the antenna toward them to warm them up, or thaw them out, whatever the case was. I wouldn't recommend it!

Daniel Koch, DL2IAE, summarized:

Well, it looks like there is no off-the-shelf solution to the problem. I was hoping someone would come up with some sort of protective glasses with a fine metal grid inlay or a similar solution that would attenuate microwaves effectively. My own web search ahead of this post was not very successful, thus my interest in the professional way of dealing with RF exposure. I think we can basically do three things:

1. Reduce exposure time: John Quarmby, G3XDY, suggests using a pulsed low duty cycle RF source: "Set a pulse generator to a repetition rate of 100Hz and pulse width of 100uS and then you are running at an average power of 1% of the peak power. A thermal power meter will indicate the average power so add 20dB to get the peak power for a 1% duty cycle."

An excellent idea. Modulators are cheaply available surplus, even in the 10 GHz range. Or you can also try to modulate the IF of your transverter.This should get you pretty close to the optimum. Still you will have to do the final tweak at maximum power.

2. Maximize the distance from the RF source: Use good illumination and some sort of magnification so your head is away from the RF source. Will my glasses or a magnifier increase the RF field near my eyes by focusing the microwaves, or will the glass or plastic lenses not promote this "optical" effect due to physical size or the materials used? Has anyone tried one of those USB cams?

3. Go QRP: Not really a solution.

Thanks for your thoughts and input. Discussions on the effects of RF on the human body tend to get extremely emotional very quickly, at least in the "real world" outside our hobby, and I personally try to avoid them. However, I think we all should be aware of the possible dangers.

Finally, Jerry Johnson, KØCQ, summarized the problems with snowflaking very succinctly: "Snowflaking is too expensive when eye damage can be a result." Well spoken, Jerry!

Current Contests

The ARRL VHF Sweepstakes is scheduled for the weekend of January 19–21, 2013. For ARRL contest rules, see the issue of *QST* prior to the month of the contest or: <http://www.arrl.org>.

Current Meteor Showers

The *Quadrantids*, or *Quads*, is a brief but very active meteor shower. The expected peak is around 1325 UTC on January 3, with up to 40 meteors per hour at its peak. The actual peak can occur three hours before or after the predicted peak. The best paths are north-south. Long-duration meteors can be expected about one hour after the predicted peak.

For more information on the above meteor shower predictions see Tomas Hood, NW7US's "Propagation" column elsewhere in this issue. Also visit the International Meteor Organization's website: <http://www.imo.net>.

And Finally . . .

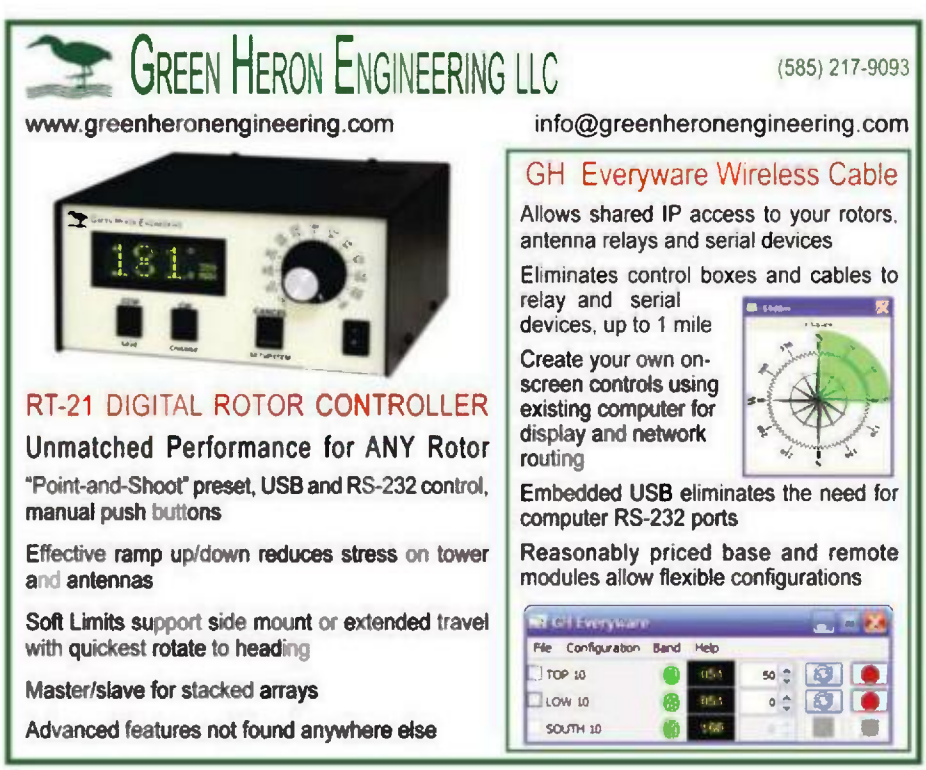
This column with its comments on RF safety has given us an interesting look at the dangers of working with RF (non-ionizing) radiation. We all need to be cautious when working around high power.

If you have a tale to tell about your RF exposure—or anything else related to the wonderful world of the VHF-plus frequencies—please e-mail me at: <n6cl@sbcglobal.net>.

A Happy New Year to all of you, and my best wishes go to you for a safe, healthy, and prosperous 2013.

Until next month . . .

73 de Joe, N6CL



BY TED MELINOSKY,* K1BV

Alaska: Why Judicial Districts instead of Boroughs?

Plus Awards from Scandinavia, Russia, and Indonesia

Alaska is unique among American states in that it does not use the traditional county (or parish) as a political subdivision. Instead, Alaska is divided into 18 "boroughs" and 11 "geographical census areas." The borough is probably the closest by analogy to a county, but even then, because of the very low population of most of Alaska, boroughs comprise less than half of the area of the state. The rest of the state is composed of census areas which were established for the 1970 Federal Census. There is a good chart on the website of the National Association of Counties (http://www.naco.org/) which gives an official list of both boroughs and census areas together with population and square miles covered by each. One of the least populated areas is Central Alaska (Yukon-Koyukuk Census Area), which has a density of one person per 26 square miles.

The USA-CA award was developed not long after Alaska became a state on January 3, 1959. I don't have any information in the USA-CA archives regarding the decision to use the four judicial districts instead of boroughs, but can only imagine that this was a logical existing unit that nicely divided the new state into reasonably even pieces for the award.

How hard would it be to achieve USA-CA if we required the use of boroughs and census areas instead of the judicial districts? I invite any of our Alaskan award hunters to consider sponsoring an award based on boroughs and census areas. It might be revealing to see who would be the first to work all 29 of them. Any volunteers to create this award?

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

USA-CA Honor Roll

500

F5POJ	3595	UX1UA	3598
9A3ST	3596	VE6VLV	3599
K9AAN	3597		

1000

F5POJ.....1837

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.

The Scandinavian Open CW Award (SOCWA) is a new award that is limited to contacts in 2013, CW contacts with some depth, such as 10 minutes worth.

The Scandinavian Open CW Award (SOCWA)

Let's start off 2013 with a new award that is limited to contacts in 2013, and not just hello-goodbye QSOs, but CW contacts with some depth, such as 10 minutes worth. It shouldn't be too difficult. Or will it be?

The object of The SOCWA is to inspire amateur radio operators in Scandinavia and elsewhere to increase CW activity on the HF ham radio bands. The intent of the award is to encourage and reward amateurs to carry on sustained CW conversations rather than short-duration CW signal reports. The award sponsors are the Öland Island Radio Amateur Society, SK7RN and The Scandinavian CW Activity Group, SCAG.

Participants: SOCWA encourages CW communication by and between licensed amateur radio stations in the Scandinavian countries of Denmark, Finland, Greenland, Iceland, Norway, and Sweden. The prefixes OY, JX, JW, OHØ, and OJØ also count as Scandinavian countries.

Amateur radio operators from non-Scandinavian countries who register on the award website listed below are welcome to participate and qualify for the award. In this regard, qualified QSOs must involve a station in the aforementioned Scandinavian countries.

VHF/UHF Enthusiast
CQ VHF is better than ever!

The all-time favorite magazine for the VHF/UHF enthusiast, CQ VHF is better than ever and here to serve you!

Within the pages of CQ VHF you'll find more meaty reading aimed at the really serious VHFer. That's what our surveys told us you wanted and that's what we deliver!

By taking advantage of our subscription specials you'll save money and have CQ VHF delivered right to your mailbox. Only $28 for four information-packed quarterly issues. Or better yet, enter a two or three year subscription at these special prices. As always, every subscription comes with our money back guarantee.

	USA	VE/XE	Foreign Air Post
1 Year	28.00	38.00	41.00
2 Years	56.00	76.00	82.00
3 Years	84.00	114.00	123.00

Please allow 6-8 weeks for delivery of first issue

SUBSCRIBE NOW AND SAVE

CQ VHF • 25 Newbridge Road • Hicksville, NY 11801

Subscribe on line at **www.cq-vhf.com**; FAX your order to us at **516 681-2926**

Call Toll-Free 800-853-9797

Period of activity: This award will be available to successful participants during calendar year 2013, starting on January 1. The SOCWA encourages unlimited CW activity between participating stations. The award will be available to those stations and operators who register and report confirmed contacts as described below. The program may be extended beyond calendar year 2013.

How to register: SOCWA participants register on line at <www.socwa.se>.

Bands: According to the IARU's HF band plan.

Call: A response to calling "CQ SAX" will initiate contact with a station within the SOCWA sphere.

Logging: QSOs should be logged at the SOCWA home page. To qualify for the award, QSOs must a minimum of 10 minutes. Both stations have to log the QSO on the website. The time stamp (GMT) of each station logged on the website must match each other.

General rule: Repeated QSOs between two stations are permitted as long as there is no more than one QSO every 24 hours but on different HF bands. Band variation is desired and encouraged. Always consider the CW speed of your contacted station. If your counter party is sending at a lower speed, reduce your speed to reduce errors and to eliminate the risk of confusion.

Fees: For Scandinavian radio amateurs, after 52 or more verified QSOs, the radio amateur will be awarded the SOCWA via postal means by payment of SEK50. The fee also entitles the amateur to participating in a lottery with many prizes. Each confirmed QSO earns one lottery ticket in the final draw. The lottery prizes are shown on the award website. The number of prizes will depend of the number of participants. Lottery tickets and prizes, however, are limited to Scandinavian radio amateurs. For non-Scandinavian radio amateurs, after 52 or more confirmed and approved QSOs, you can print, free of charge, the SOCWA Award directly from the home page. Internet: <http://www.socwa.se/regler.php>.

Gallery of the Great Genius of Russia

This is a series of awards with certificates that are the most beautifully designed and executed ones I have ever seen from any sponsor. UA6MM based the series on famous Russian leaders of the past. The images are taken from works of art depicting these leaders and the parts they played in key battles in Russian history from the year 850 to 1813. Complete details of each of the seven awards can be found at: <http://www.dxawards.com/UA6MM.htm>. The awards are sponsored by the Amateur Radio Union of Russia "SRR," together with the Taganrog club "TDXEC" (Taganrog DX-Expedition club). Collectively, the awards are known as the Gallery of the Great Genius of Russia. This program offers a certificate for one set of requirements, and a plaque for additional requirements as noted in the rules.

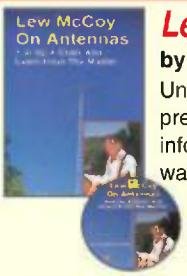
There isn't enough room in this column for all seven, so I am presenting just one of them.

Anniversary of Peter I, the Great (the first Emperor of all Russia). This award is issued in connection with the 340th anniversary of the birth of "The Great Son of the Russian Land, the Emperor Peter the Great, Peter I" (1672–1725). He was the founder of the first Russian military base "port city," "Fortress of Taganrog" in 1698, and the new northern capital of the Russian Empire, the city of St. Petersburg, in 1703.

1. Russians need 20 QSOs and all others need 10 QSOs with any different stations in the following Russian regions or countries associated with the life of Peter the Great: UA1A, UA2F, UA3A, UA4, UA6L, DL, ES, EW, G, LY, OE, OH, OHØ, OJØ, OZ, PA, SM, SM1, SP, TA, UR, UU, YL, 4K.

CQ BOOKS

Back by popular demand!



Lew McCoy on Antennas

by Lew McCoy, W1ICP

Unlike many technical publications, Lew McCoy presents his invaluable antenna information in a casual, non-intimidating way for anyone!

8.5 X 11 Paperback $19.95
***New!* CD Version $14.95**
Buy both for only $29.95

The Quad Antenna

by Bob Haviland, W4MB

A comprehensive guide to the construction, design and performance of Quad Antennas. Chapter titles include General Concepts, Circular-Loop & Arrays, Rectangular & Square Loops, Multi-Element Quads, Delta Loops & Arrays, Design Variations, Optimizing a Quad Design and more!

8.5 X 11 Paperback $19.95
***New!* CD Version $14.95**
Buy both for only $29.95

The Vertical Antenna Handbook

by Paul Lee, N6PL

You'll learn basic theory and practice of the vertical antenna. Discover many easy-to-build construction projects.

6 X 9 Paperback $17.95

VHF Propagation Handbook

The Practical Guide for Radio Amateurs

by Ken Neubeck, WB2AMU & Gordon West, WB6NOA

The combined ham radio experience of the authors represents many years of VHF observations and research. Tropo Ducting, Sporadic-E, Aurora, Meteor Scatter, F2 Propagation, TEP, Combo Modes, it's all here!

6 X 9 Paperback $15.95

33 Simple Weekend Projects

by Dave Ingram, K4TWJ

Do-it-yourself electronics projects from the most basic to the fairly sophisticated. You'll find: station accessories for VHF FMing, working OSCAR satellites, fun on HF, trying CW, building simple antennas, even a complete working HF station you can build for $100. Also includes practical tips and techniques on how to create your own electronic projects.

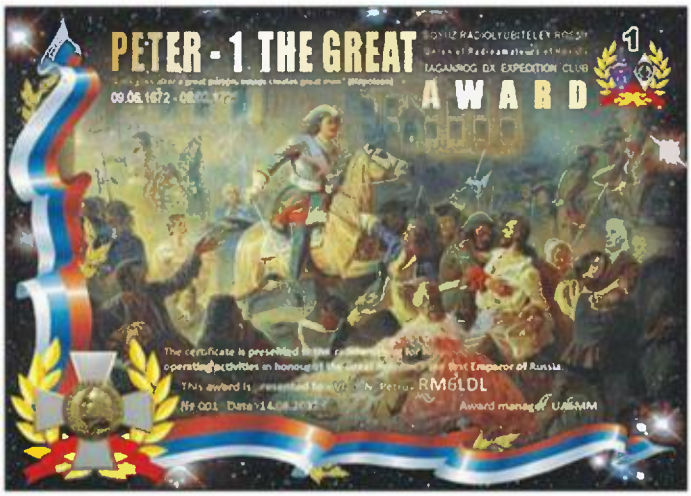
6 X 9 Paperback $17.95

Shipping & Handling: US: $7 for first item, $3.50 for 2nd and $2 for each additional. CN/MX $15 for first item, $7 for 2nd, $3.50 for each add'l. All Other Countries: $25 for first item, $10 for 2nd, $5 for each add'l.
CD Only: USA $5 for one $3 each add'l; CN/MX $10 for one $7 each add'l; All Other Countries: $15 for one $10 each add'l.

Book & CD to a single address = ONE item!

CQ Communications Inc.
25 Newbridge Rd., Hicksville, NY 11801
516-681-2922; Fax 516-681-2926
Order Toll-Free 800-853-9797
http://store.cq-amateur-radio.com

AMEX VISA



The Anniversary of Peter I award is issued in connection with the 340th anniversary of the birth of "The Great Son of the Russian Land, the Emperor Peter the Great, Peter I" (1672–1725).

2. Earn at least 340 points from the list of stations in areas below. Each city, region, or country = 10 points per contact:

a. Cities associated with the activities of Peter I: Moscow, Taganrog, Azov, St. Peterburg, Kronshtadt, Voronesh, Arkhangelsk, Pereslavl-Zalesskiy, Sergiev-Posad, Petrozavodsk, Poltava (Ukraina) Tula, Derbent, Baku, Kaliningrad, Amsterdam, Narva, Viborg, London, Istanbul, Hannover .

b. Regions: LO (Leningrad region), KL (Curly), AR (Arkhangelsk), VO (Vologda), PS (Pskov), MU (Murmansk), KA (Kaliningrad), MO (Moscow), SM (Smolensk), TL (Tula), RO (Rostov), DA (Dagestan), SV (Sverdlovsk), PM (Perm), SL (Sakhalin), PK (Maritime Territory), KT (Kamchatka).

3. Countries: DL, ES, EW, G, I, JW, LA, LY, OE, OH, OHØ, OJØ, OZ, PA, R1FJL, R1MVI, SM, SM1, SP, TA, UT, UU, YL, 4K = 10 points .

Repeated QSOs on different bands or modes count for the award. No mixed mode QSOs.

Bonus QSOs: Any QSO with special event GGGR station and RK1AN, RZ1AWZ, UA2FDM, RV3DA, UA3AHA, UA4LAQ, RK6AH, RU6BS, UA6MM, UA9AV = 50 points each, and other members of the TDXEC = 25 points each.

Application: Send log extract with the specific award and/or plaque being requested, a list of stations contacted, and the QSO information. The fee for the paper award is $US10 and the cost of each plaque is $US40. Mail applications to: Nick M. Ermolenko UA6MM, PO Box 73, Taganrog, 347902 Russia. E-mail <ua6mm@yandex.ru or ua6mm@mail.ru>, internet: <http://www.ua6mm.narod.ru>, also: <http://www.qrz.com/UA6MM>.

Indonesia's Nusantara Award

Indonesia is sometimes known as a country that is made up of islands—lots of islands. In fact, the sponsors of this award make available a listing of the 13,200 different islands comprising Indonesia.

All of your QSOs with Indonesia are available for award credit, since contacts since 1945 are valid. Too many awards are not only tough, but require you to start all over when the sponsor establishes a starting date, such as the current year. Another good feature of this award is that for US applicants, the custodian is in New Jersey.

The Nusantara Award is issued to licensed amateurs and SWLs for making two-way contacts on HF bands 160–10m),

Indonesia's Nusantara Award is issued to licensed amateurs and SWLs for making two-way contacts on HF bands 160–10m), including WARC bands, with a minimum of 10 different islands of Indonesia on or after August 17, 1945.

including WARC bands, with a minimum of 10 different islands of Indonesia on or after August 17, 1945. Repeater, satellite, eQSO, Echolink, or other relay methods are not permitted. The 10 islands must include a minimum of five out of the six main islands of Jawa/Java, Sumatera/Sumatra, Kalimantan/Borneo, Sulawesi/Celebes, Irian/Papua, and Bali.

Endorsement stickers are issued in increments of 10 for additional islands worked. All islands claimed for the award must appear on a map and have a name. Each QSL card must have the printed name of the island from which the operation took place. For major or large islands, the name of a town or city on the island, or grid locator may be sufficient. Please contact the award manager when in doubt. Not all islands in this program may have an IOTA (Islands On The Air) Reference Number. Small islands, individual coastal islands, islands in a bay, in a lake, in a river, or in an estuary, or any that cannot be classified in the IOTA Program might still be accepted for this award. Groups of islands with the same IOTA reference count for separate islands for this award—e.g., Bangka and Belitung are two separate islands for this award (OC-144).

Your claim must be accompanied by certified list (GCR) showing the callsigns of stations worked, dates, times, bands, modes, and island name. Alternatively, a list of stations worked with a copy of the QSL cards can be used as well. Applicants using e-mail may attach the list and scans of the QSL cards. All QSL cards must be in possession and must be produced upon request for inspection.

Use the official application for the award, which is found on the website listed below.

For DX stations, the award fee is 8 IRCs, $US6, or 5 Euros for the basic award. The endorsement fee is 1 IRC, $US1, or 1 Euro regardless of the level claimed. The fee covers the award and postage. There is no fee for handicapped operators or for SWLs. Payment can be made by PayPal (preferred) or cash/IRC (at your own risk). Send the application and fee to Award Manager.

DX Stations should apply to: Stephan Busono, W2FB, 3 Margaret Drive, Somerset, NJ 08873; e-mail /PayPal: <sbusono@gmail.com>.

Indonesian and DX should apply to: Adhi Widodo, YB3MM, PO Box 6, Pandaan 67156 Indonesia; e-mail/PayPal: <yb3mm@mdxc.org>. Internet: <http://www.nusantaraaward.com/>

We are always interested in learning of new awards for publication in this column. Please ontact me with details and a sample at the address shown on the first page of this column.

73, Ted, K1BV

REFLECTIONS III

by Walter Maxwell, W2DU

Here's a sampling of what you'll find inside this fully revised and updated third edition!

- Too Low an SWR Can Kill You
- The View into the Conjugate Mirror
- Standing-Wave Development and Line Impedance
- Using the Smith Chart
- The Line Match Problem
- Computer Programs for Impedance Matching
- The Quadrifilar Helix Antenna
- Dispelling New Misconceptions Concerning Wave Interference in Impedance Matching . . . *and more!*

424-page, 8.5 X 11 Paperback $39.95

New!* CD Version $29.95** ***Buy both for only $59.95

Shipping & Handling: US: $7 for first item, $3.50 for 2nd and $2 for each additional. CN/MX $15 for first item, $7 for 2nd, $3.50 for each add'l. All Other Countries: $25 for first item, $10 for 2nd, $5 for each add'l.
CD Only: USA $5 for one $3 each add'l; CN/MX $10 for one $7 each add'l; All Other Countries: $15 for one $10 each add'l. ***Book & CD to a single address = ONE item!***

CQ Communications, Inc.
25 Newbridge Rd., Hicksville, NY 11801
http://store.cq-amateur-radioc.com • Order Toll-Free 800-853-9797

Reviewing New CQ Contest Reporting Dates

BY CQ STAFF

Editor's note: Contesting Editor George Tranos, N2GA, was unable to write his column this month due to flooding at his home from Hurricane Sandy. He expects to be able to resume writing the column next month. We wish George and Diane, N2DO, all the best in getting their house—and their lives— back in order.

As we begin 2013, we also begin the transition period during which we will phase in earlier reporting of the results of most CQ-sponsored contests. Complete details are in the October 2012 issue, so we will not repeat them here. However, we will review the new schedule of contest results, both for this year and for 2014 and beyond, once the transition is complete. We will also include the issues in which the rules for various contests will appear, although that schedule is not changing.

2013 Schedule of Contest Results & Rules

Issue	Contest Results	Contest Rules
January	2012 WPX SSB	2013 WPX RTTY
February	2012 WPX CW	2013 WPX (SSB & CW)
Winter CQ VHF	2012 CQ WW VHF	
March	2012 CQWW DX RTTY	
April	2012 CQWW DX SSB	2013 CQWW Foxhunting Wknd
May	2012 CQWW DX CW	
June	2012 CQ DX Marathon 2012 CQWW Foxhunting Wknd	2013 CQWW VHF
July	2013 WPX RTTY	2013 CQWW DX RTTY
August	2013 CQWW DX 160	
September	2013 WPX SSB	2013 CQWW DX (SSB & CW)
October	CQWW DX All-Time Records	
November	2013 WPX CW	2014 CQWW DX 160
December		2014 CQ DX Marathon

2014+ Schedule of Contest Results & Rules

Issue	Contest Results	Contest Rules
January	2013 CQWW VHF	2014 WPX RTTY
February	2013 CQWW Foxhunting Wknd	2014 WPX (SSB & CW)
March	2013 CQWW DX RTTY	
April	2013 CQWW DX SSB	2014 CQWW Foxhunting Wknd
May	2013 CQWW DX CW	
June	2013 CQ DX Marathon	2014 CQWW VHF
July	2014 WPX RTTY	2014 CQWW DX RTTY
August	2014 CQWW 160	
September	2014 WPX SSB	2014 CQWW DX (SSB & CW)
October	CQWW DX All-Time Records	
November	2014 WPX CW	2015 CQWW DX 160
December		2015 CQ DX Marathon

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

In addition, please remember that the log submission deadline for nearly all CQ-sponsored contests is now **5 days after the end of the contest**. Preliminary indications (from the CQWW DX SSB weekend) are that the new deadline is having a negligible effect on the numbers of logs submitted.

The only exceptions to the 5-day rule are: CQ DX Marathon (10 days) and the CQ WW Foxhunting Weekend (flexible, along with activity dates).

Finally, thank you again to all of our contest directors and their committees for the added work that has gone into making this accelerated results reporting possible, and Happy New Year from all of us at *CQ*.

Calendar of Events

All year	**CQ DX Marathon http://bit.ly/vEKMWD 2012 Logs Due by January 15, 2013**
Jan. 1	SARTG New Year RTTY Contest http://www.sartg.com/contest/nyrules.htm
Jan 1	AGCW Happy New Year Contest http://bit.ly/PAcDvl
Jan. 5-6	ARRL RTTY Roundup http://www.arrl.org/rtty-roundup
Jan 5-6	EUCW 160m Contest http://www.eucw.org/eu160.html
Jan. 12-13	Hunting Lions in the Air http://lionshuntingintheair.lionwap.org/
Jan 12-13	MI QRP January CW Contest http://www.miqrp.org/
Jan. 12-13	North American CW QSO Party http://bit.ly/GLPfXz
Jan. 13	DARC 10-Meter Contest http://bit.ly/VZScLN
Jan. 19	LZ Open Contest http://bit.ly/NXeEnZ
Jan. 19-20	Hungarian DX Contest http://bit.ly/NXewVk
Jan. 19-20	North American SSB QSO Party http://bit.ly/GLPfXz
Jan. 25-27	**CQ WW 160M CW Contest http://bit.ly/uB0wFb**
Jan. 26-27	BARTG RTTY Sprint http://bit.ly/SnijIn
Jan. 26-27	REF CW Contest
Jan. 26-27	UBA SSB Contest http://bit.ly/W0gZiE
Feb. 2	Minnesota QSO Party http://bit.ly/P2zALC
Feb. 2-3	10-10 Int'l Winter Contest http://www.ten-ten.org/calendar.html
Feb 2-3	Mexico RTTY Int'l Contest http://www.fmre.org.mx/
Feb. 2-3	Vermont QSO Party http://www.ranv.org/vtqso.html
Feb. 2-3	Delaware QSO Party http://www.fsarc.org/qsoparty/qsohome.htm
Feb. 3	North American CW Sprint http://www.ncjweb.com/sprintrules.php
Feb. 9-10	**CQ WPX RTTY Contest http://bit.ly/uYC0gp**

Winter Finds at the CQ Store

FREE shipping on orders of $100 or more!

VHF Propagation

by Neubeck, WB2AMU & West WB6NOA

A comprehensive source-book on VHF propagation by two great authors. Includes: Tropo ducting, Aurora, Meteor Scatter, TEP, Sporadic-E, Combo Modes and more!

6 X 9 Paperback $15.95

Technical Topics Scrapbook- All 50 yrs

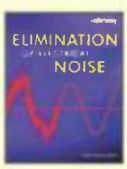
by Pat Hawker, G3VA

176 pages plus CD

All the words, pictures and line drawings from columns as they appeared. CD contains PDFs of pages arranged in annual collections from 1958 to 2008. Book reproduces pages from 2005 - 2008 as they originally appeared.

Order: RSTT50 $29.50

Elimination of Electrical Noise



From 30kHz to 30MHz

by Don Pinnock, G3HVA

64 pages

If you suffer from electrical noise problem Don's experiences and advice may provide solutions. Details various types of noise, how it's generated and how best to deal with it.

Order: RSEEN $16.50

Homebrew Cookbook

by Eamon Skelton, EI9GQ

Starts with the very basics of homebrew and progresses to advanced topics. It will have you itching to dust off your soldering iron!

Order: RSHC $23.95

33 Simple Weekend Projects

by Dave Ingram, K4TWJ

Do-it-yourself electronics projects from the most basic to the fairly sophisticated. Practical tips and techniques on creating your own projects.

6 X 9 Paperback $17.95

The NEW Shortwave Propagation Handbook

by W3ASK, N4XX & K6GKU

This authoritative book on shortwave propagation is your source for easy-to-understand information on sunspot activity, propagation predictions, unusual propagation effects and do-it-yourself forecasting tips.

8.5 X 11 Paperback $19.95
***New!* CD Version $14.95**
Buy both for only $29.95

The Quad Antenna

by Bob Haviland, W4MB

Comprehensive guide to the construction, design and performance of Quad Antennas. General Concepts, Circular-Loop & Arrays, Rectangular & Square Loops, Multi-Element Quads and more!

8.5 X 11 Paperback $19.95
***New!* CD Version $14.95**
Buy both for only $29.95

W6SAI HF Antenna Handbook

by Bill Orr, W6SAI

W6SAI was known for his easy-to-understand writing style. In keeping with this tradition, this book is a thoroughly readable text for any antenna enthusiast, jam-packed with dozens of inexpensive, practical antenna projects that work!

8.5 X 11 Paperback $19.95
***New!* CD Version $14.95**
Buy both for only $29.95

RSGB Prefix Guide *10th Edition*

by Fred Handscombe, G4BWP

80 pages

Fully updated- it provides the latest and most comprehensive list of the world's amateur radio prefixes and addition information covering references for continent, CQ Zone, DXCC, OIOTA, ITU Zone, Latitude & Longitude and much more. The very latest DXCC information is included.

Order: RSPXG $19.50

Lew McCoy on Antennas

by Lew McCoy, W1ICP

Unlike many technical publications, Lew presents his invaluable antenna info in a casual, non-intimidating way for anyone!

8.5 X 11 Paperback $19.95
***New!* CD Version $14.95**
Buy both for only $29.95

Reflections III

by Walter Maxwell, W2DU

Includes all the information in Reflections I & II and much, much more! This fully revised and updated, this 424-page, third edition is truly a must have!

8.5 X 11 Paperback $39.95
***New!* CD Version $29.95**
Buy both for only $59.95

International QRP Collection

Edited by Dobbs, G3RJV & Telenius-Lowe, 9M6DXX

The authors scoured the world for the best and have compiled them into this great scrapbook. Largest section of this 176-page collection is devoted to construction.

Order: RSIQC $23.95

"Getting Started" DVD Paks

CQ Ham Radio Welcome Pak

1 DVD contains 3 programs:
Ham Radio Horizons
Getting Started in Ham Radio
Getting Started in VHF
Order HAMDVD ~~$24.95~~ $16.00

CQ HF Specialty Pak

1 DVD contains 2 programs:
Getting Started in DXing
Getting Started in Contesting
Order HFDVD ~~$24.95~~ $16.00

CQ VHF Specialty Pak

1 DVD contains 3 programs:
Getting Started in Satellites
Getting Started in VHF
Getting Started in Packet
Order VHFDVD ~~$24.95~~ $16.00

Any 2 Paks only $30.00 3 Paks only $42.00

Shipping & Handling: U.S. add $7 for the first item, $3.50 for the second and $2 for each add'l item. FREE shipping on orders over $100 to one U.S. address. CN/MX-$15 for 1st item, $7 for 2nd and $3 for each add'l. All Other Countries-$25 for 1st item, $10 for 2nd and $5 for each additional. Buy Both=single item!

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

***Call:* 1-800-853-9797 • *Fax:* 516-681-2926 • *website:* http://store.cq-amateur-radio.com**

BY TOMAS HOOD,* NW7US

Good Conditions Predicted for 2013

A Quick Look at Current Cycle 24 Conditions

(Data rounded to nearest whole number)

Sunspots
Observed Monthly, October 2012: 53
Twelve-month smoothed, April 2012: 65

10.7 cm Flux
Observed Monthly, October 2012: 123
Twelve-month smoothed, April 2012: 126

***Ap* Index**
Observed Monthly, October 2012: 9
Twelve-month smoothed, April 2012: 8

One Year Ago: A Quick Look at Solar Cycle Conditions

(Data rounded to nearest whole number)

Sunspots
Observed Monthly, October 2011: 88
Twelve-month smoothed, April 2011: 42

10.7 cm Flux
Observed Monthly, October 2011: 137
Twelve-month smoothed, April 2011: 100

***Ap* Index**
Observed Monthly, October 2011: 7
Twelve-month smoothed, April 2011: 8

CQ WW SSB How Did You Do?

How did you fare the weekend of the CQ WW DX SSB Contest on October 27 and 28, 2012? My original forecast called for stable conditions, which proved true. Both days saw very low geomagnetic activity, with moderate, though declining 10.7-cm levels. Ten meters was a player this year with hot activity throughout the daylight hours. I'd like to hear reports from you about the contest weekend so we can get a good picture of how all of the solar activity impacted your operation.

Here is an overview of expected propagation conditions on each amateur band between 6 and 160 meters for 2013.

6 Meters: This band will see very little *F*-region propagation, even though this might be the peak of the current solar cycle, Cycle 24. Nevertheless, the summer season will bring the usual troposcatter and sporadic-*E* activity. Aurora will still play a major role during spring and fall.

10 and 12 Meters: These bands will be good during the DX seasons, but will suffer during the summer, except during times of sporadic-*E* activity. Expect most DX openings to be mostly on north and south paths.

*PO Box 27654, Omaha, NE 68127
e-mail: <nw7us@nw7us.us>

LAST-MINUTE FORECAST

Day-to-Day Conditions Expected for January 2013

	Expected Signal Quality			
Propagation Index.....	(4)	(3)	(2)	(1)
Above Normal:2-6, 9-12, 14-21, 23-27, 29-31	A	A	B	C
High Normal: 13	A	B	C	C-D
Low Normal: 1, 28	B	C-B	C-D	D-E
Below Normal: 7-8, 22	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 3 will be good (B) to fair (C) on Jan. 1st, excellent (A) from Jan. 2nd through the 6th, poor (D) to fair (C) on the 7th and 8th, and so on.

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.

15 Meters: This band will be fair to good, seeing worldwide openings during the daylight hours of all seasons. Most openings, though, will be short, except for the strong and frequent north/south path openings.

17 Meters: This band should behave much like 15, but you will find it open more often, with it remaining open for DX an hour or two longer than 15 meters.

20 Meters: Twenty is going to be the main player during this year of moderate solar activity. Expect good conditions during the daylight hours, with worldwide DX openings possible throughout the year. DX conditions on this band tend to peak for a few hours after local sunrise and again during the sunset period. During the summer, expect this band to remain open for DX several hours after local sunset, occasionally later into the night. In the winter months of 2013, nighttime DX openings are expected.

30 Meters: This will be an exciting band for those low-power digital signals. Winter brings longer

nights, providing the right mix for exceptional worldwide DX.

40, 60, 80, and 160 Meters: These are nighttime DX bands. Great worldwide DX should continue on 40 meters from about two hours before sunset to approximately two hours after sunrise during all seasons. Expect coast-to-coast DX on 60 meters. DX openings on 80 and 160 should peak during the early spring, late fall, and winter months. Expect somewhat stronger signals than those of the last few years.

January Propagation

We are in the heart of the winter season, with very short daylight hours. Average daily maximum usable frequencies (MUFs) are at their seasonal lows, but so are noise levels. During the winter months the maximum usable frequencies are generally higher during the daylight hours than during the summer daylight hours. This provides short but strong openings on higher shortwave bands during the day in winter. Then at night the MUF dips down much lower than what would be seen during the summer nights. Summertime MUFs are generally higher during the night time hours than during the winter nights, in part because the ionosphere stays energized through the short nights. Winter nights are longer, so recombination of the ionosphere (which results in a lowering of the MUF) is more complete.

This also means that the *D*-region of the ionosphere is less ionized during the winter, allowing mediumwave and shortwave frequencies to propagate through the *D*-region and off the *E*- and *F*-regions. Finally, the seasonal decrease in weather-related noise makes it easier to hear the weaker DX signals on lower frequencies. With thunderstorms few and far between, storm-related static and noise are greatly reduced.

Because atmospheric noise levels will be at seasonally minimum levels in the Northern Hemisphere during January, the 80 and 160 meter bands should also be hot. Expect some good openings to many parts of the world on 80 meters during the hours of darkness and the sunrise period. Short-skip openings between distances of 50 and 250 miles should be optimal on 80 meters during the daylight hours. During the later afternoon and early evening hours short-skip openings should increase to between 250 and 1500 miles and by nightfall openings up to and beyond 2300 miles should be possible.

Expect some DX openings on the 160-meter band during the hours of darkness. Openings toward Europe and the east should peak at about midnight. Openings toward the South Pacific and in a generally southerly direction may be possible just before daybreak, as well as openings into Asia and North Pacific. Short-skip openings up to 1300 miles should be possible during the hours of darkness, and frequently the skip will extend out as far as 2300 miles. During the daylight hours intense ionospheric absorption will severely limit openings, although some may be possible at times up to 150 miles or so.

Expect 60 meters to play a significant role in nightly DX across the United States. With very low noise levels this month, the weaker signals of 60 meters will be easy to copy.

The optimum band for DX conditions during the hours of darkness should be 40 meters. Expect openings to most areas of the world from shortly before sundown, through the hours of darkness, and until shortly after sunrise. Signal levels may be exceptionally strong at times. During the daylight hours, short-skip conditions should be optimal for openings between approximately 100 and 600 miles. Skip will lengthen during the late afternoon, and by nightfall short-skip conditions should be optimal for openings between 800 and 2300 miles.

Twenty meters is expected to be a solid band with excellent around-the-clock openings for both DX and short-skip. DX conditions should peak during a window of an hour or so right after sunrise and again during the late afternoon and early evening hours. Short-skip openings between approximately 1300 and 2300 miles should be possible from just after sunrise to as late as midnight. Shorter distance openings should also be possible from mid-morning to mid-afternoon.

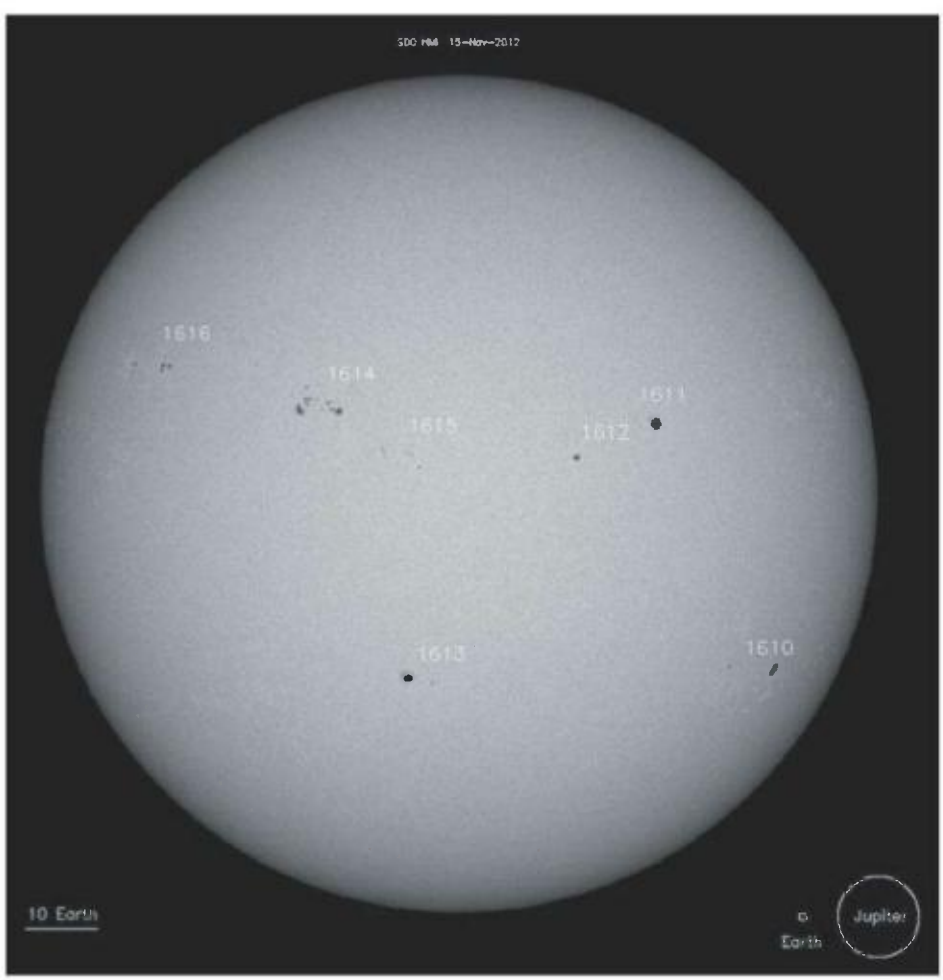


Fig. 1– While many are speculating that sunspot Cycle 24 has already reached its peak, and a dismal one at that, there are others postulating that the cycle is just very prolonged and slow on the uprise. November saw a bit of healthy sunspot activity, and time will tell as to the truth about this cycle's peak level. (Source: NASA)

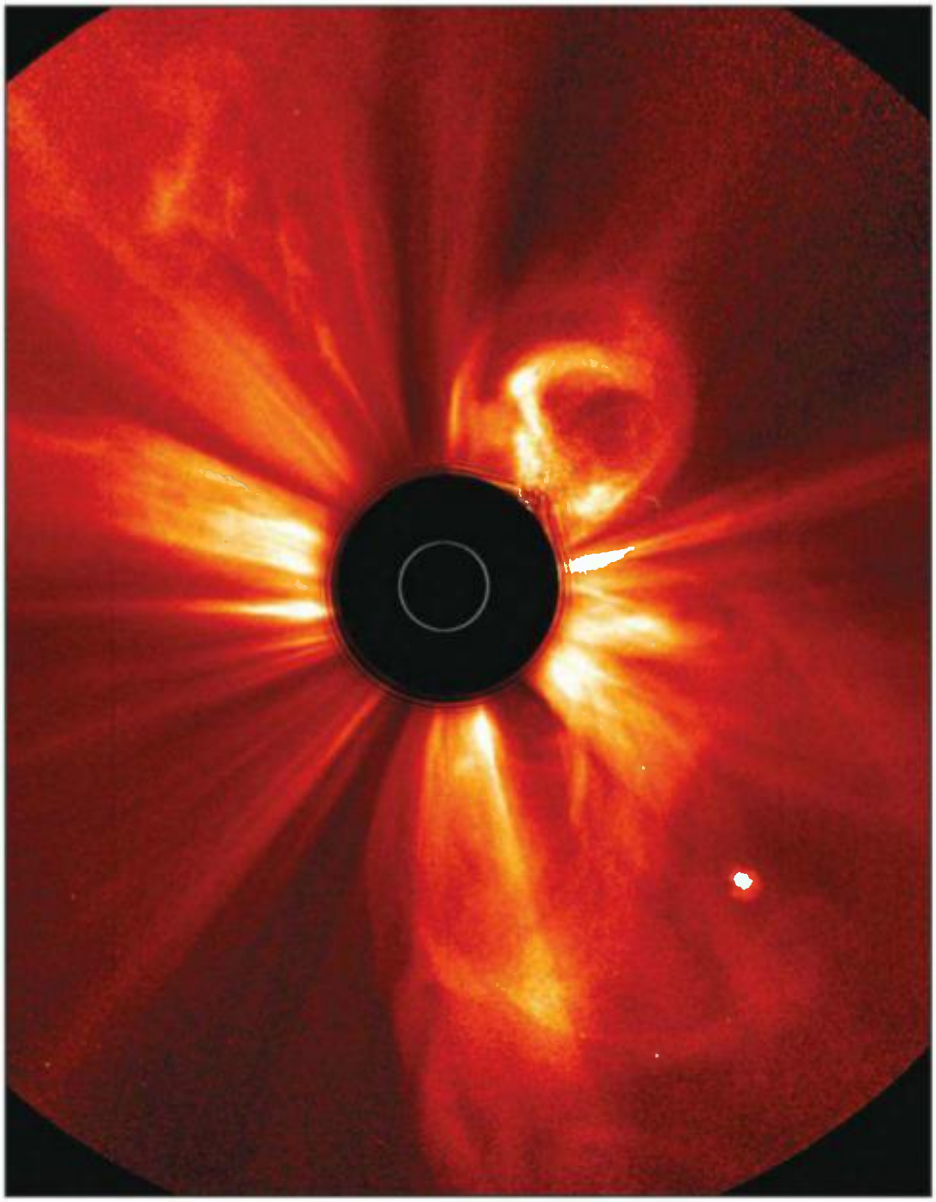


Fig. 2– The Sun produced a series of at least eight coronal mass ejections (CMEs) over a two-day period (Nov. 2–4, 2012). Some of them overlapped each other as the Sun burst some of them into space in a rapid-fire style. The series (see the movie: http://g.nw7us.us/RH9jQV) was taken by the STEREO Ahead spacecraft with its COR2 coronagraph, in which the Sun is blocked out by the black disk (Sun represented by the white circle) so that we can observe activity in the corona. These expanding clouds of charged particles also carry magnetic field into space. In the movie, the bright object moving from right to left below the Sun is the planet Mercury. (Source: NASA/STEREO)

It should be a toss-up between 15 and 17 meters for some great DX propagation openings during the daylight hours. These bands should open to most areas of the world, often with very strong signals. Fifteen meters may have a slight edge before noon, with 17 meters taking the lead after noon and becoming the optimum DX band during the late afternoon hours. Short-skip openings between distances of about 1200 and 2300 miles should be excellent during the daylight hours. Excellent short-skip openings are expected on 15 and 17 meters from shortly after sunrise through the early evening hours for distances between 1000 and 2300 miles.

VHF Conditions

Sporadic-*E* can occur during January, so be on the lookout. Very little aurora is likely to occur, however, so don't expect auroral-*E* propagation. The *Quadrantids* meteor shower is the major meteor shower for January, and it can appear any time during the first week of January. This sometimes can be quite intense, so it may be a good ideato set up some 2- and 6-meter schedules. Morning meteor openings may be the best bet during this month.

Check out the *CQ VHF* magazine "VHF Propagation" column for an in-depth look at propagation on VHF and above.

Current Solar Cycle Progress

The Royal Observatory of Belgium reports that the monthly mean observed sunspot number for October 2012 is 53. The 12-month running smoothed sunspot number centered on April 2012 is 65. The lowest daily sunspot value during October 2012 was recorded on October 7 with a count of 28. The highest daily sunspot count for October was 83 on October 15. A smoothed sunspot count of 81 is expected for January 2013.

The Dominion Radio Astrophysical Observatory at Penticton, BC, Canada, reports a 10.7-cm observed monthly mean solar flux of 123.3 for October 2012. The 12-month smoothed 10.7-cm flux centered on April 2012 is 125.8. The predicted smoothed 10.7-cm solar flux for January 2013 is about 136, give or take about eight points.

The observed monthly mean planetary *A*-index (*Ap*) for October 2012 is 9. The 12-month smoothed *Ap* index centered on April 2012 is 8. Expect the overall geomagnetic activity to be quiet to stormy during January. Refer to the Last-Minute Forecast for the outlook on the days this might occur.

I welcome your thoughts, questions, and experiences regarding this fascinating science of propagation. You may e-mail me, write me a letter, or catch me on the HF amateur bands. Please come and participate in my online propagation discussion forum at <http:// forums.hfradio.org/>. If you are on Facebook, check out <http://www.facebook.com/spacewx.hfradio> and <http://www.facebook.com/NW7US>. Speaking of Facebook, check out the CQ Amateur Radio Magazine fan page at <http://www.facebook.com/CQMag>.

Now that the new solar cycle is active, I'll be keeping my ears to the radio, hoping to hear you on the air. Happy DX!

73, Tomas, NW7US

Number groups after **call letters** denote following: Band (A = all), Final **Score**, Number of QSOs, and Prefixes. An **asterisk** (*) before a call indicates low power. Certificate winners are listed in **boldface**. (Note that the country names and groupings reflect the DXCC list at the time of the contest.)

