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Amateur Radio

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COMMUNICATIONS & TECHNOLOGY

AUGUST 2011

CQ

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- SSB Results, 2010 CQ WW DX Contest, p. 28
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On the Cover: James Archer, N3ZS/5Z4FV with his 55-foot crank-up tower in Elverson, Pennsylvania.
Details on page 80.

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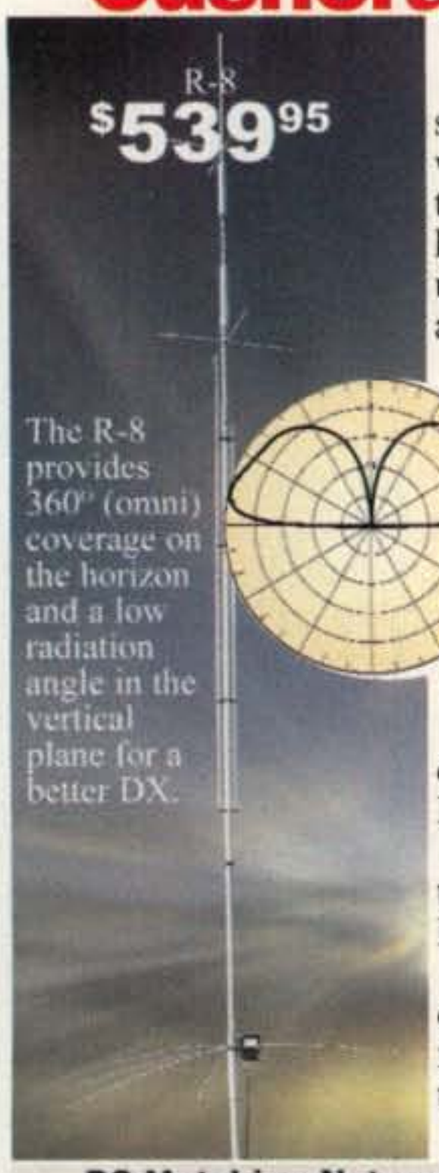
Cushcraft R8 *8-Band Vertical*



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!

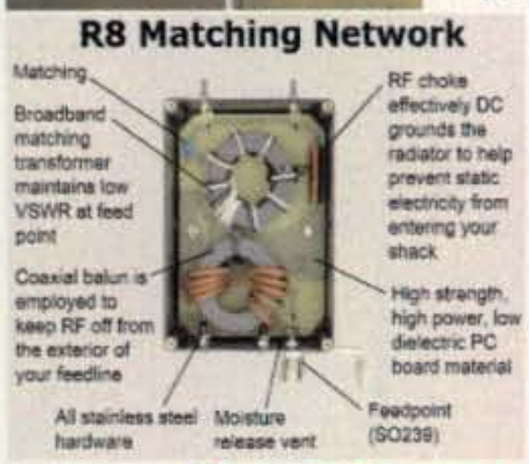
Rugged Construction: Thick fiberglass insulators, all-stainless hardware, and 6063 aircraft-aluminum tubing that is double or triple walled at key stress points handle anything Mother Nature can dish out.

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.



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 *Ringos* 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, lighting 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!

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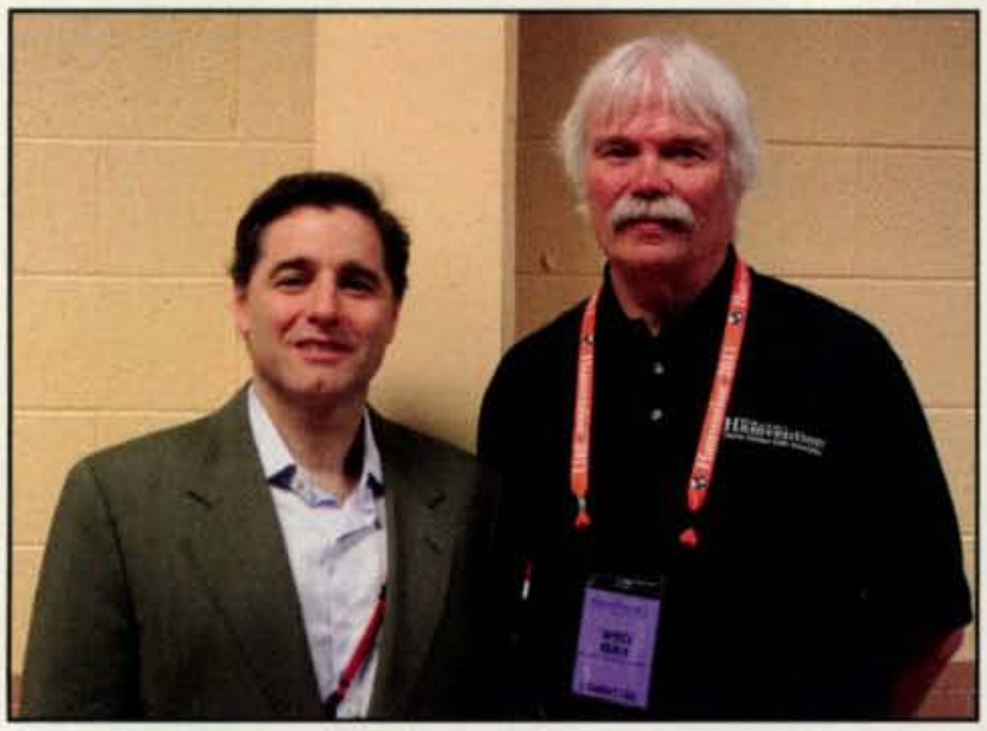
Portuguese Edition of *CQ* to Debut in Brazil

A new Portuguese-language edition of *CQ* is due to be launched this month in Brazil. The new edition will be published by Radiohaus, a major Brazilian amateur radio dealer. It will be published bi-monthly and will contain a mix of articles translated from the U.S. edition and original material written specifically for the Brazilian ham audience. This is the same arrangement that *CQ* has with the publishers of its Spanish edition, *CQ Radio Amateur*.



FCC Chairman Julius Genachowski was escorted around the Dayton Hamvention® by 2011 show chairman Mike Kalter, W8CI. (Photo courtesy K0NEB)

FCC Chief Visits Hamvention®

FCC Chairman Julius Genachowski made a surprise visit to the Dayton Hamvention® during an unplanned layover in Dayton. According to Hamvention officials, Genachowski was flying back to Washington on Friday, May 20, when his plane was diverted to Dayton because of severe weather in the Midwest. He was told he might have trouble finding a hotel room because of all the ham radio operators in town. After finding a room, he decided to visit the show on Saturday morning before returning to Washington. He spent about two hours at Hara Arena, talking with hams and checking out the equipment displays.

Astronaut Wheelock Praises Ham Radio at Dayton

A planned guest at this year's Dayton Hamvention® was Astronaut Doug Wheelock, KF5BOC, a callsign he's never used! "I call that my gravity callsign," Wheelock told *Newsline*. "My real callsign is NA1SS from the space station ..." He said that ham radio provided a great way to relax and decompress as he and his crewmates worked to fix a pump failure that required three spacewalks to repair. Plus, he said, "(h)aving you guys as an emergency contact for us around the globe was a warm, warm feeling for me as a commander..."

New Access Rules for QRZ.com

Users of the QRZ.com callsign database must now be registered and sign in before getting access to any name or address data. Owner Fred Lloyd, AA7BQ, explained in a posting that routine access to the database was being slowed down by a growing number of automated systems trying to harvest massive amounts of data at one time. Registration is free; ham users may access a maximum of 150 callsigns/day (not including their own); non-ham users are limited to 25 lookups per day, and QRZ subscribers will continue to have unlimited access.

Progress, But No Changes Yet, in HR-607

A group of New York hams met in May with the sponsor of HR-607, the bill that would create a nationwide interoperable radio service for public safety officials, but at the cost of 420-440 MHz and 450-470 MHz. According to participants, Rep. Peter King (R-NY) promised to have the bill amended to remove the section that deals with auctioning off spectrum below 512 MHz, and staff members later confirmed that the Congressman had made that request to Rep. Greg Walden (R-OR), who is chairman of the Subcommittee on Technology, Communications and the Internet (and W7EQI). The committee is now in charge of the bill. Reportedly, Walden agreed to have the section removed, but as this is written in late June, no action had yet been taken on amending the bill.

Meanwhile, in the Senate, Senators Joe Lieberman (I-CT) and John McCain (R-AZ) introduced a companion bill to HR-607—S-1040—that does not call for auctioning off any spectrum below 1675 MHz. However, it would require the FCC to not renew current public safety licenses below 512 MHz unless the licensee can show that:

(A) that migration to a different spectrum band will cause considerable economic hardship to the State or local government jurisdiction in which such licensee is located;

(B) migration to a different spectrum band would adversely impact the ability of the licensee to protect and serve the community in which such licensee is located; or

(C) there are an insufficient number of frequencies above the 700 MHz band to support the land-mobile communications needs of the licensee.

New HF Radar Proposal Could Impact Ham Bands

The National Telecommunications and Information Administration (NTIA)—which regulates federal government spectrum usage and advises the president on telecommunications matters—has proposed establishing oceanographic radar allocations at several HF frequency segments, including the 60-meter amateur band and immediately adjacent to the 20-meter ham band. According to the ARRL, the recommendation to propose these allocations at next year's World Radiocommunication Conference (WRC-12) came as a surprise to those members of a U.S. WRC working group set up by the FCC—including an ARRL representative—that had proposed different sets of frequencies and concluded that sharing between these radars and amateurs would be difficult at best. Apparently, there has not yet been an explanation of why NTIA made these specific proposals or why it disregarded the working group's advice. More to come on this one...

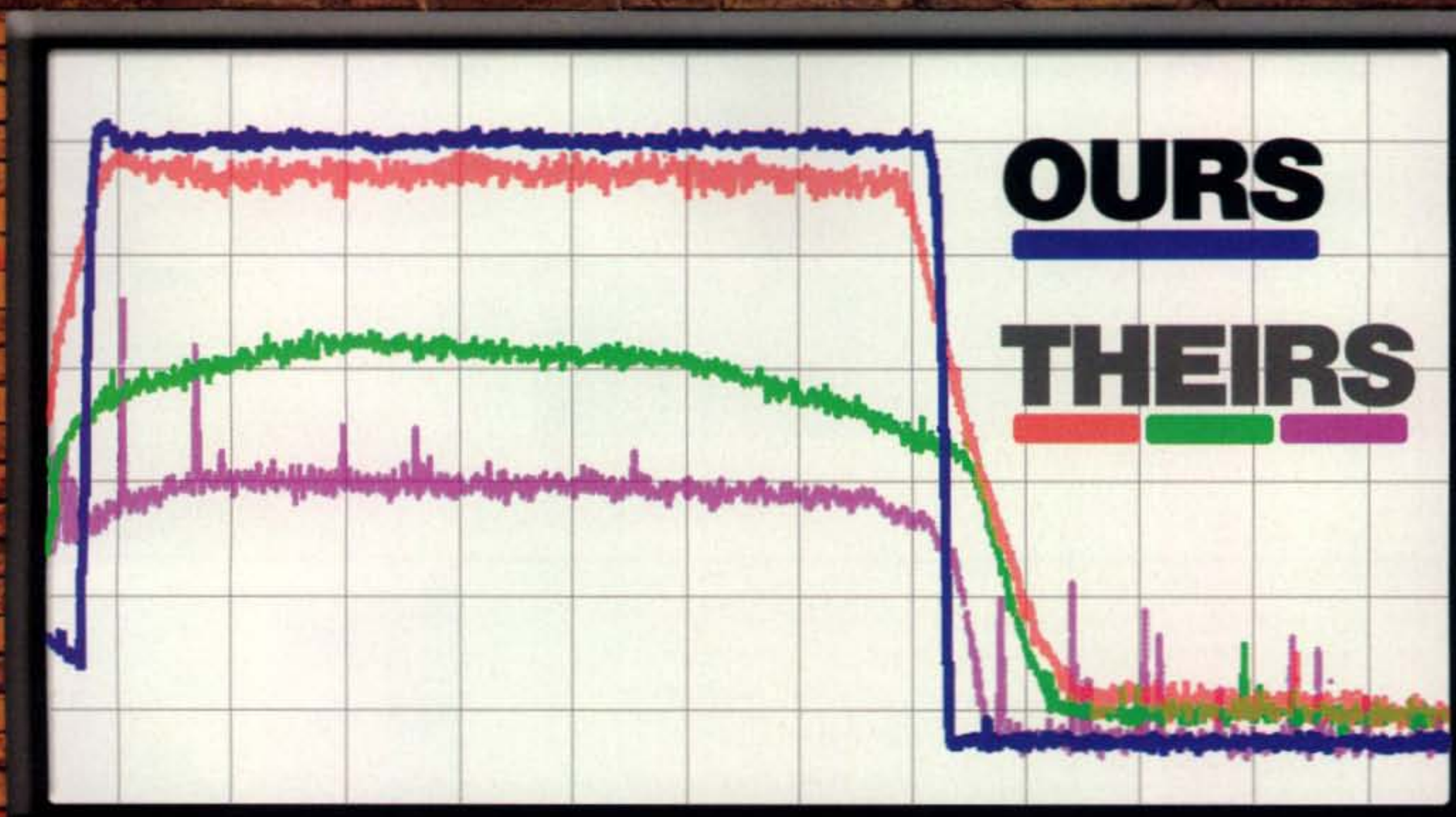
Japan Drops All Amateur Code Tests

Back in the 1950s, Japan became the first country to issue an amateur license that did not require a Morse code exam, the so-called Class 4 license. However, it has continued to require code tests for the Class 1 and Class 2 licenses, even as most of the rest of the world has ended amateur code test requirements. Now, according to Newsline, effective October 1, Japan will no longer require code tests for any class of amateur license. Interestingly, on an issue about which so many hams have been so passionate for so many decades, a request for comments on the proposed rule change drew only 39 responses.

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.

brick wall /brĭk - wôl/ ▪ *noun*

anything or anyone that is impenetrable, unrelenting, or unyielding



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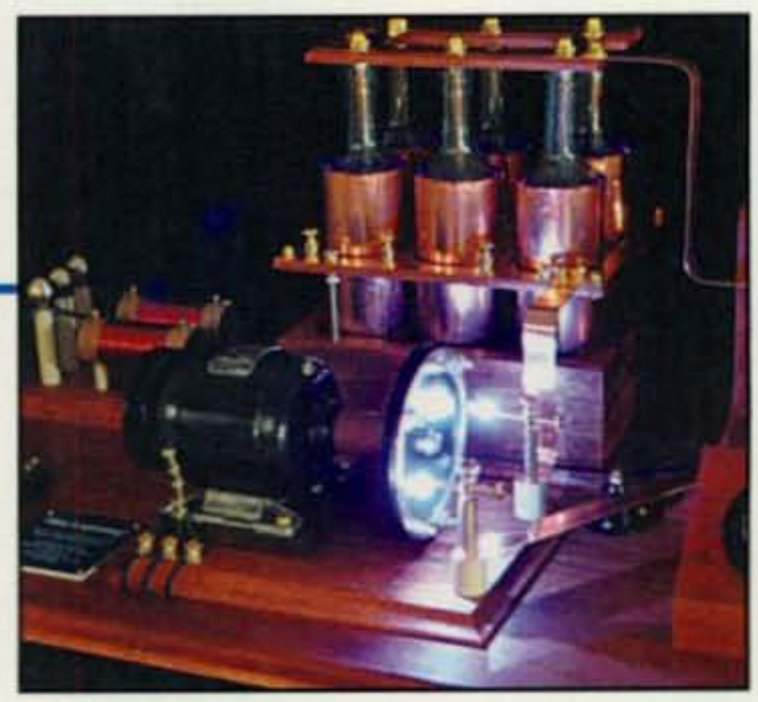

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FT-950

- Triple-conversion super-heterodyne receiver architecture, using 69.450 MHz 1st IF
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- 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
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- 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
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- 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)

"The Best of the Best Just Got Better"

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

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New licensees, casual operators, DX chasers, contesters, portable/field enthusiasts, and emergency service providers- YAESU FT-450D...This Radio is for YOU!

Compact size: 9" X 3.3" X 8.6" and Light weight: 7.9 lb

HF/50 MHz 100 W All Mode Transceiver

FT-450D

With Built-in Automatic Antenna Tuner

NEW **Illuminated Key buttons**

NEW **300 Hz/500 Hz/2.4 kHz CW IF Filters**

NEW **Foot stand**

NEW **Classically Designed Main Dial and Knobs**

NEW **Dynamic Microphone MH-31A8J Included**

■ **Large informative Front Panel Display, convenient Control knobs and Switches**
■ **The IF DSP guarantees quiet and enjoyable high performance HF/50 MHz operation**

Handy Front Panel Control of Important Features including:

- **CONTOUR Control Operation**
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  Highly-effective system that can remove an interfering beat tone/signal.
- **Digital Noise Reduction (DNR)**
  Dramatically reduces random noise found on the HF and 50 MHz bands.
- **IF WIDTH**
  The DSP IF WIDTH tuning system provides selectable IF passband width to fight QRM.
  SSB - 1.8/2.4/3.0 kHz, CW - 300 Hz/500 Hz/2.4 kHz
- **Digital Microphone Equalizer**
  Custom set your rig to match your voice characteristics for maximum power and punch on the band.
- **Fast IF SHIFT Control**
  Vary the IF SHIFT higher or lower for effective interference reduction / elimination.

■ **The rugged FT-450D aluminum die-cast chassis, with its quiet, thermostatically controlled cooling fan provides a solid foundation for the power amplifier during long hours of field or home contesting use.**

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More features to support your HF operation

●10 kHz Roofing filter ●20 dB ATT/IPO ●Built-in TCXO for incredible ±1 ppm/hour (@+77°F, after warm-up) stability ●CAT System (D-sub9 pin): Computer programming and Cloning capability ●Large, Easy-to-See digital S-meter with peak hold function ●Speech Processor ●QUICK SPLIT to automatically Offset transmit frequency (+5 kHz default) ●TXW to monitor the transmit frequency when split frequency operation is engaged ●Clarifier ●Built-In Electronic Keyer ●CW Beacon (Up to 118 characters using the CW message keyer's 3 memory banks) ●CW Pitch Adjustment (from 400 to 800 Hz, in 100 Hz steps) ●CW Spotting (Zero-Beating) ●CW Training Feature ●CW Keying using the Up/Down keys on the microphone ●Two Voice Memories (SSB/AM/FM), store up to 10 seconds each ●20 second Digital Voice Recorder ●Dedicated Data Jack for FSK- RTTY operation ●Versatile Memory System, up to 500 memory channels that may be separated into as many as 13 Memory Groups ●CTCSS Operation (FM) ●My Band / My Mode functions, to recall your favorite operating set-ups ● Lock Function ●C.S. Switch to recall a favorite Menu Selection directly ●Dynamic Microphone included ●IMPORTANT FEATURES FOR THE VISUALLY IMPAIRED OPERATOR – Digital Voice Announcement of the Frequency, Mode or S-meter reading

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zero bias – a CQ editorial

BY RICH MOSESON,* W2VU

The Chinese Connection

I'm in the middle of reading a fascinating book about Chinese voyages of discovery in the early 15th century[1]. The author claims to have evidence that, among other things, the Chinese landed and established colonies in the Americas about 80 years before Columbus "discovered" the New World. I haven't gotten far enough in yet to comment on that, but the first part of the book lays the groundwork by discussing medieval Chinese history and culture and explaining how China spread its influence and came to dominate foreign trade in Asia and Africa at the time.

Despite having the world's largest army and navy, and having already invented gunpowder and developed firearms, this book's author says it wasn't China's style to simply invade a place and take it over. Rather, the Chinese sent treasure ships full of the finest goods, not only to trade but to bestow as gifts on local rulers. Once trading relationships were established, these rulers were given every imaginable luxury and invited to major events in China—with the Chinese providing transportation and picking up the tab for everything.

Of course, all this came at a price. If the foreign rulers wanted to continue to benefit from China's largesse, and if they wanted their highly profitable trade with China to continue and grow, then they had to pay tribute to China, both financially and by swearing allegiance to the Chinese emperor. The Chinese came to dominate the region, generally without firing a shot (even though they were the only ones at the time with guns). It would do us well here in the west to study more Chinese history.

I bring this up because, as many of you are aware, the past year has seen the introduction to the U.S. market of ham gear from China. The two major brands we have seen so far are Wouxon (pronounced OH-shin) and TYT (Quanzhou TYT Electronic Co.). The prices are very low and from all reports we've heard, the radios work well, too. At Ham-Com in Texas this past June, one dealer selling these new rigs wanted to be sure everyone in the hall knew how well they were doing, so the booth staff banged a big gong every time a ham bought one. Following a commercial tradition that is at least 700 years old, the Chinese are establishing themselves in the ham radio marketplace with quality goods at low prices that significantly undercut their competition.

Of course, their competition is acutely aware of this, especially the Japanese manufacturers who know from their own experience how effective this strategy can be. After all, it's been just over 40 years since the first ad for a Japanese radio appeared in U.S. ham magazines. The Japanese manufacturers used a similar approach, offering quality goods at low prices that significantly undercut their competition, starting with low-cost VHF-FM gear and then moving into higher-priced HF equipment as well.

Most of the "long-established" U.S. manufacturers (I put that in quotes because many of them had only been in business for about 40 years themselves at that point!) could not or would not respond effectively and eventually dropped out of the amateur market, giving the Japanese manufacturers market dominance for the past three decades. Now, the Chinese manufacturers appear to be adopting similar tactics, and the question becomes whether the Japanese manufacturers will learn from their own success and how (or if) they will adapt to meet this new challenge.

Ultimately, it will be up to you, the consumer, to decide which radios from which manufacturers give you the greatest value for your dollar. Other issues that may merit consideration by consumers include possible Chinese government subsidies to hold down prices on exported goods, and questions about working conditions and worker pay at Chinese factories (we know nothing about these specific companies, only that this is an issue in the broader topic of U.S.-China trade). And, of course, we the consumers should not forget that the U.S. amateur radio manufacturing industry has rebounded, with newer companies taking leadership positions in several areas of the ham marketplace. One thing is certain: radios from China will be a part of the ham radio landscape for many years to come, and the presence of these new "players" in the market will continue to be seen in magazines, on dealers' shelves and at hamfests around America.

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

Dayton and Dallas

Speaking of hamfests, both Dayton and Dallas (Ham-Com) seemed to be down a little in attendance this year, but most dealers reported strong sales nonetheless. Getting to and from Dayton proved to be challenging this year—it took me 13 hours to get there from New Jersey, which wouldn't have been too terrible if I was driving ... but I was flying! And after the show, both Ad Manager Chip Margelli, K7JA, and *Popular Communications* and *WorldRadio Online* Editor Richard Fisher, KI6SN, got stranded overnight at different airports while trying to get home to California.

Ignoring all that, actually being at Dayton was its usual incredible experience. Yes, there was the sewer back-up that shut down nearly all of the restrooms on Saturday afternoon and sent sewage seeping across parts of the flea market. But on the other hand, there was the unplanned and unannounced visit on Saturday morning by FCC Chairman Julius Genachowski and the usual controlled chaos at the CQ booth.

Working a booth at Dayton is a lot like running a pile-up on a DXpedition. There's a constant line of people waiting to "work" you; you can only "work" one at a time, and you have to hope all the others behave until you get to them (99% of the time, they do). But the people you get to meet are the best part. Attendees at Dayton truly cover the full spectrum of the ham radio hobby. All, of course, are just-plain-hams, having fun and chatting on a first-name basis ... even though among those just plain hams were at least one Nobel laureate, two retired admirals, a former ambassador and at least one astronaut. It sure is a good thing we don't have to QSL all those "eyeball" QSOs at the booth!

A couple of issue notes: Our coverage of ham radio's response to the wicked spring weather across the U.S. continues this month with a detailed look at how SATERN (Salvation Army Team Emergency Radio Network) volunteers helped out in Joplin, Missouri after a massive tornado struck that city (p. 13); and Youth Editor Brittany Decker, KB1OGL, shares her experience with—and lessons learned from—a too-close-for-comfort encounter with lightning at her home in New Hampshire ("A Striking Story," p. 38). Plus, of course, we have the SSB results of last year's CQ World Wide DX Contest. Once again, this truly worldwide contest made its own propagation—nearly two dozen new records were set - and we received over 6500 logs, showing operation from 232 countries ... including China.

73, W2VU

Note:

1. Menzies, Gavin, *1421: The Year China Discovered America*, HarperCollins, New York, 2004.

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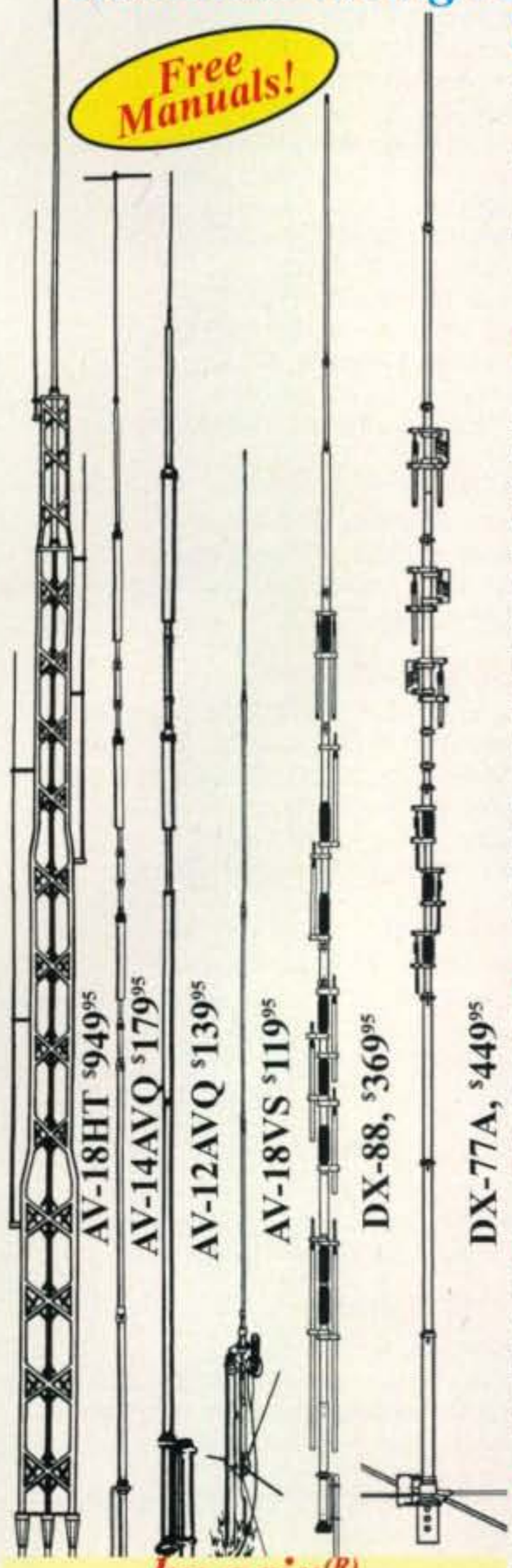
Self-supporting -- no guys required . . . Remarkable DX performance -- low angle radiation, omnidirectional . . . 1500 Watts . . . Low SWR . . . Aircraft quality aluminum tubing . . . Stainless steel hardware . . . Recessed SO-239 connect . . . Two year limited Warranty . . .



hy-gain(R) Classics

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

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

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

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

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

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

AV-14AVQ, $179.95. (10,15,20,40 Meters). 18 ft., 9 lbs. **The** Hy-Gain AV-14AVQ uses the same trap design as the famous Hy-Gain Thunderbird beams. Three separate air dielectric Hy-Q traps with oversize coils give superb stability and 1/4 wave resonance on all bands. Roof mount with Hy-Gain AV-14RMQ kit, $89.95.

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

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

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

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

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

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

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

Hy-Gain 160-6 Meters Self-Supporting Vertical

Full 1500 Watts, 43 feet, includes base mount

New! AV-6160

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

Exceptional Performance

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

Just talk with automatic tuner!

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

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

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

Assembles in an hour

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

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announcements

International Lighthouse-Lightship Weekend – The Amateur Radio Lighthouse Society is sponsoring the International Lighthouse-Lightship Weekend August 6–7. Operating guidelines and scoring details can be found at: <http://illw.org>. This annual QSO party is held in conjunction with International Lighthouse-Lightship Week, August 1–8 and National Lighthouse Day, August 7. Further lighthouse information is on the ARLHS website at: <http:// arlhs.com>.

2011 Hawaii QSO Party – 0400 UTC August 27 to 0200 UTC August 28. Operate 1.8 MHz to 28 MHz, Phone, CW, RTTY, and PSK31. Exchange: Hawaii Stations—county and islands. Non-Hawaii—S/C/P. Note: Kalawao County, *Battleship Missouri* (KH6BB), and Coconut Island (AL0HA) will be active. Logs due October 1. Information: <http:// www.karc.net/HQP>.

Punta Gorda Lighthouse DXpedition, southern Humboldt County, California, in conjunction with the International Lighthouse weekend. For Punta Gorda Lighthouse information go to <http:www.lighthousefriends. com/light.asp?ID=63>; e-mail: <AF6TS@arrl.net>.

• The following Special Event stations are scheduled for August:

K3D, honoring the world's first baseball game play-by-play broadcast at Forbes Field; August 5; North Hills ARC. Details: <http://www.nharc.org/K3D_Special-Event.html>.

N7C, commemorating the Navajo Code Talkers of World War II, Window Rock, Arizona; August 12–14 on 14.265 and 7.265 MHz. QSL information via N7HG and N7C.

W7SVD, commemorating the establishment of the National Park Service in 1916, Montezuma Pass high in the Huachuca Mountains of southeastern Arizona at Coronado National Memorial; August 27, portable operation from 1500–2300Z on 7.225, 14.275, 21.285, and 28.350 MHz SSB; 7.050, 14.050, 21.050, and 28.050 MHz CW; PSK31 and JT65 on 40, 20, 15, and 10 meters. Send QSL and SASE to: W7SVD, 1955 Santa Teresa Dr, Sierra Vista, AZ 85635. Additional information: <http://www.w7svd.net>.

W8LKY, celebrating Carnation Days Festival, Alliance, Ohio; Alliance Amateur Radio Club; August 20 from 1400–2100Z on 7.045, 7.240±, 14.045, 14.200, 21.250 MHz. For certificate, write to: AARC-W8LKY, P.O. Box 3344, Alliance, OH 44601.

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

August 12–14, **2011 Pacific Northwest DX Convention**, Everett Holiday Inn, Everett, Washington; Western Washington DX Club. Information and registration: <www. wwdxc.org/convention>.

August 13, **Tri-State Amateur Radio Association Hamfest and Computer Show,** Veterans Memorial Field House, Huntington, West Virginia. Information: <http:// www.qsl.net/tara/>. Contact: Judy Taylor, WD8EOP, 304-525-4237. (Talk-in 146.76 [PL 131.8]; exams)

August 20, **2011 East Central Illinois Hamfest**, Vermilion County Fairgrounds, Danville, Illinois; Vermilion County ARA. Contact Tuck Miller, NF9T, e-mail: <NF9T@arrl.org>, phone 217-516-8367; <www.vcara-hamfest.info>. (Talk-in W9MJL/R 146.820, –PL 88.5; exams 11 AM)

August 27, **Owen-Monroe Amateur Radio Hamfest**, Owen County Fairgrounds, Spencer, Indiana; Owen County ARA and Bloomington ARC. Contact Katie Smith, K9INU, e-mail: <K9INU@arrl.net>, phone 812-829-2140. (Talk-in KB9MZZ repeater 146.985 [PL 136.5]; exams 1 PM)

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.*

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

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

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

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

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

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

ARI-500
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Ship Code A

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SDC-102
$129.95
Suggested Retail

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

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

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

3½Wx3¼Hx1¼D inches.

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

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

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BY RICHARD FISHER,* KI6SN

A panoramic view taken from The Salvation Army Oasis at Joplin shows the level of devastation in the area. The Oasis was the immediate emergency area from which food and drink was provided to responders and victims. It served as a distribution point for other supplies, as well. (Photographs courtesy of SATERN)

Salvation Army's Show of EmComm Force in Joplin

On the Heels of Disaster, SATERN Operators Rush to Assist Missouri Tornado Victims

Time was of the essence, and June Jeffers, KBØWEQ, wasted no time in getting to the point of her urgent e-mail: "We are now invited to the disaster."

In the wake of an EF5 tornado that tore apart areas of Joplin, Missouri on May 22, Jeffers, Salvation Army Team Emergency Radio Network (SATERN) Missouri-Kansas Division Coordinator, was putting out a call for qualified volunteers to help with emergency communications. SATERN had gotten the okay to help, and this was no drill.

In June, the Jasper County Coroner's Office and the Missouri Department of Public Safety put the storm's death toll in Joplin at 153.

On the Move . . . and Fast

A Salvation Army Emergency Disaster Services (EDS) team based in Pittsburg, Kansas was quickly sent to Joplin on the heels of the storm "to help carry out mass feeding for residents and first responders through a mobile feeding kitchen capable of serving thousands of meals a day," said Patrick McPherson, WW9E, a retired Salvation Army Major and National Director and Founder of SATERN. Teams from Kirksville and Springfield, Missouri were also dispatched. There was an EF5 tornado, at the top of the measurement scale, with winds greater than 200 mph.

"The Kansas and eastern Missouri SATERN team was activated . . . along with team members and individuals (assisted) with communications in the affected area," McPherson said, providing help to survivors "in locating loved ones through a ham radio network." Communications in Joplin, WW9E said, were "challenged."

The MO-KAN Division of SATERN established nets on 3.920 MHz (75 meters) beginning on May 23 in support of the operation from 9 AM to 3 PM, and 3 PM to 9 PM.

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

Salvation Army mobile feeding units arrive in Joplin to assist residents after the tornado. All of these units were staffed by SATERN operators.

SATERN's Brian Short, KCØBS, and Matt May, KC4WCG, discuss amateur radio's value in emergency communications on Kansas City's KCTV, shortly after the Joplin tornado. (YouTube screen capture)

"Bill Shillington, W9ZCL, Central Territorial Coordinator for SATERN, was dispatched to the tornado scene to assist in the general response," McPherson said."Qualified SATERN members" who wanted to help with EmComm were directed to contact KBØWEQ, the Kansas State Coordinator, "who is compiling the database of potential SATERN assistance on scene," WW9E wrote.

"I appreciate the *at the ready* response of all those who are assisting the Salvation Army EDS response, not only in this disaster, but in all," he said, "in which the first step is *waiting to serve.*"

Being Detailed in Needs Pays Off

Jeffers' call for help included a specific list of requisites, key in assuring operators are equipped and qualified to achieve the duties they are assigned. For example:

• Must have SATERN member ID with photo.

• Three operators needed to provide communications at canteens. Must have mobile 2-meters/440-MHz capable of at least 50 watts output and mobile APRS *(Automatic Packet Reporting System, the amateur radio-based protocol for real-time tactical digital communication of information.–ed.).*

• One operator to be a *rover* able "to do APRS and 2 meters/440 MHz at the same time. Best if you have a pickup truck to deliver supplies, but a large vehicle would be great."

• SATERN magnetic signs for vehicles.

• *Must* have your own power source.

• Need net control operators with high-frequency amateur privileges to work from the EmComm trailer.

The *shopping list* went on to request respondents to describe what mobile radio gear they could deploy, what day and time they could report for duty, and for how long. "What date does your SATERN ID expire?" They thought of virtually everything. There was no time to be wasted on missteps.

Only SATERN operators in Kansas and Missouri were being sought as volunteers. "Our SATERN EmComm trailer will be on the way by the time you read this e-mail," Jeffers added. "It is set up with its own power source which can be used for recharging small radio batteries, so bring your charging equipment. We will need to start a schedule of those available through Sunday. Let us know what days and time you can spend."

Doing the Best They Can

KBØWEQ concluded her e-mail with an apology "for not getting this out earlier, as we needed to get the EmComm trailer headed out and I have been on the phone. I went to work today. However, I am now at *home* working on this deployment due to my fantastic chief, Max Sielert (Chief of Fire District No. 1)! He told me to go home and come back when I can."

Jeffers reminded everyone that "*no one is to deploy unless you have my approval.*" She and Rich Britain, NØENO, "will make the decision *who* will be deployed and we will send them the information they need by e-mail."

She recommended that everyone "keep checking your e-mail often. . . .

Salvation Army disaster officials meeting in Joplin included, from left, Dee Smith, Salvation Army Emergency Disaster Services, Missouri-Kansas Division; Warren Hildebrandt, N9PGS, Amateur Radio Liaison for SATERN Midland Division; June Jeffers, KBØWEQ, MO-KAN SATERN Coordinator; and Richard Britain, NØENO, Assistant SATERN Coordinator, MO-KAN Division.

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Destruction to this neighborhood is sober evidence of the destructive power of an EF5 tornado. The inscription on the house indicates that it has been searched for victims.

this is the best way I can get information out fast."

Nets were subsequently held "9 AM to 3 PM to 9 PM on 14.265 or 3.920 MHz, whichever is working to receive and give information to members or anyone else. Anyone can check into these nets."

Seizing PR Opportunities When the Time is Right

The SATERN Coordinator in Charge (CIC) for Monday and Tuesday—the days immediately following the deadly storm—was Brian Short, KCØBS. "He will be monitoring 147.21+ repeater in Joplin for SATERN operation. Any operators can contact him there," an EmComm bulletin reported.

As the disaster response played out, KCØBS and Matt May, KC4WCG, were invited to appear on Kansas City's KCTV Morning News to talk about amateur radio and its value in Joplin and other disasters. A YouTube video of the interview can be seen at: <http://bit.ly/l5WHpA>.

Short was a guest, as well, on the second episode of Bob Heil, K9EID's, *Ham Nation* internet videocasttalking about EmComm and ham radio's use in everyday events. *(To view the videocast, visit: <http://www.twit.tv/hn>.—ed.)*

Intra-SATERN Communications

SATERN leadership placed high value on sharing details of each day's events in a series of e-mails that captured the thought and attention to detail that went into the organization's tornado disaster response.

For example, these items randomly gleaned from a daily dispatch run through a list of *good-to-know* items for all volunteers:

• "We have been using between 8 and 10 operators per day. The food delivery seems to be very dependent on our radio operators."

• "Our use of EchoLink has seen a few problems and we are trying to determine how to utilize this mode with the options we want. We felt that having the EchoLink connected 24/7 could possibly put an additional strain on the amount of *traffic* being put into the disaster area. Outside operators would then be capable of transmitting *into* the SATERN disaster repeater and this could create problems in getting the work done. So we attempted to set the EchoLink where it could be monitored *listen only* .. . . Brian Short, KCØBS, and Gill Ludwig, WAØYCY, have been working to perfect this setup."

• "At this time, MO-KAN leaders are scheduling operators for *deployment* through Friday, June 3. We have a Coordinator in Charge through that date."

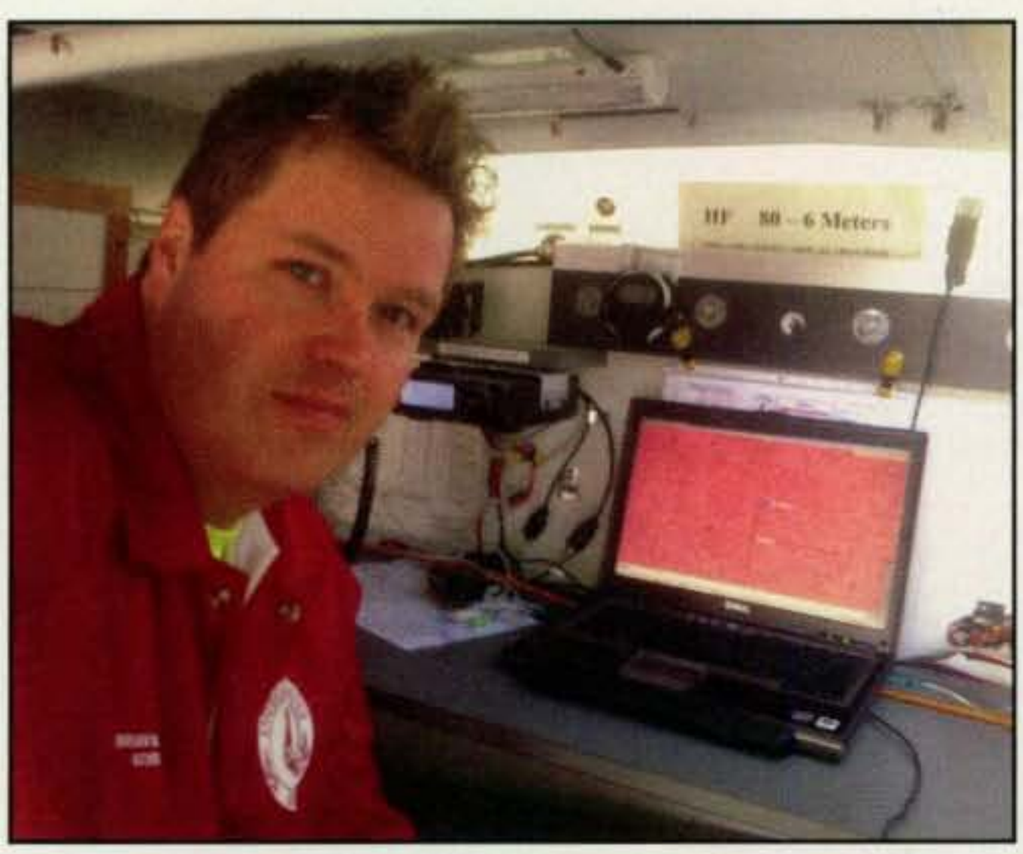
• "We have had APRS trackers—called RED BEES—on all the canteens since their arrival. These were provided by KCØBS (and) have been working very well in letting the APRS stations know where the moving canteens have been, and where they are currently located." People were then directed to a website where they could "enter the City of Joplin, MO, and it will pull up the map showing activity of the moving canteens."

Random Acts of Kindness and Efficiency

From the SATERN daily reports:

"The trustee of the 147.00 repeater sent out a call for assistance and Brian Short, KCØBS, helped the man, hauling four 80-pound bags of concrete for him. Brian indicated that after assisting this man, he was given exclusive use of his repeater for our SATERN operation. This is a very big deal for any repeater trustee to provide exclusive use of a repeater. We are extremely grateful for this, because without it we could be drastically hindered in our communications ability."

"We did well getting volunteers through the weekend. I suspect everyone wanted to be there when the



Using amateur radio's APRS mode, Brian Short, KCØBS, monitors a second day of storms approaching Joplin.

One Desperate Call for Help Scrambles Radio Operators to Southwest Missouri Hospitals

By Patti Flowers-Palmer, KDØAEL

This account of the immediate response to a call for help over ham radio from an Information Technology staff member at a hospital in Joplin—and the subsequent outpouring of assistance to facilities across the region—is from Patti Flowers-Palmer, KDØAEL, who described the response of the amateur radio community as "heartwarming and awe inspiring."

On Sunday evening, May 22, Caleb Burns, KDØBWT, a young amateur finishing his post-SKYWARN net control duties, heard a voice calling for help over the 146.91-WØEBE repeater in Fordland (Missouri). The voice was coming from Freeman Hospital in Joplin after a devastating EF5 tornado had destroyed much of the community and its local-regional medical facility.

KDØBWT went into action:

Crucial medical supplies were ordered and medical teams were quickly called to duty. The initial plea for help was made by an IT person who had been asked to begin the transmissions. He was relieved by Thomas J Ellicott, NØEKP, who had been deployed to assist his stricken community.

As that transmission was taking place, my husband, Steve Palmer, KAØSPM, and I, along with Andrew Brashers, KDØHUN, and new ham Jonathan Rinty, KDØOSF—all who had been deployed as SKYWARN spotters—went into action by driving to Cox South Hospital in Springfield.

Tom Hargis, WXØSCL, and Jamas Justice, KDØGUU, who also had been deployed with SKYWARN, drove to St. John's Regional Medical Center, also located in Springfield. Both Cox South and St. John's are regional medical centers for Southwest Missouri.

Upon arriving and finding that the radio rooms near the Incident Command Centers (ICC) were empty, void of any amateur equipment, operators at each location went to the mobile units in their vehicles and began relaying information from doctors and nurses to begin the crucial process of the moving the injured from the overwhelmed Freeman Hospital to Springfield area trauma centers.

With immediate needs met, the hospitals worked with the amateurs to provide locations for the operators to set up mobile radios where communications could continue. One was located near a window in the ICC at St. John's for best antenna position. The other was in the ambulance bay of Cox South with access to a door where the coax feedline could reach outside.

As this was occurring, KDØBWT grabbed a handie-talkie and headed for a smaller local hospital, Ozarks Community, where he established emergency communications. A short time later, Pat Conway, WA6JGM, and Clifton Smith, KCØSQU, joined KDØBWT by taking a mobile base unit to Ozarks Community to set up a more permanent station.

The amazing band opening that had allowed the initial communications began to fade, and KAØSPM deployed to the National Weather Service Office in Springfield where the staff graciously allowed him to operate and relay messages via the Joplin-area 145.21 repeater, which had survived.

Before the night was over, there was a tremendous outpouring of assistance and offers of assistance from amateurs across the region, including: KB9YZE, KDØEUU, KDØGUR, KDØKNL, KDØJXI, ACØSR, KBØTPZ, KDØKPX, KDØGUS, KDØLPR, KDØLAM, KDØMME, K9JLS, KE5MED, KDØCNP, KBØOYD, KDØJEI, NØZGG, and KCØVGC.

During the week that followed, a number of amateurs continued to call to offer assistance, and they were directed to the coordinators of the CERT search and rescue effort.

The operator who received the first transmission was on his honeymoon and had been acting as net control for the Greene County SKYWARN!

Congratulations and thank you for your devoted service to the community, Caleb Burns, KDØBWT!

I wish to thank each and every amateur operator who offered their assistance. All the hospitals personally offered their thanks to the operators on duty.

When all else fails, Amateur Radio!

The American flag, flying above a field of devastation, illustrates the spirit of the Joplin tornado survivors and those who came to help.

President was. However (the volunteer number) fell off drastically beginning on Monday, May 30. We requested that ARES® (Amateur Radio Emergency Service) provide us operators in order to cover all the locations with communications. They were having problems, as well, since they had also received a request for CERT operators with radios. Both of us worked on getting more operators in order to continue."

"On Friday, May 27, Rich Britain NØENO, and I took a one-day trip to Joplin in order to get a better feel of the situation. We were being asked questions by the ARES® leaders, so we wanted to know first hand what we were talking about. It was a very enlightening day.

"There is good news in the fact that Warren Hildebrandt, NØPGS, has been given the OK to proceed in organizing the Midland Division SATERN members for activation. I have stood in as a backup Coordinator since our last SATERN Coordinator passed away several years back. . . . Warren has been working with us daily since day one and has had the opportunity to observe our operation. He will be taking over the SATERN activity on Saturday, June 4. He is currently getting in contact with his Missouri SATERN members to schedule for deployment next weekend.

"On Friday, SATERN radio traffic on VHF was very heavy in the morning as the pace of meal and beverage delivery was quite hectic. It decreased around noon as rain and lightning moved into Joplin. Along with that, on Friday many of the Divisional Salvation Army officers and leaders were able to observe the SATERN operation."

Jim Andera, KØNK, runs the SATERN EmComm Net for Salvation Army operations in Joplin.

The Salvation Army called in help from a number of divisions, territories, organizations and a host of volunteers. Note the Oklahoma/Arkansas division's mobile canteen and the SATERN volunteer with an ARES hat.

By the Numbers, for Example

How much time and energy went into the SATERN-coordinated disaster response? During a five-day period from May 23–27 alone, 583 hours were amassed by volunteers—511 in the field and 72 for administration.

Nineteen EmComm operators in that five-day period had stepped forward in support, coming from a wide area:

Warren Hildebrant, NØPGS, Carthage, Missouri; Mark Parmley, NR4J, Gardendale, Alabama; Jim Andera, KØNK, and Tony Johnson, KDØKLD, Gardner, Kansas; Joe Krout, WØPWJ, and Ed Rust, KDØBKH, Kansas City, Kansas; Mike Asselta, KDØCDQ, and Brian Short, KCØBS, Olathe, Kansas; Chuck Simpson, KCØNUG, George McCarville, WBØCNK, Tom Griswold, KTØMG, and Herb Fiddick, NZØF, Overland Park, Kansas; Lon Martin KØWJ, Shawnee Mission, Kansas; and Henry Monton, WØIE, and Anna Monton,WØAJM, of Wichita, Kansas.

With the establishment of a Memorandum of Understanding between SATERN and the American Radio Relay League, ARES® members converged from Lenexa, Kansas, and Pierce City and Plattsburg, Missouri, as well, including: Katherine Parker, KDØETX; R. Kentch, KCØWSE; Kirk Joes, KDØAOK; and Cliff Beuterbauh, KDØNEM.

It's one snapshot in a collage of tireless EmComm work that the people of Joplin are likely to long remember.

Said and Done

In a posting of support on "The Unofficial Alberta (Canada) SATERN Blog," disaster responders were praised as "amazing volunteers . . . who run the Salvation Army Team Emergency Radio Network (SATERN), also known as 'shadows,' (helping) Salvation Army personnel establish communications during relief efforts in Joplin. Relief efforts would not be the same without their assistance."

73, Richard, KI6SN

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

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

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

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

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

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

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

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

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

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

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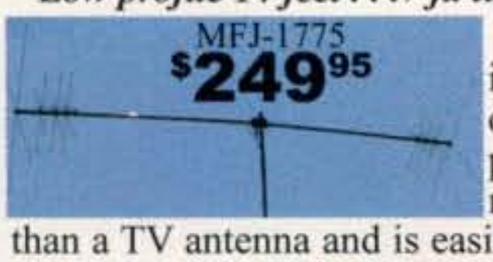
MFJ-1792, $189.95. Full size 1/4 wave radiator for 40 Meters. 33 ft., handles 1500 Watts PEP. Requires guying and radials.

MFJ-1793, $209.95. Like MFJ-1792 but has full size 20 Meter 1/4 wave also.