2012 WPX SSB RESULTS
SINGLE OPERATOR
NORTH AMERICA
United States

K1LZ	A	10,083,368	3077	1084
			(OP: N8BO)	
AJ1I	*	8,971,605	3225	1033
			(OP: K8PO)	
KQ2M/1	*	6,865,738	2579	1042
NN1N	*	2,709,956	1474	769
WV1H	*	1,218,360	879	520
K1QS	*	920,200	668	430
K1ZR	*	806,061	616	417
AD1DX	*	759,647	715	419
K1LTJ	*	653,130	653	410
WX7T/1	*	401,600	433	320
			(OP: K1RM)	
N1GLT	*	196,880	291	230
WW1WW	*	187,369	265	203
AA1O	*	170,668	294	224
WA2HIP/1	*	165,243	310	223
N1KWF	*	154,155	296	239
N1AGE	*	131,852	260	207
WJ1R	*	67,728	159	136
KB1MCK	*	59,080	171	140
AB1OC	*	31,770	105	90
K1YSY	*	22,659	91	83
W1WWW	*	2,800	35	35
K1WHS	**28**	**147,552**	**285**	**212**
KK1KW	**7**	**2,407,000**	**1381**	**664**
K1HAP	**1.8**	**6,765**	**71**	**55**
***NV1N**	A	**5,451,950**	**2201**	**925**
			(OP: N1UR)	
*W1MA	*	692,580	634	420
*AB1OD	*	507,676	522	338
*WA1DRQ	*	392,768	469	323
*W1KMA	*	294,792	391	284
*KA1EKR	*	198,660	308	220
*KB1UUB	*	148,941	269	201
*KB1FRK	*	123,344	256	208
*KB1NHV	*	115,432	239	188
*KG1V	*	70,668	194	156
*W1CRK	*	67,932	174	153
*W1MHZ	*	63,591	168	141
*NF1L	*	47,972	158	134
*K1VU	*	41,697	125	113
*AB1QP	*	19,623	96	93
*W1MSN	*	14,948	77	74
*KE1CY	*	8,835	64	57
*KA2RVO/1	*	7,884	58	54
*K1AIR	*	5,950	50	50
*KA1C	*	5,928	58	52
*NE1RD	*	5,922	52	47
*N7FYO/1	*	4,400	44	40
*N1NN	*	2,490	30	30
*KB1WRH	*	1,320	22	20
*AB1NG	*	1,311	26	23
*KB1REQ	*	574	14	14
*W1KF	*	495	15	15
***KK1X**	**28**	**7,956**	**57**	**51**
*KB1WUO	*	950	19	19
***N1WRK**	**21**	**44,928**	**135**	**128**
*KA1RFD	*	2,070	30	30
***K1YM**	**14**	**198**	**9**	**9**
***W1DYJ**	**7**	**37,026**	**102**	**102**
*N1IH	*	1,848	23	22
N2RJ	**A**	**4,578,648**	**1744**	**852**
WS9M/2	*	470,736	556	336
N2NC	*	420,540	457	326
K2FJ	*	314,395	445	277
K2NV	*	310,964	388	269
K2JMY	*	260,428	403	284
WF2B	*	207,207	325	253
			(OP: N1EU)	
KM2O	*	131,904	269	192
KX2X	*	105,040	279	208
K2BBQ	*	94,710	210	165
KC2LST	*	45,375	136	125
K2MK	*	30,690	109	99
KC2ZPK	*	18,879	98	87
KJ2P	*	13,703	76	71
KC2KZJ	*	12,871	66	61
WB2TPS	*	3,885	37	35
W2BSN	*	380	10	10
KA2LIM	**28**	**62,061**	**204**	**151**
N2NT	**21**	**184,576**	**283**	**224**
N2MM	**14**	**1,863,626**	**1280**	**734**
K2MFW	*	101,144	199	188
WO2Y	*	66,682	159	154
WN2O	**7**	**204,294**	**341**	**237**
			(OP: N2GC)	
***KU2M**	**A**	**4,318,160**	**1974**	**880**
*WA2JQK	*	1,237,504	905	512
*NW2K	*	758,961	618	441
*K2GV	*	470,400	451	320
*AB2TC	*	301,126	388	274
*K2SZ	*	275,070	356	265
*WA1FXK/2	*	267,582	396	277
*KX2S	*	225,852	330	236
*KV2R	*	162,396	285	234
*N2DD	*	109,860	252	198
*N2MTG	*	102,102	235	182
*KB2YAN	*	93,656	245	184
*N2JBA	*	93,537	214	171
*KC2QJB	*	82,832	208	167
*K2PH	*	69,376	176	128
*WB2ZEX	*	65,637	173	143
*AD2TM	*	63,700	161	140
*WB2PJH	*	60,630	158	129
*KC2PJH	*	60,300	179	150
*W2VU	*	48,256	149	128
*WZ2L	*	38,250	166	125
*N2BEG	*	34,374	118	102
*W2DZ	*	30,528	130	106
*KC2WUF	*	28,420	115	98
*WA2NLL	*	28,152	106	102
*W2MRD	*	27,456	113	96
*W3EH/2	*	26,910	105	90
*KC2BEZ	*	24,932	106	92
*KT2G	*	22,784	100	89
*N2POJ	*	22,659	99	91
*WY1H/2	*	21,476	103	91
*N2GXJ	*	15,876	86	81
*N2NFU	*	11,505	68	65
*N2UJ	*	9,792	67	64
*AB2IO	*	5,428	48	46
*K2JF	*	1,652	28	28
*KG9NZ/2	*	304	17	16
***W2GB**	**28**	**121,987**	**251**	**199**
*N2SLO	*	26,877	111	93
*W2TF	*	14,348	82	68
*KA3ZHM/2	*	7,800	58	50
*W2UIS	*	2	1	1
***KC2JRQ**	**21**	**4,200**	**42**	**42**
***K2HVE**	**14**	**23,520**	**102**	**96**
***KC2YXU**	**7**	**616**	**14**	**14**
K3ZO	**A**	**7,258,410**	**2479**	**1030**
N3JM	*	1,285,165	818	503
K1DQV/3	*	302,761	408	277
WA3SRU	*	253,825	366	275
K4JLD/3	*	238,592	346	256
W3UL	*	233,934	357	254
KW3A	*	209,076	431	266
W2BZR/3	*	204,984	314	219
NA3M	*	130,698	199	159
N3RPH	*	109,620	228	174
K3MRG	*	87,696	189	144
W3GNQ	*	85,671	200	171
K3RMB	*	70,924	190	149
N3IYX	*	61,073	185	157
N3XOB	*	53,448	152	131
KB3TAW	*	21,840	94	80
KB3JQQ	**28**	**3,955**	**41**	**35**
N2HR/3	**7**	**127,038**	**261**	**186**
W3BGN	**3.7**	**800,920**	**708**	**420**
***WB3FIZ**	**A**	**1,538,115**	**1032**	**615**
*KD3HN	*	743,785	656	395
*KB3WD	*	593,850	553	370
*N8NA/3	*	592,602	579	349
*K3CWF	*	227,328	345	256
*N3QXC	*	139,680	303	194
*ND3R	*	109,928	217	182
*WB3DEL	*	100,467	229	183
*K2LNS/3	*	58,692	165	146
*KB4MIS/3	*	54,708	167	141
*W3MTP	*	35,305	128	115
*WA3ERQ	*	27,744	114	102
*KB3RKM	*	13,845	70	65
*N3UNX	*	12,141	82	71
*KB3SJS	*	10,800	65	60
*NE3K	*	9,548	65	62
*W3MGL	*	5,888	51	46
*K3VED	*	5,580	48	45
*W3RLO	*	4,620	43	42
*N8HM/3	*	3,800	42	38
*AB3OB	*	1,820	26	26
*KB3GJT	*	36	6	6
***KR1ST/3**	**28**	**37,842**	**134**	**106**
*WA2VQV/3	*	96	6	6
*KB3SQV	*	24	4	4
***KO3T**	**21**	**338,256**	**405**	**348**
***AI3G**	**7**	**14,820**	**93**	**78**
NX6X/4	**A**	**8,815,183**	**3230**	**1157**
			(OP: N4PN)	
AD4Z	*	7,354,042	2892	1039
W2AF	*	6,367,756	2596	1052
			(OP: K4AB)	
WX4G	*	2,469,408	1243	696
K1TO/4	*	2,274,330	1208	705
WB2REM/4	*	1,608,420	1101	660
W4QN	*	1,427,456	887	544
AJ4RW	*	1,232,748	1150	566
N6AR/4	*	1,104,516	807	487
K4VV	*	1,057,815	919	495
W4KW	*	970,289	746	449
KA0Q/4	*	777,728	631	392
K5KG/4	*	673,872	669	417
WA4TII	*	620,400	592	376
NC4MI	*	601,125	588	375
N3CV/4	*	558,441	552	367
N4WZ	*	502,360	598	380
NB4M	*	469,800	510	360
N4MM	*	360,612	419	324
AI4WU	*	338,624	439	286
WM2Z/4	*	327,978	572	342
NX9T/4	*	322,410	502	330
W4UT	*	298,016	414	278
W4JAM	*	290,199	364	273
KJ4LTA	*	248,676	368	276
KI4FIA	*	208,500	544	278
WA4GIF	*	192,192	300	231
W4JS	*	186,048	277	228
NR8O/4	*	168,084	298	207
KA4OTB	*	166,100	289	220
W4ATL	*	155,363	298	247
WA3OFC/4	*	147,586	226	218
W4VKU	*	141,316	228	196
NN4F	*	139,496	263	212
AI4WW	*	138,128	234	194
AJ4HW	*	134,136	261	207
WK4Y	*	126,352	271	212
W4MAY	*	114,399	202	171
NS4X	*	99,560	235	190
WY4Y	*	93,874	347	187
			(OP: NS3Q)	
W4WEA	*	85,715	213	155
K7CS/4	*	59,492	174	139
AG4F	*	59,214	160	142
WB6NYR/4	*	48,360	142	124
KØSTP/4	*	45,924	167	129
NJ2F/4	*	45,136	134	124
K4GM	*	39,131	129	109
N4LZ	*	36,840	130	120
N4VAN	*	30,400	111	95
WW4DD	*	24,480	83	80
NA4C	*	23,496	104	89
N8BGJ/4	*	21,311	110	101
NY4O	*	19,680	89	82
N4WFJ	*	12,470	66	58
KK9O/4	*	10,640	76	70
K4JRG	*	9,500	55	50
W2YE/4	*	8,816	62	58
KW4G	*	5,450	53	50
W4OGG	*	4,950	47	45
K4BGV	*	1,265	23	23
K4DKE	*	132	6	6
WN1GIV/4	**28**	**903,378**	**919**	**471**
			(OP: N4BP)	
KU8E/4	*	349,875	545	311
K4NV	*	174,300	423	210
K4RDU	*	53,317	163	131
KJ3X/4	**21**	**8,588,114**	**2985**	**1171**
			(OP: K4XS)	
KV4T	*	2,361,895	1391	751
N2YQ/4	14	5,875	47	47
K4JC	**3.7**	**10,764**	**55**	**52**
***NR3X/4**	**A**	**2,439,441**	**1517**	**711**
			(OP: N4YDU)	
*N4XL	*	1,810,620	1244	630
*WB4OMM	*	813,906	701	439
*N2ESP/4	*	406,085	495	337
*K4DMR	*	379,200	478	320
*NA4EA	*	334,641	356	307
*KS4X	*	294,048	382	288
*K4NC	*	291,720	414	264
*AD4RE	*	260,496	386	268
*AJ4VE	*	241,965	347	283
*N4VDL	*	236,645	380	265
*W4GDG	*	234,300	352	275
*AK4PE	*	175,392	305	224
*KJ4KVC	*	173,304	383	249
*K4FJW	*	169,952	296	226
*NG4L	*	147,446	272	214
*KA1DBE/4	*	145,642	278	206
*W4BAB	*	142,688	271	208
*NY4JB	*	131,820	271	195
*N4JF	*	131,396	265	214
*K4FTO	*	123,977	246	199
*AC4YD	*	103,820	230	179
*N3TG/4	*	102,200	215	175
*KK4EDY	*	102,120	227	184
*WØQQG/4	*	101,061	228	171
*AI4UN	*	86,553	221	177
*KE4JS	*	85,842	212	171
*AF4DR	*	79,341	197	159
*KS4S	*	74,690	183	154
*K4CWA	*	71,610	199	154
*K4DMH	*	58,916	174	143
*NX9B/4	*	48,087	155	137
*KJ4KKD	*	46,208	162	128
*AK4EM	*	46,002	145	123
*NR4C	*	45,577	137	119
*WB4MNK	*	44,516	140	124
*AI4CO	*	37,632	136	112
*N1QEQ/4	*	34,299	117	103
*AI4SV	*	33,966	127	111
*KM4IK	*	33,550	133	110
*KJ4VTH	*	32,966	126	106
*W9DHD/4	*	31,827	111	103
*KR4RO	*	30,804	114	102
*K4FDP	*	29,835	99	85
*K3MZ/4	*	28,620	117	106
*AK4OD	*	26,433	100	89
*K4ORD	*	26,190	108	97
*K4GOP	*	25,688	119	104
*WO4R	*	23,814	105	98
*KB5EZ/4	*	23,808	110	93
*N4RWH	*	23,220	102	90
*N8OQ/4	*	23,205	113	91
*AK4NZ	*	23,023	97	91
*N5ALX/4	*	22,008	98	84
*N4LF	*	21,976	102	82
*N4FP	*	21,620	95	94
*NØRZT/4	*	19,844	100	82
*K4JTT	*	19,152	92	84
*KC4EZN	*	17,548	96	82
*KD4OMY	*	17,040	77	71
*W4PGM	*	16,683	92	83
*N4ZED	*	15,050	76	70
*KJ4SZL	*	14,625	82	75
*WF7T/4	*	14,282	80	74
*AA4LR	*	14,007	78	69
*N4DTF	*	13,312	71	64
*KK4LH	*	11,590	68	61
*NA3Z/4	*	9,918	61	58
*N4WD	*	9,794	67	59
*KG4USN	*	6,812	56	52
*KD4YDD	*	5,500	56	50
*AA4KD	*	5,264	54	47
*KC8YRK/4	*	4,770	50	45
*KI4YIK	*	4,452	58	53
*NE4L	*	3,999	49	43
*K4PAP	*	3,404	48	46
*W4JNC	*	3,069	35	31
*KK4HHO	*	2,673	36	33
*N4ERZ	*	2,464	31	28
*WA4PGM	*	1,971	31	27
*KJ4HDY	*	1,656	24	23
*K2CEM/4	*	1,590	31	30
*W4DKR	*	900	18	18
*KH6OU/W4	*	760	22	20
*KC4RSL	*	576	16	16
*K4TNO	*	528	16	16
*KD8IGK/4	*	272	10	8
*N4LKE	*	180	9	9
*AB3MO/4	*	152	8	8
***NA4W**	**28**	**219,089**	**459**	**247**
			(OP: K4WI)	
*KV1P/4	*	2,465	29	29
*KD4MXA	*	476	18	17
*W4YTB	*	290	10	10
*KC4WQ	*	234	9	9
*KK4FYV	*	84	6	6
*KK4BSM	*	27	3	3
*KK4GGZ	*	12	2	2
***KM4HI**	**21**	**425,632**	**448**	**376**
*WA4AXT	*	173,990	288	254
*N4EK	*	28,032	103	96
*K4NVJ	*	14,874	75	74
*W4EEH	*	9,765	66	63
*WA2EAJ/4	*	5,616	50	48
***K4AMA**	**14**	**39,216**	**137**	**129**
*W4TTX	*	3,220	35	35
*AI4CN	*	760	19	19
*K8RRP/4	*	72	6	6
***KL9ET/K4**	**7**	**7,168**	**62**	**56**
*K4OC	*	264	8	8
*KE1F/4	3.7	4	1	1
NN5J	**A**	**11,572,575**	**3272**	**1175**
			(OP: N5DX)	
NR5M	*	10,396,944	3456	1174
WM5R	*	5,547,073	3051	973
W5WMU	*	4,030,812	2384	852
K5ER	*	1,916,940	1422	645
AD5XD	*	1,240,800	1168	528
AG5Z	*	990,720	924	512
W5GCX	*	977,856	752	463
NE5D	*	894,895	799	445
			(OP: K5RX)	
AK5DX	*	688,727	840	403
AC4CA/5	*	620,084	607	398
K5LAD	*	432,140	479	340
WB5AAR	*	259,644	527	308
			(OP: N5RZ)	
W5YH	*	257,477	409	263
K5GKC	*	255,136	453	272
K5ZCJ	*	210,691	337	247
N5VU	*	156,668	278	212
AA5B	*	155,763	404	243
K5PO	*	59,496	174	148
W5RAW	*	59,040	192	144
WA5LFD	*	46,115	141	115
N5FO	*	33,063	108	107
WB5C	*	22,692	120	93
W5THT	*	22,088	98	88
K8TE/5	*	19,404	94	84
W5JNP	*	2,590	42	37
KZ5MM	**28**	**801,784**	**933**	**424**
			(OP: W5PR)	
WS5H	*	57,792	168	129
N5BLY	*	16,650	90	75
N5MV	**21**	**1,506,075**	**1341**	**645**
KZ5J	*	724,710	769	493
N0ST	*	328,650	565	350
***N5DO**	**A**	**2,194,320**	**1508**	**669**
*N5CLK	*	424,764	574	342
*WI5ID	*	408,120	507	358
			(OP: K5IID)	
*K5OHY	*	334,585	438	305
*NT5V	*	328,302	390	299
*NW5Q	*	218,078	403	259
*KF5IXE	*	210,627	456	261
*AF5Q	*	188,594	517	266
*N4LI/5	*	140,128	281	232
*K7RB/5	*	96,642	260	182
*N9RO/5	*	96,500	261	193
*KB5YEG	*	93,480	213	190
*AF5CC	*	64,239	198	161
*NT5SM	*	61,770	177	142
*K5HEM	*	58,400	187	146
*KC5IP	*	55,096	166	142
*NL5DE	*	40,040	130	130
*NN5T	*	28,179	109	101
*KE5OG	*	27,246	130	114
*AC5T	*	17,706	89	78
*WB5LAI	*	16,896	99	88
*AE5ZO	*	13,860	82	70
*KB5DRJ	*	10,065	69	61
*W8DM/5	*	6,630	54	51
*AE5MM	*	6,318	59	54
*KM5Z	*	5,406	54	53
*KØMBC/5	*	1,175	25	25
*KI4ZDR/5	*	252	15	14
*W5TJS	*	36	4	4
*W5OV	*	21	3	3
***KE5SNJ**	**28**	**16,344**	**85**	**72**
*N5UWY	*	1,428	23	21
*K5MBA	*	70	5	5
***N5DTT**	**21**	**94,272**	**202**	**192**
*N5IF	*	1,782	36	33
***NN5Z**	**14**	**331,653**	**533**	**357**
			(OP: K5PX)	
*KV5Q	*	31,800	135	120
*N9WL/5	*	25,942	121	109
*W5CSM	*	18,511	120	107
*NK5G	*	5,600	61	56
NF8A	**A**	**5,607,280**	**2278**	**868**
			(OP: K6XX @K6XX)	
W6TK	*	3,302,784	1855	752
AA6PW	*	3,262,680	2028	760
K6TU	*	2,117,016	1287	594
WA6KHK	*	1,271,820	1026	564
K5DA/6	*	1,109,544	925	498
WO6M	*	632,940	701	420
AB1U/6	*	353,904	478	303
			(OP: W6RKC)	
K6IAT	*	228,330	395	258
N6ETO	*	217,377	329	249
K6GEP	*	212,300	334	275
WT6H	*	212,052	358	246
KT6VV	*	184,080	331	240
K6ATZ	*	138,600	261	200
KJ6HBY	*	121,290	287	195
W6CWM	*	99,624	213	168
WA6PY	*	91,845	216	157
AF6WF	*	86,013	232	171
KF6JG	*	83,316	231	159
KB6A	*	78,546	220	159
WA6KEK	*	61,116	192	132
WA6URY	*	51,221	157	131
W6FB	*	48,990	166	142
KY6LA	*	40,136	146	116
AA6WH	*	32,780	131	110
K6DGW	*	22,578	125	106
NN6NN	*	21,070	98	98
			(OP: W6XK)	
N6AA	*	17,582	77	59
N6AN	*	555	16	15
KO6ES	**28**	**89,776**	**291**	**181**
W6AFA	**21**	**1,196,893**	**920**	**587**
NO6F	*	90,630	253	190
			(OP: K2RD)	
K6HNZ	**14**	**1,259,180**	**1265**	**580**
***NX6T**	**A**	**1,920,810**	**1403**	**645**
			(OP: K6AM)	
*WN6K	*	1,277,679	1218	543
*NN3V/6	*	1,029,936	856	499
*W6UX	*	842,175	852	475
*NN6CH	*	780,270	820	465
*AA6K	*	657,360	606	415
*NN6DX	*	495,132	578	372
			(OP: W1PR)	
*K6BF	*	314,721	453	289
*KE6SHL	*	239,166	407	258
*W6KAP	*	237,446	401	251
*W6RFF	*	96,654	211	181
*NJ6G	*	75,492	228	162
*KQ6X	*	66,303	209	139
*N6VOH	*	53,613	224	161
*AD6LV	*	45,981	167	131
*W6RGS	*	38,695	143	109
*N6ENO	*	35,088	158	129
*WB6BET	*	32,877	154	117
*KM6I	*	31,408	134	104
*N6ZE	*	29,320	126	110
*K6CSL	*	27,063	118	97
*WV6N	*	24,843	106	91
*KE6MRG	*	23,478	111	91
*KI6YYT	*	23,358	124	102
*KK6TV	*	21,855	98	93
*AA6JE	*	18,920	106	88
*K6RQ	*	16,168	105	86
*KE6TIM	*	13,090	98	70
*K6MSM	*	7,579	57	53
*N7FZY/6	*	7,238	56	47
*KW6JIM	*	6,758	69	62
*AJ6B	*	6,588	67	61
*KF6ZYD	*	4,830	53	46
*N6OU	*	4,796	49	44
*AE6XC	*	4,136	49	44
*WA6GFR	*	3,738	43	42
*AG6KA	*	1,675	27	25
*N6AJR	*	646	18	17
*AG6HE	*	441	21	21
*KD6NOF	*	324	12	12
***KJ6MQM**	**28**	**2,856**	**36**	**34**
*N6OIL	*	1,127	23	23
*K6VHF	*	798	21	21
*NO6E	*	518	15	14
*AF6GQ	*	110	10	10
***K6GHA**	**21**	**235,340**	**357**	**287**
*K7XE/6	*	71,786	181	143
*AE6YB	*	36,704	145	124
*N6BHX	*	9,408	76	64
*KK6BJ	*	276	12	12
***W6ONV**	**14**	**2,772**	**48**	**42**
*KK6L	*	308	11	11
***KU6T**	**7**	**8,584**	**62**	**58**
KW7Y	**A**	**9,734,296**	**3337**	**1144**
			(OP: K7RL)	
WS7X	*	2,776,320	2127	768
KZ7X	*	1,375,776	1363	612
			(OP: W7WW)	
NX1P/7	*	1,353,420	1060	515
KE2VB/7	*	1,288,662	1187	541
KZ1W/7	*	968,760	903	460
K7JQ	*	921,516	990	492
NR7DX	*	731,120	732	481
			(OP: K7ABV)	
KF7GNI	*	514,040	648	355
KT7E	*	471,686	620	362
W7PU	*	438,195	792	393
KO7X	*	388,170	599	342
AC7GP	*	368,382	497	358
WU6W/7	*	314,847	506	299
WR5G/7	*	256,956	377	276
N9RV/7	*	200,600	390	200
NA2U/7	*	160,537	325	233
KR2E/7	*	147,744	291	228
WD7K	*	134,640	242	204
WA7PRC	*	129,690	280	198
K7AR	*	111,320	211	184
W7ON	*	106,860	262	195
W7FD	*	104,448	241	192
WM7Z	*	102,466	257	182
KJ7NL	*	99,792	233	198
WW7D	*	77,274	211	162
N7IX	*	73,260	170	148
KC7V	*	70,192	203	164
KI7Y	*	68,832	197	144
W4LSC/7	*	65,270	159	122
W6TX	*	64,242	212	166
KI7DG	*	63,360	192	165
WB7BBQ	*	55,160	164	140
KR7DX	*	49,478	188	143
AD7VB	*	49,284	186	148
K7MY	*	44,732	119	106
NF7E	*	36,654	148	123
K7XV	*	27,264	112	96
NI7R	*	26,312	107	92
W7LOY	*	23,112	124	107
W7WOF	*	21,800	119	100
WF4U/7	*	15,801	73	69
W7MCM	*	10,850	66	62
K7XC	*	9,720	59	54
K2AVI/7	*	8,910	73	66
W7VS	*	18	2	2
N7AT	**21**	**2,138,904**	**1540**	**732**
			(OP: WA7NWL)	
WA7LT	*	1,570,110	1230	597
K7RF	*	280,761	392	299
KI7N	*	5,782	53	49
W6ZQ/7	*	840	21	20
AD7J	**7**	**82,232**	**166**	**152**
			(OP: W7FP)	
***AD7JP**	**A**	**3,114,840**	**1836**	**771**
			(OP: K2PO)	
*N7ZG	*	1,656,666	1093	594
*W7FYW	*	499,995	578	369
*KK7AC	*	409,895	591	365
*NK7L	*	384,130	575	359
*N7MZW	*	379,088	691	344
*N7VPN	*	305,350	422	310
*WØPAN/7	*	257,040	477	270
*W2AJW/7	*	228,942	433	237
*WA0WWW/7	*	199,836	345	252
*K7HBN	*	197,620	298	241
*K7HP	*	167,134	309	214
*K6LDN/7	*	141,267	304	217
*N7VS	*	136,116	275	199
*N7IR	*	127,800	239	200
*N7VEA	*	102,440	254	197
*W8BFX/7	*	100,648	218	184
*N7ESU	*	80,196	206	163
*KD7PCE	*	78,200	221	170
*W7QN	*	77,792	231	176
*KF7DYX	*	71,200	222	160
*KF7IUH	*	65,312	203	157
*KAØADZ/7	*	56,316	219	156
*AD7T	*	47,940	170	141
*KE7RPR	*	45,260	160	124
*AD7UP	*	42,210	141	126
*KG5EN/7	*	39,490	143	110
*W7RV	*	30,636	104	92
*KE7UQL	*	25,530	124	111
*W7DXW	*	24,816	107	94
*N3QQ/7	*	22,542	115	102
*KD7IBE	*	21,203	121	91
*KB6BYU/7	*	17,664	118	96
*K7JKM	*	13,800	88	75
*K9DR/7	*	12,480	74	60
*AF7O	*	10,395	87	77
*KF7KXV	*	9,288

*KD7HXN	"	216	12	12
*KU7Y	"	27	3	3
***K7ULS**	**28**	**82,160**	**228**	**158**
*N7BK	"	17,301	89	73
*WN7Y	"	1,281	22	21
***N7FLT**	**21**	**152,558**	**270**	**238**
*W7UPF	"	68,716	175	164
*K7BX	"	26,768	124	112
*N7RXL	"	1,920	30	30
*W7JFF	"	1,155	21	21
***KD7JS**	**14**	**152**	**8**	**8**
***KB7QND**	**3.7**	**12,382**	**130**	**82**
WØCC	**A**	**3,459,324**	**1847**	**803**
			(OP: N8BJQ)	
K8WT	"	1,477,965	1043	555
WD8EOL	"	902,176	794	484
ND8L	"	874,144	708	463
N8IVE	"	389,532	430	286
W8JRK	"	253,092	371	262
W8QGP	"	169,689	297	229
KC8RPV	"	128,330	243	205
N8MSA	"	108,780	198	185
WA8TIM	"	63,048	166	148
K8BZ	"	39,078	131	117
K8VE	"	38,500	121	110
AL7BA/W8	"	22,500	108	100
N8BI	"	1,988	29	28
W8UG	"	1,275	26	25
KC8ZMN	**21**	**181,248**	**292**	**256**
KD8SQ	**14**	**92,500**	**202**	**185**
W8JMF	**3.7**	**11,232**	**49**	**48**
***WB8TLI**	**A**	**1,317,942**	**891**	**631**
*NA8V	"	1,191,768	934	508
*KE8UN	"	681,548	655	404
*KB8UUZ	"	470,054	541	358
*AC8GX	"	435,400	539	350
*K8PGJ	"	421,824	501	312
*N8BV	"	403,800	532	331
*WS6K/8	"	338,034	484	318
*KD8NOH	"	314,032	413	304
*WA8PRE	"	270,535	428	305
*W8ASA	"	194,040	339	245
*N8SBE	"	175,017	305	227
*AC8JF	"	151,748	289	236
*KB8KE	"	151,200	276	216
*KF8BT	"	139,598	309	223
*KD8OSD	"	116,090	246	190
*W8GOC	"	110,188	204	163
*N8HAM	"	104,517	227	189
*W8KNO	"	99,617	235	179
*WJ8E	"	82,668	192	166
*K8VUS	"	63,248	164	134
*AA8N	"	52,003	159	133
*W8IDM	"	50,250	155	134
*KE8UM	"	46,750	141	125
*WB8TQZ	"	43,942	143	127
*K8CR	"	43,065	160	135
*KD8HHG	"	30,906	111	101
*KB8UHN	"	27,824	110	94
*KA8NJW	"	26,182	125	106
*NR8R	"	26,051	123	109
*WA8SDF	"	24,104	98	92
*N8NX	"	23,660	96	91
*KE8FO	"	17,052	90	84
*N8YFQ	"	14,184	74	72
*WT8E	"	13,760	85	80
*WB8WNV	"	13,505	80	73
*NA8Y	"	12,629	77	73
*WC8Z	"	11,084	80	68
*K8JTD	"	9,362	69	62
*KD8RKJ	"	9,027	61	59
*K8ANM	"	8,892	61	57
*NT8Z	"	8,788	55	52
*N8WS	"	6,555	60	57
*KC8UNR	"	3,952	39	38
*W8KH	"	3,311	46	43
*NF8M	"	2,958	36	34
*KK4CIS/8	"	2,812	42	38
*KD8JAM	"	1,166	22	22
***N8CN**	**28**	**46,566**	**152**	**117**
*KB8YSX	"	2,640	33	33
*W8AMD/8	"	406	14	14
***NF8J**	**21**	**221,680**	**297**	**272**
*KG8Z/8	"	97,427	203	187
*KJ8O	"	35,046	126	118
***AF8C**	**14**	**14,399**	**83**	**77**
*KC8R	"	4,100	43	41
*N8SGD	"	144	9	9
***NR8U**	**7**	**71,300**	**181**	**155**
AC8S	**A**	**1,531,455**	**1107**	**579**
W9KXQ	"	456,488	532	344
WS9H	"	238,750	354	250
			(OP: W9TC)	
NQ9A	"	221,805	328	265
WI9WI	"	198,220	356	265
KR9E	"	155,445	325	215
W9GT	"	131,670	245	198
W9QA	"	85,500	182	171
K9DXL	"	85,320	231	180
N9OK	"	44,604	146	118
K9QC	"	22,090	94	94
W9WLX	"	19,976	111	88
KG9N	"	14,212	114	76
WB9B	"	4,773	45	37
N9LIS	"	2,695	35	35
K9CT	**21**	**3,228,472**	**1597**	**839**
AJ9C	"	114,086	236	203
W9GL	"	25,298	94	91
KD9MS	**14**	**2,520**	**31**	**30**
KX9X	**7**	**48,069**	**231**	**147**
***KS9K**	**A**	**1,524,646**	**1033**	**542**
			(OP: N4TZ)	
*KB9OWD	"	978,112	1077	493
*K9QVB	"	898,840	739	460
*W9QL	"	408,156	516	339
*K9JE	"	332,280	432	312
*W9JA	"	153,201	279	223
*NV9X	"	130,764	252	204
*N9LYE	"	117,018	250	198
*W9MO	"	105,700	236	175
*N9VPV	"	93,438	220	174
*K9IAC	"	83,166	203	166
*WX9EP	"	67,098	206	159
*KB9RDS	"	65,858	188	149
*K9AMP	"	52,662	161	134
*WB9LRK	"	36,076	133	116
*WR9Y	"	30,360	126	115
*K9WWT	"	25,935	121	105
*KC9DOA	"	21,714	106	94
*K9XB	"	21,696	105	96
*KC9QOJ	"	9,891	69	63
*KA9CLP	"	9,796	69	62
*KC9OYE	"	9,100	75	70
*K9PMV	"	7,920	53	48
*W9SWT	"	5,535	45	41
*K9TCD	"	3,672	36	36
*KC9VGG	"	975	28	25
*N9IFG	"	208	14	13
***KC9TQR**	**28**	**4,368**	**44**	**39**
*W9YB	"	4,368	44	42
			(OP: KC9UWQ)	
*KG9HM	"	126	11	9
***K9PY**	**21**	**48,910**	**145**	**134**
***W9EBK**	**14**	**19,082**	**105**	**94**
*N9WI	"	13,968	73	72
*KC9CDW	"	2,077	31	31
***WO9S**	**7**	**4,352**	**34**	**34**
KU1CW/Ø	**A**	**8,764,784**	**3120**	**1112**
KGØF	"	7,530,886	2885	1067
			(OP: WØUA)	
ACØB	"	2,056,788	1636	684
			(OP: NXØX)	
NAØCW	"	1,546,745	1136	587
KDØFW	"	1,476,034	1147	589
WAØJZK	"	388,752	513	312
NCØB	"	301,938	389	294
NØHTV	"	125,028	266	207
KCØVTJ	"	100,890	235	177
KØAP	"	81,015	190	165
AAØA	"	63,600	193	159
KØSIX	"	49,980	159	140
WAØVPJ	"	27,071	117	107
WØRIC	"	14,271	70	67
WØBH	"	9,453	112	69
KØVG	"	6,664	60	56
NAØBR	"	6,325	57	55
KDØCVO	"	4,520	41	40
WØDHB	**28**	**3,007**	**33**	**31**
NØSMX	**21**	**52,334**	**143**	**137**
NØZC	**14**	**5,724**	**57**	**54**
NYØT	**7**	**22,841**	**93**	**91**
***WIØWA**	**A**	**1,284,792**	**1084**	**564**
		(OP: WØEWD @WØEWD)		
*WBØTSR	"	491,538	587	366
*WBØLJK	"	224,460	422	258
*KA8HDE/Ø	"	208,236	417	268
*WØOVM	"	207,315	322	255
*KØVVX	"	180,792	395	243
*WAØLJM	"	167,040	304	240
*WØGN	"	166,972	312	247
*KKØSD	"	166,105	299	239
*KØBAM	"	134,922	289	226
*NR9A/Ø	"	133,980	272	203
*KIØI	"	128,702	300	203
*WØTUP	"	102,800	253	200
*NNØQ	"	86,730	246	177
*KTØA	"	73,032	223	179
*NØGOS	"	66,810	226	170
*KØNEB	"	66,220	171	154
*KIØJ	"	52,000	144	125
*WØZF	"	40,095	138	135
*KOØZ	"	39,195	134	117
*KDØKIM	"	24,274	122	106
*KRØL	"	22,533	134	111
*KØUK	"	20,418	96	83
*WØNFS	"	17,472	92	84
*WDØT	"	14,337	91	81
*NØUJT	"	12,087	87	79
*WA5SWN/Ø	"	11,242	76	73
*NØAX	"	9,856	68	64
*AEØAR	"	9,842	90	74
*ADØH	"	8,684	64	52
*KØLDS	"	5,130	46	45
*NØAJN	"	4,312	44	44
*KDØ'COS	"	4,095	46	45
*NO2D/Ø	"	2,849	41	37
*WØJEC	"	2,720	34	34
*KDØCVZ	"	2,613	40	39
*NØWY	"	2,432	40	38
*KDØOYR	"	2,400	33	32
*KØANS	"	946	22	22
*KFØF	"	840	28	28
*NQØI	"	45	5	5
***WØPPF**	**14**	**26,100**	**129**	**116**
*KDØNEL	"	20,453	154	113
*KDØBKH	"	1,566	31	29
***KØLAF**	**7**	**24,738**	**99**	**93**
*N9HDE/Ø	"	4,512	59	48
*KCØRQH	"	462	14	14
*WØRO	"	36	4	4
Alaska				
AL1G	**A**	**1,082,052**	**1015**	**466**
AL7KZ	"	296,442	386	258
KL5DX	"	107,604	276	183
			(OP: KL7SB)	
***KL3HM**	**A**	**3,432**	**37**	**33**
Barbados				
8P5A	A	**24,809,505**	**6245**	**1385**
			(OP: W2SC)	
*8P6NW	A	**119,119**	**239**	**187**
Canada				
VY2ZM	A	**18,863,406**	**4487**	**1238**
			(OP: K1ZM)	
VY2/K5WA	"	11,796,912	3167	1037
VE9AA	"	1,298,286	864	498
VO1KVT	"	993,884	748	482
VE1JS	"	188,340	260	219
VO1BQ	"	15,158	62	53
***VO1TX**	**A**	**1,257,088**	**841**	**488**
*VE1AL	"	467,544	470	322
*VO1BBN	"	248,848	321	206
*VE1ZA	"	19,516	86	82
*VE9QA	"	13,608	68	63
***VE1RAR**	**14**	**126,630**	**229**	**210**
VE2EZD	**A**	**78,939**	**186**	**147**
VE2JM	14	112	8	7
***VE2AWR**	**A**	**434,805**	**464**	**303**
*VE2AXO	"	55,188	157	126
*VE2KY	"	38,200	118	100
*VE2OXA	"	10,200	61	60
***VA2AFH**	**21**	**54,905**	**145**	**139**
***VE2GLA**	**14**	**4,480**	**41**	**40**
XL3T	**A**	**15,890,979**	**3935**	**1231**
			(OP: VE3AT)	
VE3EJ	"	15,554,477	3981	1217
VE3OI	"	8,328,418	2528	1031
VA3ZDX	"	469,440	493	326
VA3YOJ	"	209,620	286	223
VE3TA	"	207,260	288	241
VA3FP	**21**	**182,528**	**280**	**248**
VE3RZ	**7**	**167,291**	**200**	**173**
***VA3SWG**	**A**	**2,066,012**	**1054**	**593**
*VA3UG	"	960,526	745	437
*VE3FH	"	702,506	596	361
*VE3NNG	"	420,138	443	306
*VA3DBT	"	151,620	277	210
*VA3GD	"	127,264	242	194
*VA3KAI	"	121,776	230	172
*VE3TU	"	100,245	201	163
*VA3GKO	"	92,862	186	154
*VE3NE	"	80,400	147	134
*VE3RCN	"	80,256	183	152
*VE3WG	"	31,581	116	99
*VA3PAW	"	30,452	111	92
*VA3OV	"	22,776	88	78
*VA3FN	"	15,180	75	66
*VE3OIL	"	8,640	63	54
*VE3VID	"	4,760	40	40
*VE3AJ	"	3,007	33	31
*VA3DDX	"	2,550	30	30
*VE3XAT	"	240	10	10
***VE3IAE**	**14**	**89,858**	**189**	**179**
*VA3GUY	"	50,697	142	129
*VE3AUD	"	1,904	28	28
***VE3EWS**	**7**	**146,190**	**183**	**165**
*VE3PYJ	"	7,840	42	40
***VE3EDY**	**1.8**	**8,140**	**50**	**44**
VE4VT	**A**	**3,916,350**	**1676**	**788**
VE4KZ	**14**	**178,852**	**324**	**244**
***VE4YU**	**A**	**379,431**	**440**	**299**
*VE4TTH	"	221,961	328	241
VA5LF	**A**	**155,540**	**270**	**220**
***VE5UO**	**A**	**119,970**	**269**	**186**
*VE5GC	"	65,888	190	142
***VE5KS**	**28**	**27,501**	**111**	**89**
***VE5ZX**	**21**	**634,920**	**612**	**429**
VA6UK	**A**	**861,816**	**716**	**447**
VE6KD	"	377,152	442	332
VE6FN	"	50,518	153	134
***VE6EX**	**A**	**2,354,136**	**1550**	**564**
*VE6SQ	"	208,210	354	235
*VE6AMI	"	94,500	211	180
*VE6EC	"	22,230	97	90
*VA6AN	"	5,670	49	42
VE7CC	**A**	**9,117,154**	**2787**	**1081**
VA7ST	"	2,553,759	1385	657
VE7VR	"	58,695	184	129
VC7R	**14**	**5,664,204**	**2494**	**988**
			(OP: VA7RR)	
***VE7RSV**	**A**	**57,268**	**151**	**139**
*VE7VAW	"	3,572	45	38
*VE7TI	"	2,736	28	24
***VA7CRZ**	**14**	**133,042**	**249**	**221**
*VA7ZM	"	645	15	15
*VE7DAQ	"	108	6	6
***VE7YU**	**3.7**	**10,712**	**58**	**52**
VE8DW	**A**	**19,178**	**88**	**86**
***VE8GER**	**A**	**316,008**	**434**	**297**
*VE8NE	"	2,700	40	36
Costa Rica				
*TE2M	28	**25,730**	**124**	**83**
			(OP: TI2KAC)	
Cuba				
CO2GG	**A**	2,683,535	**1588**	**655**
***CM5FZ**	**A**	**497,652**	**505**	**339**
*CO2WL	"	446,124	535	339
*CO6LE	"	317,322	478	269
*CO6LP	"	236,775	503	231
*CO2VE	"	183,209	314	221
*CO2VDD	"	36,158	116	101
*CO2JW	"	17,765	95	85
*CO2MS	"	17,242	78	74
***CO2CW**	**21**	**804,804**	**754**	**459**
*CO8AW	"	77,962	198	174
***CL8AKY**	**7**	**5,600**	**40**	**40**
***CO6CAC**	**3.7**	**72,120**	**148**	**120**
Dominican Republic				
***HI8LAM/3**	**A**	4,354,011	**1902**	**797**
*HI3TT	"	377,300	517	308
***HI3EPR**	**28**	**776,832**	**838**	**408**
***HI3K**	**21**	**2,070,445**	**1218**	**689**
***HI3CC**	**14**	**440,014**	**724**	**302**
***HI8GPR**	**3.7**	**12,906**	**57**	**54**
***HI8KW**	**1.8**	**440**	**10**	**10**
Guadeloupe				
***FG4NO**	**A**	**568,480**	**604**	**374**
*FG1PP	"	148,122	256	211
Guatemala				
***TG9AXF**	**14**	**556,125**	**669**	**375**
Honduras				
***HQ2N**	**28**	**292,608**	**521**	**256**
			(OP: JA6WFM)	
Martinique				
TO5K	**A**	**14,817,938**	**4862**	**1201**
			(OP: RC0F)	
FM1N	7	**52,015**	**112**	**101**
***FM5FJ**	**14**	**335,997**	**375**	**333**
Mexico				
XE2S	**A**	**3,284,684**	**1596**	**676**
XE1OGG	"	235,711	339	223
XE1L	**21**	**3,636,370**	**2034**	**790**
***XE1XOE**	**A**	**590,303**	**721**	**343**
*XE1FZE	"	106,020	253	180
*XE1ZTW	"	20,250	95	81
*XE1AY	"	9,342	59	54
***XE2MVS**	**21**	**18,832**	**91**	**88**
Panama				
***HP3FTD**	**A**	**60,852**	**158**	**132**
Puerto Rico				
WP4I	**A**	**89,658**	**190**	**153**
WP4WW	**28**	**339,756**	**589**	**276**
			(OP: KP4JRS)	
***WP3GW**	**A**	**575,073**	**524**	**361**
*KP4CPC	"	30,816	116	107
*KP4RAY	"	3,816	39	36
***KP4JFR**	**28**	**76,000**	**202**	**160**
Turks & Caicos Islands				
***VP52V**	**A**	**2,032,550**	**1328**	**590**
			(OP: W5CW)	
US Virgin Islands				
KP2MM	**A**	**6,621,256**	**2574**	**956**
			(OP: N2TTA)	
AFRICA				
African Italy				
***IH9YMC**	**28**	**27,260**	**107**	**94**
Angola				
***D2QV**	**28**	**822,764**	**711**	**412**
Canary Islands				
EE8Z	A	8,163,175	2423	941
			(OP: NP4Z)	
EA8DO	"	2,671,200	1209	600
EA8LS	**21**	**27,645**	**102**	**97**
***EA8OM**	**A**	**838,452**	**644**	**428**
			(OP: DJ10J)	
*EA8CST	"	252,255	336	251
*EA8AQV	"	184,496	271	208
*EA8BQM	"	156,024	268	197
***EA8CZT**	**28**	**6,075**	**47**	**45**
***EC8AQQ**	**21**	**259,570**	**348**	**257**
***EA8VD**	**14**	**990,416**	**709**	**478**
Cape Verde				
D4A	A	14,357,235	3718	1163
			(OP: N6KT)	
D44AC	**21**	**17,356,864**	**4283**	**1376**
			(OP: I4UFH)	
D4C	**14**	**6,534,990**	**2278**	**966**
			(OP: IZ4UEZ)	
Djibouti				
*J28AA	14	225	9	9
			(OP: E7ØA)	
Lesotho				
*7P8PB	A	144	**8**	**8**
Madeira Islands				
CT3FW	A	98,992	**190**	**184**
Mayotte				
*TO7BC	A	**3,172,628**	**1478**	**727**
			(OP: DL7BC)	
Morocco				
CN2R	**A**	**27,280,992**	**5455**	**1424**
			(OP: W7EJ)	
Seychelles				
***S79NEN**	**14**	**135,660**	**241**	**204**
South Africa				
ZS5NK	**A**	**80,190**	**187**	**162**
ZS6EE	**28**	**1,283,660**	**831**	**530**
***ZS6GRL**	**28**	**35,964**	**119**	**111**
*ZS1JY	"	15,478	75	71
*ZS6C	"	225	9	9
Tanzania				
***5H3MB**	**A**	**261,040**	**341**	**260**
			(OP: IK2GZU)	
Zambia				
***9J2RI**	**A**	**1,656**	**24**	**23**
			(OP: ZS6RI)	
Zimbabwe				
Z21BB	28	**379,862**	**427**	**301**
ASIA				
Afghanistan				
*T6JP	A	**155,507**	**280**	**211**
			(OP: OZ2JBC)	
*T6MO	28	**159,558**	**295**	**203**
			(OP: K9GY)	
Armenia				
***EK3GM**	**28**	**629,180**	**671**	**326**
Asiatic Russia				
RA/KE5JA	**21**	**424,252**	**604**	**367**
UA9BS	**A**	**9,356,303**	**2713**	**979**
RL9I	"	3,348,981	1483	801
R9UT	"	2,416,295	1349	655
RA9JBA	"	1,028,375	777	433
UA9AU	"	978,836	668	428
RX9JD	"	551,150	523	365
R9QQ	"	481,371	489	319
R9YP	"	359,388	471	298
R8AA	"	40,255	114	97
UA9JFR	"	31,906	101	86
RV9MA	"	25,286	103	94
RT9A	"	19,266	93	78
UA9BA	"	210	9	7
RZ9UI	**28**	**1,201,248**	**869**	**516**
UA9CBM	"	37,211	137	127
R9CB	**21**	**1,195,686**	**886**	**543**
RM9T	"	688,425	611	411
RK9QWM	"	374,868	457	324
RA9AAA	"	363,769	402	331
UA9YK	"	128,184	235	218
RU9WZ	"	75,544	185	152
RK9UN	**14**	**853,230**	**662**	**478**
RU9UC	"	10,797	62	51
R8MC	**7**	**2,329,002**	**846**	**538**
RX9UKF	**3.7**	**21,420**	**72**	**53**
***RT9S**	**A**	**3,285,816**	**1437**	**686**
*RV9CBW	"	2,584,646	1221	646
*UA8WAA	"	1,626,453	922	531
*R8MD	"	1,030,586	727	418
*RF8R	"	906,963	702	447
			(OP: RW9RW)	
*RZ9YB	"	883,036	741	427
*RX9KD	"	820,218	700	413
*RT9YA	"	678,084	579	363
*UB9AAJ	"	517,924	465	316
*RU9MN	"	305,923	400	283
*R8ABC	"	294,115	403	295
*R9OAZ	"	277,680	370	267
*RV9WND	"	253,184	346	256
*UA9SAW	"	245,949	341	257
*RZ9UGN	"	221,972	317	263
*UA9YTN	"	202,242	309	222
*RA9AN	"	193,024	283	232
*UA9NP	"	172,032	297	224
*RA9AEA	"	136,324	248	197
*RU9YF	"	124,929	221	189
*R9SD	"	119,784	202	168
*UA9JNT	"	114,266	241	194
*UA9R	"	67,326	183	147
*RV9CM	"	65,212	152	137
*RV9MB	"	56,718	172	137
*RA9JB	"	54,120	158	123
*UA9JFH	"	53,325	162	135
*RA9SKL	"	42,939	137	117
*RX9DJ	"	41,820	133	123
*RA9AMO	"	36,396	121	108
*UA9ODE	"	27,472	110	101
*UA9AX	"	20,967	95	87
*R8CS	"	20,181	98	93
*UA9UX	"	15,120	75	70
*RX9CET	"	3,276	28	28
*R9UG	"	2,054	31	26
*UA9OAL	"	364	13	13
*UA9JSJ	"	126	9	9
***RV9DC**	**28**	**1,016,880**	**861**	**456**
*RZ8U	"	448,970	516	323
*RW9DW	"	436,425	504	345
*UA9OMT	"	224,020	330	230
*RA9SF	"	35,424	134	123
*RA9AP	"	26,352	116	108
*UB8OAA	"	16,936	85	73
***R9M**	**21**	**856,215**	**669**	**477**
*RX9CCJ	"	345,408	406	336
*UF8T	"	100,419	215	187
***UA9MRY**	**14**	**190,752**	**288**	**253**
*R9MJ	"	104,992	197	193
*RU9AC	"	5,324	47	44
*RW9DX	"	532	14	14
*UA9UKL	"	429	13	13
*RA9U	"	12	2	2
***RD9SA**	**7**	**18,239**	**63**	**61**
RWØUU	**A**	**865,260**	**922**	**460**
UAØBA	"	410,560	493	345
RAØQD	"	291,323	443	317
RUØLL	"	246,740	340	260
RWØUM	"	10,659	60	57
RØDX	**21**	**2,539,116**	**1428**	**753**
			(OP: UAØDC)	
RNØCF	"	1,856,025	1252	657
RØAA	"	775,992	732	447
UAØIBX	"	113,295	230	195
RTØB	"	30,858	125	111
RKØUT	**14**	**87,894**	**197**	**171**
***RWØA**	**A**	**5,171,096**	**1892**	**856**
			(OP: RAØAM)	
*RDØA	"	544,500	507	375
*RAØJBL	"	481,492	579	353
*RAØCW	"	188,244	380	252
*UAØC	"	158,592	397	224
*RZØSB	"	131,461	262	209
*RAØCHK	"	82,302	255	174
*UAØACG	"	57,116	166	131
*RXØSA	"	51,348	145	132
*RAØWMD	"	26,108	126	107
*RXØSC	"	24,153	102	97
*RKØSV	"	16,083	88	77
*UAØLNL	"	5,750	59	50
*UAØZS	"	5,474	51	46
*RZØSW	"	3,096	36	36
***RAØUBI**	**28**	**67,064**	**290**	**166**
*UAØØD	"	53,700	221	150
***UAØSOX**	**21**	**798,930**	**694**	**495**
*UAØUK	"	483,527	540	389
*UAØXAK	"	47,320	188	130
*RAØAY	"	45,560	153	136
*RAØSMS	"	4,268	44	44
***UAØSJ**	**7**	**177,970**	**217**	**165**
Asiatic Turkey				
***TA7EB**	**A**	**99,825**	**197**	**165**
*YM3KB	"	68,761	155	133
			(OP: TA3DJ)	
***TA7AO**	**14**	**10,126**	**63**	**61**
*TA4ED	"	8,990	64	58
Azerbaijan				
***4K9W**	**A**	**7,399**	**52**	**49**
Bahrain				
A92GR	**28**	**275,400**	**367**	**255**
China				
BA7IO	**A**	**3,606,468**	**1932**	**813**
BD4QH	"	1,204,000	1077	500
B4TB	"	483,536	681	376
			(OP: BA4TB)	
BH7PFH	"	329,072	437	314
BD4DYH	"	37,152	137	108
BG5CLC	"	28,560	188	105
BD4TJ	"	11,400	116	76
BH1LYB	"	1,316	28	28
BG5FCH	"	204	12	12
BH4RZI	"	77	8	7
BY1CW	21	134,596	518	209
			(OP: BD1GXH)	
***BG8GAM**	**A**	**426,904**	**568**	**344**
*BD4WN	"	255,930	404	285
*BG5CIC	"	97,614	231	187
*BD2IAQ	"	65,280	207	160
*BG4FRZ	"	64,800	184	150
*BH4SCF	"	53,721	164	127
*BA1SN	"	44,070	173	130
*BA5HAM	"	37,088	155	122
*BD7KBH	"	35,520	143	111
*BD4UK	"	34,969	189	121
*BG4HRM	"	24,288	119	92
*BD4RDU	"	22,568	132	91
*BD7OZG	"	21,375	123	95
*BG6CJR	"	18,564	105	84
*BG4HJE	"	18,063	96	81
*BD6SN	"	14,694	99	79
*BD4TZ	"	12,512	94	68
*BA5AB	"	9,381	69	59
*BA4SCP	"	6,068	53	41
*BD5BMC	"	4,200	49	42
*BD4IJ	"	3,627	42	39
*BD7JAD	"	3,600	43	40
*BG1RHJ	"	3,216	50	48
*BD4UM	"	1,504	34	32
*BG4GYB	"	1,428	29	28
*BG1LYZ	"	1,377	28	27
*BD3RQ	"	1,363	32	29
*BD1LEN	"	330	12	11
*BH1LHS	"	288	12	12
*BG6QYE	"	230	11	10
*BG2WCG	"	210	14	14

*BH4BHB	"	100	10	10
*BG5FIM	"	77	7	7
*BG1SQT	"	60	6	6
*BA4MY	"	56	9	7
*BG6JAI	"	9	3	3
BI7JMD	28	**1,682**	**31**	**29**
BD4RQ	21	**151,417**	**411**	**223**
*BG7IEU	"	41,344	156	128
*BA1AK	"	20,564	115	97
*BH1EBF	"	17,856	119	96
*BH1KTL	"	5,616	74	52
*BD6IF	"	1,218	34	29
*BD9GBE	"	280	16	14
*BD6JIN	"	72	8	8
B[illegible]4WR	14	**102,120**	**353**	**185**
*BD2VJM	"	27,888	201	112
*BG2VIA	"	18,984	88	84
BD4WM	7	**2,635**	**34**	**31**
Cyprus				
C4W	A	**16,750,890**	**4546**	**1175**
H2T	28	**3,839,844**	**2113**	**739**
			(OP: 5B4XF)	
*5B4AJT	A	126	7	7
Hong Kong				
VR2KF	A	**198,792**	**495**	**264**
VR2VIY	"	3,914	41	38
VR2XMT	28	**591,717**	**752**	**399**
VR2PW	14	**13,520**	**103**	**80**
India				
VU2RCT	A	**481,289**	**503**	**347**
VU2JOS	"	4,140	37	36
VU2HOT	"	60	5	5
*VU2ABS	A	51,062	147	121
*VU3NXI	"	6,716	49	46
*VU2SGW	"	4,284	45	42
VU3DMP	28	**5,358**	**48**	**47**
Israel				
4X0L	A	**255,024**	**361**	**252**
			(OP: 4Z1TL)	
4Z5LA	21	**32,200**	**116**	**100**
***4Z5MV**	A	**37,604**	**124**	**119**
*4Z5PJ	"	16,117	79	71
*4Z5FL	"	690	16	15
Japan				
JR1AIB	A	**5,833,618**	**2100**	**889**
			(OP: JH5GHM)	
JO1WKO	"	2,349,900	1175	630
JH1HIC	"	895,560	740	439
JH1ASG	"	421,611	542	313
JA1TMG	"	337,820	401	266
JA1[illegible]XY	"	98,124	193	148
JA1OZC	"	78,432	184	152
JA1XUY	"	75,392	200	128
JA1MJN	"	70,528	188	152
JG1WCT	"	63,294	210	137
JA1[illegible]ZZ	"	42,642	130	103
JO1SIM	"	41,514	174	111
JA1JYS	"	32,851	111	**91**
JE1REU	"	19,902	104	93
JF1UOX	"	18,404	92	86
JR1LZK	28	**52,934**	**165**	**133**
JI1LET	21	**2,308,788**	**1214**	**708**
JR1HUA	"	247,800	333	280
JA1NQU	"	226,269	334	279
JO1COV	"	204,620	308	260
JI1LNR	"	6,164	48	46
JA1KVT	3.7	**12,320**	**62**	**55**
***JM1UTT**	A	**948,024**	**765**	**462**
*JA1GLE	"	359,712	453	288
*JH1DYU	"	276,940	381	244
*JH1FNU	"	246,012	375	247
*JA1CPU	"	189,072	323	234
*JL1MWI	"	175,446	295	243
*7L1FFH	"	156,780	271	180
*7K4VPV	"	144,256	269	196
*JA1AZR	"	91,520	241	143
***JJ1KZZ**	"	86,574	186	141
*JA1VGV	"	75,616	191	139
***JF1WNT**	"	72,150	173	130
*JA1CP	"	56,991	205	121
*JA1HOM	"	45,360	154	136
*JK1NSR	"	39,050	140	110
*JF1MBT	"	38,410	141	115
*JE1LD	"	36,080	139	110
*JA1OHP	"	34,986	122	102
*7M3FMR	"	34,848	140	99
*JA9DTV/1	"	29,520	104	80
*JE1CWQ	"	29,321	129	109
***JJ1LRD**	"	27,936	130	96
*JA1LZK	"	26,550	122	90
*JR1MRG	"	23,639	114	77
*JG1LPL	"	22,420	103	76
*JI1SAI	"	20,362	96	86
*JA1SCE	"	19,314	98	74
*JA1DDZ	"	17,120	91	80
*8J1ØSAI	"	16,037	116	79
			(OP: JH1OES)	
*JA1GFB	"	12,805	88	65
*7J1ABD	"	12,705	67	55
*JA1FO	"	11,978	60	53
*JE1RRK	"	9,945	72	65
*JJ1HHJ	"	9,440	80	59
*JF1ROR	"	8,208	76	54
*JF1DWJ	"	6,210	51	45
*JG1SWV	"	5,371	41	**41**
*JA1KK	"	4,576	45	**44**
*7L3DGP	"	3,480	45	40
*JA1LPQ	"	3,360	41	35
*[illegible]H8FAJ/1	"	2,808	27	26
*JP1LRT	"	2,525	29	25
*JG1LFR	"	2,370	30	30
*JH1EYM	"	1,924	27	26
*JI1BHO	"	1,863	28	27
*JE1HTV	"	1,566	32	27
*JG1GCO	"	1,242	28	23
*JA1VWK	"	960	21	20
*JI1DSU	"	462	16	14
*JK1CYF	"	252	12	12
*JG1MYK	"	42	7	7
***7N2UQC**	28	**61,544**	**185**	**157**
*JL1EEI/1	"	32,480	119	112
*JA1LBZ	"	4	2	2
***JF1PYJ**	21	**36,273**	**134**	**113**
*JA1RYC	"	23,370	102	95
*7K4TKB	"	21,505	104	85
*JA1ANF	"	21,296	94	88
*JA1PUK	"	13,192	71	68
*7M1MCY	"	8,736	64	56
*JA1JLP	"	4,756	47	41
*JI1UCL	"	4,635	50	45
*JK1BII	"	4,251	43	39
*JF1KWG	"	2,262	30	29
*JN1CDB	"	1,690	34	26
*JH8SEG/1	"	1,288	24	23
*JI1LAI	"	1,100	21	20
*JG1WKM	"	290	11	10
*JH1CVJ	"	260	10	10
*7N2JZT/1	"	75	5	5
*JH1RRP	"	27	3	3
*JR1AHP	"	27	3	3
***JF1TEU**	14	**21,294**	**99**	**91**
*JA1KEV	"	12,792	94	82
*JE1GZB	"	1,682	33	29
***JE1SPY**	3.7	**9,932**	**68**	**52**
JA2**VHO**	A	696,728	629	**376**
JA2BNN	"	413,319	513	311
JR2PMT	"	239,955	323	255
JA2XLV	"	197,292	328	246
JA2AYH	"	7,242	52	51
JA2CPD	"	396	15	12
JJ2CJB	28	**54,954**	**164**	**142**
JR2IOB	21	**1,161,440**	**819**	**544**
JH2BTM	"	25,996	107	97
JA2GTW	7	**71,760**	**130**	**115**
***JA2CUS**	A	**613,056**	**584**	**372**
*JA2AXB	"	524,117	570	341
*JR2PAU	"	187,220	294	230
*JA2KPW	"	108,550	254	167
*JA2GHP	"	83,367	224	157
*JE2[illegible]OD	"	27,600	111	92
*JO2OUL	"	14,592	93	**64**
*JR2N[illegible]C	"	14,325	93	75
*JF2FIU	"	12,412	71	58
*JM2NWF	"	6,776	59	44
*JG2KFI	"	1,440	47	36
*JF2OHQ	"	442	15	13
*JG2QUM	"	308	15	14
*JP2MRD	"	65	5	5
***JH2MYN**	28	**36,533**	**134**	**119**
***JA2KKA**	21	**43,542**	**145**	**123**
*JE2BOM	"	41,082	140	123
*JS2PHO	"	1,500	26	25
*JF2FKJ	"	204	13	12
*JR2AAN/2	"	8	2	2
*JI2IXA	7	42	3	3
JA3AOP	A	**1,856,995**	**1059**	**595**
JA3QOS	"	899,712	727	426
JA3RRI	"	63,705	208	137
JA3AHY	"	1,922	34	31
JO3JIS	28	**1,540,045**	**1094**	**559**
JH3GCN	21	**105,432**	**212**	**191**
***JF3BFS**	A	**919,149**	**722**	**483**
*[illegible]O3PSJ	"	120,528	274	186
*JG3BXS	"	25,670	114	85
*JS3CGH/3	"	19,513	107	79
*JA3KOJ	"	17,696	99	79
*JR3NDM	"	15,549	98	71
*JR4ISF/3	"	14,528	90	64
*JR3SZZ/3	"	12,870	93	66
*JH3BYX	"	10,332	71	63
*JL3WSL	"	4,095	41	35
*JH3GMI	"	656	17	16
*JM3HYL	"	210	17	14
*JO3EVM	"	192	8	8
***JA3DAU**	28	**38,400**	**136**	**120**
*JA3IKG	"	20,184	101	87
*JA3LKE	"	6,188	56	52
***JR3RIY**	21	**1,203,184**	**818**	**556**
*JJ3JHP	"	207,766	300	262
*JF3IYW	"	135,191	261	217
*JI3FSI	"	121,191	244	203
*JF3VAX	"	49,632	143	132
*JA3BBG	"	9,780	67	60
*JM3QIS	"	4,368	42	42
*JA3PYH	"	3,145	43	37
*JA3NOJ	"	96	6	6
***JA3DAY**	14	**18,860**	**88**	**82**
***JG3DIX**	7	**3,150**	**27**	**25**
JH4UYB	A	**9,798,779**	**2919**	**1047**
JA4DPL	"	926,534	752	458
JH4RUF	"	114,534	227	162
JO4BOW	"	16,264	88	76
JH4EMK	"	846	20	18
JA4NQD	28	**3,880**	**44**	**40**
***JR4PDP**	A	**209,990**	**352**	**230**
*JE4MHL	"	65,392	156	134
*JA4BDY	"	27,451	118	97
*JA4CSJ	"	17,088	77	64
*JA4AQR	"	10,080	64	60
*JN4UUS	"	448	14	14
***JJ4CDW**	28	**2,988**	**37**	**36**
***JR4LRY**	21	**14,129**	**95**	**71**
***JR4GPA**	14	**215,975**	**338**	**265**
***JA4AVO**	7	**624**	**13**	**13**
JI5SKS	A	**79,704**	**190**	**164**
JJ5GSY	7	**48**	**4**	**4**
***JG5UWK**	A	**114,240**	**253**	**170**
*JJ5HID	"	32,806	130	94
*JA5NSR	"	112	8	8
***JG5DHX**	21	**55,245**	**162**	**145**
*JA5XPD	"	24,388	95	91
JA6LCJ	A	**4,646,100**	**1784**	**850**
JH6QFJ	"	556,612	530	386
JA6BWH	"	108,900	214	165
***JE6JNC**	A	**103,544**	**230**	**172**
*JA6CMC	"	46,728	162	118
*JA6CM	"	41,912	146	124
*7J6AAO	"	15,120	84	72
***JE6ADE**	21	**82,560**	**208**	**172**
*JA6EFT	"	46,200	155	132
*JH6WXF	"	2,263	31	31
*JS6SRY	"	253	14	11
JA7BME	A	**2,579,310**	**1242**	**699**
JA7VEI	"	153,265	249	203
JA7JH	28	**35,844**	**123**	**116**
JG7EHM	14	**46,464**	**133**	**128**
JG7PSJ	7	**4,158**	**28**	**27**
***8J7JOOO/7**	A	**11,232**	**60**	**52**
*JA7HYS	"	2,900	29	29
*JA7BEW	"	64	4	4
*JL7FBV	28	135	10	9
***JH7KTI**	21	**10,921**	**69**	**67**
*JP7CFP	"	6,171	63	51
*JK7UST	"	2,187	27	27
***JA7LLL**	14	**7,452**	**54**	**54**
*JA7ADV	"	936	26	26
JH8CXW	A	**291,555**	**378**	**279**
JA8DIV	"	263,144	351	254
JA8KXA	"	107,508	219	186
JA8ECS	21	**393,764**	**430**	**343**
***JA8COE**	A	**492,558**	**506**	**374**
*JE8KKX	"	33,088	131	94
*JJ3DJS/8	"	12,348	79	63
***JI8BUR**	7	**780**	**13**	**13**
JA9LJS	A	**656,448**	**629**	**416**
JF9JTS	"	268,832	377	248
JA9CCG	21	**209,308**	**315**	**268**
JH9URT	7	**555,485**	**425**	**269**
***JA9TQY**	A	**84,336**	**208**	**168**
*JA9EJG	"	220	10	10
***JA9XAT**	28	**85**	**7**	**5**
JAØAXV	A	**944,182**	**722**	**446**
JAØCIY	"	258,263	390	271
JJØPJD	"	47,502	142	117
JAØJHA	28	**547,008**	**609**	**352**
JHØOXS	21	**97,495**	**210**	**185**
JHØNOS	14	**322,088**	**364**	**326**
***JHØNEC**	A	**334,184**	**411**	**296**
*JAØNFP	"	20,580	90	70
*JHØMXV	"	11,245	70	65
***JHØJDV**	28	**77,274**	**210**	**162**
***JHØEPI**	14	**95,757**	**209**	**177**
Jordan				
***JY4NE**	A	**1,593,492**	**1048**	**551**
Kazakhstan				
UPØL	A	**18,541,055**	**4396**	**1235**
P4L	"	9,786,309	2883	1047
			(OP: UN7LZ)	
UN7QF	"	252,476	374	254
UN6GK	"	229,320	320	234
UN8GU	28	**1,098,540**	**902**	**496**
UN8GV	21	**2,632,449**	**1418**	**743**
UPØP	"	2,170,824	1169	696
			(OP: UN6P)	
***UN8PT**	A	**449,460**	**484**	**330**
*UN5C	"	262,680	349	264
*UNØLE	"	45,384	134	124
*UN7TW	"	112	9	8
UN9PQ	28	**16,892**	**86**	**82**
***UN6G**	21	**344,410**	**429**	**341**
***UN6LN**	14	**267,090**	**338**	**290**
*UN7RL	"	250,040	332	280
Kyrgyzstan				
EX8MAT	A	**1,400,841**	**994**	**507**
EX2B	"	284,900	454	275
EX2T	28	**987,705**	**873**	**467**
***EX7ML**	21	**622,120**	**591**	**412**
Laos				
***XW3DT**	28	**736,932**	**692**	**434**
Macao				
***XX9AU**	21	**12,450**	**141**	**83**
Mongolia				
JUØX	A	**790,603**	**800**	**451**
			(OP: JT1BV)	
JT1E	28	533,544	779	376
			(OP: JT1DA)	
*JT1BZ	A	62,431	174	149
Ogasawara				
*JDØBIA	7	**22,896**	**122**	**72**
Oman				
A41OO	14	**4,329**	**43**	**37**
***A41OF**	14	**7,425**	**61**	**55**
***A41MX**	7	**248,024**	**226**	**206**
Republic of Korea				
HL5YI	A	**63,431**	**189**	**137**
HL5UOG	"	45,133	168	121
***HL1VAU**	A	**327,184**	**438**	**286**
*HL2NFB	"	3,400	35	34
*HL2/KA8U	"	2,624	39	32
***DS2GOO**	21	**30,368**	**118**	**104**
***6K2FJJ**	7	**13,206**	**129**	**62**
Saudi Arabia				
HZ1TT	A	**2,504,568**	**1297**	**583**
***HZ1DG**	A	**2,297,460**	**1267**	**649**
*HZ1HN	"	1,603,661	1055	527
*HZ1BL	"	299,945	375	251
*HZ1PS	"	109,395	205	187
***7Z1TT**	14	**488,240**	**498**	**359**
Singapore				
9V1YC	A	**412,482**	**544**	**294**
***9V1DE**	A	**4,256**	**32**	**32**
Spratly Islands				
9M6/OH2YY	A	**154,755**	**417**	**181**
Taiwan				
BV1EK	A	**381,480**	**468**	**289**
BU2AW	21	**23,618**	**171**	**98**
*BU2AE	A	**8,694**	**78**	**63**
*BV4VQ	21	**11,550**	**84**	**70**
Tajikistan				
EYØA	A	**1,234,548**	**970**	**497**
			(OP: UA4LCQ)	
*EY7BJ	21	**11,033**	**71**	**59**
Thailand				
HSØZIN	28	**523,200**	**670**	**400**
***E21EIC**	A	**2,846,340**	**1525**	**753**
*E21YDP	"	950,976	742	468
*E2ØYLM	"	292,236	411	294
*E21IZG/8	21	52	5	4
United Arab Emirates				
A61ZX	A	**2,511,620**	**1383**	**620**
A61QQ	"	359,127	429	283
***A61C**	21	**77,154**	**190**	**154**
Uzbekistan				
***UK7F**	A	**309,228**	**404**	**292**
***UK/RZ1ZZ**	14	**473,200**	**526**	**350**
Vietnam				
***XV2RZ**	21	**92,415**	**364**	**183**
*XV4Y	"	3,672	38	36
West Malaysia				
9M2CQC	A	**1,214,464**	**1057**	**512**
9M2IDJ	28	**326,146**	**417**	**313**
***9M2TO**	A	**117,810**	**247**	**210**
*9M2ZAK	"	42,896	150	112
*9M2ESM	"	39,360	133	123
***9W2VVH**	28	**129,956**	**254**	**212**
*9W2WWW	"	9,610	63	62
*9W2CEH	"	1,180	23	20
EUROPE				
Aland Islands				
OHØX	14	**5,195,988**	**2502**	**1044**
			(OP: OH2PM)	
Albania				
***ZA1TC**	A	**302,583**	**519**	**349**
			(OP: TA1HZ)	
Andorra				
***C31CT**	A	**20,832**	**100**	**93**
Austria				
OE1SSS	A	**97,284**	**244**	**201**
OE1WWL	"	82,368	206	176
OE9MQN	"	79,566	211	178
OE3DXA	"	14,476	81	77
OE8SKO	21	**1,520,714**	**1064**	**598**
***OE2LRO**	A	**25,992**	**144**	**114**
*OE2IJL	"	840	14	14
*OE8SCQ	21	27	3	3
Azores				
CQ8X	A	**14,154,000**	**4344**	**1200**
			(OP: OH2UA)	
CR2T	28	**1,621,312**	**1396**	**704**
			(OP: CU2AF)	
Balearic Islands				
EA6SX	**1.8**	**41,340**	**154**	**130**
*EA6UP	A	**1,357**	**23**	**23**
Belarus				
EW8DD	A	**2,438,650**	**1625**	**755**
EW4MM	"	873,600	883	520
EW8DJ	"	631,136	637	484
EW8DX	"	99,216	249	212
EW8CY	"	91,980	274	219
EU6AF	"	78,200	197	170
EW3LN	"	7,068	59	57
EU8MM	"	1,298	23	22
EW8MM	"	407	13	11
***EU2DX**	A	**790,035**	**863**	**465**
*EU2MM	"	225,852	444	319
*EU6AA	"	15,251	106	101
*EW7LE	"	15,222	98	86
*EU7BBN	"	1,428	25	21
***EW6EW**	21	**22,999**	**124**	**109**
*EW7DK	"	12,728	78	74
***EW2EG**	14	**928**	**32**	**29**
***EW8OG**	7	**99,600**	**226**	**200**
*EW6DM	"	71,832	179	164
***EU2EU**	1.8	**74,304**	**219**	**172**
Belgium				
ON7HLU	A	**357,896**	**527**	**392**
ON7ON	"	16,974	88	82
OQ4T	28	**9,016**	**61**	**55**
			(OP: ON4TO)	
OQ7T	7	**1,454,976**	**1068**	**576**
***ON3AR**	A	**296,032**	**424**	**319**
*ON4CT	"	29,810	120	110
***ON3ND**	14	**43,139**	**214**	**179**
*ON5YU	"	4,047	61	57
*OR3R	"	992	32	31
Bosnia-Herzegovina				
E7DX	A	**16,982,770**	**4410**	**1330**
			(OP: E77DX)	
E77A	21	**5,608,691**	**2384**	**979**
***E73MJ**	A	**60,912**	**199**	**162**
*E78CB	"	4,800	51	48
***E76MB**	21	**11,398**	**94**	**82**
*E74NR	7	**39,186**	**144**	**126**
Bulgaria				
LZ1784**SIB**	A	**1,448,811**	**1300**	**609**
			(OP: LZ1ZF)	
LZ1BJ	"	1,035,424	978	608
LZ3ZZ	"	986,583	865	533
LZ2UW	"	46,292	150	142
LZ4ØYE	"	12,312	80	76
LZ1RA	14	**68,392**	**242**	**206**
LZ8A	"	7,900	82	79
			(OP: LZ1KDP)	
LZ1QN	7	**10,248**	**63**	**61**
LZ1VPS	"	1	1	1
***LZ8E**	A	**3,558,100**	**1995**	**884**
			(OP: LZ2BE)	
*LZ2PS	"	681,720	738	437
*LZ5XQ	"	79,913	207	157
*LZ1QJ	"	68,456	191	172
*LZ3GH	"	60,496	192	152
*LZ1ONK	"	31,625	134	115
*LZ3TL	"	19,046	98	89
*LZ2FM	"	18,330	104	94
*LZ1FJ	"	16,932	116	102
*LZ1MC	"	1,248	25	24
***LZ9V**	28	**150,752**	**291**	**224**
			(OP: LZ1WG)	
*LZ3RN	"	46,343	140	121
*LZ1VW	"	23,970	110	102
***LZ2JA**	21	**918,517**	**950**	**551**
*LZ3DJ	"	45,150	185	150
***LZ1KP**	14	**52,136**	**223**	**196**
Crete				
SV9GPV	21	**2,878,092**	**2306**	**846**
Croatia				
9A2ØT	A	**1,237,086**	**859**	**558**
			(OP: 9A2EU)	
9A2ØJK	"	1,205,028	926	612
			(OP: 9A2JK)	
9A8A	"	10,164	71	66
9A3KS	"	672	16	14
9A8DX	7	**1,854,949**	**1236**	**647**
9A2AJ	1.8	**465,864**	**601**	**376**
***9A2[illegible]4MF**	A	**598,752**	**722**	**462**
			(OP: 9A4MF)	
*9A2NO	"	498,804	580	422
*9A1IW	"	398,808	541	348
*9A2EY	"	115,907	257	257
*9A3QB	"	85,778	203	154
*9A6ARB	"	60,720	201	165
*9A1CVG	"	46,189	179	143
*9A1MM	"	39,375	145	125
*9A2[illegible]3JB	"	34,500	136	115
			(OP: 9A3JB)	
*9A5IGY	"	29,640	143	130
*9A6IND	"	28,514	113	106
*9A6JOY	"	24,852	125	109
*9A2[illegible]4W	"	22,420	101	95
			(OP: 9A4W)	
*9A7IUP	"	21,424	116	104
*9A5G	"	19,800	94	88
			(OP: 9A2VX)	
*9A5KIS	"	9,338	64	58
*9A1SZ	"	8,946	70	63
*9A1DL	"	7,250	63	58
***9A[illegible]W**	28	**162,176**	**279**	**224**
*9A2WJ	"	24,200	98	88
*9A7ZZ	7	4,176	50	48
Czech Republic				
OK2BXE	A	**2,185,690**	**1273**	**731**
OLØW	"	519,995	599	415
			(OP: OK1DSZ)	
OK2JK	"	48,422	163	142
OK1FRO	"	5,712	51	48
OK1EP	28	**342,264**	**456**	**312**
OK2ABU	"	61,490	166	143
OK1XC	21	**411,642**	**513**	**378**
OK6MA	"	110,670	265	217
***OK1WCF**	A	**4,302,909**	**2057**	**943**
*OK2ZI	"	3,710,889	1814	897
*OK1CID	"	1,135,025	1074	547
*OK1CLD	"	612,896	688	428
*OK1HEH	"	429,323	592	373
*OK1BA	"	418,968	590	396
*OK7N	"	319,853	395	317
*OK2BZE	"	310,072	436	343
*OK2BRX	"	305,588	455	317
*OK2WYK	"	188,768	347	272
*OK1MJA	"	186,816	398	278
*OK1MKC	"	126,522	253	198
*OK1DPU	"	125,802	301	241
*OK2SGY	"	120,310	292	227
*OK1BLU	"	97,284	237	201
*OK2WZN	"	94,432	262	208
*OK2MRJ	"	91,080	223	184
*OK1AOU	"	66,864	211	168
*OK2KFK	"	62,790	200	161
*OK2PBG	"	45,457	170	131
*OK2TC	"	32,500	150	125
*OK1VHV	"	30,420	143	117
*OK2SWD	"	19,570	117	103
*OK2EC	"	13,072	80	76
*OK2BND	"	5,050	52	50
*OK5SWL	"	1,952	34	32
			(OP: OK2SWD)	
***OK2TBC**	21	**21,338**	**102**	**94**
*OK1ARO	"	12,600	81	70
***OK5ET**	14	**294**	**14**	**14**
***OK2ILD**	7	**312,180**	**406**	**330**
*OK2BRS	"	148,520	260	235
*OK1ZY	3.7	576	18	18
***OK1JOK**	**1.8**	**60,060**	**199**	**156**
*OK1KZ	"	1,012	23	23
Denmark				
OZ6AGX	A	**291,200**	**432**	**320**
OZ2BKK	"	288,108	473	318
OZ1HHH	"	236,835	413	277
OZ7DK	"	33,840	147	120
OZ7EA	"	25,894	122	107
5P12EU	"	1,600	21	20
			(OP: OZ1HHH)	
OZ3BJ	28	**93,195**	**195**	**171**
***OU8A**	A	**460,498**	**658**	**386**
*OZ1ACB	"	442,728	578	387
*OZ4NA	"	336,826	515	343
*OZ1KVM	"	233,478	401	306
*OZ5TL	"	111,321	310	217
*OZ2CA	"	98,345	263	221
*OZ3ANT	"	95,480	251	217
*OZ6OG	"	12,719	85	79
*OZ8PG	"	12,375	76	75
*OZ8KEL	"	1,881	41	33
*OZ1DGQ	28	119	7	7
***OZ1CCB**	7	**8,636**	**69**	**68**
*OZ9V	"	8,370	66	62
*OV3X	"	1,325	25	25
			(OP: OZ8AE)	
England				
M0UTD	A	**1,234,944**	**976**	**603**
G1T	"	613,776	694	456
			(OP: MØSCG)	
G3SVD	"	340,370	428	337
G4OJB	"	233,160	404	290
MØVKY	"	164,090	362	269
G4VMX	"	90,240	215	188
GØAZG	"	40,386	148	127
G4AFJ	"	6,394	50	46
G5XW	7	**265,824**	**482**	**288**
G3TDH	"	123,824	247	218
***M0MCV**	A	**1,464,457**	**1192**	**613**
*G4DFI	"	282,111	483	347
*M6TBY	"	258,093	427	297
*GØCER	"	185,130	330	255
*G8AFN	"	154,869	324	247
*2E0TCC	"	147,506	346	262
*G0LZX	"	121,746	256	197
*G8ZRE	"	118,750	326	250
*G3TAN	"	109,512	295	216
*MØMXX	"	104,598	304	234
*G3TRB	"	83,220	225	190
*MØGKC	"	73,533	237	193
*MØAUG	"	73,431	236	199
*G6VMR	"	71,242	223	179
*G4NXG	"	57,820	167	140
*MØVKG	"	57,440	191	160
*MØGOJ	"	51,480	190	156
*GØPBE	"	46,978	199	166
*G1KFB	"	41,888	152	136
*M6TOK	"	37,800	164	140
*G7DPE	"	19,500	143	125
*MØDMJ	"	17,510	113	103
*MØSFR	"	16,849	91	83
*M6AGY	"	16,300	105	100

*MØWAG	"	9,000	78	72
*2EØCKC	"	7,854	84	77
*GØMRH	"	7,847	63	59
*GØRJL	"	1,012	25	22
GØFPU	**28**	**171**	**9**	**9**
***G5E**	**21**	**453,612**	**503**	**412**
			(OP: G3RAU)	
*MØTQR	"	7,812	67	62
*G7RTI	"	990	25	22
*G7RSM	"	35	5	5
***GØRRM**	**14**	**109,445**	**317**	**265**
*MØZIF	"	168	15	14
***G4DBW**	**7**	**171,120**	**349**	**240**
*MØGVZ	"	48,840	139	132
***GØDCK**	**1.8**	**5,565**	**55**	**53**

Estonia

ES2IPA	**A**	**403,256**	**594**	**379**
***ES1LS**	**A**	**830,180**	**923**	**515**
*ES8SX	"	332,724	529	357
*ES6RMR	"	80,674	235	193
*ES2TT	"	48,471	155	107
***ES1WST**	**28**	**18,564**	**94**	**84**
***ES6TX**	**14**	**97,060**	**258**	**230**

European Russia

RW1CW	**A**	**2,877,784**	**1651**	**826**
U1BD	"	444,583	635	409
RV1CC	"	320,640	382	320
RA1TV	"	124,320	262	222
RZ1AZ	"	95,380	232	190
RA1OD	"	34,561	118	107
RW1QQ	"	19,434	93	79
UA1OMS	"	8,415	55	51
UA1OMZ	"	6,164	49	46
UA1ORK	"	4,368	40	39
R1AC	**28**	**31,212**	**114**	**102**
UA1AFZ	**14**	**821,130**	**999**	**606**
***UA1CEI**	**A**	**2,139,713**	**1645**	**713**
*UA1CUR	"	556,278	676	417
*UA1ZLN	"	259,584	501	338
*RV1AE	"	240,526	472	319
*RA1APV	"	20,020	119	110
*UA1CBM	"	13,585	108	95
*RN1NW	"	7,254	65	62
*RW1AI	"	5,292	55	54
*UA1WBV	"	2,772	30	28
***RW1CX**	**28**	**52,540**	**158**	**142**
***R1TEU**	**14**	**204,085**	**472**	**343**
*UA1WA	"	22,236	110	109
***RA1AKR**	**7**	**3,774**	**37**	**37**
UA5A	**A**	**11,307,639**	**3949**	**1263**
			(OP: RA3AKT)	
RM3F	"	9,484,079	3765	1237
			(OP: UA3DPX)	
RG3K	"	8,955,804	3594	1228
RM2U	"	3,130,788	1675	894
			(OP: RU3UR)	
UD3D	"	2,221,128	1858	756
			(OP: UB3DAY)	
UA3VFS	"	1,514,877	1253	651
R3ZV	"	889,875	895	525
RN3ZC	"	680,826	706	466
R3OM	"	592,974	716	417
RA3NC	"	534,660	651	402
RC3F	"	381,888	686	416
R2DW	"	346,527	450	417
R3NA	"	300,324	433	348
RZ3DN	"	297,472	461	332
R3DL	"	254,584	362	263
RA3BL	"	213,465	340	285
R3LA	"	183,345	327	255
UA3DUJ	"	149,184	334	259
RT3G	"	146,233	316	257
RV3IC	"	132,305	282	235
RL3XK	"	92,160	221	192
RN3FK	"	82,095	244	195
RK3BA	"	58,652	209	172
RN3RY	"	52,706	169	146
R5ZAA	"	28,860	172	148
RV3TG	"	28,544	146	128
RA3EA	"	21,762	104	93
R3DG	"	19,448	117	104
RV3FT	"	13,662	69	66
RL3DZ	"	12,480	91	80
UA3QNS	"	3,840	34	32
RN3FS	"	3,597	37	33
UA3AB	"	1,944	27	24
RA3IGK	"	280	11	10
R3RK	**28**	**73,472**	**202**	**164**
RW3DU	**21**	**1,050,111**	**968**	**621**
RZ3VA	"	392,040	542	405
RJ3AA	"	156,729	368	267
RM5O	"	27,383	152	139
RW3XM	"	5,841	63	59
RT5Z	**14**	**4,914,560**	**2334**	**1097**
RT5K	"	1,185,900	1141	670
RA3OA	**7**	**501,421**	**531**	**389**
UA3A	**3.7**	**50,728**	**170**	**136**
RW3SY	**1.8**	**30,193**	**131**	**109**
***RM5D**	**A**	**3,587,622**	**1992**	**894**
*UA3BL	"	1,804,298	1349	674
*UA3ABJ	"	992,351	917	551
*RA3DAD	"	931,032	888	536
*RG5A	"	894,030	818	510
*RL3ZH	"	883,500	915	500
*RZ3DW	"	600,171	667	429
*RU3BA	"	577,918	721	482
*UA3AIU	"	440,886	571	394
*RN3ZJJ	"	311,298	496	338
*UA3RN	"	221,850	401	306
*RA3YDA	"	178,880	269	260
*RL3ZZ	"	159,517	385	269
*RU3VV	"	146,050	326	254
*RU3FT	"	142,496	310	244
*R3OX	"	138,030	348	258
*UA3DKT	"	135,108	291	243
*RN3BU	"	128,520	316	270
*RD3QA	"	125,100	272	225
*RX3AEX	"	114,975	283	225
*RK3DU	"	109,616	282	221
*RN3ZIN	"	90,675	253	195
*RY3F	"	89,666	266	214
*R3AAA	"	77,792	222	187
*UA3AKI	"	50,706	188	162
*UA5D	"	41,328	164	144
*RW3WX	"	32,480	126	112
*RZ3DC	"	31,680	115	110
*RU3UB	"	31,590	133	130
*RA3LDX	"	31,047	145	131
*RA3RUF	"	30,504	132	124
*RU3AWK	"	29,260	159	133
			(OP: RU3ALH)	
*RD5D	"	27,140	124	115
*RA3IS	"	25,670	95	85
*RM2T	"	21,182	132	119
*UB3DAO	"	20,400	104	100
*RN3FY	"	19,380	127	114
*R3OA	"	19,096	138	124
*RA3TUT	"	16,068	83	78
*RM3TO	"	15,180	117	110
*RA3RGQ	"	14,885	77	65
*RX3MM	"	14,328	75	72
*RA3BQ	"	12,716	74	68
*UA3DSS	"	10,833	71	69
*UA3MOM	"	10,434	80	74
*RK3IT	"	10,176	64	53
*RA3PPA	"	6,996	72	66
*RZ3QM	"	6,732	52	51
*RQ3M	"	6,292	50	44
*RW5D	"	5,180	47	37
*UA3YAA	"	3,333	35	33
*RX3ASQ	"	3,306	38	38
*RL3AN	"	3,128	39	34
*RK3IM	"	2,241	30	27
*RA3XGY	"	70	7	7
***UA3EDQ**	**28**	**77,736**	**194**	**158**
*RA3XO	"	2,106	27	26
***RK3SWB**	**21**	**607,212**	**663**	**501**
			(OP: RU3SD)	
*RA3DGH	"	63,963	257	207
*RD3AJB	"	14,508	96	93
***UA3VVB**	**14**	**311,236**	**497**	**391**
*UA3UJP	"	26,951	139	129
***R3LC**	**3.7**	**224,548**	**374**	**292**
RT4RO	**A**	**7,517,104**	**3448**	**1148**
RM4HZ	"	2,313,000	1886	750
RK4FM	"	1,129,115	966	599
RA4LFQ	"	536,836	566	412
UA4PAN	"	346,566	506	354
UA4W	"	278,726	378	301
UA4AAC	"	227,036	386	269
UA4NC	"	207,060	407	290
RA4PIT	"	142,835	325	245
UA4RF	"	111,250	249	178
RJ4F	"	102,612	264	204
RV4LC	"	99,485	235	197
RX4YY	"	82,875	280	221
RX4WX	**21**	**11,528**	**95**	**88**
RM4R	"	168	9	8
UA4CNZ	**14**	**738,078**	**907**	**583**
RA4LO	"	50,600	205	184
RU4SS	**3.7**	**370,596**	**478**	**347**
RN4HJQ	**1.8**	**40,125**	**148**	**125**
***UA4HBM**	**A**	**635,964**	**739**	**469**
*RA4ACX	"	557,600	676	425
*RZ4WZ	"	511,411	686	449
*UD4FD	"	351,190	480	346
*RN4HFJ	"	311,971	552	359
*RN4NF	"	205,086	319	266
*RN4CA	"	187,174	375	299
*RM4A	"	136,234	320	259
*RA4DR	"	116,403	295	241
*UA4UT	"	115,560	261	216
*RA4AAO	"	94,395	245	203
*RW4NH	"	76,797	191	161
*UA4CGR	"	64,216	210	184
*RN4HKQ	"	56,279	212	167
*UA4HDB	"	51,750	188	150
*R4HR	"	51,102	191	153
*RU4CO	"	44,064	147	136
*RW4LC	"	39,600	196	165
*R4IO	"	30,247	208	149
*R4WT	"	27,560	148	130
*RV4AB	"	20,492	97	94
*RV4HL	"	10,011	74	71
*UA4ARF	"	9,890	92	86
*UA4PCM	"	2,850	33	30
*UA4CNJ	"	2,392	30	26
*RA4PX	"	2,001	32	29
*RA4FP	"	1,058	24	23
*RA4UAT	"	645	16	15
***RV4LS**	**28**	**2,970**	**34**	**33**
*UA4WAG	"	1,173	23	23
*RW4LQ	"	126	9	9
***RU4SO**	**21**	**602,922**	**736**	**514**
*UB4AAV	"	160	10	10
***R4HAW**	**14**	**55,005**	**225**	**193**
*UA4SN	"	4,154	68	62
***RN4ADU**	**7**	**19,872**	**95**	**92**
***RM4PTI**	**3.7**	**47,886**	**163**	**138**
RC7A	**A**	**434,238**	**534**	**422**
RA6AR	"	104,196	291	228
RZ6HDX	"	45,981	167	131
RA7G	"	9,861	62	57
RU6L	"	5,850	45	39
UA6YI	"	1,495	25	23
RX6CC	"	805	23	23
RY7G	**28**	**477,282**	**848**	**422**
RA7A	"	6,272	49	49
R7FO	**21**	**691,834**	**846**	**533**
UA6AES	"	897	23	23
RV6ASU	14	3	1	1
RW6HJV	**7**	**456,120**	**487**	**362**
***R7MM**	**A**	**2,074,950**	**1439**	**725**
*RN6HCW	"	1,110,790	1039	565
*R7NA	"	1,067,692	994	586
*RL6MA	"	325,360	548	332
*UA6HHE	"	283,200	480	300
*RU6HL	"	280,276	435	404
*RA6LIS	"	232,806	456	322
*UA6II	"	172,920	352	262
*RX6LOL	"	118,650	261	226
*R7MP	"	103,456	204	212
*RN6MA	"	56,771	172	143
*RY7A	"	49,392	150	144
*UA6AGE	"	16,720	90	88
*RZ6LB	"	3,588	48	39
*RA6AAW	"	363	11	11
***RV6LX**	**28**	**36,234**	**143**	**122**
*RW6AH	"	35,712	160	128
*R6CW	"	34,608	133	112
*RX6MR	"	33,750	135	125
*RW7M	"	5,824	60	56
*RM6J	"	720	16	15
***R7BN**	**21**	**223,436**	**409**	**332**
*R7MC	"	38,398	150	146
*UB6ACR	"	22,040	125	116
***UA6LUQ**	**14**	**867,064**	**900**	**649**
*RU6YK	"	70,551	229	201
*RV6ACC	"	10,864	100	97
*RV6FT	"	341	11	11
*UA6JQ	"	324	19	18
***UA6YE**	**7**	**641,079**	**693**	**437**
UA9XF	**A**	**849,852**	**1053**	**516**
RD9FM	"	26,986	114	103
UA9FM	"	23,424	136	122
***R9FR**	**A**	**470,678**	**663**	**421**
*UA9XBJ	"	3,811	40	37
***RA9FEL**	**28**	**169,024**	**429**	**278**