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

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



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

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

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

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

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

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

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

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

MFJ's Super High-Q Loop™ Antennas

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

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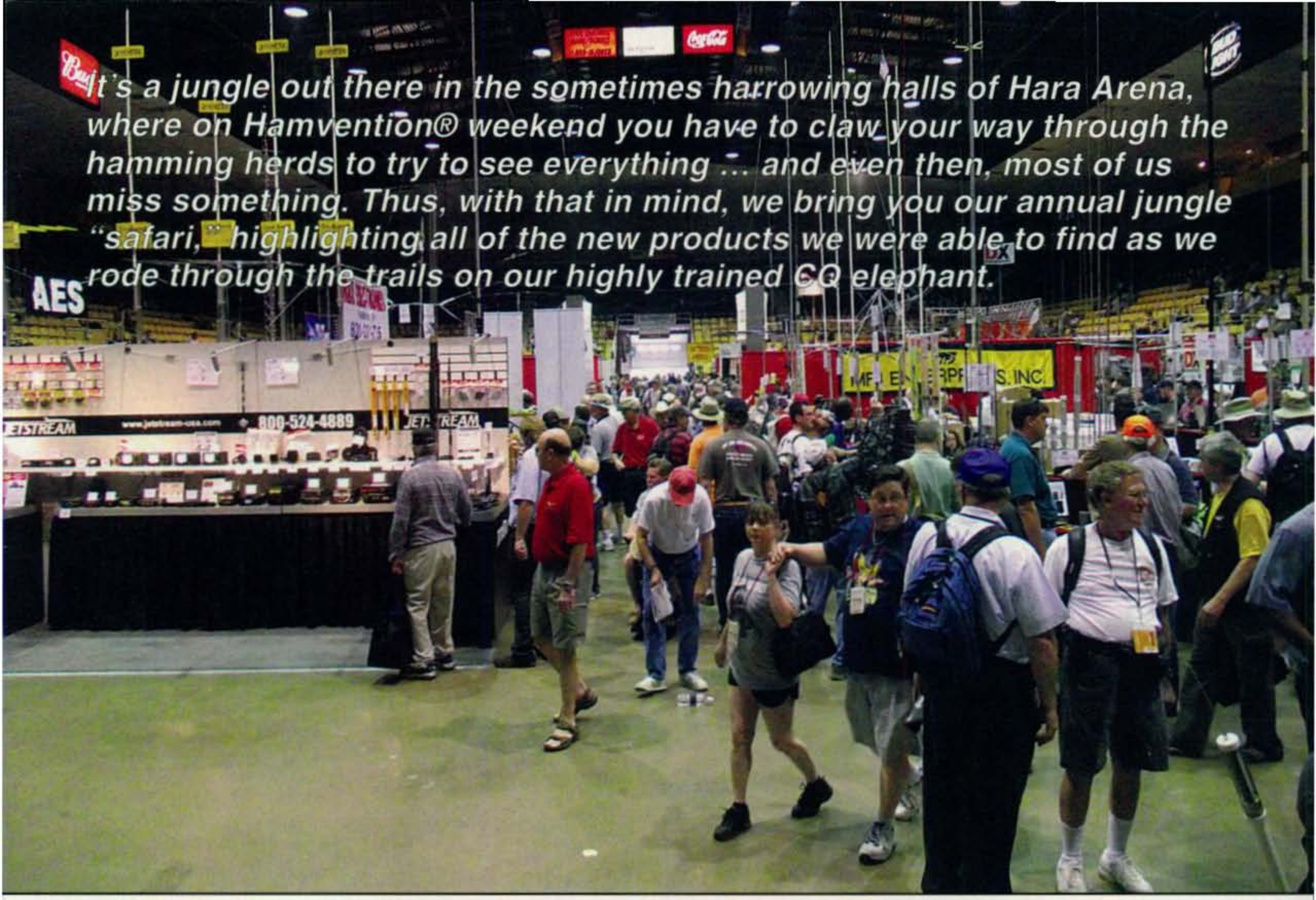

It's a jungle out there in the sometimes harrowing halls of Hara Arena, where on Hamvention® weekend you have to claw your way through the hamming herds to try to see everything ... and even then, most of us miss something. Thus, with that in mind, we bring you our annual jungle "safari," highlighting all of the new products we were able to find as we rode through the trails on our highly trained CQ elephant.

The 2011 Dayton Hamvention® Safari Part I Transceivers, Receivers, and Amplifiers

Getting the Signal Out So You Can Be Heard

BY JOHN WOOD,* WV5J

On this, its 60th anniversary, the 2011 Dayton Hamvention® is still the largest gathering of amateur radio operators in the world, and the world was well represented with hams being drawn to the big party in Ohio from all points of the compass. Manufacturers were also there to show their new products and *CQ* magazine gave them all a chance to be in the spotlight, to play a part in *CQ*'s 2011 version of its New Products "Safari."

I participated in this tour again this year, joining up with *CQ* Advertising Manager Chip Margelli K7JA, acting as tour guide through the various Hamvention® displays, and *CQ* Editor Rich Moseson W2VU, serving as the tour's photographer, recording images of new products debuted at this year's Hamvention® to accompany this article. Therefore, without further ado, let's get this safari started so we can let you in on all of the new amateur radio products we saw and the new products that you'll be seeing either on the web or in person when they come to a ham radio retailer near you.

*1870 Alder Branch Lane, Germantown, TN 38139
e-mail: <wv5j@cq-amateur-radio.com>

Starting with Icom

One of the first Hamvention® booths we visited inside Dayton's landmark Hara Arena was the Icom America booth, a location where we felt we were certain to find products on display that had never before been viewed by the general amateur radio public. We were not disappointed, for Icom was quick to show us not one, but two new yet distinctive all-mode amateur radio transceivers, the IC-9100 (photo A) and the IC-7410.

Beginning with the more expensive of the two transceivers (the IC-9100 has a street price in the $3800 range), Icom delivers a lot for the loot by packing HF, 6-meter, 2-meter, 440-

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See our website for all of our other competition proven contesting hardware: StackMatch, StackMatch II, StackMatch II Plus (with Upper, Lower, Bip, Bop), K9AY Receiving Systems. Watch for our new StackMaster II for stacking 4 antennas!

NEW!

PowerMaster II

- New Larger, Sharp & Fast LCD Display
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- Best accuracy in the ham radio market
- New - Both 3kW and 10kW couplers on one display - switched
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Photo A– The IC-9100 is one of two new HF transceivers introduced this year by Icom at the Dayton Hamvention®. The second is the IC-7410. See text for details. (Unless otherwise noted, photos by W2VU)

MHz, and 1.2-GHz capability into one attractive package. The 1.2-GHz module is optional at an additional price of around $600, and for that you can transmit from 1 to 10 watts out. On the other built-in bands, the IC-9100 transmits 100 watts SSB on HF, 6 meters, and 2 meters, and 75 watts on 70 centimeters.

On the front, Icom gives IC-9100 owners a monochrome display which seems appropriate given its fairly monochrome front panel that offers some color but overall has a ready-for-business appearance. The LCD display screen carries the load of operator information by providing frequency, channel name, channel number, a multi-function meter that operates as an S-meter, RF output meter, SWR meter, and ALC level report, while other areas of the display give the operator the function key assignments, a band scope, RTTY decoding, memory keyer content, a graphical SWR scale, the D-STAR callsign, message and DR list, and the GPS position information.

Besides AF and squelch controls for the receivers, the left side of the radio also offers the power switch, notch control, built-in antenna tuner (HF through 6 meters), plus controls and jacks for headphones, keyer, and microphone. On the right side lies the multi-function keypad, main tuning dial, and knobs to control RIT, transmit bandwidth, passband tuning, and memory-channel selection.

To improve reception of its double-conversion superheterodyne receiver and support many digital processing features, Icom has equipped the IC-9100 with 32-bit floating point DSP and 24-bit AD/DA converters. According to Icom, the AGC level, which is controlled by the DSP unit, works for the desired signal and rejects blocking by strong adjacent signals out of the filter passband. The AGC time-constant preset gives the flexibility and speed needed for working pile-ups.

The IC-9100 also features optional D-STAR capability and a satellite mode that synchronizes the uplink and downlink frequencies and tracks the frequencies in the same tuning steps. There's much more this transceiver can do that we don't have room to mention, but that information will probably be available on the <www.icomamerica.com> website by the time you see this article in print.

The Icom IC-7410 is priced in the $2000 range and is billed by the company as the "best balance of technology, performance, and fun." I was also told by Icom reps that the IC-7410 uses the same chassis and front panel as the IC-9100, with a notable difference being the reduced information relayed by the LCD multi-function display when compared to the IC-9100.

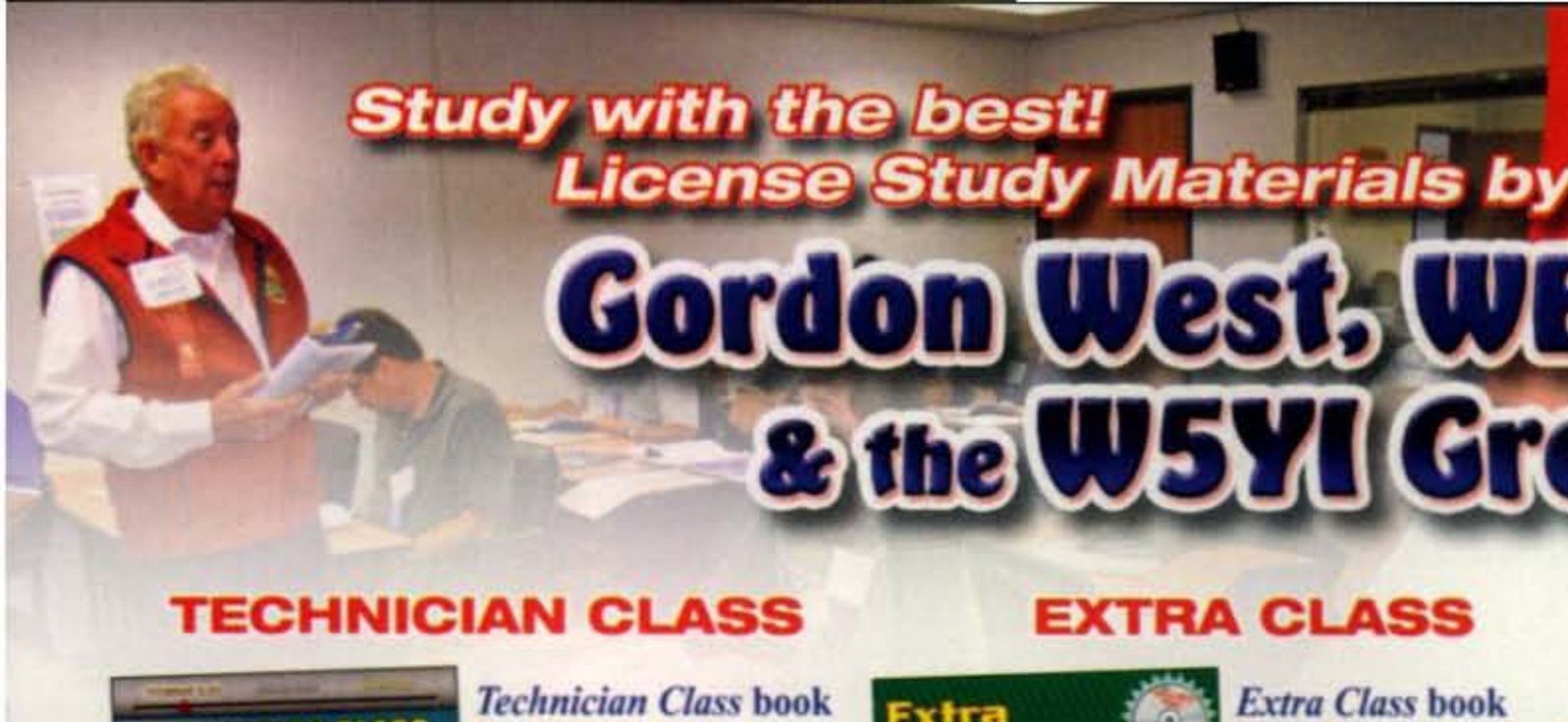
The IC-7410 also offers the latest in digital signal processing, a double-conversion superheterodyne receiver, HF through 6-meter capability, an RTTY demodulator and decoder, a simple band scope, ample CW functions, high-frequency stability, a voice synthesizer, two preamplifier types, automatic antenna tuner, CTCSS tone encoder and decoder functions, and a USB connector to facilitate PC control.

Elecraft KX3 Transceiver

One of the more intriguing designs for a new transceiver was the Elecraft KX3, a 160- through 6-meter all-mode, 10-watt unit that weighs in at around 24 ounces, and according to Elecraft, offers DSP-based features usually found only in larger radios (photo B).

Elecraft is quick to point out that due to its small size and weight, this transceiver can operate from almost anywhere—a desktop to a picnic table or from a vehicle. With its optional battery pack, internal wide-range antenna tuner (ATU), adjustable KXPD3 keyer paddle, and with the addition of a whip antenna, the radio can even be operated hand-held.

Photo B– Elecraft's new KX-3 is a hybrid of sorts, blending the high-end features of the K3 with the super-portability of the KX-1. (Photo by KØNEB)



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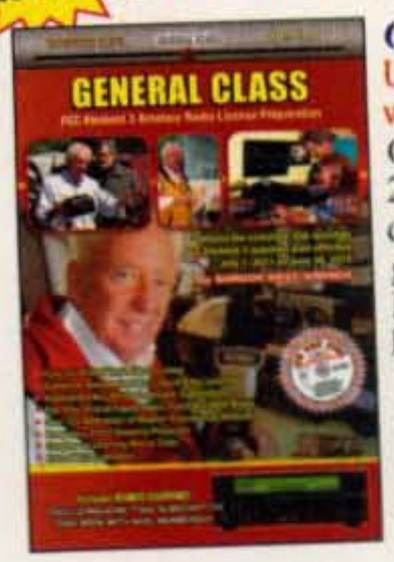

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CQ

On the receive side, the radio comes with a quadrature down-sampling mixer compatible with PC-based SDR (software defined radio), switchable preamps and attenuators, an internal CW keyer, passband tuning, automatic and manual notch filtering, a center-tuning indicator for CW and data modes, an eight-band receive audio equalizer, a built-in speaker, a built-in digital voice recorder, and as an option a narrow roofing filter with four bandwidths (500 Hz, 1500 Hz, 2700 Hz, and 3800 Hz) for excellent dynamic range.

Elecraft also offers an optional 100-watt KXPA100 amplifier for the days when a little more power seems necessary. Elecraft says it won't be accepting orders and shipping the units until sometime this coming fall or winter, so don't get your heart set on one for awhile. However, if you just have to have it as soon as possible, use the time wisely to save your dollars and read all the literature you can find on the KX3 transceiver.

Photo C– The Eagle is Ten-Tec's newest HF + 6-meter offering, packing big-rig features into a small package.

Ten-Tec Model 599, "The Eagle"

Emerging from the hills of Tennessee, Sevierville, to be specific, is the Ten-Tec Model 599, more commonly known amidst a growing circle of amateur radio fans as "The Eagle" (photo C).

Priced at $1995 with the auto-tuner and $1795 without, The Eagle is an HF+6 rig and general-coverage receiver that spans the ham bands from 160 meters through 6 meters with adjustable power output (5 watts to 100 watts) and all IF digital signal processing.

While we were at the Ten-Tec booth at Dayton, company reps told us that The Eagle uses a down-conversion system called *ASR* that they say is a "comprehensive design philosophy that includes low-noise receiver technology blended with advanced software control."

Given the features provided and the price range, this positions The Eagle to squarely compete with HF 160- to 6-meter rigs offered by other manufacturers. In fact, The Eagle does offer some unique features that others may not have, such as a choice of 256 main dial background colors and 16 intensity levels. Buyers also have the choice of adding AM and FM capabilities if they wish, since in its basic form, The Eagle comes only with USB/LSB and CW modes.

With its small size (roughly 3 by 8.5 by 10 inches) and low weight of 7.5 pounds, The Eagle also is ideal as a carry-along ham rig for the car, the camper, or Field Day operation. Therefore, if you are considering the purchase of a moderately priced HF rig, don't forget to consider The Eagle by Ten-Tec.

MFJ-9200 "QR-Pocket" Transceiver

Yes, the folks at MFJ Enterprises have named it a pocket transceiver, and when you consider its size (4.8 by 3.15 by 1.34 inches; see photo D), it could easily fit in some of the pockets I've seen. Also, with the small size comes portability. This radio covers 80, 40, 30, 20, 17, and 15 meters by using computer-modeled plug-in filter modules that reportedly yield no-compromise receiver performance. You pick your favorite band module at the time of ordering, and it comes with your MFJ-9200. Modules for other bands may be ordered for $29.95 each.

With all the features MFJ's engineers have packed into this tiny 7.4-ounce jewel, it's obvious they didn't scrimp on the extras to make it, as MFJ claims, "the smallest and lightest backpack transceiver currently available."

For the price of $249.95, the MFJ-9200 comes with the frequency module

Photo D– MFJ is moving from its single-band QRP (low-power) rigs to the MFJ-9200 "QR-Pocket" transceiver. It operates one band at a time, but you can change bands by swapping out band modules.

you specify and provides you with QRP+ (5 watts) of transmit power on every band, a programmable CQ message, built-in iambic keying, DDS frequency control, a selectable IF bandwidth for monitoring CW (600 Hz) or SSB (2.5 Hz), three main dial tuning rates, seamless QSK T/R switching, a precise 100-Hz readout, and a switched backlight for its digital display.

According to MFJ, the 9200 runs on any power source between 8 and 15 VDC and draws only 40 mA on receive with the digital display's backlight switched off. For more information on the MFJ-9200 and a laundry list of offered accessories, visit <www.mfjenterprises.com>.

Alinco DJ-G29T Portable

The Alinco DJ-G29T 222/900-MHz dual-band HT (yes, that's 222 and 900 MHz) is said by Alinco to be "ruggedly built to stand up to the elements!" A look at the specs and we find that statement to be verified. The 1-watt output DJ-G29T was built to IPX7 standards, meaning it can be submerged in 3 feet of water for up to 30 minutes. Assuming that is a worst-case scenario and that hams don't deliberately dunk their HTs in creeks and rivers, the DJ-G29T should be able to withstand the rigors of a cross-country walk, a city-wide tour, or a lost-child search. Thus, if you often find yourself in such situations, then perhaps the DJ-G29T is something to consider, particularly if you prefer to operate on the 222- or 900-MHz bands, for which it is often difficult to find gear. (Alinco is still making design tweaks to the exterior of the DJ-G29, so no photo is yet available.)

SSB Electronic LAN-SDR

Next on our list was a quick look at a unique product of Germany brought to us and the USA by one of our international friends, Willi Passmann, DJ6JZ. At his SSB Electronic booth, the star debuting was the SSB LAN-SDR (photo E).

Photo E– SSB Electronic from Germany introduced the new SSB-LAN SDR (software defined radio) receiver this year, which you can operate through your computer anywhere on your home WiFi network, as well as a software upgrade to the Perseus receiver, also seen here.

Yes, SSB Electronic has now combined the technology of an SDR with modern networking components to produce its SSB LAN-SDR.

It is called "a top-class receiver for the home network," and its prowess was displayed on a large-screen TV at Hamvention®. The SSB LAN-SDR with its network integration creates attributes that previously have only been available to a locally operated receiver. Now, however, due to LAN (Local Area Network) integration, this software-defined receiver which lends itself so easily to remote operation can be used comfortably from almost any spot in a computer-networked house.

This SDR connects to your computer through its own USB 2.0 interface, has two N-type connectors on back for antennas (software switchable), has double-notch filtering, and also has its own network Ethernet interface (10/ 100). The receiver tunes from .1 to 30 MHz and is designed to work with all Windows® operating systems from XP through Windows® 7. 32 and 64 bit. A plethora of information about what this SDR is receiving at any particular moment is displayed on the monitor screen.

Also new from SSB Electronic is a software upgrade for its Perseus SDR which allows it to be operated and tuned via the internet. According to SSB, that one improvement makes the Perseus a tool with a variety of uses, possibilities, and applications for its "direct sampling principle" and its powerful analog-to-digital converter.

With the ever-changing money market, it's tough to give an MSRP in either dollars or Euros, so if you want more infor-

mation about the radio and an accurate price, visit the SSB LAN SDR website at <www.ssb.de/index.php? cat=c262_SSB-LAN-SDR.html>.

Yaesu VL-2000 Amplifier/ VP-2000 Power Supply

Over at the Yaesu booth we found the company's newest item. Making its first public appearance in the U.S. was the VL-2000 amplifier and its matching power supply, the VP-2000 (see photo F). Looking like an amp that's ready to go to work making contacts, the Yaesu stat sheets tell us that the VL-2000 is an all-solid-state linear amplifier that covers 160 to 15 meters and the 6-meter band. It provides a 1500-watt power level on HF (full legal limit) and 1000 watts on 6 meters when wired for 220 VAC. When wired for 110 VAC, the amp provides 500 watts output. It features a built-in antenna tuner with memories, a front panel that sports two dual-function meters, and a rear panel that can handle five antennas. The separate VP-2000 power supply provides all the voltages the VL-2000 requires.

Specific price figures were not available during Hamvention®, but additional information about the VL-2000 and VP-2000 should be available on the web at <www.Yaesu.com>.

Photo F– Yaesu has a new offering for those hams who feel that "life's too short for QRP," the new VL-2000 legal-limit amplifier and its matching VP-2000 power supply.

ACOM 1010 and 1011 Amplifiers

Making their joint debut at the 2011 Hamvention were the ACOM 1010 and 1011 linear amplifiers from the company based in Sofia, Bulgaria. Both amps are built small and lightweight for fixed or DXpedition and Field Day operations and both cover the 160- through 10-meter bands but utilize different tubes that produce different output wattages. The ACOM 1010 (photo G) uses a single Svetlana 4CX800A (GU74B) high-performance ceramic-metal tetrode with plate dissipation of 800 watts, while the ACOM 1011 utilizes two 4CX250B (7203) ceramic-metal tetrodes with a total plate dissipation of 500 watts (forced-air cooling, grid-driven) for maximum efficiency.

ACOM has been developing products since 1988. It lists two U.S. dealers on its website: ACOM International at 4

Photo G– ACOM's Model 1010 is one of two new linear amplifiers the Bulgarian company introduced this year at Dayton.

Photo H– Rounding out the new amps at Dayton is the Expert 2K-FA fully automatic linear from Italian manufacturer SPE. Stay tuned for antennas and accessories in the September issue.

Marc Road, Medway, Massachusetts 02053, phone 508-533-7765, fax 508-533-7707, toll-free for USA at 1-866-533-ACOM (or 2266), e-mail: <k6nd@hfpower.com> or via the web at <http://www.hfpower.com>; and Array Solutions at 2611 N. Beltline Road, Sunnyvale, TX 75182, phone 214-954-7140. In addition, you may contact the dealer via e-mail at <sales@arraysolutions.com> or visit the company's website at <http://www.arraysolutions.com>. Array Solutions had the amps on display at Dayton. For more information about either of these amplifiers, you can also visit <www.acom-bg.com>.

Expert 2K-FA Amplifier

Last, but definitely not least, we have the Expert 2K-FA 2-KW solid-state amp from SPE Co. of Rome, Italy (photo H). SPE reps at the booth were quick to let us know that this HF plus 6-meter amplifier is being billed as "The Most Advanced Solid State Automatic Linear Amplifier in the World." With a price quoted at $7495 U.S., it's obvious that this product is built to be an addition to "a very-high-quality amateur's station."

That's not a description of my station and may not be of yours, but you may get an opportunity to operate this unit at some point in the future, so you should be aware that the company takes pride in its statement that "the operator has only to move the frequency tuning knob on the transceiver" and let the fully automatic Expert 2K-FA handle the rest.

The amp has a back panel with a USB port for PC control and downloading upgrades along with six antenna connectors, and the paperwork says it is capable of selecting up to three antennas on each band. It also has a 5.4× heat-sink surface and a total of four ventilation fans for continuous operation at any of three different power levels: full, 1 KW, and 500 watts. The front panel offers switchable operator selections for power, input antenna, and operating band, among others, plus a digital display that shows power output, operating band, input antenna, and PA gain in dB and more.

Weight for this contender comes in at just under 50 pounds, so I'll leave it to you to decide if it is lightweight (a relative term) or portable, as the reps mentioned. For more information about the Expert 2K-FA, visit the SPE website at <www.linear-amplifier.com>.

Summary

That pretty much covers the transceivers, receivers, and amplifiers that made their first public appearance at the 2011 Dayton Hamvention®. Stay with us for the second part of this grand *CQ* New Products Safari in the September issue, in which we will describe the new antennas and accessories found at Hamvention® 2011.

Results of the 2010 CQ WW DX SSB Contest

BY BOB COX,* K3EST

Expanded Results on the Web

Editor's Note: Having more than 6500 logs submitted for the CQ WW SSB Contest is great, but it does put a squeeze on space. In order to assure that the efforts of all entrants are recognized through the publication of complete line scores, certain other elements of our contest reporting have been moved to the CQ website. Please visit the CQWW DX Contest page (follow the links from <www.cq-amateur-radio.com>) for QRM, expanded top scores listings, and more. —*W2VU*

A73A. Standing (left to right): K5GN, K6JL, W6XD, N6AA, WB6BFG, AB6BH, N6VI, OH2KI. Sitting (left to right): A71AD, A71EL, A71CV, A71BX.

The CQ WW is all about fun and lots of activity. Quiet bands come to life during the CQ WW. Let the entrant's comments describe the activity: "There was a huge amount of activity on all bands," *DJ3WE*. "Great contest as always. Lots of activity improved the score over last year and added some to the DXCC. What more could I ask?" *VK4BL*. "Band conditions were great. We did better than last year with more than 300 more QSOs,"VE3DC.

The CQ WW is a good way to introduce new contesters to our sport, as commented others: "Three new contesters are now happy to take part in this big event," *DP6T*. "Some absolute 'newbies' to contesting on the team and they took to it like a duck to water. I think we have now converted them to contesting," *GM2T*. "I made my first U.S. contact, so very happy," *MØTTE*. "The Cambridge University Wireless Society's annual entry in CQ WW DX SSB was primarily aimed at introducing young amateurs to contesting. This year was no exception, as 10 out of the 14 operators were age under 30," *M4A*. "This was my first CQ WW SSB. I was very excited," *YC1PEI*. "This was my first World-Wide DX Contest, my second contest—ever," *KG4WPD*.

The CQ WW is about lots of DXpeditions: "My first chance to operate outside the USA, what a rush!" *VP9/N1SV*. "First time that I ever operated a contest from a DX location and it was the most fun I ever had. Felt great to have big contest stations calling me for once to get the multiplier," *Z2/AC7GP*. "It was good to have a large number of DXpeditions during the contest," *AA6K*.

The CQ WW is about learning propagation: "Working VR2ZQZ and B7P via LP Sunday morning on 10 meters was cool!" *N5XJ*. "The most fun contest of all. A special thanks to 9M6LSC for calling in on 20 at 2358 Sunday for a multiplier," *WØUA*. "Yes!! The bands were open. It was great to see 20 and 15 meters wall to wall with signals," *WB6JJJ*.

Once you listen to the bands during the CQ WW, you will be hooked. The scores list the results of the efforts of all the entrants. A yearly reminder: If you want to know how long it is until the 2011 CQ WW SSB test, check out the website of OT5A: <http://www.on7lr.org>. Read on to see how you and your friends ended up. Everyone who operated the CQ WW SSB in 2010 was a winner.

Ash, 3V8SS.

High Power

Taking full advantage of the unique location of the Azores, Jeff, N5TJ, operating from CR2X, took the top spot. Jeff had to work lots of 3-pointers to overcome his disadvantage into Europe. Not very far behind in second place was Jim, W7EJ, operating from CN2R. Third place world went to 4LØA operated by Andi, UUØJM. Taking second place in Europe and fourth in the world was Tonno, ES5TV, operating from Montenegro as 4O3A. From Finland, Marko, OH4JFN, took OH8X to third place in Europe. Doug, K1DG put his considerable skills to work to take the USA top position from New Hampshire. Richard, NN3W, operating from N3HBX, took second place from the Maryland countryside. Third place USA went to Ray, W2RE, from southeastern New York. The top West Coast scorer was Glenn, K6NA. Other worthy efforts from propagationally challenged areas were: VU2PAI, HSØZEE, VK3TDX, VK4EMM, 9M8Z (9M6DXX), 3D2A (VK4AN), WH2D (K3UOC), YB1AR, V63CJB (JJ2CJB), T88DL (DL2OBO), and DU9RG.

The continental winners were: North America VY2ZM (K1ZM); Africa CN2R (W7EJ); Asia 4LØA (UUØJM); Europe CR2X (N5TJ); Oceania 9M8Z (9M6DXX); South America FY5KE (FY5FY); Japan JH4UYB; U.S. K1DG.

Low Power

To enter the low power category all you need is a transceiver and an antenna.You will be surprised by what you can work with 100 watts. Plus, making the Top Scores box really means something. Operating from beautiful Puerto Plata, located on the north coast of the Dominican Republic, Ted, HI3TEJ, took world top honors. World second place went to well-known contester S53R operating from ST2AR. Robert made a lot of people happy handing out his double multiplier. Third place in the world and number one in Asia was taken by Yuri, RG9A. 9A7P operated by Hrvoje, 9A6XX, took first place in Europe. Second place Europe was captured by Pasi, OH6UM, at OH2BH. Third place Europe went to low power champion Marius, YO3CZW. In the U.S., taking the top spot for the third year in row was Art, K1BX.

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

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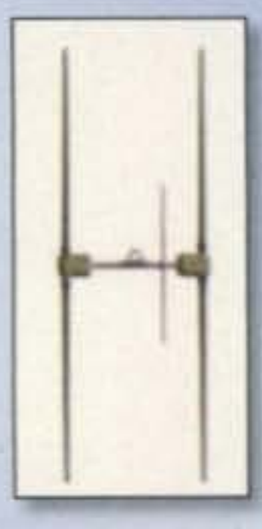
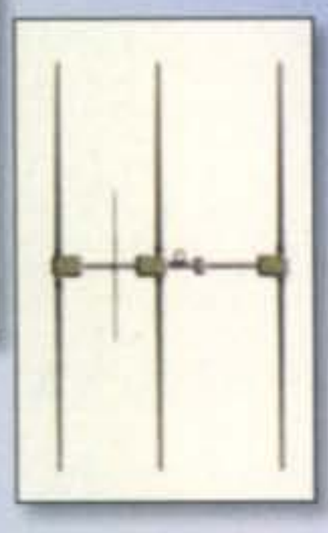
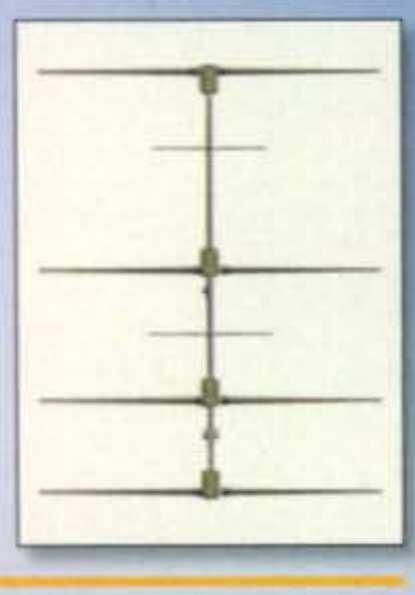


2 Element 20m-6m Yagi
2 element Yagi, 20m-6m continuous coverage; 57" boom, 36 ft longest element, 18.2 ft turning radius, 6 sq ft wind load, 30 lb; SDA 100 controller included.



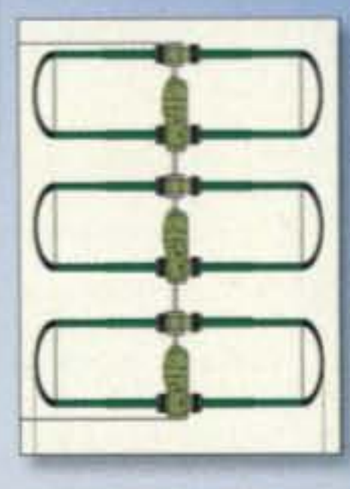
3 Element Yagi 20m-6m
3 element Yagi, 20m-6m continuous coverage; 16 foot boom, 36 ft longest element, 19.7 ft turning radius, 6.1 sq ft wind load, 51 lb; SDA 100 controller included.



4 Element Yagi 20m-6m
4 element Yagi, 20m-6m continuous coverage; 36 ft longest element, 24.1 ft turning radius, 9.7 sq ft wind load, 99 lb; SDA 100 controller included.

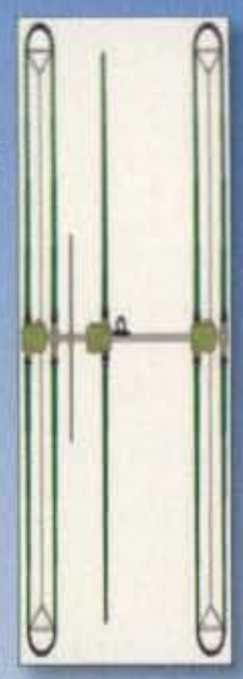
Dream Beam Series Yagi's

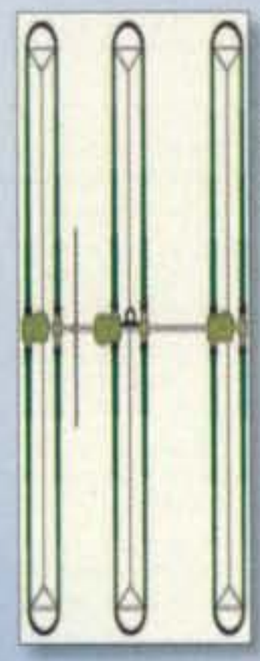
The Dream Beam series offers antennas for both space limited Hams as well as the "Big Guns" who have the space and want the very best.



DB11 Yagi Antenna
DB11 Yagi, 18.5 ft element length, 11 ft boom, 10.8 ft turning radius, 61 lb, 5.9 sq ft wind load; 2 active elements on 20m; 3 active elements on 17, 15, 12, 10, 6m.

DB18 YAGI
Dreambeam DB18 yagi, 3 el on 20m-6m, 2 el on 40/30m, 18 ft boom; Does not include optional 6m passive element kit; Includes SDA100 controller.





DB18E YAGI
Dreambeam DB18E, 3 el 30m-6m, 2 el 40m, three looped elements, does not include optional 6m passive element kit, 18 foot boom; Includes SDA 100 controller.

Vertical and Dipoles

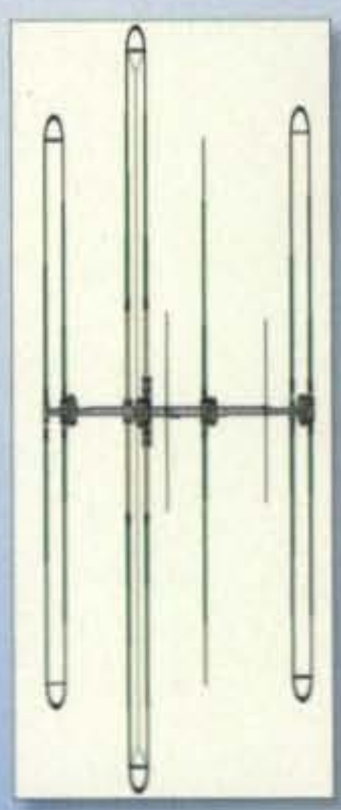
For the ham who may not have a tower, but a tree or two for a dipole. SteppIR verticals work great when there are no tall structures around to hang some wire. And, the low take-off angle can be your friend.

BigIR Vertical Antenna, 40m-6m
BigIR vertical antenna, 40m-6m continuous coverage, 32 ft length, 15 lb total weight, 2 sq ft wind load; EIA 222C wind rating when guyed; Comes with SDA 100 controller and 1.5"mounting pole ; Does not include optional 80m coil.

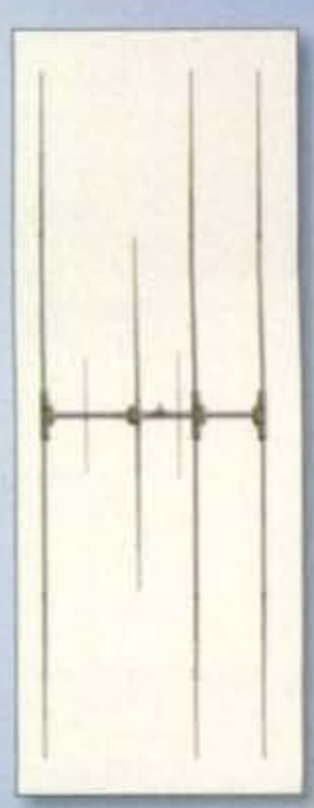
SmallIR Vertical Antenna 20m-6m
20m-6m continuous coverage, 18 ft total length, 12 lb weight, 1 sq ft wind load; EIA-222C wind rating without guys.

20m-6m Dipole
20m-6m continuous coverage dipole; 36 ft element length; Comes with SDA 100 controller.

40m-6m Loop Dipole
40m-6m continuous coverage, 39 ft total length; SDA 100 controller included.



DB36 DreamBeam Yagi, 40m-6m
DreamBeam DB36 4 element Yagi, 40m-6m continuous coverage; 36ft boom, 48 ft longest element, 26 ft turning radius, 17.5 sq ft wind load, 160 lb; SDA 100 controller included.



MonstIR 4 Element Yagi 40m-6m
MonstIR 4 element Yagi, 40m-6m continuous coverage with full length elements; 34ft boom, 70 ft longest element, 39.7 ft turning radius, 23.9 sq ft wind load, 160 lb; SDA 100 controller included.

SteppIR

2112 116th Ave NE Suite 1-5, Bellevue, 98004

www.steppir.com

Tel: (425) 453-1910 Fax: (425) 462-4415

Great operating, Art! Reprising his second-place finish last year was Ed, N1UR. Perennially near or at the top was Marvin, N5AW, taking the third position. N6RV, NQ7R, and K7ACZ made top scores from the U.S. west. V51YJ, ST2AR, 3V8SS, TA2/DL7BC, BA8CY, JY5CC, BW2/KU1CW, E21YDP, EY8CC, UN1O, 3D2A, and DV1JM all had excellent scores from interesting locations.

The continental winners were: North America HI3TEJ; Africa ST2AR; Asia RG9A; Europe 9A7P; Oceania DV1JM; South America HK6P; Japan JH3CUL; U.S. K1BX.

QRP

The QRP category really sharpens your tuning skills. Almost all the top scorers' QSOs are search and pounce. The world winner this time was determined by 15 points! That equals less than 1/15 of a QSO. Coming out on top was Doug, KR2Q, from northern New Jersey, who just edged out Dima, RX1CQ, operating from his station just north of St. Petersburg (both will receive trophies!). Third place world went to Steffen, DM2DX, from west central Germany. Long-time QRPer Chris, KA1LMR, took sec-

2010 WW DX SSB TROPHY WINNERS AND DONORS

SINGLE OPERATOR
World All Band
CR2X (Opr.: Jeffrey Steinman, N5TJ)
Donor: Southern California DX Club

World Low Power
Ted Jimenez, HI3TEJ
Donor: Slovenian Contest Club

World QRP
Doug Zwiebel, KR2Q
Donor: Jeff Steinman, N5TJ

World Assisted
ERØWW (Opr.: Sergey S. Rebrov, UT5UDX)
Donor: Glenn Johnson, WØGJ

World Assisted Low Power
Miro Heleta,YU2A
Donor: Gail Sheehan, K2RED

U.S.A.
Doug Grant, K1DG
Donor: Potomac Valley R.C. – KC8C Memorial

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

U.S.A. QRP
Christopher M. Merchant, KA1LMR*
Donor: Pat Collins, N8VW

U.S.A. Assisted
Charles Fulp, K3WW
Donor: John Rodgers, WE3C

U.S.A. Assisted Low Power
Douglass M. Allen, K4LY
Donor: CQ Magazine

U.S.A. Zone 3
Glenn Rattmann, K6NA
Donor: Dave Pruett, K8CC & Greg Surma, K8GL

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

Canada
Jeffrey Briggs, VY2ZM
Donor: Contest Club Ontario – VE3WT Memorial

Caribbean/C.A.
TO7A (Opr.: Dmitry V. Stashuk, UT5UGR)
Donor: Alex M. Kasevich, W1CDC

Europe
4O3A (Opr.: Tonno Vahk, ES5TV)*
Donor: Potomac Valley R.C. – W4BVV Memorial

Europe Low Power
9A7P (Opr.: Hrvoje Horva, 9A6XX)
Donor: Scott Jones, N3RA & Tim Duffy, K3LR

Europe QRP
Dmitry A. Sokolov, RX1CQ
Donor: CQ Magazine

Europe Assisted High Power
OE4A (Opr.: Wolfgang Klier, OE2VEL)*
Donor:CQ Magazine

Europe Assisted Low Power
Boban Kojic, YT9A*
Donor: CQ Magazine

Russia
Vadim Ovsyannikov, R9DX
Donor: CQ magazine

Africa
CN2R (Opr.: James Sullivan, W7EJ)
Donor: CQ magazine

Asia
Donor: CQ magazine

Japan
Masaki Okano, JH4UYB
Donor: Tack Kumagai, JE1CKA

Japan Low Power
Eiji Souno, JH3CUL
Donor: Western Washington DX Club

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

South America
FY5KE (Opr.: Didier Bironneau, FY5FY)
Donor: Yankee Clipper Contest Club

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

World – 21 MHz
HC8A (Opr.: Richard Smith, N6KT)
Donor: Robert Naumann, W5OV

World – 14 MHz
UP2L (Opr.: Vladimir Umanets, UA9BA)
Donor: North Jersey DX Assn. – K2HLB Memorial

World – 7 MHz
Jham Salim Gechem, HK1T
Donor: Fred Laun, K3ZO – K7ZZ Memorial

World – 3.7 MHz
Teemu S. Korhonen, SMØW
Donor: Fred Capossela, K6SSS

World – 1.8 MHz
Mikhail V. Nabokin, RA9FW/9
Donor: CQ magazine

USA – 28 MHz
Colin S Jenkins, KU5B
Donor: Donald Thomas, N6DT

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

USA – 14 MHz
Frederick E. Lass, K2TR
Donor: Yankee Clipper Contest Club – KC1F Memorial

USA – 7 MHz
Daniel S. Handa, W7WA
Donor: Stanley Cohen, W8QDQ

USA – 3.7 MHz
Joseph Gagliardi, Jr., AA1BU
Donor: CQ Magazine

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

Carib./C.A. (21 MHz)
Edwin Adalberto Nunez Redondo, HI3K
Donor: Nate Moreschi, N4YDU

Carib./C.A. Assisted (21 MHz)
Alfredo Velez Ramos, WP3C
Donor: CQ Magazine

Europe – 28 MHz
George Charokopakis, SV9GPV
Donor: Charles Dietz, W5PR

Europe – 21 MHz
Sebastien Le Gal, F8DBF
Donor: Tine Brajnik, S5ØA

Europe – 14 MHz
Olivier Seizelet, F1AKK
Donor: Charles Wooten, NF4A

Europe – 7 MHz
TM$ST (Opr.: Gildas Balannec, F/TU5KG)
Donor: John Warren, NT5C

Europe – 3.7 MHz
SN3A (Opr.: Jurek Smoczyk, SP3GEM)
Donor: Ted Demopoulos, KT1V

Europe – 1.8 MHz
M8M (Opr.: Tony Preedy, G3LNP)
Donor: Robert Kasca, S53R

Oceania (14 MHz)
KH7Q (Opr.: Kurt M. Andress, K7NV)
Donor: Bruce D. Lee, KD6WW

Asia –14 MHz
Khalid Al-Jardani, A41OO*
Donor: Charles Shinn, W5PG

Japan – 14 MHz
Gou Hanazak, JA1QXY
Donor: Take Yokoyama, JL1BLW

MULTI-OPERATOR, SINGLE TRANSMITTER
World
D4C (Oprs.: I4UFH, I4YSS, IZ4DPV, IK1HJS, CT1ESV, YL2GM)
Donor: So. Calif. DX Club – W6AM Memorial

U.S.A.
K1LZ (Oprs.: K1LZ, KB1RDZ, KL1A, N2OW, K3JO, NU5Y, N8BO)
Donor: Carolina DX Association

Carib./C.A.
V26B (Oprs.: JA7HMZ, JA7GYP, JA7EPO)
Donor: Bob Raymond, WA1Z

Africa
CQ9T (Oprs.: CT3CD, CT3FQ, CT3HF, CT3KN)*
Donor: Doc Sayre, W7EW

Asia
P33W (Oprs.: RX9TL, UA2FZ, RA6LBS, RW4WR, R3DCX, RA3AUU)
Donor: Edward L. Campbell, NT4TT – AA6BB and KA6V Memorial

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

Europe
E7DX (Oprs.: 9A1TT, 9A5CW, 9A5K, E7ØR, E7ØT, E74AW, E76C, E77DX)
Donor: Bob Cox, K3EST

Oceania
AH2R (Oprs.: JI3ERV/NH2C, JG3RPL/N1BJ, JE8KKX/AH2K, NH2M, JH7QXJ/AH2Q)
Donor: Junichi Tanaka, JH4RHF

South America
P49Y (Oprs.: AE6Y, KØDQ, N4OC, P43A)
Donor: Victor Burns, KI6IM – The Cuba Libra Contest Club

MULTI-OPERATOR, TWO TRANSMITTERS
World
CN3A (Oprs.: IK2QEI, IK2SGC, IV3ZXQ, IV3TMV, S5ØA, S57AW, S5ØXX, CN8WK)
Donor: Array Solutions

U.S.A.
KC1XX (Oprs.: KC1XX, DL9DRA, K1EA, K1FWE, KM3T, N1KWF, WC1M, W1FV)
Donor: Kimo Chun, KH7U & Mike Gibson, KH6ND Dan Robbins, KL7Y Memorial

Europe
IR4X (Oprs.: I4VEQ, I4TJE, I4EAT, I4IKW, I4USC, I4LEC, I4AVG, I4YRW, IZ3EYZ, IK4ZGO, IV3YYK, IZ4BOY)
Donor: Aki Nagi, JA5DQH

Oceania
AHØBT (Oprs.: W1FPU/7L1FPU, W1NDE/JE1NDE, KW2X/JG7PSJ, AHØBR/JA1OJE, AHØBZ/JM3CRK)
Donor: Japan CQ Ham Radio

MULTI-OPERATOR, MULTI-TRANSMITTER
World
EF8R (Oprs.: EA8AH, EA8EW, EA8CAC, EA8RY, EA8ZS, EA5DY, ES2RR)
Donor: Dave Leeson, W6NL and Barb Leeson, K6BL

U.S.A.
K3LR (Oprs.: K3LR, N2NC, N5UM, W3TX, K8GL, W2RQ, W8JV, K8CX, N2NT, K1AR, N3SD, K3UA, DL6LAU, N3GJ, LU7DW)
Donor: Jim Lawson, W2PV Memorial

Europe
DR1A (Oprs.: DB6JG, DF6JC, DJ6ET, DJ7EO, DK2CX, DK6XZ, DL2YL, DL3BPC, DL3DXX, DL5CW, DL5LYM, DL5NDX, DL6FBL, DL8WPX, JK3GAD, PA1TX, PC5A, SV2KBS)
Donor: Finnish Amateur Radio League

Japan
8N5A (Oprs.: JM1UWB, JA5FBZ, JA5FDJ, JH5FIS, JH5RXS, JR5IAH, JR5JAQ, JJ5GMJ)
Donor: Masahiro Kitagawa, JH3PRR

CONTEST EXPEDITIONS
World Single Operator
V63CJB (Opr.: Seiichiro Miki, JJ2CJB)
Donor: National Capitol DX Assn. – Stuart Meyer, W2GHK Memorial

World Multi-Single
C91WW (Oprs.: G4LDL, GI4FUM, ZS6JR)
Donor: Gail Sheehan, K2RED

World Multi-Multi
C37N (Oprs.: C31US, EA5BZ, C31CT, C31JM, C31MO, EA1DVY, EA3GHZ, EA3HCJ, EA5CEE, EA5KA, EA6DD, F2VX, F5HX, F5VLY, F6EXV)
Donor: CQ Magazine

*Second place

ond place USA from New Hampshire. Third place USA went to a familiar QRPer Phil, NØKE. Phil had the highest USA score west of New Jersey. Taking the third position in Europe was Frank, DL4VCG. Special mention must be made of the very fine score of Izuno-san, JR4DAH, #4 in the world and #1 in Asia. The top zone 3 scorer was Mark, K6UFO, operating from NN7SS. He was followed by Bill, W8QZA, operating W6QU. JA2WMV, BA4WI, EA3FF, K8ZT, EA8IK, and 7K1CPT are to be congratulated for their outstanding efforts.

The continental winners were: North America KR2Q; Africa EA8IK; Asia JR4DAH, Europe RX1CQ; Oceania No Entry; South America PY2BN; Japan JR4DAH; U.S. KR2Q.

Assisted High Power

Our emphasis on the assisted categories really increased participation. Why not try to win one of the new assisted awards? A well-known assisted entrant, K3WW, has called the category "Single op distracted." It takes a lot of discipline to achieve a good balance between chasing packet spots and running stations. Repeating last year's victory, Sergey, UT5UDX, operated ERØWW to world #1. Great job, Sergey! Second-place world and number one in North America was KP3Z operated by Felipe, NP4Z. Third place world and first place in South America was Felipe, PY1NB. Second in Europe went to Wolf, OE2VEL, operating OE4A from far eastern Austria. Third place in Europe went to SO8A operated by Andrzej, SP8BRQ. Returning to first place in the U.S. was Charles, K3WW. Charles continues to put in 45–47 hours in the contest! Second place USA went to Joe, AA3B. Third place in the U.S. was Mark, KØKX, in Minnesota. A reminder: use of *any* QSO spotting tool places you in the assisted category.

The efforts of those handing out good multipliers need to be recognized: FP/KV1J, J28RO, 5N7M, 3V8BB, BA7IO, BY3MM, VR2XLN, JT5DX, HZ1FS, A65BP, XV1X, 9M6LSC, FO8RZ, and NH2T made a lot of QSOs.

The continental winners were: North America KP3Z (NP4Z); Africa EA8/DL6MHW; Asia JA2IVK; Europe ERØWW (UUØJM); Oceania FO8RZ; South America ZX2B (PY2MNL); Japan JA2IVK; U.S. K3WW

Low Power Assisted

"As a low power assisted addict, I was very happy to see the CQ WW Contest Committee create separate categories for high, low, and QRP assisted. Finally, we assisted guys get treated just like the unassisted lads. Now I can see where I stand with the other low power assisted stations," *N2FF*. The low power entrants are listed separately and compete for awards with only other low power stations. We hope that many entrants will choose to try the assisted category.

2010 CQ WW DX SSB TOP SCORES

WORLD

SINGLE OPERATOR
HIGH POWER
All Band

CR2X	15,256,808
CN2R	14,462,305
4LØA	10,949,688
4O3A	10,587,780
FY5KE	10,372,524

28 MHz

LU1HF	941,829
PW5G	729,355
ZS6TQ	461,992

21 MHz

HC8A	3,565,674
ZX5J	2,301,308
KH7Y	1,259,180

14 MHz

UP2L	1,775,378
HK1X	1,591,948
F1AKK	1,556,646

7 MHz

HK1T	1,189,650
JAØJHA	854,811
TMØT	633,933

3.7 MHz

SMØW	509,268
SN3A	448,440
EA8CMX	388,065

1.8 MHz

RA9FW/9	121,346
M8M	86,545
ES5RW	83,433

LOW POWER
All Band

HI3TEJ	5,414,118
ST2AR	4,290,087
RG9A	2,792,153
9A7P	2,485,230
JY5CC	2,422,154

28 MHz

EA8TX	359,476
CW3D	315,675
LU6FOV	270,000

21 MHz

ZV2C	687,401
HI3K	605,968
7Z1SJ	531,872

14 MHz

HC1JQ	665,457
CO6LP	342,912
RZ9OQ	230,652

7 MHz

EK6TA	557,370
S57DX	319,667
HI3FVA	229,104

3.7 MHz

XE1CQ	140,798
CO6YAC	131,475
UK9AA	126,910

1.8 MHz

EA6SX	23,450
F5SSK	22,995
OK1CRM	19,722

QRP
All Band

KR2Q	594,943
RX1CQ	594,928
DM2DX	411,740
JR4DAH	367,821
NP2Q	342,225

ASSISTED
HIGH POWER
All Band

ERØWW	7,862,990
KP3Z	5,644,142
PY1NB	5,558,720
ZX2B	5,533,276
OE4A	5,371,993

ASSISTED
LOW POWER
All Band

YU2A	2,516,631
PY2SEX	2,430,330
YT9A	2,188,041
9A3XV	2,026,640
NP3O	2,005,521

ASSISTED
QRP
All Band

RW3AI	222,952
HA7YS	190,384
SO8T	90,093
PU5ATX	75,033
HA7VK	36,822

Multi-Operator
Single Transmitter

D4C	22,812,320
P33W	19,267,610
P49Y	14,084,807
PJ4X	13,529,100
V26B	13,060,125

Multi-Operator
Two Transmitter

CN3A	33,320,736
CR3A	32,470,760
PW7T	18,244,437
KC1XX	15,936,950
LP1H	14,556,432

Multi-Operator
Multi-Transmitter

EF8R	29,023,327
PJ2T	27,984,516
A73A	23,364,120
DR1A	21,624,680
K3LR	21,247,382

UNITED STATES

SINGLE OPERATOR
HIGH POWER
All Band

K1DG	6,298,860
NN3W	5,659,026
W2RE	4,985,904
K4ZW	4,844,712
W9RE	4,472,940

28 MHz

KU5B	55,784
W5PR	51,148
W3EP/1	25,315

21 MHz

N2PP	522,543
KØEJ/4	509,151
N4OX	441,071

14 MHz

K2TR	948,084
WB9Z	885,764
KK9A/4	680,628

7 MHz

W7WA	396,648
W3UA/1	362,943
W5WMU	157,122

3.7 MHz

AA1BU	112,665
K2XA	110,401
W3NO	78,942

1.8 MHz

W2MF	19,670
K5RX	12,705
W2VO	7,952

LOW POWER
All Band

K1BX	2,278,402
N1UR	1,617,337
N5AW	1,537,704
N4TZ/9	988,603
N5DO	902,088

28 MHz

K4WI	27,550
WW4LL	21,114
KZ5J	8,864

21 MHz

K4MDX	147,896
N4IG	145,386
N1NK	120,536

14 MHz

N2GM	145,280
W7FP	123,380
N7BK	119,925

7 MHz

WB2REM/4	57,600
AB7E	51,000
W9ZRX	20,935

3.7 MHz

NA8V	33,680
WA6WPG	8,967
N7ZG	8,316

1.8 MHz

NA4W	128

QRP
All Band

KR2Q	594,943
KA1LMR	336,954
NØKE	240,277
K8ZT	205,942
NN7SS	160,769

ASSISTED
HIGH POWER
All Band

K3WW	3,933,024
AA3B	3,257,263
KØKX	2,837,562
K1KI	2,684,695
W4SVO	2,498,229

ASSISTED
LOW POWER
All Band

K4LY	1,385,268
KS1J	1,041,100
K2TE/1	1,030,000
NØHR	1,025,188
KT4ZB	958,265

ASSISTED
QRP
All Band

No entry

Multi-Operator
Single Transmitter

K1LZ	10,193,630
K5ZD/1	6,622,287
N5DX	5,406,882
W3BGN	5,343,624
N2IC/5	5,137,170

Multi-Operator
Two Transmitter

KC1XX	15,936,950
WE3C	10,991,044
N3RS	9,490,192
K1RX	8,246,080
NK7U	6,529,756

Multi-Operator
Multi-Transmitter

K3LR	21,247,382
W3LPL	17,824,653
K1TTT	7,760,808
KM1W	6,054,300
WØAIH/9	5,060,268

EUROPE

SINGLE OPERATOR
HIGH POWER
All Band

CR2X	15,256,808
4O3A	10,587,780
OH8X	6,508,899
OE3K	5,815,260
OHØB	5,761,276

28 MHz

SV9GPV	117,488
S53O	105,391
E73O	94,800

21 MHz

F8DBF	1,207,813
E77A	900,860
S53MM	833,796

14 MHz

F1AKK	1,556,646
GM2V	1,094,317
OZ7X	1,082,154

7 MHz

TMØT	633,933
DJ7WW	526,848
OHØV	492,632

3.7 MHz

SMØW	509,268
SN3A	448,440
G3TXF	244,272

1.8 MHz

M8M	86,545
ES5RW	83,433
I4FYF	68,769

LOW POWER
All Band

9A7P	2,485,230
OH2BH	1,845,900
YO3CZW	1,547,757

28 MHz

IT9PQJ	73,831
IZ8DBJ	26,524
IT9ZVJ	25,500

21 MHz

EA7ISH	379,183
UR5IFX	157,596
IT9RYJ	153,090

14 MHz

UA1AQA	130,345
OK2BXE	127,958
UT3EV	125,760

7 MHz

S57DX	319,667
ES5JR	177,282
USØHZ	117,215

3.7 MHz

S54W	94,100
F5BEG	84,584
LY1G	80,360

1.8 MHz

EA6SX	23,450
F5SSK	22,995
OK1CRM	19,722

QRP
All Band

RX1CQ	594,928
DM2DX	411,740
DL4VCG	325,435
EA3FF	250,230
SP2DNI	166,124

ASSISTED
HIGH POWER
All Band

ERØWW	7,862,990
OE4A	5,371,993
SO8A	4,669,086
HG1ØP	4,481,880
GW9T	4,398,070

ASSISTED
LOW POWER
All Band

YU2A	2,516,631
YT9A	2,188,041
EW1IP	1,050,740
MIØM	944,674
RL6M	903,630

ASSISTED
QRP
All Band

RW3AI	222,952
HA7YS	190,384
SO8T	90,093
HA7VK	36,822
EA4FH	1,681

Multi-Operator
Single Transmitter

E7DX	12,185,136
OM8A	10,701,680
RU1A	10,069,460
UZ2M	9,498,524
RL3A	9,436,520

Multi-Operator
Two Transmitter

IR4X	13,885,885
9A7A	9,106,461
DQ4W	8,473,101
T7ØA	8,427,883
DLØCS	7,593,795

Multi-Operator
Multi-Transmitter

DR1A	21,624,680
DFØHQ	16,439,906
LZ9W	12,613,744
OT5A	10,659,128
EE2W	x

DX Colombia ARC: HK1R, HK1X, HK1N, HK1W, HK3JJH/1, HK1T.

2010 WW DX SSB TOP SCORES IN MOST ACTIVE ZONES

Zone 3

K6NA	2,467,150
W6YI	1,913,302
K6XX	1,701,080
VA7FC	1,602,040
K5RR/7	1,524,135

Zone 4

VC3A	7,447,734
VE3JM	5,236,938
W9RE	4,472,940
VE3CX	3,384,368
VE3UTT	3,258,063

Zone 5

VY2ZM	9,863,138
K1DG	6,298,860
NN3W	5,659,026
W2RE	4,985,904
K4ZW	4,844,712

Zone 14

CR2X	15,256,808
SJ2W	5,756,040
GM5X	5,369,590
GW9T	4,398,070
DC4A	4,089,407

Zone 15

4O3A	10,587,780
OH8X	6,508,899
OE3K	5,815,260
OHØB	5,761,276
OE4A	5,371,993

Zone 16

ERØWW	7,862,990
RX3APM	3,784,260
RM3F	3,114,048
US5D	3,112,246
UA4W	2,867,056

Zone 20

P3N	9,182,016
C4W	8,435,425
YO9HP	3,542,022
*JY5CC	2,422,154
*TA2/DL7BC	1,964,088

Zone 25

JH4UYB	4,453,610
JA7NVF	2,311,008
JA2IVK	2,060,305
JQ1BVI	2,018,975
JA2PAC	1,915,128

**Low Power*

The world winner in this tough category was Miro,YU2A. Miro put his location in southern Europe to good use. Second place in the world was Alex, PY2SEX, located in Campinas, Sao Paolo. Third place in the world went to another station from the Balkans, Boban, YT9A. The third position in Europe was taken by Aleksander, 9A3XV. In the U.S., Doug, K4LY, took away top honors and the new U.S. low power assisted trophy. Second place went to James, KS1J, located in Barrington, Rhode Island. Pat, NØHR, from out in Ames, Iowa rounded out the top three U.S. scores. From the U.S. West Coast, N6WS turned in a fine score. There were some real nice multipliers in this new category: XU7ACY, 6V7T, RV9UP, AYØDX, BD5BAJ, BD4HF, A65CA, JM1LRQ, and VK4LDX.

The continental winners were: North America NP3O; Africa 6V7T; Asia RV9UP; Europe YU2A; Oceania VK4LDX; South America PY2SEX; Japan JM1LRQ; U.S. K4LY.

Multi-Single

If you count all the operators who are part of multi-singles, you have a lot of operators. This fun category allows for more than one person to contribute to the score. A run station and a multiplier station allow for good use of different skills. The top score in the world went to the multi-national team at D4C. With the sun not cooperating, the Monteverde contest team just fell short of the African record. For the third year in a row, second place world went to the six-man Russian team operating P33W. The third position went to P49Y: "We had a great time in our first M/S effort from Aruba." The continent with the most multi-single operations is Europe. This year there were 177 different teams who put in a lot of hard work to have fun in the contest. Moving up to the top position in Europe was E7DX. Second place went to OM8A representing the Slovak Contest Group. Third place in Europe went to the RU1A contest club team. MS scores in the U.S. are usually close. Not so this year. Krassy's team at K1LZ took full advantage of the category's possibilities and registered 10-plus million points. The race for second place was taken by another New Englander, K5ZD/1. The team from Harrison, Arkansas, N5DX, took third-place honors. They had the highest score west of Massachusetts! K7RL took top honors from the U.S. West Coast. Some of the rarer ones appearing in many logs were: EF9K, AH2R, C91WW, TA7KA, BY4QA, BY8AC, BT4EXPO, A62ER, 9K2HN, OY6A, V6B, and DX1M.

The continental winners were: North America V26B; Africa D4C; Asia P33W; Europe E7DX; Oceania AH2R; South America P49Y; Japan JI2ZJS; U.S. K1LZ.

Multi-Two

The multi-two category is a real challenge. At least two operators are needed. The world's top team used eight operators to bring home the trophy. Operating from near the ocean, the multi-national crew of CN3A put Morocco in a lot of logs. Not far behind was CR3A, the CT3 Madeira Contest Team. They put their new callsign to very good use. Finishing out the top three world results was the Fortaleza DX Group, PW7T. The top three all were located very near salt water. The famous team from IR4X took first place in Europe. They have been having a good time on a mountaintop near Bologna for a very long time. Moving up from last year's finish into second place Europe was Radio Club Varazdin, 9A7A. Third place in Europe went to the Bavarian Contest Cub station, DQ4W. Taking a break from their usual MM entry, KC1XX proved they were up to the task in this category too by taking first place in the U.S. WE3C's station in eastern Pennsylvania took the second U.S. honors. Sig's team at N3RS took third place U.S. The far west U.S. station of NK7U again did a great job from eastern Oregon. There were several stations that put nice multipliers on the air and made big scores: S79K, ZS9X, AHØBT, B1Z, T7ØA, V84CQ, YE2R, and YEØX.

The continental winners were: North America KC1XX; Africa CN3A; Asia B1Z; Europe IR4X; Oceania AHØBT; South America PW7T; Japan JF2ZPA; U.S. KC1XX.

Multi-Multi

Many months of planning the station site, gathering operators together, planning the technology, and finally waiting to see what the sun deals us make for excitement. The top world score this year was made by EF8R operating from Gran Canaria. Second place went to PJ2T operating near Sint Martha's Bay located on the northwest coast of Curacao. The number three scorer in the world was A73A. This team has made a real splash at many radio conventions in the last year. They are to be congratulated for their enthusiasm. The M/M battle in the U.S. is always competitive. The CQ WW SSB seems to be a charm for K3LR. Repeating from last year, K3LR took top honors over friendly rival W3LPL, who took U.S. second place. Third place in the U.S. went to the team of K1TTT operating in far western Massachusetts. The top effort from the West Coast was N6WM. Repeating from last year, the top European score went to the fine operators at DR1A, the contest callsign of the DFØCG crew. Second place in Europe for the second year was DFØHQ, the club call of the Ilmenau Contest Club. Third place went to LZ9W located in a small hotel 60 km southwest of Sofia, Bulgaria. The Chinese team B7P made another big effort which allowed many contesters to log a new one. It was very nice to find C37N as a multi-multi. The Shikoku mountaintop QTH allowed 8N5A to take advantage of their special callsign and take top honors in Japan over the eastern Nara team of JA3YBK. WH2DX, BV1ØØ, DX1DBT, and VK4UC gave a lot of contesters a double multiplier.

The continental winners were: North America K3LR; Africa EF8R; Asia A73A; Europe DR1A; Oceania VK4UC; South America PJ2T; Japan 8N5A; U.S. K3LR.

Team Contesting

You can make a team with five contesters from anywhere. You can be on a team and still submit your score for your local club. This is a good way for former club members who live outside a club area to band together and name themselves for the old club and still submit for their local club. You need to register your team anytime before the contest begins. You can submit your team list to <teams@cqww.com>. Top honors in the team competition went to the Black Sea team. Second place went to the WWYC QRO LIDs. Third place went to another WWYC team, WWYC QRO LIDs #2. Congratulations to everyone!

The results of Team Contesting are as follows:

1. Black Sea team: 4LØA (UUØJM), ERØWW (UT5UDX), RCØF (UU5MAF), TO7A (UT5UGR), VE2IM (VE3DZ): **38,608,937**

2. WWYC QRO LIDs: 4O3A (ES5TV), NN3W, OH0B (OH2UA), OH8X (OH4JFN), YN2AA (N6GQ): **34,238,503**

3. WWYC QRO LIDs #2: CR3L (DJ8OG), 9A7P (9A6XX), JY5CC, SJ2W (SM2WMV): **13,912,966**

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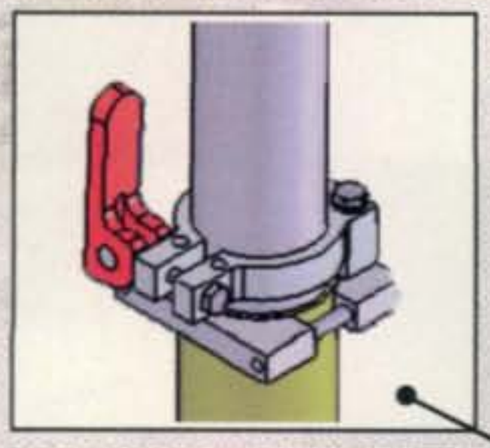
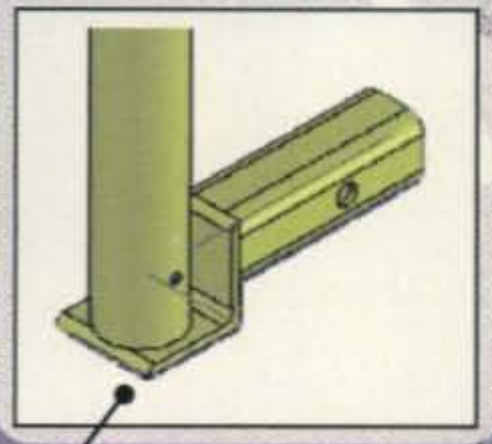


MANUAL AZIMUTH ROTATION WITH OVER CENTER LOCKING LEVER

STEEL CONSTRUCTION GOLD ZINC PLATED HITCH MOUNT



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4. Carolina DX Association: KI4TZ, KZ2I, N4PQX, W3GQ, W3OA: **5,760,167**

5. WWYC Not So QRO LIDs: LN5O (LA6FJA), NH2T (KH2/N2NL), OH6GDX, PA2LS, OQ5M (ON5ZO): **5,421,158**

6. Team Orca: VA7ST, VE7XF, VA7FC, VC3X (VE7VR): **4,324,132**

7. JUMANJI – DX COLOMBIA AMATEUR RADIO CLUB (DXARC)**:** 10M HK3JJH, 15M HK1R, 20M HK1X, 40M HK1T, 80M HK1W: **4,273,826**

8. Contest Group du Quebec (**CGQ team**): VE2XAA, VA2SG, VA2UP, VA2EW (VE2TZT), VC2A (VA2WDQ): **2,833,408**

9. Maritime Contest Club #2 – Time Bandits: VY2LI, VE9AA, VE9ZX, VA1CHP, VE1ZA: **2,303,186**

10. Maritime Contest Club #1 – Halloween Hooligans: VE1OP, VE1ZD, VE1JS, VE1AL, VA1MM: **2,276,858**

11. DXXE Tigers: 4B2S, XE3N, 4B1EE, XE2AC: **2,167,679**

12. WWYC Not So QRO LIDs #2: OH1F (OH1NOA), SMØW, DK5TX: **1,198,581**

13. Grand Mesa #1: NX7TT, NØHF, WWØAL, WØETT: **1,123,206**

14. Grand Mesa #2: NØKE, W4ZW, WØRAA, AD1C, WØZA: **890,348**

15. Wireless Outback DX Crew: AA4XA, AA4ZU, K8DV, AA8HH: **522,454**

16. Portage County Amateur Radio Service: KB8UUZ, KC8UNR, N8RLG, W8KNO: **244,236**

17. Allegheny Valley Radio Association, Team #1: KB3LIX, KN3A, W3WC: **128,862**

18. Dundee Amateur Radio Club: GMØBKC, MMØSVK, MMØDXD, MMØDRA, 2MØLEW: **100,907**

19. TIF-TCSWAT Scouting and Guiding Federation of TURKIYE & TC Special Wireless Activity Team: TC87TC (TA1HZ), TA2KN (TA1GE), TB2MYE, TA1FR: **77,560**

Records

Records exist for every mode in every country and continent. If you take a look at the records (cqww.com), you might find one you have a chance to beat. If you discover an error in the records list, please let us know at <questions@cqww.com>. Outstanding efforts of super operators resulted in the following new records. Congratulations!

World: 21 HC8A (N6KT), L7 EK6TA. **U.S.** A3.7 K6ND/1. **North America:** L3.7 XE1CQ, A14 VE6JY. **Africa**: A14 IG9S (IZ8GCE), A21 EF8A (EA8AUW), M2 CN3A. **Asia:** L7 EK6TA, A7 RW9USA, A3.7 RU9CK, A1.8 UA9MA. **Japan:** 7 JAØJHA, A7 JS3CTQ, A3.7 JA6SRB. **Europe:** A CR2X (N5TJ), Q7 S57SU, A7 TM9R (F5FLN). **Oceania:** 3.7 KH7X (KH6ND), Q7 VK2DX, Q3.7 KH6LC. **South America:** 21 HC8A (N6KT), A3.7 PY5QW.

Special Mention

The CQ WW is a great place to pick up new QSOs for your DXCC, IOTA, WPX, and many other awards. During the 2010 SSB contest there were 232 countries active! You can also be on the other end of a pile-up. Pick out a spot, jump on a plane and get on the air from an exotic location. Why not make a plan and travel to a nearby country that is rarer than your own?

Some of the callsigns making the contest more interesting for all of us were: VE2IM, VE2DXY, VYØJA, OX2A, KG4EM, TO7A, VP2MDG, YN2AA, PJ7MF,V48M, IG9/I2ADN, IH9YMC, J28AA, 5Z4EE, 5R8UI,V51YJ, 9Q6CC, 6W1RY, ST2AR, 3V8SS,Z23MS, Z2/AC7GP, T6MB, T6AF, VR2YYW, VR2ZQZ, VR2PX, VU2PAI, VU2CDP, VU2RBI, VU2ABS, JY5CC, JD1AHC, A41OO, A41MX, HZ1PS, 7Z1TT, 7Z1SJ, HZ1DG, 9V1YC, 4S7AB, XX9AU, HSØZEE, HSØZCW, HSØZDG, E21YDP, HSØZJD, A61BK, UK9AA, XV2RZ, 9M2JKL, 9M2ODY, 9M2TO, 9M2PS, SV9COL, SV9GPV, TA1CM, 9H1XT, 3A2MG, 4O3A, GZ5Y, 9M8Z, 9M6BOB, 3D2A, V63CJB, T88DL, T88OM, FY5KE, HC8A, 8R1K, OA4SS, DT8A, ZF2AH, J3/AA8LL, J37K, VP5I, IG9S, IG9D, J28RO,TR8CA, 5N7M, 6V7T, 3V8BB, VR2XLN, XU7ACY, JT5DX, HZ1FS, HSØZCX, A65BP, A65CA, XV1X, 3W1M, MUØGSY, MD2C, 9M6LSC, FO8RZ, NH2T, 8J1RL, V26B, AA9V/VP9, TI5N, HQ2W, VP5DX, A25HQ, D4C, EF9K, CQ9T, CQ3L, C91WW, 9K2HN, A62ER, A61BM, 9M2SMC, OY6A, GJ2A, GDØAMD, JW5E, AH2R, V6B, P49Y, PJ4X, V31BD, TIØRC, CN3A, CR3A, S79K, T7ØA, V84CQ, YE2R, YEØX, AHØBT, VP5T, A73A, C37N, SX5P, HBØ/HB9AON, WH2DX, PJ2T.

Comments

We received 6566 2010 CQ WW SSB contest logs of which 6446 were electronic! Thanks to all the contesters around the world who sent in a log. **Please send in your log no matter how small.** Submitting an electronic log is easy. Send your SSB log to <ssb@cqww.com> (CW to <cw@cqww.com>). Please send your log in Cabrillo format. If your radio has a computer

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0.625"	$2.35	$4.05	0.625"	$4.75	$6.65
0.750"	$2.65	$4.35	0.750"	$5.35	$7.25
0.875"	$2.75	$4.45	0.875"	$5.65	$7.55
1.000"	$2.95	$4.65	1.000"	$5.95	$7.85
1.125"	$3.25	$4.95	1.125"	$6.55	$8.45
1.250"	$4.15	$5.85	1.250"	$7.75	$9.65
1.375"	$4.45	$6.15	1.375"	$8.45	$10.35
1.500"	$5.25	$6.95	1.500"	$8.95	$10.85
1.625"	$6.05	$7.75	1.625"	$9.75	$11.65
1.750"	$6.85	$8.55	1.750"	$10.65	$12.55
1.875"	$7.65	$9.35	1.875"	$11.55	$13.45
2.000"	$8.45	$10.15	2.000"	$12.45	$14.35
2.125" D	$9.25	$10.95	2.125"	$13.35	$15.25

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DXE-8UDU018	18 ft.	$31.88
DXE-8UDU025	25 ft.	$39.88
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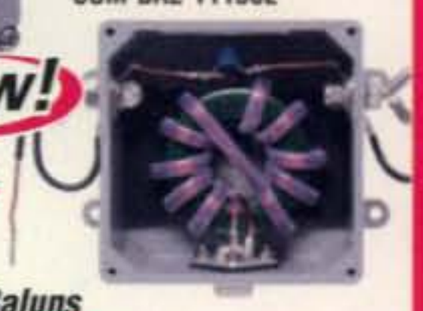

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- Special coated toroid core handles close coupling without extra stress
- High, consistent common mode impedance across specified bandwidth—provides isolation where most needed
- Special wire sizing and Teflon-insulated wire sleeves for exact impedance matching and better isolation than Thermaleze wire
- Typical insertion loss: less than 0.2 dB
- Power handling: 3 kW continuous to 5 kW+ intermittent depending on model
- Silver-plated gasketed SO-239 connectors, stainless hardware, weatherproof NEMA box

1:1 Dual Wire/Single Core, 1.8 to 54 MHz		
COM-BAL-11130E	3 kW, side eyebolts	$49.95
COM-BAL-11130ET	3 kW, side and top eyebolts	$49.95
COM-BAL-11130S	3 kW, side studs/wingnuts	$49.95
COM-BAL-11130T	3 kW, top studs/wingnuts	$49.95
1:1 Coax/Single Core		
COM-BAL-11150E	5 kW, side eyebolts	$49.95
COM-BAL-11150ET	5 kW, side and top eyebolts	$49.95
COM-BAL-11150S	5 kW, side studs/wingnuts	$49.95
COM-BAL-11150T	5 kW, top studs/wingnuts	$49.95
1:1 Dual Wire/Dual Core		
COM-BAL-11140T	5 kW, top studs/wingnuts	$69.95
COM-BAL-11140S	5 kW, side studs/wingnuts	$69.95
1:1 Coax/Dual Core		
COM-BAL-11150DS	5 kW, side studs/wingnuts	$69.95
COM-BAL-11150DT	5 kW, top studs/wingnuts	$69.95
4:1 Dual Wire/Single Core		
COM-BAL-41130E	3 kW, side eyebolts	$59.95
COM-BAL-41130ET	3 kW, side and top eyebolts	$59.95
COM-BAL-41130T	3 kW, top studs/wingnuts	$59.95
COM-BAL-41130S	3 kW, side studs/wingnuts	$59.95
4:1 Dual Wire/Dual Core		
COM-BAL-41150T	5 kW, top studs/wingnuts	$89.95
COM-BAL-41150S	5 kW, side studs/wingnuts	$89.95
COM-BAL-41150E	5 kW, side eyebolts	$89.95

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2010 CQ WW DX SSB BAND-BY-BAND BREAKDOWN—TOP ALL BAND SCORES

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

WORLD SINGLE OPERATOR ALL BAND

Station	160	80	40	20	15	10
CR2X	339/15/66	771/27/97	1915/30/107	2458/36/124	3018/37/130	910/27/95
CN2R	530/16/70	726/21/88	1211/29/99	1095/35/105	2701/36/115	757/24/77
4LØA	263/9/54	557/20/82	1887/33/116	1101/31/90	2095/26/89	716/15/57
4O3A	413/15/67	619/21/88	1817/37/112	1627/36/125	2292/36/128	241/23/68
FY5KE	21/8/15	419/14/53	879/27/84	1544/36/107	3024/30/109	547/20/61

USA TOP SINGLE OPERATOR ALL BAND

Station	160	80	40	20	15	10
K1DG	91/13/51	409/23/82	438/23/84	1179/34/107	1593/30/109	91/16/38
NN3W	53/10/23	290/23/77	646/27/93	1042/35/119	1310/32/120	109/18/41
W2RE	27/9/14	162/17/65	637/25/87	1235/35/112	1348/30/103	67/9/22
K4ZW	67/14/38	249/23/69	567/29/94	879/37/107	1135/31/103	84/17/37
W9RE	46/12/23	205/25/74	514/34/95	869/36/100	1101/32/110	108/15/31

WORLD SINGLE OPERATOR ASSISTED ALL BAND

ERØWW	359/10/62	922/25/94	1372/37/125	1720/36/128	1338/38/138	119/21/52
KP3Z	137/12/27	581/22/70	886/34/109	1170/35/98	1399/32/91	300/15/29
PY1NB	16/5/5	71/17/45	612/32/99	599/36/108	1436/30/112	691/22/69
ZX2B	3/2/3	21/12/14	207/24/77	603/33/90	1865/35/120	1021/26/82
OE4A	152/7/51	475/18/80	618/35/123	989/37/120	1205/38/136	118/24/68

USA SINGLE OPERATOR ASSISTED ALL BAND

K3WW	91/13/43	178/24/76	218/28/96	927/36/116	785/31/122	81/15/36
AA3B	48/10/21	151/16/61	242/29/94	593/33/113	796/31/123	168/14/42
KØKX	16/7/6	82/20/42	221/32/83	778/36/128	703/33/127	118/9/23
K1KI	23/8/14	65/19/47	191/27/79	658/36/108	906/30/116	29/12/19
W4SVO	56/11/25	173/23/78	155/28/85	377/34/112	782/37/128	104/14/28

WORLD MULTI-OPERATOR SINGLE TRANSMITTER

D4C	175/18/68	915/26/109	1138/38/122	2220/40/142	2845/38/154	1494/31/134
P33W	256/16/71	799/24/98	1665/39/132	1445/39/143	2882/39/158	729/28/103
P49Y	123/13/24	836/26/95	1618/34/106	1508/35/119	2665/33/120	739/18/36
PJ4X	79/9/15	751/26/79	1680/33/108	1049/35/114	2834/35/126	909/23/47
V26B	152/11/35	811/24/92	1500/31/108	1666/36/128	2562/34/134	958/23/49

USA MULTI-OPERATOR SINGLE TRANSMITTER

K1LZ	105/14/65	340/27/96	1067/38/126	1540/39/142	1564/33/139	136/21/57
K5ZD/1	54/11/31	240/27/86	476/35/107	1403/37/130	1330/32/128	74/16/39
N5DX	57/14/36	152/27/78	718/36/112	1162/36/128	1224/33/128	58/14/31
W3BGN	79/13/45	189/25/77	521/34/105	1045/37/127	878/31/130	119/21/47
N2IC/5	29/11/17	142/27/69	851/36/99	645/37/127	1295/36/137	95/19/39

WORLD MULTI-OPERATOR TWO TRANSMITTER

CN3A	215/13/68	1685/28/117	2688/37/127	2705/38/143	4395/39/152	1066/30/119
CR3A	315/14/63	1160/25/107	2670/37/126	3116/39/139	4371/38/153	1107/32/117
PW7T	22/11/19	731/23/80	1327/35/103	2080/37/141	3956/36/143	633/25/100
KC1XX	86/15/57	584/29/102	1376/39/131	2546/39/151	2185/35/153	230/24/66
LP1H	7/4/5	179/25/35	384/29/68	2120/38/136	3903/34/133	1677/27/93

USA MULTI-OPERATOR TWO TRANSMITTER

KC1XX	86/15/57	584/29/102	1376/39/131	2546/39/151	2185/35/153	230/24/66
WE3C	94/21/67	408/29/100	1195/38/123	1723/39/144	1474/33/132	183/21/52
N3RS	53/12/28	441/26/86	972/37/119	1857/37/135	1380/34/132	209/21/57
K1RX	125/16/52	448/26/90	1028/33/109	1652/36/128	1311/31/134	131/15/36
NK7U	52/12/19	212/28/56	905/37/101	1860/38/136	1153/31/116	112/15/33

WORLD MULTI-OPERATOR MULTI-TRANSMITTER

EF8R	221/12/66	1404/25/106	2324/33/117	2311/38/136	4146/38/151	1618/32/129
PJ2T	401/16/41	1489/25/94	3208/32/119	3500/34/132	4010/33/115	1503/23/50
A73A	623/15/74	949/30/95	2378/36/131	2322/39/137	2988/39/150	1122/28/107
DR1A	1113/16/75	1923/27/112	3293/40/143	3658/40/155	2086/39/161	525/28/99
K3LR	401/24/77	1053/29/111	1657/39/138	2973/40/159	2577/36/155	482/22/77

USA MULTI-OPERATOR MULTI-TRANSMITTER

K3LR	401/24/77	1053/29/111	1657/39/138	2973/40/159	2577/36/155	482/22/77
W3LPL	429/20/76	992/30/114	1731/37/129	2480/39/149	2129/35/149	387/23/66
K1TTT	223/15/53	500/26/92	698/34/106	1443/36/131	1267/32/131	243/17/44
KM1W	133/14/61	369/25/89	424/28/98	964/35/124	1174/32/132	183/17/45
WØAIH/9	164/13/36	317/26/75	585/35/100	1079/36/123	1217/35/133	205/16/38

EF8A operated by Edu, EA8AUW.

interface, please submit a log with **exact frequencies**. Exact frequencies help in the log checking process.

Before you submit your log, you can help us a great deal by double-checking your Cabrillo submission. Please make sure your category is correctly indicated in the Cabrillo header. If you did everything okay, you will get back an acknowledgment from the robot. If there was something wrong, you will get a message telling you what to do to correct the error. You can then resubmit your log to the same addresses. If you are having submission problems, we can help you at <questions@cqww.com>.

The CQ WW Contest Committee provides several ways for an entrant to check his/her log. Soon after you submit your log, a **log received list** with your category and score is posted on the CQ WW site (cqww.com, tab logs: received). Look over your data for accuracy. If you find an error, please let us know at <questions@cqww.com> . About one month before the results become finalized in *CQ* magazine, you will receive a password via e-mail which will allow access to your log report at <http://cqww.com>. This is called your **report** (rpt). Look over the report to verify again your category and other information. If you find an error, please let us know at <questions@ cqww.com>.

Changes to the 2011 CQ WW rules: Remote receivers outside the limitations of Rule III.3 are not allowed. The only *exception* is public remote Skimmers which are allowed for the Multi-Operator, Assisted, and Xtreme categories. For all multi-operator categories: When two or more transmitters are present on a band, either a software or hardware device **must** be used to prevent more than one signal at any one time; interlocking two or more transmitters on a band with alternating CQs (to solicit QSOs) is not allowed. **For club scores to be listed an officer of the club must submit a list of eligible members for each contest.**

If you plan to try to make the Top Scores box, you can count on your log being carefully checked for rule compliance. Your competitors are relying on fair play. Running more power than the rules of your category allow, the use of undeclared packet, the use of additional operators for a single operator entry, two signals simultaneously on the same band, or on separate bands at the same time, if you are single operator, are violations of the CQ WW rules. The CQ WW has at its disposal many methods to verify the score of an entrant and ensure a fair contest.

Through our interaction with many entrants whose primary language is not English, we found that confusion might exist on the definition of the word "assisted." Ask yourself, "Did I have any help finding *any QSO* in my log? "If you can answer, "*Yes*, I did have help finding/spotting some QSOs in my log," you are in the assisted category. There are many new awards available for those who enter the assisted category. You can find an assisted category record that you can set or beat. You can find the complete CQ WW rules and records at cqww.com. The full rules for the 2011 contest will also be in the September issue of *CQ* magazine and on the CQ website.

MS and M2 categories: Please indicate in the submitted log which of your transmitters is making each contact. All contesting logging programs allow transceiver designation during setup. **U.S. Location:** For U.S. entrants please make sure your operating QTH is shown correct-

EUROPE TOP SINGLE OPERATOR ALL BAND

Station	160	80	40	20	15	10
CR2X	339/15/66	771/27/97	1915/30/107	2458/36/124	3018/37/130	910/27/95
4O3A	413/15/67	619/21/88	1817/37/112	1627/36/125	2292/36/128	241/23/68
OH8X	140/11/49	462/22/83	814/34/102	2313/36/113	1408/34/115	100/15/43
OE3K	342/13/57	446/20/77	1098/31/87	1321/31/92	1636/34/106	131/17/40
OHØB	456/15/62	686/24/86	1007/29/101	1656/31/105	1147/31/113	130/14/50

EUROPE SINGLE OPERATOR ASSISTED ALL BAND

ERØWW	359/10/62	922/25/94	1372/37/125	1720/36/128	1338/38/138	119/21/52
OE4A	152/7/51	475/18/80	618/35/123	989/37/120	1205/38/136	118/24/68
SO8A	118/9/53	457/20/88	867/36/120	1219/34/109	849/35/110	45/16/32
HG1ØP	277/9/56	663/17/77	714/32/106	780/38/115	1253/37/125	50/20/48
GW9T	55/6/32	649/18/89	205/21/82	1079/33/105	1374/35/125	189/21/64

EUROPE MULTI-OPERATOR SINGLE TRANSMITTER

E7DX	324/15/71	1134/26/111	1461/40/131	1652/38/139	2015/39/156	406/26/96
OM8A	282/13/66	1030/32/120	1431/39/131	1588/39/141	1644/39/148	168/28/84
RU1A	128/15/65	1193/35/122	1227/38/129	1969/40/144	1428/37/152	100/29/84
UZ2M	218/14/68	885/30/101	1740/38/131	1548/39/142	1969/36/154	405/26/89
RL3A	113/13/63	902/34/118	1935/40/141	1648/39/134	1596/37/152	114/27/79

EUROPE MULTI-OPERATOR TWO TRANSMITTER

IR4X	247/11/60	941/27/105	1816/40/132	2222/39/137	2257/38/148	228/26/82
9A7A	171/11/60	1051/23/98	1075/37/126	1654/38/135	1486/39/138	232/27/87
DQ4W	239/10/57	883/18/87	1096/36/122	1782/35/128	1382/39/138	211/23/64
T7ØA	644/10/60	1386/17/90	2275/37/125	2069/33/110	1452/37/116	112/23/51
DLØCS	287/12/63	1136/19/93	1303/35/121	1556/36/125	1243/37/135	98/19/64

EUROPE MULTI-OPERATOR MULTI-TRANSMITTER

DR1A	1113/16/75	1923/27/112	3293/40/143	3658/40/155	2086/39/161	525/28/99
DFØHQ	946/18/76	2120/29/113	2930/37/147	2647/39/150	1693/39/153	335/26/84
LZ9W	662/10/66	1534/20/94	2339/35/126	2819/40/139	2322/36/140	307/26/82
OT5A	971/13/67	1533/18/78	2214/36/116	2047/38/141	1341/38/141	335/24/77
EE2W	601/12/63	1133/24/105	1360/30/102	1975/37/120	2072/38/122	502/24/83

ly. We need this information to place you in the right call area within the results. **Single band entrants:** Single band entrants can make QSOs on other bands as a check log. Please submit the QSOs made on all bands you operate. Indicate in the comments section of the Cabrillo header that all contacts on your *non-entry* bands are to be a check log.

Thanks

Creating the results you see in *CQ* magazine is just the final product of a lot of work. Entrant log-submission problems, incomplete logs, forgotten band changes not in log, incorrect call indicated, and a myriad of other subtle problems are sorted out behind the scenes. Using an armamentarium of log-checking tools and data sources, the CQ WW Contest Committee has done its best to certify the winners.

The members of the WW Committee who provided insight into many contesting topics are: CT1BOH, DB7MA, DJ6QT, DL6RAI, E21EIC, ES5TV, F6BEE, G3SXW, HA1AG, IK2QEI, JE1CKA, K1AR, K1DG, K3LR, K3WW, K3ZO, K5TR, K5TR, K5ZD, K6AW, KM3T, KR2Q, KT3Y, LY3BA, LZ2CJ, N2AA, N2NC, N2NT, N3ED, N5KO, N6AA, N6TR, N6TW, N8BJQ, N9RV, OH2MM, OH6LI, PA3AAV, PP5JR, RA3AUU, S5ØA, USØLW, VE3EJ, W3ZZ, W5OV, W6OAT, W7EJ, WØYK, YU1EW, and ZS4TX. We would also like to thank those contesters other than committee members who helped translate the CQ WW rules into their language (cqww.com under rules): 3V8SS, SV1DPI, EA5RS, R3/SM6LRR, BA7JS, BA7NQ, and 9A6C. A special thank you to Ken, K1EA, who spent countless hours making the CQ WW results the best in contesting. Thanks as always to John, K1AR, and Tim, K3LR, for their advice. We want to thank Barry, W5GN, for providing the machinery that produces certificates in a timely manner. The CQ WW records are maintained by John, N2NC, and K3EST. Over many years, Sergio, EA3DU, Oms, PY5EG, and Jorma, OH2KI, have contributed in numerous ways to make the contest better. They have retired from the committee. We want to thank them for all their enthusiasm! Also, congratulations to John, VE3EJ, on his Contest Hall of Fame induction in 2011.

Congratulations to all the winners and entrants! 73, and CU in the 2011 contests!

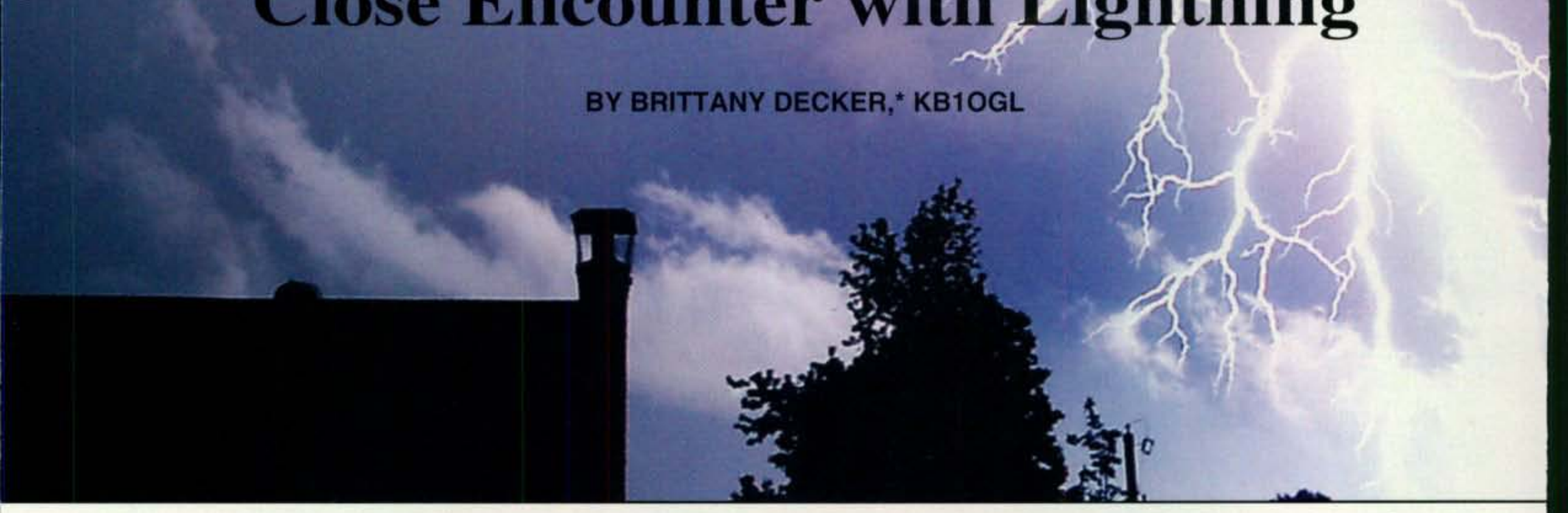
Bob, K3EST

(Continued on page 100)

CQ Youth Editor KB1OGL's "up-close and personal" encounter with the power of lightning prompted her to do a little research and share some useful information with all of us who live in lightning-prone areas (that is, all of us!)

A Striking Story
Lessons Learned from a Close Encounter with Lightning

BY BRITTANY DECKER,* KB1OGL



Are you doing enough to protect yourself and your home from possible lightning damage? (Photo by Mark Coldren, courtesy publicdomainpictures.net)

It was a beautiful August day in New Hampshire. Hot, humid, green, and full of summer smells. My brother, my mom, and I were all at Robinson Pond across the street swimming, when the skies started to cloud up and the humidity started to become oppressive. We felt a thunderstorm coming on. We started hearing distant thunder, but it seemed to be far enough away that we could just slowly make our way back home with no problem. My mom and brother went before my friends and I did, and just as we were catching up and crossing the street to my driveway, CRACK! I saw a red—that's right, *red*—flash above my house, which at that moment started to smoke profusely.

My heart started to race as I thought my house was on fire. Therefore, I went to the house immediately across the street, along with my mom, and we asked to use their phone to call the fire department. The house was not smoking as badly by this time, and we were a bit calmer. The firefighters checked out the house and said there was no danger. Then we went inside to check out things for ourselves.

We discovered that the lightning had done quite a lot of damage. Our projector did not work, our washer didn't work, our TV was shot, and one radio was damaged beyond repair. Not only that, but our loop antenna had been seared and the two pieces were hanging from the trees looking quite shameful. We also had to catch our dog, Penny, because the dog fence console had been blown in two pieces along with the melted plug, which had been shot straight out of the light socket. Poor Penny had been right on our back porch when the lightning struck, and like the smart dog she is, she booked it right into the woods.

Now you may say that we are very unlucky for that sort of thing to happen. However, we were extremely lucky in one sense. As I said, the thunder had sounded far off, so my mom and my brother had gone to the hot tub to wash off their feet. The lightning struck *while their feet were in the hot tub*. It was a good thing my dad had installed a surge protector in the hot tub, and it was also a good thing that it appeared afterward that the lightning's power had dissipated by the time it reached our hot tub. It had, in fact, reached the hot tub, because after that the jets and the heater didn't work. However, the surge protector apparently helped prevent any injuries, thank goodness.

Did Our Antenna Attract the Lightning?

After we collected ourselves, we began talking with the folks from the fire department. We asked if our antenna was to blame for the lightning strike. They said they didn't think so. However, we were not all that convinced yet. Regardless of whether anything in our yard was to blame, *we* were also to blame for putting our own lives in danger. It is a common misconception that if lightning (thunder) sounds like it is far away, you are safe for the moment. As our experience proves, looks, or rather sounds, that can be deceiving.

I asked lightning expert John Jensenius of the National Weather Service

*CQ Youth Editor, c/o CQ magazine
e-mail: <kb1ogl@cq-amateur-radio.com>

We were very lucky that this blackened area of our roof, directly below where the lightning struck, was the only visible structural damage from the strike. (Except as noted, photos by the author)

in Gray, Maine, about protecting yourself from lightning. He said that if you hear thunder, you need to go inside immediately, because the lightning that caused it was at most 10 miles away, meaning not as far off as you may think. The National Weather Service website states: "Other victims waited too long before seeking shelter. By heading to a safe place 5 to 10 minutes sooner, they could have avoided being struck by lightning."

Error two was the fact that we just slowly made our way inside. We shouldn't have dipped our feet, or fooled around on the way home. We should have gone straight in. Granted, this wouldn't have prevented the lightning from striking; however, it would have greatly reduced the risk of any of us being injured or killed.

Richard Kithill of the National Lightning Safety Institute advises even more caution. He says that in addition to going inside, you also must not touch anything that could conduct electricity. This means no showers, no light switches, no touching televisions, etc. Don't even use a corded phone, as you could go deaf in a lightning strike! Imagine if we had been indoors touching the TV at that time. We would have gotten the "shock" of our lives.

Protecting Appliances

As for protecting our appliances, there was no safe thing we could have done from the time we heard the first crack of thunder. John Jensenius of NWS says that in order to be *completely* safe, you need to unplug everything, and it is not safe to start unplugging things once

This is a PolyPhaser VHF/UHF surge protector for your antenna feedline. It will protect your gear from induced currents from static discharge and nearby lightning, but not from a direct strike.

A similar surge protector from Alpha Delta.

you've heard thunder. Again, that means that the storm is within 10 miles.

The only way to save your appliances (including radios) from lightning is foresight. To sum it up, there are two main things you can do: First, check the weather every day. If lightning is in the forecast, make sure everything is unplugged before you leave for work or your daily activities. This means all power, and for us ham radio operators, coax cables. You must unplug everything well before the storm to eliminate the risk of being injured from the lightning. *(You also need to balance the risk of a lightning strike against the risks of unplugging certain appliances, such as refrigerators and air conditioners, for the day. However, anything that won't be in use while you're away should be unplugged if lightning is in the forecast.—ed.)*

Second, if you don't regularly check the weather or watch the news, and you think you might forget, it is a good idea to install a few things. First, as the National Electrical Code requires, you must have all grounds grounded to the same place. If not, you will have a grounds-voltage mismatch. Check with an electrician if you have added any grounds for your ham equipment. Next, you can buy surge protectors. Although they won't do much for a direct strike, if a nearby strike induces a power surge in your electrical line, surge protectors could save the frustration of having to replace damaged appliances. However, if it is a direct hit, a small surge protector cannot really be expected to reroute 200,000 to 300,000 volts of electricity.

For amateur radio operators specifically, it can be helpful to install surge protectors in coaxial feedlines as well as power lines to protect against currents induced on the antenna and feedline by a nearby strike. There are many different surge protectors to choose from, and two good companies that sell them are Polyphaser and Alpha-Delta. The pictures of the surge protectors I have included are from these companies. You can get plug-in surge protectors for about $20 each. However, unplugging everything—radios and antennas—is still the best precaution, along with grounding your unplugged feedline.

At this point you may be asking, well, what about the good ole' lightning rod? Both Jensenius and Kithill agree that lightning rods will not prevent a strike, because lightning is capricious. Lightning rods really have only one purpose, which is to prevent fire by diverting the energy from a strike to ground and away from your house. Lightning searches for the most conductive object, and in the choice of wood versus metal, the lightning rod generally will win. Therefore, a lightning rod is a good idea overall, especially if you live in an area that is prone to frequent lightning strikes.

Now back to our original question. Was our antenna to blame for the lightning strike? The answer is simply no; it is not likely. Our antenna is about 100 feet in the air, and taller trees surround it. This means it is highly unlikely that our antenna coerced the lightning to strike our house.

This is how John Jensenius described the way lightning acts: First, when a bolt of lightning comes down, it is totally and completely random. This is called the *step leader*. When it reaches about 200 feet above ground, it looks for tall objects. That could mean objects of any material—wood, metal, anything. Since our antenna was under 200 feet in height, it is unlikely that this was the cause of the strike hitting our house.

If Someone is Struck...

Finally, if someone is, in fact, struck by lightning, call 911 immediately and begin performing CPR if the person is not breathing. This will help him/her survive until reaching a hospital. The National Weather Service website advises that lightning victims "do not carry an electrical charge, are safe to touch, and need urgent medical attention. Cardiac arrest is the immediate cause of death. Some deaths can be prevented if the victim immediately receives the proper first aid . Call for help. Call 911 or your local ambulance service. Give first aid. Do not delay CPR if the person is unresponsive or not breathing. Use an Automatic External Defibrillator if one is available. If possible, move the victim to a safer place. Lightning *can* strike twice. Don't become a victim."

About 58 people in the U.S are killed every year from lightning, and one of every ten people who are struck dies. My own experience serves as a scary what-could-have-been story that I hope will open your eyes to the danger of lightning as much it has opened ours.

Resources

National Lightning Safety Institute: http://www.lightningsafety.com/index.html

Polyphaser Corporation
http://www.polyphaser.com/home.aspx

Alpha Delta Communications:
http://www.alphadeltacom.com/

National Weather Service Lightning Safety:
http://www.lightningsafety.noaa.gov/

What You've Told Us...

Our May survey asked about your attendance at hamfests and, for the first time, was available online on our Facebook page as well as in print. Among all respondents, 94% had been to a hamfest, convention or similar gathering at least once.

Broken down by type of gathering, 89% of you have been to a local hamfest or swap meet at least once, followed by 79% attending a regional hamfest, 53% an ARRL section, state or division convention, 34% the Dayton Hamvention®, 28% at least one ARRL national convention, and 21% a specialized convention or conference.

Interestingly, the numbers shifted around a bit when we asked you which types of ham gatherings you attend *regularly*: Local hamfests still came out on top, with 63%, followed by regional hamfests at 40%. ARRL section, state or division conventions dropped to 26%, followed by "none" at 19%, Dayton at 15%, specialized conventions at 9% and ARRL national conventions at the bottom of the list at 4%.

Asked for your usual reasons for attending hamfests, 82% of you responded "to shop for equipment," followed by "as a social event" (66%), "to attend forums" (45%), to sell equipment" (23%) and "to help as a volunteer" (14%).

We next asked which one of the following statements best reflected your feelings about hamfests. Your responses: "I go to hamfests to browse, even if there's nothing particular that I need" (47%); "I go (mostly) to socialize " (40%); "I go (mostly) to sell (7%); "I don't go to hamfests" (6%); "I go (mostly) to buy (5%) and "I go … mostly for the forums"(5%).

Finally, 68% of you feel that the hamfests you've attended recently have met your expectations, while 13% each felt they exceeded expectations or did not meet expectations.

This month's free subscription winner is Stephen McBride, KI4VBA, of Clayton, NC.

Reader Survey August 2011

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*.