European Turkey

TA1TA	**A**	**9,702**	**78**	**77**
***TA1DK**	**A**	**171,027**	**382**	**279**

Fed. Rep. of Germany

DF5MA	**A**	**1,668,576**	**1150**	**672**
DF9OO	"	1,015,880	865	545
DF7EF	"	919,100	796	505
DL9GWD	"	858,528	735	528
DF0BV	"	808,848	741	492
			(OP: DL1MAJ)	
DG7HL	"	684,950	698	475
DL5AXX	"	637,364	571	412
DL9DYL	"	564,554	521	439
DG1IU	"	478,336	702	404
DC1JAG	"	476,000	588	400
DM8ØØANH	"	347,812	487	356
DL8EAQ	"	331,272	448	344
DO8SM	"	308,160	449	320
DM3KXL	"	251,617	453	323
DL5MEV	"	233,282	290	266
DF2RG	"	213,567	342	277
DL1TPY	"	212,735	355	271
DJ8LX	"	184,262	322	247
DK5AI	"	169,785	282	245
DF5BX	"	155,034	320	243
DF6WE	"	150,016	335	256
DL1RYD	"	147,980	294	245
DF6RI	"	141,062	298	251
DL5YM	"	140,921	310	253
DL6DVU	"	124,655	280	233
DJ2QV	"	119,544	250	204
DL1WM	"	112,554	253	222
DL1PT	"	82,980	253	180
DL1LOD	"	75,990	186	170
DC9ZP	"	69,046	190	158
DJ7JC	"	63,722	165	151
DL3NCJ	"	55,444	213	166
DL8RB	"	51,220	157	130
DM2DXA	"	47,784	139	132
DG1ATN	"	45,885	161	137
DK2YL	"	32,490	131	114
DL6ZXG	"	21,620	99	92
DK7VW	"	21,204	104	93
DK1LRS	"	13,520	86	80
DG5YFK	"	9,108	72	69
DJ8QA	"	8,308	64	62
DL0SM	"	8,256	69	64
			(OP: DG3NEC)	
DL2RUG	"	3,534	39	38
DJ6YX	"	2,976	33	31
DL9MWG	"	2,112	33	33
DK6EA	"	918	19	18
DM2GM	"	880	20	20
DF1MM	"	476	14	14
DK7KD	"	462	22	21
DL2MJ	"	297	11	11
DL7BA	"	60	4	4
DL1EK	**28**	**190,610**	**331**	**245**
DK4IO	"	6,900	51	46
DL3APO	**21**	**2,890**	**35**	**34**
DJ1XT	"	432	12	12
DJ7WW	**14**	**80,364**	**261**	**222**
DL1MDZ	"	26,112	133	128
DL9ZWG	"	6,322	61	58
DF1AQ	**7**	**264,017**	**432**	**299**
DJ2YE	"	134,890	266	235
DK7AN	"	63,474	162	142
***DL6NDW**	**A**	**1,510,625**	**1285**	**625**
*DJ0MGZ	"	988,803	907	543
*DL4ZA	"	967,324	929	538
*DL4WA	"	724,916	726	508
*DF5BM	"	715,088	697	478
*DJ8UV	"	677,326	788	478
*DM2SR	"	524,208	591	402
*DM5JBN	"	451,526	580	401
*DL9OLI	"	351,616	467	328
*DK7CH	"	336,609	508	351
*DL1MHJ	"	317,220	434	311
*DM5BB	"	280,053	428	333
*DG3NEC	"	265,431	434	309
*DL7DET	"	201,772	412	292
*DL4EBA	"	192,873	378	269
*DM2AWM	"	191,100	363	273
*DF9FT	"	184,527	336	261
*DL1JGO	"	183,483	343	261
*DF2AJ	"	173,118	338	258
*DL4SZB	"	165,240	320	243
*DL3UX	"	164,475	352	255
*DK2WU	"	155,204	319	241
*DL2DQL	"	153,000	335	250
*DL2YAK	"	151,788	357	278
*DL5ALW	"	150,892	290	238
*DJ4DN	"	136,754	246	202
*DQ0A	"	136,160	299	230
			(OP: DK2DQ)	
*DK7TA	"	123,625	273	215
*DO1CS	"	119,853	260	207
*DL6TA	"	118,622	293	229
*DK4GC	"	114,264	285	216
*DL9LF	"	107,038	247	218
*DF5AN	"	97,888	184	184
*DD1OP	"	80,200	206	200
*DO1HGS	"	77,464	194	184
*DD3D	"	72,670	198	169
*DK4WO	"	71,149	188	169
*DL1ARJ	"	68,526	196	162
*DJ9SN	"	67,716	185	162
*DL4LAX	"	67,694	209	181
*DF8XC	"	61,940	178	163
*DL5AWE	"	55,491	195	159
*DO5TMM	"	55,420	183	163
*DK7MCX	"	54,316	182	148
*DK6NF	"	52,992	158	138
*DB8AH	"	48,100	167	148
*DL1DF	"	47,740	172	154
*DH2PAF	"	41,292	163	148
*DD7NT	"	39,902	166	142
*DL4EAX	"	38,784	149	128
*DK2FW	"	38,634	163	137
*DO1NPF	"	38,376	142	123
*DG1LS	"	37,905	166	133
*DL5ZBA	"	37,820	144	124
*DO7TC	"	36,990	149	137
*DM3FF	"	33,098	155	134
*DL8ULO	"	31,578	135	114
*DL8UAA	"	31,000	141	125
*DL2RCH	"	30,634	123	106
*DK5FT	"	27,178	131	107
*DL9FB	"	23,544	127	109
*DK1FW	"	22,792	93	88
*DO6PS	"	21,952	106	98
*DO6RO	"	21,930	106	102
*DO6NI	"	20,806	104	101
*DL9HB	"	20,045	107	95
*DL2DUA	"	16,720	104	95
*DO2WHK	"	16,380	95	84
*DL1MWG	"	14,105	102	91
*DJ6UP	"	13,940	98	85
*DM5WH	"	13,493	115	103
*DL5ANS	"	13,464	74	68
*DJ5LY	"	13,192	72	68
*DF3MA	"	12,834	75	69
*DL3MVC	"	12,384	89	86
*DL6RAI	"	11,160	76	72
*DJ4PK	"	10,676	71	68
*DK0CN	"	8,321	57	53
			(OP: DG5DJ)	
*DH7TNO	"	8,249	79	73
*DL7ULM	"	7,824	53	48
*DG6DAF	"	7,546	55	49
*DL7VRG	"	7,380	65	60
*DL1GO	"	6,204	70	66
*DD9HK	"	6,095	55	53
*DF0MS	"	5,764	48	44
*DG4HZ	"	5,704	67	62
*DL8SAD	"	5,504	47	43
*DL9MFT	"	5,225	58	55
*DO3ED	"	5,060	47	44
*DK3WM	"	4,848	49	48
*DL1G	"	4,646	46	46
*DL1RIO	"	3,648	50	48
*DL7CU	"	2,520	43	40
*DL5FCY	"	1,122	23	22
*DH1MST	"	969	20	19
*DJ5CL	"	576	16	12
*DK4EF	"	405	15	15
*DO5ALX	"	264	13	12
*DO8UO	"	260	10	10
*DL4HCF	"	220	11	11
***DJ8TK**	**28**	**28,310**	**108**	**95**
*DL2RZG	"	5,781	48	47
*DM3F	"	4,879	41	41
			(OP: DH5FS)	
*DLØMFS	"	1,700	25	25
*DG1DB	"	1,656	24	23
*DL5SWB	"	1,281	21	21
*DL3DRN	"	300	10	10
***DJ9ZB**	**21**	**111,616**	**236**	**218**
*DO3KMF	"	94,127	233	199
*DL4VAI	"	46,580	151	137
*DL2AL	"	19,285	104	95
*DL4JYT	"	17,889	89	89
*DO4VPF	"	2,904	44	44
*DO7CED	"	783	29	27
*DK2AB	"	240	12	12
*DL7LZ	"	119	7	7
*DL4HWM	"	78	6	6
*DO3MF	"	78	6	6
*DO2ABK	"	20	5	5
***DL9ZP**	**14**	**320,000**	**519**	**400**
*DL9LIM	"	123,390	320	270
*DL1SBF	"	47,382	173	159
*DL1HSI	"	30,003	163	137
*DL6UAM	"	4,558	60	53
*DM3DA	"	3,869	57	53
*DH3WB	"	225	15	15
***DM4DX**	**7**	**270,774**	**441**	**307**
*DL5RU	"	185,344	290	256
*DH1DX	"	53,630	177	155
*DL/F4GFT	"	2,660	41	38
*DLØESA	"	1,978	23	23
			(OP: EA1HEO)	
***DF2DJ**	**3.7**	**923,832**	**881**	**504**

Finland

OH6LI	**A**	**6,787,131**	**2729**	**1059**
OH3LB	"	229,971	502	329
OH4BNP	"	138,424	304	242
OH1LEG	"	52,959	161	139
OH1B	"	35,264	125	116
			(OP: OH1BOI)	
OH6NT	"	23,400	105	100
OG7M	**28**	**31,209**	**116**	**103**
OG1M	**21**	**977,546**	**866**	**538**
			(OP: OH1VR)	
OH7JL	"	454,545	678	455
OH6GAZ	**14**	**25,878**	**124**	**114**
OH6NV	"	18	3	3
OH5NE	**1.8**	**18,492**	**100**	**92**
***OH2LU**	**A**	**340,423**	**541**	**361**
*OH9GGY	"	141,226	282	241
*OH3DP	"	135,752	302	239
*OH6FXW	"	675	15	15
*OH6G	"	594	23	22
			(OP: OH6ECM)	
*OH6GFI	"	264	12	12
***OH2BEN**	**28**	**23,328**	**110**	**96**
***OH1TD**	**21**	**23,199**	**123**	**111**
*OH8KVY	"	17,472	99	96
***OG3P**	**14**	**273,424**	**553**	**368**
			(OP: OH3P)	

France

TM6M	**A**	**15,743,661**	**4063**	**1203**
			(OP: F8DBF)	
F5VKT	"	1,990,872	1280	709
F6DZU	"	1,462,920	1194	668
F4DSK	"	833,340	803	510
F5PQU	"	637,515	747	457
F5BBD	"	477,360	612	408
TM38O	"	434,592	571	432
			(OP: F6ITD)	
F1AGR	"	277,242	388	294
F5PAL	"	250,071	411	319
F6GPT	"	226,719	431	311
F4FLF	"	172,960	315	230
F4DSE	"	134,995	314	245
F5CG	"	67,032	159	147
F5VML	"	46,718	152	142
F1PYN	"	28,702	125	113
F8DFP	"	22,002	128	114
F4GWY	"	14,872	94	88
F4FNT	"	10,521	66	63
TM4W	**28**	**1,272,700**	**1039**	**572**
			(OP: F5HRY)	
TM1W	**21**	**5,601,827**	**2479**	**931**
			(OP: F1HAR)	
TM7X	"	2,553,224	1559	727
			(OP: F5BSB)	
F5JY	"	49,135	166	155
F6CZV	"	10,540	71	68
F8ARK	**14**	**2,221,193**	**1566**	**793**
F5VMN	**3.7**	**165,085**	**295**	**241**
***F1AEY**	**A**	**734,487**	**782**	**509**
*F8AEE	"	580,440	701	420
*F6DRP	"	489,069	624	441
*F4DPW	"	364,744	507	359
*F4DLL	"	315,235	503	335
*F8VNU	"	162,150	292	235
*F6GCI	"	153,140	295	247
*F5GGL	"	145,884	277	238
*F4FSY	"	141,834	287	231
*F4DXP	"	109,312	289	224
*F4BPO	"	94,535	227	185
*F5BTH	"	76,860	210	183
*F8KKH	"	60,822	205	186
			(OP: F4GBW)	
*F4GLQ	"	41,019	132	113
*F4LKJ	"	37,814	152	146
*F4DVO	"	37,539	163	129
*F1WH	"	22,660	126	110
*F4GCU	"	20,304	108	94
*F4FSB	"	20,196	126	102
*F8DYD	"	19,104	104	96
*F4FZR	"	15,045	91	85
*F5MA	"	10,944	85	76
*F4GVP	"	9,179	68	67
*F4FWN	"	540	18	18
***F5LIW**	**28**	**194,640**	**319**	**240**
*F1UJS	"	180,792	294	243
*F4FQZ	"	97,680	233	185
*TM22P	"	60,150	194	150
			(OP: F6HRP)	
***F5DRD**	**21**	**55,870**	**169**	**151**
*F4CGJ	"	2,204	38	38
*F5ISY	"	800	31	25
*F4FOO	"	3	1	1
***F4GTD**	**7**	**592,724**	**645**	**418**

Greece

SV2GJV	**A**	**988,264**	**997**	**524**
J47X	"	325,827	525	369
			(OP: SV7BVM)	
SV1QN	"	308,700	450	315
SV1JSN	"	192,510	325	270
SV2JAO	**28**	**261,948**	**389**	**263**
SV1JG	"	238,497	398	287
SZ6P	**21**	**245,520**	**492**	**341**
			(OP: SV1BJW)	
SV1BFW	**7**	**3,920**	**35**	**35**
SV1GRD	**1.8**	**7,257**	**63**	**59**
***SV7CUD**	**A**	**94,940**	**237**	**202**
*SV1MNF	"	69,696	244	192
*SV1HKD	"	16,910	102	95
***SV2YC**	**21**	**6,780**	**63**	**60**
***SV1MQJ**	**14**	**40,716**	**201**	**174**
*SV1MRV	"	14,060	104	95
*SV1OBY	"	320	16	16

Guernsey

MU6FAL	**28**	**37,744**	**131**	**112**
***2U0FER**	**A**	**12,865**	**92**	**83**
***MU0GSY**	**28**	**146,272**	**336**	**224**

Hungary

HG3R	**A**	**9,759,981**	**3317**	**1169**
			(OP: HA3NU)	
HAØHW	"	135,235	270	215
HA9SU	"	3,234	51	42
HG1G	**28**	**205,840**	**324**	**248**
***HA5UA**	**A**	**50,697**	**153**	**131**
***HG8YKO**	**3.7**	**155,360**	**308**	**239**
***HA7JOK**	**1.8**	**720**	**20**	**18**

Iceland

TF1CY	**A**	**803,995**	**984**	**565**
TF3AM	"	228,422	524	362
TF8GX	**28**	**47,376**	**219**	**168**
TF3CW	**14**	**1,766,676**	**1351**	**692**
***TF3SG**	**A**	**167,399**	**286**	**229**

Ireland

EI9HX	**A**	**4,350,192**	**2137**	**924**
EI9E	"	573,496	592	418
			(OP: EI2FG)	
EI9FVB	"	86,457	208	179
***EI8GQB**	**A**	**2,193,620**	**1601**	**767**
			(OP: ON4EI)	
*EI4GNB	"	811,890	804	485
*EI3CTB	"	392,040	551	363
*EI4GXB	"	212,667	360	273
*EI9GSB	"	92,660	249	218
*EI4GAB	"	78,912	226	192
*EI5JQ	"	22,080	113	96
*EI2KA	"	2,201	34	31
***EI6JK**	**7**	**625,820**	**639**	**415**

Italy

IR4M	**A**	**2,846,480**	**1387**	**680**
			(OP: IK2NCJ)	
IZ3SQW	"	1,957,883	1430	701
IV3UHL	"	1,603,797	1273	663
IK8UND	"	964,320	993	560
IK6GPZ	"	954,738	884	531
I4XNN	"	723,120	730	460
IK2LFF	"	608,832	765	453
IZ

IZ1NBX	*	21,358	125	118
IK3UNA/1	**7**	**738,700**	**803**	**445**
IW5ELR	*	294,118	424	319
IKØGDG	*	265,482	377	294
IC8WIC	**3.7**	**834,968**	**772**	**488**
IR1A	**1.8**	**97,709**	**259**	**199**
			(OP: IK1GPG)	
IZØGIF	*	1,980	31	30
***IR4X**	**A**	**6,328,036**	**2379**	**1012**
			(OP: IZ3EYZ)	
*IQ2Z	*	2,028,285	1270	705
			(OP: IK2DZN)	
*IV3BCA	*	418,264	458	392
*IKØXBX	*	391,590	481	342
*IK7NXU	*	363,216	454	376
*IK7RVY	*	253,890	434	315
*IZ2BKA	*	219,608	368	283
*I1DXD	*	215,594	405	289
*IZ3GNG	*	205,744	337	308
*IZ5MKA	*	203,000	346	280
*IK3SSW	*	192,384	364	288
*IZ7FLT	*	158,337	295	241
*IK7WPD	*	147,500	308	250
*IW1RHR	*	104,607	256	197
*IZ3QCH	*	103,092	272	213
*IZ2UST	*	97,970	258	202
*IK8NSR	*	93,258	215	198
*IZ5IMD	*	76,065	191	165
*IQ7AF	*	75,624	227	184
*IK2YSJ	*	68,378	213	179
*IZ5RKC	*	61,845	190	155
*IZ2LQD	*	61,576	194	172
*IW2NRI	*	60,264	180	162
*I1YGQ	*	57,720	194	156
*IN3ADW	*	53,592	189	154
*IZ1TYP	*	47,233	160	149
*IK2IKW	*	42,742	158	142
*IN3IZT/I7	*	35,712	140	124
*IZ2NZZ	*	28,188	132	116
*IN3URZ	*	27,820	151	130
*IN3EHR	*	25,920	142	120
*IW4AOT	*	24,948	96	84
*IN3JJI	*	24,408	133	113
*IZ2WRL	*	24,336	134	117
*IZ4RYS	*	23,265	105	99
*IZØKBA	*	22,248	119	103
*IO7R	*	21,216	109	96
*IZ1MLS	*	20,806	101	101
*IK2QIN	*	19,710	96	90
*IZ8EEL	*	19,201	96	91
*IZ1HBC	*	19,008	107	96
*IZØPMV	*	17,664	76	69
*I2BZN	*	16,434	101	83
*IZ1FAL	*	15,480	95	90
*IK2SGB	*	14,162	78	73
*IW1RGP	*	13,851	88	81
*IK6SBW	*	12,320	87	77
*IK2SGL	*	12,160	84	76
*IN3EJN	*	11,988	84	81
*IK5YJK	*	11,712	68	64
*IZ2NYY	*	11,592	72	69
*IWØEAC	*	11,310	69	65
*IV3IDP	*	11,172	85	76
*IK4XQT	*	9,976	93	86
*IZ5EKX	*	9,940	71	71
*IZ1OYD	*	9,864	79	72
*IR1X	*	8,360	61	55
*IWØBET	*	5,661	54	51
*IN3MSD	*	5,236	46	44
*IV3BGG	*	4,968	48	46
*IZ1QXW	*	4,914	45	42
*IZ5LZP	*	4,900	53	50
*IZØTHT	*	4,032	50	48
*IZ1QXV	*	3,432	41	39
*IW3BTR	*	2,754	35	34
*IK5BOH/2	*	2,697	31	29
*IW5ELA	*	2,240	29	28
*IZ8LIP	*	1,705	31	31
*IZ8CLM	*	1,656	26	24
*IK2AUK	*	1,558	39	38
*IZØIRH	*	1,116	36	36
*IZ8DUD	*	940	20	20
*IZ1REP	*	756	27	27
*IZ3SXO	*	756	29	27
*IZ5IOM	*	704	16	16
*IW2DJN	*	512	17	16
*IZ8IBC	*	448	16	16
*I3YYY	*	312	22	13
*IZ2CSX	*	192	12	12
*IZ2SSO	*	77	7	7
*IW2FLB	*	75	5	5
***IK2OLD**	**28**	**50,439**	**152**	**129**
*IW2BZY	*	37,064	125	113
*II7M	*	12,816	77	72
			(OP: IZ7SIA)	
*IZ5WTV	*	12,342	72	66
*IW5ECP	*	11,658	69	67
*IZ5UGE	*	8,415	62	55
*IZ5TJF	*	12	3	3
***IO3K**	**21**	**237,336**	**395**	**319**
*IZ5HSK	*	179,025	308	275
*IZ5CHI	*	104,682	254	219
*IK1BBC	*	96,515	228	199
*IZ5UGM	*	12,960	73	72
*IK8TFN	*	9,450	75	75
*IX1CKN	*	4,092	44	44
*IW4CXX	*	377	13	13
***IZ2ACD**	**14**	**559,035**	**750**	**505**
*IQ2DN	*	371,234	560	419
			(OP: IZ2JQP)	
*II0K	*	85,008	288	231
			(OP: IZ0UME)	
*I3QKO	*	75,712	224	224
*IR7M	*	31,610	157	145
			(OP: IK7TAI)	
*IZ2JNN	*	6,674	76	71
*IZ5MXA	*	5,600	61	56
*IZ6NNH	*	3,240	55	54
***IQ1BD**	**7**	**283,976**	**414**	**308**
			(OP: IZ1DGG)	
*IZ5RLK	*	184,832	324	256
*IZ7SIA	*	34,574	125	118
*IQ0CI	*	4,346	41	41
			(OP: IKØVVE)	
***IZ5OQX**	**3.7**	**3,066**	**42**	**42**

Kaliningrad

UA2CZ	**A**	**47,244**	**138**	**127**
UA2F	**14**	**545,280**	**605**	**384**
			(OP: UA2FB)	
***RT2F**	**A**	**34,432**	**159**	**128**
*RA2FU	*	29,890	149	122

Latvia

YL2SM	**A**	**7,700,624**	**2972**	**1124**
YL2IP	**21**	**38,497**	**151**	**137**
YL2BJ	**14**	**2,611,614**	**1739**	**843**
YL3FT	**7**	**2,824,356**	**1281**	**746**
***YL3DR**	**A**	**805,475**	**781**	**505**
*YL2GR	*	255,664	450	304
*YL2NK	*	97,170	284	205
*YL2QV	*	17,280	93	90
*YL3DX	*	12,180	98	87
*YL1ZX	*	288	13	12
			(OP: YL2GCV)	
***YL2PJ**	**21**	**89,208**	**233**	**189**
***YL5W**	**14**	**569,016**	**863**	**504**
***YL2GUV**	**3.7**	**336,980**	**450**	**332**

Lithuania

LY8Y	**A**	**6,090,858**	**2481**	**1046**
LY2MM	*	1,171,810	952	565
LY2ER	*	210,375	337	255
LY2AE	**28**	**88,810**	**204**	**166**
LY2DM	**21**	**167,700**	**309**	**260**
LY2UU	**7**	**485,000**	**490**	**388**
LY5O	*	138,416	288	211
LY2BKT	**3.7**	**13,090**	**84**	**77**
LY2OU	**1.8**	**228,285**	**386**	**285**
***LY1R**	**A**	**4,803,825**	**2208**	**975**
			(OP: LY9A)	
*LY6A	*	2,594,761	1690	767
*LY4T	*	1,201,008	1016	573
*LY3B	*	681,777	736	443
*LY2TS	*	615,276	718	422
*LY2N	*	281,710	427	286
*LY1DJ	*	201,280	417	296
*LY2OM	*	130,200	292	217
*LY1NDN	*	96,585	286	235
*LY2BIS	*	93,215	227	181
*LY1VP	*	81,030	235	185
*LY2BBF	*	38,016	157	128
*LY2HQ	*	6,200	65	62
*LY4Q	*	3,960	50	45
***LY8O**	**14**	**618,838**	**768**	**506**
***LY5I**	**7**	**488,824**	**481**	**392**

Luxembourg

LX7I	**A**	**12,685,492**	**3717**	**1108**
			(OP: LX2A)	
LX1SG	*	468,305	608	409
LX3PR	*	15	3	3

Macedonia

Z35X	**A**	**926,256**	**918**	**552**
Z32XU	**28**	**14,008**	**74**	**68**
Z36W	**21**	**37,400**	**172**	**136**
***Z35F**	**A**	**105,408**	**321**	**244**
***Z35W**	**21**	**289,167**	**472**	**339**
*Z37Y	*	246,328	475	328
			(OP: Z30KNA)	
*Z31MM	*	560	20	20
*Z37V	14	225	15	15
			(OP: Z39W)	
***Z33F**	**7**	**651,651**	**582**	**429**

Malta

9H1XT	**A**	**48,504**	**165**	**141**

Market Reef

***OJØVM**	**A**	**136,427**	**295**	**227**
			(OP: OH6VM)	

Moldova

***ER4LX**	**A**	**1,121,940**	**1051**	**542**
*ER3C	*	622,576	703	466
***ER1CS**	**14**	**194,370**	**400**	**330**
***ER2RM**	**1.8**	**33,408**	**134**	**116**

Netherlands

PC2T	**A**	**1,722,105**	**1295**	**693**
PA1NHZ	*	331,114	511	353
PE2LZ	*	305,276	421	334
PA7AL	*	200,616	442	312
PAØJNH	*	109,824	230	208
PAØLOU	*	108,150	235	206
PE1LUB	*	72,168	224	194
PDØMHZ	*	60,681	211	179
PAØDOM	*	27,768	115	104
PD1B	*	20,670	117	106
PAØVST	*	1,404	26	26
PA2A	*	925	25	25
PA2MRT	**7**	**216,008**	**291**	**268**
PA2WO	*	183,401	426	241
***PA8KW**	**A**	**1,023,990**	**861**	**535**
*PA1PE	*	403,333	461	367
*PA3ACA	*	290,624	389	304
*PG1R	*	244,200	451	296
*PA2W	*	243,824	399	311
*PA9WOR	*	217,848	435	313
*PA3DBS	*	212,472	407	312
*PD73X	*	196,196	424	308
			(OP: PDØEMR)	
*PA2GRU	*	153,386	353	271
*PAØEMO	*	134,478	335	241
*PA9CC	*	128,040	292	220
*PA3FMC	*	125,628	295	228
*PHØAS	*	121,338	244	214
*PA3EWG	*	110,432	297	232
*PA4HM	*	105,160	292	239
*PA2PCH	*	83,842	259	206
*PA3FOE	*	76,356	257	202
*PA3CMF	*	75,819	252	199
*PA7BAS	*	64,617	225	181
*PDØME	*	54,908	169	148
*PD3ALX	*	53,250	155	142
*PE1RWL	*	51,840	186	160
*PD1ABO	*	47,376	193	168
*PA1VC	*	46,944	185	163
*PE1MIR	*	41,595	168	141
*PA/DL1KSR	*	40,404	181	148
*PE1OLM	*	39,204	147	132
*PA2CHM	*	37,422	171	154
*PA1TO	*	34,749	167	143
*PD1TV	*	33,135	160	141
*PA2CVD	*	32,265	158	135
*PA1ØØNOM	*	30,702	150	129
			(OP: PAØFAW)	
*PA8KM	*	29,606	151	131
*PAØJHS	*	28,665	124	105
*PAØCGB	*	21,909	117	109
*PA5CA	*	21,620	94	92
*PD1SGH	*	21,293	112	107
*PC3H	*	19,210	137	113
*PAØB	*	15,750	105	90
*PA3DCU	*	15,318	83	74
*PA3ARM	*	12,905	99	89
*PA3MET	*	12,640	87	80
*PAØCYW	*	11,880	98	88
*PA3HGF	*	9,798	76	71
*PD1LG	*	7,548	73	68
*PDØDK	*	6,643	82	73
*PA3J	*	5,772	54	52
*PE1DGM	*	5,445	58	55
*PA9HR	*	4,815	47	45
*PA3RC	*	1,357	23	23
*PA3DDP	*	1,150	25	23
*PAØLIE	*	1,034	23	22
***PAØRHA**	**14**	**4,260**	**67**	**60**
*PA3GEO	*	3,245	56	55
*PE1RMO	*	16	4	4
***PA8C**	**7**	**24,510**	**100**	**95**

Northern Ireland

***GI7AXB**	**A**	**573,648**	**697**	**458**

Norway

LN8W	**A**	**4,863,488**	**2225**	**944**
			(OP: LB1GB)	
LA6KOA	*	519,750	783	450
LA3ZPA	*	185,744	311	247
LA8HGA	*	154,406	391	287
LB9RE	*	94,792	195	164
LA2OTA	*	19,250	125	110
***LA5LJA**	**A**	**723,330**	**811**	**470**
*LA3BPA	*	510,848	563	416
*LA1DSA	*	327,474	501	339
*LA2HFA	*	279,270	503	321
*LA3HPA	*	167,679	383	279
*LA8OKA	*	117,236	283	212
*LA2NTA	*	86,922	248	198
*LA7TN	*	77,224	263	197
*LA9OSA	*	54,720	200	171
*LA2RR	*	21,900	104	100
*LA4AAA	*	10,934	79	77
*LA6VQ	*	6,028	49	44
*LA9NSA	*	1,025	26	25
*LA7IJA	28	60	5	5
*LA1ORA	14	25	5	5

Poland

SO6I	**A**	**2,324,582**	**1554**	**754**
			(OP: SP6JIU)	
SP9AQF	*	2,224,995	1354	703
SP5VYI	*	1,266,432	1130	582
SQ7DQX	*	1,220,184	1204	538
SN5V	*	1,046,653	856	589
			(OP: SQ5EBM)	
SP5IT	*	132,288	247	208
SP4OIZ	*	91,494	278	207
SP9OHL	*	66,256	190	164
SP5GMM	*	37,888	129	128
SP8TDV	*	20,332	95	92
SP9AUV	*	960	24	24
SP1II	*	352	11	11
SP8HXN	*	105	7	5
SO6R	**21**	**366,996**	**477**	**357**
SP3GXH	*	124,320	258	210
SP8BQL	*	91,630	228	187
SN5U	*	1	1	1
SP3ASN	**14**	**54,540**	**200**	**180**
SP3GTS	**3.7**	**390,375**	**507**	**347**
SP4JCP	**1.8**	**172,500**	**354**	**250**
***SO9G**	**A**	**508,654**	**590**	**394**
			(OP: SP9DTE)	
*SQ2WHH	*	501,684	675	388
*SN3B	*	450,300	598	380
			(OP: SQ3JPV)	
*SP8CGU	*	405,858	508	346
*SN1J	*	332,010	396	315
			(OP: SP1MWF)	
*SP5X	*	277,550	429	305
*SQ5LTL	*	234,000	371	300
*SP6OPZ	*	233,428	417	268
*SP9RTL	*	231,844	412	298
*SP8UFB	*	216,006	358	278
*SP6QKS	*	206,873	412	283
*SP3HZG	*	205,556	383	268
*SQ9NKK	*	204,060	373	285
*SP6RYD	*	200,405	367	269
*SP3UIW	*	188,496	361	264
*SQ5NWD	*	186,461	334	253
*SP1QXK	*	173,910	320	255
*SP4FMD	*	170,880	369	267
*SP6NVK	*	157,045	348	245
*SQ9IAU	*	154,178	310	254
*SP5LKJ	*	145,418	305	238
*SP4AAZ	*	124,173	289	219
*SQ9CWO	*	114,300	237	225
*SP5TWA	*	105,152	259	212
*SP3JZX	*	103,390	274	211
*SP3SPK	*	95,475	261	201
*SQ5JUP	*	95,275	227	185
*SQ6NEJ	*	80,750	253	190
*SP8BOZ	*	74,250	258	198
*SN4W	*	73,850	218	175
			(OP: SP4ICP)	
*SQ3VV	*	69,125	203	175
*SQ5ASR	*	68,554	188	151
*SP2RIQ	*	66,861	203	171
*SQ1PTO	*	62,678	198	154
*SQ9LOM	*	60,756	199	166
*HF1Z	*	58,353	192	159
			(OP: SP1EG)	
*SP7VS	*	57,565	158	145
*SQ8GUM	*	57,218	165	134
*SQ6STI	*	44,384	157	146
*SQ6LJV	*	40,454	124	113
*SP4AVG	*	33,250	141	125
*SP9DEM	*	23,166	105	81
*SP2ILQ	*	21,658	112	98
*SP9JZT	*	19,437	97	93
*SP5GDY	*	18,078	87	69
*SQ7OTA	*	8,758	62	58
*SP9CLO	*	6,426	53	51
*SQ9ONK	*	4,860	60	60
*SP1O	*	3,880	44	40
*SQ3PMM	*	2,886	39	37
*SP6EWB	*	1,584	37	36
*SQ8JMZ	*	1,100	26	25
*SQ7OTH	*	384	12	12
*SQ5RIX	*	136	8	8
*SP5MDB	*	65	5	5
***SP5AUY**	**28**	**124,701**	**239**	**197**
*SP7DSI	*	55,380	149	130
*SQ8LSC	*	12,870	68	65
*SQ6ILJ	*	8,008	58	52
*SN9I	*	3,708	36	36
			(OP: SP9EMI)	
*SQ9SHR	*	2,418	31	31
*SQ3QYQ	*	602	15	14
*SQ5ABF	*	490	14	14
*SP5IKO	*	444	13	12
***SP1NY**	**21**	**301,950**	**409**	**330**
*SP5UD	*	15,540	83	74
*SQ8OGC	*	3,567	42	41
*SP5BMU	*	1,275	26	25
*SP9IHP	*	954	19	18
*SP2MGR	*	432	12	12
***SP5GRM**	**14**	**1,255,130**	**1101**	**625**
*SP1FRC	*	81,900	236	210
*SQ4G	*	50,112	211	174
*SQ1WO	*	46,306	195	169
*SP5DRE	*	22,620	128	116
*SQ3LLR	*	6,164	69	67
*SQ4KLM	*	2,907	56	51
*SQ3RLC	*	2,303	53	49
*SP6HDS	*	520	20	20
***SP9HZF**	**7**	**164,500**	**271**	**250**
*SP9EML	*	14,898	79	78
*SP9LWH	*	12,530	71	70
***SP4SHD**	**3.7**	**274,920**	**403**	**316**
***SQ2OSE**	**1.8**	**2,592**	**38**	**35**
*SP8ONB	*	2,080	35	32

Portugal

CR6K	**A**	**15,527,376**	**4289**	**1296**
			(OP: CT1ILT)	
CS2C	**21**	**8,004,231**	**3341**	**1179**
			(OP: OK1RF)	
CT1IQI	7	51,170	125	119
*CT1EGF	**A**	**255,200**	**380**	**319**
*CT2KFA	*	230,298	361	293
*CT1ETK	*	228,000	430	300
*CT7ABG	*	156,180	386	285
*CT1JRZ	*	120,866	261	223
*CT2GMH	*	118,854	279	213
*CT2IWW	*	84,688	196	158
*CT1EBM	*	10,586	76	67
***CT1DJE**	**28**	**13,140**	**74**	**73**
***CT1EEK**	**21**	**312,858**	**473**	**382**
*CS5DX	*	132,235	265	265
			(OP: CT1EGW)	
*CT1EVE	*	22,624	117	112
***CT1DZY**	**14**	**117,132**	**288**	**258**
***CT1EWA**	**7**	**8,910**	**56**	**55**
*CT1DKS	3.7	6	1	1

Romania

YO3CZW	**A**	**5,926,176**	**2747**	**1026**
YO6A	*	2,484,300	1533	780
			(OP: YO6BHN)	
YO3RU	*	1,107,700	1014	583
YO8RNI	*	440,022	544	354
YO9XC	*	344,442	500	354
YO9GVN	*	109,620	232	189
YO6KW	*	104,127	199	183
YO7NE	*	42,700	133	122
YO5CUQ	*	16,352	102	73
YO7VT	*	7,950	56	53
YO9IF	**28**	**8,736**	**61**	**56**
YP3A	**21**	**885,036**	**951**	**524**
			(OP: YO3GOD)	
YO8RAC	*	16,470	99	90
YO3JW	**7**	**51,152**	**162**	**139**
YO4AUP	**3.7**	**29,040**	**115**	**110**
***YO5KTK**	**A**	**991,278**	**910**	**522**
			(OP: YO5PJF)	
*YO7LCB	*	474,840	514	360
*YO4RST	*	401,488	511	368
*YO8SGN	*	311,084	501	332
*YO7ARY	*	305,270	504	343
*YO4US	*	247,428	454	316
*YO8THG	*	211,511	338	257
*YO5DGE	*	187,411	319	287
*YO2MKT	*	105,690	237	195
*YO6DBL	*	104,040	258	204
*YO2MLM	*	65,709	169	147
*YO7HKM	*	62,976	188	164
*YO8RFS	*	58,435	177	145
*YO9ADN	*	32,330	145	122
*YO9HRB	*	31,354	153	122
*YO9CSM	*	30,625	143	125
*YO7DBR	*	19,698	105	98
*YO2MKL	*	16,920	96	90
*YO2MLG	*	12,464	77	76
*YO9FLD	*	11,872	66	56
*YO2MBU	*	11,840	78	74
*YO7LKW	*	10,074	78	73
*YO5TP	*	8,350	55	50
*YO5CCQ	*	7,848	76	72
*YO4GVC	*	5,871	57	57
*YO3GLH	*	4,526	63	62
*YO8RFJ	*	2,881	46	43
*YO2SH	*	1,265	23	23
*YO2LIM	*	931	20	19
***YO5CRQ**	**28**	**65,888**	**168**	**142**
*YO3FRI	*	34,138	117	101
*YO2MTG	*	16,650	79	75
*YO2ARV	*	3,816	39	36
*YO6OHS	*	2,640	35	33
*YO6SHK	*	48	4	4
***YO9CWY**	**21**	**26,269**	**135**	**109**
*YO5AYT	*	9,660	80	70
*YO5KAS	*	48	4	4
			(OP: YO6CGB)	
*YO5BTZ	*	27	3	3
*YO5CEU	*	12	4	4
***YO5ALI**	**14**	**255,065**	**489**	**367**
*YO9FYP	*	96,924	323	246
*YO8RZJ	*	86,106	280	226
*YO9AG	*	75,905	277	235
*YO8RES	*	42,579	196	171
*YO4DL	*	32,130	166	153
*YO6EZ	*	812	30	28
***YO2MUZ**	**7**	**150,332**	**267**	**236**
*YO5BQQ	*	130,832	230	208
*YO9IXC	*	27,234	105	102
*YO4RSS	*	14,250	78	75

Sardinia

IS0HQJ	**A**	**5,488**	**61**	**56**
***IS0BSR**	**A**	**332,024**	**629**	**392**
*IS0BGL	*	19,872	103	92

Scotland

GM7V	**A**	**4,040,025**	**2272**	**885**
			(OP: 2E0KLO)	
GM3POI	*	365,442	490	294
MM3T	**28**	**100,746**	**266**	**193**
			(OP: GM0ELP)	
***MMØBQN**	**A**	**555,940**	**619**	**418**
*MMØLBX	*	416,973	630	393
*MM1X	*	37,000	177	148
*GMØTTY	*	11,174	86	74
***GMØBKC**	**14**	**74,793**	**288**	**233**

Serbia

YT5A	**A**	**4,490,490**	**2154**	**885**
			(OP: YT3W)	
YU1DW	*	353,290	547	343
YT3H	*	250,515	370	293
YU5R	**28**	**570,312**	**616**	**356**
			(OP: YU6DX)	
YT5W	**21**	**6,010,788**	**2502**	**978**
			(OP: YT7AW)	
YT1A	**14**	**2,565,574**	**1773**	**842**
YT8A	**7**	**6,557,886**	**2176**	**986**
			(OP: YU1EA)	
YU1AAX	*	37,605	126	115
			(OP: YT1BD)	
YT4A	**3.7**	**1,243,200**	**953**	**556**
			(OP: YT1AA)	
***YT3M**	**A**	**4,109,560**	**1986**	**910**
			(OP: YT6W)	
*YU/S56A	*	170,272	316	272
*YU5CW	*	93,978	264	207
*YU3M/P	*	51,356	182	148
*YT1KC	*	13,800	82	75
*YU8NU	*	1,922	33	31
*YU2EA	*	589	19	19
***YT3MA**	**28**	**23,545**	**99**	**85**
***YT2AAA**	**14**	**341,823**	**588**	**417**
*YU1TY	*	148,975	379	295
*YT1ET	*	58,962	259	186
*YT2SMS	*	11,712	103	96
***YT8WW**	**3.7**	**683,648**	**734**	**436**

Shetland and Fair Isle

GZ5Y	**A**	**907,798**	**885**	**541**
			(OP: GM4SSA)	

Sicily

IU9T	**A**	**11,882,041**	**3395**	**1181**
			(OP: IT9GSF)	
***IT9ESW**	**A**	**566,420**	**643**	**446**
*IW9FI	*	253,761	458	337
*IW9HHB	*	78,624	268	216
*IT9AZK	*	77,220	243	180
***IT9CLN**	**28**	**9,686**	**61**	**58**
*IT9YAO	*	3,348	37	31
***IT9LED**	**21**	**264,152**	**447**	**356**
*IT9AXQ	*	18,117	107	99
*IT9AJP	*	12,166	88	79
***IT9MYY**	**14**	**97,751**	**272**	**239**
***IR9P**	**7**	**157,974**	**257**	**226**
			(OP: IW9HMQ)	

Slovak Republic

OMØR	**A**	**11,644,387**	**3402**	**1123**
			(OP: OM3GI)	
OM8AA	*	85,140	221	180
OM3IAG	*	26,287	115	97
OM1ADX	**21**	**224,790**	**382**	**295**
OM3DX	*	133,152	266	219
OM7RU	**1.8**	**340,599**	**502**	**331**
***OM7AB**	**A**	**743,652**	**813**	**468**
*OM4DN	*	422,096	600	368
*OM1DK	*	400,140	456	405
*OM8FR	*	350,660	528	356
*OM6A	*	341,658	507	342
*OM2DT	*	119,567	252	203
*OM7AX	*	53,949	187	147
*OM3ZBG	*	729	27	27
***OM3TB**	**14**	**77,688**	**264**	**218**
*OMØWR	*	8,755	97	85
***OM6TX**	**7**	**81,420**	**198**	**177**
*OM3CON	*	71,442	179	162
***OMØCS**	**3.7**	**213,030**	**366**	**270**
*OM7AGF	*	3,549	42	39

Slovenia

S59ABC	**A**	**7,429,512**	**2776**	**1047**
			(OP: S56AA)	
S53MM	*	7,006,725	2604	1045
S51F	*	4,107,465	1960	873
S52OP	*	2,063,061	1339	693
S56B	*	1,030,450	969	557
S58K	**14**	**4,833,312**	**2405**	**1012**
S54ZZ	*	1,510,548	1229	598
S54K	**3.7**	**849,420**	**812**	**484**
***S50A**	**A**	**4,732,052**	**1933**	**901**
*S52BT	*	146,371	262	197
*S59GS	*	102,128	263	208
*S51JS	*	69,973	190	167
*S51I	*	54,750	172	150
***S56ZZ**	**28**	**1,218**	**22**	**21**
***S52Q**	**21**	**22,119**	**112**	**101**
***S52WW**	**14**	**674,245**	**827**	**533**
*S57U	*	453,840	663	465
*S57PKT	*	257,890	509	370
*S57ZT	*	1,700	35	34
*S57LR	*	140	10	10
***S57DX**	**7**	**2,270,452**	**1264**	**692**
***S53N**	**3.7**	**220,792**	**362**	**286**
			(OP: S58G)	