Well, it turns out we made a last-minute substitution and didn't ask about your CW (Morse code) activities in May. So, since we asked about your phone (voice) activities last month, here are the same basic questions about your CW activity:

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

1. Do you currently operate CW at all on the air?
- Yes 26
- No 27

2. Approximately what percentage of your total operating is done in CW?
- 100% 28
- 76–99% 29
- 51–75% 30
- 26–50% 31
- 1–25% 32
- None 33

3. What type of operating accounts for most of your CW activity? (Choose one)
- Contesting 34
- DXing 35
- Rag-chewing 36
- Traffic-handling 37
- VHF/UHF weak-signal (e.g., meteor scatter, moonbounce) 38
- Other 39
- I do not operate CW 40

4. What are your main motivations for operating CW? (Choose all that apply)
- It's fun 41
- It's a ham radio tradition 42
- I can work stations/places on CW that I can't work on SSB 43
- I can work greater distances on CW than I can on SSB 44
- It's the only digital mode you can decode by ear 45
- I enjoy working CW in contests 46
- CW gets through when nothing else will 47
- Other 48
- I do not operate CW 49

5. What was your main motivation for learning Morse code? (Choose one)
- It was necessary to qualify for my ham license 50
- It was necessary for military/job requirements 51
- I wanted to learn a "language" that most people don't know 52
- It was a challenge to be met 53
- I wanted to get the benefits of operating CW for DXing and contesting 54
- Other 55
- I have not learned Morse code 56

6. Did you pass an FCC (or equivalent) code test?
- Yes, 20 words per minute (wpm) 57
- Yes, 13 wpm 58
- Yes, 5 wpm 59
- No 60

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

math's notes

BY IRWIN MATH,* WA2NDM

Isolation

In our experimentation efforts there is often the need to isolate one portion of a circuit from another. Whether this is to protect the circuit from the AC line, a high-voltage point, or to simply eliminate a ground loop, a way of breaking the electrically conductive path from one point to another while transferring the signal is useful.

This month we will look at a few ways to do this for both analog and digital signals. There are three common methods that can be readily used by the experimenter. These are inductive (transformers), capacitive, and optical. Each has its assets and limitations, and we will examine applications of each technique.

The most basic form of isolation is the simple transformer. It consists of two or more windings, not necessarily connected to each other and usually wound on a metallic or non-metallic core. Since there is no direct conductive path between the windings, coupling is by magnetic means only. In the case of analog signals (such as audio), it is only necessary to choose the correct impedance and turns ratio for the specific application and you are in business. Typical isolation levels of 1500 volts between windings are common. Transformers are available in the audio range from frequencies as

*c/o CQ magazine

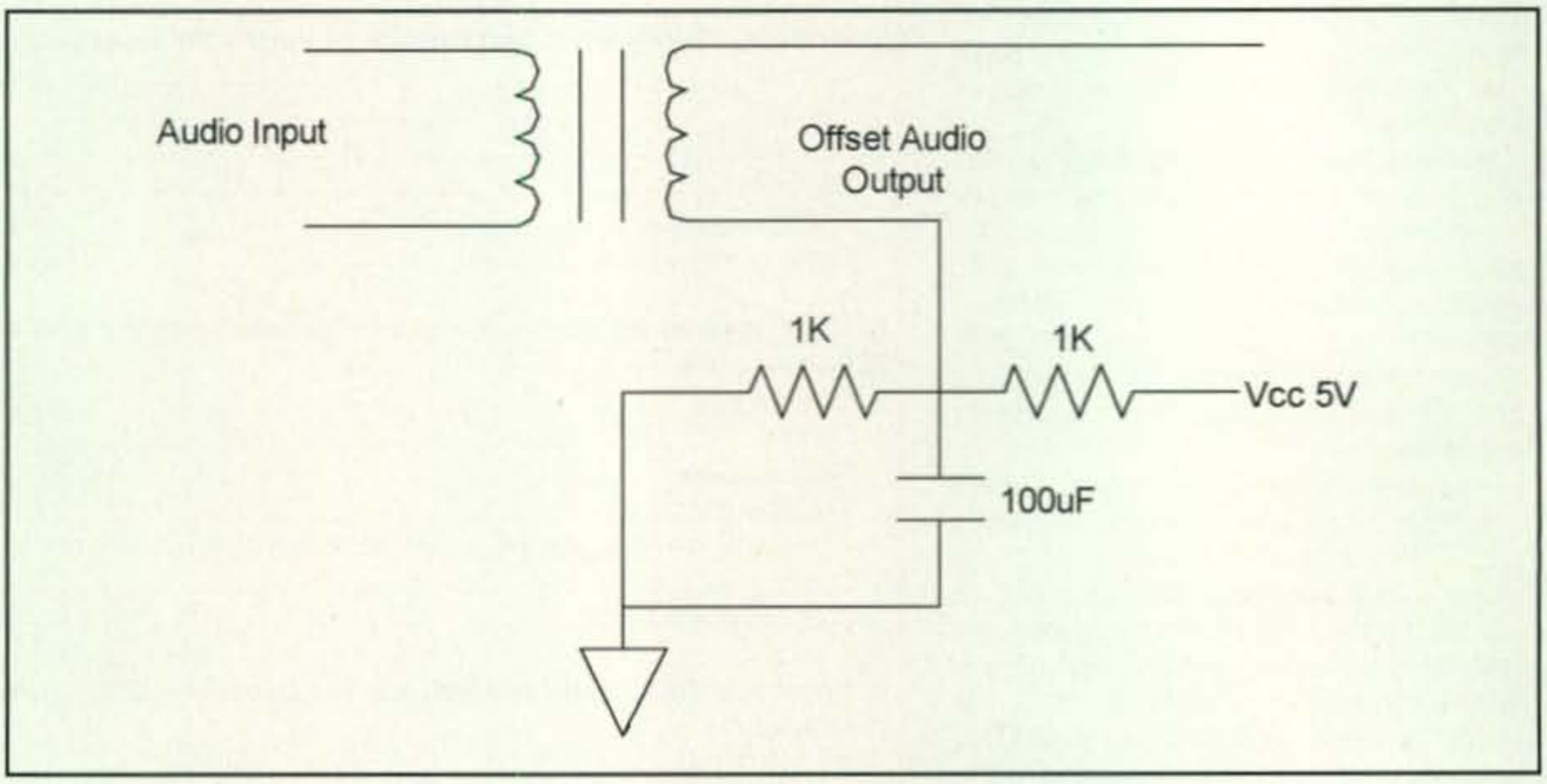


Fig. 1– Offset audio coupling stage.

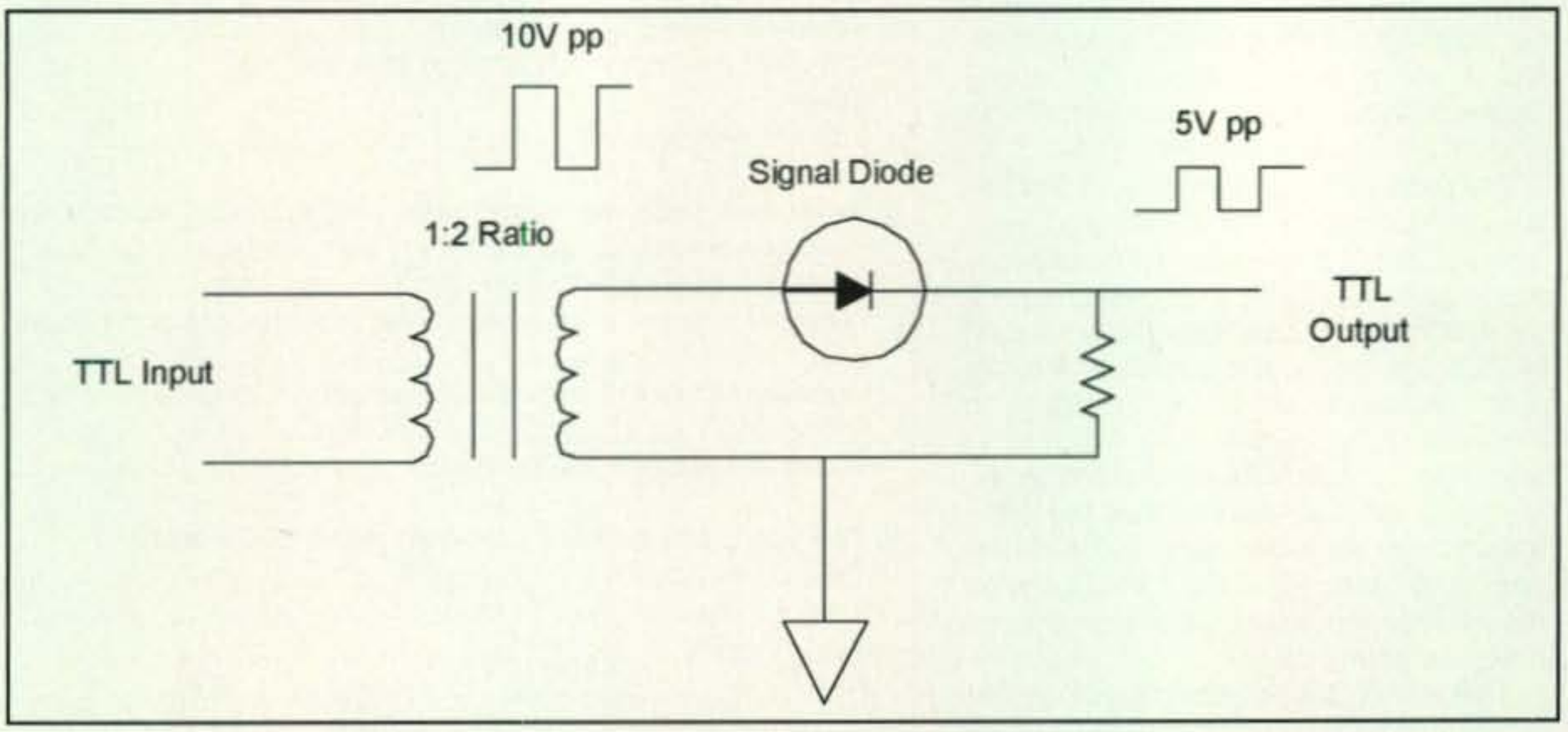


Fig. 2– Transformer coupled high-speed TTL signal.

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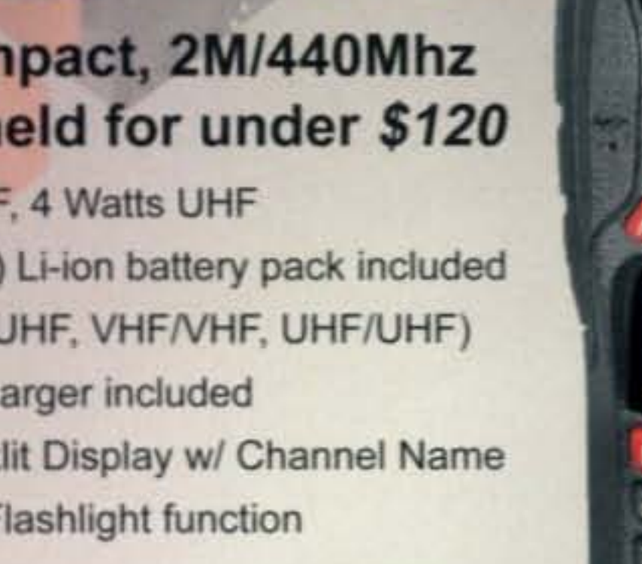

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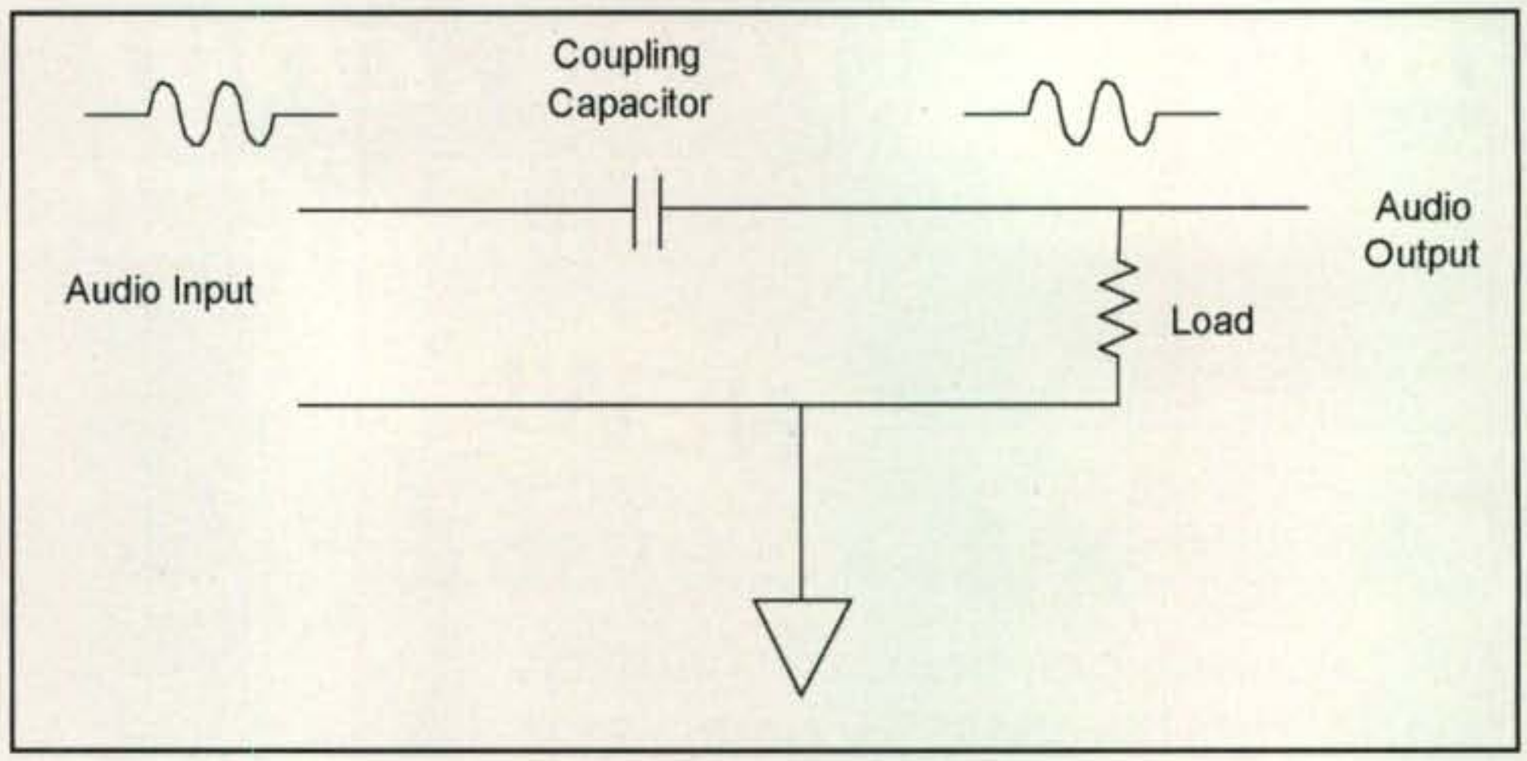

Fig. 3– Capacitor coupled audio stage.

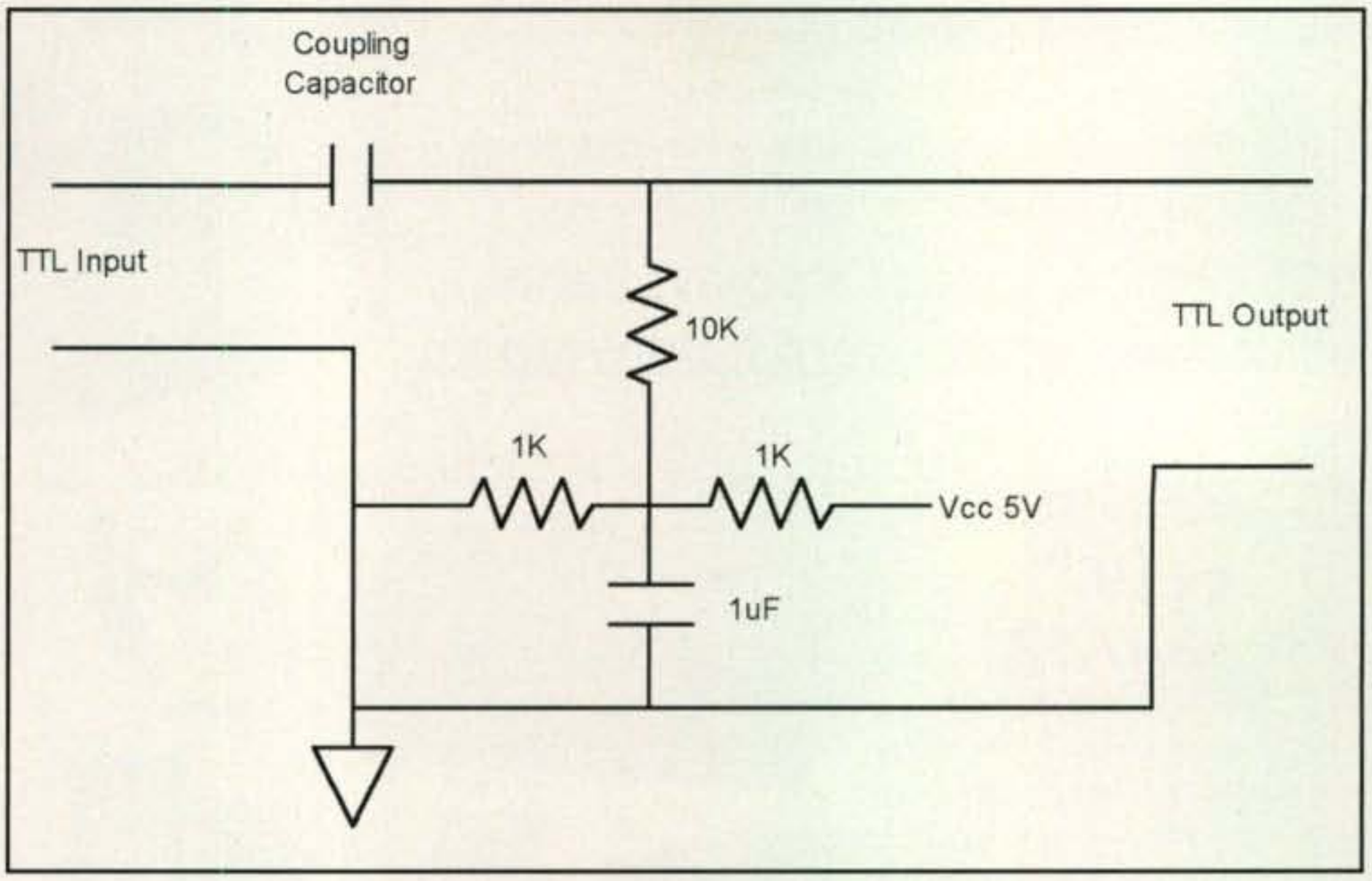

Fig. 4– Offset TTL AC coupled stage.

low as 5–10 Hz all the way up to and into the GHz RF region. Very-wide-band transformers are also available from a few MHz to a GHz in one device, so you should not have any problem finding something that will suit your needs.

If you keep in mind that a changing magnetic field is required for any transformer to operate, you will realize that DC voltages cannot be directly accommodated. If you must pass an analog signal with a specific DC level, then you have to resort to a trick or two. As an example, fig. 1 is a circuit that will transmit an audio signal, offset by 2.5 volts from input to output. Since the DC level is known beforehand we simply bias the transformer secondary up by means of a simple Zener diode. Unfortunately, this technique only works with fixed offsets. A varying offset is beyond this simple approach.

One should note that analog signals are not the only ones that can be isolated with a transformer. Fig. 2 shows a TTL isolation system with a 1:2 step-up transformer. In this example, the 0- to 5-volt TTL signal is converted to a 10-volt pp signal by the transformer. The diode then cuts off the negative half cycle, and the result is a TTL signal at the correct 5-volt logic level. Note that this only works for data rates that are within the transformer's frequency range and that are essentially symmetrical with regard to duty cycle. For square-wave clock signals, for example, it is fine.

Isolation method #2 uses capacitors. Again DC coupling is not possible, but AC signals are passed with no problems as long as the values of the capacitors and other components are chosen properly for the bandwidths desired. Fig. 3 shows a capacitor coupled audio signal circuit as an example, although almost any analog signal can be handled as well. Note that in this configuration ground or the signal common point is not isolated. Digital signals can be capacitor coupled as well. Fig. 4 shows a TTL clock circuit that is similar to the one in fig. 1. Here the resistor network raises the signal back to the TTL levels. As in the case of the transformer coupled system, however, DC is not isolated and duty-cycle distortion will occur for any significant symmetrical variations in the signal. Isolation is based on the breakdown voltage of the capacitor used and can easily be quite high.

The final isolation method we will discuss isolates DC levels as well as signals and does not have duty-cycle limitation for digital signals. This is optical coupling and is based on the fact that an LED can produce a beam of light which can then be detected by a photodiode. The opto-isolator is a common device that has both an LED and a photodiode in one package. Some devices can provide isolation factors of as much as 5000 volts, and their close cousin, the fiber optic system, can extend this to millions of volts if necessary. The

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enterprising amateur can even "roll his own" by coupling an LED to a photodiode with a short length of tubing, as shown in fig. 5.

Fig. 6 is a simple analog opto-isolation system. The LED is biased at 50% of its brightness, and the input analog signal varies this brightness above and below this quiescent point much like AM modulation of a carrier—except that in this case the carrier is light! The received light is converted by a photodiode/op-amp circuit that reproduces the original signal. If the gains are set properly, the output voltage will very closely match the input voltage. Note that at zero input voltage the LED is at its 50% point and the photodiode output is at 50% of the Vcc voltage available. This is the zero point, and an offset voltage equal to this level is required to drop the zero signal output to actual zero.

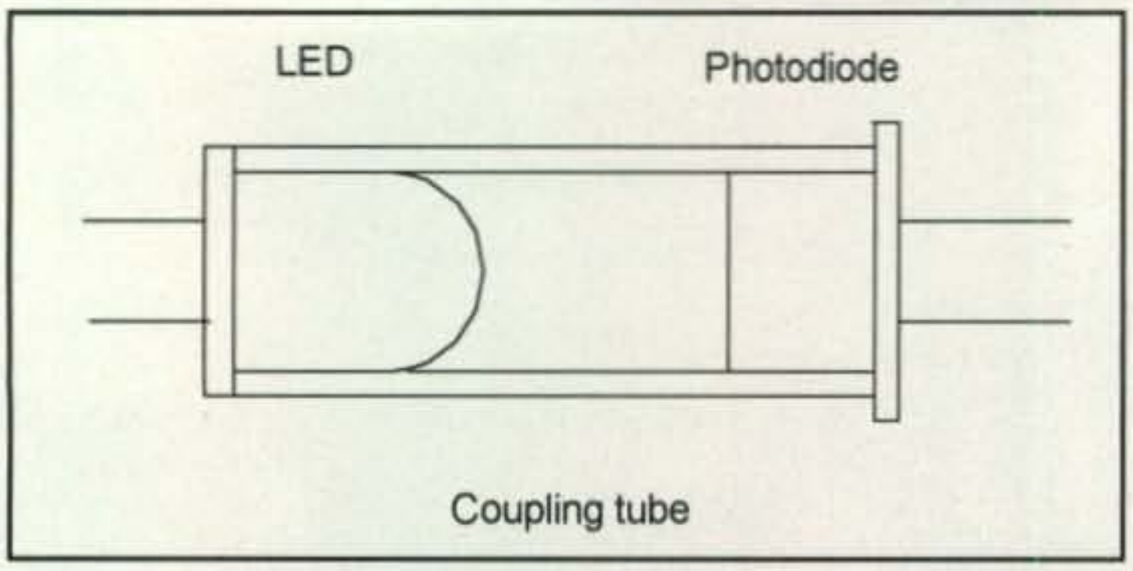

Fig. 5– Homebrew opto-isolator.

Fig. 7 shows the digital approach. For logic 0 the LED is off and the first transistor is cut off. This causes the second transistor to conduct, with the result that the output is zero. For logic 1 the LED turns on, the first transistor conducts, and the second transistor cuts off, producing a positive output.

All of the above are simple approaches toward isolation, and all can be optimized for your particular application.

73, Irwin, WA2NDM

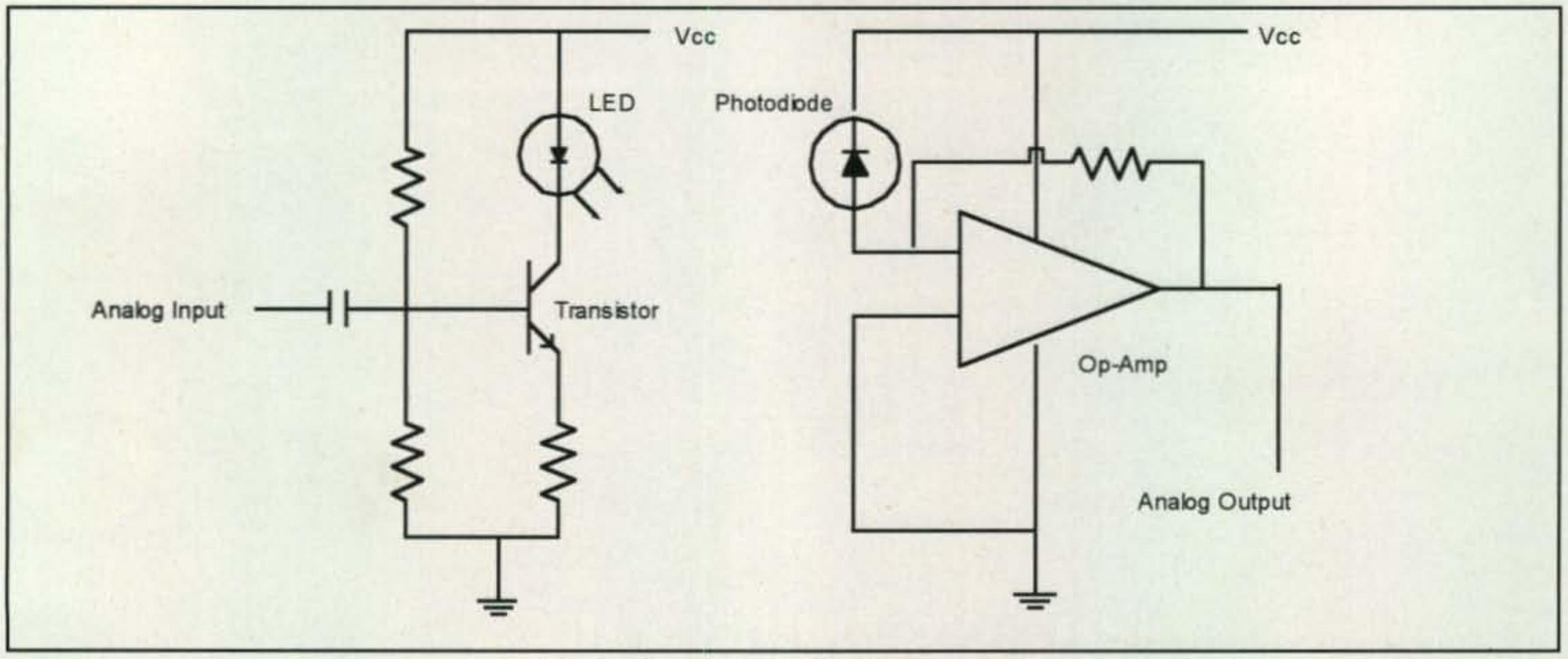

Fig. 6– Analog optical isolation system.

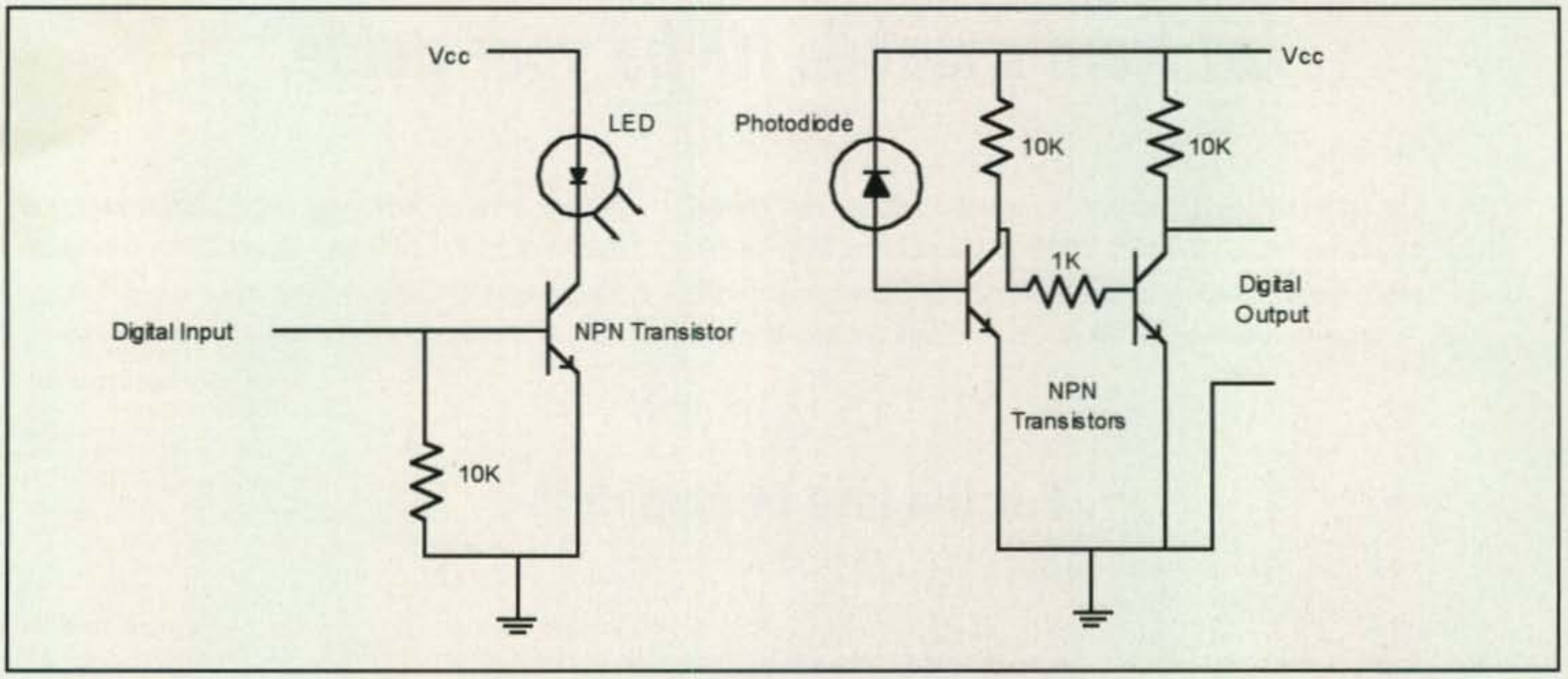

Fig. 7– Digital optical isolation system.

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Amateur Radio License Exams

There is more to them than you realize

BY FREDERICK O. MAIA,* W5YI

The examinations required for the various ham radio licenses have changed many times over the years. First, a little history:

Amateur radio operator licensing has been in effect since December 1912, nearly a century ago. Under authority of the Radio Act of 1912, the Department of Commerce issued two ham operator licenses: Amateur First Grade and Amateur Second Grade. The Amateur First Grade required an essay-type examination and a 5 (later 10) words-per-minute code examination before a Radio Inspector at one of the Department's field offices.

A new top-level license was created in 1923, the Amateur Extra First Grade, which conveyed extra operating privileges. It also required a more difficult written examination and a code test at 20 words per minute.

The Amateur First Grade license was renamed Amateur Class in 1927 and then Amateur First Class in 1932. A year later, the old Federal Radio Commission (FRC) reorganized amateur operator licenses into Classes A, B, and C. In 1951, the FCC converted the A, B, and C classes into six license levels: Novice, Technician, General, Conditional, Advanced, and Extra Classes.

The new Novice Class was limited to a crystal-controlled, 75-watt station and the one-year license term could not be renewed. Novice power was eventually increased to 250 watts and renewal was permitted.

Besides answering multiple-choice exam questions, Novice and Technician Class applicants had to demonstrate 5 words-per-minute code (CW) proficiency. Conditional, General, and Advanced Class applicants had to pass 13 wpm code and Extra Class 20 wpm.

Before 1984, Novice exams were given by volunteers, but all other exams were administered at local Federal Communications Commission (FCC) field offices. The Novice written and code tests were given by a local General (or higher) Class radio amateur. The FCC provided the written exam and graded the test.

Applicants who lived more than 75 miles away from an FCC testing point were also allowed to be examined by a General (or higher) licensee, who would administer the 13-wpm code test, proctor the Element 3 (General Class) written test, and send the completed exam paperwork to the FCC. Successful applicants were issued a "Conditional Class" ticket. Conditional Class licenses were later converted to General in the mid-1970s.

Prior to 1987, the only difference between the requirements for Technician and General licenses was the Morse code test: 5 wpm being required for the Technician; 13 wpm for General. The Element 3 written test was the same for both classes.

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

The FCC introduced "Novice Enhancement" in 1987. The Element 3 questions were split into two new sections. Element 3A covered VHF theory and 3B, HF. Element 3A became a requirement for the Technician Class and Element 3B for General. Both classes required applicants to have previously passed the Novice Element 2 written exam and 5-wpm code.

The Technician Class license became the first license without Morse code testing, on February 14, 1991. The International Telecommunication Union (ITU) regulations still required Morse proficiency for amateur radio operation below 30 MHz, however.

In 1994, Technician Class amateurs who passed a 5-wpm code test gained access to Novice HF privileges and the FCC started calling them "Technician Plus" operators.

Effective April 15, 2000, the FCC simplified the ham radio license structure by reducing the number of written examination elements from five to three and the code tests to only 5 wpm. Written Elements 2/Novice, 3A/Technician, 3B/General, 4A/Advanced, and 4B/Extra were reduced to 2/Technician, 3/General, and 4/Amateur Extra Class. Telegraphy Elements 1A (5 wpm), 1B (13 wpm), and 1C (20 wpm) became Element 1.

The Advanced, Technician Plus, and Novice Class licenses were deemed dispensable and were no longer issued. Existing holders, however, were "grandfathered." That is, they retained their operating privileges and would be allowed to renew their Novice and Advanced licenses indefinitely. Amateurs holding a Tech Plus license had their license renewed as Technician but still retained the 5-wpm code credit.

The Technician license required only passing Element 2. General Class required passing Elements 1, 2, and 3, and the Extra Class required Elements 1, 2, 3, and 4.

In 2003, the ITU changed the International Radio Regulations to allow each country to decide for itself whether Morse code testing should be required. Effective February 23, 2007, the FCC eliminated all (Element 1) telegraphy testing for all U.S. amateur operator licenses.

Regulation of Amateur Radio Operators

Amateur radio is quite different from Citizens Band radio. CBers do not have to pass any examinations nor meet any specific qualifications before being allowed to operate on forty 11-meter channels. Their transmitter power level is limited to 4 watts, communications distance is short, and only FCC-approved radios may be used. Unlike ham operators, CBers are not issued individual station callsigns or licenses.

By contrast, ham operators can radiate up to 1500 watts, build and repair their own transmitting equipment, and each is granted an individual operator/station license and unique callsign by the FCC.

Exam Element	Operator Privileges	Questions in Pool	Effective Until	Questions in Exam	Minimum Passing Score
2	Technician Class	394	June 2014	35	26
3	General Class	456	June 2015	35	26
4	Amateur Extra	738	June 2012	50	37

Table I– Each written examination consists of a set of questions taken from a pool as shown above. The various question pools are revised on a four-year cycle. Each question pool is valid from July 1 to June 30 four years later. July 1 is selected as the beginning date to coincide with the amateur radio "hamfest" season, which begins with the Dayton Hamvention®, and local school and ham club training classes which historically start in the fall.

Radio amateurs have access to many frequency allocations throughout the RF spectrum, enabling effective communications across a city, a region, a country, a continent, or the whole world. The Amateur Radio Service is an international entity and exists in nearly every country.

The ITU, a specialized agency of the United Nations, is the governing body over worldwide information and communications technologies. Because radio waves do not respect international borders, representatives of nearly 200 countries meet periodically at the Geneva-based ITU to agree on global telecommunications regulations ... including those pertaining to the Amateur Radio Service.

Both the requirements for and privileges granted to a ham operator vary from country to country, but generally follow the international regulations and standards established by the ITU at World Radio Conferences.

Article 1.56 of the current ITU Radio Regulations contains the international definition of the Amateur Radio Service. It defines ham radio as: "A radiocommunication service for the purpose of self-training, intercommunication and technical investigations carried out by amateurs, that is, by duly authorized persons interested in radio technique solely with a personal aim and without pecuniary interest." The FCC's version goes a step further. It adds that another of the purposes of the Amateur Service is to provide emergency communications.

Both the international and U.S. regulations require that the qualifications of any person wishing to operate an amateur station be verified. This confirmation is accomplished through the passing of various examinations.

Section S25.6(2) of the International Radio Regulations specifically states that "Administrations shall verify the operational and technical qualifications of any person wishing to operate an amateur station. Guidance for standards of competence may be found in the most recent version of Recommendation ITU-R M.1544."

This recommendation states "...that any person seeking a license to operate an amateur station should demonstrate theoretical knowledge of both international and domestic Radio Regulations, methods of radiocommunication, radio system theory (transmitters, receivers, antennas, propagation and measurements), radio emission safety,

electromagnetic compatibility and avoidance and resolution of radio frequency interference."

Section 303(l)(1) of the U.S. Communications Act of 1934 requires the FCC to issue licenses only to persons it finds qualified. There is no statute that allows the Commission to grant any individual an exemption from the licensing requirements stated in Section 97.501 of the FCC's Amateur Radio Rules. This regulation provides that applicants for new amateur operator license grants—or for a change in operator class—must pass one or more specified examinations.

An amateur radio license is tangible evidence that a person is qualified to operate a radio transmitter on certain radio frequencies and that the holder has agreed to comply with the operating and technical parameters specified in the rules for that particular class of license.

Operation of an individual ham station requires an amateur operator license "grant" from the FCC. We say "grant," because you are licensed as a ham operator as soon as your callsign hits the FCC's computer system and is posted to its website. You do not have to wait for the actual paper license document to arrive before beginning your operation on the ham bands. Your paper license document that the FCC sends you is not even needed; it's the listing in the FCC's Universal Licensing System (ULS) that counts. The fact is that no FCC enforcement agent has ever asked a ham operator to show his/her license.

Before receiving a license grant, you must pass one or more examinations to determine your operator class. A major reason for an examination is to ensure that potential licensees are fully aware of the interference potential and RF and electrical safety hazards of radio equipment.

Generally, the higher the class of license, the more frequencies and operating privileges are available to the applicant. Earning each higher class license requires passing a more difficult examination and each license must be obtained in order.

Ham Radio Exams Privatized

In the early 1980s, mainly due to budgetary constraints, a general trend toward privatization developed at the FCC. In 1982, President Ronald Reagan signed legislation authorizing amateur radio operator license examinations to be prepared and administered by volunteer ham radio organizations. The new testing procedure came to be known as the Volunteer Examiner Coordinator System, or for short, the VEC System.

In 1983, banks of multiple-choice license questions were developed by the FCC. Five different question pools from which the various examination questions would be drawn were produced for the five license classes in existence at the time.

Although regulated by the FCC, amateur radio license exams are now administered by volunteer groups of ham operators operating under supervisory organizations called Volunteer Examiner Coordinators. VEC organizations act as the link between the Volunteer Examiner (VE) testing teams and the FCC, which grants the station/operator license.

Today there are more than a dozen VECs and thousands of VEC-certified volunteer examiners. VEs must be 18 years old, have a squeaky-clean radio enforcement record, and hold an amateur radio license of a class higher than the examinee (if one exists).

The various examinations are administered by a team of three volunteer examiners who determine the license operator class for which you are qualified. The VEs grade the various tests and report the results to their VEC. If you have suc-

cessfully completed the required exams, the VEC will electronically file your license application with the FCC over the internet.

The VECs have their own amateur radio application form which they call the NCVEC Form 605. This is because the FCC's version is not suitable for use by the VEC System. The NCVEC Form 605 is available at all examination sessions. By law, you must provide your Social Security number (SSN) to the FCC before you can be granted a license.

Once the FCC receives the filing, your new license grant will be posted to its Universal Licensing System (ULS) website at: <http://wireless.fcc.gov/uls>. U.S. ham radio licenses are valid for a 10-year term and can be renewed indefinitely without cost.

Most new amateur radio operators start with the entry-level Technician Class operator license. Some newcomers, however, begin at the General Class. A few even begin at the Amateur Extra Class.

The Question Pools

In 1986, the FCC turned over maintenance of the written exam question pools to the Volunteer Examiner Coordinators. In turn, the VECs elected an internal Question Pool Committee (QPC) to update each question pool. Using Recommendation ITU-R M.1544 as guidance, there are ten topics—or sub-elements—covered in each of the Element 2, 3, and 4 question pools.

FCC Section 97.523 requires that only one question pool may exist for each license examination level and each must contain at least ten times the number of questions required for a single examination (see Table I). Furthermore "Each question pool must be published and made available to the public prior to its use for making a question set."

Every question set administered to an examinee is selected by the VE team or a VEC-provided computer program that randomly selects the appropriate number of questions from each sub-element. You receive a Certificate of Successful Completion of Examination (CSCE) when you score a passing grade. If you already have been granted a license and callsign, the CSCE authorizes you to immediately begin using your newly upgraded operating privileges.

The questions and multiple-choice answers that appear on your written examination are taken word-for-word from the appropriate pool. There are nearly 1600 questions total in the three pools. These banks of questions are revised and updated periodically by the VEC's Question Pool Committee to incorporate the latest rules, new technology, and interests of the amateur community.

Your written examination establishes your level of operational and technical ability in performing properly the duties of an Amateur Radio Service licensee. Once you pass an examination element you do not have to retake it. For example, a Technician Class ham needs only pass Element 3 to upgrade to General. (*Exception:* If your license has been expired for more than two years, in most cases you will need to retake any previously passed exam elements. There is a petition currently before the FCC to give lifetime credit for elements passed, but it has not yet been acted upon.)

The National Conference of VECs (NCVEC) has the current Element 2/Technician, Element 3/General, and Element 4/Extra Class question pools (complete with the correct answer identified) on its website at <http:// www.ncvec.org/>. You can even take free practice amateur radio exams at <http://aa9pw.com/radio/> and <http://www.qrz.com/testing.html>.

Most amateur radio examinations are coordinated by the American Radio Relay League (ARRL VEC) or the W5YI VEC. Together they account for about 85 percent of all applicants tested. Both list examination location information on the following websites: <http://www. arrl.org/finding-an-exam-session> or <http://www.w5yi.org/exam_locations_ama.php>. Merely insert your state or zip code to find the nearest examination site. Some other VECs also list their upcoming exams on their website.

Your VE may charge you a reimbursement fee ($15.00) for their out-of-pocket expenses incurred in preparing, processing, administering, or coordinating your examination. This fee is paid to the VE team when you take the exam.

It is important that you prepare for your examination by studying material based upon the question pools currently in use. These training instructions are usually in the form of audio and video tapes, manuals and books, and computer and live classroom courses.

Your operating authority begins when your license grant information appears in the Amateur Radio Service licensing information, available by searching the Universal Licensing System (ULS). These searches allow the viewing of pending applications and granted license information.

73, Fred, W5YI

learning curve

BY RICH ARLAND,* K7SZ

Homebrewing and Kits: A Century-Old Ham Tradition

One of the really cool things about QRP (under-5-watt ham radio) is the homebrewing side of this facet of our hobby. QRP and homebuilt gear go hand in hand, just like cake and ice cream! Seriously, I doubt that there are many QRPers who do not build at least some of their own gear and/or accessories. What is it that draws these low-power denizens of the ham bands to engage in the "lost art" of homebrewing ham radio equipment?

For one thing, it is the ability to produce a working piece of amateur radio gear that they have built with their own hands. Another aspect is the idea that they can communicate on a worldwide scale (when propagation allows) using gear they have built in their own shacks! Finally, not everyone can do it, nor does everyone want to do it. Basically, it's a pride in accomplishment kind of thing.

Where did this homebrewing idea really begin? Glad you asked. Back at the turn of the last century, homebrewing was the only way that a radio experimenter (read that "radio amateur") could put a signal on the air. Early amateur radio operators had to build their own gear in order to participate in this new horizon in physics called "radio." Looking through old issues of *QST* you can see all sorts of RF-radiating "contraptions" that were used in 1914 and later. Some of them were true "widow makers" in that they could easily kill the operator if one were to place one's hands in the wrong place!

To further illustrate this point, my friend Hal, N4GG, undertook a retro-project. He built a working 1/2-KW rotary spark gap transmitter circa 1910–1915 (photo A). Hal nicknamed his creation "Blue Lightning" and for good reason! I have seen this early ham radio transmitter in action at several local ham radio club meetings in the Atlanta area and it is, in one word, *impressive*! There is a certain ambiance about a working rotary spark gap that one should experience at least once in a ham radio lifetime. To hear and feel that "evil hiss" of the spark making-and-breaking as the rotary disk spins when the key is pressed and to smell the ozone is truly a magical moment. Then there is the eerie blue-white spark that emanates across the spark gap each time the key is closed. All this adds up to a unique ham radio experience. This is how they did it in the old days. Listening to Hal's warnings regarding the lethality of Blue Lightning conjures up visions of the very early days of our ham radio hobby and what it must have been like for those who were pushing the boundaries of communications technology at the time.

From Homebrew to Kits

The granddaddy of all kit companies was Heath Company in Benton Harbor, Michigan. It ruled the kit building world for nearly five decades and produced some of the most useful and prolific kits for amateur radio operators during that time. How did the Heath Company get its start? Glad you asked.

In 1912 Edward Heath of Chicago started a small company, the E.B. Heath Aerial Vehicle Co., and in 1926 began selling a single-engine light aircraft in kit form. Heath died in 1931 and the company reorganized and moved from Chicago to Niles, Michigan. By 1935 it was bankrupt and was rescued by Howard Anthony. He revived the compnay by selling accessories for light aircraft. After World War II, the Heath Company entered the electronics industry. The idea was to buy a large stock of surplus wartime electronic parts and repackage them as kits for various projects. In 1947 Heath introduced its first electronic kit, the

*770 William St. SE, Dacula, GA 30019
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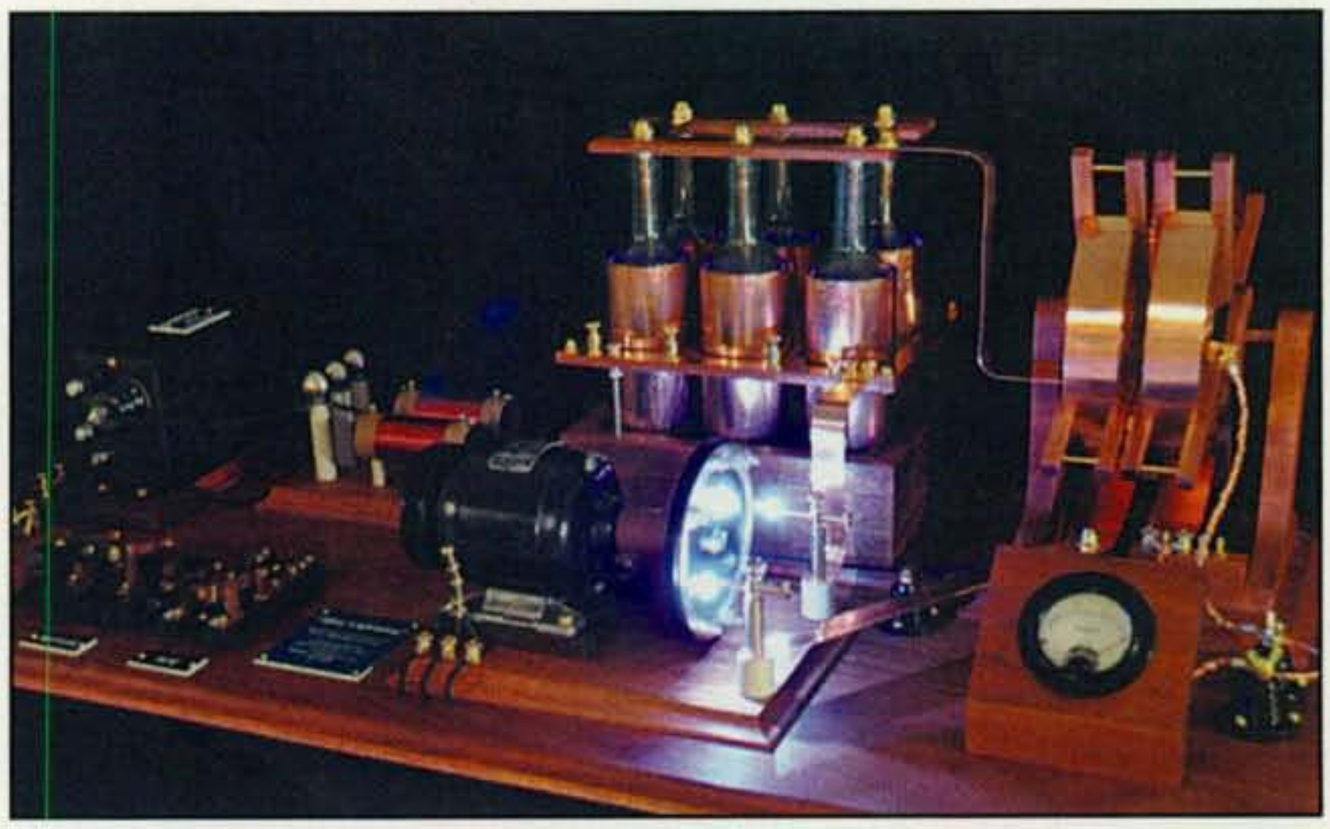

Photo A– Hal Kennedy, N4GG, built this beautiful reproduction of a 1/2-KW rotary spark-gap transmitter circa 1910. This photo shows the rig running at about 200–300W output (there are 2000 AMPS across that arc!). Not only is it pretty to look at and watch in operation, it is a real thrill to hear the spark jumping every time the key is closed. The smell of ozone adds to the suspense! (Photo courtesy ARRL; used by permission)

O1 oscilloscope which sold for $50, an unbeatable price for the time. The oscilloscope went on to become a huge seller, paving the way for a myrid of future kits covering all aspects of the comsumer electronics and radio hobby industry during the next four decades.

I can remember building many of the Heathkits during my early years in ham radio. The GR-81 super-regenerative shortwave receiver was my first Heathkit build. The HR-10 (previously covered in this column) was my second try at a Heathkit. In 1973 Heathkit entered the QRP facet of our hobby with the release of its iconic HW-7 multiband, CW QRP transceiver. The "Hot Water Seven" was my first QRP kit and I had a lot of fun with it. Heathkit followed the HW-7 with the HW-8 a couple of years later. The HW-8 had a much improved direct-conversion receiver, covered four bands (80/40/20/15 meters), had semi-break in keying, and between 1.5 and 3 watts output depending upon the band in use. The HW-8 holds the unofficial title of "the most modified Heathkit in history." My old friend, Mike Bryce, WB8VGE, publishes the *Hot Water Handbook,* detailing mods for the HW-7, HW-8, and HW-9 QRP rigs.

Honestly, I have lost count of the number of HW-8s I've owned and modified, but that number is sizeable! Currently I have two in my work area. One is awaiting restoration and the other is strictly for parts, since there are virtually no spares available unless you cannibalize a non-working HW-8. Heath's final entry into the QRP arena was the much improved HW-9, which offered a superhet receiver and covered all nine HF bands.

The Kit is Dead! Long Live the Kit!

In the mid 1990s Heathkit got out of the electronic kit business and now concentrates on educational media. The loss was immediately felt by the entire ham radio community, especially the QRP fraternity. In a way, the demise of the Heathkit dynasty was a blessing, although many of us didn't look at it that way at the time. The dearth of ham radio kits from Benton Harbor created a major void within the ham radio hobby.

This void was quickly filled by QRPers themselves. In no particular order: Northern California (NorCal) QRP Club, New Jersey QRP Club, American QRP Club, QRP Amateur Radio Club International, Ft. Smith QRP Club, Ramsey Electronics, Vectronics, and others designed and kitted simple CW-only QRP kits and accessories.

One of the members of the NorCal group, Wayne Burdick, N6KR, offered a design he whipped up on a napkin at a NorCal meeting to Doug Hendricks, KI6DS, one of the prime movers in NorCal. Doug promptly took the design, had it built and beta tested, and then offered the NorCal 40 as an inexpensive 40-meter CW transceiver kit. It was a very impressive kit and provided many of us countless hours of enjoyment working the 40-meter band. An upgraded version of this kit is currently sold by Bob "QRP Bob" Dyer, K6KK, of Wilderness Radio (http://www.fix.net/~jparker/wild.html). Bob also has two other N6KR designs, the Sierra multiband QRP rig that has been featured in many issues of the *ARRL Handbook* and the QRP "Cult Classic," the SST. The NC-40A, the Wilderness Radio version of the NorCal 40, is also used by a California Institute of Technology engineering school as an undergraduate project for its students. Now *that* is something for the record books!

The Burdick/Hendricks connection spawned two very interesting kit manufacturers: Doug Hendricks founded Hendricks QRP Kits (http://www.qrpkits.com/), which offers some very interesting and inexpensive pieces of QRP shackware.

Wayne went on to form Elecraft (www.elecraft.com) with Eric Swartz, WA6HHQ, in Aptos, California. In the event you have been living under a rock for the last ten years, Elecraft has some of the most innovative kit radios and accessories in all of ham radio!

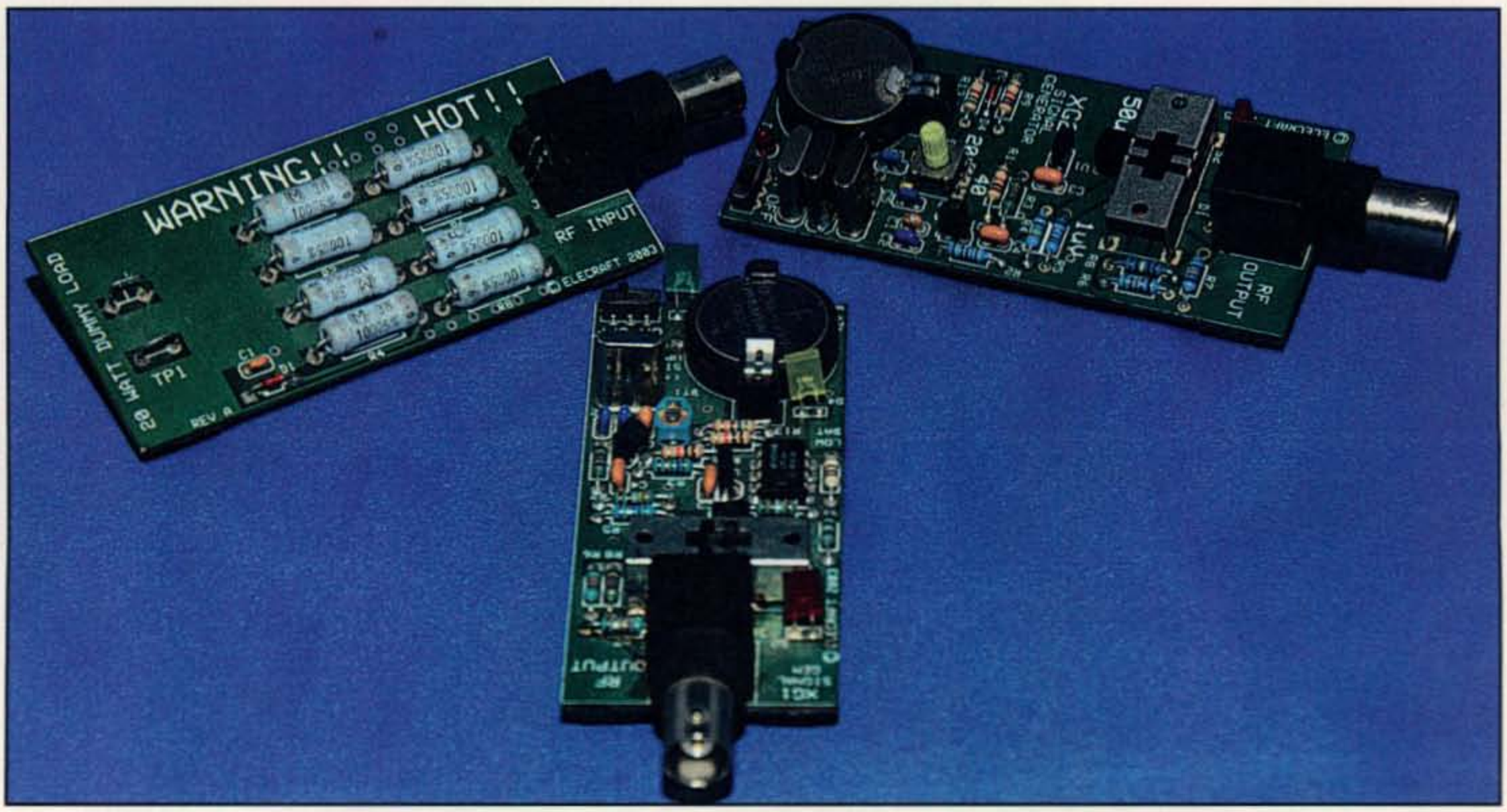

Photo B– Elecraft not only manufactures great transceiver kits but also offers a wide selection of small "kitletts" designed to augment your homebrew/test bench. Left to right: 50-ohm dummy load, XG-1 40-meter signal generator with dual outputs, XG-2 80/40/20-meter signal generator with dual outputs.

One of the problems with Heathkit radios was that their success rested upon the talent of the person doing the construction. More problems in Heath rigs were traced to poor soldering techniques than any other single thing. Repeatability in performance was always an issue with Heath gear.

Elecraft rigs have been designed from the drawing board up to offer a simple-to-build radio with exceptional specifications and repeatability in design and performance (see photo B). Additionally, the Elecraft design wizards have gone above and beyond to offer unique and cutting-edge (bleeding-edge?) technology in the form of their K2 and K3 transceivers. Having built two K2s and just recently completed the build on my first K3, I can say with authority that building an Elecraft kit is a very, very rewarding experience. To gild the lily, several K2 and K3 reviews favorably compare both radio sets with imported radios costing many times more. In the case of the K3, the receiver specs are superior to imported rigs costing over $10,000! And it's a *kit*! I will be devoting a future column to the K3. Right now I have a steep learning curve ahead of me trying to figure out how to drive that rig!

OK, we have explored a bit of the history behind homebrewing ham radio gear, so now it is time to check out some really cool rigs that are readily available to anyone wanting to enjoy the art of building their own gear.

My Kit-Building Projects

First we'll go "retro" and showcase the AMECO AC-1 "clone," the GB-1 (short for "glow-bug," a nickname for tube-type QRP radios from the 1950s and '60s). My GB-1 came to me as a partial kit—punched chassis with the tube sockets, antenna connector, and two variable capacitors already mounted. I added a high-voltage transformer from Antique Electronics Supply (http://www.tubesandmore.com/) along with some of the high-voltage capacitors needed in the rig. The rest of the "stuff" I had in the junk box. *Note:* A well-stocked "junk box" is almost essential for anyone interested in homebrewing their ham gear. You will start small but soon have multiple pull-drawer parts cabinets along with boxes of radio-related "stuff," so don't sweat the small stuff; get busy and start collecting miscellaneous parts and start building your junk box.

As you can see in photo C, the GB-1 turned out very well, and it works great. This CW-only rig has an RF output of about 5–6 watts on 40 meters, keys very well with no clicks or chirps, and is a pleasure to use. I have FT-243 style crystals covering both 80 and 40 meters, so all I really have to do is wind the 80-meter coil for this tiny rig to have a two-band transmitter. I use this rig in conjunction with my vintage Drake 2B tube-type receiver whenever I need to relive the old days of my ham radio youth!

Shown in photo D are my two Heathkit HW-8s. Believe it or not, the grungy rig with the bad cosmetics is my restoration unit and the better-looking HW-8 is the parts rig! The grungy rig is fully electrically functional and only needs a swap out of the front panel, knobs, and case clamshells to become fully restored. Rest assured, however, that there are a few mods I intend to put into this rig, including a working audio-derived S-meter, upgraded active audio CW filter, and dial lights, along with an upgrade to the antenna and power connectors. One thing I will hasten to add regarding mods to the HW-8: If you are planning on restoring/modding/using an HW-8, be sure to install some type of reverse-power-polarity protection. The North Georgia QRP Club (NoGA: <www.nogaqrp.org/>) has a nifty little inexpensive kit called the NoGA PIG (Power Indicator/Guard) which provides over/under and low-voltage protection along with reverse-polarity protection! Trust me; it's worth the expense to add a PIG to your HW-8. Try finding those old ICs and transistors today! Ergo, the reason for the second HW-8 as a parts rig.

The next kit we'll examine is a preci-

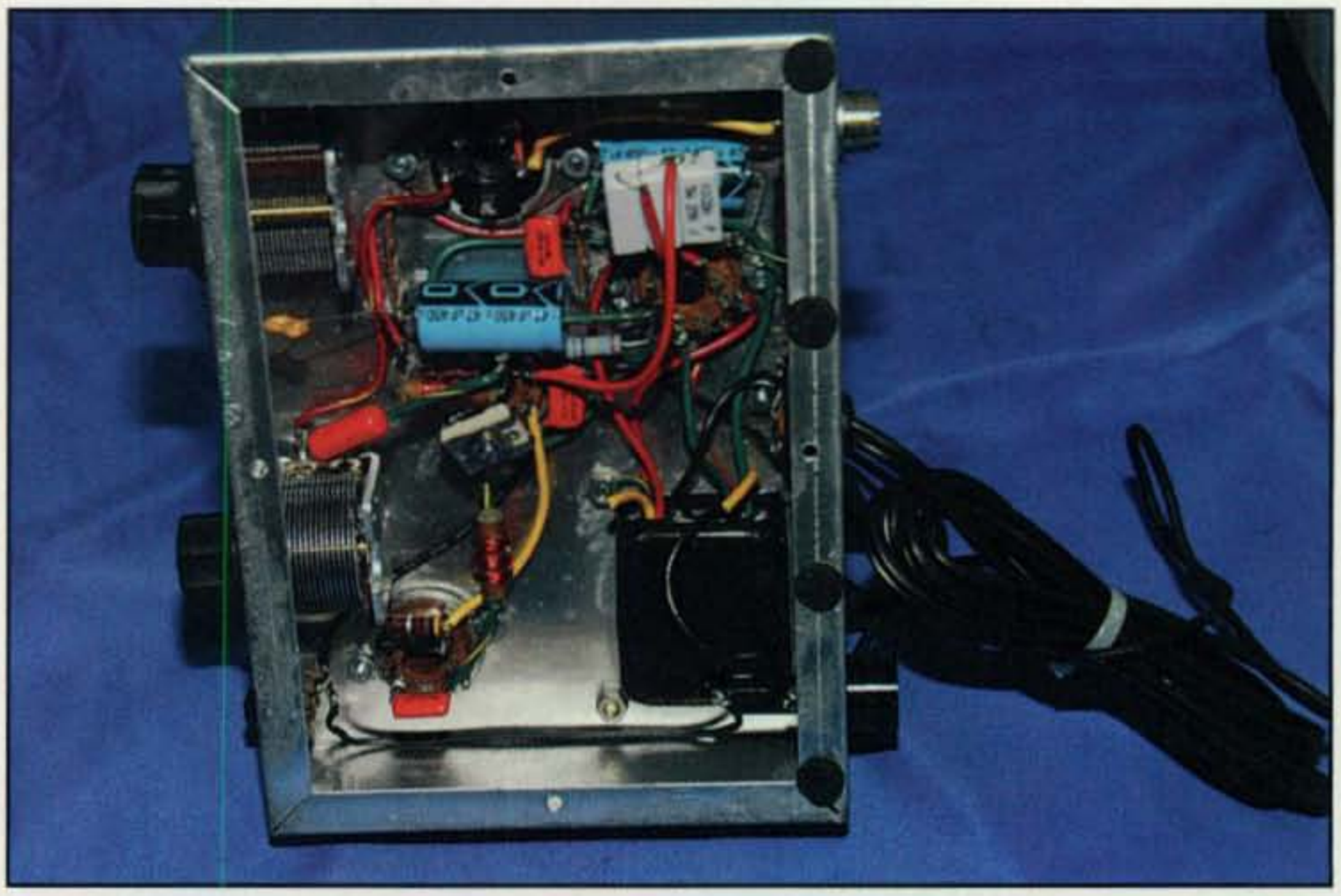

Photo C– These are shots of my Glow-Bug-1 clone of the popular AMECO AC-1 80/40-meter CW transmitter kit of the 1950s/60s. This kit was a great experience to build, as it brought back many fond memories of my early days in ham radio. Alas, this clone-kit is no longer available, but check out the internet auction sites. Occasionally one will turn up at a reasonable price.

Photo D– Two Heathkit HW-8s on the author's bench. The grungy-looking one is being restored, using parts from the nicer-looking (but not repairable) "parts rig."

sion frequency counter from M³ (pronounced "M Cubed"). Unfortunately, M³ is no longer in business. Mike Doty, WƒMNE, one of the "three Mikes" in M³, advised me that they disbanded the company in June of 2010. However, I had several kits that Mike had provided me for my building pleasure. The freq counter was the kit I reviewed for *QST* several years ago. A quality precision counter good from DC to the gigahertz range is one very handy piece of test gear. The M3 kits (I've built three of them) go together without a hitch; just read the instructions thoroughly and, once calibrated, they are great additions to the test equipment on the workbench.

Finally, my newest acquisition, the Elecraft K3 mentioned above. It took me about eight hours to "build" this kit. This is a definite departure from previous Elecraft kits in that the majority of the construction takes the form of mounting subsystems and daughter boards into the RF board or "mother" board and constructing the case. While there is no soldering with the K3 kit, it is a very detailed build, and my first word of caution regarding this kit is to thoroughly read *all* the instructions in the builder's manual. This includes the configuration and alignment sections. Without a doubt the most involved portion of the K3 build was doing a parts inventory. That took nearly two hours alone! Do not attempt to build the K3 *until* you do the parts inventory. You have so many different types and lengths of screws, lock washers, and standoffs that you can easily confuse some of them, which will result in problems and possibly cause damage to the K3 when power is applied.

I haven't explored the brave new world of software-defined-radio (SDR) kits, but that will be the subject for an entire column in the not-too-distant future. For now, I'm out of space and need to get this column on the wire to Hicksville. Until next time, have fun, explore the homebrewing side of the radio hobby, and I'll look for you on the bands.

73, Rich, K7SZ

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Our customers have always known we're #1. But did you know that LDG was the first company with a "no questions asked" two-year transferable warranty on ALL our products? LDG autotuners also have the highest resale value of any autotuner on the market. Our customers feel good about owning LDG products and so will you!

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

NEW! AT-200ProII

The AT-200ProII features LDG's new "3-D memory system" allowing up to eight antenna settings to be stored for each frequency. Handles up to 250 watts SSB or CW on 1.8 – 30 MHz, and 100 watts on 54 MHz (including 6 meters). Rugged and easy-to-read LED bar graphs show power and SWR, and now includes LEDs for the antenna position and if the tuner is in bypass. A function key on the front panel allows you to access data such as mode and status. Includes six foot DC power cable. ***Suggested Price $259.99***

Z-11ProII

Meet the Z-11ProII, everything you always wanted in a small, portable tuner. Designed from the ground up for battery operation. Only 5" x 7.7" x 1.5", and weighing only 1.5 pounds, it handles 0.1 to 125 watts, making it ideal for both QRP and standard 100 watt transceivers from 160 - 6 meters. The Z-11ProII uses LDG's state-of-the-art processor-controlled Switched-L tuning network. It will match dipoles, verticals, inverted-Vs or virtually any coax-fed antenna. With an optional LDG balun, it will also match longwires or antennas fed with ladder-line. Includes six foot DC power cable.
Suggested Price $179.99

radio not included

Z-817

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

We have a tuner that will work for you!

We make tuners that will work with any transceiver. Don't know which one is right for you? Give us a call or see the Tuner Comparison Chart on our web site for more selection help!

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***

AT-600Pro

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

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***

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The #1 Line of Autotuners!

YT-100

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

Suggested Price $199.99

- ***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

AT-1000Pro

The AT-1000Pro has an Automode that automatically starts a tuning cycle when the SWR exceeds a limit you set. Operates at any power level between 5 and 1,000 watts peak. RF Relay protection software prevents tuning at greater than 125 watts. Tunes from 1.8 to 54.0 MHz (inc. 6 meters), with tuning time usually under 4 seconds, transmitting near a frequency with stored tuning parameters, under 0.2 seconds. 2000 memories. 2 Antenna connections. Includes six foot DC power cable.

Suggested Price $599

IT-100

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

Suggested Price $179.99

YT-450

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

Suggested Price $249.99

Designed to handle the higher power of the Tokyo Hi Power HL-45B.

NEW! Z-817H

The ultimate autotuner for QRP radios including the Yaesu FT-817(D) with addition of the Tokyo High Power HL-45B. The Z-817H interfaces to the CAT port (ACC) on the back of the radio with the provided cable. Tuning could not be simpler; one button push on the tuner and the Z-817H takes care of the rest. Switch to PKT mode, transmit a carrier, tune the tuner, then restore the radio to the previous mode! The CAT thru port on the back allows connection to the THP HL-45B for automatic band selection on the amp. The Z-817H will also function as a general purpose antenna tuner with other QRP radios or QRP radios with up to 75 watt HF amps. Powered by four AA internal Alkaline batteries (not included), so there are no additional cables required. 2000 memories cover 160 through 6 meters. Latching relays, so power consumption is Zero when not tuning. ***Suggested Price $159.99***

KT-100

LDG's first dedicated autotuner for Kenwood Amateur transceivers. Easy to use - just right for an AT-300 compatible Kenwood transceiver (except TS-480HX). The KT-100 actually allows you to use the Tune button on the radio. The LEDs on the front panel indicate tuning status, and will show a match in seconds, or even less of you've tuned on or near that frequency before. Has 2,000 memories for instant recall of the tuning parameters for your favorite bands and frequencies. If you have an AT-300 compatible Kenwood radio, you can simply plug the KT-100 into your transceiver with the provided cable; the interface powers the tuner, and the Tune button on the radio begins a tuning cycle. The supplied interface cable makes the KT-100 a dedicated tuner for most modern Kenwood transceivers.

Suggested Price $199.99

YT-847

YT-847 Autotuner is an integrated tuner for the Yaesu FT-847. An included CAT/Power cable interfaces with your FT-847. Just press the tune button on the tuner and everything else happens automatically! The mode is set to carrier and the RF power is reduced, a tune cycle runs and the radio is returned to the original settings.

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LDG

kit-building

BY JOE EISENBERG,* KØNEB

New Kits at Dayton

Every year, the Dayton Hamvention® brings with it a variety of new kits for amateur radio operators. This year was no exception.

Deluxe Tenna Dipper

One of the kits introduced at Dayton is the Hendricks Deluxe Tenna Dipper kit, which was the first to hit my bench. This kit is a wonderful addition to the tool bag of any ham who needs to tune or test an HF antenna. The Deluxe Tenna Dipper is handheld in size and provides a very quick and simple way to test the resonant frequency of an HF antenna at home or in the field. It operates from the 160-meter band to 10 meters in two overlapping ranges. Mine goes from about 1.8 MHz to 31 MHz.

This kit is based on a previous kit sold by the 4-State QRP Group called the Tenna Dipper, and both were designed by Steve Weber, KD1JV. The original kit worked in the same fashion as the new one, but output its tuned frequency in Morse code. The way it worked was to connect the unit to the antenna in question and tune it until the red LED went dim or completely out. The user then pushed the button and read the frequency in code. It made the kit inexpensive and small, but unless you were good at reading code, it had little appeal. The Deluxe Tenna Dipper operates much the same, but displays the frequency in a bright, four-character LED digital display. It still has the bright red LED which indicates when you have found the resonant frequency. The circuit operates somewhat like a Wheatstone bridge does for measuring unknown resistances, and when the load in question approaches 50 ohms, the light goes out. For most antennas—such as verticals, beams, and dipoles—the light indeed often can go completely out when tuned to the resonant frequency, or multiple frequencies on multiband antennas. With antennas such as the popular G5RV design, the light may sometimes only dim, but not go out, when it approaches a resonant frequency, meaning the resonant point is not quite 50 ohms. This is why an antenna tuner is often necessary when using this type of antenna.

Assembly of this kit takes about 2 1/2 to 3 hours if you also take the time to place the supplied decals on the case, a process that should be completed before the rest of the final assembly. An alternative to the decal procedure is to use a label-making device such as the Brother P-Touch series to produce labels for the front panel. Using their clear tape with black lettering option, you can produce very good front-panel labels without having to go through the longer decal-application procedure.

After you have sorted the parts, assembly on the well-marked board begins with a single surface-mount part, a voltage regulator. This part is very easy to install, following the directions in the manual. You can use the same soldering iron you use to assemble the rest of the kit, and placement of this part is very easy, as it is not too small. After this part, assembly begins with the resistors, followed by the capacitors, diodes, and other semiconductors, and then the switches. Placing the finished kit into the included case is very easy, with just four screws. Be prepared to supply six AA batteries to power it up and you are ready! I found that I was able to hold a general-coverage HF receiver next to it and hear its signal as I tuned near where the receiver was listening to verify the accuracy of the readout in the Deluxe Tenna Dipper. Using the extra resistor supplied with the kit, you can test the Dipper's reaction when a 50-ohm load is connect-

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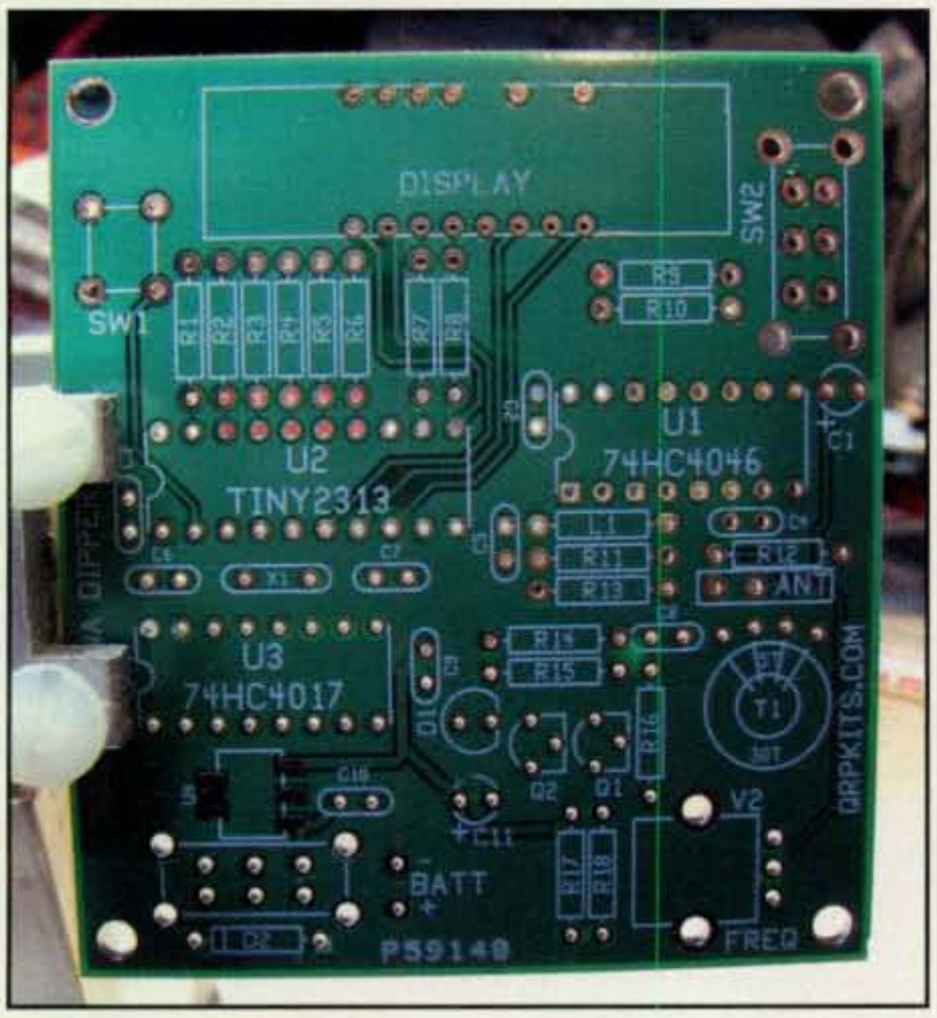
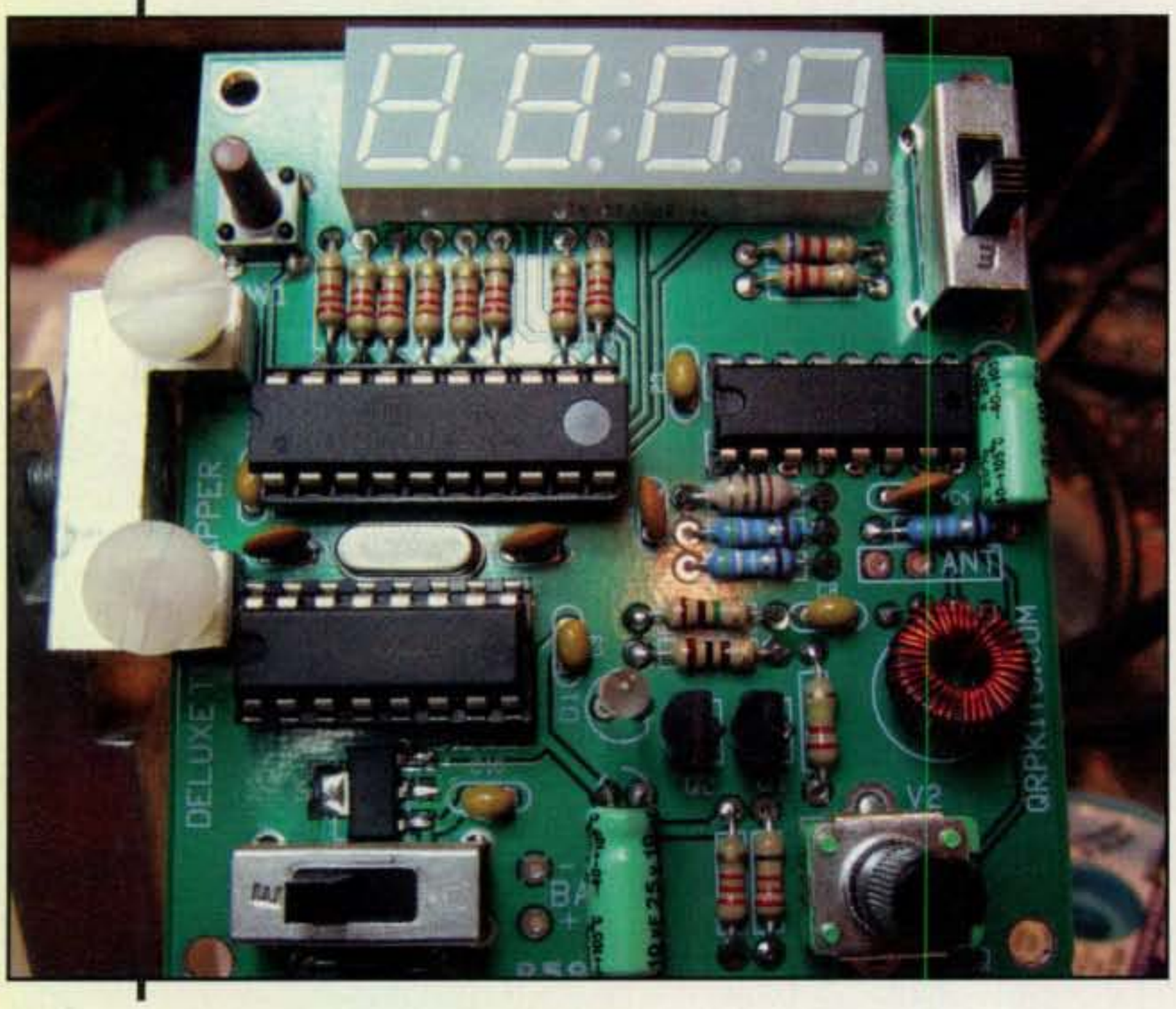


Deluxe Tenna Tuner board ready for assembly.



Deluxe Tenna Tuner board with all components mounted. Note the surface-mount part on the lower left part of the board. ←

ed. I also had a 50-ohm BNC LAN terminator handy, which worked perfectly. There is a front-panel button to increase the precision of the frequency display from 10 kHz to 100 Hz, but I didn't find it necessary to use that precise readout to get my Pac-12 portable vertical antenna tuned where I wanted to operate.

This kit sells for $75 and is available from Hendricks Kits at <http://www.qrp-kits.com>. *(For more on this kit, also see this month's "QRP" column—ed.)*

Elecraft KX-3

A big eye-opener at Dayton was the introduction by Elecraft of a transceiver kit that combines the front panel of the K3 with the portability of the KX-1. The new KX-3, which will be available by late 2011, is a modular kit that requires no soldering. The boards come pre-assembled, and the builder assembles the case and mounts all of the boards and component assemblies into it and performs the final adjustments. It features all-mode operation and many of the features of the K3 in a very small and portable case. You can see more information on the upcoming Elecraft KX-3 at <http://www.elecraft.com>.

No trip to Dayton would be complete

Deluxe Tenna Tuner completed but before decals are applied. You can use the provided decals or save time using a labeling kit with clear tape (see text).

Buildathon at Four Days In May (FDIM) assembling the "Sudden Squall" QRP transceiver kit.

without a stop at Four Days In May, the annual QRP gathering. At FDIM, I got to see first hand the new SS-40 40-meter CW receiver kit offered by the 4-State QRP Group. This kit has 150 parts, so it is not a quick one-evening build, but all parts are through-hole except, again, for one lone surface-mount part that is easy to install. What sets apart this receiver kit is its high performance specs, which include –132 dBm sensitivity, great selectivity provided by a crystal IF filter, and an extremely low noise floor, making it easier to hear those weak signals. Combine all of this performance with practically no drift, and you have a very affordable and high-performance receiver for 40 meters CW for only $50. You can download the manual or order this kit from 4SQRP at <http://www.4sqrp.com>.

Also at FDIM, I was pleased to see a large group of kit builders in the Thursday evening buildathon putting together Rex Harper, W1REX's "Little Squall" CW transceiver kit. In addition, I was honored to participate in Rex's first-ever simultaneous online streaming video kit-build session held at FDIM. Hams from all over the world had their Crystal Checker kits mailed to them and participated via video streaming and online chat room in the step-by-step construction at the same time as a group at FDIM. This simple kit was made so that the online participants would solder their parts to the board while builders with Rex at FDIM could simply plug their parts into sockets on the board. A 100% success rate was achieved! Once completed, the kits fit perfectly into an Altoids® tin. Rex also introduced a fun, simple QRP dummy-load kit designed for those in-hotel QSO parties that are popular at QRP hamfests. This kit, designed to act as a 50-ohm load to a low-power transmitter and yet radiate enough RF for near-field communications, sells for $10 and is available at <http://www.qrpme.com> as the "Dummy Load Construction Set."

Prototype of the new Elecraft KX-3 portable all-mode transceiver kit.

Summary

This year at Dayton it was wonderful to see so many new kits offered and hear of many new ones on the horizon. If you hear of any new kits, be sure to e-mail me and I'll check them out!

As always, I returned home from Dayton with kits to build, tired feet, and lots of digital photos. You can see all of my Dayton slide-show compilations at <http://www.youtube.com/joehusker>, and one of the 2011 shows not on YouTube is at <http://www.vimeo.com/24390342>.

See you at the Huntsville Hamfest in August! 73 de Joe, KØNEB

Good Things Come in Small Boxes

A Chat with Designer KD1JV, plus Two QRP Rig Mini-Reviews

BY CAM HARTFORD,* N6GA

qrp

By their very nature, QRP things come in QRP-sized containers, whether they are boxes, cans or tins. This month we highlight some small items and have a talk with a small-radio designer.

Steve "Melt Solder" Weber, KD1JV

Chances are good that if you're an active QRPer, you've heard of Steve Weber, KD1JV. Mr. "Melt Solder" has been designing and selling his own variety of innovative small radios and accessories for several years.

Steve is an avid backpacker, and as such he tries to hike a segment of the Appalachian Trail every year. Several years ago, he decided to build a small rig that he could operate from camp in the evenings. His goal was to build a rig small and light enough that it wouldn't be a burden to carry long distances, yet have enough features to make it truly useful. The result of his efforts was a radio that met his immediate goals, but as we now know, it turned out to be so much more than that.

The little transceiver featured a DDS (direct digital synthesis) based VFO and was small enough to fit in an Altoids® tin. After giving it the requisite field trials, he bragged about it on the QRP-L e-mail reflector. Surprisingly, quite a few guys liked the idea and bugged him about making it into a kit and selling it.

The one he had made for himself was not reproducible in kit form. Lots of work went into making it salable. "What made the new version possible was my development of the OR gate driven 2N7000 final," Steve explained. "Not only did this reduce the footprint of the transmitter enough so everything could now fit on one board (less band filters), it could produce up to 5 watts out on all the bands without the need for gain controls or frequency compensation networks."

Steve made a run of 50 of these kits, simply called the ATS (for Appalachian Trail Sprint). These sold out in a flash, indicating the presence of a market for this kind of radio. Since then there have been the ATS-2, ATS-3, ATS-3A, ATS-3B, and ATS-4. There's no telling how far this family of little trail radios will go. If my math is correct, something such as 850 of the ATS series kits have gone out the door.

Tracing their development, they've gone from three bands to four bands to six bands to five bands. They've gone from plug-in band modules to slide-switch band changing. They've gone from Altoids® size boxes to a plastic case which had room for batteries, back to the Altoids® size, and finally to the current model, which is the first to come with its own custom-fabricated metal box. Photo A shows an ATS-3A with one of its band modules along with the latest model, the ATS-4.

The frequency readout went from an audio enunciator to a single-digit display to the current three-line LCD which displays frequency, battery voltage, and an S-meter, plus momentary displays for RIT, XIT, code speed, manual frequency jumps and keyer memories. Also, the rig now offers PSK-31 capabilities through a laptop or PDA.

Most of the feature creep has come directly from input by users. The AT Sprint Yahoo group (http://groups.yahoo.com/group/AT_Sprint) is a pretty lively one, often with messages such as "In the next ATS, I'd like to see . . . ". This is followed quickly by a chorus of "Me Too" messages whereupon Steve studies the issue to decide its feasibility. Usually a year goes by and out comes the new model with a whole bunch of new features. Other times change is forced by the discontinuation of a critical part, such as the analog AGC chip which went out of production when the cell-phone makers went digital. This chip had allowed Steve to build a rig without a bulky audio gain control (!), and is one reason the ATS-4 had to grow to accommodate this monstrous item. It's still a small box, being just 30% larger than the original Altoids® tin.

Photo A– The Altoids®-size ATS-3A with one of its band modules shown beside the newer ATS-4, which trades the modules for internal switching.

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I asked Steve when he sold his first kit. "My very first kit was the 'Deluxe DDS VFO' published in *73* magazine in 1993," he recalled. "It used the first DDS chip designed specifically for that application by Analog Devices, the AD7008. The kit was very expensive at $250, so only a handful were sold."

"Over the years other versions of DDS VFOs were produced as new parts were introduced and became somewhat more affordable," said Steve. "Other kits, such as keyers and accessories, were produced because of something I desired to have or from suggestions gleaned off QRP-L."

Steve also designs rigs for Doug Hendricks of Hendricks QRP Kits (http://www.qrpkits.com/index.html). Some of the designs started out as items that Steve built for himself, such as the MMR transceiver. He designed this rig as an entry in an ARRL design contest. Doug liked it so much that he snatched the design to fill out his product lineup. Others, such as the PFR-3 transceiver, were done at Doug's request. If you hold the PFR-3 and the ATS-4 side-by-side, you'll see the strong family resemblance.

I recently built an ATS-4. I hesitate to do an actual review of the rig because Steve is no longer selling them. He does limited runs of a rig, usually 100 to 200, depending on a variety of factors. I can only say that it's wise to get onto the Yahoo group to see what's being discussed. The approach of a new offering is well-documented, and he offers the items to list members before going to the general public. The mail list is also where the older models are bought and sold, so if you see one you can't live without, the mail list is the place to be.

To be able to make something so small and with so many features requires the use of surface-mount parts. I've come to enjoy building SMT rigs, so this one went together pretty easily. Steve's instructions are as good as any, and my ATS-4 would have played perfectly from the start if I'd only bothered to solder both ends of a particular inductor chip!

I have to say that I enjoyed using my ATS-3A on the trail, but with the ATS-4, its digital frequency readout, built-in band switching, and the addition of 15 meters, I feel I'm in the lap of minimalist luxury! The receiver draws about 30 mA at 12 volts, and the transmitter puts out 5 watts with a current draw of 750 mA, so a small 2.2AH SLA battery will easily last for an entire FYBO ("Freeze Your Buns Off" QRP competition each winter).

What's next to come from the Melt Solder shack? Steve would only say that he has several products on the bench. We'll just have to tune in to the Yahoo group or check in on Hendricks QRP Kits to find out what's been cooking.

Deluxe Tenna Dipper

Speaking of Steve Weber, he recently designed a new antenna analyzer for Hendricks QRP Kits. Called the Deluxe Tenna Dipper, this unit is capable of determining the 50-ohm resonant frequency of an HF antenna. It's small, self-contained, and comes in a kit form that is easily assembled in an evening or two (photo B). The documentation for the unit is up to the usual Hendricks standards.

Applying power, the first thing you notice are some familiar-looking component parts: a KD1JV Digital Dial frequency readout and the red LED eye of a Tayloe SWR bridge. What Steve has done is taken some off-the-shelf parts, whipped up a little additional circuitry, waved his magic wand, and come up with a really useful little device.

How does the dipper work? Very simply, you attach your antenna's feedline, adjust the frequency of the internal

SUCH A HAM

Stan, I know you're talking about me as soon as you switch to Morse code.

oscillator, and when the LED extinguishes, read the resonant frequency of your antenna on the digital display.

The first thing I did with the completed unit was hook it up to the lead-in of my R7 vertical. This antenna covers 40 through 10 meters and so provides seven opportunities to find SWR dips. The Dipper found all seven resonant spots where they were supposed to be. Ditto on my Yagi. To check the Dipper's accuracy, I recorded all of the resonant points from these antennas and then did the same run with an MFJ-259 analyzer and an AEA VIA-HF graphing analyzer. There were slight variations from unit to unit, but for the most part the Dipper gave the same answers. For what it's worth, I don't really know which unit was more accurate, as they all said just about the same thing.

Besides checking the resonant frequency of an existing antenna, the Dipper should be quite useful in adjusting portable antennas in the field. To do this, you would simply set the display to read the frequency where you want your antenna to be resonant and then adjust the antenna until the SWR LED extinguishes.

There are circumstances where the tuning rate is a little too fast to easily zero in on the null. I'm sure space and cost would prevent the use of a 10-turn pot, but on several occasions I found myself wishing for one.

Since this unit obviously does not provide as much information as, say, an MFJ-259, one could question what its place is in the antenna analyzing world. To noodle that out, I decided to take an arms-length view and ask the following two questions:

What does it do? Easy answer, it tells you the frequency(ies) at which an antenna is resonant.

What doesn't it do? At that point of lowest SWR it doesn't tell you what the numerical SWR is, nor does it give you any information about the resistive or reactive components of the impedance. For that matter, compared to something like an AIM 4170 VNA, it gives very little information.

However, it does answer the big question, which is "Where is my antenna resonant?"

Photo B– The Deluxe Tenna Dipper from Hendricks QRP Kits, showing that the attached antenna is resonant at 7.060 MHz.

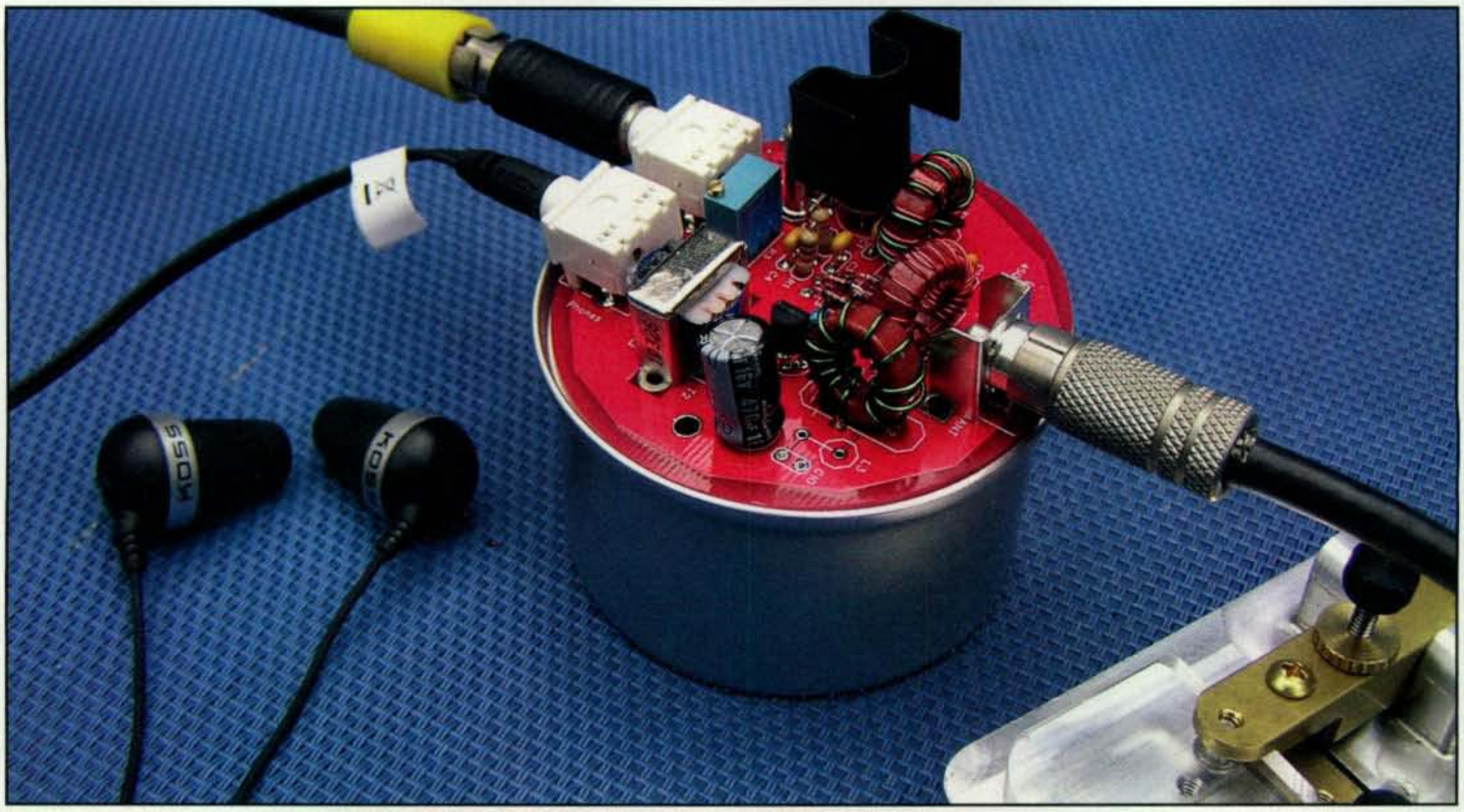

Photo C– The very small HamCan from the Four State QRP Group.

What most of us need is something that tells us we are not going to blow up our rigs, and the Dipper provides that information. To a certain extent we all like to read the meters to learn the *real truth* about the antenna under test, but there are so many occasions when all we need to know is just that one important piece of info, and the Deluxe Tenna Dipper provides it without drowning us in data overload.

(For more on this unit, see this month's "Kit-Building" column—ed.).

Radio Minimalism for the Masses

My wife and I were on the way to the local coffee emporium one morning when the conversation turned, as it often does, to minimalist radios. "What do you want for lunch today?" she asked. "How about deviled ham sandwiches?" I replied.

"Huh?" She was baffled. In our 43 years of marriage, she's never made a deviled ham sandwich, and I'm sure the last one I had was made by my mom sometime back in the 1950s. "I have a can of the stuff and we need to use it so I can use the can," I replied.

"Oh, you mean like the bag of 400 Altoids® mints we have because you needed the boxes?" How well she knows me.

I'd recently taken possession of a Ham Can, a kit offered by the Four State QRP Group (www.4sqrp.com). Like a Tuna Tin Two, the Ham Can is a rig designed to use a food container as its base (see photo C). Actually, the can does double duty as the base for the circuit board and a container for the power supply, which is a 9-volt battery.

Designed by Dave Cripe, NMØ0S, the Ham Can is a minimalist transceiver employing only two transistors. One transistor is an oscillator that does double duty, acting as the regenerative detector on receive and the oscillator/PA on transmit. The second transistor is the audio amp which drives your headphones. There are only 25 parts in the whole transceiver. It comes supplied with a 7122-kHz crystal.

I generally build kits at a leisurely pace. This one took a whole two hours. All of the parts are through-hole, and the connectors mount on the board so that when you've finished stuffing and soldering the board, the rig is ready to go.

However, not mine. I heard signals in the receiver and the transmitter was making lots of RF. I called CQ for quite while but nothing happened. I tried again the next night and again no luck. After some snooping around, I discovered that I was transmitting on 7120 kHz but receiving on 7250! No wonder nobody came back to my calls. I shot an e-mail to Terry, WAØITP from the Four State group. Both he and Dave, NMØS, the designer, responded immediately. The upshot was that the receiver doesn't like ferrites in the antenna path and I was using a tuner with a ferrite balun. I switched to a Z-match, after which the RX and TX were happily reunited on the same frequency.

My experience with regenerative receivers has been spotty, but this one is quite smooth and glitch-free. The regen control is a little board-mounted multi-turn trimmer that isn't in the least bit touchy. The transmitted signal has just enough of a "crystal" sound to make it a good running mate for an old hand key.

The Ham Can is a fun and easy project that when you feel overrun by SDRs and microprocessed signals can provide you with a shot of "doing more with less." Thanks to the Four State QRP Group for this little shot of minimalism.

Ten-Tec R4020

I recently had the opportunity to spend some quality time with a Ten-Tec R4020. This rig inverted some preconceived notions I had about it, turned my thoughts upside down as it were, so I thought I'd turn this review upside down and start at the end. Bottom line: It is an amazingly competent little rig with plenty of features and operating conveniences. Once you become familiar with the operating controls it's quite easy to use—smooth QSK, good keying, and a receiver that's pleasing to use (photo D).

Quite honestly, I was expecting something a little less polished, maybe because of its heritage, being the "Son-of-First-

Photo D– The Ten-Tec R4020 makes going portable an easy matter.

Radio-from-China." First impressions being what they are, I picked it up and was surprised by the solidity and heft. Applying power, the display comes on with bright white letters on a blue background and it just looks happy to be alive, ready, and eager to play radio. There's lots of info on that display, too—mode, frequency, signal strength in receive, battery voltage, and memory location are displayed along with RIT and attenuator, if used. Since one of the power options is an internal battery pack (8 AA cells), it's a helpful feature to be able to monitor the battery voltage.

Things I like about this rig, in no particular order, are the following:

• DDS frequency control. More and more little radios are turning to digital frequency synthesis in lieu of traditional VFOs and this is commendable. Stability and wide tuning range are among the benefits; even though this rig can transmit only on the 20- and 40-meter bands, it can receive from 5 to 16 MHz.

• Variable IF bandwidth. During casual operating and while tuning the band I like a fairly wide bandwidth; 500 Hz just seems too pinched. With the R4020 you can choose between CW and SSB modes and among four bandwidth settings in each mode. I spent most of my operating time in the SSB mode at 2200

Photo E– Danny, K9KHJ, has one of the tidiest shacks known to hamdom!

Hz. It won't transmit SSB, but my ears appreciate the wider filter setting.

• Smooth QSK. Most of today's QRP designers have solved the mystery of good QSK, and the R4020 is no exception—no clunks, pops, or thuds. If there's a strong signal in the pass band, the transition from transmit to receive can be a bit fuzzy but it's nothing objectionable.

• Good-sounding transmit signal. When heard from afar, this radio has a pleasing and stable signal with no chirps or key clicks, even when your batteries have drooped to 9 volts. Really! Recently I ran into Terry, WAØIPT, who was operating as K6JSS/Ø in Iowa. It wasn't until we were well into the chat that I noticed the battery voltage was down to 9.5. I'd filled the battery packs with fresh AA alkalines a couple of months prior to this contact, so they did have quite a bit of use on them. At 9.5 volts the rig was still putting out 2.5 watts.

Another evening I answered a weak CQ from 9-land and Danny, K9KHJ, came right back to me. It turns out Danny was running his HB-1A, the predecessor to this rig. This was probably the first HB-1A-to-R4020 QSO on record. It also turns out that Danny uses his rig as the main radio in his tidy little station; check out photo E. If you don't have much space to devote to radio, the R4020 would do a creditable job as the centerpiece of a minimalist QRP station. Kind of makes me think of those pictures of "World's Messiest Hamshack," but in reverse.

The only thing that feels below par on this radio is the encoder. It's very heavily detented, feeling something like a 20-position rotary switch, and a bit floppy to boot. The floppiness is no doubt because it also serves as the push button to change tuning rates. Also, the tuning rate of 100 Hz per click in its slowest tuning mode is a bit on the fast side for me. Beyond these nits, there's not much to pick at on this radio.

Now for some details that should have come at the beginning: The R4020, which covers the 40- and 20-meter bands, and the R4030, which covers the 40- and 30-meter bands, are sold by Ten-Tec (www.tentec.com; 800-833-7373).

To The Field

As I submit this column I'm starting to pull the Field Day gear out of storage in anticipation of another good weekend in the woods. As you're reading this, FD '11 is history. I hope you had as great a time as I hope to!

72/73, Cam, N6GA

Narrow Band Emergency Messaging System (NBEMS) and FLDIGI

BY DON ROTOLO,* N2IRZ

I'm always on the lookout for new digital communications software, which I then bring to you, dear readers. But this is a double-edged sword: The bleeding edge is nice, but it can be pretty lonely trying for a QSO with this month's brand-new digital mode. A reader sent me some information about the Narrow Band Emergency Messaging System (NBEMS, pronounced "N-Beams"), which is a software suite presently used by several EmComm (Emergency Communications) groups throughout the United States, and I thought would be a perfect topic for this month's column.