Spain

EE7L/1	**A**	**1,220,940**	**1344**	**612**
			(OP: EA7HLU)	
EA1AR	*	80,964	190	156
EB1IC	**21**	**153,330**	**

EE2W	21	2,389,671	1432	**711**
***EA2LMI**	A	1,090,100	**983**	**550**
*EF2F	"	267,066	514	362
			(OP: EA2DNR)	
*EA2RW	"	78,676	**211**	**178**
*EA2BVV	"	15,120	121	**105**
*EA2AVM	"	14,499	89	81
*EA2DDE	"	10,212	89	74
***EA2DT**	**14**	**479,160**	**691**	**495**
*EA2CHL	"	2,107	46	43
ED3B	**A**	**2,639,536**	**1697**	**796**
			(OP: EA3BOX)	
EF3A	"	660,500	755	500
			(OP: EA3KU)	
EA3HEK	"	2,492	31	28
***EE3P**	**A**	**1,246,474**	**1311**	**601**
			(OP: EA3DUW)	
*EA3GHZ	"	267,872	507	352
*EA3FCQ	"	220,629	360	293
*EB3WH	"	99,603	233	189
*EA3AYQ	"	97,614	249	198
*EA3GYK	"	71,925	214	175
			(OP: DK7TM)	
*EA3HJO	"	49,950	163	135
*EA3HDT	"	16,920	106	94
*EA3OWX	"	13,376	90	76
*EA3EXP	"	11,040	86	80
***EA3NA**	**28**	**72,822**	**192**	**159**
*EA3OJL	"	23,670	98	90
*EA3GXD	"	22,352	94	88
***EF3E**	**21**	**32,640**	**150**	**136**
			(OP: EC3PL)	
*EF3AB	"	31,490	148	134
*EE3E	"	189	9	9
			(OP: EA3ELZ)	
EA4KD	**A**	**2,231,829**	**1402**	**711**
EA4TG	**21**	**346,626**	**572**	**393**
***EA4EF**	**A**	**92,004**	**219**	**187**
*EA4GHB	"	44,950	179	155
*EA4CWW	"	38,160	155	120
*EA4FLY	"	16,554	97	89
*EA4FJJ	"	9,519	64	57
*EA4MI	"	1,500	31	30
***EA4AQC**	**21**	**33,300**	**161**	**148**
***EA4YK**	**14**	**12,028**	**104**	**97**
EA5GTQ	**A**	**238,788**	**374**	**297**
EA5DIT	**28**	**27,200**	**106**	**100**
EB5KT	**21**	**674,424**	**851**	**522**
			(OP: EA5KV)	
EA5GS	"	139,682	284	211
EA5DFV	**14**	**3,898,378**	**2371**	**979**
***EA5AER**	**A**	**2,433,090**	**1703**	**803**
*ED5W	"	809,286	764	458
			(OP: EA5FWW)	
*EA5MON	"	342,990	467	333
*EA5HRB	"	320,112	442	324
*EB5CS	"	163,404	346	267
*ED5A	"	92,316	238	196
			(OP: EA5HRT)	
*ED5L	"	27,192	138	132
			(OP: EC5AEI)	
*EA5UJ	"	15,876	101	81
*EB5BB	"	10,836	77	63
*ED5Z	"	7,638	72	67
			(OP: EA5ZD)	
*EA5HRM	"	7,139	64	59
***EA5EOR**	**28**	**180,960**	**309**	**240**
*EA5HJO	"	51,408	162	144
*EB5BBM	"	50,400	147	126
***EA5XY**	**21**	**143,260**	**305**	**260**
*EA5HKZ	14	3,127	59	59
***EF5V**	**7**	**84,251**	**194**	**173**
			(OP: EA5AVW)	
EE7H	**A**	**393,312**	**611**	**408**
			(OP: EA7ELY)	
EA7HGX	"	3,760	50	47
EA7JB	**28**	**399,122**	**560**	**394**
EE7Y	**21**	**2,859,740**	**1871**	**884**
			(OP: EA7ISH)	
EA7ATX	"	253,528	459	344
***EE7R**	**A**	**1,165,794**	**954**	**574**
			(OP: EA7IA)	
*ED7R	"	1,009,125	1230	621
			(OP: EA7ZJ)	
*EE7J	"	105,340	265	229
			(OP: EA7FTZ)	
*EA7JIY	"	74,315	204	167
*EA7CWA	"	7,104	50	48
*EA7WV	"	4,080	42	40
*EA7JHV	"	1,887	42	37
***EA7EPF**	**28**	**26,037**	**107**	**99**
*EA7FRX	"	13,179	76	69
*EA7VJ	"	12,328	68	67
***EF7A**	**21**	**338,776**	**494**	**376**
			(OP: EC7ABV)	
*EA7HMD	"	43,299	161	153
***EA7RM**	**7**	**12,537**	**68**	**63**
Sweden				
SM4DQE	**A**	**911,113**	**946**	**511**
SM6NOC	"	833,257	758	487
SB6A	"	570,414	678	426
SM7PEV	"	171,810	300	249
SM2S	"	133,249	271	227
SM5EPO	"	128,444	238	197
SM7DQV	"	108,900	237	198
SM6CMU	"	93,120	197	160
SI3A	"	73,986	254	209
			(OP: SM5IIV)	
SLØW	"	63,420	189	151
			(OP: SMØAJU)	
SK7A	"	58,282	233	181
			(OP: SA7AOI)	
SA6P	"	51,194	177	143
			(OP: SA6AVB)	
SA7AUW	"	34,700	125	100
SM3NFB	"	21,255	117	109
SD3A	"	9,272	84	76
			(OP: SM3FJF)	
SM2IXM	**14**	**69,720**	**237**	**210**
SK2AZ	"	16,206	119	111
			(OP: SM2JCB)	
SM3M	**3.7**	**1,001,151**	**837**	**519**
***SJ7M**	**A**	**393,470**	**498**	**365**
*SM5BS	"	134,208	306	233
*SM3EAE	"	68,515	236	193
*SE6N	"	66,000	200	165
			(OP: SA6AXR)	
*SM6XUZ	"	54,009	198	153
*SA7AHC	"	38,907	**134**	**131**
*SAØE	"	28,080	152	130
			(OP: SAØBJL)	
*SMØHBV/3	"	26,904	133	114
*SI5Y	"	22,032	122	108
			(OP: SM5BKK)	
*SM6XVI	"	19,344	107	104
*SMØFM	"	14,507	92	89
*SM4WKT	"	13,515	91	85
*SH3O	"	11,424	71	68
			(OP: SM3TLG)	
*SM5ISM	"	10,492	67	61
*7S5S	"	5,000	52	50
			(OP: SM5CSS)	
***SM6RXZ**	**28**	**1,775**	**25**	**25**
*SM6IQD	"	1,224	24	24
*SK3W	"	588	14	14
			(OP: SM3SGP)	
*SM7RZJ	"	133	7	7
***SM6DPB**	**21**	**980**	**20**	**20**
*SH7DX	14	76,838	249	206
*SA3BGM/5	"	1,147	31	31
***SM5MX**	7	**275,280**	**366**	**310**
***SM6FJY**	**1.8**	**20,592**	**109**	**99**
Switzerland				
HB9CVQ	**A**	**1,167,438**	**887**	**537**
***HB9ARF**	**A**	**591,162**	**708**	**429**
*HB9WDY	"	374,960	504	344
*HB9MXY	"	146,229	297	237
*HB9RJG	"	127,676	310	236
*HB9EYP	"	119,004	264	211
*HB9EMS	"	10,585	79	73
***HB9TSU**	**28**	**5,117**	**47**	**43**
Ukraine				
UZ2M	**A**	**11,640,179**	**4007**	**1279**
			(OP: URØMC)	
UY7MM	"	4,222,968	2595	983
US5D	"	3,380,520	1762	858
			(OP: UT7DX)	
UXØRR	"	1,150,518	1006	569
UT6EE	"	1,061,174	945	529
US5UO	"	693,000	699	462
UR5RP	"	632,700	755	475
UT5RB	"	468,375	633	375
UT5UKY	"	340,736	488	352
UT8IT	"	212,878	350	326
UT2UB	"	200,100	385	276
UR4JC	"	164,724	310	259
UTØVE	"	124,280	296	239
UY8IO	"	114,124	268	206
UT7UE	"	52,850	188	151
US4IQS	"	50,048	164	136
UT8LN	"	9,348	64	57
US4IRT	"	3,503	34	31
UX7LL	28	3,638	37	34
UT6IS	**21**	**110,896**	**283**	**232**
UZØU	**14**	**3,250,640**	**1997**	**908**
			(OP: UY5ZZ)	
UT7QL	"	1,009,855	1111	671
UX1VT	**3.7**	**243,168**	**380**	**298**
UT5UGR	**1.8**	**299,882**	**455**	**317**
UT5ECZ	"	19,950	106	95
UR4LFA	"	6,380	59	58
***UU7J**	**A**	**6,531,670**	**2860**	**1115**
			(OP: UU4JMG)	
*US0HZ	"	2,084,541	1477	681
*UR4U	"	1,862,091	1272	693
			(OP: UR4UDI)	
*UT1IM	"	950,175	900	515
*UR5ETN	"	794,612	810	481
*UT3I	"	636,174	751	459
			(OP: US2IHS)	
*UTØLK	"	609,450	803	478
*UR7QC	"	569,622	632	417
*UV3QF	"	536,284	693	428
*UX3HA	"	510,198	709	403
*UY4F	"	468,714	628	409
*UZ2L	"	454,565	623	397
			(OP: S4ØS)	
*UV5EQO	"	353,444	550	364
*UT2AA	"	339,577	480	349
*UYØCA	"	333,870	535	359
*US2IW	"	319,410	430	338
*US7IA	"	290,274	462	303
*UY1IP	"	283,028	525	346
*UX7FD	"	271,062	471	333
*UR7CT	"	254,529	410	297
*UR6LEY	"	239,008	396	308
*UX6IB	"	222,606	386	298
*US5IND	"	211,680	422	288
*UR3AHF	"	208,080	383	289
*UT1EI	"	189,630	319	258
*US7IY	"	173,283	382	267
*UY5TE	"	160,132	366	266
*UT5ULX	"	147,371	270	259
*US5ISV	"	147,048	336	264
*US6IKV	"	136,795	328	251
*UX2KA	"	110,768	218	184
*UUØJC	"	94,668	228	196
*UT4MW	"	88,592	230	196
*US7LM	"	86,193	219	183
*UT7LW	"	81,120	196	156
*UR5AMJ	"	67,744	173	146
*US7IID	"	62,832	193	187
*UR5MAF	"	52,598	217	182
*US5MSJ	"	48,960	170	160
*US8UA	"	44,156	149	133
*US5ZE	"	32,469	175	137
*UT8UD	"	31,098	150	146
*US7IGN	"	30,129	131	121
*UU2JA	"	27,825	115	105
*UTØIA	"	23,912	110	98
*UT7VR	"	22,895	108	95
*UX3IO	"	22,357	98	79
*UR5LAK	"	15,366	93	78
*UY5TF	"	13,608	90	81
*UY2ZZ	"	12,348	68	63
*UT2HM	"	11,826	82	73
*UU3JU	"	8,700	77	75
*UR3LDO	"	6,960	52	48
*UX7FB	"	3,321	42	41
*US6IKF	"	1,971	27	27
*UT5JCE	"	1,944	29	27
*UR3LPP	"	1,675	26	25
*US3ITA	"	266	16	14
*UT2DV	"	5	5	1
***UT7EW**	**28**	**83,650**	**207**	**175**
*UTØNN	"	61,134	162	138
*UT1XX	"	40,680	140	120
*UT1UW	"	28,992	105	96
*UR5LCZ	"	2,465	29	29
*UT4PZ	"	588	14	14
*US0YA	"	546	14	13
*UT3EK	"	48	4	4
***UT7LA**	**21**	**266,455**	**413**	**331**
*UT7NW	"	241,293	389	299
*URØHQ	"	182,512	319	272
*UR5FCM	"	40,890	172	141
*UR3QNV	"	4,505	54	53
***UR6MM**	**14**	**357,136**	**588**	**442**
*UT8UF	"	219,172	550	349
*UR3PGW	"	75,820	257	223
*UT7MD	"	27,495	146	141
*UX7U	"	26,931	154	141
			(OP: UX7UA)	
*UR5EFL	"	23,091	145	129
*US0U	"	13,736	117	101
*US1MM	"	7,696	74	74
*US1GBH	"	437	20	19
***UZ7M**	**7**	**2,561,598**	**1177**	**738**
			(OP: UT9MZ)	
*UY2UQ	"	1,214,292	873	564
*UU2CW	"	1,042,317	745	537
*UT5PY	"	170,400	263	240
***US2IZ**	**3.7**	**169,596**	**320**	**252**
*UR8QR	"	60,621	170	167
*UX2MK	"	35,760	134	120
Wales				
GW9X	**A**	**449,748**	**578**	**403**
			(OP: MW1LCR)	
GW4BKG	**7**	**223,600**	**366**	**260**
GW4BLE	**3.7**	**146,642**	**322**	**227**
***GW8NBI**	**A**	**85,696**	**275**	**208**
*MW1CFA	"	30,186	158	129
***GW4EVX**	**28**	**55,338**	**165**	**138**
OCEANIA				
Australia				
VK4CT	**A**	**5,147,126**	**1882**	**733**
			(OP: VK4EMM)	
VK8TDX	"	1,044,120	795	440
VK3TZ	"	427,869	454	299
VK4GH	"	290,615	368	263
VK3AVV	"	142,880	253	188
VK8AA	"	48,190	149	122
			(OP: VK2CZ)	
VK2BCQ	"	25,872	99	77
VK2TTP	"	6,068	41	37
VK2PN	"	5,060	48	44
VK7GN	**28**	**391,876**	**437**	**313**
VK8AS	**21**	**387,504**	**518**	**276**
VK3GK	"	96,120	200	178
VK7ZX	**7**	**4,303,684**	**1249**	**623**
***VK5PAS**	**A**	**414,352**	**455**	**304**
*VK6MAB	"	82,335	190	165
*VK2ERP	"	75,190	181	146
*VK3FM	"	69,000	158	138
*VK2BO	"	38,986	124	101
*VK4BL	"	34,344	127	108
*VK3NRW	"	27,448	106	94
*VK7GM	"	24,780	95	84
*VK4FATT	"	15,276	68	57
*VK6WX	"	3,700	43	37
*VK5UE	14	176	10	8
***VK3VTH**	**7**	**12,288**	**50**	**48**
Brunei Darussalam				
***V85TX**	**14**	**13,940**	**72**	**68**
***V85ZX**	**7**	**64,449**	**145**	**93**
East Malaysia				
9M6YBG	**21**	**223,480**	**421**	**185**
***9W6ZAM**	**28**	**1,632**	**24**	**24**
Guam				
NH2T	**21**	**571,200**	**614**	**320**
			(OP: N2NL)	
***KH2/JO3XGY**	21	27	3	3
***N1BJ/KH2**	14	12	2	2
Hawaii				
WH7M	**A**	**12,799,780**	**3816**	**980**
			(OP: K1YR)	
NH7A	"	9,905,280	3214	924
NH6WZ	"	253,422	360	234
KH6OA	"	19,470	82	66
NH6P	**21**	**4,121,650**	**1935**	**746**
			(OP: KH7Y)	
KH6QJ	**3.7**	**1,938**	**19**	**17**
***KH6CJJ**	**A**	**672,948**	**662**	**324**
*NH6AB	"	203,732	318	212
*KH6SAT	"	8,450	52	50
*AH6KW	"	7,884	64	54
*KH6XL	"	4,800	44	40
*KH7AL	"	782	17	17
***WH7GG**	**14**	**972**	**18**	**18**
Indonesia				
YB4IR	**A**	**2,404,368**	**1233**	**566**
YB3OX	"	387,750	433	275
YC1LA	**21**	**1,173,786**	**831**	**498**
YC1KI	**7**	**304,590**	**290**	**195**
***YB1TJ**	**A**	**1,426,810**	**920**	**545**
*YB6EN	"	385,581	390	301
*YB1LZ	"	274,835	391	263
*YF1AR	"	158,603	262	199
*YB7SKM	"	114,560	248	160
*YB6DE	"	101,352	212	164
*YBØCOU	"	80,511	178	141
*YC1BRS	"	57,130	117	94
*YB7MRK	"	32,865	120	105
*YB1AQD	"	27,573	108	101
*YC6EI	"	21,612	82	76
***YBØNSI**	**28**	**869,440**	**688**	**440**
*YB3IZK	"	199,680	312	240
*YBØAKM	"	194,577	291	237
*YB1UUN	"	40,002	122	113
***YC9CT**	**21**	**90,111**	**231**	**147**
*YF8RIM	"	57,589	164	133
*YBØCOX	"	36,612	124	113
*YC1BTJ	"	8,305	57	55
*YC1DYY	"	8,140	58	55
*YC6EO	"	5,593	51	47
*YC6EFY	"	3,534	41	38
*YC1ELI	"	1,472	26	23
***YB9WZJ**	**14**	**675,540**	**579**	**417**
***YB2DX**	**7**	**303,048**	**275**	**207**
*YC2WBF	"	83,611	154	121
*YE3JT	"	62,480	132	110
*YB1BGI	"	31,242	94	82
*YD1DDB	"	19,825	73	65
*YCØIEM	"	4,929	31	31
*YD1BSL	"	1,600	20	20
*YF1FTK	"	564	13	12
*YD1EGP	"	290	10	10
*YB8EL	"	100	5	5
New Zealand				
ZL/VO1AU	**A**	**5,418,803**	**2168**	**797**
ZL2CC	**7**	**256,494**	**261**	**197**
***ZL3IO**	**A**	**6,182,904**	**2283**	**894**
*ZL2MM	"	33,558	124	94
*ZL3DW	"	10,664	68	62
***ZL1YE**	**28**	**314,464**	**435**	**248**
*ZL2UO	"	108	6	6
***ZL2GQ**	**21**	**39,618**	**163**	**93**
*ZL2K	"	1,820	28	26
			(OP: ZL2KT)	
Palau				
***T88TW**	**21**	**16**	**4**	**4**
Philippines				
4H1T	**A**	**2,695,510**	**1550**	**515**
			(OP: DU1IVT)	
DU1AV	"	756,865	868	257
DU1UGZ	**14**	**162,393**	**268**	**209**
DU9XO	**7**	**494,750**	**447**	**250**
***DV1JM**	**A**	**1,341,072**	**979**	**402**
*DV1UBY	"	35,690	114	83
*DU6/N6SS	"	20,736	80	64
*DU7/KDØJJO	"	3,080	30	28
***DU1LC**	**21**	**406,340**	**640**	**220**
*DU1EG	"	160,050	290	194
*DU4JT	14	374	12	11
***DU7RH**	**3.7**	**130**	**5**	**5**
SOUTH AMERICA				
Argentina				
LT1F	**A**	**16,704,753**	**4334**	**1271**
			(OP: LU1FAM)	
LV5V	"	1,637,025	1012	575
			(OP: LU5VV)	
LT5Y	"	189,306	316	234
			(OP: LU1YU)	
LU9EY	"	112,833	253	199
LU3DAT	"	27,400	118	100
LU1VM	**21**	**493,649**	**578**	**299**
LU7DW	**7**	**1,239**	**22**	**21**
LU6FEC	**3.7**	**78,720**	**135**	**120**
***LU7HW**	**A**	**1,133,719**	**850**	**491**
*LU5FR	"	910,962	758	442
*LW1HR	"	436,050	494	342
*LW4EF	"	157,311	306	231
*LS9D	"	89,178	214	167
*LU5CAB	"	50,939	174	133
*LU7DSI	"	11,098	67	62
*LR1A	"	8,820	67	60
*LW7DUC	"	5,070	47	39
***LW8DQ**	**28**	**3,011,602**	**1433**	**746**
			(OP: LW7DX)	
*LU6FOV	"	2,837,100	1352	735
*LU7EC	"	2,525,888	1383	647
*AY8A	"	1,070,913	791	487
			(OP: LU8ADX)	
*LU8DCF	"	985,150	756	475
*LU9DAG	"	905,513	740	467
*LU3DR	"	779,833	663	433
*LU9DPM	"	284,856	386	286
*LU2ICA	"	170,496	278	222
*LU1EXR	"	147,705	264	215
*LW3DG	"	120,684	255	178
*LU5FF	"	118,110	219	186
*LU8DY	"	116,594	238	194
*LU3YEP	"	111,000	271	200
*LU1DR	"	52,780	163	140
*LU2FDA	"	30,492	129	99
*LO7D	"	16,279	87	73
			(OP: LW1DRH)	
*LU1MPK	"	14,742	83	78
*LW1EUD	"	11,844	82	63
*L73DX	"	5,750	48	46
			(OP: LU7DUE)	
***LU5MT**	**21**	**252,992**	**346**	**268**
***LR1H**	**14**	**665,660**	**603**	**401**
***LU1FM**	**7**	**13,384**	**58**	**56**
Aruba				
P49Y	**A**	**22,182,251**	**5312**	**1261**
			(OP: AE6Y)	
***P4ØW**	**A**	**13,062,600**	**3712**	**1080**
			(OP: W2GD)	
*P43E	"	1,046,560	858	422
Bolivia				
***CP1FF**	**A**	**98,640**	**216**	**180**
Brazil				
PT5T	**A**	**16,578,468**	**4461**	**1236**
			(OP: PP5XX)	
PP1OZ	"	2,759,888	1369	724
PY4RGS	"	2,006,901	1066	663
ZW5V	"	314,600	395	286
			(OP: PY5KA)	
PY1WS	"	276,352	367	254
PY1RY	"	197,760	333	240
PP5AX	"	68,425	186	161
PP5JY	"	65,268	169	148
PY2KP	"	36,822	133	114
PV8ADI	"	35,765	133	115
PV8CQ	"	32,054	117	94
PY3BRA	"	13,246	95	74
PW5G	"	8,874	53	51
			(OP: PP5WG)	
PY9BDA	"	1,419	39	33
PY2LCN	"	1,196	30	26
PY1SGT	"	323	20	19
PX5E	**28**	**17,785,368**	**4512**	**1358**
			(OP: PP5JR)	
PY5QW	"	4,643,936	1845	869
ZY5Y	"	3,215,668	1470	766
			(OP: PP5BS)	
PY7ZBK	"	121,220	246	209
PP5RZ	"	24,534	124	87
PU2WCD	"	13,612	89	82
PU2LVA	"	6,300	63	60
PY5KC	"	2,376	38	36
PU2OOT	"	380	21	20
PV8AA	"	3	1	1
PV8DX	"	3	1	1
PR5B	**21**	**11,236,625**	**3202**	**1205**
			(OP: PY2LSM)	
PY2NZ	"	9,184	59	56
ZY2V	**14**	**7,101,512**	**2370**	**1034**
			(OP: PY2LED)	
PS2T	**7**	**1,977,880**	**713**	**502**
			(OP: OH2MM)	
PV8ABC	**3.7**	**294**	**7**	**7**
***PY2NY**	**A**	**3,088,025**	**1438**	**745**
*ZX5ZZ	"	1,160,454	789	527
			(OP: PY5PDC)	
*PY5AS	"	787,314	643	453
*PY1PDF	"	139,152	296	223
*ZW2T	"	115,200	217	192
			(OP: PY2TI)	
*PY1ON	"	92,571	199	177
*PY2TEL	"	62,168	188	152
			(OP: PY2AXH)	
*PV8RF	"	49,950	165	135
*PY2MR	"	48,246	155	129
*PY2DXA	"	48,120	148	120
*PY3IP	"	46,683	151	133
*PY2RDZ	"	43,623	158	131
*PY3AJB	"	43,596	144	126
*PY1NS	"	39,424	148	128
*PR2W	"	30,485	127	91
			(OP: PT2AW)	
*PY3TIO	"	28,350	109	105
*PP7LL	"	24,510	117	95
*PY4DK	"	21,384	98	88
*PY3ZK	"	20,532	107	87
*PY2SRI	"	19,747	101	91
*PV8AZ	"	18,480	98	77
*PY2RFU	"	4,128	47	43
*PY1MT	"	2,730	40	39
*PY1PM	"	1,566	27	27
*PY1XP	"	988	27	26
*PV8DR	"	286	11	11
***PU2LEP**	**28**	**5,134,649**	**1932**	**923**
*PY2MTS	"	2,242,880	1221	652
*PU5YJR	"	1,463,405	957	541
*ZV2C	"	477,256	514	353
			(OP: PY2CX)	
*PY2TDX	"	337,518	405	306
*PU1PYZ	"	335,276	412	316
*PY2SBY	"	322,973	436	301
*PP5JAK	"	182,172	297	228
*PU5BIA	"	154,822	290	199
*PU1MMZ	"	150,570	269	239
*PU2WDX	"	134,480	259	205
*PU2KIV	"	89,595	222	181
*PU3SVA	"	31,635	119	111
*PU2UIB	"	29,945	129	113
*PU1SAT	"	28,304	126	116
*PX3X	"	26,765	120	101
			(OP: PY3DJB)	
*PY2YRC	"	17,640	93	90
*PU2KXM	"	14,514	97	82
*PU1KVA	"	11,920	90	80
*PY2HH	"	11,700	81	78
*PY2VOX	"	10,064	81	68
*PP5CIT	"	3,783	39	39
			(OP: PY5KC)	
*PU5ADX	"	3,626	40	37
*PU2RKP	"	3,555	51	45
*PY1CD	"	2,664	41	37
*PY1WX	"	2,613	40	39
*PS7DX	"	1,104	45	24
*PU2SDX	"	931	20	19
*PU8TLS	"	828	26	23
*PV8RR	"	352	17	16
*PU2LED	"	81	10	9
***PY4RR**	**21**	**4,002**	**47**	**46**
*PY2DJ	"	2,470	39	38
***PY1ZV**	**14**	**1,287,453**	**854**	**543**
*PY1TR	"	22,100	111	100
*PY4WWW	"	3,612	42	42
***PV2P**	**7**	**325,040**	**267**	**239**
			(OP: PY2DY)	
*PY6KY	"	8,643	44	43
*PY2LCD	"	7,406	48	46
*PS8ET	"	162	6	6
Chile				
XR3P	**A**	**1,034,640**	**783**	**479**
			(OP: CE3PG)	
CA3KHZ	"	175,350	305	210
CE3CT	**28**	**8,812,826**	**2991**	**1018**
			(OP: CE4CT)	
CE3EEA	21	2,473,640	1303	**670**
XR3A	"	103,463	239	157
***XQ7UP**	**A**	**2,216,885**	**1238**	**645**
*CE3WYZ	"	13,206	75	71
***CA3SOC**	**28**	**1,056,088**	**795**	**484**
*3G4W	"	96,425	227	175
			(OP: XQ4CW)	
*CE3TMM	"	340	17	17
***XR1I**	**14**	**445,284**	**480**	**342**
			(OP: CE1KR)	
Colombia				
HK1R	**A**	**1,976,744**	**1141**	**616**
HK1T	**7**	**14,512,230**	**2344**	**1062**
***5K3R**	**21**	**2,819,245**	**1389**	**715**
			(OP: HK3R)	
*HK3TK	"	68,908	178	161
***5K3W**	**14**	**3,564**	**36**	**36**
***HK6P**	**3.7**	**164,104**	**203**	**146**
Curacao				
PJ2T	**28**	**4,853,292**	**2171**	**788**
			(OP: AC8AP)	
***PJ2OF**	**A**	**5,192**	**45**	**44**
Ecuador				
***HC2/KF6ZWD**	**A**	**3,477,285**	**1630**	**735**
***HC1JQ**	**14**	**396,490**	**442**	**310**
Paraguay				
ZP5DBC	**28**	**991,028**	**811**	**436**
ZP5MAL	**21**	**507,276**	**534**	**366**
***ZP9MCE**	**28**	**583,920**	**585**	**360**
Suriname				
PZ5P	**A**	**15,667,080**	**4143**	**1210**
			(OP: RX3APM)	
Trinidad & Tobago				
9Y4W	**14**	**9,177,904**	**2869**	**1096**
***9Z4DZ**	**21**	**41,704**	**138**	**104**
Uruguay				
CW5W	**A**	**15,933,607**	**4213**	**1207**
			(OP: CX6VM)	
CX2DK	**21**	**3,551,292**	**1504**	**828**
***CX5TR**	**A**	**223,602**	**318**	**249**
*CX3TQ	"	135,596	275	218
***CX1DP**	**28**	**1,510,083**	**999**	**543**

*CX9AU	"	823,832	692	424
*CX2TG	"	635,375	598	391

Venezuela

YV6BXN	7	259,584	229	208
4M5W	3.7	491,301	360	237
			(OP: YV5MSG)	
*YY5EPM	A	88,340	150	140
*YV5COR	"	30,744	95	84
			(OP: YY5COR)	
*YV4MP	"	12,261	68	67
*YV5NWG	"	8,321	57	53
*YV5JGO	"	943	23	23
*YY5KG	21	2,177,872	1222	632
*4M1F	"	978,040	711	490
			(OP: YV1JGT)	
*YY5OSW	"	9,405	69	57
*YY5NEA	14	283,968	369	272
*YV5OIE	"	85,068	202	153

ASSISTED
NORTH AMERICA

United States

KI1G	A	11,971,296	3273	1266
W1KQ	"	1,608,920	1048	584
NM1JY	"	1,132,168	1027	548
			(OP: K1RX)	
KB1OWT	"	721,594	619	421
K1SM	"	590,920	543	374
W1AN	"	464,079	451	343
K1AR	"	432,327	502	357
KT1B	"	419,300	448	323
W1PL	"	413,049	504	357
K1JB	"	401,120	518	368
WK1J	"	188,135	284	197
W1EBI	"	44,400	117	111
W1BYH	"	30,680	110	104
K1PH	"	26,400	96	88
KV1J	14	98,697	209	197
*KA2KON/1	A	1,563,136	923	568
*NR1I	"	1,223,344	881	487
			(OP: W1NT)	
*N1API	"	875,996	736	463
*AD1L	"	339,434	408	314
*W3SM/1	"	286,425	407	285
*K1KXN	"	278,100	373	270
*K1VOI	"	35,482	125	113
*K1DEC	"	21,845	94	85
*KB1WKB	"	15,987	76	73
*KB1ST	"	14,819	79	73
*WA1N	"	12,716	72	68
*WA1ZYX	"	7,700	58	55
*NF1O	"	840	15	14
*NE1F	"	826	14	14
*N1VVV	28	2,304	33	32
*N1QD	21	8,232	56	56
*KG1E	14	1,036,630	795	590
W2YC	A	2,297,622	1167	673
AB2E	"	1,674,711	1251	587
N2SQW	"	1,451,738	987	547
WT4Q/2	"	1,054,000	784	500
N2MUN	"	643,500	606	396
WG2L	"	504,640	509	332
W2CCW	"	194,922	305	234
N1IBM/2	"	131,937	214	199
W1GD/2	"	39,962	111	106
WA3AFS/2	"	30,080	94	94
K2CYE	"	8,840	55	52
K2SSS	28	178,365	353	235
W2RR	"	98,580	254	186
			(OP: WA2AOG)	
N2YBB	21	408,478	416	358
K2RET	14	262,854	359	306
*K2DSL	A	658,140	652	420
*WA2MCR	"	562,320	603	360
*KS2G	"	449,242	481	362
*WA2TML	"	265,136	340	292
*K9CHP/2	"	57,510	153	135
*N2CQ	"	16,999	95	89
*KB2NGK	21	14,162	75	73
*NY6DX/2	7	632,818	727	397
*W2MF	1.8	54,730	197	130
AA3B	A	3,736,512	1546	832
N3RR	"	2,793,604	1338	734
N3RD	"	2,677,170	1260	699
K3WW	"	1,883,772	1013	639
K3MD	"	1,732,722	1168	634
W3KL	"	1,371,312	893	534
W3FV	"	1,000,728	731	492
WA3F	"	945,120	746	440
NN3Q	"	518,910	489	353
N3MX	"	482,515	501	341
NW3H	"	324,555	405	281
KD3TB	"	300,160	358	280
NN3RP	"	261,290	367	265
AA3K	"	227,853	291	261
NB3R	"	180,999	282	221
N3WD	"	148,674	251	213
K3IT	"	12,896	73	62
K3QX	"	4,032	44	36
K3YDX	"	2,079	27	27
K3YG	"	407	11	11
AK3S	21	155,178	255	233
W3FW	14	1,479,184	1067	658
*W3LL	A	1,931,130	1047	645
*N3ALN	"	411,156	519	324
*ND3D	"	203,984	342	244
*K3FS	"	141,858	264	222
*AB3IC	"	102,420	231	180
*W3OD	"	62,634	151	143
*KN3A	"	40,446	132	126
*WB4QBF/3	"	21,266	108	98
*KC8RHC/3	"	18,860	93	82
*W4EE/3	"	11,368	56	56
*N3ZA	21	228,222	303	279
*N3GJ	14	7,599	52	51
N4WW	A	6,512,198	2188	1078
NF4A	"	4,729,318	2148	947
N4RV	"	2,860,188	1405	723
KG4W	"	2,229,255	1211	735
AI4DX	"	1,525,992	970	536
			(OP: W4NF)	
WJ2O/4	"	1,384,932	858	524
KD2JA/4	"	1,256,080	807	560
AA4DD	"	946,803	740	479
N4DJ	"	803,187	673	427
N4NX	"	677,474	535	446
W4AS	"	610,414	497	413
K4OV	"	597,144	601	417
N4DWK	"	469,476	439	324
K4GAA	"	405,130	448	319
N4PB	"	390,340	431	290
ND4V	"	317,768	397	314
N7EO/4	"	234,434	319	251
NS1S/4	"	192,479	258	217
			(OP: K1ZZI)	
KD4RF	"	167,320	288	235
			(OP: W9EQ)	
AF4AI	"	139,605	271	205
N4NM	"	127,779	244	191
N3UA/4	"	126,730	239	190
K4EDI	"	121,520	231	196
KC4HW	"	100,182	233	177
N4ZZ	"	98,736	298	187
KZ1X/4	"	68,480	161	160
K4SWE	"	63,273	161	131
KR4F	"	27,324	94	92
N4GG	"	22,995	91	73
K0LUZ/4	"	10,638	67	54
N4DXI	"	9,020	59	55
KI4VCT	28	12,784	73	68
K4XZ	"	372	12	12
NS1L/4	21	5,364,639	2265	1071
			(OP: W4SVO)	
K4KZZ	7	299,184	313	271
WD4EFZ	"	76,160	147	136
KD4RH	"	46,842	126	111
*KT4ZB	A	1,949,935	1225	655
*W4DFB	"	529,968	558	362
*N4HXI	"	304,114	400	302
*K9ES/4	"	301,476	385	259
*AK4QU	"	253,328	381	284
*AB4SF	"	246,980	338	265
*K3IE/4	"	139,986	278	231
*N4BFR	"	99,575	238	175
*N4UEZ	"	90,951	214	183
*N4ARO	"	69,255	167	135
*K9AIH/4	"	41,800	135	110
*VE3JDF/W4	"	30,690	128	110
*KB4YPK	"	29,585	115	97
*W4WNT	"	25,988	98	89
*KC4YBO	"	24,552	108	88
*K1ZW/4	"	14,040	73	72
*KC2NYU/4	"	12,090	66	65
*N4TOL	"	9,796	65	62
*K4ADR	"	6,072	51	46
*NB4F	"	4,797	42	39
*KI4HHK	"	4,223	42	41
*N1HO/4	"	595	17	17
*K4CWW	28	226,566	473	246
*K4MOA	21	6,909	49	49
K5QXR	A	2,225,080	1368	715
K5MV	"	1,667,900	1222	650
AD5VJ	"	1,064,877	991	529
W3TZ/5	"	778,707	678	453
W5HP	"	64,960	162	145
N5MOA	"	51,737	142	133
KG5VK	"	49,046	146	137
WØVX/5	"	8,058	53	51
AA5AU	"	384	12	12
N5MT	28	24,108	101	84
NQ5K	21	1,245,184	1080	608
			(OP: W5ASP)	
WA5ZUP	"	97,812	251	198
*NE5LL	A	369,098	504	358
			(OP: N1CC)	
*KE5LQ	"	231,084	335	262
*AB5XZ	"	63,196	207	148
*AE5NO	"	990	22	22
*WJ5DX	28	113,685	264	195
			(OP: W5AJ)	
*KE5FXE	"	109,552	245	167
*WF5E	7	84,812	231	182
			(OP: W5AJ)	
N6QQ	A	4,046,868	1764	909
N6JV	"	2,768,304	1685	749
K6MM	"	1,538,400	1144	641
NY6I	"	1,399,918	976	598
			(OP: K6RIM)	
WX6ZZ	"	947,023	837	539
N6WS	"	919,524	666	444
W1RH/6	"	784,356	899	489
K6AAX	"	655,578	811	387
KI6QDH	"	437,510	541	335
W6GJB	"	411,312	472	328
K6LRN	"	305,522	401	314
N6VH	"	258,995	398	277
WB6JJJ	"	217,128	347	249
WM6DX	"	137,795	247	217
			(OP: W6DPD)	
W6KC	"	123,906	264	193
W6GMP	"	110,656	220	182
W6SZN	"	31,625	134	115
W6PK	"	23,852	98	89
KZ5OM/6	"	19,458	95	94
			(OP: K6III)	
N6ER	"	18,240	78	76
W4EF/6	"	10,540	66	62
KI6KVW	"	9,453	72	69
NO6T	"	7,467	64	57
			(OP: N6NC)	
AI6Z	"	6,240	54	52
WB6CZG	"	3,502	40	34
K6III	28	1,675	25	25
N2NS/6	21	81,356	189	172
NE6I	"	2,233	29	29
*WV6E	A	271,656	380	294
*K6AAB	"	223,780	395	268
*N6DZR	"	190,311	305	237
*K6MMU	"	129,162	268	206
*K6FI	"	86,025	217	155
*K6DSW	"	56,280	189	140
*N6ORB	"	50,540	175	140
*N6S	"	990	23	22
*KD6WKY	"	12	2	2
*WS6T	28	3	1	1
*AG6AN	21	9,387	63	63
KW7XX	A	3,866,447	2182	767
W6AEA/7	"	2,175,992	1294	686
W7PP	"	1,184,226	866	548
KK7YL	"	1,175,706	1007	558
			(OP: K7FA)	
KY7M	"	1,157,580	860	590
N3RC/7	"	1,096,984	1033	532
AD7KG	"	488,754	564	378
K7LV	"	468,578	514	361
K7VI	"	445,486	517	353
KV7DX	"	287,546	566	322
			(OP: AA7V)	
KD7DCR	"	266,552	410	286
KB7KYK	"	187,341	377	231
WR7Q	"	180,544	454	248
WW7CA	"	80,990	192	178
K7MKL	"	78,942	197	177
NG7M	"	73,500	275	175
WV7P	"	61,586	222	166
AJ7T	"	60,384	217	148
KO7P	"	35,910	121	105
N7RVD	"	34,428	132	114
NO7T	"	32,552	111	104
W6NF/7	"	29,481	103	93
W7CT	"	24,892	98	98
NO6C/7	"	17,479	84	77
WA1PMA/7	"	16,748	79	79
W6RLL/7	28	29,300	115	100
KM7W	21	2,151,728	1344	724
			(OP: K7ZO)	
K6LL/7	"	2,080,880	1345	740
K7EIQ	7	960	20	20
*WZ7ZR	A	1,558,752	1166	624
*W7SO	"	552,375	590	375
*W7MLG	"	182,721	335	231
*K7JE	"	172,050	276	222
*N7MAL	"	138,229	336	217
*K7TYF	"	118,800	280	198
*AE7NR	"	62,424	213	153
*K7LOP	"	48,580	167	140
*AC7MV	"	40,171	161	139
*K7EM	"	24,970	134	110
*KB7QFE	"	15,770	90	83
*AE7GT	"	14,790	98	87
*K7HPT	"	5,643	74	57
*K7DAC	"	3,552	40	37
*K6TUJ/7	14	5,472	62	57
WA8Y	A	351,080	422	268
K3CO/8	"	168,025	308	235
N8AGU	"	55,640	151	130
KX8O	"	51,724	160	134
NI8G	"	48,438	164	138
			(OP: W8CAR)	
KD8PHF	"	12,352	69	64
N8KOJ	"	1,809	28	27
K8ND	28	12,155	76	55
AA8LL	"	4,144	40	37
N8HP	14	215,460	309	265
*K8BL	A	618,068	485	484
*WD8S	"	392,326	485	374
*KC8CY	"	219,844	337	244
*KC8KNC	"	190,696	343	242
N2BJ/9	A	2,768,781	1431	753
WN9O	"	1,098,100	828	556
			(OP: W9IU)	
W9AV	"	679,770	800	415
N9FN	"	666,037	649	383
WW9R	"	527,795	783	373
N9WKW	"	436,872	499	334
K9EN	"	223,560	344	270
N9YKE	"	150,715	256	215
NS9I	"	148,518	257	222
KØTQ/9	"	114,632	234	184
NF9V	"	22,784	94	89
K8LEE/9	28	22,841	113	91
W9IIX	21	159,536	263	236
*KB9UWU	A	1,082,943	770	513
*N9UA	"	204,678	276	274
*KA9MOM	"	81,696	201	184
*KB9NW	"	79,002	201	171
*W9VQ	"	42,624	144	128
*WA9LEY	"	18,081	84	79
*KB9O	"	17,974	94	86
*W8FB/9	"	7,007	51	49
*K9PG	"	3,939	41	39
*W9ILY	"	108	6	6
*N9TGR	21	1,001,616	787	542
KBØEO	A	2,376,704	1361	704
KØKX	"	1,730,784	945	596
WDØECO	"	641,784	759	408
KMØDX	"	217,701	458	297
			(OP: WØTT)	
WØHBH	"	189,312	293	232
KDØS	"	172,788	262	238
NØQO	"	92,169	215	171
NØUU	"	81,260	189	170
K4UØ	"	41,574	133	123
W6GX/Ø	"	22,407	92	77
KØTZ	"	21,560	97	88
KSØT	"	14,910	75	70
KCØUUT	"	7,124	56	52
N5MU/Ø	"	5,445	45	45
WØCEM	14	123,525	227	225
NØUN	"	6,950	50	50
*NXØI	A	606,616	792	397
*AD1C/Ø	"	483,552	535	368
*KCØDEB	"	402,784	510	328
*WØLSD	"	273,300	364	300
*WGØM	"	78,672	205	176
*KFØIQ	21	4,797	41	41

Alaska

WL7E	A	5,642,300	2284	850
AL9A	"	2,509,800	1399	712

Canada

VE9HF	A	8,789,700	2639	1059
*VE1BVD	A	657,030	574	363
*VO1DJT	"	272,640	357	284
*VE9ML	7	255,387	234	213
VE2FXL	A	243	9	9
*VE2EBK	A	756,040	631	410
*VC2W	"	693,440	533	394
			(OP: VA2WDQ)	
VE3MV	A	553,104	550	334
VA3DX	"	327,480	333	274
VE3CX	21	3,325,688	1592	796
VA3YP	14	1,689,035	1119	641
*VE3JSQ	A	59,362	160	134
*VE3TL	14	20,740	85	85
*VY2MGY/3	7	685,640	637	281
			(OP: VE3MGY)	
*VE6FI	21	227,106	353	279
VE7XF	A	1,373,582	898	574
VE7AX	"	133,551	233	213
VA7FC	"	115,455	244	179
VE7TG	21	32,330	116	105
VA7OM	14	843,776	687	512
*VA7BEC	A	1,073,655	846	495
*VA7HZ	14	192	8	8
VY1EI	21	917,889	1005	401

Mexico

XE1GZU	A	97,200	193	162
XE1KK	21	729,790	684	437
*XE3N	A	1,116,900	967	450
*XE2RV	28	12,220	87	65

Puerto Rico

*NP4G	14	497,377	634	353

St. Kitts & Nevis

V47JA	A	638,469	579	351

AFRICA

Canary Islands

*EA8CNB	A	1,983,296	1120	608
*EC8AFM	28	22,714	94	82
*ED8D	21	935,520	659	480
			(OP: EA8MT)	

Madeira Islands

CT3HF	28	1,351,396	895	524

Morocco

*CN8WW	A	72,884	173	137

South Africa

ZS1LS	A	104,104	202	182

ASIA

Asiatic Russia

RC9O	A	17,536,244	3915	1243
RW9OA	"	3,172,124	1504	718
RA8T	"	2,565,615	1234	669
			(OP: RA9SPF)	
RX9CAZ	"	1,490,940	881	540
RM9RZ	"	1,456,768	885	599
RG8K	"	482,300	487	371
RK9KWI	"	125,048	250	203
RO9O	"	68,328	170	146
R9SA	"	51,480	154	132
RN9CM	"	37,080	136	103
R9UAG	28	132,300	245	196
RT9J	"	12,992	75	64
RA9JP	21	2,533,824	1335	747
R9DA	"	410,742	451	342
RT8O	"	238,944	333	262
RK9DM	14	1,295,720	807	580
UA9OC	"	279,000	352	310
RW9TP	"	236,300	311	278
RK8I	"	197,208	291	249
UA9YF	"	63,792	161	144
*RV9UP	A	4,626,720	1804	840
*UA9AL	"	2,556,440	1283	632
*RK9JE	"	1,026,500	767	500
*RA9DZ	"	635,040	596	420
*RV9AM	"	556,686	484	338
*RK9DC	"	458,808	421	409
*RW9C	"	311,505	399	285
*RZ9CI	"	233,282	320	266
*RA9C	"	193,250	280	250
*RG8U	"	58,000	156	145
*UA9AGX	"	36,064	129	112
*RV9CX	"	28,785	112	101
*UI8W	"	26,132	107	94
			(OP: RW9WW)	
*RU9AZ	"	19,092	89	86
*UA9CSA	"	13,978	66	58
*RM8W	"	6,466	57	53
*RA9MX	28	34,578	118	113
*R9MC	21	925,688	696	502
*UB9UAK	"	3,325	37	35
RUØFM	A	6,087,732	2300	959
UAØSR	"	2,913,801	1580	759
RAØFU	"	1,603,080	1232	549
RAØACM	"	450,892	507	338
RWØBG	"	51,168	135	123
RØQA	"	34,800	125	120
RXØAO	"	19,264	91	86
RXØAE	28	833,316	724	428
UBØA	"	405,854	459	307
RMØW	"	309,720	413	290
RKØAB	14	214,797	320	253
UAØQBR	"	89,910	195	162
*UAØWW	A	565,547	562	367
*RAØANO	"	1,449	23	23
*UAØIT	"	1,320	22	22
*UAØWY	21	831,833	696	499

Asiatic Turkey

*TA5CV	A	48,081	115	93
*TA3ATA	21	216	9	9

Cambodia

*XU7ACY	A	119,068	306	206

China

BD5RV	A	2,556,469	1277	683
BD4CQ	"	410,670	584	338
BD4KYA	"	202,300	505	238
BG9BTH	28	256	19	16
BD4TS	21	24,100	108	100
*BG4ACE	A	477,666	699	357
*BD3CB	"	309,618	472	309
*BG5LU	"	240,264	446	282
*BA4SD	"	172,653	305	233
*BD7MTJ	"	28,512	125	99
*BG4KLA	"	17,892	92	84
*BD9BKC	"	2,754	36	34
*BD5FFK	"	1,464	26	24
*BH3OTC	"	1,372	31	28
*BH1JGA	"	510	18	17
*BG9BJZ	"	105	7	7
*BH1KZQ	"	35	8	7
*BD6AHU	7	6,525	59	45

Cyprus

H22H	A	13,617,600	3590	1200
			(OP: 5B4MF)	
P3J	"	1,559,920	1083	496
			(OP: 5B4AHJ)	
5B4KH	21	5,336,788	2087	907

Georgia

4L5O	7	5,963,804	1447	737

Hong Kong

VR2XLN	21	230,324	487	284

India

*VU3DJQ	A	444,204	455	324
*VU3TMO	"	17,952	96	88
*VU3LMS	"	819	21	21

Israel

4XØA	28	2,609,750	1503	650
			(OP: 4X1VF)	
4X9A	21	3,505,614	1651	798
			(OP: 4Z4OO)	
*4Z5W	A	418,500	460	310

Japan

JQ1BVI	A	3,547,021	1652	761
JE1LFX	"	452,920	480	335
7L2OHM	"	159,402	263	186
JA1WPX	"	153,786	251	213
JH1OVY	"	11,900	71	70
JH1ACA	21	334,150	396	326
*JH1EAQ	A	1,061,548	781	466
*JA1BJI	"	692,661	655	373
*JM1LRQ	"	454,346	513	367
*JH1DGO	"	360,114	396	282
*JA1XRH	"	131,008	233	184
*JA1MZM	"	39,183	137	111
*JA1BIV	"	30,700	144	100
*JA1KEB	"	1,584	24	22
*JA1IST	"	1,302	24	21
JG2REJ	A	234,260	360	265
JA2DLM	28	1,392	24	24
JH2FXK	21	122,012	228	188
JF2IWL	7	37,665	112	93
*8J2NDP/2	A	130,900	304	170
			(OP: JK2VOC)	
*JF2OZH	"	50,570	147	130
*JE2HXL	28	2,046	32	31
JO3DDD	A	2,185,000	1220	625
JS3CTQ	"	689,073	634	399
JN3SAC	"	119,930	227	179
*JR3BOT	A	70,641	188	141
*JL3RDC	"	32,344	137	104
*JA3PYC	"	29,973	110	103
JH4UTP	A	3,385,975	1538	775
JO4CFV	"	366,585	433	289
JO4CTB	"	321,468	439	267
JM4WUZ	21	593,332	560	422
JA6BZI	A	1,479,289	900	527
*JA6DIJ	A	492,102	520	351
*JH6WHN	28	9,747	66	57
JA7ZP	A	324,786	401	266
*JA7KQC	28	47,816	154	139
JR9GMS	A	24,288	100	92
JAØFVU	A	212,750	316	230
JHØEQN	28	137,340	273	210
JRØBUL	"	4,922	51	46
*JAØBJY	A	178,245	303	233
*JAØVTK	21	8,436	72	57

Kazakhstan

UN1L	A	7,478,818	2405	989
UN2G	"	400,325	464	335
UN4PG	28	69,275	172	163
UP5P	14	1,207,524	775	564
			(OP: UN7PL)	
UN2E	"	1,153,040	745	560
UN7BEW	"	3,589	40	37
*UN7MMM	A	2,947,204	1467	722
*UN6T	"	7,772	61	58
*UN9GD	28	22,410	99	83

Qatar

A71EM	A	6,281,652	2377	871

Republic of Korea

DS5DNO	A	46,767	154	131
*DS2NMJ	A	62,848	189	128
*DS5TOS	7	110,522	242	146

Thailand

HSØZJU	A	2,914,120	1452	740
HSØZCW	"	1,755,840	1135	590

United Arab Emirates

A61BK	28	498,326	500	386
A61K	3.7	452,473	330	259
*A65CA	A	64,904	167	133
			(OP: RV6AJJ)	

Vietnam

XV1X	28	957,190	799	481

EUROPE

Austria

OE6M/DF	A	1,795,682	1223	658
OE6HLF	"	778,092	759	471
OE5CSP	"	36,478	127	122
*OE5JSL	A	308,691	394	309
*OE2E	"	208,616	351	293
			(OP: OE2GEN)	
*OE4VMB	"	30,012	145	123

Belarus

EW2A	A	3,889,458	1985	906
EU1AZ	"	3,149,664	1708	872
EV1R	"	3,141,861	1790	843
EW7BR	"	1,245,825	1006	565
EW8OM	"	10,292	66	62
EW1BA	"	5,548	41	38
EW8KY	14	494,553	750	467
EW6GF	"	438,561	732	439
EU3AR	1.8	328,308	477	327
*EW5W	A	1,482,848	1142	596
			(OP: EW1IP)	
*EU3AA	"	97,776	257	194
*EU1EU	"	73,117	241	187
*EU4AA	21	40,950	149	130
*EW1FR	1.8	364	15	14

Belgium

OQ5M	A	4,205,362	1929	917
			(OP: ON5ZO)	
OS8A	"	3,485,580	1702	860

OQ4U	21	4,685,949	2122	879
OQ4B	"	576,400	620	440
			(OP: ON4BHQ)	
OR5N	3.7	130,804	277	212
			(OP: ON1CB)	
***OP4A**	A	948,170	771	530
*OT1S	"	694,166	710	454
			(OP: ON5RZ)	
*ON4VDV	"	524,728	550	428
*ON6LR	"	473,280	467	464
*OO7W	"	377,055	573	399

Bosnia-Herzegovina

E73ESP	3.7	1,094,100	970	521
			(OP: E72SIE)	
***E77R**	A	12,544	73	64
***E74AA**	21	240,396	406	268
***E74A**	14	27,560	150	130
***E7CW**	1.8	320,458	479	326
			(OP: E74WN)	
*E72MM	"	6,307	56	53

Bulgaria

LZ7S	A	5,569,950	2319	1046
			(OP: LZ2HM)	
LZ2DF	"	4,606,848	2040	1032
LZ0M	"	598,372	726	454
			(OP: LZ2SX)	
LZ3FN	"	180,630	287	223
LZ1QZ	"	11,988	92	81
LZ3A	28	167,896	285	204
			(OP: LZ3CQ)	
***LZ12FDAY**	A	2,213,099	1444	773
			(OP: LZ1UK)	
*LZ2FQ	"	41,480	139	122
***LZ1DQ**	21	89,648	268	208