NBEMS isn't really a single piece of software. Instead, it is a system having several components that work together to deliver communications capability for EmComm applications. At the heart of the system is FLDIGI (Fast Light DIGItal, a modem application), a new-old software written by Dave Freese, W1HKJ (and several others) that is an outstanding program for digital communications enthusiasts in its own right. I say new-old because this application appears to have been around for a few years, but I'd never heard of it until now. Once you see its capabilities, you'll also wonder why it's such a well-kept secret.

The first very unusual thing about FLDIGI is that it capably works with so many digital modes, from CW, PSK31, and RTTY to Throb, Domino EX11, and Olivia. See the Resources box for a listing of the modes FLDIGI operates.

The second very unusual thing about FLDIGI is that it is available for Linux and Mac OS X, along with the usual Windows® versions. Those of us using Microsoft's operating systems are a bit spoiled, since virtually everything is available for Windows®. Our friends using Apple computers and Linux are often not so fortunate. FLDIGI and its related components are a welcome exception. Fig. 1 shows a screen shot of the download page on which the various versions are shown.

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The Components of FLDIGI

Let's first look at the components of this software suite. FLDIGI is the main software application used by NBEMS and really is all that's necessary. For some specialized tasks, there are a few additional programs that would surely come in handy. Oh, and they are all offered for free. In fact, on W1HKF's website he answers the question "How can I support FLDIGI?" with this eloquent text:

> I have received several requests for information on providing support for fldigi. I have been blessed with good health and sufficient income to allow me to enjoy our great hobby for over 54 years. I consider fldigi and all of the other software as my gift back to all of the great hams with whom I have QSO'd over the years and to those I still hope to catch on the waterfall. So monetary support is not needed or solicited.
>
> Instead I request that you make a contribution to your favorite charity. Name me in recognition or simply make an anonymous contribution; either suffices. You would do me great honor if your contribution were made to the Gideons International through their gift Bibles recognition program.

Thanks, Dave, for your generous gift to the amateur radio community. *(Ed. note: CQ does not endorse any specific charity; we are simply relaying W1HKJ's request regarding his program.)*

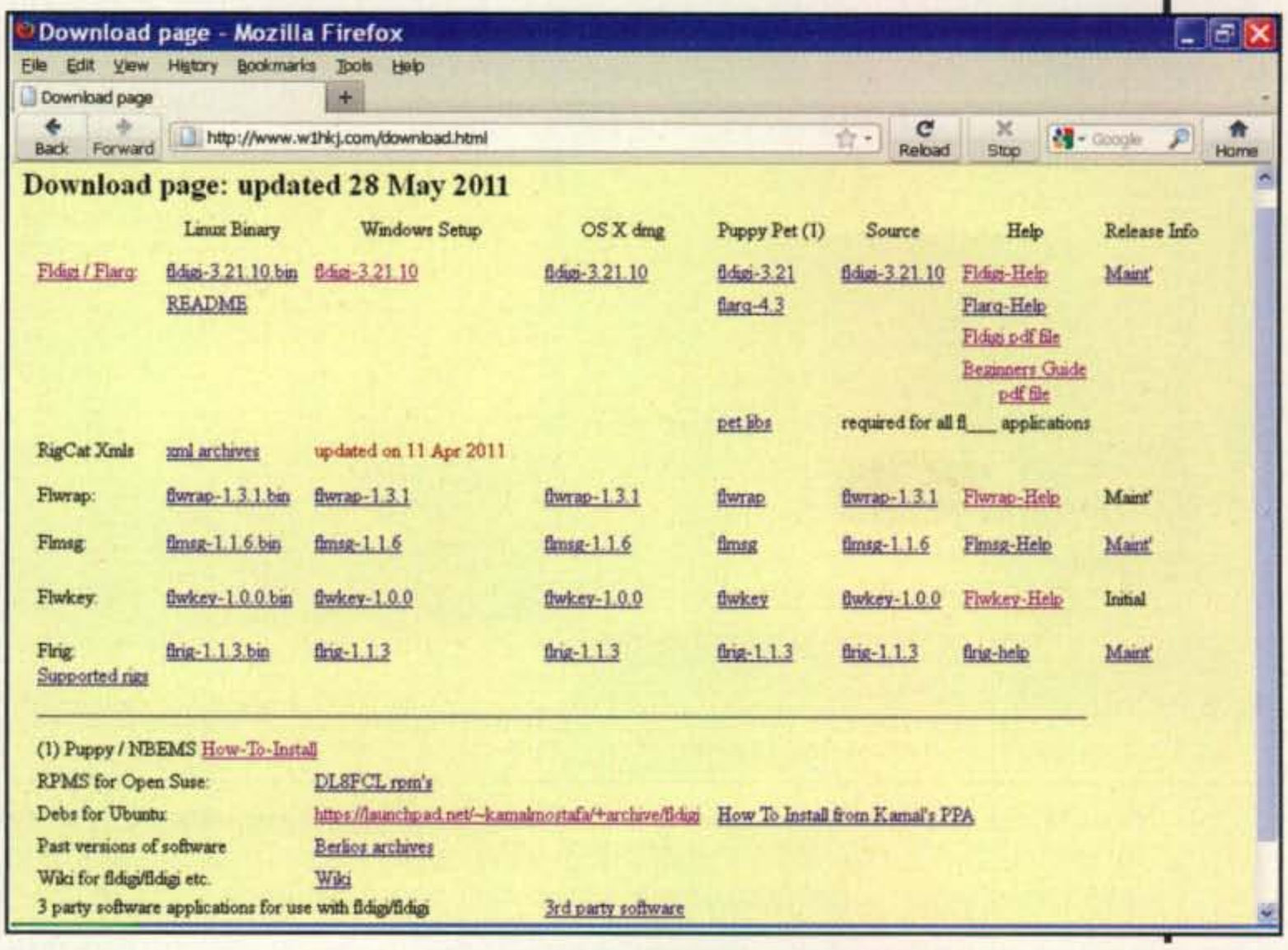

Fig. 1– W1HKJ's software download page at <http://www.w1hkj.com/download.html>. This lists all of the various applications for the supported operating systems, including Windows®, Mac OS X, and Linux. Here is also where you'll find the documentation and, if you're interested, the source code as well.

FLDIGI doesn't offer any new modes. Rather, several existing modes are combined into a single, small, easy-to-learn package (fig. 2). All of these features are big advantages for EmComm work. Since we can't always count on fully-trained help in an emergency, the short learning curve and fast deployment help get the system up and running quickly. Since we can't always pick which computers are available, having a small and portable application allows us to use whatever computer resources are available. Small, too, is not an understatement. The FLDIGI install package weighs in at just under 4 MB, and when fully installed with all the options is under 14 MB.

There is also a "Slow CPU" mode. If you happen to have an older computer with a CPU speed of less than around 700 MHz, check off a box in the configuration screen and the application will compensate for that.

This wide variety of supported digital modes (and some other features we'll discuss in a moment) makes it very flexible, yet another clear advantage for EmComm. As we know, band conditions during an emergency can't be chosen, so instead we need to have the flexibility to choose the best mode for the situation. FLDIGI gives us that choice. Olivia is quite slow, but gets through in really poor conditions, while MT63-2k is plenty fast when the band is wide open. Not only is this an advantage for EmComm, but casual users will find it great for casual ragchews as well. With all this flexibility and advantages, no wonder NBEMS uses FLDIGI.

To ensure the maximum flexibility in communications, FLDIGI has a few optional applications—all of which are also available for Linux and OS X as well as Windows®—to help overcome digital mode limitations when necessary. These optional additional programs include FLWRAP, FLARQ, FLMSG, and FLRIG. Let's now take a look at each of these.

Additional Programs

Emergency communications are not always limited to text messages, and sometimes the only modes that work are those that don't guarantee data integrity from end to end. FLWRAP "wraps" a text message with an error-free shell, guaranteeing the integrity of a message. Looking at PSK31, anyone who has used the mode knows that received text can be garbled, even in pretty good conditions. This is fine for casual operating, since it doesn't really matter if the fellow is from PittV3rgh or Pittsburgh, but in most EmComm work, getting things accurately is often important. Even modes such

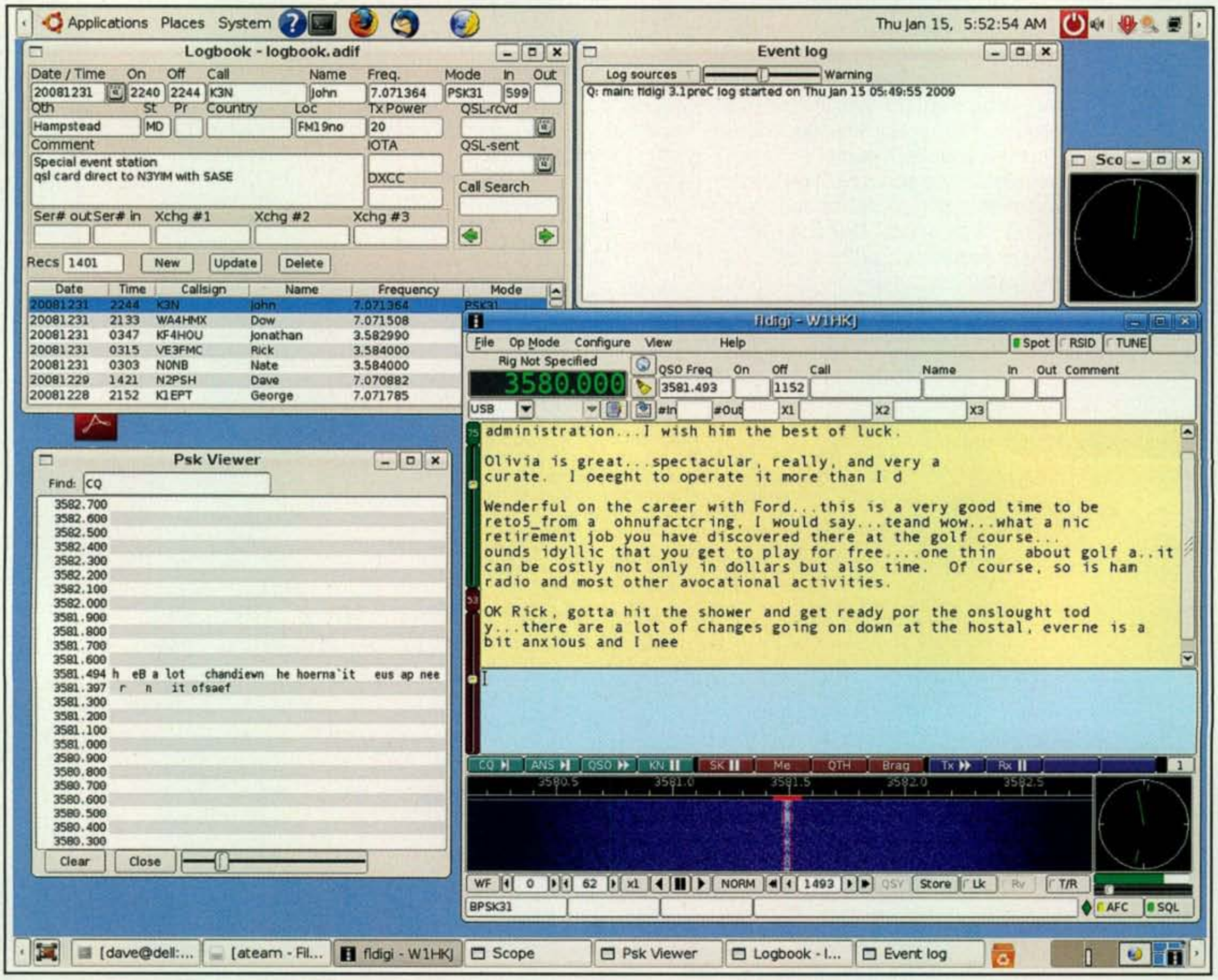

Fig. 2– The main FLDIGI window, along with Event Log, Logbook, and PSK Viewer windows, shown running in Ubuntu Linux. Configuring and using FLDIGI is about as easy as it looks. The short learning curve is a big advantage in emergency situations when experienced operators may be unavailable. (Image courtesy Dave Freese W1HKJ)

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as Olivia can still have errors, despite lots of error correction. FLWRAP allows you to send error-free text using a non-error-free mode.

Sometimes, FLWRAP isn't enough. For example, a small MS Excel spreadsheet might need to be moved over the air. FLARQ is an application that is used to transfer computer files. It adds an ARQ (Automatic Repeat reQuest) layer to whatever mode you're using. The information is then sent in relatively small blocks, and if an error is detected, the receiving station automatically requests that the block is sent again. Most modes support the use of FLARQ, but not all do; this is explained in the documentation.

FLMSG helps the operator format messages into standard message formats, such as ICS-205, ICS-206, ICS-213, ICS-214, and ICS-216 forms, in addition to ARRL Radiograms and plain text messages. There's no reason standard message formatting shouldn't be handled by your computer, whether for routine traffic handling or within NBEMS.

Last, we have FLRIG which offers computer control of several different brands and models of amateur transceivers. Don't confuse this with simple PTT control (which is already a part of FLDIGI). We're talking about frequency, mode, and other major functions. There are many software applications that allow you to control your radio via computer, and this is another one, small and efficient like the rest of the Fast Light applications.

That's our quick tour of the NBEMS applications. All of the installation files can easily fit on a CD or memory stick for on-the-fly installations on just about any computer. Once installed, the applications don't consume a lot of resources and are easy to uninstall without a trace later. For casual use, it never hurts to be familiar with your emergency software. FLDIGI actually is quite comfortable to use, with a rich feature set, making it my new favorite on the air.

Do Your Homework and Plan Ahead

If you have plans to use this for EmComm work, you'd do well to verify the modes and frequencies being used in your area. Google "NBEMS" for some suggestions and ideas about how others around the country are using these applications.

One thing I need to mention whenever I talk about digital sound-card modes: It really is critically important that you properly set your transmit audio and (to a lesser extent) RF power levels. Search YouTube (http://www.youtube.com) for "PSK31 Level K7AGE" for a nice video explaining how to do this. Although this shows PSK31, it's valid for all sound-card digital modes.

Some digital modes, such as MT63 and Olivia, depend upon accurate sound-card clock frequencies to tune and decode signals. Sound cards generally don't hold the kind of frequency accuracy desired for optimal performance, so it's a good idea to calibrate your sound card. You only have to do this once. In a pinch you can get away without it, but it's best to do it if you can.

The Pennsylvania Situation Report page (see Resources) has (amongst many resources) a small program named CheckSR.exe at <http://www.pa-sitrep.com/checksr/> that can be used to calibrate your sound card. Included with the FLDIGI installation is a receive-only mode that lets you calibrate your sound card against WWV. Either way, it's easy to do and will make a difference in performance for those frequency-sensitive modes.

Getting the software is as easy as visiting the download page. W1HKJ maintains a website with all the latest downloadable versions (see Resources). Download all the programs available for your operating system (even if you have no plans on using all of them, you never know if you'll need them later). For Windows®, they are self-installing .exe files, so installation is as easy as a double-click.

I recommend reading the documentation carefully. It turned out that I had a few copies of a file called "cygwin1.dll" and I had to find and remove some incompatible versions. I have no idea what the file does, but once I'd followed the instructions, everything worked perfectly.

Also, allow the program to install the desktop shortcuts; otherwise you have to go to C:\My Programs and double-click the runtime.exe file. When FLDIGI first runs, the automatic configurator starts, which is a handy way to set up the program with minimal effort. Of course, you can also configure or change everything from the Configure menu at any time.

When I set up the various displays and modes, I used the information on the Pennsylvania Situation Report home page. Although I'm not expecting to work any EmComm, my reasoning was that "it can't hurt," and I wanted to have a guide to accepted and published standards as I set up everything.

Remember my June column, where I discussed online user groups? Well, as expected, there's also a Yahoo! group with nearly a thousand members dedicated to NBEMS, all ready to help get you up and running. They are a wealth of helpful information, and even though I did not need to join—the message database is open to non-members and has lots of information—any serious users are well advised to become a member of the group.

Summary

That's NBEMS in a nutshell. Although I touched upon a few important points with the installation and configuration, for two reasons I'm not going to explain in detail how to install, configure, and use the software. The first reason is that I'm simply out of space this month. The second reason is that the on-line resources are quite good. To find out how to get the NBEMS software programs, install, configure, calibrate, use, and troubleshoot them check out the Resources box.

This month's column idea came from a reader just like you. Do you have an opinion on what you'd like to see here? Drop me a line. Until next time . . .

73 de Don,

Resources

The main software page: <http://www.w1hkj.com/>. This also links to the Download page and several other valuable resources, including "Sights & Sounds of Digital Signals" and all the documentation.

The best setup and use information for NBEMS that I've found is on the Pennsylvania Situation Report home page: <http://www.pa-sitrep.com/NBEMS/index.html>. Be sure to download the PowerPoint presentation, which covers the modes and settings best suited for EmComm work, and pay special attention to slide 8, which shows the sound-card calibration details.

Two presentations on NBEMS, one that covers all the basics and a second offering some detail on FLMSG: <http://www.arrl.org/nbems>.

Modes supported by FLDIGI v3.21.10 (some variants are not shown here): CW; DominoEX 4, 5, 8, 11, 16, 22; Feld-Hell, FSK-Hell, FSK-Hell 105; MFSK-8, 16, 16 pix; PSK/QPSK 31, 63, 125, 250; Olivia (various tones and bandwidth); RTTY (various baud rates, shifts, data bits, etc.); Throb-1, 2, 4, X-1, X-2, X-4; Thor-4, 5. 8, 11, 22. As receive-only modes, there's WWV (calibrate sound card to WWV) and Freq Analysis (receive only; be ready for the ARRL Frequency Measuring Test).

Installation Potpourri: We hear from some car companies and readers

BY JEFF REINHARDT,* AA6JR

Lots of correspondence this time around; many thanks to those who took a few minutes to share their experiences in setting up and operating mobile gear. With the ever-growing variety of vehicles in the marketplace, and a corresponding increase in their complexity, sharing your stories through this column is a great way to benefit those of us who love to operate on the road.

Guidance from Above

No I'm not referring to The Great Ham In The Sky; in this case it's the vehicle manufacturers.

You may recall we set out to get information right from the source on installing mobiles in some specific vehicles. While the inquiries we made were not comprehensive or exhaustive, here's what we've learned.

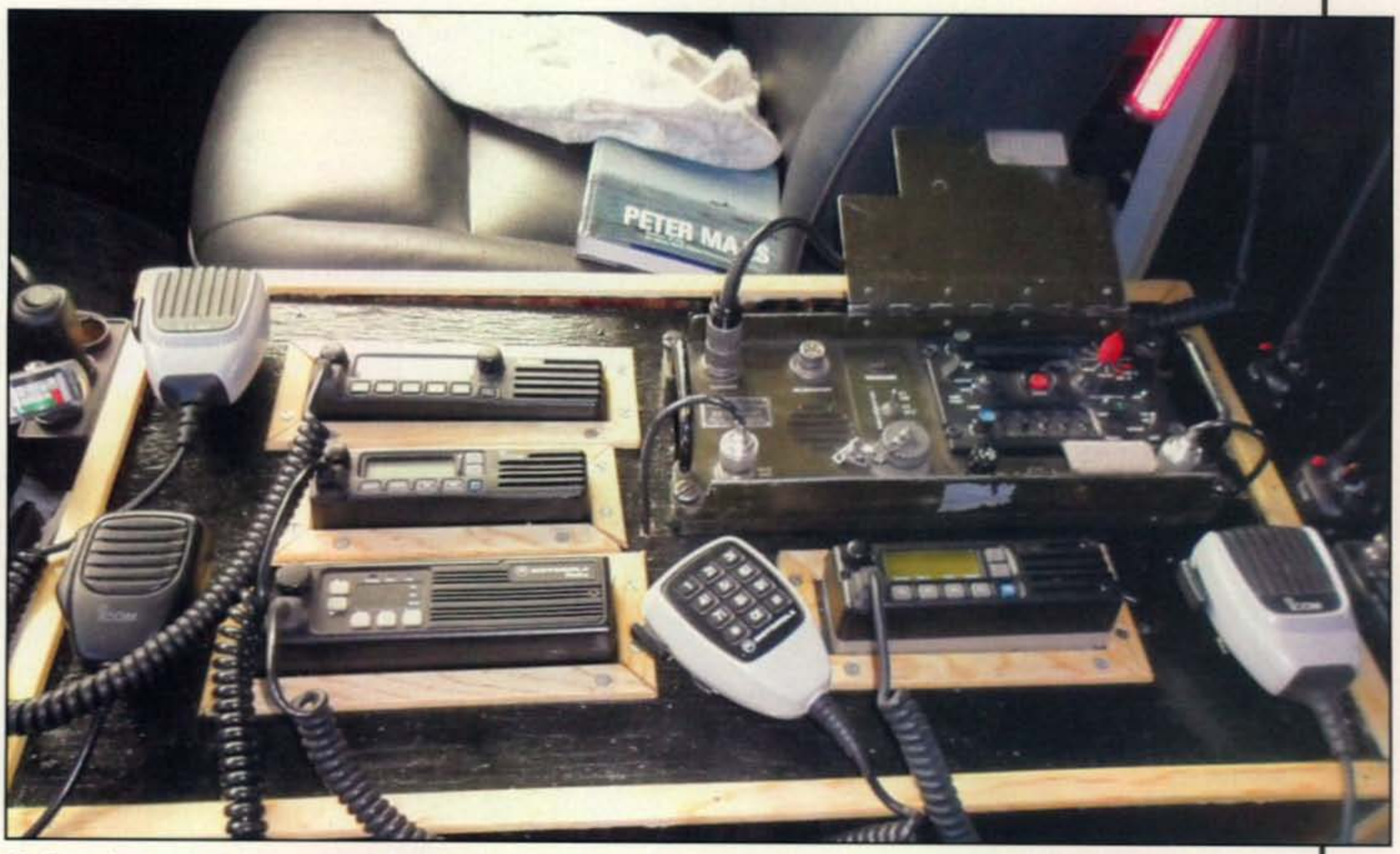
Honda was rather brief: It does not offer support for mobile radio installations as it is not a component that comes with the vehicle.

*5904 Lake Lindero Drive, Agoura Hills, CA 91301
e-mail: <aa6jr@cq-amateur-radio.com>

There was no response to my inquiries from General Motors or Chrysler.

Toyota sent a very professional response that addressed the complexities of electronics and their potential interaction. With its letter was an attachment that stated:

> Installation of a 2-way radio in Toyota vehicles should not present problems under the following conditions:
> • The transceiver must be type-accepted by the FCC, and not modified in any way.
> • Maximum output power complies with FCC regulations (100 watts).
> • All installation and operating instructions provided by Toyota and the equipment manufacturer must be followed closely.
> • The antenna must be installed as far away as possible from all vehicle electronic control modules (ECM) or other onboard computers/sensors.
> • Antenna and power cabling must not be routed along side or in conjunction with the vehicle wire harness. It is always preferable to cross vehicle harness (sic) at right angles when possible. Antenna and antenna cabling should be properly adjusted to obtain the lowest possible standing wave ratio (SWR).



Believe it or not, this impressive stack is Curt's first effort at cabinetry. Made to serve multiple roles for ham radio, commercial and volunteer fire functions, the operator has it all at his fingertips. (AL7LQ photo)

Note: Toyota repair manuals will be revised in the 1994 model year to include this information: The current "10 watts maximum power" limitation will be deleted.

It must be emphasized that, under the terms of Toyota's new vehicle warranty, any damage caused by RF energy from a higher power mobile radio is specifically excluded from coverage because it is not the result of faulty material or workmanship. Accordingly, all such responsibility is assumed by the owner."

AL7LQ's HF setup is an SG-2020 with ADSP2 installed. It's mounted on the dash and the power output is set at 10 watts PEP. That hula dancer might just catch a chill in Alaska! (AL7LQ photo)

WA7ZBO created a modular drop-in unit with his rigs and speakers nicely arranged. (WA7ZBO photo)

Ford also sent a detailed response that included a reference to a mobile radio installation guide at its public website, <www.fordemc.com>. The manual I downloaded was dated March 1998 but I can only assume the information is still valid or it wouldn't be there, right? In its response, Ford also stated, "We design and validate our vehicles will function correctly with these radio systems that use up to a 100 watt amplifier."

Ford also added, "As for hybrids and electric vehicles, the high voltage section of the vehicle is isolated on its own ground system and is heavily shielded. Also the high voltage cables run under the vehicle."

Our thanks to Toyota and Ford for their detailed responses.

Reader Experiences

Sadly, here's the experience of John Holmes, W9ILY, which is all too common:

I thought I'd drop you a line about my recent experience with a brand new 2011 Hyundai SantaFe. I discussed my need for a vehicle in which I could use my HF equipment (100 watts only) with the dealer's salesman. The salesman was never able to provide me with any info. He did arrange for me to meet their service manager for his assistance, which I did. Unfortunately, he was not at all helpful and really was not aware of anything related to my issue. The only thing that I received was a suggestion to check on YouTube for info, which I did. I found installation tips, but not for my new vehicle, of course. I sent an email to Hyundai Customer Relations explaining what I was looking for. They responded that the local service manager could provide me with the needed info, which of course was not the case. I notified Hyundai Customer Relations that I had already tried their suggestion and my results. They then suggested I try a different dealership.

I now have my new SantaFe V6 that I like very much. Generally, when we take trips, my mobile operation is not made while in motion but while parked. So, I don't think this will be a really huge issue. At least I hope not. If you discover any information from Hyundai about their requirements, I would really appreciate your passing them along.

In a relatively short amount of time, Hyundai has become a major player in the vehicle marketplace. Let's hope their customer support develops at an equally rapid rate.

North to Alaska!

At the opposite end of today's jam-packed passenger car is the versatile van, which offers "the wide open spaces" of its cavernous cargo area and

accessible roofline. Curt Law, AL7LQ, wrote to share some photos of his rig, which fills multiple roles. Curt operates a mobile radio business and serves his community's fire department as well, so both he and his van have to be excellent at multitasking.

The IC-F1721D is set to scan about 10 channels. This includes all the 2M frequencies used on Kodiak Island. The priority channel is set for the ARES repeater. The IC-F221 UHF transceiver is also scanning the ham frequencies and my company's commercial repeater. So, I can get a call from a ham or the office. The priority channel on this is set to my company's channel. The Motorola sits on the national 6M simplex frequency *(52.525 MHz—ed.)*. The AN/URC-101 scans two tower frequencies. The IC-F1020 is always on the main borough fire channel.

Space limits keep us from sharing additional photos of the two neat rows of antennas on the roof and some other details but Curt's installation seems well suited for the rugged conditions of Alaska. And serious mobile operators looking for a dedicated operations vehicle would do well to consider a new or used van for the ultimate in versatility—and elbow room.

Busy in the Beehive State

And speaking of new vehicles, Larry Jacobs WA7ZBO writes from Utah to share how he approached mounting his rigs in a new truck:

I had to switch my mobile gear over from my old truck to my new truck. After seeing the hatchet job I did on my old truck, I decided to try a modular approach. Using a shelf board from Home Depot, I mounted my two radios, MFJ power box, two speakers and LDG tuner in a one piece unit. Mounting in the truck is limited to two screws, one acting as ground connection.

A small cut in the carpet allows power in and coax out. The HF antenna is an ICOM AH-2b fed via an LDG 1:1 balun. I'm not sure if that's needed but it does make a nice terminating point.

My old truck had major strapping between body parts but new info is the isolating of body panels is (part of the) anti-corrosion plan. Still looking into this.

Good call on investigating the isolation of vehicle panels; this could be yet another new wrinkle in the list of challenges we face in mobile operations. The conventional wisdom states that vehicle panels such as doors, hood, trunk lid, exhaust pipes, pickup bed, etc., should all be electrically bonded (grounded) for quietest operations, especially on HF. If manufacturers are now isolating panels to prevent bimetallic corrosion, it could be an issue.

Great Canopy!

And if you find mobiling on the ground a bit boring, you can always join the hams at the Southgate, California ARC for some "Parachute Mobile" communications. While they always seem headed in one direction, a parachute mobile contact may be a unique QSO to enter in the logbook. Check them out at: <www.southgatearc.org/news/march2011/parachute_mobile.htm>.

That rounds out this visit. Thanks to our contributors for sharing their photos and experiences. If you'd like to join in, please send an e-mail to my address shown at the beginning of this column.

Enjoy great hamming and stay safe.

73, Jeff, AA6JR

vhf plus

BY JOE LYNCH,* N6CL

Maritime Mobile Grid Expedition to CM93

The following summary is from Barry Garratt, KS7DX, of the June 8–12, 2011 maritime mobile trip to CM93:

First, I would like to thank all the folks who sent Dennis Motschenbacher, K7BV, and me notes thanking us for doing the trip. It was an adventure, to say the least ,and we were very happy to have handed out the grid to so many people who needed it for FFMA.

Hearing Mark Ammann, KMØA, calling early Saturday morning, giving him the grid and then hearing him say it was the last one he needed ,had to be the highlight of the whole trip. When we left on Wednesday, he needed two, and to find out we gave him the last was just unbelievable!

We had planned to be in the grid late Wednesday afternoon or early evening, but we left later than anticipated and our leaving late, combined with headwinds, forced us to overnight off the coast of Santa Cruz Island. We had no way of letting anyone know we were delayed but figured everyone would know something had delayed us.

We arrived at Santa Rosa on Thursday and proceeded to set up the stations and get the 6M7JHV antenna installed. Once it was installed, we determined very quickly that it wasn't going to be very good. It was moving around a lot with the rolling of the boat and the constant wind, so we took it back down and replaced it with our spare 3-element beam. Even that antenna was moving around a lot, but with its wider pattern and shorter boom it was easier to move as the boat changed position.

Adding to our antenna problem was the fact that the boat changed position a lot! We'd no sooner get the antenna pointing east and the boat would swing on the anchor and all of a sudden the antenna was pointing west or some other oddball direction. The winds and currents didn't do us any favors. Combine those factors with QSB on the band and you begin to understand why we were loud one minute and gone the next!

Once we had the 3-element beam up, I started to check out things, set levels, etc., and in doing so I started calling Jim Skjervem, KS7S. As soon as the first TX sequence ended and I was back in receive, I heard Bruce Junkin, KI7JA, calling me. I immediately answered him and the pile-up started! There were three or four stations at a time calling, so as fast as I would work one I had another ready to go.

Looking at the log I was averaging one station every five minutes for the first hour. Not a great run-rate for SSB/CW, but not too bad for meteor scatter. I quit shortly after that and Dennis took over mainly on CW for the rest of the evening.

*e-mail: <n6cl@sbcglobal.net>

VHF Plus Calendar

August 2	Moon perigee
August 6	First quarter Moon
August 12	*Perseids* meteor shower
August 13	Full Moon
August 18	Moon apogee
August 21	Last quarter Moon
August 29	New Moon
August 30	Moon perigee

—EME conditions courtesy W5LUU

Friday morning was again very good for meteor scatter. I added more contacts to the log before Dennis took over on SSB and CW. Friday turned out to be our best day during the whole trip in terms of contacts. The band stayed open until well after midnight with lots of double hop to the East Coast.

When the band would start to dry up, Dennis switched to beacon mode and eventually someone new would call. What became abundantly clear was that the majority of signals we were hearing came from stations with stacked arrays and power. And there we sat with a lowly 3-element beam waving in the breeze!

Saturday morning, of course, was the red-letter day, with Mark KMØA being the first in the log on SSB. The opening was short lived into MO. Even so, I switched to ISCAT and worked a few in that mode with some SSB and FSK in between. Running WSJT V7 on FSK and V9 on ISCAT meant I could switch between modes quickly and that helped with the short openings. My last digital contact was with Doug, VE5UF.

After that contact I went to SSB and got ready to start the contest. Once the contest started, it was tough to hold our QRG with so much activity. I had no way of knowing how great the sporadic-*E* was except by what I was working and what I heard other stations working. I ended up having to do search & pounce to be able to work anyone. Being called by some VE3s and some W1 and W2 stations was very cool. though. Dennis took over on CW around 0045 UTC but found the band starting to fade for us.

The weather had been deteriorating all day and according to NOAA it wasn't going to get any better through the night. With the band conditions not great we decided to take a break and have supper and see how band conditions were later on. We never got the chance!

We had no sooner started to eat supper when the weather really turned on us. The anchor was holding, but the seas were getting rougher and the winds were increasing badly. In fact, the boat was rising and falling so much that the anchor chain occasionally would whip and jump the cogs in the

windlass. The latest NOAA weather forecast wasn't encouraging, with forecasted winds gusting over 50 mph and seas running 8 to 11 feet. We decided rather quickly to, as the saying goes, "get the heck out of Dodge!"

Getting the anchor up and stowed took more time and effort than any of us thought it would take. After several attempts and a frustrating moment when it jumped its guide and had to be levered back into place, it finally was stowed safely and we began heading for cover. By now it was 9:15 PM and too dark to find another anchorage, so with the wind pushing us east we decided to head for Oxnard, CA.

For the next seven hours I sat on the floor of the fly bridge navigating from the charts and GPS while Ken did his best to keep us heading in the right direction. The autopilot wouldn't hold us, so Ken had to constantly correct for the wave action and try and keep us upright. No easy task in 8-ft. plus waves and heavy wind. We were being forced more out to sea because we couldn't turn across the waves to get closer to the islands. Eventually we got some protection from Santa Cruz Island. Additionally, as we approached the eastern tip we were able to turn north and slip between it and Anacapa Island.

Once we cleared Santa Cruz and Anacapa, we were out in the Santa Barbara channel and the waves weren't quite as bad but the wind was still howling and pushing us around. Visibility eventually improved, and we could occasionally see the glow from the lights at Oxnard. Finally we got behind the seawall of the Channel Island Harbor and a pilot boat came and directed us into a temporary slip for what was left of the night. It was now 4:30 AM.

We spent the next morning getting down the antenna and mast and cleaning up the mess inside the boat. Once that was done, we transferred to another slip at the Pacific Corinthian Yacht Club for the rest of the day. We overnighted there Sunday and headed for home Monday morning. After stopping for fuel at Long Beach. we finally made it back to Seal Beach around 5 PM.

Other than the weather and lack of propagation at times it was good trip and there are 300 or so folks who no longer need CM93. As mentioned in earlier posts, QSLs go to our home addresses which are okay on QRZ.com. I've posted some pictures of the trip at the following: <http://picasaweb.google. com/VE3CDX/GridCM93xwJune2011>. Clicking a photo will make it bigger. Enjoy!

Very 73, Barry, KS7DX, Dennis, K7BV, and Ken

News from K7BV

The following are a couple of items from Dennis Motschenbacher, K7BV. First, his account that was posted on the Yahoo WSJTgroup of giving Mark Ammann, KMØA, his grid numbers 485 and 486 for the FFMA:

I think the CN-CM-DM grid trip can generally be called a success. The majority of the trip was devoted to WSJT meteor scatter because of the hours most of the traveling occurred as well as the fact that Es didn't show when it was daylight. The one exception was the two days on the CN77-78 border line where Es did appear. I started the trip as planned ugly early Monday AM. Over the next 24 straight hours, I covered several CA and OR grid border lines and individual grids. I had to grab 3 hours sleep after 28 straight hours, though.

While the actual purpose of the trip was to work in a booth at the SeaPac convention in Seaside, OR, I went up to the CN77/78 line to see if I could help KMØA, WØFY, and others from the Leader Board with these` two girds. Wednesday was a long day of only meteor scatter SSB/CW/Digital contacts and

Preparing to leave Seal Beach. From left to right: the author, Barry Garratt, KS7DX, Ken, the boat captain, and Dennis Motschenbacher, K7BV.

a few very short Es. I took the antenna down and went to the hotel about 7 PM thinking the band was dead and gone for the day. After climbing into my pajamas and bed, the phone rang. It was Mark, KMØA, calling to tell me the band was open for him into CN87 not far from me. I jumped out of bed and ran to the car. I raced back to the border-line setup spot alongside Hwy 101 and pulled the generator, antenna, and push-up mast out of the rear of the SUV. I fired up the amp and the FT-450 and then called Mark on the cell to tell him I was ready to go. We agreed on 50.090 MHz to see if the band would still support a QSO since conditions had faded. . . . I could not hear any signals on the band. As I spun the dial down to 090, I heard a series of Vs beings sent. Shoot; the frequency was in use! Hmmm, Mark, are sending Vs by any chance? Mark responded, "Yes." I said, "Well, listen to your receiver, as you are gonna like this! A few moments later, Mark had grids numbers 485 and 486 in the log.

I worked a few more guys, primarily in MO, before the band appeared to close. I did have one very strong QSO with K7TNT during the MO QSOs ,confirming the fact that WY was the first hop for me, with MO being the second footprint. I kept the CQ beacon going and did manage to scare up a few other QSOs before it truly was wrung out for the night. Thursday had a number of short Es openings in the morning and then a long opening in the late afternoon and evening south to CA, NM, and most of the 7th call area.

Thanks for the fun, everyone. I will answer cards after getting back from the CM93 boat gird trip.

Second are two short excerpts from Dennis's blog concerning his bout with cancer: <http://k7bvcancer.blogspot.com/>:

Officially Cancer Free – Life is Good!

I simply do not know what to say or even what to think, for that matter: I am cancer

On the Cover...

Steppin' out ... for James Archer, N3ZS/5Z4FV, of Elverson, Pennsylvania, accessing his 55-foot automatic crank-up Tri-Ex tower is as easy as stepping off his roof! Of course, if he were doing it for real, James would be wearing all of the necessary climbing and safety equipment. At the top of the tower are a Telrex 5-element, 15-meter monobander (at 60 feet) and a Cushcraft A3WS dual-bander for 12 and 17 meters (at 70 feet).

Inside his shack, James runs a Yaesu FT-990 transceiver and an Alpha Power 91B amplifier. He focuses almost exclusively on DXing and is working toward a spot on the DXCC Honor Roll. He currently has 301 countries confirmed.

Born and raised in Kenya, James grew up in Uganda, then returned to Kenya as a teenager to work as a pilot for that country's national parks. He received his first ham license in Kenya, on the strength of his pilot's license, for which you needed to pass a Morse code test and be able to repair your plane's radios. James recalled that he went to the licensing agency in his pilot's uniform and the clerk there told him, "If you can fly an airplane, you can operate a radio," and issued him his ham license!

Today, James works as an international environmental engineer, helping Fortune 500 companies "to meet their global environmental challenges." While he has lived in the US for the past 20 years, much of his time has been spent on the road, so far working in 48 of the 50 states and 60 different countries. His career isn't leaving much time for ham radio or flying at the moment, but he did make time back in 1991 to lead the 5X1DX expedition, which was the first DXpedition to Uganda after 20 years in which no ham radio was permitted there. "That was so much fun," he said. "One of the greatest things you can do in amateur radio is go on a DXpedition." *(Cover photo by Larry Mulvehill, WB2ZPI)*

KS7DX—two versions of WSJT running, V7 on the left and V9 on the right. The ICOM 706MKiiG is running HF and 2 meters. The 6-meter antenna is in use on the upper deck, which is why there is an open port on the Bird wattmeter. The duct tape on the side of the RigBlaster is for an emergency repair for the power supply.

The maritime mobile QTH, Loon's Call, anchored off Santa Rosa Island.

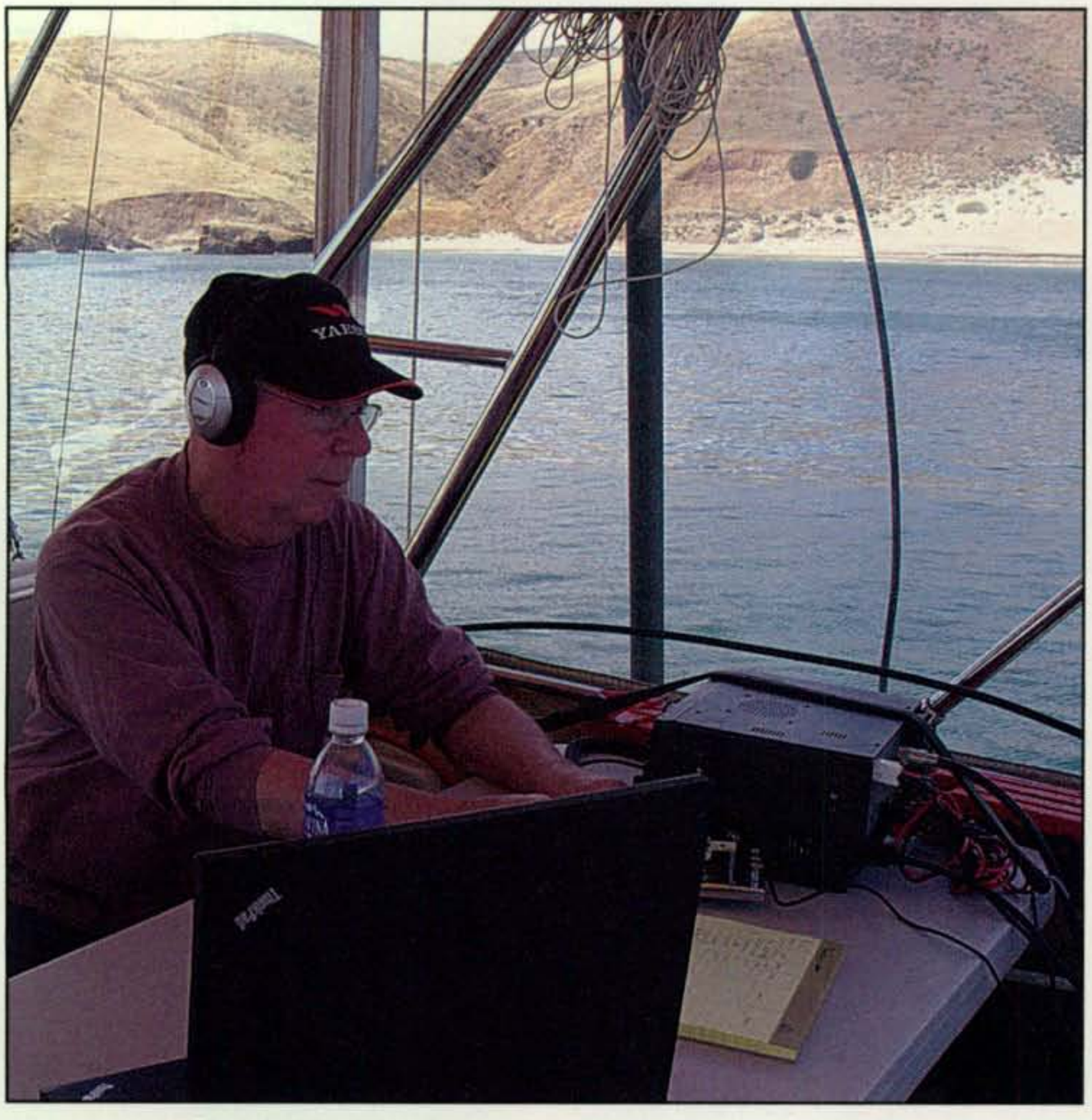
free. Such a short, simple four-word sentence. Yet there is not a football coliseum big enough to contain all that those words represent to me in past history and future that can now unfold.

Thank you for all you have given of yourselves so I can live today. I will keep you informed of my slooooooow but sure recovery progress. Hugs and kiss for all . . . even those ugly Ham Radio buddies, hi.

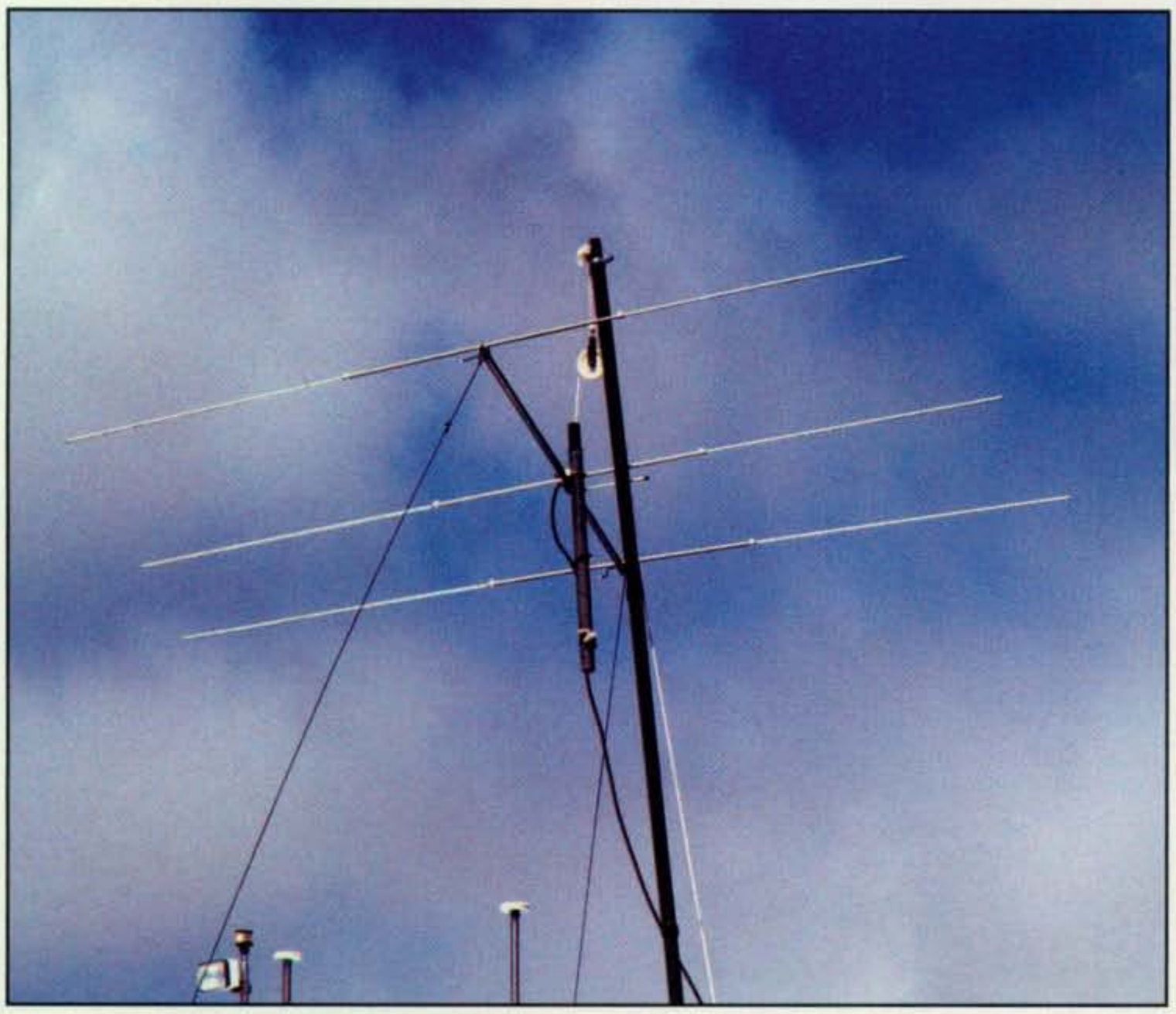
W7GJ to Activate Western Samoa this Month

Lance Collister, W7GJ, will activate Western Samoa on EME this month. In preparing for this column, complete details can be found at: <http://www.bigskyspaces.com/w7gj/Samoa2011.htm>. I asked him if he had anything he wanted to tell us in our preparing for his trip. Here is his response:

I really appreciate whatever exposure I can get! I am *amazed* at the number of good 6-meter stations *who have WSJT capability* and still do not know about this opportunity to snag a rare one! I think the important thing to get across is that if you have *good*



Dennis Motschenbacher, K7BV, working the pile-ups.



The reliable, spare 3-element beam.

ground gain (a flat, clear area west of your antenna), and an amplifier, you have a very good chance of completing with me during your moonset! The smallest station I worked on the last two DXpeditions was N3CXV with his 6M5X Yagi. Ground gain where the antenna is installed is a *very* significant part of the equation in whether there will be enough overall gain to make the half-million mile trip to the moon and back.

Please sign in on the ON4KST EME chat page and find out where the other stations are calling so you can spread out with 200 Hz between each other. *[Editor's note: First time access to the ON4KST chat page requires a quick registration.]* Also, please read the procedure notes on my web page: <http://www.bigskyspaces.com/w7gj/jt44.htm>. There will not be much time to work horizon-only stations and we will have to try to do it as smoothly as possible.

I made 26,000,000 miles worth of contacts on 6 meters last fall from Fiji. I hope to hand out a new DXCC to many 6-meter DXers again this time. *Thanks again and VY 73, Lance.*

W7EME to Activate BL02

Jeremy Alexander, W7EME, plans to activate BL02 in Hawaii between July 31 and August 9, 2011. He will be QRV on 144.141 MHz, ±EME, using second sequencing. He will be using 1 KW, with two 17-element long Yagis.

A New "The World Above 50 MHz" Editor

Effective with th August column, Jon Jones, NØJK, has become the new editor of "The World Above 50 MHz" column in *QST*. Jones succeeds Gene Zimmerman, W3ZZ, who held the post for nearly ten years, concluding with last month's column. Your editor congratulates Gene for his excellent work during his tenure and looks forward to working with Jon in the future.

New Weak-Signal Records

The following is from *DUBUS*:

In Vol. 40, First Quarter issue is the following report. New Tropo World Record: On February 7, 2011 DL7QY in JN59BD and F6DKW in JN18CS completed a 579 km QSO on 24 GHz, eclipsing the previous record of 543 km, which took place on September 7, 2002 between W5LUA in EM13QC and WW2R/5 in EM41HC.

In Vol. 40, Second Quarter issue is the following report. New World Record on 76 GHz: On March 8, 2011 DL2AM, DL2GWZ, and DJ5AP made a 228 km contact on 76 GHz between Zugspitz (JN57LK) and Feldberg (JN47AU). This record eclipses the previous record of

177 km set by AD6FP, KF6KVG, and WØEOM.

COØOM QSL Route

Arnie Coro, CO2KK, advises that he will relay QSL cards that he receives at his post office box to CO3JY, the QSL manager. Arnie's postal address is: Prof. Arnaldo Coro Antich, P.O. Box 6363, Ciudad de la Habana 10600, Cuba. Arnie states that one should not include currency with the QSL card. However, IRCs will be accepted.

Silent Keys

The following amateurs have been reported as Silent Keys: Jon Casamajor, K6EL, and Cor Maas, VE7BBG. Their passing has left a sense of loss for their friends and amateur radio in general.

Current Contests

There are two important contests of note: The **ARRL UHF and Above Contest** is scheduled for August 7–8. Complete rules can be found in the July issue of *QST*. The first weekend of the **ARRL 10 GHz** and above cumulative contest is scheduled for August 21–22. The second weekend is September 18–19. Complete rules for this contest also can be found in the July issue of *QST*.

Current Hamfest

The annual **Huntsville, Alabama, Hamfest** will be held August 20–21 at the usual South Hall of the convention center in Huntsville. There are several VHF-related forums scheduled. For more information, see: <http://www.hamfest.org/>.