Corsica

***TK4LS**	28	236,835	392	277

Crete

SV9DJO	28	300,390	531	323
***SV9XCC/9**	A	91,653	308	223

Croatia

9A2Ø6B	A	704,696	694	472
			(OP: 9A5ADH)	
9A2U	28	576,240	611	392
			(OP: 9A3ZA)	
9A5Y	21	4,054,290	1796	894
			(OP: 9A3NM)	
9A2Ø3B	14	2,720,133	1793	871
			(OP: 9A1AA)	
9A2R	3.7	784,665	764	477
***9A2Ø2GA**	A	456,252	615	394
			(OP: 9A2GA)	
*9A6GWF	"	32,330	128	122
*9A4WY	"	1,500	24	20
***9A3TY**	28	75,047	179	151
***9A3TU**	21	58,520	176	152
***9A2Ø5ST**	14	200,592	423	336
***9A1JSB**	3.7	527,050	582	415
			(OP: 9A7ZZ)	

Czech Republic

OK1NI	A	1,950,312	1138	728
OK1KT	"	593,400	576	430
OK3C	"	422,095	483	355
			(OP: OK2ZC)	
OK6DJ	"	82,164	200	167
OK1MSP	"	32,980	110	97
OK4PA	21	2,395,470	1317	770
OK1IC	"	758,961	710	441
OK7MT	"	125,209	254	217
OL9Z	14	5,014,488	2383	1032
OK1UG	7	1,742,959	1148	629
***OK6Y**	A	1,880,856	1180	692
			(OP: OK2PTZ)	
*OK1AY	"	456,960	579	384
*OK1JOC	"	362,496	511	354
*OK5OK	"	128,235	327	249
*OK2BEN	"	65,783	195	157
*OK2MA	"	9,063	58	57
***OL7Y**	28	8,848	56	56
***OK6RA**	14	371,840	629	415

Denmark

OZ1IKY	A	931,602	763	574
OZ2PBS	"	381,060	492	348
OZ1ADL	21	1,204,294	935	509
***OZ4RT**	A	1,449	24	21

Dodecanese

SV5DKL	A	4,178,160	2123	1008
SX5P	21	2,447,600	1929	844
			(OP: SV5FRD)	

England

GØVXE	A	1,861,880	1328	712
MØRNR	"	129,285	255	221
G6T	"	125,100	264	225
			(OP: G4MKP)	
G6NHU	"	111,360	244	240
GØRPM	"	34,020	126	108
G8DYT	28	150,234	301	219
***M1JJK**	A	159,993	340	261
*G4WGE	"	101,640	276	210
*G1PIR	"	98,568	260	222
*G4JFS	"	588	14	14
*G7GGI	"	65	5	5
***G3VAO**	14	192,060	394	330
***2E1FVS**	7	419,692	465	364
*MØVWK	"	21,902	100	94

Estonia

ES2TI	A	1,444,025	1110	649
ES5MG	"	950,250	829	525
ES2MC	28	405,074	523	337
ES4RD	14	662,184	877	541

European Russia

RD1A	A	162,324	319	243
RO1B	"	129,030	308	253
R1DX	14	259,038	531	369
RO1A	"	32	8	8
			(OP: UB1ACM)	
***RA1AFR**	A	221,862	353	309
*RA1QD	"	112,808	271	236
RN3DMU	A	3,146,094	2003	861
RU5A	"	1,268,028	1002	597
RT2T	"	1,054,647	1046	603
			(OP: RA3TT)	
UA3AGW	"	730,422	677	462
RA5A	"	534,933	584	441
RN3BO	"	517,409	622	421
RZ3EC	"	135,915	249	221
RL2A	"	72,540	231	186
RA3PCI	"	45,087	149	133
R3MS	"	42,534	151	139
RA3DNC	"	17,202	98	94
RT3M	"	5,945	51	41
RN3F	28	605,319	705	429
			(OP: RK3FT)	
RM5P	21	20,402	107	101
RJ3FF	14	4,334,240	2294	1030
RY3D	"	2,187,516	1580	866
RQ3R	"	143,616	325	264
			(OP: RN3RQ)	
R3KM	7	1,600,225	991	605
***RO3DX**	A	1,075,140	937	594
*UA3RF	"	486,390	745	465
*RA3RBL	"	298,582	476	337
*RU3DM	"	200,668	339	227
*RX3VF	"	183,744	363	288
*RN3FT	"	70,455	218	183
*RA3FD	"	69,184	220	184
*RL3QCQ	"	52,744	189	152
*RL3DZ	"	49,419	181	153
*RA3VE	"	32,387	160	139
*RZ3AUL	"	27,234	115	102
*R3FF	"	22,692	104	93
*RU3GF	"	14,212	73	68
*UA3XAC	"	12,900	85	75
*RA3QJ	"	11,016	73	54
*R5AJ	"	7,473	58	53
*R3AT	"	3,822	43	42
***UA3RC**	28	265,221	494	297
***R2SA**	21	119,556	285	243
***RX3DBG**	14	182,590	371	310
*RN3DKQ	"	5,940	47	44
***RU3KO**	1.8	3,698	48	43
UA4FEN	A	4,097,236	2195	988
UI4I	"	1,974,748	1309	766
RA4LW	"	1,287,954	1001	621
RW4NN	"	407,862	515	378
UA4LCH	"	124,218	248	206
RW4WZ	"	32,760	130	117
RA4WC	28	319,923	560	369
UA4CC	"	101,074	238	194
UA4HOX	21	1,894,326	1425	777
RI4PP	"	265,200	437	340
RU4HU	"	101,280	238	211
RN4ACX	"	5,768	57	56
RZ4HC	14	419,078	539	443
RW4W	7	113,575	222	175
***RW4WA**	A	2,349,000	1606	870
*UA4NDX	"	195,871	325	247
*R4RM	"	5,776	40	38
*RA4CEW	"	1,248	24	24
***RM4AM**	28	21,150	100	94
***RM4HPI**	21	306,000	455	375
***RV4AS**	14	4,738	49	46
*RA4LBS	"	2,622	47	46
RN7F	A	5,829,134	2992	1061
RC6U	"	5,592,588	3007	1058
R7LV	"	535,208	538	449
R7FF	"	456,230	527	430
R7HF	"	353,990	594	389
RI6VJ	"	127,008	242	196
RZ6HKM	"	80,618	194	173
UA6AA	"	67,137	182	161
UA6BH	"	59,488	216	176
RC6IM	"	27,160	125	97
UA6IK	"	23,229	110	89
RZ6FA	"	4,025	39	35
RA6XV	7	595,059	593	417
UA6AIW	1.8	35,916	139	123
***RL6M**	A	3,010,144	1995	872
*RN6A	"	206,885	317	257
*RL6LP	"	93,015	227	195
*RA6YJ	"	17,242	84	74
*RN6DR	"	5,406	54	53
***RU4CS/6**	21	73,875	205	197
***RA6GW**	14	357,840	527	426
R9XT	A	530,454	723	419
UA9FGJ	"	484,802	517	446
RC9F	"	79,200	264	198
***RA9FRD**	A	8,556	72	69
***UB8XAB**	14	14,453	104	97

European Turkey

TC1DX	A	55,440	169	144
			(OP: TA1DX)	

Fed. Rep. of Germany

DJ8OG	A	8,423,018	2826	1151
DK2OY	"	6,725,915	2613	1085
DM9K	"	5,597,460	2248	1028
			(OP: DL2OBF)	
DI5JS	"	1,932,645	1235	689
DI7ON	"	1,875,876	1193	701
DK1KC	"	1,635,816	1092	642
DH0GHU	"	1,595,220	1106	660
DK2AT	"	1,125,040	973	560
DF2TT	"	648,566	648	479
DF2UU	"	644,504	622	476
DL9OHA	"	612,968	581	386
DL8ZAW	"	493,680	556	374
DL2OBO	"	490,610	501	355
DL2A	"	456,552	597	408
			(OP: DK1AX)	
DI1NEO	"	427,800	502	372
DI9NGR	"	369,936	453	336
DL1JKK	"	219,114	417	282
DL8OH	"	201,300	304	275
DJ1ER	"	188,325	330	243
DL4JLM	"	184,667	320	259
DL5RCW	"	172,809	365	273
DG9SEH	"	124,644	263	221
DG2NMH	"	122,100	292	220
DL9NDV	"	113,669	241	197
DG2MKV	"	103,752	245	196
DI6EZ	"	97,536	216	192
DI5ASK	"	87,110	206	155
DK6AH	"	81,243	217	177
DI9HD	"	56,516	150	142
DL6AG	"	38,448	126	108
DG1NFS	"	26,676	117	114
DL5ST	"	25,334	120	106
DJ3JD	"	23,296	102	91
DJ8EW	"	14,872	90	88
DF5EM	"	11,076	75	71
DI9GTI	"	6,255	48	45
DH8BQA	28	759,050	728	470
DM6DX	"	198,205	310	245
DF2LH	"	50,526	141	126
DF9ZP	21	4,976,624	2110	976
DG3FK	"	2,322,774	1327	774
DL2AMD	"	23,460	95	92
DA2C	14	3,441,925	1879	925
			(OP: DK3DM)	
DLØWW	"	1,707,192	1174	724
DM5ØUEA	3.7	1,358,934	1146	586
			(OP: DL3BQA)	
***DF2SD**	A	1,987,395	1196	705
*DO1YGL	"	723,900	678	475
*DL5RDP	"	417,340	502	385
*DJ9MH	"	346,850	469	350
*DH6DAO	"	244,398	420	322
*DK4WF	"	209,345	343	281
*DL3LSM	"	203,931	350	273
*DL8MAS	"	193,476	390	276
*DL4GBA	"	187,796	320	266
*DF1HF	"	140,712	280	246
*DF1LX	"	116,790	272	229
*DL7URH	"	103,716	265	201
*DL5JAG	"	103,456	251	212
*DL0NG	"	97,740	220	181
			(OP: DK8NC)	
*DL5GAC	"	96,960	242	192
*DL6MHW	"	94,376	220	188
*DL2YCA	"	84,040	239	191
*DJ2UX	"	67,230	172	162
*DL1SVA	"	63,252	178	159
*DM3PKK	"	58,144	174	158
*DJ3HW	"	56,025	150	135
*DL1TS	"	50,283	174	151
*DL8ZAJ	"	41,340	157	130
*DG8FAY	"	19,780	95	86
*DF6YC	"	6,554	61	58
*DG7RO	"	5,985	58	55
*DG9VH	"	5,280	57	55
*DG2BHB	"	4,590	59	54
*DF9IU	"	4,277	49	47
*DC2CT	"	2,494	29	29
*DL1HWH	"	2,184	44	39
*DL1MX	"	800	26	25
*DH6YMC	"	578	18	17
***DL1DTL**	28	22,932	97	84
*DK3WW	"	8,856	57	54
***DD9WG**	7	59,732	146	137
*DJ3WE	"	6,762	50	49
*DL4FDM	"	4,067	50	49
***DR2K**	3.7	163,226	311	262
			(OP: DL5OCR)	
***DO4DXA**	1.8	252	12	12

Finland

OG73X	A	6,148,554	2605	1059
			(OP: OH8LQ)	
OG4T	"	1,044,110	867	526
			(OP: OH4MFA)	
OH6OS	"	701,040	708	508
OH2XX	"	549,810	627	410
OH2KW	"	423,996	515	397
OH6MW	"	421,580	560	394
OH6DX	"	390,260	496	395
OG8N	"	380,181	476	359
OH6RE	"	314,443	599	383
OH3JR	"	119,068	208	206
OH5DA	"	105,252	230	196
OH2V	"	8,610	78	70
			(OP: OH2LRG)	
OH5BM	28	115,290	256	189
OH1F	21	3,683,488	1751	944
			(OP: OH1NOA)	
OG6N	"	2,915,500	1562	850
OH2KI	14	264	12	12
OH9W	3.7	966,264	899	494
			(OP: OH2FPK)	
***OH3FOG**	A	998,037	904	519
*OH6GDX	"	851,916	857	516
*OH8FKU	"	29,100	111	97
*OH8KA	"	27,144	136	116

France

TM7F	A	7,617,195	2884	1121
			(OP: F6GLH)	
F4FFH	"	2,178,495	1367	815
F1NZC	"	338,100	437	350
F1RHS	"	182,850	317	265
F5JFU	"	94,428	188	183
F4CPF	"	56,700	151	135
F1UVN	28	12,512	68	68
TM1E	21	3,042,960	1673	818
			(OP: F1JRD)	
TM1T	"	2,554,146	1466	783
			(OP: F5TRO)	
F5NBX	"	240,825	392	247
TM4Q	14	15,049	102	101
***TM5FFT**	A	662,640	667	502
			(OP: F4FFZ)	
*F4GDI	"	443,820	551	390
*F8CRS	"	24,605	104	95
*F6DZD	"	20,856	100	88
*F4FRF	"	3,325	35	35
***F4FEP**	28	133	7	7

Greece

SV1JGX	A	1,465,632	1220	672
SV8RX	"	185,400	293	206
SV2FLQ	"	18,146	91	86
J42T	7	303,222	379	291
			(OP: SV2DCD)	
***SV1CQN**	28	12,218	96	82
***SV1NK**	21	68,310	237	198

Hungary

HA8JV	A	9,654,390	3217	1215
HA3HZ	"	405,530	507	379
HA2NA	"	90,200	262	205
HA8LLK	"	30,015	131	115
HA5JI	28	373,584	501	344
HA5OO	"	203,252	311	244
***HA5BSW**	A	1,323,616	994	608
*HG8C	"	145,140	290	236
			(OP: HA8EK)	
*HA5BA	"	29,280	147	120
***HGØR**	28	469,080	504	360
			(OP: HAØNAR)	
*HA1ZH	"	101,304	211	168
***HA4XH**	21	2,442,462	1346	759
*HAØNAR	14	5,824	54	52

Iceland

TF3AO	21	81,039	302	227

Ireland

EI2GLB	A	10,556	54	52
EI2CN	21	4,331,998	2030	883
***EI5GSB**	A	958,938	899	543
*EI/W5GN	"	752,544	747	468
*EI7JZ	"	515,034	604	403
***EI4CF**	7	892,012	733	484

Isle of Man

GDØAMD	A	163,185	347	253

Italy

IW2HAJ	A	9,061,152	3078	1184
IQ2MM	"	6,890,120	2853	1124
			(OP: IK2YCW)	
IK2SND	"	2,157,736	1479	742
IK3SCB	"	870,954	849	534
I7CSB	"	590,444	603	457
IK2TDM	"	244,362	331	278
IZ6KFH	"	209,595	308	267
IK2SAI	"	152,149	304	233
IZ5BRW	"	151,734	265	242
IZ5ASZ	"	148,392	260	229
IZ5NSH	"	143,314	345	262
IR7R	"	135,460	341	260
IZ2DII	"	59,096	183	166
IZ8MXB	"	4,477	41	37
IR4C	28	716,378	680	467
			(OP: IZ4NIC)	
IWØHBY	"	467,060	519	386
IZ4GWE	"	214,935	359	267
IZ2GNQ	"	14,040	78	72
IQ3P	21	2,302,556	1344	751
II4K	"	2,144,704	1328	713
			(OP: IZ4AMS)	
IZ5NFD	"	208,453	334	307
IR1SP	"	6,815	52	47
			(OP: IK1NEG)	
IRØR	14	464,576	595	476
IR5X	"	252,960	475	372
			(OP: IZ5MMB)	
IQ4RA	3.7	1,693,584	1087	619
			(OP: I4AVG)	
IO4C	1.8	688,170	764	435
IZ5MOQ	"	253,968	433	296
***IB1B**	A	2,966,194	1386	847
			(OP: IW1QN)	
*I1EIS	"	708,435	677	455
*IZ3KKE	"	352,253	411	341
*IZ3NYG	"	248,255	361	287
*IZ2QGH	"	172,546	315	242
*IN3FHE	"	100,320	225	220
*IK2YXB	"	45,195	132	115
*IW2MYG	"	28,203	139	119
*IZ5RJS	"	27,846	112	102
*IZ6CUS	"	23,328	115	108
*IZ4AFW	"	17,064	82	79
*IK4VET	"	16,605	90	81
*IV3XZG	"	7,353	57	57
*IK4NGP	"	2,442	34	33
*IZ8FTW	"	1,280	22	20
*IW7ECJ	"	363	13	11
***IØUZF**	28	281,000	398	281
*IZ5GML	"	236,280	339	264
*IW3IFJ	"	160,094	279	209
*IZ0LHI	"	12	2	2
***IR8M**	21	650,886	710	498
			(OP: IZØEYP)	
*IZ1JLN	"	166,320	298	270
*IZ3TFL	"	372	12	12
***IZ8EFD**	14	219,240	498	380
*II7U	"	57,195	239	205
*IV3CTS	"	25,452	126	126
*IZ8PPH	"	15,435	121	105

Kaliningrad

***UA2FT**	7	128,554	223	199

Latvia

YL4U	A	6,637,947	2862	1097
			(OP: YL1ZF)	
YL7X	"	826,728	777	518
			(OP: YL2LY)	
YL2KO	"	31,790	128	110
YL9T	28	67,248	180	144
			(OP: YL2TW)	
YL2KF	7	209,880	319	264
YL6W	3.7	852,867	748	491
***YL2TB**	A	52,480	173	160
***YL2PP**	28	13,467	71	67
***YL3AGV**	21	318,763	453	361

Liechtenstein

***HBØWR**	A	56,416	207	172

Lithuania

LY3CY	A	174,754	343	262
LY5R	"	138,600	243	200
LY3BY	"	30,797	111	103
LY5E	21	5,203,000	2195	946
			(OP: LY2IJ)	
LY7M	1.8	376,957	519	343
***LY2SA**	A	1,102,900	967	538
*LY2CO	"	704,160	794	489
*LY2RJ	"	96,307	235	193
*LY4OO	"	12,337	74	73
***LY7Z**	3.7	521,968	596	404

Luxembourg

LX1NO	A	76,736	200	176

Macedonia

***Z36N**	1.8	205,905	365	265

Moldova

***ER3ZZ**	A	92,781	223	183
*ER3DX	"	29,472	107	96

Netherlands

PA3AAV	A	99,072	232	192
PA3FGA	"	82,703	242	191
PA3GEQ	14	756	28	27
PAØCWN	7	171,584	245	224
***PD9X**	A	1,004,792	976	568
*PAØMIR	"	632,835	648	441
*PE1FTV	"	587,292	713	436
*PD7BZ	"	404,296	522	388
*PA4PS	"	242,408	444	314
*PE4BAS	"	232,724	389	292
*PG2AA	"	187,040	357	280
*PA3GVI	"	12,800	97	80
*PD5T	"	10,032	82	76
*PE1NBD	"	3,168	39	36

Northern Ireland

***GIØRQK**	A	736,223	726	479
*GI4AAM	"	135,904	329	248

Norway

LN5O	A	4,787,848	2343	988
			(OP: LA6FJA)	
LN3C	"	1,192,620	1139	572
			(OP: LA9DFA)	
LA7GNA	"	1,191,344	945	616
*LA9TY	A	387,933	495	377

Poland

SP9LJD	A	8,058,432	2780	1128
HF8N	"	253,500	379	250
SP1GZF	"	209,328	336	267
SP1MWN	"	38,804	125	109
SP1APZ	"	816	17	17
3Z6V	28	211,440	330	240
SQ9HZM	"	207,849	329	237
3Z2X	21	3,539,571	1754	861
			(OP: SP2DWG)	
SP1RKT	"	806,415	731	555
SO2R	14	7,181,838	2975	1074
			(OP: SP2FAX)	
SP4JTJ	"	27,664	134	133
SN2M	3.7	1,740,188	1225	628
			(OP: SP2XF)	
SQ8JX	"	562,800	638	402
***SP6FJ**	A	145,782	245	234
*SQ8NZB	"	132,153	249	203
*SP8DIP	"	106,506	219	183
*SN1T	"	88,059	249	197
			(OP: SQ1RET)	
*SQ1BHH	"	74,664	188	163
*SQ1EIC	"	71,442	206	189
*SQ8LSB	"	52,480	177	160
			(OP: SQ8JMC)	
*SP6FXY	"	25,721	98	89
*SQ8JMC	"	24,341	117	101
*SQ1K	"	21,669	112	93
*SP2HMN	"	21,060	102	90
*SP9WZA	"	18,810	105	95
*SP7VTQ	"	15,064	80	78
*SQ8GBG	"	9,145	68	59
***SP4Z**	28	14,280	73	70
*SP6IHE	"	5,125	43	41
*SN9Y	"	330	11	11
			(OP: SP9UOP)	
***SP4DZT**	21	511,936	543	421
*SO1D	"	61,936	194	158
			(OP: SP1JPQ)	
*SQ1RMM	"	18,715	115	95
*SQ8KFH	"	5,661	53	51
*SP5FHF	"	544	16	16
***SP3LPG**	14	268,996	476	364
***SO7L**	7	92,394	188	174
			(OP: SP7UWL)	
*SP8LBK	1.8	121,208	282	218

Portugal

CT2IOV	A	806,470	965	562
***CT2IVH**	A	162,908	374	293
*CT2JBG	"	148,685	280	227
*CT1FOQ	"	41,374	146	137
*CT7AEZ	"	189	10	9
***CT5KAO**	28	163,724	325	244

Romania

YP9W	A	11,956,764	3568	1289
			(OP: YO9GZU)	
YO3APJ	"	1,905,057	1140	693
YP6Z	"	576,678	587	431
			(OP: YO6PZZ)	
YO4RIU	"	538,128	622	404
YO4DW	"	293,570	448	310
YO3ZA	"	100,440	227	186
YO8SAI	"	74,655	216	189
YO5PBW	28	67,044	170	148
YP8T	21	2,571,156	1481	756
YO9HP	"	1,918,440	1252	730
YP5A	14	868,700	1102	595
			(OP: YO5AM)	
YO2MHJ	7	9,348	58	57
YO5PBF	3.7	122,388	257	217
YO8MI	"	22,795	105	97
***YO5OHO**	A	821,204	811	478
*YO5LD	"	818,100	860	505
*YO5OBA	"	476,280	567	405
*YO2LXW	"	105,664	278	208
***YO9BXC**	28	40,356	122	114
***YO5OED**	21	47,124	160	132
***YO8SSB**	14	640,920	807	545
*YO4RDW	"	350,244	562	423

Scotland

MMØAMW	A	1,460,250	983	590
GM8SBH	"	499,500	563	444
			(OP: GMØFGI)	
MMØSJH	7	153,102	304	237
***GM4UYZ**	A	3,417	52	51
*MMØIMC	"	2,618	35	34
***MMØSVK**	21	126,232	280	248

Serbia

YT7R	A	2,268,480	1335	680
			(OP: YU7BW)	
YT2AA	"	73,308	183	164
YT5N	"	13,552	99	88
YT7Z	21	4,608,128	2131	896
			(OP: YT5M)	
YU5A	"	4,178,944	1939	896
			(OP: YU1EW)	
YT1R	14	1,640,082	1394	678
			(OP: YU1UN)	
YU7KM	"	127,248	329	264
YT3PL	7	110,386	227	194
YU1ARC	3.7	958,856	831	511
			(OP: YU1YV)	
***YTØZ**	A	2,597,188	1480	737
			(OP: YU1ZZ)	
*YT7AA	"	12,384	77	72
***YT7EE**	21	75,828	221	178
***YT5CT**	14	1,511,433	1438	727
*YT8T	"	1,142,580	1042	685
***YTØA**	7	112,658	192	182

Sicily

II9X	28	1,243,772	973	556
			(OP: IT9SPB)	

IT9XTP	21	1,558,375	1177	685
*IT9AUH	21	192,072	445	318
*IT9IMJ	"	37,008	151	144
*IR9Z	14	10,509	99	93
*IT9JDH	3.7	139,200	260	232
Slovak Republic				
OM7PY	28	9,072	56	54
*OM8DD	A	854,128	806	506
*OM4O	"	444,266	592	382
			(OP: OM3NI)	
*OM4AQP	"	211,002	360	278
*OM0DX	"	60,060	196	165
*OM8LA	21	54,769	157	143
Slovenia				
S51DX	A	321,222	486	341
S51AF	"	316,958	580	361
S57W	"	248,254	369	278
S57S	"	5,280	50	48
S53F	14	5,149,956	2381	1036
S50G	"	2,891,904	1764	886
			(OP: S57AW)	
S51CK	"	1,913,330	1386	730
S53M	"	1,549,863	1210	657
			(OP: S51FB)	
S56X	7	3,454,297	1487	791
*S50XX	A	3,156,849	1707	799
*S52W	"	60,372	198	172
*S55Z	"	31,320	133	120
*S53NW	3.7	243,837	394	297
Spain				
EC1AE	A	84,360	206	190
EA1XT	21	513,166	595	379
EA1EA	3.7	134,829	241	213
ED1Q	1.8	6,625	62	53
			(OP: EA1QA)	
*EF1W	A	804,972	785	518
			(OP: EA1WS)	
*EA1YG	28	380,915	520	355
*EA1GWM	3.7	4,988	44	43
EC2DX	A	9,440,957	3035	1147
*EA2CE	A	116,550	283	225
EB3CW	A	8,096,272	2944	1136
EE3A	"	4,514,610	1977	915
			(OP: EA3ATM)	
EA3XL	"	185,000	317	250
EA3CEC	"	46,648	157	136
EE3R	21	976,773	853	579
			(OP: EA3OR)	
*EA3BO	A	396	12	12
*EA3AKA	3.7	94,500	212	189
ED4A	A	1,516,455	1235	705
			(OP: EA4TV)	
EA4ETW	"	347,014	550	386
EA4AK	14	231,914	390	359
*EA4EUI	A	390,855	501	367
*EA4ZK	"	864	19	16
EA5EV	A	1,072,746	888	549
EA5AX	"	281,430	387	295
ED5J	28	110,290	259	205
			(OP: EA5DM)	
ED5N	3.7	491,720	515	380
*EC5AN	14	5,610	68	66
*EA5HSI	7	345,779	383	329
EA7ZY	28	112,772	300	233
EC7ZK	7	582,400	534	416
EA7EU	3.7	622,566	573	427
*EA7HOJ	A	448	15	16
*ED7C	28	21,736	96	76
			(OP: EA7KJ)	
*EF7W	14	425,898	642	478
			(OP: EC7KW)	
Sweden				
SJ2W	A	6,281,184	2465	1092
			(OP: SM2LIY)	
SI6E	"	2,500,000	1505	800
SM0BSO	"	720,954	780	507
SI2E	"	66,144	185	159
			(OP: SM2EKA)	
SM5CZQ	"	2,754	28	27
SJ6A	28	53,430	147	130
			(OP: SM6JSM)	
8S8C	14	1,889,264	1282	806
			(OP: SM8MPV)	
*SE5S	A	752,640	708	490
*SM6MVE	"	343,285	505	355
*SH0G	"	93,870	245	210
*SE5E	"	78,873	221	183
			(OP: SM5AJV)	
*SM3L	"	286	11	11
			(OP: SA3BPA)	
*SD6N	7	49,392	170	144
			(OP: SM6V)	
Switzerland				
HB8CSA	A	6,404,905	2493	1055
			(OP: HB9DUR)	
*HB9DHG	28	66,792	185	138
Ukraine				
EM2G	A	4,593,493	2374	1069
			(OP: UR7GO)	
UW5IM	"	2,493,517	1558	767
UR5AS	"	2,295,984	1634	744
UT0U	"	1,710,000	1080	720
			(OP: UT5UDX)	
US3IZ	"	531,118	629	413
UT0EO	"	270,522	451	339
UT7NY	"	51,870	138	129
UU2JQ	"	40,230	139	135
UZ5ZV	"	37,674	132	117
UT7QF	28	225,081	344	267
UV9I	21	2,277,986	1754	794
			(OP: UR5IFX)	
UT7U	"	992,993	843	487
			(OP: UT7UV)	
UX1UA	"	668,682	667	406
US1I	14	6,520,784	2950	1208
			(OP: UX2IO)	
EO3Q	"	3,768,498	2143	1026
			(OP: UR3QCW)	
US1MY	"	7,290	85	81
UT8QQ	7	81,954	193	174
UW5ZM	3.7	853,461	743	483
UY3AW	"	81,993	196	181
*UY2IG	A	1,874,698	1458	746
*UT8IM	"	484,960	614	433
*UT8EL	"	466,580	642	410
*UT3RS	"	376,842	525	347
*UT5ERV	"	359,970	560	355
*UX7IB	"	194,180	358	292
*UW7CN	"	163,784	283	236
*UR5XFQ	"	159,960	340	258
*UX8IX	"	138,425	325	245
*UT2IV	"	57,128	172	148
*UT4WA	"	9,990	62	54
*UU8JW	28	5,762	50	43
*UT5LO	21	526,128	595	452
*UR6IJ	"	167,895	310	273
*UT2AB	"	27,336	110	102
*UT7Y	14	724,895	926	565
			(OP: US0YW)	
*UY5ZI	"	858	22	22
*EN1C	7	845,435	708	479
*UR8IDX	3.7	552	13	12
*UR5IFB	1.8	96,114	240	193
Wales				
GW9T	14	6,915,090	2957	1105
			(OP: MW8ZZK)	
*MW8MAU	21	11,455	85	79
OCEANIA				
Australia				
VK8IR	A	5,118,505	1926	817
VK4IU	"	12,462	70	67
VK4QH	7	210,405	252	169
*VK1OO	A	95,509	200	149
East Malaysia				
9M8Z	A	8,261,785	2636	959
			(OP: 9M6DXX)	
Guam				
KG6DX	28	4,406,832	1910	808
Hawaii				
NH7RO	A	4,104	40	38
Indonesia				
*YC2FAJ	A	94,466	203	149
*YB0MWM	"	51,186	139	114
*YB2ECG	"	40,005	138	105
*YC1HLT	"	480	16	16
*YC8HI	21	966	23	21
*YB1AR	3.7	15,386	62	49
New Zealand				
ZL1T	A	150,360	262	210
			(OP: ZL1ANH)	
*ZM3T	14	1,036,074	780	481
			(OP: W3SE)	
Philippines				
*DU7HF	A	92,316	217	147
SOUTH AMERICA				
Argentina				
LU6QI	A	528	11	11
LR2F	28	7,746,093	2668	1009
LU3HS	"	4,503,842	1950	827
LU7ADR	"	2,130	35	30
LW6DG	21	3,352,016	1534	766
LR9D	7	1,296,297	643	369
			(OP: LU9ESD)	
*LU4HW	A	164,502	296	234
*LU7YW	"	75,046	183	157
*LU8EOT	28	4,400,685	1819	855
*LU3JVO	"	24,910	103	94
Aruba				
P41P	A	23,229,884	5365	1303
			(OP: DF7ZS)	
Brazil				
ZZ2T	A	12,663,156	3677	1164
			(OP: PY2MNL)	
PY3DX	"	105,842	214	187
PY3APY	"	98,208	212	186
PY5ZD	"	96,222	221	174
PP6JN	28	1,398,132	933	547
PY1EW	"	1,078,740	819	468
PY2HI	"	540	16	15
PR7AR	21	581,357	560	371
PT2CM	14	4,830,602	1902	887
			(OP: PT2IC)	
PY2KJ	"	72,562	178	146
PY7ZY	"	62,080	167	128
PY1CAS	"	12,141	72	71
PR7AP	7	252,560	226	205
*PY2VZ	A	1,434,860	945	554
*PY7M	"	963,500	791	470
			(OP: PT7ZT)	
*PY1SX	"	93,593	193	173
*PY3OPP	"	92,364	200	172
*PY7DJ	"	53,055	220	135
*PY3FOX	"	34,068	121	102
*PY2ABN	"	33,176	131	116
*PY2JCM	"	29,526	145	111
*PP5ZB	"	24,600	115	100
*PY2NM	"	6,750	60	54
*PR3A	28	4,639,460	1872	868
*PY3FJ	"	1,323,552	863	544
*PU8WWW	"	1,248,566	864	551
*PU2STZ	"	853,549	687	449
*PY2HT	"	839,300	720	436
*PY2TKB	"	774,204	660	433
*PU1KGG	"	396,198	457	319
*PY2TNT	"	357,408	442	306
*PY2XV	"	100,534	237	167
*PU2VTC	"	79,261	218	169
*ZW5WIM	"	73,788	196	172
			(OP: PU5IKE)	
*PU5AGM	"	24,960	118	104
*PY2XC	"	13,600	76	69
*PY4XX	"	3,663	37	37
*PY2LUC	"	240	11	10
*PY9MM	21	1,069,932	721	547
*PP5BB	"	37,023	128	123
*PY2VM	14	6,018	53	51
Chile				
3G3O	A	507,000	572	338
			(OP: CE3OPE)	
*CE5PHI	28	208,750	337	250
Colombia				
*HK3JJB	7	83,070	125	117
Ecuador				
*HC5VF	A	412,794	463	323
Uruguay				
*CX1CAK	28	7,722	57	54
Venezuela				
YW5T	7	6,849,684	1515	783
			(OP: YV5JBI)	
*YV8AD	A	2,390,775	1264	635
*YV5JF	28	1,330,662	1014	479
*YY7OMF	21	33,488	114	112
QRP				
TI5N	A	1,449,725	1089	515
			(OP: W8QZA)	
TM9K	"	953,680	826	524
			(OP: F5BEG)	
LU7HZ	"	756,646	678	422
DL8LR	"	749,700	707	490
ND9C	"	641,600	663	401
IZ8JFL	"	541,250	700	433
OO4O	"	500,148	567	421
RN4HAB	"	496,353	705	429
HG6C	"	485,204	590	404
			(OP: HA6IAM)	
E77TA	"	482,466	636	382
UX2MF	"	395,589	514	401
RT4W	"	388,544	596	416
IZ1ANK	"	365,160	609	408
JR3RWB	"	352,692	490	291
EA1GT	"	334,236	535	346
KC0MO	"	316,464	462	304
			(OP: KØOU)	
HA7YS	"	283,974	442	318
T5UCV	"	274,458	491	298
DR2Q	"	273,360	495	340
			(OP: DL8MBS)	
KT8K	"	269,856	397	288
UT5EOX	"	245,315	453	301
N9LB	"	232,716	368	258
RA1AI	"	230,688	414	324
PE2K	"	220,158	431	302
SP2DNI	"	203,792	396	271
EF8C	"	188,726	247	197
			(OP: WP3A)	
NT4TS	"	187,110	294	243
IZ1JLF	"	175,653	359	261
EU3MA	"	164,338	324	254
YO9FTN	"	150,331	293	239
UT8UL	"	133,152	286	228
VK4ATH	"	132,076	261	178
LU1VK	"	123,519	264	197
RW3AI	"	115,962	308	231
UX8ZA	"	112,347	306	219
RA4FUT	"	103,032	280	216
SP5XSL	"	100,880	267	208
YO4AAC	"	100,116	260	206
YU1LM	"	95,550	247	195
KC5WA	"	92,310	249	170
CT2KCG	"	79,662	222	187
EA1TI	"	71,378	205	178
IK3XTY	"	67,462	232	178
DF2WF	"	66,394	199	178
I2BPP	"	58,981	192	169
JA2MWV	"	58,680	149	120
IZ7FLP	"	57,038	193	158
LZ7H	"	53,976	199	156
DL/KL1A	"	53,460	198	162
IZ2QKG	"	48,139	208	161
AI9K	"	45,560	178	136
AB3GB	"	43,268	147	116
JK1TCV	"	41,808	135	104
EA3FF	"	40,528	153	136
SQ8MFB	"	40,326	168	143
KD8DVY/4	"	38,907	149	131
IZ2NG	"	37,356	138	132
EA4EMC	"	36,352	137	128
DJ3GE	"	32,637	156	129
OZ6OM	"	31,527	125	113
9A2/040P	"	30,831	142	129
IW3SGT	"	25,134	141	118
W2JEK	"	23,904	107	96
7K1CPT	"	20,482	104	77
YO5OPH	"	20,460	98	93
PY2BN	"	20,240	105	92
UA0SBQ	"	18,018	89	77
EI7HE	"	17,460	106	90
N8XX	"	16,896	103	88
PD0PMS	"	15,688	119	106
MSAEF	"	11,036	98	89
RC9YA	"	9,338	60	58
			(OP: RW9Y)	
YO2LAN	"	9,042	67	66
WA5RML	"	8,378	90	71
VA3RKM	"	8,288	58	56
OK1DMP	"	5,891	48	43
SQ7IQI	"	5,724	57	54
KA6PVB	"	5,586	68	57
AF9J	"	5,044	61	53
T3IW	"	4,972	47	44
KK7WL	"	4,914	63	54
DU7JGU	"	3,956	47	43
YO4HHP	"	1,768	37	34
EA3GI	"	1,728	27	27
U9JQ	"	1,728	35	32
K6RM/4	"	1,632	24	24
EA3FHP	"	1,404	30	26
EA4CU	"	1,225	25	25
RK6AOM	"	1,150	25	25
OZ1LTR	"	957	32	29
JH7UJU	"	940	23	20
JL6LTB	"	874	20	19
KG7WZ	"	828	23	23
VU2GUR	"	684	18	18
A3TW	"	532	20	19
EA3GYE	"	495	16	15
F6BZG	"	336	13	12
YC1RHS	"	18	2	2
LU3HFA	28	120,330	249	191
ON6NL	"	92,105	219	169
I5KAP	"	79,977	198	159
R2AD	"	30,680	134	118
YO5OHY	"	27,730	104	94
LU7VCH	"	21,725	95	79
EC4AA	"	14,960	89	80
RA4CLU	"	11,319	87	77
KG4CDL	"	10,726	67	62
R7MX	"	10,540	72	68
DL2TM	"	9,735	66	59
YO9GSB	"	9,519	61	57
BY1SK	"	7,205	63	55
F4FPG	"	6,069	56	51
3Z3Z	"	5,250	45	42
			(OP: SQ3ET)	
RX3AU	"	3,708	39	36
LU6EVD	"	2,686	34	34
JI3CJO	"	2,144	32	32
OM8JP	"	1,449	23	23
DF7LS	"	1,176	21	21
JR1USU	"	66	6	6
ZS1LL	"	45	5	5
JA1POS	"	9	3	3
EI4II	21	117,898	268	233
EA1CJJ	"	109,068	276	244
SP4LVK	"	92,571	241	177
WA6FGV	"	91,455	224	195
JH3DMQ	"	79,325	200	167
IV3AOL	"	64,872	174	153
IZ3NVR	"	46,800	165	150
MW8T	"	44,968	160	146
			(OP: MM8CWJ)	
JR1NKN	"	41,535	151	117
UI8CM	"	24,472	98	92
KF7IYO/2	"	20,856	93	88
W3EK	"	20,381	93	89
DL1DXA	"	19,550	99	85
VU2PTT	"	10,416	64	62
SP9GLJ	"	6,710	58	55
IK7XNF	"	5,376	61	56
RA4DX	"	2,728	49	44
JA6WEQ	"	1,430	27	26
9M2SM	"	1,302	22	21
			(OP: 9M2GET)	
VU2UR	"	1,127	25	23
BG1UW	"	1,008	34	28
VE3GTC	"	612	17	17
CO8ZZ	"	504	14	14
JA0GSG	"	45	5	5
E27EK	"	8	2	2
YT1CS	14	131,108	355	292
SP3DRM	"	81,468	264	219
ON3DI	"	50,220	214	186
RU4SM	"	43,792	204	184
UA0A	"	38,350	123	118
LY5G	"	31,106	172	151
JA2JSF	"	26,936	119	104
IN3HUU	"	23,580	151	131
UA1CEC	"	13,886	119	106
SQ3OGP	"	13,000	109	100
LA8WG	"	10,920	114	105
DU1AJ	"	10,354	68	62
MØJBA	"	7,440	86	80
BG7FBI	"	5,300	67	53
IZ5JLW	"	3,763	53	53
YO6OEJ	"	3,248	60	58
BH4RNX	"	1,288	31	28
R2WW	"	1,254	34	33
LZ1/TA2AHS	"	1,053	28	27
UX7QG	"	720	24	24
IZ5PNL	"	440	20	20
VR2JAM	"	378	14	14
			(OP: VR2UNG)	
DJ6TB	"	81	9	9
IZ2WMW	"	16	4	4
S57SU	7	609,329	550	427
9A2B9L	"	217,722	329	262
			(OP: 9A9L)	
SP2QDT	"	180,576	306	264
SP4GFG	"	172,125	301	255
HA8V	"	57,961	174	149
I2/IZ3IBL	"	31,680	118	110
K3TW/4	"	12,996	60	57
DD8VS	"	8,976	77	68
N1TM	"	3,104	32	32
AC0ZG	"	4	2	2
UX9Q	3.7	36,010	138	130
			(OP: UR9QQ)	
K9JWV/7	"	4,272	57	48
9A4AA	1.8	1,984	32	32
R3VA	"	91	8	7

MULTI-OPERATOR SINGLE TRANSMITTER NORTH AMERICA

United States

AK1W	14,020,535	3935	1285
KM1W	3,872,750	1566	875
NG1R	2,137,278	1249	689
NC1	705,200	685	410
W1BUR	7,560	56	56
WW2DX	19,167,080	4495	1373
AB2DE	1,514,688	874	644
WV2ZOW	1,033,734	860	457
N2FF	614,658	555	402
W2GH	419,888	438	326
NO2J	275,076	400	283
N2NGW	205,146	316	261
WR3Z	10,964,307	3668	1213
N3WAX	569,859	597	339
W3LJ	214,750	336	250
KM4MK	2,957,184	1751	816
WF3C/4	2,714,838	1629	777
K4NAB	506,483	553	361
N4OXY	216,832	353	242
K5KDX	219,964	348	254
K5TR	59,210	219	155
N5FM	55,266	181	151
AD5XM	3,432	42	39
NY6N	14,316,616	4215	1304
KX7M/6	10,136,232	3480	1124
WQ6X	5,377,580	2503	860
KE1B/6	2,716,270	1783	745
K6W	2,090,574	1304	666
W6I	1,724,800	1734	616
WM6A	567,816	545	401
W6KA	437,524	572	356
K6UD	161,403	330	219
KS7AA	7,268,469	2533	969
KK7PR	3,758,686	2089	829
W7IWW	1,006,368	1075	528
N7VF	878,548	737	451
WS7L	411,585	507	345
WX7P	241,224	389	276
WS7V	192,533	404	253
K7JAN	183,513	355	249
N7LR	83,790	233	171
WC5B/8	139,832	303	227
KD9ST	4,563,870	2362	894
KØRH	2,889,789	2321	713
KØJDD	1,009,944	832	507
KCØDWX	26,085	124	111
Alaska			
KL7AIR	760,682	681	442
Canada			
VC2G	3,712,328	1513	757
VE2NGH	2,467,941	1217	669
VA2TG	2,044,700	1121	635
VC3T	5,010,247	1802	881
VC3B	1,803,458	1132	562
VE3ZJS	3,913	43	43
VC6R	12,680,220	3689	1140
VE6AO	477,325	656	313
VE7NA	80,483	205	151
El Salvador			
HUØA	2,937,141	1746	711
US Virgin Islands			
WP2Z	21,335,538	5548	1358
KP2TM	17,121,160	5274	1301
KP2DX	674,561	611	359
AFRICA			
Botswana			
A25HQ	202,170	302	230
Guinea-Bissau			
J52HF	697,872	656	372
Madeira Islands			
CQ9T	21,845,680	4688	1360
Morocco			
5D5A	38,510,454	6579	1601
Namibia			
V55B	3,758,040	1658	780
Senegal			
6V7Z	27,788,120	6043	1465
Tunisia			
3V8BB	26,263,647	5018	1363
ASIA			
Asiatic Russia			
RF9C	29,672,318	5696	1489
RK9CYA	1,363,984	893	523
RK9SWF	1,096,620	782	490
RK9MWO	151,317	272	207
UI9I	141,375	256	195
RZ9SZZ	4,692,506	1941	825
RZØCWH	35,207	136	109
Asiatic Turkey			
YM7KA	14,529,592	3861	1133
TC3C	7,521,552	2531	828
YM3KM	2,544,048	1251	604
China			
BY5CD	5,457,870	2340	894
B3C	1,915,948	1352	634
B4S	1,822,048	1201	587
BY8DX	1,499,797	1200	559
BY2AA	1,319,010	992	571
BY4SA	808,353	765	441
B4X/6	530,530	658	371
BY6LY	380,568	795	303
BY1CQ	289,954	512	298
BY1QH	97,539	248	183
BY2WL	54,349	177	139
BD4SVB	2,880	39	36
BY4RWT	1,950	33	30
Cyprus			
P33W	37,798,352	7283	1556
Hong Kong			
VR2HKS	972	28	27
Japan			
JA1ZGP	166,722	309	222
JI2ZEY	2,163,405	1228	619
JE7YSS	3,158,218	1450	766
Kazakhstan			
UP2L	27,522,568	5365	1451
Kuwait			
9K2HN	15,264,424	4211	1112
Saudi Arabia			
7Z1SJ	12,592,800	3363	1080
Taiwan			
BPØP	2,137,674	1485	661
United Arab Emirates			
A6ØA	607,523	565	413
West Malaysia			
9M2NNM	420,282	625	362
EUROPE			
Austria			
OE3K	19,989,925	4905	1465
OE6XUG	167,480	334	265
Belarus			
EW8ZO	356,928	528	338
EW8ZZ	3,520	44	40
EU1XA	1,320	34	33

Belgium

ON6BR	**1,871,155**	**1208**	**715**
ON4CRD	334,024	477	344
ON4CP	15,280	90	80

Bosnia-Herzegovina

E74ACL	902,010	906	562

Croatia

9A22P	**18,871,685**	**4871**	**1435**
9A8M	9,072,856	3181	1196
9A1CRD	15,312	97	87

Czech Republic

OK2KOJ	**2,489,418**	**1447**	**753**
OK2RVM	497,743	639	391

Denmark

OZ2AR	**1,534,496**	**1109**	**632**
OZ5GX	1,106,432	991	512

England

G2W	**9,225,118**	**3374**	**1162**
M4U	2,624,820	1602	820
G5FZ	1,655,270	1264	695
GXØFUN	1,398,036	1019	678
GØD	512,079	588	393
G4EKT	11,055	71	67

Estonia

ES9C	**21,585,315**	**5603**	**1549**
ES1XQ	1,064,061	1092	573
ES1N	5,559	62	51

European Russia

RZ1AWT	**91,805**	**286**	**215**

RL3A	**22,523,280**	**6003**	**1560**
R 5TT	3,095,810	2005	877
UG3G	955,136	1095	574
RT2M	346,110	612	417
RC3W	272,285	471	355
RL3QWA	208,314	443	326
RA3SI	158,337	275	241
RK3FWE	41,454	169	147

RT4F	**20,857,344**	**5837**	**1536**
RK4HYT	1,083,810	985	546

UE85DRK	**2,991,807**	**2222**	**843**

RK9FYS	**65,148**	**227**	**178**

Fed. Rep. of Germany

DQ4W	**9,663,060**	**3145**	**1210**
DLØUM	3,872,642	1717	887
DD2CW	3,070,244	2117	772
DP7D	2,435,070	1422	785
DLØP	1,616,502	1164	643
D 1NKS	1,500,642	1215	583
DJØA	1,396,383	900	597
DC6RI	1,032,669	969	549
DQ5X	892,680	955	519
DF5P	670,016	706	464
DKØSU	256,366	368	271
DF2P	198,300	376	260
DLØH	163,386	324	261
DLØML	61,623	187	167
D ØTUM	1,600	27	25