Calls for Papers

Calls for papers are issued in advance of forthcoming conferences either for presenters to be speakers, or for papers to be published in the conferences' *Proceedings*, or both. For more information, questions about format, media, hardcopy, email, etc., please contact the person listed with the announcement. The following conference organizer has announced a call for papers for its forthcoming conference:

Technical papers are solicited for presentation at the **30th Annual ARRL and TAPR Digital Communications Conference** to be held September 16–18 in Baltimore, Maryland, and publication in the conference *Proceedings*. Presentation at the conference is not required for publication. Submission of papers is due by July 31, 2011 and should be submitted to: Maty Weinberg, KB1EIB, ARRL, 225 Main Street, Newington, CT 06111, or via the internet to <maty@arrl.org>. For suitable topics and submission guidelines also contact Maty via e-mail, plus check <http://www.arrl.org>.

Meteor Showers

Beginning around July 17 and lasting until approximately August 24, you will see activity tied to the *Perseids* meteor shower. Its predicted peak is August 13, 2011 between 0100–1330 UTC. The κ-*Cygnids* meteor shower is expected to peak on August 18. The visually-impossible γ-*Leonids* is expected to peak August 25, around 1600 UTC. However, this shower may have gone dormant. The α-*Aurigids* is expected to peak around September 1.

For more information on the above meteor shower predictions, see Tomas Hood, NW7US's propagation column elsewhere in this issue. Also visit the International Meteor Organization's website: <http://www.imo.net/calendar/2011>.

And Finally . . .

With this column I begin my 21st year as the editor of this, your column. I am glad to report that there is lots of good news this month. I thank everyone who has contributed to the plethora of news this month and over the past 20 years. I look forward to receiving your input in the coming months and years.

Until next month…73 de Joe, N6CL

awards

BY TED MELINOSKY,* K1BV

County Hunters Aid Tornado Victims, plus IARU Awards

April and May 2011 saw a series of deadly tornadoes strike the central and southeastern United States. A force 3 storm (winds of from 150 to 165 mph) struck well-known county hunter Hollis Thigpen, KC3X, of Snow Hill, North Carolina on Saturday, April 16th. The storm completely destroyed his home, a second structure, his tower and antenna, plus several vehicles. Hollis and his wife Sandy, W4SMT, were in the house when the tornado struck, but survived uninjured.

In short order, members of Hollis's local radio club, the Brightleaf Amateur Radio Club, and many county hunters started to collect donations to help Hollis cover the many items lost in the tornado that regular insurance does not cover. The effort was coordinated by Bill Pedersen, KM1C, and Dave Langley, W4YDY. At the time this column was written (in late May 2011), the amount collected was estimated to be in excess of $6000. This includes at least three individual contributions of $500.

KC3X earned USA-CA #538 in 1987, and earned the subsequent 2nd , 3rd, 4th, and 5th Time Around awards offered by the Mobile Amateur Radio Awards Club (MARAC).

The heart-warming generosity of the County Hunter fraternity was displayed for one of its own in a terrible natural disaster. This shows how just one group, among many, of ham radio operators can come together and help those in need.

USA-CA Honor Roll

500

VE3EK	3540
K8DV	3541
ON4RO	3542

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.

IARU Awards

Begun in Paris, France, the International Amateur Radio Union (IARU) has been the watchdog and "spokesman" for the world amateur radio community since 1925. The IARU Constitution, last amended in 1989, organizes the Union into three Regional Organizations that correspond with the three radio regions of the International Telecommunication Union (ITU).

The IARU represents the political and administrative side of the hobby, and is not really well known by many amateurs, who are more interested in operating than in legalities. One of the tools used by the IARU to publicize its background role was the creation of awards which require contacting specified numbers of its member countries, sort of like a DXCC for each region. Note that in the list of countries shown for each of the three awards, some countries within the region are not active members of the IARU, and consequently are not valid for the award.

Region I Award—Administered by the Radio Society of Great Britain (RSGB). Contact the required number of stations in countries whose national societies are members of the Region I Division of the IARU. This award may be endorsed for a single mode or band including 2 or 6 meters, and for contacts made by satellite.The three classes are:

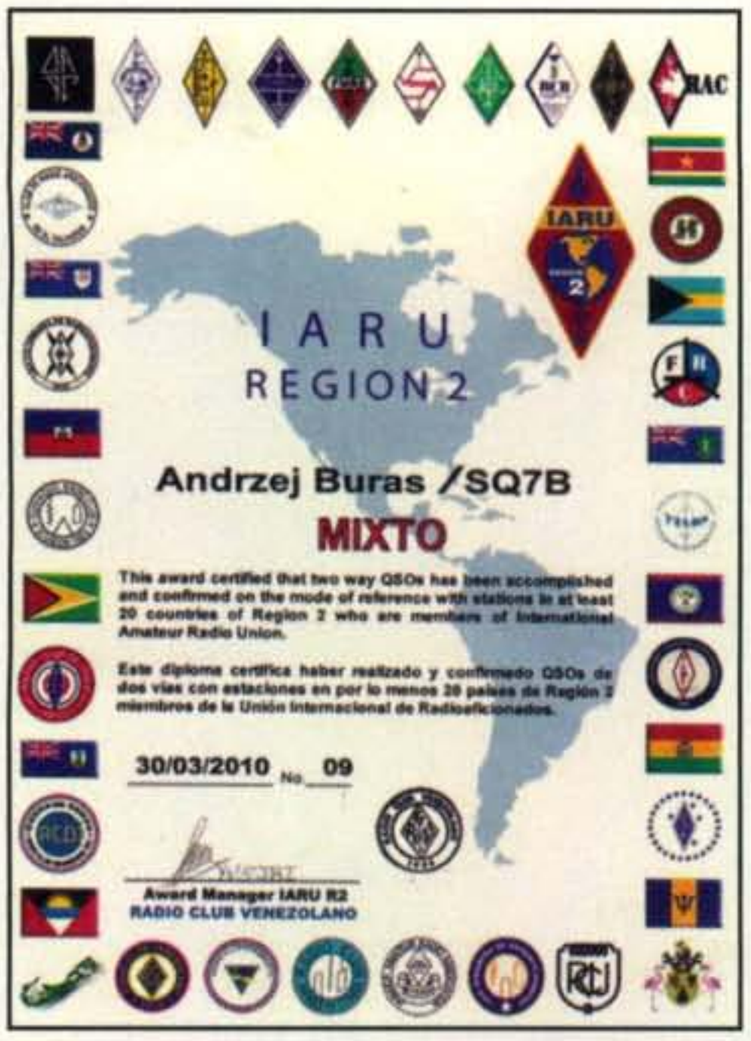
Class 1—All member countries on the current list
Class 2—60 member countries
Class 3—40 member countries.

A special version of the award is available, in the same three classes, for confirmed contacts on the 28-MHz band since July 1, 1983.

Submit a list of countries in prefix order, callsign, and all QSO details. including band, mode, etc. A special application form is available via e-mail or SASE from the HF Awards Manager listed below. Please note that a certified list signed by the applicant and his/her national society awards manager confirming QSL cards are held must be submitted for all Class 1 applications. For Class 2 and Class 3 awards, General Certification Rules apply; General Certification by two radio amateurs or local club officials stating the QSLs have been examined is satisfactory proof. Please note e-QSLs are not

The IARU Region I Award is administered by the Radio Society of Great Britain.

*12 Wells Woods Rd., Columbia, CT 06237
e-mail: <k1bv@cq-amateur-radio.com>



The Radio Club Venezolano sponsors the IARU Region II Award.

acceptable as proof of a QSO. Cost of this award is US$6, 6 Euros, or £3 UKP.

RSGB HF Awards Manager: John Dunnington, G3LZQ, Box-36, Gilberdyke, East Yorkshire, HU15 2WX England. Internet: <http://www.rsgb.org/spectrumforum/hf/hfawards/iarureg1.php>.

Countries of IARU Region I: 3A, 3B, 3C, 3DA, 3V, 4L, 4O, 4X, 5B, 5H, 5N, 5X, 5Z, 6W, 7P, 7X, 9A, 9G, 9H, 9J, 9K, 9L, 9Q, A2, A4, A6, A7, A9, C3, C5, C9, CN, CT/CU/CT3, DL, EA, EI, EK, EL, ER, ES, ET, EU, EY, EZ, F/TK, G/GI/GJ/GM/GU/GW, HA, HBØ, HB9, I/ISØ, J2, JT, JY, LA, LX, LY, LZ, OD, OE, OH/OHØ/OJØ, OK, OM, ON, OY, OZ, PA, R, S5, SM, SP, SU, SV, T7, T9, TA, TF, TJ, TN, TR, TU, TZ, UN, UR, V5, XT, YI, YK, YL, YO, YU, Z2, Z3, ZA, ZB2, ZS.

Region II Award—Administered by Radio Club Venezolano (RCV). The IARU Region II sponsors and the Radio Club of Venezuela administers this award for contacting at least 20 countries or entities of the 44 which comprise IARU Region II. Contacts on or after April 16, 1964. The official application form IARU Region II provides must be used; located on the internet site <http://www.iaru-r2.org>.

The application must be sent together with a certification from an IARU Member Society authorized person (i.e., an official DXCC or WAC card checker, your country's award manager, etc.) that your cards have been checked. If this is not possible, it will be mandatory to provide a photocopy of both sides of the QSLs valid for the award. Electronic verifications are not accepted.

The Region II countries are: Anguilla, Antigua, Barbuda, Argentina, Aruba, Bahamas, Barbados, Bermuda, Bolivia, Brazil, Canada, Cayman Islands, Chile, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, Ecuador, El Salvador, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Montserrat, Netherland Antilles, Nicaragua, Panama, Paraguay, Peru, Puerto Rico, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Suriname, Trinidad and Tobago, Turks and Caicos Islands, United States (including Alaska), Uruguay, and Venezuela.

The award may be endorsed for all Mixed, Phone, CW, Digimodes, or Satellite. Contacts may be made on the amateur bands 160 through 6 meters, endorsable for any single band or mixed bands. All contacts must have been made from the same country and must be two-way QSOs. No use of cross-mode operation, except for satellite.

Up to a four-month delay may be expected to receive the award. Send the application, cards, or copies and fee of $US10 or 10 current IRCs. Mail application to: Radio Club Venezolano, Award Manager IARU-R2, PO Box 20285 Caracas 1020-A, Venezuela. E-mail: <awardmanager@iaru-r2.org>; internet: <http://www.iaru-r2.org>.

Region III—Administered by the New Zealand Amateur Radio Transmitters (NZART). Contact stations in member countries after April 5, 1982. The basic award requires seven Region III areas; Silver endorsement 15 areas; Gold endorsement 20 areas.

Eligible countries list: Australia, Bangladesh, Brunei, China (PRC),

The Region III Award is sponsored by the New Zealand Amateur Radio Transmitters group.

Chinese Taipei (Formosa), Fiji, French Polynesia (FO8 only), Hong Kong, India, Indonesia, Japan, Korea, Macau, Malaysia, Myanmar, New Caledonia, New Zealand, Pakistan, Papua New Guinea, Philippines, Pitcairn Islands (VR6), Samoa, Singapore, Solomon Islands, Sri Lanka, Thailand, Tonga, Vanuatu and Vietnam. (One contact per country allowed.) Plus one or more country credits from U.S. territories in the Pacific: Guam, Northern Marianas, American Samoa, Wake Island, Baker Howland Group, as represented by the ARRL; or one from Chagos Archipelago (VQ9), represented by RSGB. Current total of available "countries" is 31.

Apply to: NZART Awards Manager, PO Box 1733, Christchurch Mail Centre, Christchurch 8140, New Zealand. Internet: <http://www.nzart.org.nz/assets/awards/iaru-region-iii-log.pdf>.

We're always on the hunt for new awards to feature in these pages. I invite your e-mails to the address shown on the first page of this column.

73, Ted, K1BV

DX News, Six Meters, and QSLing

BY CARL SMITH,* N4AA

It's been a fairly quiet summer DX season so far. The Sun has been playing games with us. The on-again, off-again status of activity on the Sun has many wondering what the heck is going on. Frankly, I don't think anyone knows, and definitely not for sure. They seem to be "guessing" (although with knowledge as far as that is deemed possible as far as nature goes), kind of like those who predict the end of the world. Therefore, we'll just have to wait it out for the Sun to finally do whatever it's going to do. For now, then, just make the most of whatever we have in the way of propagation and be thankful we have that.

Hams keep asking me when this country or that country is going to be on the air. I only wish I could answer all those questions. There are some that we just know are not going to be on for the foreseeable future. Places such as Yemen and North Korea are not going to be granting permission for any activity that I can foresee. There are some on the African continent that won't be seeing much, if any, action any time soon either. Entities such as Libya, Sudan, and Somalia are off the table, in my opinion. However, that is my opinion, and everyone is entitled to their own opinion.

DX News, Old and New

There were some trips announced too late to get them in the July column. Stan, SQ8X, took a team to **Jan Mayen** as **JX5O**. Ron, WA8LOW, and a few of his friends were set to operate from **KH8**, **American Samoa** the end of July into the first two weeks of August. Members of the Hellenic ARA of Australia were active from **Lord Howe** as **VK9HR** in mid-July, too.

ET3AA in **Ethiopia** got good news for the antenna system in May. The club station was updated with a new 17-element log periodic antenna covering 6–30 MHz. Professor Doctor Schroeder, the head of the Tech Faculty at the University of Addis Ababa, Ethiopia, and Hans Timmerman, President of IARU Region I, cut the ribbon for the opening the "new" hamshack. The antenna update was the result of donations from Support to The Amateur Radio Service (STARS) and individuals through the efforts of Sid, ET3SID. By the end of July the Ethiopian Amateur Radio Society (EARS) hoped to have more than 25 members taking the radio exam for that country.

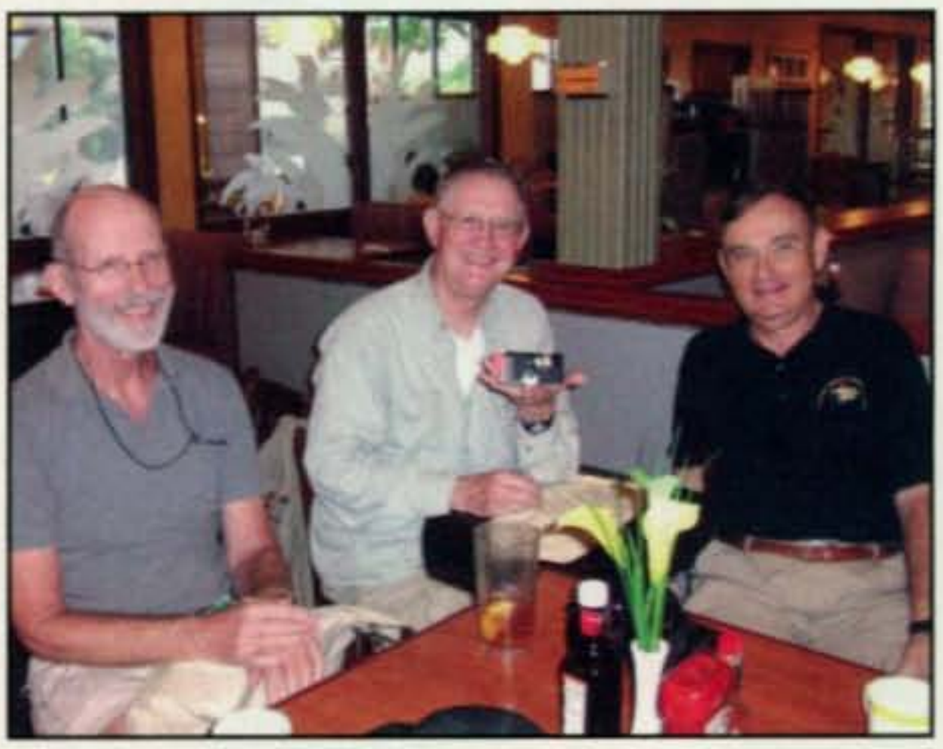
E4, Palestine! Even with all of the unrest in the Middle East, there is a report that HB9IQB has been granted a license to operate from Palestine during the second and third weeks of December 2011. Time will tell if this really happens.

Other activities announced for time periods later in the year and into early 2012 are:

4W6A, Timor Leste for September
3D2/R, Rotuma for September/October
YJ, Vanuatu for September/October
9N, Nepal for November
C21AA, Nauru for November/December
HKØNA, Malpelo for February 2012

In addition, after all the time and effort spent to put together a DXpedition to **Midway, KH4**, a new

*P.O. Box DX, Leicester, NC 28748-0249
e-mail: <n4aa@cq-amateur-radio.com>



Rick, AI5P, spent some time on Pacific islands and on his way home stopped in Hawaii. Here he is having breakfast with local DXers. Left to right: Bill, KH6OO, Rick, and Dan, KH6P. (Photo by Tets, AH7C, and sent courtesy of Dan, KH6P)

These are the ops who put Mayotte on the air in April as TO2FH. Left to right are: Fernando, PY4BZ; Alex, PY2WAS; and Ric, PY2PT. They reported 11,300 QSOs in the six-day operation. Equipment failure prevented them from working digital modes. (Photo courtesy of Ric, PY2PT)

The WPX Program

CW

3267 .....UA3QNS
3268 .....UA1TGQ

SSB

3096 .....I6DVX
3097 .....WDØBMS
3098 .....UA3QNS
3099 .....UA9YF

Mixed

2154 .....ZL3PAH
2155 .....UA3RAB
2156 .....ZS6GRL
2157 .....YI1RZ
2158 .....UA3QNS
2159 .....I8JIT
2160 .....PAØQRB

Digital

56 .....ZS6GRL
57 .....VA7CRZ
58 .....KI3F
59 .....R9OSN

CW: 500 UA1TGQ. 650 UA3QNS. 800 JH6JMM. 3300 KF2O. 3600 WA5VGI. 4600 N5NO.
SSB: 450 I6DVX. 500 WDØBMS. 550 N4GOA. 600 UA9YF. 650 UA3QNS. 2750 WA5VGI. 3600 KF2O.
Mixed: 500 UA3RAB, YI1RZ, I8JIT. 650 PAØQRB. 850 ZS6GRL. 1100 UA3QNS. 4150 WB2YQH. 4200 ON4CAS. 4500 KF2O. 5200 N4NO.
Digital: 800 KF2O. 850 ZS6GRL.

160 meters: UA3QNS
80 meters: UA3QNS
40 meters: ZL3PAH, UA3QNS
20 meters: ZS6GRL, UA3QNS
15 meters: ZS6GRL, UA3QNS
10 meters: UA3QNS

Asia: UA3QNS
Africa: UA3QNS
Europe: UA3QNS, R9OSN
Oceania: UA3QNS
N. America: UA3QNS
S. America: UA3QNS

Award of Excellence: AG4W, UA3QNS
160 Meter Bar: AG4W, UA3QNS
Digital Bar: AG4W

Award of Excellence Holders: N4MM, W4CRW, K5UR, K2VV, VE3XN, DL1MDD, DJ7CX, DL3RK, WB4SIJ, DL7AA, ON4QX, 9A2AA, OK3EA, OK1MP, N4NO, ZL3GO, W4BQY, IØJX, WA1JMP, KØJN, W4VQ, KF2O, WB8CNL, W1JR, F9RM, W5UR, CT1FL, WA4QMQ, W8ILC, VE7DP, K9BG, W1CU, G4BUE, N3ED, LU3YL/W4, NN4Q, KA3A, VE7WJ, VE7IG, N2AC, W9NUF, N4NX, SMØDJZ, DK5AD, WD9IIC, W3ARK, LA7JO, VK4SS, I8YRK, SMØAJU, N5TV, W6OUL, WB8ZRL, WA8YTM, SM6DHU, N4KE, I2UIY, I4EAT, VK9NS, DEØDXM, DK4SY, UR2QD, AB9O, FM5WD, I2DMK, SM6CST, VE1NG, I1JQJ, PY2DBU, HI8LC, KA5W, K3UA, HA8UB, HA8XX, K7LJ, SM3EVR, K2SHZ, UP1BZZ, EA7OH, K2POA, N6JV, W2HG, ONL-4003, W5AWT, N3XX, HB9CSA, F6BVB, YU7SF, DF1SD, K7CU, I1POR, K9LJN, YBØTK, K9QFR, 9A2NA, W4UW, NXØI, WB4RUA, I6DQE, I1EEW, I8RFD, I3CRW, VE3MS, NE4F, KC8PG, F1HWB, ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, KC7EM, YU1AB, IK2ILH, DEØDAQ, I1WXY, LU1DOW, N1IR, IK4GME, VE9RJ, NN1N, HB9AUT, KC6X, N6IBF, W5ODD, IØRIZ, I2MQP, F6HMJ, HB9DDZ, WØULU, K9XR, JAØSU, I5ZJK, I2EOW, IK2MRZ, KS4S, KA1CLV, WZ1R, CT4UW, KØIFL, WT3W, IN3NJB, S50A, IK1GPG, AA6WJ, W3AP, OE1EMN, W9IL, I7PXV, S53EO, DF7GK, S57J, EA5BM, DL1EY, DJ1YH, KUØA, VE2UW, 9A9R, UAØFZ, DJ3JSW, OE6CLE, HB9BIN, N1KC, SM5DAC, RW9SG, WA3GNW, S51U, W4MS, I2EAY, RAØFU, CT4NH, EA7TV, W9IAL, LY3BA, K1NU, W1TE, UA3AP, EA5AT, OK1DWC, KX1A, IZ5BAM, K4LQ, KØKG, DL6ATM, VE9FX, DL2CHN, W2OO, AI6Z, RU3DX, WB9IHH, CT1EEN, G4PWA, OK1FED, EU1TT, S53MJ, DL2KQ, RA1AOB, KT2C, UA9CGL, AE5B, KØDEQ, DKØPM, SV1EOS, UAØFAI, N4GG, UA4RZ, 7K3QPL, EW1CQ., UA4LY, RZ3DX, UA3AIO, UA4RC, N8BJQ, UA3BS, UA9FGR, UT3UY, WA5VGI, UT9FJ, UT4EK, K9UQN, UR5FEO, LY2MM, N3RC, OH3MKH, RA3CQ, UT3IZ, S55SL, RU3ZX, YO9HP, RA3DNC, K8ZT, KE5K, JH8BOE, TF8GX, S58MU, UX1AA, AB1J, DM3FZN.

160 Meter Endorsements: N4MM, W4CRW, K5UR, VE3XN, DL3RK, OK1MP, N4NO, W4BQY, W4VQ, KF2O, W8CNL, W1JR, W5UR, W8ILC, K9BG, W1CU, G4BUE, LU3YL/W4, NN4Q, VE7WJ, VE7IG, W9NUF, N4NX, SMØDJZ, DK5AD, W3ARK, LA7JO, SMØAJU, N5TV, W6OUL, N4KE, I2UIY, I4EAT, VK9NS, DEØDXM, UR2QD, AB9O, FM5WD, SM6CST, I1JQJ, PY2DBU, HI8LC, KA5W, K3UA, K7LJ, SM3EVR, UP1BZZ, K2POF, IT9TQH, N6JV, ONL-4003, W5AWT, N3XX, F6BVB, YU7SF, DF1SD, K7CU, I1POR, K9LJN, YBØTK, K9QFR, W4UW, NXØI, WB4RUA, I1EEW, ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, YU1AB, IK4GME, NN1N, W5ODD, IØRIZ, I2MQP, F6HMJ, HB9DDZ, K9XR, JAØSU, I5ZJK, I2EOW, KS4S, KA1CLV, KØIFL, WT3W, IN3NJB, S50A, IK1GPG, AA6WJ, W3AP, S53EO, S57J, DL1EY, DJ1YH, KUØA, VR2UW, UAØFZ, DJ3JSW, OE6CLD, HB9BIN, N1KC, SM5DAC, S51U, RAØFU, CT4NH, EA7TV, LY3BA, K1NU, W1TE, UA3AP, OK1DWC, KX1A, IZ5BAM, DL6ATM, W2OO, RU3DX, WB9IHH, G4PWA, OK1FED, EU1TT, S53MJ, DL2KQ, RA1AOB, UA9CGL, SM6DHU, KØDEQ, DKØPM, SV1EOS, N4GG, UA4RZ, 7K3QPL, EW1CQ, UA4LY, RZ3DX, UA3AIO, UA4RC, N8BJQ, UA3BS, UA9FGR, UT3UY, WA5VGI, UR5FEO, N3RC, UT3IZ RU3ZX, YO9HP, RA3DNC, K8ZT, KE5K, JH8BOE, S58MU, UX1AA, DM3FZN.

Complete rules and application forms may be obtained by sending a business-size, self-addressed, stamped envelope (foreign stations send extra postage for airmail) to "CQ WPX Awards," P.O. Box 355, New Carlisle, OH 45344 USA. Note: WPX will now accept prefixes/calls which have been confirmed by eQSL.cc. Other electronic QSL confirmation means are not accepted.

*Please Note: The price of the 160, 30, 17, 12, 6, and Digital bars for the Award of Excellence are $6.50 each.

CQ DX Awards Program

SSB

2569 .....WA4NEL

SSB Endorsements

340 .....I8KCI/341
340 .....W7OM/340
330 .....W9SS/339
320 .....KD5ZD/328
320 .....WØROB/324
275 .....N3KV/290
275 .....WD8EOL/282
275 .....IWØHOU/278
3.5/7 MHz WA4NEL

CW Endorsements

330 .....W7OM/339
330 .....N7WO/332

RTTY Endorsements

330 .....NI4H/339

The basic award fee for subscribers to *CQ* is $6. For non-subscribers, it is $12. In order to qualify for the reduced subscriber rate, please enclose your latest *CQ* mailing label with your application. Endorsement stickers are $1.00 each plus SASE. Updates not involving the issuance of a sticker are free. All updates and correspondence must include an SASE. Rules and application forms for the CQ DX Awards may be found on the <www.cq-amateur-radio.com> website, or may be obtained by sending a business-size, self-addressed, stamped envelope to CQ DX Awards Manager, Billy Williams, N4UF, Box 9673, Jacksonville, FL 32208 U.S.A. We recognize 341 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.

Communications Officer was assigned to the island by the U.S. Fish and Wildlife Service. He is Joe, W5FJG, and he will be active from Midway for about a year. He had minimal equipment when he arrived but is expanding his station. He has an IC-7000 and an R5 vertical antenna. As soon as a much-needed power supply gets out there, he will be more active on the air. Early reports only reflect SSB operation. There is no indication if he can/will be working any CW while there.

Six-Meter Activity

Six meters is getting a lot of attention. With more and more radios coming out with 6 and even higher VHF/UHF bands, "built-in" folks are taking an interest in using those bands. Also, this time of year, 6 meters gets very active. I am getting a large number of reports from U.S. DXers who are working some pretty fair DX on the "Magic Band." With the sun playing its games, the Magic Band is holding its own and providing a lot of fun and many "counters" for VHF DXCC, the DX Challenge, and other

awards. Have you tried it? Maybe it's time you did!

QSLing and LoTW, via G3TXT

I received an interesting paper from Nigel, G3TXT, a well-known DXpeditioner, on the subject of QSLing and the ARRL's Logbook of The World. Here's what Nigel had to say:

LoTW:
The unintended consequences?

By Nigel, Cawthorne, G3TXF

Any new development, however successful, can bring with it unintended consequences. The DX-Cluster is arguably one of the contributory causes for much of today's poor pile-up operating behavior, and even worse, the outlandish radio *thuggery* of the D-QRMers. A complete litany of the unintended consequences of the internet as a whole is just too long to list, but probably starts with large-scale global-crime and ends with your junk mail.

The introduction of the ARRL's Logbook of The World (LoTW) is without doubt one of the most significant operational innovations for HF DXers of the past decade. The ability to be able to upload your log and automatically receive credits for the ARRL's DXCC and Worked All States (WAS) awards has revolutionized these major DX programs. Getting credits for many of the current total of 3,400 potential band-slots of the ARRL's DX Challenge is made so much easier by using LoTW.

Traditionally, the submitting of paper QSLs to either a local DXCC Checker, or to ARRL Hq., has always been part of the administrative process of keeping your DXCC score up to date. With the rapid expansion of LoTW, an ever-increasing proportion of DXCC claim updates are made using paperless "LoTW credits." In my own case, recent DXCC update submissions have been about half-and-half—i.e., 50% paper QSLs and 50% LoTW credits, but with the LoTW element becoming more significant with each submission.

However, despite the welcome increase in LoTW activity, traditional QSL cards still have an important role to play in the world of Amateur Radio and DX awards. Remember that LoTW only works for the awards run by the ARRL. Other major DX operating award programs such as the RSGB's IOTA and Commonwealth Awards, as well as the award programs of all other national societies (apart from the ARRL), are not catered to in LoTW.

Speedy LoTW up-loads are always good news. More and more ultra-friendly DXpeditions are uploading their logs to LoTW, if not "live" during the operation then immediately after they return home. There's a discernible warm glow of gratitude generated amongst the whole DX-community whenever a major DXpedition uploads its logs to LoTW within days of the end of the operation. On the other hand, the LoTW foot-draggers who argue that they want to withhold uploading their logs, be it for three months, six months, or even a year, based on some confused reasoning that they will somehow be missing out on their precious "QSL dollars" just leaves a sour taste.

One of the "unintended consequences" of LoTW has therefore been the debate over the timing of uploads following a DXpedition. LoTW upload timings currently range between "instantaneous" and "never," with some "LoTW foot dragger" DXpeditions hovering around six months. Hopefully over time the immediate uploading of logs to LoTW at the end of a DXpedition will become standard practice. DXers the world over are massively grateful (just see the numerous positive comments on the CDXC reflection) to DXpeditions that upload their logs immediately.

LoTW's threat to QSLing. However, another unintended consequence of LoTW is possibly more serious, as it threatens one of the longest traditions of the hobby of Amateur Radio: the QSL Card. To put it bluntly, more and more operations are using LoTW as an "excuse" not to reply to requests for paper QSLs. Just look on QRZ.com. You will find an ever-increasing number of stations (be they DXers, contesters, or even some small DXpeditions)

5 Band WAZ

As of June 1, 2011, 848 stations have attained the 200 zone level and 1733 stations have attained the 150 zone level.

New recipients of 5 Band WAZ with all 200 zones confirmed:

RW3PZ N8BJQ RAØFF R7AY

The top contenders for 5 Band WAZ (zones needed, 80 or 40 meters):

N7US, 199 (18)
N4WW, 199 (26)
W4LI, 199 (26)
K7UR, 199 (34)
IK8BQE, 199 (31)
JA2IVK, 199 (34 on 40)
IK1AOD, 199 (1)
VO1FB, 199 (19)
KZ4V, 199 (26)
W6DN, 199 (17)
W3NO, 199 (26)
RU3FM, 199 (1)
N3UN, 199 (18)
W1JZ, 199 (24)
W1FZ, 199 (26)
SM7BIP, 199 (31)
N4NX, 199 (26)
EA7GF, 199 (1)
JA5IU, 199 (2)
RU3DX, 199 (6)
N4XR, 199 (27)
HA5AGS, 199 (1)
N5AW, 199 (17)
JH7CFX, 199 (2)
K7LJ, 199 (37)
RA6AX, 199 (6 on 10m)
RX4HZ, 199 (13)
KØGM, 199 (17)
S58Q, 199 (31)
KQØB, 199 (2 on 10)
K9OW, 199 (34 on 10)
G3NKC, 199 (31 on 10)
K8PT, 199 (26)
N8AA, 199 (23)
HB9ALO (1)
IN3ZNR, 199 (1)
EA5BCX, 198 (27, 39)
G3KDB, 198 (1, 12)
JA1DM, 198 (2, 40)
9A5I, 198 (1, 16)
G3KMQ, 198 (1, 27)
N2QT, 198 (23, 24)
OK1DWC, 198 (6, 31)
W4UM, 198 (18, 23)
US7MM,198 (2, 6)
K2TK, 198 (23, 24)
K3JGJ, 198 (24, 26)
W4DC, 198 (24, 26)
F5NBU, 198 (19, 31)
W9XY, 198 (22, 26)
KZ2I, 198 (24, 26)
W9RN, 198 (26, 19 on 40)
W5CWQ,198 (17, 18)
I5KKW, 198 (31&23 on 20)
UA4LY, 198 (6&2 on 10)
IK4CIE, 198 (1, 31)
K2FF, 198 (18, 23)
JA7XBG, 198 (2 on 80&10)
JA3GN, 198 (2 on 80&40)
K2FF, 198 (18, 23)

The following have qualified for the basic 5 Band WAZ Award:

I3VJW (170 zones)
LU2FYU (165 zones)
RN6FK (190 zones)

5 Band WAZ updates:

KØGM (200 zones)
VE3XN (200 zones)
N6UK (180 zones)
W7VJ (200 zones)
SP6EQZ (190 zones)
LU4FPZ (193 zones)

***Please note: Cost of the 5 Band WAZ Plaque is $100 shipped within the U.S.; $120 all foreign (sent airmail).**

Rules and applications for the WAZ program may be obtained by sending a large SAE with two units of postage or an address label and $1.00 to: WAZ Award Manager, Floyd Gerald, N5FG, P.O. Box 449, Wiggins, MS 39577-0449. The processing fee for the 5BWAZ award is $10.00 for subscribers (please include your most recent *CQ* mailing label or a copy) and $15.00 for nonsubscribers. An endorsement fee of $2.00 for subscribers and $5.00 for nonsubscribers is charged for each additional 10 zones confirmed. Please make all checks payable to Floyd Gerald. Applicants sending QSL cards to a *CQ* checkpoint or the Award Manager must include return postage. N5FG may also be reached via e-mail: <n5fg@cq-amateur-radio.com>.

The WAZ Program

6 Meters

104 .....UXØFF (26 zones) 105 .....EI3IO (30 zones)

17 Meters SSB

50 .....K2FF

20 Meters SSB

1201 .....R7AY

15 Meters CW

341 .....K2FF 342 .....K8VFV

17 Meters CW

77 .....JA1AYV 78.....K2FF.

80 Meters CW

85 .....RW3PZ 87 .....R7AY.
86 .....N4MM

160 Meters

379.....US5CB (30 zones) 381 .....EI3IO (40 zones)
380 .....UXØFF (31 zones)

All Band WAZ

Mixed

8802 .....K9CT 8808 .....K6GEP
8803.....SP5APW 8809 .....OK1DMP/QRP
8804 .....W4UR 8810.....UA3QNS
8805 .....VA3NQ 8811.....W8KHP
8806 .....UXØFF 8812.....UA2AB
8807 .....K8DV

SSB

5164.....K2SHA 5166.....WF2F
5165 .....I6DVX 5167.....WA9PIE

CW

631 .....WA6KHK

RTTY

215 .....K9MM

Rules and applications for the WAZ program may be obtained by sending a large SAE with two units of postage or an address label and $1.00 to: WAZ Award Manager, Floyd Gerald, N5FG, P.O. Box 449, Wiggins, MS 39577-0449. The processing fee for all *CQ* awards is $6.00 for subscribers (please include your most recent *CQ* mailing label or a copy) and $12.00 for nonsubscribers. Please make all checks payable to Floyd Gerald. Applicants sending QSL cards to a *CQ* checkpoint or the Award Manager must include return postage. N5FG may also be reached via e-mail: <n5fg@cq-amateur-radio.com>.

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S9V 43' $199.99

80-6 meters *Fixed Operation*

The S9V 43' is a high-performance lightweight telescoping fiberglass vertical. The best value in high-performance 'tall' verticals!

S9V 31' $99.99

40-6 meters *Fixed or Portable Operation*

S9V 18' $49.99

20-6 meters *Fixed or Portable Operation*

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Meters!

radio not included

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Suggested Price $79.99

NEW! M-7600 For IC-7600. S-meter on receive, or power out, SWR, ALC level or supply voltages, all selectable from the radio's menu. The M-7700 and the virtual meter on your radio can work together.
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CQ DX Honor Roll

The CQ DX Honor Roll recognizes those DXers who have submitted proof of confirmation with 275 or more ACTIVE countries. With few exceptions, the ARRL DXCC Countries List is used as the country standard. The CQ DX Award currently recognizes 341 countries. Honor Roll listing is automatic when an application is received and approved for 275 or more active countries. Deleted countries do not count and all totals are adjusted as deletions occur. To remain on the CQ DX Honor Roll, annual updates are required. All updates must be accompanied by an SASE if confirmation of total is required. The fee for endorsement stickers is $1.00 each plus SASE. Please make checks payable to the awards manager, Billy F. Williams. All updates should be mailed to P.O. Box 9673, Jacksonville, FL 32208.

CW

NØFW 340	EA2IA 340	K9BWQ 339	K3JGJ 338	K9OW 335	JA7XBG 330	IKØADY 326	WA4DOU 314	K4EQ 279
K2TQC 340	N7FU 340	N4MM 339	F3TH 336	K2OWE 334	W4UW 330	F6HMJ 326	YO9HP 314	4Z5SG 277
WB4UBD 340	K4IQJ 340	W7CNL 339	DL3DXX 336	W4MPY 334	K8SIX 329	EA5BY 326	ON4CAS 312	WA2VQV 277
K3UA 340	K4MQG 340	N5ZM 339	N5FG 336	K5UO 334	W7IIT 329	WG5G/QRPp 325	KØKG 312	
N4JF 340	W8XD 340	N4AH 339	YU1AB 336	N6AW 334	K1FK 329	W9IL 319	WD9DZV 310	
K2FL 340	N7RO 340	K9IW 339	UAØMF 336	HB9DDZ 334	W6OUL 327	OZ5UR 318	KT2C 302	
WK3N 340	N5FG 340	K8LJG 339	WØJLC 335	G3KMQ 332	KE3A 327	CT1YH 318	HA5LQ 302	
N4NX 340	K4CN 340	W7OM 339	VE3XN 335	K6LEB 332	K6CU 327	EA3ALV 317	N2LM 300	
K9MM 340	OK1MP 340	K7LAY 338	N4CH 335	N7WO 332	W1DF 327	RA1AOB 315	K4IE 296	
W4OEL 340	K4JLD 339	KA7T 338	PY2YP 335	K5RT 330	KA3S 326	W6YQ 314	N2VW 281	

SSB

XE1AE 341	EA2IA 341	W6BCQ 340	W2CC 338	WS9V 336	W2FKF 335	CT1AHU 330	XE1RBV 319	AD7J 306
NØFW 341	IN3DEI 341	VE2GHZ 340	K3LC 338	VE3XN 336	YU3AA 335	N1ALR 330	VE7SMP 318	HB9DQD 305
K6YRA 341	DU9RG 341	K2FL 340	4Z4DX 337	K9HQM 336	W7BJN 335	K7HG 329	ON4CAS 317	4Z5FL/M 304
IK1GPG 341	K4MQG 341	K9BWQ 340	W4WX 337	VE3MR 336	W4UW 335	N5YY 329	N8SHZ 314	K7SAM 303
K2TQC 341	N4MM 341	K7LAY 340	IØZV 337	VE3MRS 336	K1UO 335	KE4SCY 328	IV3GOW 314	I3ZSX 302
K4MZU 341	K9MM 341	W6DPD 340	OE2EGL 337	AA4S 336	HB9DDZ 335	K6GFJ 328	W6NW 312	AE9DX 300
K5OVC 341	K3JGJ 341	K8LJG 340	W4ABW 337	PY2YP 336	K8SIX 334	KD5ZD 328	KU4BP 312	4X6DK 299
DJ9ZB 341	N5ZM 341	YU3AA 340	DL3DXX 337	K9OW 336	KE3A 334	W9GD 327	N2LM 312	WD9DZV 299
OZ5EV 341	N7RO 341	W7OM 340	VE1YX 337	EA5BY 336	N2VW 334	SV3AQR 326	KA1LMR 310	K7ZM 298
K3UA 341	KE5K 341	AB4IQ 340	N4CH 337	XE1J 336	JA7XBG 334	VE7EDZ 326	RA1AOB 310	W9ACE 292
WB4UBD 341	K4IQJ 341	W8ILC 340	EA3BMT 337	OE3WWB 335	K5UO 333	W1DF 324	G3KMQ 310	W6MAC 290
N4JF 341	N5FG 341	KØKG 339	IKØAZG 337	N6AW 335	K5RT 332	WØROB 324	XE1MEX 310	N3KV 290
VE2PJ 341	K4CN 341	W7FP 339	YU1AB 337	IK8CNT 335	WØYDB 332	W4MPY 323	IØYKN 308	WD8EOL 282
WK3N 341	OZ3SK 341	W4UNP 339	UAØMF 337	EA4DO 335	WA4WTG 332	TI8II 322	XE1MW 307	N3RC 278
N4NX 341	OK1MP 341	K9IW 339	KZ2P 336	CT3BM 335	ZL1BOQ 332	YO9HP 322	AA1VX 306	IWØHOU 278
K4JLD 341	I8KCI 341	W9SS 339	W8AXI 336	K8LJG 335	W9IL 332	KW3W 322	W5GT 306	WA5UA 276
N7BK 341	K5TVC 340	N7WR 339	VK4LC 336	W3AZD 335	F6HMJ 331	W6OUL 320	K4IE 306	

RTTY

WB4UBD 339	N5FG 336	K3UA 333	K4CN 323	WK3N 314
NI4H 339	N5ZM 335	OK1MP 333	UAØMF 318	K8SIX 298

saying that because they have uploaded their logs to LoTW, there will not be any paper QSLs available at all.

Sorry, but to use the current parlance, this is just "out of order!" The collecting of QSLs for contacts made with out-of-the-way or otherwise interesting places has been a long tradition within Amateur Radio. The cost of the QSLs themselves can hardly be an excuse, particularly when it's probably but a small fraction of the overall cost of the operation. The refusal to provide any QSLing for special calls or other contest calls just seems selfish and disingenuous. There are many competent and enthusiastic QSL Managers who are only too willing to provide an excellent service to contesters and DXpeditioners who may not be interested in handling and processing of QSL cards themselves. To refuse to provide any QSLs at all (either directly or through a helping QSL Manager) just because the log has been uploaded to LoTW seems, in some way, to be an abuse of LoTW itself.

An Amateur Radio license is a privilege. A special callsign (be it DX callsign or contest callsign) is an even greater privilege. With privilege comes responsibility. Within Amateur Radio the courtesy of a QSL is a long-held tradition. To draw on the privileges (by running pileups in a contest with a special callsign) but without accepting the responsibility somehow seems one-sided. "Look at me, I've got a nice contest callsign. Hopefully more people will call me because of my snappy contest call. That'll increase my enjoyment of the privilege of operating. But no, I won't bother to do any QSLing. I can't be bothered. I'm here to draw pleasure from the privilege of my special call, but I'll ignore the responsibility."

So, it seems there are two major unintended consequences of LoTW. One centers round the time that it takes to upload a DXpedition log. Hopefully, peer pressure (combined with the realization that there is no significant reduction in "QSL income") will encourage all DXpeditions, both large and small, to upload their logs immediately after they get *home*. *The*

The annual Dayton Hamvention® SWODXA DXpedition of the Year award resulted in two winners this year. Here, team members of ZL8X, Kermadec and VP8ORK, South Orkney receive their awards during the DX Dinner on Friday evening in Dayton. (Photo courtesy of David, K4PZT)

other unintended consequence is slightly more insidious. It's the spreading of the "because I have uploaded to LoTW I will cease QSLing altogether" syndrome.

Let's all encourage the continuing improvement in the speed of post DXpedition LoTW uploads, but let's also register our clear disapproval of the distinctly ham unfriendly "I've uploaded to LoTW, hence I won't QSL" excuse.

Happy DXing and QSLing in 2011.

—Nigel, G3TXF

With that, I'll leave it to you to ponder the LoTW and QSLing situation and possibly comment on it. Until next time, enjoy the chase, and Have Fun! 73, Carl, N4AA

Left to right in this photo are Phil, W9IXX; John, N7CQQ; Lynn, W4NL; and Mike, N9NS. Phil hands one of the laminated maps of Kanton Island in Central Kiribati, signed by all the team members of T31A, to Lynn, congratulating him on working T31A. W4NL was Number One on the Club Log list for the World, and of course, all of North America. He was the first station to work T31A 19 times on the various bands/modes where they were available. (Photo courtesy of Phil, W9IXX)

QSL Information

EG7SDC via EA1AUM
EG7SE via EA4URE
EG7SSM via EA7URM
EG8AAD via EA8RCP
EG8DIA via EC8ADW
EG8FSA via EA8RKL
EG8FVC via EA8RKL
EG9A via EA4URE
EG9IA via EA4URE
EG9IC via EA4URE
EG9Z via EA9LZ
EH1DAA via EA1WS
EH1PAZ via EA1RCM
EH5FL via EA5FL
EH5H via EA5FL
EH5URJ via EA5FL
EH5VE via EA7URD
EH6R via EA6AZ
EH7H via JA1HGY
EH7VE via EA7URD
EH9IC via EA4URE
EI/DG5SDQ via DG5SDQ
EI/DL3OCH via DL3OCH
EI/G7VJR via G7VJR
EI/GIØNCA via GI0NCA
EI/HAØHW via HAØHW
EI/OM7CA via OM7CA
EI/ON4EI via ON4EI
EI/W4MPS via W4MPS
EIØ9VOR via EI8DD
EIØW via EI2JD
EI2GBW via EI9JO
EI2VDO via DL1DA
EI6DX/6W via RX3RC
EI7DAR via EI2JD
EI9JF via LZ3HI
EJ/DL8AAV via DL8AAV
EJØGI via EI2SDR
EJ1DD via EI7CC
EJ3HA via EI3HA
EJ4GRC via EI8DD

(The table of QSL Managers is courtesy of John Shelton, K1XN, editor of "The Go List," 106 Dogwood Dr., Paris, TN 38242; phone 731-641-4354; e-mail: <golist@golist.net>; <http://golist.net/>.)

GEORGE TRANOS,* N2GA

Ergonomics

A ham in a typical radio contest can be compared to a runner in a marathon. Each must prepare in advance to be competitive and must run the event as an endurance contest. Like the marathoner, the contester must have the right strategy, the right equipment, and the proper mindset.

For contesting, the right equipment includes having an appropriate contest-grade radio, antennas, filtering, switching equipment, keying devices, computers, interface cables and other hardware. All of these items are important in the heat of battle. However, it may be even more important to have the right "software"—the proper chair, operating table, and ergonomics—so that you can maximize your "time in the seat."

Shack Furniture

The *Merriam-Webster Dictionary* defines ergonomics as "an applied science concerned with designing and arranging things people use so that the people and things interact most efficiently and safely—called also biotechnology, human engineering, human factors." For radio amateurs, the operator-to-radio interface can make the difference between winning and losing. An improper chair or a table at the wrong height can cause discomfort, fatigue, and loss of concentration. Good ergonomics can help you achieve your goals by helping you stay in the chair and continue to make contacts.

A good chair should provide support, be comfortable, and allow free movement of your arms. It should not chafe, cut, or cause any pain. The seat should have some cushioning but not compress so much that you will feel the wood or metal base. It should allow some air flow if possible and be made of soft, yet durable fabric. The base of the chair should be secure. If a rolling chair is utilized, consider one with five versus four legs to prevent a tip-over. The ability to adjust the height of the chair is important, as you want to position yourself so both your feet and arms are comfortable. I prefer chairs with padded and adjustable armrests, but some operators prefer chairs without arms. The back of the chair should support your back properly. Again, an adjustable back is preferred to allow the chair to be positioned so it supports you when you are seated at the operating table. A chair with some back movement might also allow you to shift positions to tolerate longer stints seated.

Your operating table or desk is another component in the ergonomic equation. Key factors in a good operating table include one that is at the proper height, has enough room for all of the necessary equipment, and allows positioning of that equipment in an optimal way to allow easy manipulation of controls. Another consideration is the arrangement of your equipment. You must decide what will gear will be closest to you and where it will be placed. Consider placing the most-frequently used items nearest to you and those things that are less used farther away.

Equipment Layout

Many contesters today utilize computers as the primary component during contest operating. As such, consider positioning your computer display at the center of your operating table, directly in front of you. It should be at a good focal distance for your eyes and at the right height so your neck is in a

*P.O. Box 657, Copiague, NY 11726
e-mail: <n2ga@cq-amateur-radio.com>

Les, W2LK, at the controls of one of the radios at Andy's multi-multi operation at K2LE in Vermont.

Calendar of Events

All year	**CQ DX Marathon**
July 30–31	RSGB IOTA Contest
Aug. 6	European HF Championship
Aug. 7	SARL HF Phone Contest
Aug. 6–7	North American CW QSO Party
Aug. 6–7	ARRL UHF Contest
Aug. 13–14	Worked All Europe CW Contest
Aug. 13–14	Maryland-DC QSO Party
Aug. 20-21	SARTG RTTY Contest
Aug. 20–21	North American SSB QSO Party
Aug. 20–22	New Jersey QSO Party
Aug. 27-28	YO DX Contest
Aug. 27–28	SCC RTTY Championship
Aug. 27–28	Ohio QSO Party
Aug. 28	SARL HF CWContest
Sept. 3–4	All Asian SSB Contest
Sept. 10–11	Worked All Europe SSB Contest
Sept. 10–11	ARRL September VHF QSO Party
Sept. 25–26	**CQ WW RTTY DX Contest**

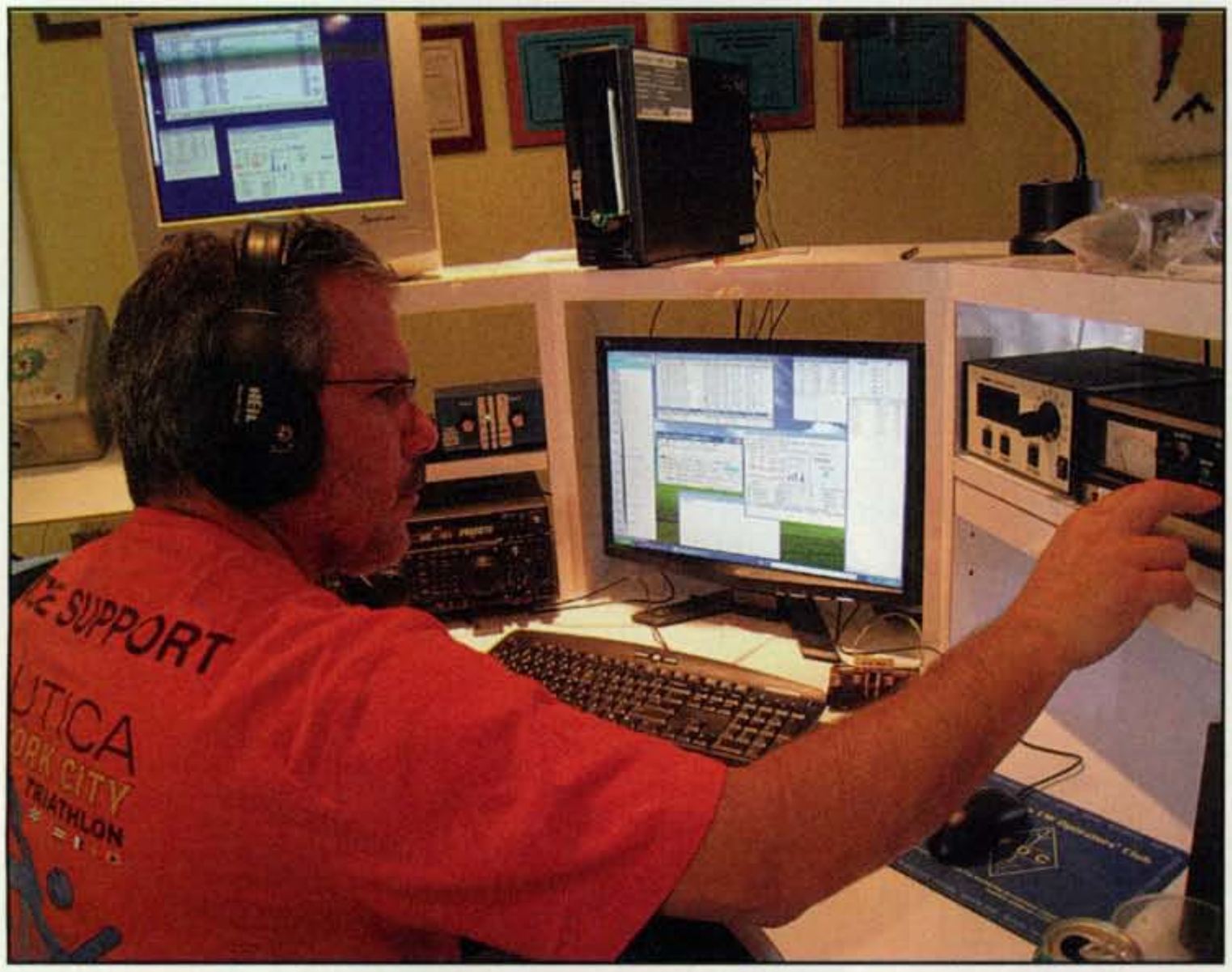
Basic information on many of these events may be found in WorldRadio Online*'s Contest Corner at <www.worldradiomagazine.com>. For complete information on any of these contests, see their respective sponsors' web pages.*

comfortable position. You don't want to look up or down too much, so the screen has to be elevated just right. You might want to consider a shelf or shelves to hold your display screen and some of your other equipment.