Finland

OH8X	**10,948,224**	**3994**	**1344**
OH6K	452,510	538	370
OH2K	54,340	174	143

Greece

SZ3P	**3,805,540**	**2449**	**895**
SZ1A	2,670,440	1911	808

Ireland

EIØDIRTS	**658,860**	**707**	**474**

Isle of Man

GT8IOM	**1,110,725**	**977**	**577**

Italy

IO5O	**13,781,740**	**3778**	**1372**
IR6T	7,665,918	2737	1131
IR5A	5,059,880	2208	1063
IY4FGM	4,085,276	1921	1004
IQ6RS	2,295,240	1553	744
IO7T	1,742,784	1280	696
II5PT	1,697,076	1271	708
IQ3UD	977,466	1003	629
IQ3PN	398,537	527	353

Jersey

GJ2A	**60,350**	**207**	**170**

Luxembourg

LX7GRL	**1,212,432**	**912**	**624**

Netherlands

PA6V	**2,798,761**	**1504**	**811**
PA6B	1,078,398	970	543
PA5W	176,616	326	264

Norway

LN7H	**681,675**	**794**	**447**
LA1K	115,842	360	258
LN1B	36,974	163	139

Poland

SO9Q	**10,474,716**	**3339**	**1238**
HF3A	9,426,816	3023	1169
SN9V	3,317,892	1803	849
SN7H	2,566,026	1667	779
SP6YAQ	2,106,570	1318	710
SP2KPD	1,392,787	1049	583

Portugal

CR6P	**4,528,260**	**2146**	**990**
CS2P	3,269,743	2077	953

Romania

YP7P	**2,142,750**	**1391**	**750**
YR2X	811,620	763	486
YR8D	668,572	708	463
YO4KAK	198,444	401	276
YP2P	174,384	364	252

Scotland

GM7A	**2,328,640**	**1427**	**766**

Serbia

YT2T	**10,151,880**	**3599**	**1240**
YU7AJM	828,307	796	463

Sicily

II9P	**10,264,944**	**3850**	**1264**
II9K	7,459,803	3080	1203
IO9A	4,311,945	2324	1023
IF9A	3,073,455	1943	887

Slovak Republic

OM7M	**15,957,970**	**4198**	**1385**
OMØA	3,164,808	1975	809
OM4C	3,164,355	1672	855

Slovenia

S51A	**9,217,440**	**3305**	**1184**
S56CW	4,169,616	2176	894
S59T	1,134	30	27

Spain

EC1DBO	**5,000,760**	**2462**	**958**
ED1C	1,917,876	1367	724
ED1G	1,769,459	1309	719

EE2K	**4,202,880**	**2103**	**960**
ED2W	554,800	736	475

ED3X	**10,874,058**	**3549**	**1279**
EE3T	6,449,960	2992	1096

EA4RCT	**16,020**	**94**	**89**

EA5URV	**1,293,516**	**1120**	**609**

Sweden

SK7DA	**3,333,524**	**1797**	**853**

Switzerland

HB9EE	**6,710,349**	**2572**	**1097**
HB9MH	5,615,400	2318	955
HB9ODK	553,656	575	408
HB9FA	246,000	406	300

Ukraine

UX2U	**4,545,260**	**2497**	**943**
UT7E	4,536,773	2422	943

OCEANIA

Australia

VK4NM	**11,989,252**	**3368**	**1042**
VK6AHR	21,165	93	85

East Malaysia

9M6SDX	**2,132,568**	**1397**	**486**

Guam

WH2DX	**1,407,710**	**997**	**478**

Hawaii

KH7X	**19,038,120**	**4430**	**1180**

Indonesia

YB1C	**4,708,340**	**1927**	**845**
YE3J	317,070	427	234

Philippines

DU1HR	**1,671,360**	**1120**	**480**
4GØLD	416,540	617	236

SOUTH AMERICA

Argentina

LS1D	**17,695,510**	**4400**	**1334**
AY5F	17,023,395	4310	1299
LV6D	5,870,004	2236	938
L73D	3,493,228	1548	799
LU1UM	1,487,646	1097	486
LT5D	1,427,755	926	565
L66S	668,152	653	376
LQ4D	159,285	286	205

Brazil

PQ6B	**17,088,354**	**4298**	**1269**
PW2D	15,690,814	4053	1291
PW2T	8,287,457	2842	1021
ZW4O	5,662,569	2005	957
PX7C	4,159,876	1635	812
ZV2K	3,811,146	1685	814
ZW8T	1,768,044	1032	587
PR5A	1,215,164	841	542
PT2CVA	1,020,604	842	494
PY3AA	5,031	45	43

Chile

CE1TT	**5,993,478**	**2325**	**934**
CE2LS	3,124,784	1468	724

MULTI-OPERATOR TWO TRANSMITTER NORTH AMERICA

United States

KE3X	**14,400,995**	**4361**	**1285**
WC6H	**13,697,376**	**4849**	**1232**
K4BP	**10,975,920**	**3842**	**1245**
NØMA	**4,349,362**	**2148**	**899**
NA5NN	**4,292,762**	**2704**	**866**

Canada

VE3MIS	**3,596,800**	**1357**	**800**
VE3WBT	1,629,015	1127	487

AFRICA

CR3A	**50,282,186**	**8518**	**1702**
V55V	**36,092,544**	**7341**	**1544**
ED9Z	**31,118,395**	**5945**	**1441**
CO3L	28,737,382	5822	1433

ASIA

A73A	**28,885,818**	**6282**	**1401**
JT5DX	**18,151,616**	**4958**	**1307**

EUROPE

EI10ØT	**33,721,072**	**7665**	**1616**
OL4A	**29,159,072**	**6593**	**1592**
9A7A	**25,898,786**	**6309**	**1598**
DQ8N	**25,729,776**	**6508**	**1576**
ED1R	**22,438,600**	**5963**	**1510**
IR9Y	**20,422,264**	**5836**	**1558**
HG7T	**19,571,712**	**5440**	**1472**
DR5N	19,125,673	5173	1477
G6PZ	**18,294,624**	**5173**	**1371**
OH5Z	**16,180,905**	**4933**	**1473**
PI4DX	**13,473,653**	**4039**	**1357**
IQ1RY	12,167,280	3794	1290
E72ØRS	**12,020,479**	**4137**	**1307**
G5O	11,496,200	3909	1223
LY22A	**10,941,016**	**3932**	**1256**
S55T	**10,470,735**	**3244**	**1089**
DM4X	10,227,148	3604	1231
7SØX	**7,714,107**	**3239**	**1143**
DR7B	5,306,712	2716	984
DAØT	4,631,852	2427	926
CQ7A	**4,281,255**	**2331**	**961**
SP9PDF	**4,010,495**	**2003**	**895**
IQØRM	1,933,963	1196	739
EE1D	1,791,262	1211	722
DJ5AN	1,289,377	969	619
SK6HD	1,015,014	911	546

OCEANIA

YB8Y	**5,664,852**	**2618**	**636**

SOUTH AMERICA

PJ4Z	**57,741,867**	**9873**	**1641**
PW7T	**44,052,624**	**7943**	**1624**
LR3M	**15,359,800**	**4347**	**1259**
XR6T	**14,278,810**	**4174**	**1183**
LU4FM	10,570,752	3258	1147
PR5D	6,822,520	2494	940

MULTI-OPERATOR MULTI-TRANSMITTER NORTH AMERICA

United States

NX5M	**19,565,898**	**6827**	**1441**
WX3B	**18,216,301**	**5102**	**1439**
NR6O	**17,320,290**	**5759**	**1335**
NE1C	**9,110,720**	**3299**	**1136**
AK7AZ	**3,608,815**	**2292**	**805**
NQØK	**118,604**	**293**	**199**

Alaska

KL7RA	**19,449,164**	**5008**	**1316**

Canada

VC6Z	**19,953,621**	**5048**	**1361**
VA5AA	**6,161,524**	**2401**	**974**
VE7IO	**1,900,555**	**1162**	**635**

AFRICA

EB8AH	**76,018,024**	**11714**	**1784**

ASIA

JE1ZWT	**8,428,028**	**2715**	**1058**
B1Z	**7,590,180**	**3056**	**1052**
8V6J	**6,963,698**	**3388**	**917**

EUROPE

OR1A	**51,608,753**	**10636**	**1841**
9A1A	**38,960,724**	**8801**	**1749**
OT5A	**34,489,028**	**7921**	**1687**
LZ9W	**34,413,120**	**8514**	**1680**
HG1S	**26,861,948**	**6713**	**1579**
LY7A	**19,266,170**	**6106**	**1441**
DP6T	18,691,695	5415	1485
EE1W	**15,352,676**	**5249**	**1412**
EA3GTJ	**6,967,635**	**3028**	**1115**
SN6F	**5,052,861**	**2494**	**963**
UZ2Q	**761,022**	**877**	**459**
DB5ØEFA	323,613	531	369
IZ1DMY	**320,594**	**425**	**314**

OCEANIA

VK4KW	**18,934,336**	**4713**	**1216**
VK2KDP	3,228,196	1443	631
DX1DBT	**303,303**	**489**	**231**

SOUTH AMERICA

LP1H	**47,996,898**	**9039**	**1662**
3G1B	**11,032,521**	**3382**	**1159**

ROOKIE

United States

K6AAX	A	**655,578**	**811**	**387**
W1PL	"	**413,049**	**504**	**357**
WT6H	"	212,052	358	246
N1AGE	"	131,652	260	207
KJ6HBY	"	121,290	287	195
WA6KEK	"	61,116	192	132
KØSTP/4	"	**45,924**	**167**	**129**
KC2ZPK	"	**18,879**	**98**	**87**
KD8PHI	"	**12,352**	**69**	**64**
W7MCM	"	**10,850**	**66**	**62**
N9LIS	"	**2,695**	**35**	**35**
K4DKE	"	132	6	6
AK3S	21	**155,178**	**255**	**233**
KF7IYQ/2	"	**20,856**	**93**	**88**
AGØZG	7	4	2	2
***W4DTB**	A	**529,968**	**558**	**362**
***AB1OD**	"	**507,676**	**522**	**338**
***AC8GX**	"	**435,400**	**539**	**350**
*K8PGJ	"	421,824	501	312
*NA4EA	"	334,641	356	337
*KD8NOH	"	314,032	413	304
*AK4QU	"	253,328	381	284
***NW5Q**	"	**218,078**	**403**	**259**
*KF5XE	"	210,627	456	261
*KB1UUB	"	148,941	269	201
***K7TYF**	"	**118,800**	**280**	**198**
***W8TUP**	"	**102,800**	**253**	**200**
*KK4EDY	"	102,120	227	184
***NJ6G**	"	**75,492**	**228**	**162**
*KF7DYX	"	71,200	222	160
*KI7UH	"	65,312	203	157
*AE7NR	"	62,424	213	153
*AK4EM	"	46,002	145	123
***KC2WUF**	"	**28,420**	**115**	**98**
*KA8NJW	"	26,182	125	106
*W7DXW	"	24,816	107	94
*KDØKIM	"	24,274	122	106
*KRØL	"	22,533	134	111
*KJ6RQT	"	16,168	105	86
*NA3Z/4	"	9,918	61	58
*K8JTD	"	9,362	69	62
*KF7KXV	"	9,288	76	72
*N7FZY/6	"	7,238	56	47
*KW6JIM	"	6,758	69	62
*NØAJN	"	4,312	44	44
*KDØKQS	"	4,095	46	45
*KK4HHO	"	2,673	36	33
*N4ERZ	"	2,464	31	28
*KDØOYR	"	2,400	33	32
***AB3OB**	"	**1,820**	**26**	**26**
*AG6KA	"	1,675	27	25
*KB1WRH	"	1,320	22	20
***KC9VGG**	"	**975**	**28**	**25**
*KF7SKB	"	350	14	14
*W5TJS	"	36	4	4
***KC9TOR**	28	**4,368**	**44**	**39**
*W9YB	"	4,368	44	42
			(OP: KC9UWQ)	
***KJ6MQM**	"	**2,856**	**36**	**34**
*KB1WUO	"	950	19	19
***KK4FYV**	"	**84**	**6**	**6**
*KK4BSM	"	27	3	3
***KB3SQV**	"	**24**	**4**	**4**
*KK4GGZ	"	12	2	2
***AG6AN**	21	**9,387**	**63**	**63**
*KK6BJ	"	276	12	12
***KDØNEL**	14	**20,453**	**154**	**113**
***KC2YXU**	7	**616**	**14**	**14**

DX

UA5A	A	**11,307,639**	**3949**	**1263**
			(OP: RA3AKT)	
S59ABC	"	**7,429,512**	**2776**	**1047**
			(OP: S58AA)	
RN3DMU	"	3,146,094	2003	861
HZ1TT	"	**2,504,568**	**1297**	**583**
UD3D	"	2,221,128	1858	756
			(OP: UB3DAY)	
IZ3SQW	"	**1,957,893**	**1438**	**701**
DG7HL	"	**684,950**	**698**	**475**
YP6Z	"	**576,678**	**587**	**431**
			(OP: YO6PZZ)	
ON7HLU	"	**357,896**	**527**	**392**
JO4CTB	"	**321,468**	**439**	**267**
DL1WM	"	112,554	253	222
WP4I	"	**89,658**	**190**	**153**
IZØRCP	"	83,265	205	183
IZ7SLU	"	72,982	208	182
F1PYN	"	**28,702**	**125**	**113**
EA3HEK	"	**2,492**	**31**	**28**
BH1LYB	"	**1,316**	**28**	**28**
RA3ICK	"	280	11	10
PY1EW	28	**1,078,740**	**819**	**468**
BY1CW	21	134,596	518	209
			(OP: BD1GXH)	
D4C	14	**6,534,990**	**2278**	**986**
			(OP: IZ4UEZ)	
BH4RNX	"	**1,288**	**31**	**28**
LZ1/TA2AHS	"	**1,053**	**28**	**27**
			(OP: TA2AHS)	
IZ2WMW	"	16	4	4
***EA2LMI**	A	**1,090,100**	**983**	**550**
***ED7R**	"	**1,009,125**	**1230**	**621**
			(OP: EA7IZJ)	
***OH3FOG**	"	**998,037**	**904**	**519**
***YO5LD**	"	**818,100**	**860**	**505**
***UB9AAJ**	"	**517,924**	**465**	**316**
***F4GDI**	"	**443,820**	**551**	**390**
***VK5PAS**	"	**414,352**	**455**	**304**
***LA1DSA**	"	**327,474**	**501**	**339**
***EA5HRB**	"	**320,112**	**442**	**324**
*RV9WND	"	253,184	346	256
***UR6LEY**	"	**239,008**	**396**	**308**
***CT2KFA**	"	**230,298**	**381**	**293**
***VE7TTH**	"	**221,961**	**328**	**241**
*UR3AHF	"	208,080	383	289
***DL7DET**	"	**201,772**	**412**	**292**
***IZ2QGH**	"	**172,546**	**315**	**242**
***VA3DBT**	"	**151,620**	**277**	**210**
***2E0TCC**	"	**147,506**	**346**	**262**
*GØLZX	"	121,746	256	197
***OM2DT**	"	**119,587**	**252**	**203**
*DL6TA	"	118,622	293	229
*YO2MKT	"	105,690	237	195
***SP6TWA**	"	**105,152**	**259**	**212**
***OZ2CA**	"	**98,345**	**263**	**221**
*IZ2UST	"	97,970	258	202
***VE3MMI**	"	**94,500**	**211**	**180**
***EI9GSB**	"	**92,650**	**249**	**218**
*ED5A	"	92,316	238	196
			(OP: EA5HRT)	
*SN1T	"	88,059	249	197
			(OP: SQ1RET)	
*LA2NTA	"	86,922	248	198
*VK6MAB	"	82,335	190	165
*EA7JIY	"	74,315	204	167
***S51JS**	"	**69,973**	**190**	**167**
*F8KKH	"	60,822	205	186
			(OP: F4GBW)	
*LA9OSA	"	54,720	200	171
*UA9JFH	"	53,325	162	135
***PY7DJ**	"	**53,055**	**220**	**135**
***EA3HJO**	"	**49,950**	**163**	**135**
*IZ1TYP	"	47,233	160	149
***EA4GHB**	"	**44,950**	**179**	**155**
*F4GLQ	"	41,019	132	113
*DD7NT	"	39,902	166	142
*M6TOK	"	37,800	164	140
***PD1TV**	"	**33,135**	**160**	**141**
*VA3PAW	"	30,452	111	92
***OE4VMB**	"	**30,012**	**145**	**123**
***SAØE**	"	**28,080**	**152**	**130**
			(OP: SAØBJL)	
*OE2LRO	"	25,992	144	114
***JG1LPL**	"	**22,420**	**103**	**76**
***UB3DAO**	"	**20,400**	**104**	**100**
***ISØBGL**	"	**19,872**	**103**	**92**
*YO7DBR	"	19,698	105	98
***YU3TMO**	"	**17,952**	**96**	**88**
***BG4KLA**	"	**17,892**	**92**	**84**
***CO2JW**	"	**17,765**	**95**	**85**
*EA3HDT	"	16,920	106	94
*YO2MKL	"	16,920	96	90
*M6AGY	"	16,300	105	100
*VK4FATT	"	15,276	68	57
***DL1MWG**	"	**14,105**	**102**	**91**
***2U0FER**	"	**12,855**	**92**	**83**
*IN3EJN	"	11,988	84	81
*YO2MBU	"	11,840	78	74
***EA1HVW**	"	**11,550**	**67**	**66**
*IW0EAC	"	11,310	69	65
*IZ1QYD	"	9,864	79	72
***9A5KIS**	"	**9,338**	**64**	**58**
*PD1OG	"	7,548	73	68
*UR3LDO	"	6,960	52	48
*VU3NXI	"	6,716	49	46
***LY2HQ**	"	**6,200**	**65**	**62**
*BA4SCP	"	6,068	53	41
*LA6VQ	"	6,028	49	44
*JG1SWV	"	5,371	41	41
***VE7VAW**	"	**3,572**	**45**	**38**
***KL3HM**	"	**3,432**	**37**	**33**
***HL2NFB**	"	**3,400**	**35**	**34**
*SQ3PMM	"	2,886	39	37
***UA1WBV**	"	**2,772**	**30**	**28**
***MMØIMC**	"	**2,618**	**35**	**34**
*EA7JHV	"	1,887	42	37
*OZ8KEL	"	1,881	41	33
*LA9NSA	"	1,025	26	25
*IZ8DUD	"	940	20	20
*DL1MX	"	800	26	25
*IZ1REP	"	756	27	27
*IZ3SXO	"	756	29	27
*OH6FXW	"	675	15	15
*F4FWN	"	540	18	18
*BH1JGA	"	510	18	17
*SM3L	"	286	11	11
				(OP: SA3BPA)
*DO8UO	"	260	10	10
***5B4AJT**	"	**126**	**7**	**7**
*JG1MYK	"	42	7	7
*BH1KZQ	"	35	8	7
***CX1DP**	28	**1,510,083**	**999**	**543**
***PU8WWW**	"	**1,248,566**	**864**	**551**
*PU2STZ	"	853,549	687	449
*PU1PYZ	"	335,276	412	316
***CT5KAQ**	"	**163,724**	**325**	**244**
***LU3YEP**	"	**111,000**	**271**	**200**
*PU2KIV	"	89,595	222	181
*ZW5WIM	"	73,788	195	172
			(OP: PU5KE)	
*PU5AGM	"	24,960	119	104
*PY2YRC	"	17,640	93	90
***UB8QAA**	"	**16,936**	**85**	**73**
***II7M**	"	**12,816**	**77**	**72**
				(OP: IZ7SIA)
*PY2VOX	"	10,064	81	68
***IT9CLN**	"	**9,686**	**61**	**58**
*IZ5UGE	"	8,415	62	55
***EA8CZT**	"	**6,075**	**47**	**45**
*PU5ADX	"	3,626	40	37
***SQ9SHR**	"	**2,418**	**31**	**31**
***8I7JMD**	"	**1,682**	**31**	**29**
***YL3AGV**	21	**318,763**	**453**	**361**
***DO3KMF**	"	**94,127**	**233**	**199**
***UB6ACR**	"	**22,040**	**125**	**116**
***IZ5UGM**	"	**12,960**	**73**	**72**
***SQ8KFH**	"	**5,661**	**53**	**51**
*IX1CKN	"	4,092	44	44
*SQ8OGC	"	3,567	42	41
*DO7CED	"	783	29	27
*IZ3TFL	"	372	12	12
***UB4AAV**	"	**160**	**10**	**10**
***KH2/JO3XGY**	"	**27**	**3**	**3**
***LR1H**	14	**665,660**	**603**	**401**
***II0K**	"	**85,008**	**288**	**231**
				(OP: IZ8UME)
*IV3CTS	"	25,452	126	126
***EI5HKZ**	"	**3,127**	**59**	**59**
***SQ3RLC**	"	**2,303**	**53**	**49**
***EA1IFU**	"	**700**	**28**	**28**
***SV1OBY**	"	**320**	**16**	**16**
***F4GTD**	7	**592,724**	**645**	**418**
***EA5HSI**	"	**345,779**	**383**	**329**
***YO2MJZ**	"	**150,332**	**267**	**236**
***MØGVZ**	"	**48,840**	**139**	**132**
***IZ7SIA**	"	**34,574**	**125**	**118**

TRIBANDER/SINGLE ELEMENT

United States

NXØX/4	A	**8,815,183**	**3230**	**1157**
				(OP: N4PN)
NF4A	"	4,729,318	2148	947
W6TK	"	**3,302,784**	**1855**	**752**
N6JV	"	2,768,304	1685	749
KG4W	"	2,229,255	1211	735
W6AEA/7	"	**2,175,992**	**1294**	**686**
ACØB	"	**2,056,788**	**1636**	**684**
				(OP: NXØX)
K3MD	"	**1,732,722**	**1168**	**634**
AB2E	"	**1,674,711**	**1251**	**587**
K5MV	"	**1,667,900**	**1222**	**650**
W1KQ	"	**1,608,920**	**1048**	**584**
K6MM	"	1,538,400	1144	641
AC9S	"	**1,531,455**	**1107**	**579**
N2SQW	"	1,451,738	987	547
NX1P/7	"	1,353,420	1060	515
KE2VB/7	"	1,288,662	1187	541
N3UM	"	1,285,165	818	503
AJ4RW	"	1,232,748	1150	566
WV1H	"	1,218,360	879	520
W7PP	"	1,184,228	866	548
N3RG/7	"	1,096,984	1033	532
AD5VJ	"	1,064,877	991	529
AG5Z	"	990,720	924	512
W5GCX	"	977,856	752	463
K7JQ	"	921,516	990	492
N6WS	"	919,524	666	444
W3TZ/5	"	778,707	678	453
NR7DX	"	731,120	732	481
				(OP: K7ABV)
W9AV	"	679,770	800	415
N2MUN	"	643,500	606	396
WDØECO	"	641,784	759	408
NDØC	"	**641,600**	**663**	**401**
W4AS	"	610,414	497	413
NC4MI	"	601,125	588	375
KI6QDH	"	437,510	541	335
KT1B	"	419,900	448	323
K4GAA	"	406,130	448	319
KO7X	"	388,170	599	342
AB1L/6	"	353,904	478	303
				(OP: W6RKC)
NX9T/4	"	322,410	502	330
WU6W/7	"	314,847	506	299
W4UT	"	298,016	414	278
KV7DX	"	287,546	556	322
				(OP: AA7V)
KD7DCR	"	266,552	410	286
N6VH	"	258,985	398	277
WR5G/7	"	256,956	377	276
K6JAT	"	228,330	395	258
K9EN	"	223,560	344	270
K6GEP	"	212,300	334	275
KW3A	"	209,076	431	266
KI4FIA	"	208,500	544	278
WF2B	"	207,207	325	253
				(OP: N1EU)
N1GLT	"	196,880	291	230
WK1J	"	188,135	284	197
KT6VV	"	184,080	331	240
NB3R	"	180,999	282	221

Visit Our Web Site

KD4RF	"	167,320	288	235	*KT4ZB	"	1,949,935	1225	655	*K1VU	"	41,697	125	113	EE3A	"	4,514,610	1977	915	UA9FGJ	"	484,802	517	446
			(OP: W9EQ)		*NX6T	"	1,920,810	1403	645	*WØZF	"	40,095	138	135				(OP: EA3ATM)		JE1LFX	"	452,920	480	335
KA4OTB	"	166,100	289	220				(OP: K6AM)		*N6ENO	"	35,088	158	129	OQ5M	"	4,205,362	1929	917	GW9X	"	449,748	578	403
AA5B	"	155,763	404	243	*WZ7ZR	"	1,558,752	1166	624	*W7RV	"	30,636	104	92				(OP: ON5ZO)					(OP: MW1LCR)	
N3WD	"	148,674	251	213	*WB8TLI	"	1,317,942	891	531	*W2DZ	"	30,528	130	106	SV5DKL	"	4,178,160	2123	1008	DL1NEO	"	427,800	502	372
KR2E/7	"	147,744	291	228	*KB9UWU	"	1,082,943	770	513	*N6ZE	"	29,920	126	110	_A4FEN	"	4,097,236	2195	988	BD4CQ	"	410,670	584	338
WA3OFC/4	"	147,586	226	218	*KB9OWD	"	978,112	1077	493	*K6CSL	"	27,063	118	97	EW2A	"	3,889,458	1985	906	ES2IPA	"	403,256	594	379
W4VKU	"	141,316	228	196	*N1API	"	875,996	736	463	*WV6N	"	24,843	106	91	EU1AZ	"	3,149,664	1708	872	4U1GSC	"	361,344	558	384
K6ATZ	"	138,600	261	200	*NW2K	"	758,961	818	441	*AK4NZ	"	23,023	97	91	EV1R	"	3,141,861	1790	843	EA4ETW	"	347,014	550	386
AJ4HW	"	134,136	261	207	*KD3HN	"	743,785	656	395	*NØRZT/4	"	19,844	100	82	UA0SR	"	2,913,801	1580	759	R2DW	"	346,527	450	417
WA7PRC	"	129,690	280	198	*W1MA	"	692,580	634	420	*AB1QP	"	19,623	96	93	CO2GG	"	2,683,535	1588	655	UT5UKY	"	340,736	488	352
N4NM	"	127,779	244	191	*K2DSL	"	658,140	652	420	*AA6EE	"	18,920	106	88	JO1WKO	"	2,349,900	1175	630	F1NZC	"	338,100	437	350
WK4Y	"	126,352	271	212	*AA6K	"	657,360	606	415	*N2CQ	"	16,999	95	89	OK2BXE	"	2,185,690	1273	731	DL8EAQ	"	331,272	448	344
K4EDI	"	121,520	231	196	*K8BL	"	618,068	485	484	*N2GXJ	"	15,876	86	81	F4FFH	"	2,178,495	1367	815	J47X	"	325,827	525	369
W7ON	"	106,860	262	195	*W7SO	"	552,375	590	375	*AA4LR	"	14,007	78	69	YO3APJ	"	1,905,057	1140	693				(OP: SV78VM)	
NØQO	"	92,169	215	171	*W7FYW	"	499,995	578	369	*NØAX	"	9,856	68	64	GØVXE	"	1,861,880	1328	712	RV1CC	"	320,640	382	320
KB6A	"	78,546	220	159	*NN6DX	"	495,132	578	372	*N2JJ	"	9,792	67	64	OE6MDF	"	1,795,682	1223	658	ZW5V	"	314,600	395	286
KI7Y	"	68,832	197	144				(OP: W1PR)		*AD0H	"	8,684	64	52	DF5MA	"	1,668,576	1150	672				(OP: PY5KA)	
WJ1R	"	67,728	159	136	*WBØTSR	"	491,538	587	366	*K7JR	"	7,800	60	50	ED4A	"	1,516,455	1235	705	AL7KZ	"	296,442	386	258
WG7X	"	64,242	212	166	*AD1C/Ø	"	483,552	535	368	*W8DM/5	"	6,630	54	51				(OP: EA4TV)		JF9JTS	"	268,832	377	248
N3IYX	"	61,073	185	157	*K2GV	"	470,400	451	320	*N8WS	"	6,555	60	57	SV1JGX	"	1,465,632	1220	672	JA0CIY	"	258,263	390	271
AJ7T	"	60,384	217	148	*KS2G	"	449,242	481	362	*KI4YIK	"	4,452	58	53	VE9AA	"	1,298,286	864	498	NH6WZ	"	253,422	360	234
K7CS/4	"	59,492	174	139	*N3ALN	"	411,156	519	324	*KI4HHK	"	4,223	42	41	9A2ØT	"	1,237,086	859	558	IK2TDM	"	244,362	331	278
N8AGU	"	55,640	151	130	*WI5ID	"	408,120	507	358	*KC8UNR	"	3,952	39	38				(OP: 9A2EU)		RA3BL	"	213,465	340	285
WB7BBQ	"	55,160	164	140				(OP: K5IID)		*WA6GFR	"	3,738	43	42	EYØA	"	1,234,548	970	497	BD4KYA	"	202,300	505	238
N3XJD	"	53,448	152	131	*KCØDEB	"	402,784	510	328	*K7DAC	"	3,552	40	37				(OP: UA4LCQ)		PA7AL	"	200,616	442	312
W6FB	"	48,990	166	142	*NK7L	"	384,130	575	359	*KC7RPO	"	3,306	38	38	SQ7DQX	"	1,220,184	1204	538	JA2XLV	"	197,292	328	246
NJ2F/4	"	45,136	134	124	*N7MZW	"	379,088	691	344	*KG7P	"	2,278	45	34	9A2ØZJK	"	1,205,028	926	612	VE1JS	"	188,340	260	219
K7MY	"	44,732	119	106	*AD1L	"	339,434	408	314	*WA4PGM	"	1,971	31	27				(OP: 9A2JK)		EU3NA	"	164,338	324	254
W1GDV/2	"	39,962	111	105	*K9JE	"	332,280	432	312	*AE5NO	"	990	22	22	LN3C	"	1,192,620	1139	572	GD8AMD	"	163,185	347	253
K4GM	"	39,131	129	109	*KS4X	"	294,048	382	288	*NI4HO/4	"	595	17	17				(OP: LA9DFA)		DF5BX	"	155,034	320	243
N5FO	"	33,063	108	107	*K4NC	"	291,720	414	264	*N6AJR	"	646	18	17	LA7GNA	"	1,191,344	945	616	JA1WPX	"	153,786	251	213
W6SZN	"	31,625	134	115	*WA1FXK/2	"	267,582	396	277	*N4LKE	"	180	9	9	LY2MM	"	1,171,810	952	565	IZ5ASZ	"	148,392	260	229
K1PH	"	26,400	96	88	*WA2TML	"	265,136	340	292	*KE5SNJ	28	16,344	85	72	UX0RR	"	1,150,518	1006	569	IZ4EFP	"	144,060	299	245
W6PK	"	23,852	98	89	*AB4SF	"	246,980	338	265	*N1VVV	"	2,304	33	32	YO3RU	"	1,107,700	1014	583	IZ5NSH	"	143,314	345	262
NF9V	"	22,784	94	89	*AJ4VE	"	241,965	347	283	*KM4HI	21	425,632	448	376	EA5EV	"	1,072,745	888	549	DF6RI	"	141,062	298	251
WB5C	"	22,692	120	93	*K6AAB	"	223,780	395	268	*KO3T	"	338,256	405	348	SN5V	"	1,046,653	856	589	IR7R	"	135,460	341	260
K9QC	"	22,090	94	94	*KA1EKR	"	198,660	308	220	*NF8J	"	221,680	297	272				(OP: SQ5EBM)		MØRNR	"	129,285	255	221
K3IT	"	12,896	73	62	*N6DZR	"	190,311	305	237	*WA4AXT	"	173,990	288	254	OG4T	"	1,044,110	867	526	RO1B	"	129,030	308	253
N4DXI	"	9,020	59	55	*N8SBE	"	175,017	305	227	*KG9Z/8	"	97,427	203	187				(OP: OH4MFA)		G6T	"	125,100	264	225
W2YE/4	"	8,816	62	58	*K7HP	"	167,134	309	214	*N5DTT	"	94,272	202	192	VO1KVT	"	993,884	748	482				(OP: G4MKP)	
AI6Z	"	6,240	54	52	*KKØSD	"	166,105	299	239	*K7XE/6	"	71,786	181	143	UA9AU	"	978,836	668	428	RK9KW	"	125,048	250	203
WB9B	"	4,773	45	37	*KV2R	"	162,396	285	234	*W7UPF	"	68,716	175	164	IK8UND	"	964,320	993	560	JN3SAC	"	119,930	227	179
WN1GIV/4	28	903,378	919	471	*NG4L	"	147,446	272	214	*AE6YB	"	36,704	145	124	DF7EF	"	919,100	796	505	VA7FC	"	116,455	244	179
			(OP: N4BP)		*W4BAB	"	142,688	271	208	*K4NVJ	"	14,874	75	74	R3ZV	"	889,875	895	525	G6NHU	"	111,360	244	240
KU8E/4	"	349,875	545	311	*N4LJS	"	140,128	261	232	*N6BHX	"	9,408	76	64	EW4MM	"	873,600	883	520	PA0JNH	"	109,824	230	208
K4NV	"	174,300	423	210	*NR9A/Ø	"	133,980	272	203	*N5IF	"	1,782	36	33	DL9GWD	"	858,528	735	528	DG2MKV	"	103,752	245	198
KQ6ES	"	89,776	291	181	*NY4JB	"	131,820	271	195	*W7JFF	"	1,155	21	21	F4DSK	"	833,340	803	510	EW8DX	"	99,216	249	212
K6LL/7	21	2,080,880	1345	740	*NV9X	"	130,764	252	204	*KG1E	14	1,036,630	795	590	SM6NOC	"	833,257	758	487	JA1IXY	"	98,124	193	148
KZ5J	"	724,710	769	493	*K4FTO	"	123,977	246	199	*NN5Z	"	331,653	533	357	DFØBV	"	808,848	741	492	F5JFU	"	94,428	188	183
N2YBB	"	408,478	416	358	*W8GOC	"	110,188	204	163				(OP: K5PX)					(OP: DL1MAJ)		G4VMX	"	90,240	215	188
ND5T	"	328,650	565	350	*WØQQG/4	"	101,061	228	171	*WØPPF	"	26,100	129	116	OE6HLF	"	778,092	759	471	EI9FVB	"	86,457	208	179
K7RF	"	280,761	392	299	*W6RFF	"	96,654	211	181	*AF8C	"	14,399	83	77	SMØBSO	"	720,954	780	507	OK6DJ	"	82,164	200	167
NO6F	"	90,630	253	190	*KA9MOM	"	81,696	201	184	*KD7JS	"	152	8	8	9A2Ø6B	"	704,696	694	472	JA1QZC	"	78,432	184	152
			(OP: K2RD)		*AF4DR	"	79,341	197	159	*WF5E	7	84,812	231	182				(OP: 9A5ADH)		EU6AF	"	78,200	197	170
NE6I	"	2,233	29	29	*WGØM	"	78,672	205	176				(OP: W5AJ)		DF2TT	"	648,566	648	479	JA1XUY	"	75,392	200	128
N8HP	14	215,460	309	285	*KTØA	"	73,032	223	179	*W1DYJ	"	37,026	102	102	V47JA	"	638,469	579	351	YT2AA	"	73,308	183	164
KD8SQ	"	92,500	202	185	*N4ARO	"	69,255	167	135	*NJ1H	"	1,848	23	22	JR5RP	"	632,700	755	475	PE1LUB	"	72,168	224	194
WN2O	7	204,294	341	237	*W1CRK	"	67,932	174	153	*KCØRGH	"	462	14	14	EW8DJ	"	631,136	637	484	JA1MJN	"	70,528	188	152
			(OP: N2GC)		*KØNEB	"	66,220	171	154	*KB7QND	3.7	12,382	130	82	IK2LPF	"	608,832	765	453	F5CQ	"	67,032	159	147
KX9DX	"	48,069	231	147	*AF5CC	"	64,239	198	161						VE3MV	"	553,104	550	334	SP9OHL	"	66,256	190	164
K7EIQ	"	960	20	20	*AB5XZ	"	63,196	207	148			DX			IZ8JFL	"	541,250	700	433	HL5YI	"	63,431	189	137
W8JMF	3.7	11,232	49	48	*K4DMH	"	58,916	174	143	RT4RO	A	7,517,104	3448	1148	RN3BO	"	517,409	622	421	IZ7FLP	"	57,038	193	158
K4JC	"	10,764	55	52	*K6DSW	"	56,280	189	140	KP2MM	"	6,621,256	2574	956	GM8SBH	"	499,500	563	444	IZ2QKG	"	48,139	208	161
*NR3X/4	A	2,439,441	1517	711	*KC5FP	"	55,096	166	142				(OP: N2TTA)					(OP: GMØFGI)		JJØPJD	"	47,502	142	117
			(OP: N4YDU)		*W2VU	"	48,256	149	128	LZ2DF	"	4,606,848	2040	1032	DL8ZAW	"	493,680	556	374	F5VML	"	46,718	152	142

If you enjoy Amateur Radio...you'll enjoy CQ

It's a different kind of ham magazine.

Fun to read, interesting from cover to cover, written so you can understand it. That's CQ. Read and enjoyed by thousands of people each month in 116 countries around the world.

It's more than just a magazine. It's an institution.

CQ also sponsors these world-famous award programs and contests: The CQ World-Wide DX Phone and CW Contests, the CQ WAZ Award, the CQ World-Wide WPX Phone and CW Contests, the CQ World-Wide VHF Contest, the CQ USA-CA Award, the CQ WPX Award, the CQ World-Wide 160 Meter Phone and CW Contests, the CQ World-Wide RTTY Contest, the CQ 5 Band WAZ Award, the CQ DX Award, CQ iDX Award, CQ DX Field Award, CQ DX Marathon and the highly acclaimed CQ DX Hall of Fame. Accept the challenge. Join the fun. Read CQ.

Print Edition & New Digital Edition Combo Sale!
Buy both at a Combo price and save!

1 Year	Print	Digital	Both
USA	$38.95	$27.00	$55.95
CN/MX	$51.95	$27.00	$68.95
Foreign	$63.95	$27.00	$80.95

CQ The Radio Amateur's Journal

25 Newbridge Road • Hicksville, New York 11801 • Phone 516-681-2922 • FAX 516-681-2926

www.cq-amateur-radio.com

JA1IZZ	"	42,642	130	103
GØAZG	"	40,386	148	127
SP1MWN	"	38,804	125	109
OH1B	"	35,264	125	116
			(OP: OH1BOI)	
IZ6RWD	"	34,176	148	128
RW4WZ	"	32,760	130	117
OZ6OM	"	31,527	125	113
LY3BY	"	30,797	111	103
IW3SGT	"	25,134	141	118
YO5OPH	"	20,460	98	93
VE8DW	"	**19,178**	**88**	**86**
YO5CUQ	"	16,352	102	73
DJ8EW	"	14,872	90	88
JH1OVY	"	11,900	71	70
EI2GLB	"	10,556	54	52
RC9YA	"	9,338	60	58
			(OP: RW9Y)	
DLØSM	"	8,256	69	64
			(OP: DG3NEC)	
G4AFJ	"	6,384	50	46
IKØUXO	"	4,536	43	42
DU7JGU	"	3,956	47	43
EA4CU	"	**1,225**	**25**	**25**
LU6QI	"	**528**	**11**	**11**
IK3POG	"	270	10	10
VE2FXL	"	**243**	**9**	**9**
4XØA	28	**2,609,750**	**1503**	**650**
			(OP: 4X1VF)	
9A2U	"	**576,240**	**611**	**392**
			(OP: 9A3ZA)	
WP4WW	"	**339,756**	**589**	**276**
			(OP: KP4JRS)	
RA4WC	"	**319,923**	**560**	**369**
SV9DJO	"	**300,390**	**531**	**323**
IZ4GWE	"	**214,935**	**359**	**267**
ON6NL	"	**92,105**	**219**	**169**
LY2AE	"	**88,810**	**204**	**166**
UN4PG	"	**69,275**	**172**	**163**
OG7M	"	**31,209**	**116**	**103**
IZ2GNQ	"	14,040	78	72
R7MX	"	10,540	72	68
PY5KC	"	**2,376**	**38**	**36**
ZS1LL	"	**45**	**5**	**5**
4X9A	21	**3,505,614**	**1651**	**798**
			(OP: 4Z4OQ)	
SV9GPV	"	**2,878,092**	**2306**	**846**
VY1EI	"	**917,889**	**1005**	**401**
EB5KT	"	**674,424**	**851**	**522**
			(OP: EA5KV)	
OQ4B	"	**576,400**	**620**	**440**
			(OP: ON4BHQ)	
EA1XT	"	**513,166**	**595**	**379**
RA/KE5JA	"	**424,252**	**604**	**367**
R9DA	"	**410,742**	**451**	**342**
IZ5NFD	"	**208,453**	**334**	**307**
EA5GS	"	139,682	284	211
IZ3NVR	"	46,800	165	150
YO8RAC	"	**16,470**	**99**	**90**
VU2PTT	"	**10,416**	**64**	**62**
JA6WEQ	"	1,430	27	26
9A2Ø3B	14	**2,720,133**	**1793**	**871**
			(OP: 9A1AA)	
RY3D	"	**2,187,516**	**1580**	**866**
S51CK	"	**1,913,330**	**1386**	**730**
8SØC	"	**1,889,264**	**1282**	**806**
			(OP: SMØMPV)	

UP5P	"	**1,207,524**	**775**	**564**
			(OP: UN7PL)	
JHØNOS	"	**322,088**	**364**	**326**
IR5X	"	**252,960**	**475**	**372**
			(OP: IZ5MMB)	
EA4AK	"	**231,914**	**390**	**359**
PY2KJ	"	**72,562**	**178**	**146**
PY7ZY	"	62,080	167	128
RU4SM	"	**43,792**	**204**	**184**
SK2AZ	"	16,206	119	111
			(OP: SM2JEB)	
PY1CAS	"	12,141	72	71
MØJBA	"	7,440	86	80
YO6OEJ	"	**3,248**	**60**	**58**
9A8DX	7	**1,854,949**	**1236**	**647**
IK3UNA/1	"	**738,700**	**803**	**445**
RA3OA	"	**501,421**	**531**	**389**
LY2UU	"	**485,000**	**490**	**388**
IW5ELR	"	294,118	424	319
YV6BXN	"	**259,584**	**229**	**208**
ZL2CC	"	**256,494**	**261**	**197**
G3TDH	"	**123,824**	**247**	**218**
JJ5G3Y	"	**48**	**4**	**4**
DM5ØUEA	3.7	**1,358,934**	**1146**	**586**
			(OP: DL3BQA)	
YT4A	"	**1,243,200**	**953**	**555**
			(OP: YT1AA)	
9A2R	"	**784,665**	**764**	**477**
EA7EU	"	**622,566**	**573**	**427**
EA1EA	"	**134,829**	**241**	**213**
OR5N	"	**130,804**	**227**	**212**
			(OP: ON1CB)	
KH6QJ	"	**1,938**	**19**	**17**
IZ5MOQ	1.8	**253,968**	**433**	**296**
SV1GRD	"	**7,257**	**63**	**59**
***ZL3IO**	A	**6,182,904**	**2283**	**894**
***RT9S**	"	**3,285,816**	**1437**	**696**
***TO7BC**	"	**3,172,628**	**1478**	**727**
			(OP: DL7BC)	
***IB1B**	"	**2,966,194**	**1386**	**847**
			(OP: IW1QN)	
***E21EIC**	"	**2,846,340**	**1525**	**753**
***XQ7UP**	"	**2,216,865**	**1238**	**645**
*IQ2Z	'	2,028,285	1270	705
			(OP: IK2DZN)	
***UR4U**	"	**1,862,091**	**1272**	**693**
			(OP: UR4UDI)	
***DL6NDW**	"	**1,510,625**	**1285**	**625**
***EW5W**	"	**1,482,848**	**1142**	**596**
			(OP: EW1IP)	
***PY2VZ**	"	**1,434,850**	**945**	**554**
***YB1TJ**	"	**1,426,810**	**920**	**545**
***EE7R**	"	**1,165,794**	**954**	**574**
			(OP: EA7IA)	
***LU7HW**	"	**1,133,719**	**850**	**491**
***ER4LX**	"	**1,121,940**	**1051**	**542**
***LY2SA**	"	**1,102,900**	**967**	**538**
***JH1EAQ**	"	**1,061,548**	**781**	**466**
***P43E**	"	**1,046,560**	**858**	**422**
***PD9X**	"	**1,004,792**	**976**	**568**
***UA3ABJ**	"	**992,351**	**917**	**551**
*PV7M	'	963,500	791	470
			(OP: PT7ZT)	
***EI5GSB**	"	**958,938**	**899**	**543**
***OP4A**	"	**948,170**	**771**	**530**
*JM1UTT	'	948,024	765	462
***OM8DD**	"	**854,128**	**806**	**506**

***EA8OM**	"	**838,452**	**644**	**428**
			(OP: DJ1QJ)	
*EU2DX	"	790,035	863	465
***SE5S**	"	**752,640**	**708**	**490**
***GIØRQK**	"	**736,223**	**726**	**479**
*DL4WA	"	724,916	726	508
*I1ES	"	708,435	677	455
***KH6GJ**	"	**672,948**	**662**	**324**
*PAØMIR	"	632,835	648	441
*LY2TS	"	615,276	718	422
***JA2CUS**	"	**613,056**	**584**	**372**
***OK1CLD**	"	**612,896**	**688**	**428**
***XE1XOE**	"	**590,303**	**721**	**343**
***F8AEE**	"	**580,440**	**701**	**420**
***WP3GW**	"	**575,073**	**524**	**361**
*GI7AXB	"	573,648	697	456
***UA1CUR**	"	**556,278**	**676**	**417**
***MMØBQN**	"	**555,940**	**619**	**418**
*ON4VDV	"	524,728	550	428
*DM2SR	"	524,208	591	402
*EI7JZ	"	515,034	604	403
***JA6DIJ**	"	**492,102**	**520**	**351**
*UA3RF	"	486,390	745	465
***BG4ACE**	"	**477,666**	**699**	**357**
***OU8A**	"	**460,498**	**658**	**386**
*9A2ØZGA	"	**456,252**	**615**	**394**
			(OP: 9A2GA)	
*JM1LRQ	"	454,346	613	367
*DM5JBN	"	451,526	580	401
*OZ1ALB	"	442,728	578	387
*BG8GAM	"	426,904	568	344
***VE3NNG**	"	**420,136**	**443**	**306**
*SJ7M	"	393,470	498	365
*EI3CTB	"	392,040	551	363
*IKØXBX	"	391,590	481	342
***HI3TT**	"	**377,300**	**517**	**308**
***HB9WDY**	"	**374,960**	**504**	**344**
*IK7NXU	"	363,216	454	376
*IZ3KKE	"	352,253	411	341
*SM6MVE	"	343,285	505	355
*OZ4NA	"	336,826	515	343
***JHØNEC**	"	**334,184**	**411**	**296**
***RL6MA**	"	**325,360**	**548**	**332**
*OK7N	"	319,853	395	317
*DL1MHJ	"	317,220	434	311
*RW9C	"	311,505	399	285
*OK2BZE	"	310,072	436	343
***OE5JSL**	"	**308,691**	**394**	**309**
*US7IA	"	290,274	462	303
*UA6HHE	"	283,200	480	300
*LY2N	"	281,710	427	286
*JH1DYU	"	276,940	381	244
***IW9FI**	"	**253,761**	**458**	**337**
*UA9SAW	"	245,949	341	257
*BG5LU	"	240,264	446	282
***CO6LP**	"	**236,775**	**503**	**231**
*OZ1KVM	"	233,478	401	306
*PA9WOR	"	217,848	435	313
*EI4GXB	"	212,667	360	273
*PA3DBS	"	212,472	407	312
***VE6SQ**	"	**208,210**	**354**	**235**
***SO9NKK**	"	**204,060**	**373**	**285**
*DL3LSM	"	203,931	350	273
*NH6AB	"	203,732	318	212
*PD73X	"	196,196	424	308
			(OP: PDØEMR)	
*JA1CPU	"	189,072	323	234
*OK2WYK	"	188,768	347	272
*DF9FT	"	184,527	336	261
*LU4HW	"	164,502	296	234
***CT2IVH**	"	**162,908**	**374**	**283**
***M1JJK**	"	**159,993**	**340**	**261**
*LW4EF	"	157,311	306	231
*G8AFN	"	154,869	324	247
*SO9IAU	"	154,178	310	254
*F6GC	"	153,140	295	247
*IK7WPD	"	147,500	308	250
*RU3VV	"	146,050	326	254
*7K4VPV	"	144,256	269	196
***OH9GGY**	"	**141,226**	**282**	**241**
*US6IKV	"	136,795	328	251
*DJ4DN	"	136,754	246	202
*OH3DP	"	135,752	302	239
*SO8NZB	"	132,153	249	203
*JA1XRH	"	131,008	233	184
*PA3FMC	"	125,628	295	228
*DF1LX	"	116,790	272	229
*YB7SKM	"	114,560	248	160
***JG5UWK**	"	**114,240**	**253**	**170**
***HZ1PS**	"	**109,395**	**205**	**187**
*XE1FZE	"	106,020	253	180
***Z35F**	"	**105,408**	**321**	**244**
*IW1RHR	"	104,607	256	197
*DL7URH	"	103,716	265	201
*VE3TU	"	100,245	201	163
*EU3AA	"	97,776	257	194
*DL0NG	"	97,740	220	181
			(OP: DK8NC)	
*DL5GAC	"	96,960	242	192
***SV7CUD**	"	**94,940**	**237**	**202**
*IK8NSR	"	93,258	215	198
*RL6LP	"	93,015	227	195
*PY3OPP	"	92,364	200	172
***DU7HF**	"	**92,316**	**217**	**147**
*JA1AZR	"	91,520	241	143
*VE3RCN	"	80,256	183	152
***CN8WW**	"	**72,884**	**173**	**137**
***JR3BOT**	"	**70,641**	**188**	**141**
*IK2YSJ	"	68,378	213	179
***JE4MHL**	"	**65,392**	**156**	**134**
***A65CA**	"	**64,904**	**167**	**133**
			(OP: RV6AJJ)	
*DL1SVA	"	63,282	178	159
*IZ5RKC	"	61,845	190	155
*IW2NRI	"	60,264	180	162
*DM3PKK	"	58,144	174	158
*G4NXG	"	57,820	167	140
*SO8G M	"	57,218	165	134
***VE2AXO**	"	**55,188**	**157**	**126**
*PDØME	"	54,908	169	148
*DK6NF	"	52,992	158	138
***RXØSA**	"	**51,348**	**145**	**132**
*YBØMWM	"	51,186	139	114
***HA5UA**	"	**50,697**	**153**	**131**
*JF2OZH	"	50,570	147	130
***TA5CV**	"	**48,081**	**115**	**93**
*JA6GMC	"	46,728	162	118
*PY3AJB	"	43,596	144	126
*IK2IKW	"	42,742	158	142
*RX9DJ	"	41,820	133	123
*CT1FOQ	"	41,374	146	137
*DL8ZAJ	"	41,340	157	130
*UA5D	"	41,328	164	144
*YB2ECG	"	40,005	138	105

*JA1MZM	"	39,183	137	111
***VK2BO**	"	**38,986**	**124**	**101**
*SA7AHC	"	38,907	134	131
*LY2BBF	"	38,016	157	128
*DL5ZBA	"	37,820	144	124
*JE1LDU	"	36,080	139	110
*UA9AGX	"	36,064	129	112
*VK4BL	"	34,344	127	108
***JE8KKX**	"	**33,088**	**131**	**94**
*YB7MRK	"	32,865	120	105
*OK2TC	"	32,500	150	125
*JL3RDC	"	32,344	137	104
***YO9HRB**	"	**31,354**	**153**	**122**
*DL8AA	"	31,000	141	125
*PA1ØØNOM	"	30,702	150	129
			(OP: PAØFAW)	
*PR2W	"	30,485	127	91
			(OP: PT2AW)	
*US7IGN	"	30,129	131	121
*ON4CT	"	29,810	120	110
*PA8KM	"	29,606	151	131
*ER3DX	"	29,472	107	96
*JE1CWQ	"	29,321	129	109
*RU3AWK	"	29,260	159	133
			(OP: RU3ALH)	
*IW2MYG	"	28,203	139	119
*JJ1LRD	"	27,936	130	96
*JA4BDY	"	27,451	118	97
*VK3NRW	"	27,448	106	94
*SMØHBV/3	"	26,904	133	114
*SP6FXY	"	25,721	98	89
*F8CRS	"	24,605	104	95
*PP7LL	"	24,510	117	95
*RXØSC	"	24,153	102	97
*JR1MRG	"	23,639	114	77
*IZ4RYS	"	23,265	105	99
*DK1FW	"	22,792	93	88
*SI5Y	"	22,032	122	108
			(OP: SM5BKK)	
*IK2QIN	"	19,710	96	90
*SP9JZT	"	19,437	97	93
*SM6XVI	"	19,344	107	104
*IZ1HBC	"	19,008	107	96
*IZ4AFW	"	17,064	82	79
*MØSFR	"	16,849	91	83
*PAØB	"	15,750	105	90
*7J6AAO	"	15,120	84	72
***EA2BVV**	"	**15,120**	**121**	**105**
*UA9UX	"	15,120	75	70
*JR4ISF/3	"	14,528	90	64
*JR2NTC	"	14,325	93	75
*IK2SGB	"	14,162	78	73
*UA1CBM	"	13,585	108	95
*CE3WYZ	"	13,206	75	71
*JR3SZZ/3	"	12,870	93	66
*JA1GFB	"	12,805	88	65
*JJ3OJS/6	"	12,348	79	63
*IK6SBW	"	12,320	87	77
*SH3O	"	11,424	71	68
			(OP: SM3LG)	
*IV3IDP	"	11,172	85	76
*CT1EBM	"	10,586	76	67
*VE2OXA	"	10,200	61	60
*JA4AQR	"	10,080	64	60
***RA9FRD**	"	**8,556**	**72**	**69**
*R5AJ	"	7,473	58	53
*IV3XZG	"	7,353	57	57
*DF6YC	"	6,554	61	58
*DG7RO	"	5,995	58	55
*VA6AN	"	5,670	49	42
***PJ2OF**	"	**5,192**	**45**	**44**
*RW5D	"	5,180	47	37
*IZ1QXW	"	4,914	45	42
*DF9IU	"	4,277	49	47
*DL1RIQ	"	3,648	50	48
*IZ1QXV	"	3,432	41	39
*RL3AU	"	3,128	39	34
***JA7HYS**	"	**2,900**	**29**	**29**
***HL2/KA8U**	"	**2,624**	**39**	**32**
*EI2KA	"	2,201	34	31
*9A4WY	"	1,500	24	20
*OZ4RT	"	1,449	24	21
*JG2KFI	"	1,440	47	36
*IZ8FTW	"	1,280	22	20
*DL5FCY	"	1,122	23	22
*YO2LIM	"	931	20	19
*G4JFS	"	588	14	14
*DH6YMC	"	578	18	17
*IW2DJN	"	512	17	16
*IZ8IBC	"	448	16	16
*IW7EGJ	"	363	13	11
*I3YYY	"	312	22	13
*DO5ALX	"	264	13	12
*JK1CYF	"	252	12	12
*BG1SQT	"	60	6	6
***LU7EC**	28	**2,525,888**	**1383**	**647**
*AY8A	"	1,070,913	791	487
			(OP: LU8ADX)	
*LU8DCF	"	985,150	756	475
*LU3DR	"	779,833	663	433
***HQ2N**	"	**292,608**	**521**	**256**
			(OP: JA6WFM)	
***CE5PHI**	"	**208,750**	**337**	**250**
***F5LIW**	"	**194,640**	**319**	**240**
***PU5BMA**	"	**154,822**	**290**	**199**
*PU1MMZ	"	150,570	289	239
***MUØGSY**	"	**146,272**	**336**	**224**
*PU2VTC	"	79,261	218	169
***KP4JFR**	"	**76,000**	**202**	**160**
***7N2UQC**	"	**61,544**	**185**	**157**
*LU1DR	"	52,780	163	140
***YB1UUN**	"	**40,002**	**122**	**113**
***RAØSF**	"	**35,424**	**134**	**123**
***R6CW**	"	**34,608**	**133**	**112**
***TE2M**	"	**25,730**	**124**	**83**
			(OP: TI2KAC)	
***OH2BEN**	"	**23,328**	**110**	**96**
***UN9PD**	"	**16,892**	**86**	**82**
***IZ5WTV**	"	**12,342**	**72**	**66**
***XE2RV**	"	**12,220**	**87**	**65**
*PY2HH	"	11,700	81	78
*IW5ECP	"	11,658	69	67
***OL7Y**	"	**8,848**	**56**	**56**
***JA3LKE**	"	**6,188**	**55**	**52**
***DM3F**	"	**4,879**	**41**	**41**
			(OP: DH5FS)	
*DC1DB	"	1,656	24	23
***GØFPU**	"	**171**	**9**	**9**
*PU2LED	"	81	10	9
***R9MC**	21	**925,688**	**696**	**502**
***UAØSOX**	"	**798,930**	**694**	**495**
***RUØSO**	"	**602,922**	**736**	**514**
***EE1B**	"	**387,045**	**512**	**423**
			(OP: EA1YB)	

***CT1EEK**	"	**312,858**	**473**	**382**
***UT7NW**	"	**241,293**	**389**	**299**
***IQ3K**	"	**237,336**	**395**	**319**
*IZ5HSK	"	179,025	308	275
***R2SA**	"	**119,556**	**285**	**243**
*IZ5CMI	"	104,682	254	219
*IK1BBC	"	96,515	228	199
***JE2BOM**	"	**41,682**	**140**	**123**
***EU4AA**	"	**40,950**	**149**	**130**
*UT2AB	"	27,336	110	102
***S52Q**	"	**22,119**	**112**	**101**
***DL4JYT**	"	**17,889**	**89**	**89**
*RD3AJB	"	14,508	96	93
***JR4LRY**	"	**14,129**	**95**	**71**
***JA3BBG**	"	**9,780**	**67**	**60**
*IK8TFN	"	9,450	75	75
***7M1MCY**	"	**8,736**	**64**	**56**
***F4CGJ**	"	**2,204**	**38**	**38**
***ZL2K**	"	**1,820**	**28**	**26**
			(OP: ZL2KT)	
*G7RSM	"	35	5	5
*JR1AHP	"	27	3	3
***PY1ZV**	14	**1,287,453**	**854**	**543**
***ZM3T**	"	**1,036,074**	**780**	**481**
			(OP: W3SE)	
***S57U**	"	**453,840**	**663**	**465**
***XR1I**	"	**445,284**	**480**	**342**
			(OP: CE1KR)	
***EF7W**	"	**425,898**	**642**	**478**
			(OP: EC7KW)	
***OK6RA**	"	**371,840**	**629**	**415**
***IQ2DN**	"	**371,234**	**560**	**419**
			(OP: IZ2JQP)	
***YT2AAA**	"	**341,523**	**588**	**417**
***DL9ZP**	"	**320,000**	**519**	**400**
***UA3VVB**	"	**311,236**	**497**	**391**
***OG3P**	"	**273,424**	**553**	**368**
			(OP: OH3P)	
*IZ8EFD	"	219,240	490	360
***JR4GPA**	"	**215,975**	**338**	**265**
***G3VAO**	"	**192,060**	**394**	**330**
***UA9MRY**	"	**190,762**	**288**	**253**
***VA7CRZ**	"	**133,042**	**249**	**221**
***EE1X**	"	**101,255**	**300**	**263**
			(OP: EB1EVX)	
***VE3IAE**	"	**89,858**	**189**	**179**
*VA3GUY	"	50,697	142	129
***SP5DRE**	"	**22,620**	**128**	**116**
***JA3DAY**	"	**18,860**	**88**	**82**
***RV6ACC**	"	**10,864**	**100**	**97**
***IR9Z**	"	**10,509**	**99**	**93**
*PY2VM	"	6,018	53	51
*IZ5MXA	"	5,600	61	56
*IZ6NNH	"	3,240	55	54
*VE3AUO	"	1,904	28	28
*VK5UE	"	176	10	8
***N1BJ/KH2**	"	**12**	**2**	**2**
***EN1C**	7	**845,435**	**708**	**479**
***VY2MGY/3**	"	**685,640**	**637**	**281**
			(OP: VE3MGY)	
***OK2ILD**	"	**312,180**	**406**	**330**
***IQ1BD**	"	**283,976**	**414**	**308**
			(OP: IZ1DGG)	
*VE3SWS	"	146,190	183	165
***YC2WBF**	"	**83,611**	**154**	**121**
***DD9WG**	"	**59,732**	**146**	**137**
***MØVWK**	"	**21,902**	**100**	**94**
***SP9LWH**	"	**12,530**	**71**	**70**
***VK3VTH**	"	**12,288**	**50**	**48**
*DLØESA	"	1,978	23	23
			(OP: EA1HEO)	
*OV3X	"	1,325	25	25
			(OP: OZ8AE)	
***YL2GUV**	3.7	**336,980**	**450**	**332**
***S53NW**	"	**243,837**	**394**	**297**
***R3LC**	"	**224,548**	**374**	**292**
*S53N	"	220,792	362	286
			(OP: S58G)	
***OMØCS**	"	**213,030**	**366**	**270**
***IT9JDH**	"	**139,200**	**260**	**232**
***UR8IDX**	"	**552**	**13**	**12**
***VE3EDY**	1.8	**8,140**	**50**	**44**

CHECKLOGS

2EØOKS, 4X4REM, 5C5W, 5Q4B, 8J6O, A45XR, AB4G, BA5BJ, BD2OB, BD2UYY, BD4CD, BD4GNV, BG8SWA, CE2WZ, CX5BE, DAØHEL, DB1EF, DF8UO, DG1BQC, DH2PL, DJ2BC, DL1EKO, DL1VTL, DL6ER, DL6HWH, DL7UGO, DM5DX, E72U, E73W, E74Y, E77M, EA1AW, EA1EWY, EA1FDI, EA1JK, EA1OS, EA1VO, EA1YT, EA2MH, EA2WD, EA3BHK, EA3NO, EA4DUT, EA4GB, EA4TX, EA5WP, EA6AFM, EA6XO, EB2RA, EC5CY, EC7AMY, EC7DZZ, ED5D, EI7JK, EU6RO, G3RSD, G3RWL, G3VQO, G4AYU, G6ENY, GM4JR, HAØGK, HA3OU, HF1K, HI3TEJ, HSØZDR, HSØZDY, I2WIJ, IK3QAR, IR1Y, IV3JCC, IV3NVN, IWØHOU, IW3AU, IZ2SMQ, IZ4MJP, IZ8TXX, JG1SXP, K4RO, K9JU, KB1GKN, KE4KY, KE7SW, KJ4FEL, KJ6MQE, LA3BO, LA6NNA, LY1K, LY2KZ, N1WQ, N2CJ, N2WLS, N5AU, NE6M, NX1T, NY1H, OE5FZO, OK1RKS, OK1TA, OK1UKV, OK2QX, OK2RN, OM5CD, OO9O, OZ1AXG, PAØRBO, PAØRRA, PAØWYS, PT9PA, PY1JR, PY1KN, PY2HAM, PY4CHM, R2AB, R2EAA, R3PA, R6GA, R9RT, RA1AIW, RA2FIA, RA3THN, RA3XDX, RA9AU, RA9CIN, RA9MEM, RA9YTX, RD3AW, RK4PA, RN7G, RN9A, RU1A, RU3FN, RU3UA, RU7A, RV1OO, RV3ID, RWØLL, RW4HD, RW6AVQ, RX6AMV, RZ1AN, RZ3DOT, RZ9AN, RZ9YF, SE6C, SF7WT, SO4R, SP1DMD, SP1MVW, SP2FWC, SP3EA, SP3IC, SP5NZZ, SP6JOE, SP6MLX, SP6NVN, SP6TRX, SP7HOV, SP9CLU, SP9HZW, SQ1OD, SQ2NNN, SQ3POY, SQ4HRN, SQ5OVL, SQ7BFS, SQ8IFG, SQ9E, SQ9MZ, TA2RX, TA7N, AØCA, AØSIK, UA3ICU, UA3OO, UA4SJS, UA6GK, UA9XSJ, UB9LBL, UN7ECA, UN7LAN, UR3CRD, UR4QZZ, UR9QQ, US1IW, UT5CB, UT7MW, UU4JOE, U5JZ, W5UL, UX1IL, UZ5UA, VE2PZ, VE3QI, VK7XX, WØKIT, W5WJR, W6HYI, WN7Z, XE1/DL3DUE, XE2EX, YL2TD, YL2TQ, YO2MIL, YO4BTB, YO8CHF, YO8DDP, YO8RKU, YO9HOW, YU7KW, ZL1XX

Rule Violations:
Yellow Cards: ED5K, EO4M, RV9CP, R5AKU, EC6AAE – unclaimed assistance [rule IV(e)]
RX1CQ – excess power [rule V.A.c]

Red Cards: TG9ANF – unclaimed assistance and excess power [rules IV(e), V.A(c)]

Looking Ahead in

Amateur Radio

Here are some of the articles we're working on for upcoming issues of *CQ*:

- Sparks in the Snow
- CW Results, 2012 CQ World-Wide WPX Contest
- An HF Modem Autoswitch

Upcoming specials: QRP (March), Take it to the Field (June), Emergency Communications (Oct.), Technology (Dec.).

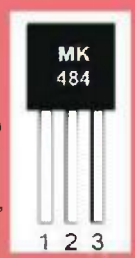
Do you have a ham radio story to tell? Something for one of our specials? See our writers' guidelines on the CQ website at <http://www.cq-amateur-radio.com/guide.html>.

advertisers' index

including website addresses

MK484 AM RX KIT!

Our PCBs have arrived and the kit is ready to go. Check the details on our web kits page. It includes PCB, PCB parts, panel, chassis, ferrite core, and air variable capacitor for tuning. The MK484 is capable of AM reception from 180 to 3,000 kHz. Our circuit runs on a 9V battery and includes a 1.5V regulator, MK484 chip, and 386-4 audio IC. PCB is 4.0 by 2.5", fitting on a 5x5 inch chassis with 5x5.5 laser labeled front panel on anodized aluminum. Build time is about 1.5 hours for a regular kit builder. Great for nighttime listening!

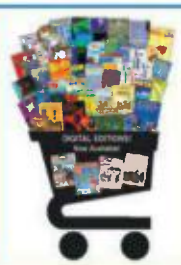


The Xtal Set Society
www.midnightscience.com
405-517-7347

NATIONAL RF, INC.

VECTOR-FINDER
Handheld VHF direction finder.
Uses any FM xcvr. Audible & LED display
VF-142Q, 130-300 MHz $239.95
VF-142QM, 130-500 MHz $289.95
7969 ENGINEER ROAD, #102, SAN DIEGO, CA 92111
858.565.1319 FAX 858.571.5909
www.NationalRF.com

Hobby books, cds, dvds & calendars!



CQ Communications, Inc. Online Store!
http://store.cq-amateur-radio.com

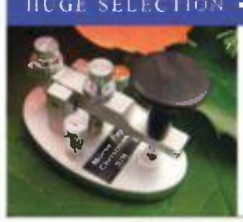
www.MorseX.com

OAK HILLS RESEARCH · MORSE Express · AMECO

Everything for the Morse Enthusiast!

KEYS	PADDLES	BUGS
Keyers	Kits	Tools
Parts	Accessories	Books

HUGE SELECTION • FREE CATALOG



2012 Christmas Key
$99.95

Milestone Technologies Inc
10691 E Bethany Dr Ste 800 Aurora CO 80014

1-877-DOT-DASH

ham shop

Advertising Rates: Non-commercial ads are 20 cents per word including abbreviations and addresses. Commercial and organization ads are $1.00 per word. Boldface words are $1.50 each (specify which words). Minimum charge $2.00. No ad will be printed unless accompanied by full remittance. All ads must be typewritten double-spaced.
Closing Date: The 10th day in the third month preceding date of publication (example: Jan. 10th for the March issue). Because the advertisers and equipment contained in Ham Shop have not been investigated, the Publisher of *CQ* cannot vouch for the merchandise listed therein. The publisher reserves the right to reject any advertisement. Direct all correspondence and ad copy to: CQ Ham Shop, 25 Newbridge Road, Hicksville, NY 11801 (fax: 516-681-2926; e-mail: <hamshop@cq-amateur-radio.com>.

"QRZ DX"—since 1979: Available as an **Adobe PDF file** each Wednesday or by regular mail. Your best source for weekly DX information. Send #10 SASE for sample/rates. **"The DX Magazine"—since 1989:** Bi-monthly – Full of DXpedition reports, QSL Information, Awards, DX news, technical articles, and more. Send $3.00 for sample/rates. DX Publishing, Inc., P.O. Box DX, Leicester, NC 28748-0249. Phone/Fax: 828-683-0709; e-mail: <DX@dxpub. com>; <http://www.dxpub.com>.

At **www.HamRadioExpress.com** we know you can't afford to waste time looking for Ham Radio Antennas & Accessories. With **over 3,000 products in our four warehouses**, you can rely on **Ham Radio Express** to have the parts you need, in stock, especially those special, hard-to-find parts, fixed station antennas, baluns, mobile antennas, mobile antenna mounts, accessories, and RF connectors. **Custom Built Cable Assemblies** for your Packet TNC/KPC to radio interface devices. We stock interface cables for all amateur radio makes and models: AEA, Kantronics, MFJ, PacComm, and more Packet Controllers. All cables are in stock or can be built in one day. All cable assemblies are double-checked before they are shipped. Toll-Free Order Lines: M–F 9 AM to 4 PM: **1-800-726-2919** or **1-866-300-1969**; Fax **1-434-525-4919**. **Help and Tech Support:** *Not sure what model you need?* At **www.HamRadioExpress.com** our Technical Support staff (1-434-632-7028, 9 AM to 4 PM weekdays) can help you decide what you need, and all available for same-day shipment. Online visit: **www.HamRadioExpress.com**

MAUI, HAWAII: vacation with a ham. Since 1990. <www.seaqmaui.com>, telephone 808-572-7914, or <kh6sq@seaqmaui.com>.

ALUMINUM CHASSIS AND CABINET KITS, UHF-VHF Antenna Parts, Catalog. On the web: <http://www.k3iwk.net>; e-mail: <k3iwk@verizon.net>.

REAL HAMS DO CODE: Move up to CW with **CW Mental Block Buster III.** Succeed with hypnosis and NLP. Includes two (2) CDs and Manual. Only $29.95 plus $7.00 s/h US. FL add $2.14 tax. Success Easy, 568 SE Maple Terrace, Port St. Lucie, FL 34983, phone 561-302-7731, <www.success-is-easy.com>.

TWO NEW NOVELS Involving ham radio: *Full Circle*, and *Frozen in Time*, by N4XX. Visit <http://www.theodore-cohen-novels.com/>.

QSLing SUPPLIES. e-mail: <plumdx@msn.com>.

WWW.PEIDXLODGE.COM

CASH FOR COLLINS, HALLICRAFTERS SX-88, & DRAKE TR-6. Buy any Collins equipment. Leo, KJ6HI, phone/fax 310-670-6969, e-mail: <radioleo@earthlink.net>.

www.SecondHandRadio.com

MicroLog by WA0H
Free download . . . www.wa0h.com

LOOKING GREAT on the wall behind your equipment. <www.hamradioprints.com>

OVERSEAS AIRMAIL POSTAGE plus complete line of airmail envelopes. Order directly from our website. James E. Mackey, proprietor. website: <www.airmailpostage. com>

ARUBA RADIO RENTAL: www.p49v.com

TOWER ACCESSORIES Gin Pole Kits – stand off brackets – antenna mounts – vehicle radio mounts – for 30 years. IIX Equipment Ltd., 708-337-8172, <http://www.w9iix.com/>.

HOMEBREW! "Recollections of a Radio Receiver" a 565 page book on HBR homebrew receivers. $10 delivered (eBook on CD-ROM). Details <www.w6hht.com>

WANTED: VACUUM TUBES – Commercial, industrial, amateur. Radio Daze, LLC, 7620 Omnitech Place, Victor, NY 14506 USA (phone 585-742-2020; fax 800-456-6494; e-mail: <info@radiodaze.com>).

ARMS – Amateur Radio Missionary Net. Christian Fellowship Net, Everyone Welcome. 14.3075 Daily except Sunday 1500–1700Z, –1 Hr DST. Website: www.qsl.net/arms

NEAT STUFF! DWM Communications: <http:// qth.com/dwm>

VORTEX ANTENNA SYSTEMS specialist in HF and VHF high performance antennas. Yagis and Delta Loops. Linear Loaded 30 and 40m Arrays. OWA Arrays, bespoke individual design solutions. Antenna related hardware. We ship worldwide including North America. <www.vortexantennas.co.uk/>. or by e-mail to <enquiries@vortexantennas.co.uk>.

WANTED: HAM EQUIPMENT AND RELATED ITEMS. Donate your excess gear—new, old, in any condition—to the Radio Club of Junior High School 22, the Nation's only full time non-profit organization working to get Ham Radio into schools around the country as a teaching tool using our EDUCOM—Education Thru Communication—program. Send your radio to school. Your donated material will be picked up ANYWHERE or shipping arranged, and this means a tax deduction to the full extent of the law for you as we are an IRS 501(c)(3) charity in our 31st year of service. It is always easier to donate and usually more financially rewarding, BUT MOST IMPORTANT your gift will mean a whole new world of educational opportunity for children nationwide. Radios you can write off; kids you can't. Make 2012 the year to help a child and yourself. Write, phone, or FAX the WB2JKJ "22 Crew" today: The RC of JHS 22, P.O. Box 1052, New York, NY 10002. Twenty-four hours call 516-674-4072; fax 516-674-9600; or e-mail <crew@wb2jkj.org>. Join us on the WB2JKJ Classroom Net, 7.238 MHz, 1200–1330 UTC daily and 21.395 MHz from 1400 to 2000 UTC.

IMRA-International Mission Radio Assn. helps missioners—equipment loaned; weekday net, 14.280 MHz, 1:00–3:00 PM Eastern. Sr. Noreen Perelli, KE2LT, 2755 Woodhull Ave., Bronx, NY 10469.

"World of Keys – Keys III" book features highly detailed views and photos of keys, bugs, and paddles like few people have ever seen ($18)!. Also still available, **"Keys II"** ($16) and **"QRP Romps!"** ($18), plus **"Your Guide to HF Fun"** ($16). Available from dealers nationwide.

ROTATING GUYED TOWERS AND ORBITAL RING ROTORS: Rotating bases, Rotating guy rings, Orbital ring rotors. For 45G, 55G, or Custom. Learn more and request free PDF catalog at www.SuperBertha.com or call 814-881-9258.

PACKET RADIO AND MORE! Join TAPR, connect with the largest amateur radio digital group in the U.S. Creators of the TNC-2 standard, working on Software Defined Radio technology. Benefits: newsletter, software, discounts on kits and publications. For membership prices see the TAPR website: <http://www.tapr.org>).

www.oldqslcards.com

HAWAII HAM STATION RENTAL: Beautiful Big Island location. Brochure: <KD4ML@juno.com>.

DXPEDITION DVD VIDEOS: For full description and how to order . . . <www.k4uee.com/dvd/>.

www.isotronantennas.com FOR HF. CHECK IT OUT! Call: 719-687-0650; **<wd0eja@isotronantennas. com>**

SMART BATTERY CHARGERS: 5A model for larger deep cycle down to 1/4A model for smaller QRP lead acid batteries. <www.a-aengineering.com>

HONDURAS DX VACATION: K3, Alpha 86, SteppIR, Meals, Private Facilities. HR2J, (206) 259-9688.

HY POWER ANTENNA COMPANY <http://www.freewebs.com/hypower> Multiband dipoles, delta loops, half squares and QRP antennas.

HAM RADIO PARADISE in the Pacific (NA-072) for sale. See www.qsl.net/hp1vxh and e-mail to contadora@gmx.de

240-PIECE KEY (a few sounders) COLLECTION: I am selling the collection, delivered, to the highest bidder for P43JB's widow; photos @http://photobucket.com/P43JB; list via e-mail to ai6v@aol.com.

NEW AMATEUR RADIO MAP with DXCC list updates. Full color 22 x 34" – $10. Free shipping on club orders. **http://www.hamradiomap.qth.com/**

<http://www.vintagehamshack.com>

COLLINS . . . Owners of Collins 30S-1 amplifiers. Very rare. K201, K202, and K203 relays now available. Newly manufactured – not NOS. We ship overseas. More info on **www.collinsradioactive.com**

DISPLAY YOUR CALL SIGN IN NEON. To order call 1-401-846-0294, Duncan DeSigns

YAGIS DESIGNED BY WA3FET/K3LR: Bust pileups using these proven DX and Contest winning "Ultimate OWA Yagis"! Learn more and request free PDF catalog at www.SuperBertha.com or call 814-881-9258.

ROTATING MONOPOLE TOWERS: SuperBertha . . . BudgetBertha . . . No guy wires, Entire pole rotates, Ground level rotor. Stack and rotate all your antennas at optimum heights on one monopole. The Ultimate antenna system! Learn more and request free PDF catalog at www.SuperBertha.com or call 814-881-9258.

HAWAII DX VACATION: SteppIR antennas, amplifiers, private. KH6RC, <www.leilanibedandbreakfast.com>.

WWW.KM5KG.COM

HAM TRAVELERS Discount travel, tours, cruises, more. **www.GreatExpectationTravel.com**

PROMOTIONAL VIDEO: 15-minute DVD describes amateur radio's fun and public service. Details: <www.neoham.org>.

WANTED: OLD QSL CARD COLLECTIONS. Collector seeks US & DX cards. W2VRK, 9 Laird Terrace, Somerset, NJ 08873; e-mail: <tpllrs@comcast.net>.

TELEGRAPH KEY INFORMATION AND HISTORY MUSEUM: <http://w1tp.com>

HAM RADIO GIFTS: <www.mainestore.com>

FT243 AND HC6U CRYSTALS: www.af4k.com

VAIL, COLORADO mountaintop 40-mile views, 4000-square-foot home. Upscale construction and finishes. Secluded woods but 10 minutes to town. Includes $75K ham station and other items. Front cover *CQ* magazine 2004. One of the best ham locations in country. Selling for health reasons. Just dropped price $300K well below appraisal and construction cost for quick sale. $895K. www.w0tm.com, phone 913-441-6593.

FREE 2-meter Repeater Frequencies for Travelers by Western Trucker: **USREPEATERS.ORG**

CHECK SPOTS; log contacts; manage QSLs, LoTW with DXtreme Station Log: <http://www.dxtreme.com/>.

DX BOOKS: "Up Two – Adventures of a DXpeditioner," "Contesting in Africa," Micro-DXpeditioning Uncovered," "DX Delights – Tales of Travels with my Radio." All informative and fun! Signed by the author, **Roger Western, G3SXW.** Details: <g3sxw@btinternet.com>, $20 each including postage. PayPal or cash to G3SXW.

FUTURE TIMES: Dreams and visions of Disasters. Great guide book for Hams. www.xlibris.com/futuretimes.html

OLD QSLs Available. 50's and 60's, DX and USA. Specify call, send SASE. W5SQA@arrl.net

RFI Filters <www.RFchoke.com>

QRP KITS: <www.breadboardradio.com>

SOTA BEAMS: <http://www.sotabeams.co.uk>. G3CW

CRANK-A-WATT Power & More via KE5NYS. Visit <www.FactorReady.com>

HAM RADIO CLUB WEBSITES & NEWSLETTERS: Domain names, websites, email, newsletters, logos and club marketing aids. Newsletters customized for your club. So affordable any size club can now have a professional newsletter. http://www.HamRadioWebsites.Net (503-717-3484)

advertiser's index

including website addresses

Hy-Gain	9	www.hy-gain.com
ICOM America, Inc	27	www.icomamerica.com
KJI Electronics	49	www.kjielectronics.com
Kanga US	72	www.kangaus.com
Kenwood U.S.A. Corporation	Cov. II	www.kenwoodusa.com
LDG Electronics, Inc.	33	www.ldgelectronics.com
M² Antenna Systems, Inc.	Cov 3	www.m2inc.com
MFJ Enterprises, Inc.	31,43	www.mfjenterprises.com
Miami Tropical Hamboree	91	http://miamihamfest.net
Morse Express	113	www.morseX.com
National RF, Inc.	113	www.NationalRF.com
Orlando HamCation℠ 2012	81	www.HamCation.org
PowerPort	49	www.powerportstore.com
QCWA	72	www.qcwa.org
R.F. Connection	23	www.therfc.com
RF Parts Company	19	www.rfparts.com
Radio Club of J.H.S. 22	67	www.wb2jkj.org
SteppIR Antennas Inc.	21	www.steppir.com
Tac-Comm	49	www.tac-comm.com
Ten-Ten International Net, Inc.	61	www.ten-ten.org
Telewave, Inc.	73	www.telewave.com
XTAL SET SOCIETY, THE	113	www.midnightscience.com
Timewave Technology, Inc.	37	www.timewave.com
Universal Radio	63	www.universal-radio.com
Vibroplex	49	www.vibroplex.com
W2IHY Technologies	85	www.w2ihy.com
W4RT Electronics	51	www.w4rt.com
W5YI Group	17	www.w5yi.org
West Mountain Radio	53	www.westmountainradio.com
Yaesu	6,7,Cov IV	www.yaesu.com

Let CQ help you get the most for your advertising dollar.
Contact Charlie Payne at 859-305-6117
e-mail: charlie@cqcomm.com
Please direct editorial and subscription questions to (516) 681-2922

BATTERIES AMERICA

Jan. 2013 SALE Call 800-308-4805; ONLINE:
www.batteriesamerica.com

For YAESU VX-8R, 8DR/GR, FT1DR/E (Strap BELT CLIP $ 6.95
FNB-102Li Li-ION batt 7.4v 2000mAh $45.95
For YAESU FT-897, 897R, 897D "BackPacker" Radios:
FNB-78 Ni-MH battery 13.2v 4500mAh $89.95
For YAESU-Vertex VX-5R/s VX-6R VX-7R/b VX-7Rb VXA-700:
FNB-80Li Li-ION battery 7.4v 1600mAh $44.95
E-DC-5BA DC Power & Charge cord (NEW) $19.95
NC-72BA AC-DC Power / Battery Charger $17.95
For YAESU-Vertex FT-60R 250 270R: VX-110 120 150 170 177 180 210
FNB-83xe eneloop 7.2v 2100mAh $49.95
For YAESU-Vertex FT-817 (PRE-CHARGED) (E-DC-5BA DC cord $19.95
FNB-72xe eneloop 9.6v 2100mAh $49.95
For YAESU-Vertex VX-1R: (RARE: has custom-designed PCB)
FNB-52Li Li-ION battery 3.7v 750mAh $29.95
For YAESU-Vertex FT-50R 40R 10R: VXA-100: (E-DC-5BA: $19.95)
FNB-41xs Hi-Watt battery 9.6v 1200mAh $45.95
For YAESU FT-11R FT-41R FT-51R etc. (HIGH POWER batteries)
FNB-38h Hi-Watt battery 9.6v 750mAh $39.95
For YAESU FT-530 76 26 416 415 816: (E-DC-5BA: DC Pwr cord $9.95
FNB-25x Ni-MH battery 7.2v 1200mAh $32.95
FBA-12 6-cell AA Battery Case $22.95
FBA-12h 10-cell AA Battery Case (5W) $28.95
For YAESU FT-411 470 73R 33R 23R etc: (WC-12 wall charger $12.95
FNB-12xh Ni-MH batt. 12v 1250mAh $39.95
FBA-17 6-cell AA Battery Case $19.95
For ICOM IC-92AD D-STAR: (CP-11L: DC Pwr/Chg cord $ 19.95
BP-256 Hi-Watt Li-ION batt. 7.4v 1620mAh $44.95
For ICOM IC-T70A/E IC-V80A/E/SPORT F3003 F4003 etc:
BP-265L Li-ION batt. 7.2v 2200mAh $46.95
For ICOM IC-T90A/E IC-91A IC-91AD IC-80AD D-STAR etc:
BP-217 5W Li-ION battery 7.4v 1600mAh $44.95
CP-11L DC Power & Charge Cord (fits IC-92AD too) $22.95
For ICOM IC-V8 V82 U82 F3 F4GS/GT F30 40GS/GT A24 A6 etc
BP-210N Hi-Watt battery 7.2v 2000mAh $44.95
For ICOM IC-T8A/E/HP T81A/E: A23 A5: (WC-A/C Wall Charger $12.95)
BP-200XL Hi-Watt battery 9.6v 1450mAh $59.95
BP-197h 6-cell AA Battery case (Hi-Watt) $29.95
For ICOM IC-W32A/E T7A/E T7H Z1A/E T22A T42A W31A/E:
BP-173x Hi-Watt battery 9.6v 1450mAh $59.95
BP-170L 6-cell AA Battery case (Hi-Watt) $25.95
For ICOM IC-2/3/4SAT W2A 24AT 2/4SRA R1: (BC-105A: $22.95
BP-83xh Ni-MH battery 7.2v 2200mAh $39.95
For ICOM IC-2/02/03/04AT 2/4GAT etc: Radio Shack HTX-202/404:
IC-8 8-cell AA battery case (w/ Charge Jack) $24.95
BP-202e Eneloop- Rad. Sh. 7.2v 2100mAh $34.95
For KENWOOD TH-D72A/E: (CP-KE12: DC Pwr & Chg. cord: $ 19.95)
PB-45L Li-ION batt (NEW) 7.4v 2000mAh $44.95
For KENWOOD TH-F6A, TH-F6E TH-F7: (CP-42L- DC cord: $ 9.95)
PB-42L Li-ION battery 7.4v 2000mAh $44.95
PB-42XL Li-ION battery 7.4v 4000mAh $59.95
EMS-42K Desktop Rapid Charger for PB-42L/XL $49.95
For KENWOOD TH-G71/K TH-D7A/E/G/E: (CP-39: DC Pwr cord $9.95)
PB-39h Hi-Watt Ni-MH batt. 9.6v 1450mAh $54.95
BT-11h 6-cell AA Battery Case (Hi-W) $24.95
For KENWOOD TH-79A/E 22A/E 42A/E etc: (CP-79: DC cord $9.95)
PB-34xh Hi-Watt Ni/MH batt. 9.6v 1200mAh $39.95
For KENWOOD TH-78A/E 48A/E 28A/E 27A/E: (CP-17: DC cord $9.95)
BT-8 6-cell AA Battery Case $14.95
PB-13xh Ni-MH battery 7.2v 1800mAh $39.95
For KENWOOD TH-77A/E 75A/E 55A/E 46A/E 45AT 26A/E 25A/E:
PB-6x Long Life Ni-MH battery 7.2v 1600mAh $36.95
For KENWOOD TH-205A/E 215A/E 225A 315A: (Wall Charger $12.95)
PB-2 Std. Ni-Cd batt. 8.4v 800mAh $29.95
For KENWOOD TR2500 TR2600: (Wall Charger $ 12.95
PB-25-26 Std. Ni-Cd batt. 8.4v 800mAh $29.95
For ALINCO DJ-V5 DJ-V5TH: (CP-46: DC Pwr/Chg Cord $ 9.95)
EBP-46xh Ni-MH batt. 9.6v 1450mAh $52.95
For ALINCO DJ-195/HP/R 193 196 446 493 496 596: (DC cord $ 9.95)
EBP-48h Hi-Watt battery 9.6v 2000mAh $44.95
For ALINCO DJ-G5T/D/T/H/TY: 190T 191T/TD/TH: DC Pwr Cord $9.95
EBP-36xh Hi-Watt batt. 9.6v 1450 mAh $52.95
For ALINCO DJ-580/T DJ-582 DJ-180/T DJ-280/T DJ-480 etc:
EDH-11 6-cell AA Battery Case $22.95
EBP-20x Ni-MH battery 7.2v 2000 mAh $32.95
For ADI AT-600: REALISTIC HTX-204 (Wall Charger is: $ 12.95:
ADI-600x Hi-Watt battery 12.0v 1200mAh $44.95
For STANDARD C228 C528 C558: ADI HT-201 HT-401 etc:
CNB-152xh Ni/MH batt. 12.0v 1200mAh $45.95
CBP-R6S 6-cell AA Battery Case (new) $26.95

NEW- V-6500 Digital SMART Charger for AA & AAA batteries! $24.95 pkg.
(1) Rapid Charger for 1 - 4 AA & AAA Ni-MH cells; has 4 separate charging channels!
(2) Comes with AC power supply AND 12VDC power cord for home & mobile operation.
(3) Safe, quick 1 - 2 hr chg w/ auto shut-off.
(4) Easy-to-read LED charge status indicators.

SANYO eneloop AA cells PRE-CHARGED $13.95/pack of 4
Order Online, Mail, E-mail, Phone, or Fax w/ MC, VISA, DISC, or AMEX
BATTERIES AMERICA- 8845 S.Greenview #2, Middleton, WI 53562
Order online, or call us at 1-800-308-4805
Fax: 608-831-1082 E-mail: ehyost@chorus.net

A World of Great Reading for the Radio Amateur...

Print or Digital... Your Choice*

Visit Us at www.cqcomm.com

CQ Amateur Radio

For 67 years CQ has been the reading choice for active hams. The independent choice of independent thinkers in 167 countries throughout the world.

Popular Communications

Covers the entire range of the radio hobby from Shortwave listening to scanner monitoring and everything in between.

World Radio Online

The first major amateur radio publication delivered solely in digital format. A fun, fast read that covers all aspects of amateur radio from the human side.

CQ VHF

The only publication in the USA devoted solely to amateur radio operating and technology above 50 MHz.

Be Sure To Visit Our On-Line Store!
http://store.cq-amateur-radio.com

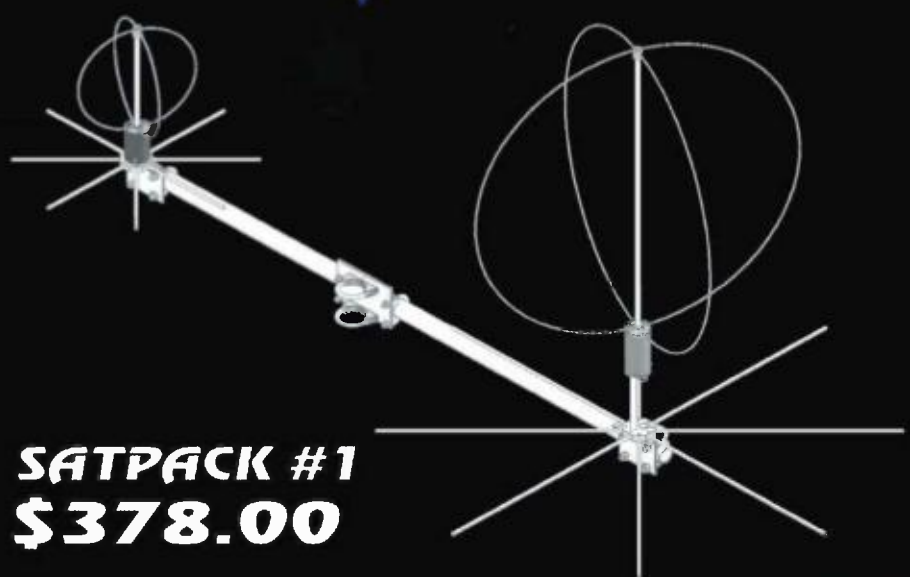
CQ Communications, Inc.
25 Newbridge Road • Hicksville, NY 11801
Phone: 516-681-2922
Fax: 516-681-2926

(WorldRadio offered only in digital format)*

"BLAST OFF!"

REACH ORBIT WITH AN M2 SATELLITE PACKAGE

WORLD CLASS PRODUCTS



SATPACK #1
$378.00

M^2 offers a complete line of top quality amateur, commercial and military grade antennas, positioners and accessories.

We produce the finest off-the-shelf and custom radio frequency products available anywhere.

For high frequency, VHF, UHF and microwave, we are your one stop shop for all of your high performance RF needs.

M^2 also offers a diverse range of heavy duty, high accuracy antenna positioning systems.

Whether your communication needs are across town, around the world or beyond, M^2 has World Class Products to suit your needs.

M² ANTENNA SYSTEMS, INC.
The New American Antenna

M^2 products are proudly 'Made in the USA'

4402 N. Selland Ave.
Fresno, CA 93722
Phone (559) 432-8873
http://www.m2inc.com
sales@m2inc.com

ANTENNAS POSITIONERS ACCESSORIES

The radio... YAESU

HF/50 MHz 100 W Transceiver

FTDX3000

New Crystal Roofing Filters provide ultimate weak signal receiver performance in crowded, strong signal environments

The amazing Crystal Roofing Filter performance

The Down conversion 9 MHz 1st IF frequency receiver construction, can realize narrow 300 Hz (optional), 600 Hz and 3 kHz bandwidth roofing filters.

Outstanding receiver performance, the heritage of the FTDX5000!

The high dynamic range IP3 performance that was realized and proven in the FTDX5000.

IF DSP provides effective and optimized QRM rejection

Independent Frequency display

The newly developed LCD has a wider viewing angle and higher contrast.

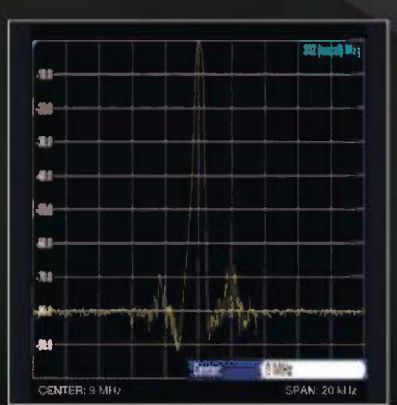
4.3-inch Large and wide color LCD display with high resolution

High Speed Spectrum Scope built-in

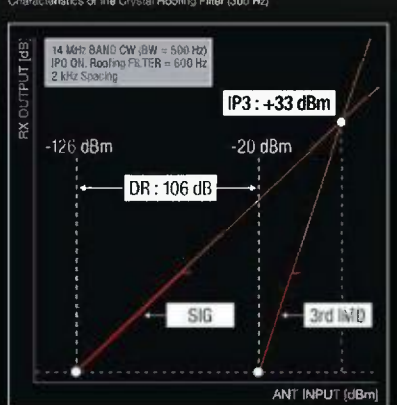
AF SCOPE display and RTTY/PSK encoder/decoder

Other features

The specialized Receiver amplifier for 50 MHz is built in / Three antenna connectors are provided / The "ANT-3" terminal may be assigned to "RX-only" / Signal output for an external receiver and the 9 MHz IF output are furnished / High speed Automatic antenna tuner built in / Optional μ-tune unit available / USB interface equipped



Characteristics of the Crystal Roofing Filter (300 Hz)



3rd Order Dynamic Range / IP3 (2kHz Spacing)

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

YAESU
The radio

YAESU USA
6125 Phyllis Drive, Cypress, CA 90630 (714) 827-7600

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.