Your keyboard and mouse are also important items and should be placed properly. The keyboard will be the most touched device during the contest, especially if you plan on "running" a lot. The height of the keyboard is paramount; it must allow you to position your arms and wrists in a comfortable way. Some contesters place the keyboard directly on the operating table in front of the radio. I personally prefer a keyboard drawer. In this configuration the keyboard is slightly lower than the table and closer to you. This allows you to move slightly closer or farther from the screen. It also lets you move your hands above the keyboard easily to tune or adjust the radio. Some keyboard drawers also position the mouse or other pointing device on the drawer. This takes it off the desk to allow other accessories such as paddles, switches, and antenna rotators to be closer.

The layout of your station can also be done in different configurations depending upon the your room and the space you have available. Options include straight, corner, U-shaped, or V-shaped. Placing items in any configuration besides a straight table permits the gear to wrap around you to make it easier to reach controls. The U-shaped pattern is becoming more popular. You can place your monitor in the center with one radio on each side for a single-operator, two-radio (SO2R) setup. This makes it easy to know which radio is your "left" and which is your "right" when you are fatigued. Your switching scheme should have left and right marked clearly as well. If you are a single radio operator, place the radio where it can be easily reached with your preferred hand for tuning. I tune with my left hand and leave my right hand free for the mouse, antenna rotator, or paddles. When operating with one radio, I place it slightly to the left of the display with my rotator close at hand on the right.

Headsets, boom microphones, and foot switches are other equipment that should be chosen with proper ergonomics in mind. It is good to have a variety of headsets so you can switch off during the contest. Headsets can cover the ears completely or rest on top of the ears. You may prefer one type over the other, but having both will allow you to switch back and forth. Use the one that feels comfortable and doesn't give you



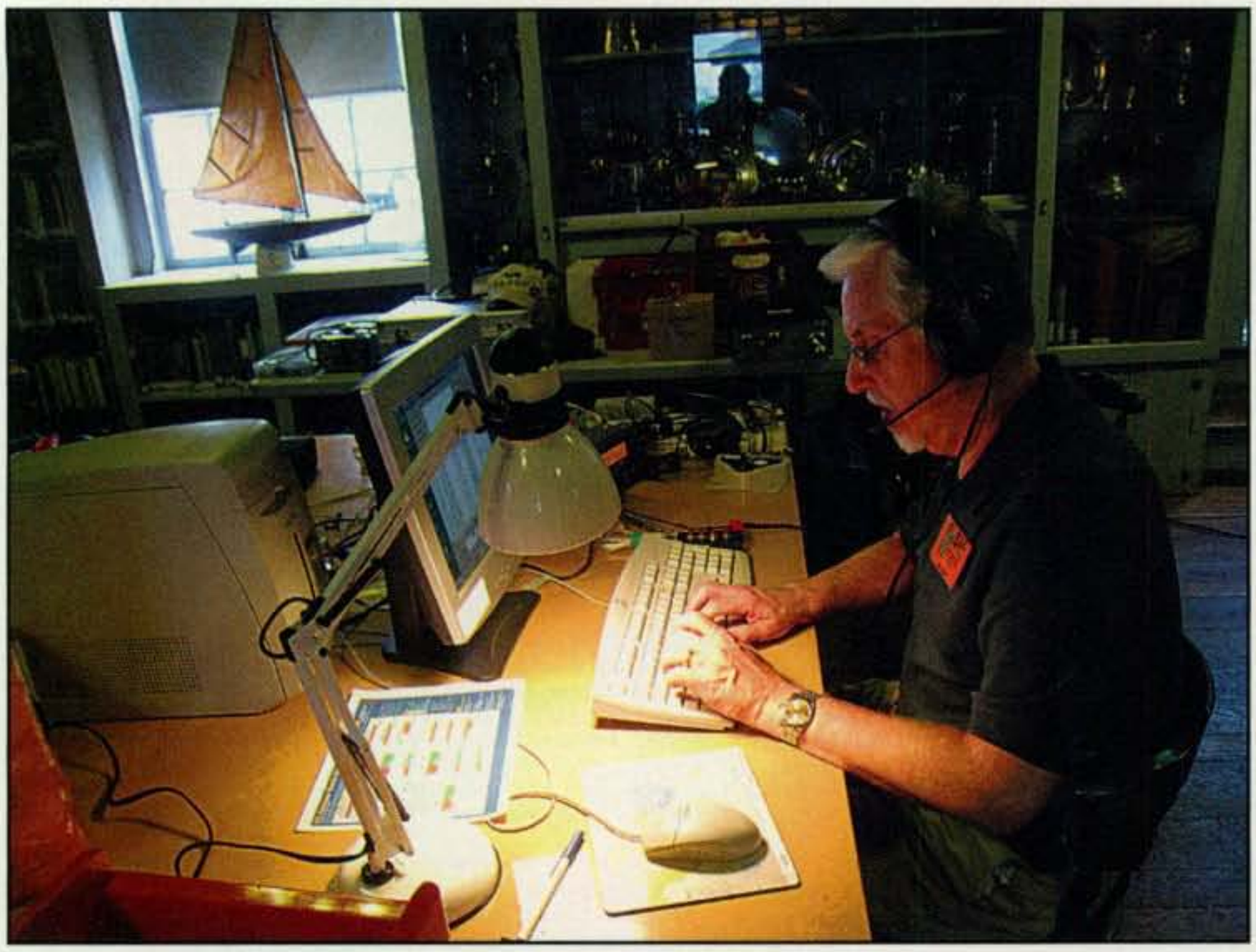
George, N2GA, reaches for nearby rotor controls at Andy's multi-multi station at K2LE in Vermont.

a headache. Consider removing the headset and using an external speaker for part of the contest to also give your ears a rest. If you use a boom microphone, position it so that you don't have to stretch your back and neck to speak into it. The same goes with a footswitch; make sure it is right underfoot, so to speak, to prevent having to lunge for it when you want to transmit. Consider switching to VOX operation for phone contests for at least part of the time as well to give your feet a rest.

Keeping Everything Accessible

When setting up a new station, leave room to walk behind the operating table. This adds flexibility and allows changes to be made easily. Wires and cables can be added, changed, and removed. It also makes tracking down problems much quicker and easier without having to crawl underneath desks or move equipment. Clearly label all of your coax feedlines, switches, and controls. Make sure the writing is legible and easy to read. It is easy to make mistakes during the middle of a contest when you are tired and may not be thinking clearly. Proper labeling helps prevent that from happening.

Proper ergonomics also means removing items that are in the way of controls and equipment. Many hams are pack rats and collect a lot of stuff. Some of it can accumulate and get in the way. Take the time to remove the clutter around the shack. Put away things you want to keep; throw out, sell, or give away the stuff you don't need. It makes no sense to arrange and label your gear and then have a pile of junk obscuring it.



Mel, K2SG, operating the Order of Boiled Owls Field Day station KW2O at the Long Island Maritime Museum in Sayville, New York.

Eat, Drink, and ... Stay Awake!

Like the athlete, you need fuel to keep you going during a long contest. Choose the proper food and drink that will invigorate you and keep you energized. Don't eat heavy meals that will make you sleepy. Consider small, frequent meals to equalize your blood-sugar level. Diet is a personal choice and every successful contester has his/her own eating and drinking plan. If you haven't considered this in the past, try protein-rich sources of food for long-term energy. Drink enough fluids so you don't dehydrate. Avoid all alcoholic beverages (until after the contest). Most of all, have the food ready and available to eat. Think about keeping a small cooler near you at the operating location so you can snack and drink when needed without having to get up.

In Closing . . .

More time in the chair will equate to more contacts, and the longer you are able to sit, the higher your score will be and the better you will do. Create an environment that is conducive to long-term operating. This will maximize your comfort and minimize distractions. Good lighting, proper ventilation, and temperature control will also help. Your radio shack should be a place where you want to spend time, not a cave that you can't wait to crawl out of! Take the time to create the right ergonomic setting and it will pay off in higher scores, less pain and fatigue, and just plain more fun. 73, George, N2GA

BY TOMAS HOOD,* NW7US

Setting It Straight

A Quick Look at Current Cycle 24 Conditions
(Data rounded to nearest whole number)

Sunspots
Observed Monthly, May 2011: 42
Twelve-month smoothed, November 2010: 27

10.7 cm Flux
Observed Monthly, May 2011: 96
Twelve-month smoothed, November 2010: 88

***Ap* Index**
Observed Monthly, May 2011: 9
Twelve-month smoothed, November 2010: 6

One Year Ago: A Quick Look at Solar Cycle Conditions
(Data rounded to nearest whole number)

Sunspots
Observed Monthly, May 2010: 9
Twelve-month smoothed, November 2009: 8

10.7 cm Flux
Observed Monthly, May 2010: 74
Twelve-month smoothed, November 2009: 75

***Ap* Index**
Observed Monthly, May 2010: 8
Twelve-month smoothed, November 2009: 5

LAST-MINUTE FORECAST

Day-to-Day Conditions Expected for August 2011

	Expected Signal Quality			
Propagation Index.....	(4)	(3)	(2)	(1)
Above Normal: 1-4, 6-16, 20, 23-24, 27-28, 31	A	A	B	C
High Normal: 2-3, 5, 17, 21-22, 25, 29-20	A	B	C	C-D
Low Normal: 26	B	C-B	C-D	D-E
Below Normal: 18-19	C	C-D	D-E	E
Disturbed: N/A	C-D	D	E	E

Where expected signal quality is:
A—Excellent opening, exceptionally strong, steady signals greater than S9.
B—Good opening, moderately strong signals varying between S6 and S9, with little fading or noise.
C—Fair opening, signals between moderately strong and weak, varying between S3 and S6, with some fading and noise.
D—Poor opening, with weak signals varying between S1 and S3, with considerable fading and noise.
E—No opening expected.

HOW TO USE THIS FORECAST

1. Find the *propagation index* associated with the particular path opening from the Propagation Charts appearing in *The New Shortwave Propagation Handbook* by George Jacobs, W3ASK; Theodore J. Cohen, N4XX; and Robert B. Rose, K6GKU.

2. With the *propagation index*, use the above table to find the expected signal quality associated with the path opening for any given day of the month. For example, an opening shown in the Propagation Charts with a *propagation index* of 2 will be good (B) on August 1st, fair (C) on the 2nd and 3rd, good (B) on the 4th, etc.

3. As an alternative, the Last-Minute Forecast may be used as a general guide to space weather and geomagnetic conditions through the month. When conditions are Above Normal, for example, the geomagnetic field should be quiet and space weather should be mild. On the other hand, days marked as Disturbed will be riddled with geomagnetic storms. Propagation of radio signals in the HF spectrum will be affected by these conditions. In general, when conditions are High Normal to Above Normal, signals will be more reliable on a given path, when the path is ionospherically supported.

Have you heard a fellow amateur radio operator make the statement, "a solar flare is heading our way, so conditions will be terrible"? Even the news media makes statements like this, as do popular blogs: "A spectacular coronal mass ejection on June 7 sent a solar flare heading our way at a speed of 1400 km/s. The flare, said to be of medium size, is likely to result in spectacular aurora and other space weather effects with the potential to cause some communications, navigation, and power-grid problems." (Do a search on your favorite internet search engine for "solar flares heading our way," and look at how popular this phrase has become.) The problem with these statements is that they are inaccurate.

Solar flares do not head our way, in the way that these statements imply. Faithful readers of this column know that solar flares often trigger a complex series of events that may lead to the release of solar plasma clouds that do head our way, but also know that the flare itself is a nearly instant release of energy much like the burst of light of a flash bulb on a camera.

Solar flares are good examples of some of the most energetic natural explosive events known to man. Complex magnetic looping structures concentrated in an active sunspot region suddenly snap apart. Radiation is emitted across virtually the entire electromagnetic spectrum, from longwave radio frequencies, through the optical spectrum (the bright flash of a solar flare that is seen by the naked eye), to x-rays and gamma rays at the shortest wavelength end. The amount of energy released is the equivalent of millions of 100-megaton hydrogen bombs exploding at the same time!

This release of energy is nearly instantaneous—and because this radiation of light and radio energy travels at the speed of light, it takes only about eight minutes for the energy to reach Earth. When an x-ray flare occurs on the Earth-facing side of the Sun, it takes only eight minutes for full impact of the flare's energy to reach our planet! That's why it is misleading for someone to say, "a solar flare is heading our way and the HF bands are going to be terrible tonight," as if sometime in the coming hours, the results of the flare are going to make it here.

The x-rays from these events penetrate into the lower ionosphere and cause the *D*-region, which acts as a sponge that soaks up radio signals, to become more energized. The more ionized the *D*-region, the higher the frequencies that are absorbed and the stronger the absorption of the lower frequencies. Thus, radio signals from distant locations that travel through a flare-enhanced ionosphere are absorbed and become inaudible. These fadeouts, which used to be called radio blackouts but are now known as Sudden Ionospheric Disturbances (SIDs), last only minutes for minor

*e-mail: <nw7us@nw7us.us>

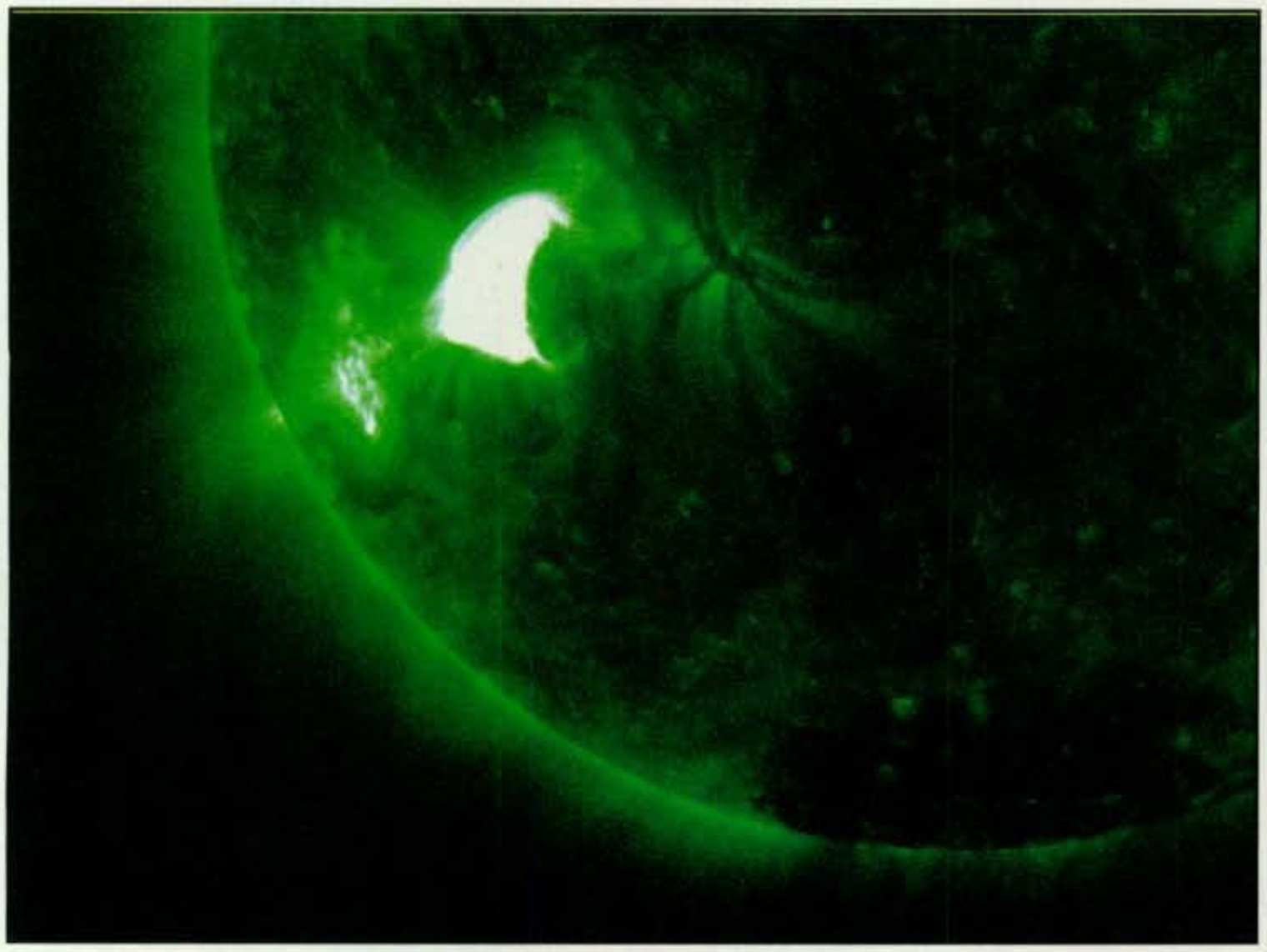


Fig. 1– Nearly two dozen flares were unleashed in just over two days (April 21–23, 2011) from the tangled magnetic fields of active region 11195. In this wavelength of extreme ultraviolet light (94 Angstroms), the flares appear as rapid brightenings of the strong active region. In this image, the very bright flash is just one of the x-ray flares in the sequence of the dozens during this period. The vertical line seen in this image is a reaction of the CCD in the telescope to the overwhelmingly bright light. What we are actually looking at is ionized iron heated to over 6 million degrees. Now that is HOT! (Source: Solar Dynamics Observatory [SDO]/Atmospheric Imaging Assembly [AIA])

flares, to maybe an hour or so for the largest of flares. Once the flare is exhausted, the x-ray radiation fades and the ionosphere recovers to its normal level of ionization.

It might be that there is confusion about what actually may be heading toward the Earth when people talk about a "solar flare is heading our way." As all of this magnetic energy is being released during the explosive moment of a solar x-ray flare, and the Sun heats and accelerates the Sun's plasma caught up by the complex tangle of magnetic fields, and sometimes releases these plasma particles as huge clouds out into interplanetary space. These billion-ton clouds are known as coronal mass ejections (CMEs), and they ride the solar wind out away from the Sun.

A CME travels very fast, but not as fast as the speed of light. Depending on how intensely the plasma is ejected during the explosive solar flare, the coronal mass ejection could take anywhere from one to four days to arrive at Earth, if the CME was directed toward Earth. Not all CMEs are ejected toward Earth.

If a CME is directed toward Earth, it can cause a lot of havoc. When it hits our magnetosphere, we could see the geomagnetic activity turn stormy, which will cause longer-term degradation of HF propagation, as well as trigger auroral conditions. Geomagnetic activity has the effect of lowering the ionization of the various ionospheric layers, which brings down the maximum usable frequency (MUF) over a given signal path. This lowering is much like what happens at night, when the ultraviolet radiation of the Sun is blocked and the ionosphere settles down. The stronger and longer the geomagnetic storm, the more depressed the ionospheric propagation becomes.

Some people think of the coronal mass ejection and the resulting geomagnetic storms collectively as a "solar storm." This may lead some to think of this as the "solar flare that is heading our way leading to bad radio conditions." However, now we know that a solar flare is a nearly instant event that affects radio propagation on the sunlit side of the Earth, with a possible longer-term event known as the coronal mass ejection. But wait! There is one more related event.

Readers of this column know that the Sun is always generating a solar wind. The solar wind is made up of protons and other particles that stream out away from the Sun with varying speeds. When CMEs plow through interplanetary space, they plow through this gaseous material, first in the Sun's atmosphere and then out in the solar wind. Shock waves in front of the CME can accelerate these protons in our direction, causing what we know as "the proton storm."

When these accelerated protons are aimed toward Earth, they penetrate our magnetosphere and are funneled down toward the polar regions, forced along the Earth's magnetic field lines. These highly energized protons cause the *D*-region of the ionosphere to become highly ionized, effectively absorbing first the lowest wavelengths of the high-frequency spectrum, then moving on to the highest of the shortwave spectrum if the proton storm is extremely intense. This is known as a polar cap absorption (PCA) event, and this can occur as quickly as within hours of an x-ray flare, or perhaps days after the flare. When a PCA occurs, and radio signals over the polar regions are absorbed, it shuts down radio paths between DX locations, depending on the polar paths, such as between central Europe and the United States.

August Propagation

At last! With August comes a shift from summertime to wintertime ionospheric conditions in the Northern Hemisphere. While most days in August will exhibit summertime conditions, conditions will begin to conform more to a winter pattern of higher daytime and lower nighttime usable frequencies. Moving into August, summer conditions caused by the Sun-baked, thinned ionosphere will prevail. However, as we move into September, with less sunlight over the pole, the maximum usable frequencies should become higher, with longer windows on higher bands.

Being in mid-summer with low 10.7-cm flux numbers, 20 meters will be the most usable DX band. The low bands are too noisy and experience a high amount of absorption. The higher bands (10 and 12 meters) are usually dead due to low summertime MUFs. Fifteen meters will become more usable in the morning and evening hours following the greyline, with peaks during the afternoon. Twenty meters, though, is where August activity will be strongest.

Daytime: While the 15-, 17-, and 20-

meter bands should be open for DX throughout the daylight hours, peak signals are expected during an approximate two-hour window immediately following sunrise and again during the late afternoon. Occasional fair openings might occur on 10 and 12 meters during the hours of daylight, particularly along an arc extending across central Africa, Latin America, and into the far Pacific area. Peak conditions should occur during the afternoon hours, but as we move into September, earlier and later windows will open.

Nighttime: Between sundown and sunrise 20 meters is expected to be the best DX band. Openings should be possible to nearly all areas of the world, often with exceptionally strong signal levels. Until midnight, good DX conditions may be found on 15 and 17 meters for openings toward Latin America, the far Pacific, and into Asia. Fairly good nighttime DX conditions are also expected on 30, 40, and 80 meters despite the high static at times. Openings should be possible before midnight along an arc extending from northern Europe, through Africa, and into Latin America. By late August it should be possible to work some DX on 160 meters during the hours of darkness. Conditions on this band, as well as on 40 and 80 meters, will tend to peak just as the sun begins to rise on the light, or easternmost, terminal of a path.

Short-Skip Conditions

For openings over distances ranging between 50 and 250 miles, use 80 and 40 meters during the day, and 80 and

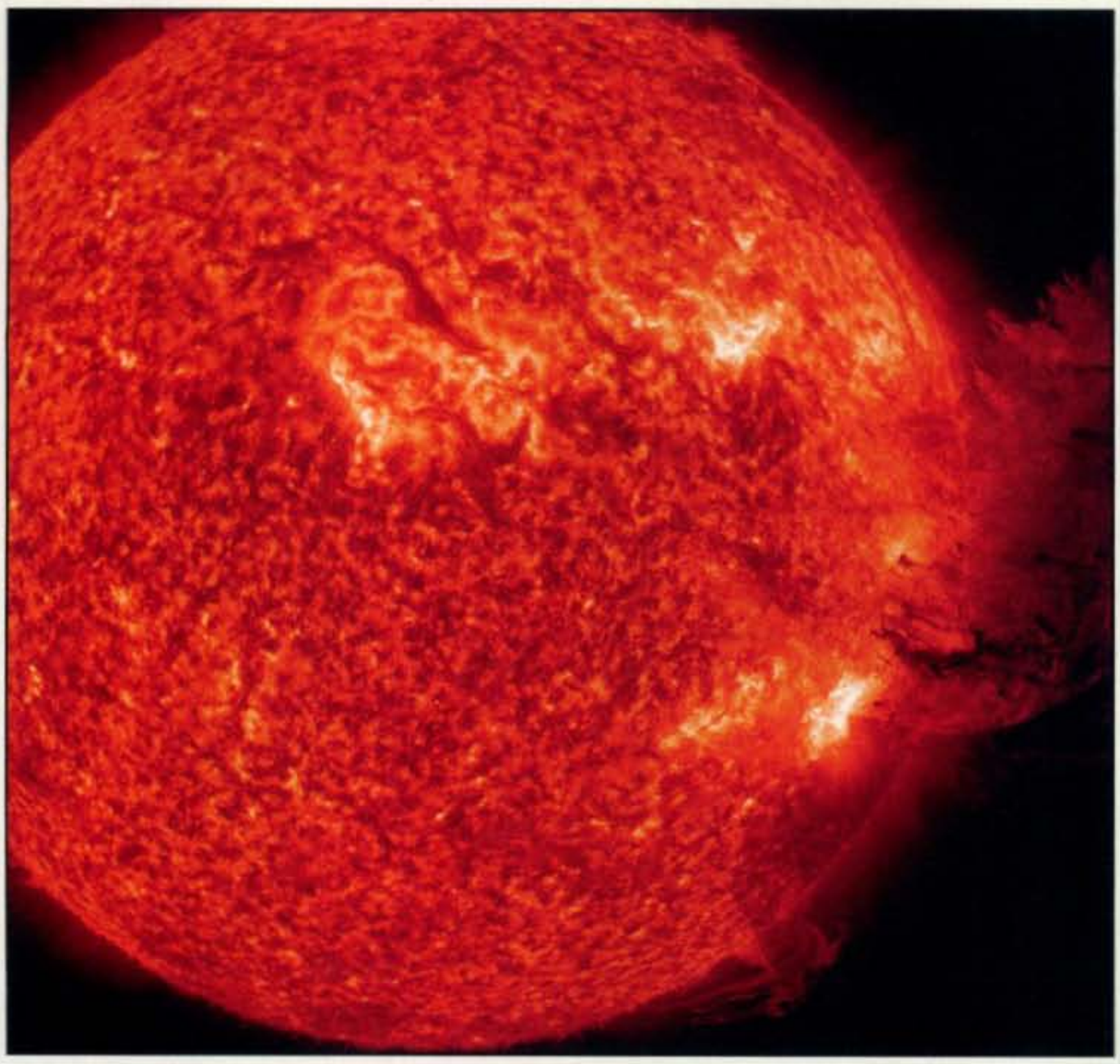


Fig. 2– The Sun unleashed an M-2 (medium-size) solar flare with a spectacular coronal mass ejection on June 7, 2011. The large cloud of particles mushroomed up and fell back down looking as if it covered an area of almost half the solar surface. (Watch the movie at <http://nw7us.us/m2cme01.html>.) SDO observed the flare's peak at 1:41 AM ET. SDO recorded these images in extreme ultraviolet light that show a very large eruption of cool gas. It is somewhat unique because at many places in the eruption there seems to be even cooler material—at temperatures less than 80,000 K. When viewed in SOHO's coronagraphs, the event shows bright plasma and high-energy particles roaring from the Sun. This Earth-directed CME moved at 1400 km/s, but missed the Earth. However, the CME did trigger a proton storm causing a polar-cap absorption event (PCA; see text). (Source: SDO/AIA)

160 meters at night. Between 250 and 750 miles, the best bands should be 40 and 30 meters during the day, and 40 and 80 meters at night. For openings between 750 and 1300 miles, the best bands should be 20 and 17 meters during the day, with some fairly good openings also possible on 15 meters. From sundown to midnight try 40 and 30 meters. From midnight to sunrise try 80 meters. Between 1300 and 2300 miles, the best daytime bands should be 20 and 17 meters, with some activity on 15. Try 30 and 40 meters during hours of darkness.

VHF Conditions

Sporadic-*E* propagation usually tapers off during August, but it may offer fairly frequent opportunity on 10 meters. Some 6-meter sporadic-*E* openings are expected during the month over distances of approximately 750 to 1300 miles. Be sure to check the 2-meter band for an occasional sporadic-*E* short-skip opening between approximately 1200 to 1400 miles. While sporadic-*E* short-skip openings may occur at any time, there is a tendency for them to peak between 8 AM and noon, and again between 6 PM and 9 PM local daylight time.

Aurora? This year there is a very good chance for aurora-mode propagation events during August. We expect coronal mass ejections this month, as well as the likely recurring coronal holes that will contribute to high-speed solar winds. The CME-related massive clouds of plasma will race toward Earth on the elevated solar winds after an x-ray flare and will trigger aurora and geomagnetic storms. Auroral-scatter-type openings, on both 6 and 2 meters, can range from a few hundred up to about a thousand miles, and they usually are characterized by very rapid flutter and Doppler shift on SSB signals.

Also this month, for the very patient, check the 6-meter band for possible trans-equitorial (TE) openings between 8 and 11 PM local daylight time. This type of propagation favors openings from the southern tier states into deep South America, with the signal path crossing the magnetic equator at a right angle. TE openings during August are rare, but they can occur. Very weak signals and severe flutter fading usually characterize them.

Also check out *CQ VHF* magazine for more details on VHF propagation and conditions. If you use Twitter.com you can follow @hfradiospacewx for hourly updates that include the *K*-index numbers. You can also check the numbers at <http://sunspotwatch.com>.

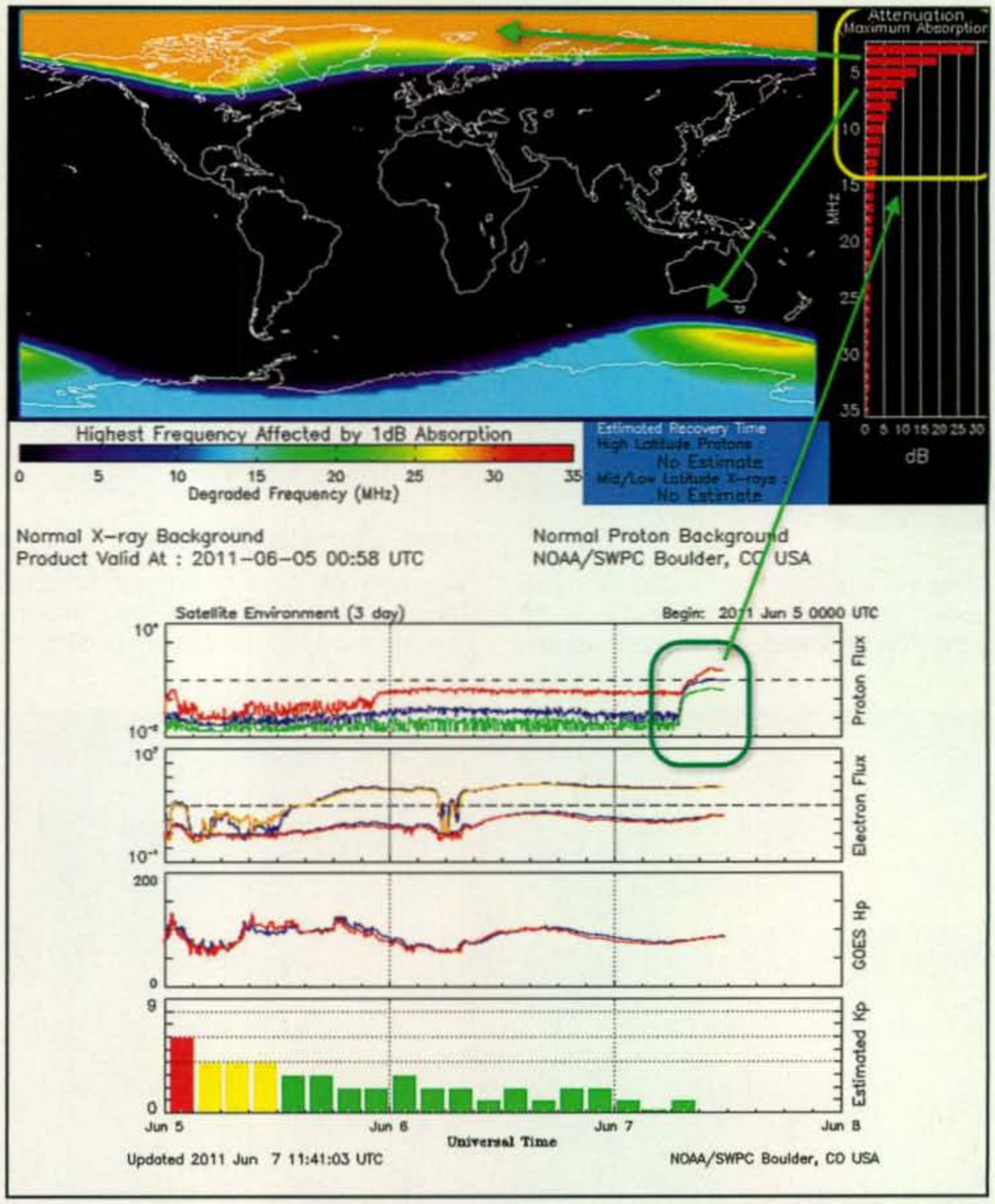


Fig. 3– A polar-cap absorption event (PCA) ensued on June 7, 2011, causing degradation of shortwave radio propagation over the polar regions. In the top graphic, the right-side chart indicates what frequencies are being absorbed and at what level of attenuation, while the map reveals the regions affected. In the bottom plot, notice the arrival of the high-energy proton "cloud" (circled) in the proton flux graph. This proton storm lasted days, affecting trans-polar radio signal propagation (see text). (Source: NOAA/Space Weather Prediction Center)

Current Solar Cycle Progress

The Dominion Radio Astrophysical Observatory at Penticton, BC, Canada, reports a 10.7-cm observed monthly mean solar flux of 95.9 for May 2011, down from April's 112.6. The 12-month smoothed 10.7-cm flux centered on November 2010 is 87.7, up from October's 85.3. The predicted smoothed 10.7-cm solar flux for August 2011 is 117, give or take about 9 points. Expect strong openings on higher bands primarily on paths between the Northern and Southern Hemispheres; expect an abundance of daytime activity on 15 and 17 meters.

The Royal Observatory of Belgium reports that the monthly mean observed sunspot number for May 2011 is 41.6, down from April's 54.4. The lowest daily sunspot value of 8 was recorded on May 24. The highest daily sunspot count was 82 on May 30. The 12-month running smoothed sunspot number centered on November 2010 is 26.5, up from October's 23.2. A smoothed sunspot count of 63, give or take about 9 points, is expected for August 2011.

The observed monthly mean planetary *A*-index (*Ap*) for May 2011 is 9, as it was for April. These figures still indicate very quiet geomagnetic conditions

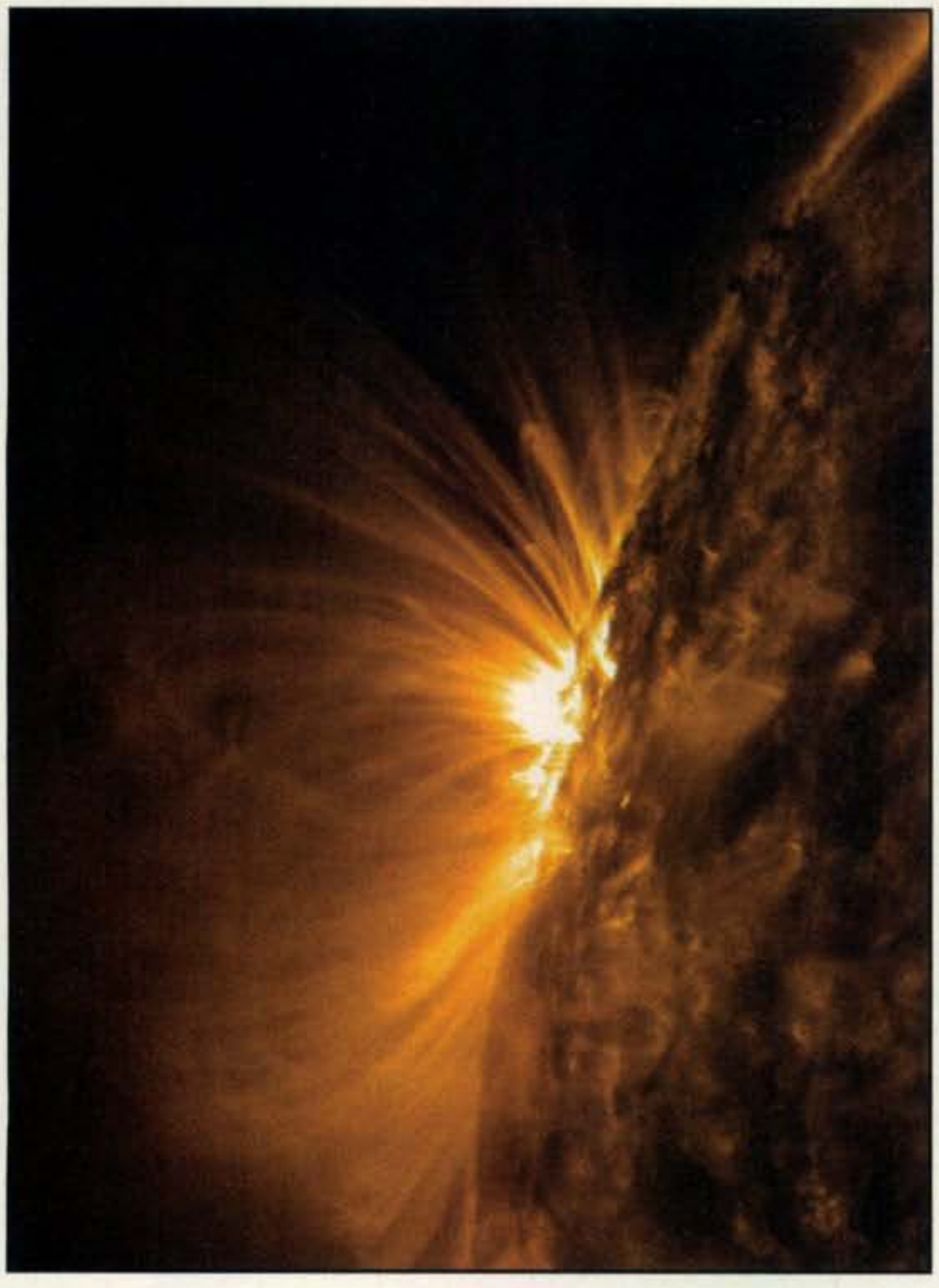


Fig. 4– A beautiful view of the complex magnetic structure seen above active sunspot region 11236. These twisted magnetic structures, which extend from deep inside the Sun, punching out through the sunspots, sometimes burst and explode into powerful x-ray flares (see text). This image was captured on June 14, 2011 at 0055 UTC at the 171-Angstrom wavelength. (Source: SDO/AIA)

overall, but June became a much more active month, so this will be seen in the next issue of this column. The 12-month smoothed *Ap* index centered on November 2010 is 6.4, the same as October's 6.4. Expect the overall geomagnetic activity to vary greatly between quiet to moderate storm level during August, since the increased sunspot activity also includes flares and related space weather. Refer to the Last-Minute Forecast on the first page of this column for the outlook on conditions during August. You can find the online version of this outlook at <http://sunspotwatch.com>.

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, Zones, and Countries. An asterisk (*) before a call indicates low power. Certificate winners are listed in bold. (All country terminology reflects the DXCC list at the time of the contest.)

2010 SSB RESULTS
SINGLE OPERATOR
NORTH AMERICA
United States

K1DG	**A**	**6,298,860**	**3801**	**139**	**471**
K8PO/1	*****	**3,211,092**	**2565**	**119**	**348**
WW1WW	*	2,604,246	1967	117	365
			(OP: KK1KW)		
N1DD	*	837,494	853	87	280
W1RZF	*	590,744	801	62	212
W1STT	*	467,558	525	92	275
K1LU	*	443,460	585	76	209
N1IX	*	385,758	538	62	199
W1MAW	*	372,600	501	73	197
K1QS	*	297,245	498	54	167
K1RM	*	291,902	523	53	153
W1FM	*	245,931	405	70	169
KB1W	*	243,450	405	51	174
NN1N	*	236,208	257	90	246
W1ZZ	*	189,745	251	65	212
AK1N	*	146,412	294	61	135
K1YSY	*	133,965	268	54	141
N1ZJ	*	121,040	266	53	125
K1BV	*	111,800	300	29	101
W3IZ/1	*	99,280	268	29	107
W2QQ/1	*	90,216	214	51	117
NU3C/1	*	79,994	397	19	55
AJ1E	*	66,096	172	43	110
W1XX	*	57,970	163	59	96
N1QEH	*	47,736	170	27	75
W1WEF	*	45,360	155	51	75
K1HI	*	44,268	134	42	82
WM1G	*	29,495	143	26	59
WA1OUI	*	23,415	91	33	72
KB1ODO	*	16,240	82	34	46
WR7Q/1	*	8,418	48	31	38
W1TR	*	7,524	64	19	38
W1MSN	*	4,180	43	11	27
W1AW	*	364	11	6	8
W3EP/1	**28**	**25,315**	**161**	**18**	**43**
K1WHS	*****	**17,160**	**116**	**17**	**38**
W3UA/1	**7**	**362,943**	**958**	**35**	**112**
AA1BU	**3.7**	**112,665**	**386**	**19**	**86**
K1UO	*****	**13,862**	**109**	**13**	**45**
KM1R	**1.8**	**4,788**	**92**	**11**	**25**
K1HAP	*****	**3,503**	**61**	**9**	**22**
***K1BX**	**A**	**2,278,402**	**1764**	**117**	**352**
***N1UR**	*****	**1,617,337**	**1413**	**109**	**328**
*N1PGA	*	713,215	794	87	248
*K1HT	*	304,689	471	60	171
*N1BCL	*	242,209	403	67	160
*W1JQ	*	224,536	389	63	158
*W2JU/1	*	204,955	342	68	161
*W1WBB	*	204,140	336	66	170
*NJ1H	*	157,056	309	52	140
*WA1DRQ	*	124,875	259	56	129
*K1VSJ	*	121,752	265	47	124
*W1CCE	*	120,156	312	57	129
*KA1GEU	*	100,905	241	43	112
*KT1VT	*	90,746	226	45	112
*W1DYJ	*	66,284	186	44	102
*KB1THU	*	49,500	157	40	85
*KA1C	*	47,880	179	33	81
*K1VU	*	29,154	113	40	73
*KB1REQ	*	27,342	107	31	67
*N1NN	*	24,380	100	29	63
*W1SRB	*	15,051	96	34	53
*KC2KTZ/1	*	14,707	75	25	52
*WV1K	*	13,680	67	24	48
*KB1FRK	*	6,664	53	17	39
*N1RNR	*	5,858	56	19	39
*KB1NHV	*	5,460	51	25	40
*N1IMW	*	4,416	69	31	33
*KA1VMG	*	4,094	40	18	28
*W1CRK	*	3,432	38	19	25
*K1EP	*	864	18	16	16
*KB1SXZ	*	741	14	7	12
*WK1L	*	620	18	9	11
*KB1QEM	*	459	14	8	9
*K1QED	*	169	8	6	7
*AE1P	28	784	23	7	7
*AB1J	*	561	21	4	7
***N1NK**	**21**	**120,536**	**352**	**24**	**98**
*N1WRK	*	28,500	135	15	60
*W1NK	*	3,010	34	12	23
***KG1V**	**14**	**21,692**	**118**	**15**	**53**
***NX1T**	**7**	**13,520**	**91**	**16**	**49**

W2RE	**A**	**4,985,904**	**3476**	**125**	**403**
N2LT	*****	**2,128,647**	**1693**	**118**	**335**
W2XL	*	1,161,315	1105	96	297
NX2X	*	1,141,875	1119	93	282
N2GC	*	819,927	783	94	297
WA2NHA	*	754,389	835	80	247
N2RJ	*	546,840	739	62	217
KA2D	*	445,676	538	79	229
N2MUN	*	301,455	474	56	175
W2LU	*	269,824	464	75	197
KW2J	*	244,933	390	66	161
N1JP/2	*	235,200	354	57	188
K2NV	*	230,964	401	64	164
N2ED	*	193,998	389	60	157
KM2O	*	153,842	300	56	138
K2FU	*	136,837	289	55	138
K2FJ	*	127,846	315	64	130
N2PKB	*	122,880	231	54	138
K2JMY	*	114,660	272	58	137
K3QDV/2	*	113,025	288	40	125
N2BEE	*	92,016	235	41	121
W2FUI	*	59,055	163	37	90
K2MK	*	57,323	161	38	95
W2MKW	*	57,000	196	31	83
WB2KLD	*	54,981	171	31	92
N2CK	*	51,480	177	32	78
N2ZN	*	27,621	105	30	69
N2EIK	*	26,695	127	29	66
NQ3N/2	*	21,975	108	16	59
NC2T	*	21,600	81	39	69
W2UDT	*	19,800	101	28	62
KB2KOL	*	10,584	59	28	44
K2YR	*	1,189	19	12	17
W2RR	**28**	**16,608**	**127**	**15**	**33**
N2PP	**21**	**522,543**	**1275**	**30**	**119**
K2TR	**14**	**948,084**	**2229**	**37**	**127**
WO2Y	*	45,220	182	17	68
WS9M/2	*	20,979	129	14	49
K2XA	**3.7**	**110,401**	**386**	**26**	**87**
W2MF	**1.8**	**19,670**	**113**	**13**	**57**
W2VO	*	7,952	59	15	41
***K2CS**	**A**	**426,897**	**547**	**77**	**214**
***W2TF**	*****	**348,704**	**492**	**77**	**195**
***WA2JQK**	*****	**309,149**	**449**	**77**	**230**
*K2DER	*	217,350	386	52	158
*N2JF	*	200,688	353	57	169
*KV2M	*	196,452	364	64	150
*K1TN/2	*	195,545	301	72	187
*W2CCW	*	143,260	300	49	141
*AB2TC	*	123,900	304	38	112
*N2GA	*	114,134	273	39	110
*W2NTV	*	102,705	214	61	144
*N2MTG	*	78,210	199	54	111
*WI2W	*	67,298	182	55	99
*KC2QJB	*	63,945	178	40	105
*K2CYE	*	49,674	171	25	77
*WA2LXE	*	37,742	133	36	77
*K2RET	*	37,510	138	32	78
*W2VU	*	36,108	123	39	79
*N2NOM	*	25,900	111	37	63
*N1IA/2	*	20,152	89	26	62
*KB2MN	*	19,201	89	33	58
*KC2GLG	*	17,464	93	23	51
*KA2ANF	*	16,254	90	27	59
*AB2IO	*	14,746	79	24	49
*K3DUB/2	*	13,332	84	19	47
*K9CHP/2	*	12,530	73	25	45
*K2PH	*	10,512	62	28	45
*WA2YSJ	*	9,996	59	25	43
*WB2SXY	*	9,849	66	27	40
*WA2MCR	*	8,944	71	16	36
*KC2WUF	*	8,001	67	24	39
*KC2JKU	*	5,141	51	19	34
*KB2DE	*	4,902	45	12	31
*AE2NG	*	4,033	43	12	25
*N3LZG/2	*	3,600	38	12	28
*KC2SYF	*	3,431	30	20	27
*WA2LUY	*	3,404	32	18	28
*W2HCB	*	3,240	42	21	24
*WY1H/2	*	2,360	39	17	23
*KA2AAM	*	2,272	30	13	19
*K2IZ	*	2,124	29	16	20
*KC2OVM	*	1,904	31	12	22
*KC2SKG	*	1,288	17	12	16
*K2TZY	*	1,190	22	15	20
*N2LK	*	1,150	23	11	14
*K2AMP	*	660	13	10	12
*KA2FHN	*	364	12	6	8
*KA2IBN	*	340	20	5	12
*WA2ACV	*	90	5	5	5
*K2JF	*	70	6	5	5
*W3EH/2	28	320	13	6	10
***KX2S**	**21**	**90,145**	**292**	**27**	**94**
*WB2AIO	*	24,472	113	18	58
*K2TV	*	23,840	112	20	60
*W2ARP	*	9,686	72	16	42
*W2LHL	*	2,016	32	9	23
*KC2TVJ	*	551	13	7	12
*N2BEG	*	198	10	5	6
*KC2JRQ	*	20	2	2	2
***N2GM**	**14**	**145,280**	**427**	**30**	**98**
*K2BQW	*	22,680	129	18	54
*AA2DS	*	12,137	91	12	41
*KC2MBN	*	7,452	68	18	36
*K2HVE	*	1,092	27	10	16
*KC2OSR	*	420	22	8	12
***K2SZ**	**3.7**	**3,816**	**52**	**12**	**24**

NN3W	**A**	**5,659,026**	**3450**	**145**	**473**
K3CR	*****	**3,710,133**	**2541**	**133**	**404**
			(OP: LZ4AX)		
K3ZO	*****	**3,455,135**	**2428**	**133**	**382**
AA1K/3	*	2,878,690	2025	136	409
K3TC	*	1,027,157	1012	99	292
WA2C/3	*	679,320	807	86	247
N3UM	*	595,680	759	75	217
N3RJ	*	584,240	693	93	242
K4JLD/3	*	326,700	475	88	212
N3RR	*	222,640	361	69	173
WM3O	*	190,470	345	55	155
W3FVT	*	181,280	344	57	149
K3VA	*	134,596	321	36	118
K3MRG	*	78,645	192	45	102
W3SQ	*	47,630	181	29	81
N3XL	*	36,666	132	41	85
K3BHX	*	32,205	130	25	70
N3RW	*	31,460	126	36	74
K3DCW	*	30,627	130	52	71
K3RMB	*	27,825	104	36	69
KN3A	*	27,438	104	32	70
W3GNQ	*	21,090	85	32	63
N3XPD	*	10,502	66	19	40
W3ZGD	**21**	**49,970**	**210**	**25**	**70**
K3RWN	*	15,275	92	18	47
K3ISH	*	8,892	69	17	40
K3NK	**7**	**16,720**	**90**	**22**	**54**
W3NO	**3.7**	**78,942**	**251**	**27**	**91**
***KD3HN**	**A**	**295,661**	**421**	**79**	**192**
***N3YW**	*****	**142,692**	**286**	**51**	**137**
*WB3BSA	*	126,400	247	59	141
*KB3LIX	*	100,467	211	54	129
*NY3B	*	87,291	220	66	117
*K2MS/3	*	84,972	218	39	107
*N2US/3	*	79,821	207	44	103
*K3LA	*	62,906	190	47	95
*K3VED	*	59,920	171	47	93
*AA3CS	*	50,400	176	47	93
*ND3R	*	48,422	132	48	94
*WB8YYY/3	*	48,258	147	37	89
*W3OD	*	46,980	137	43	92
*N3CHX	*	45,630	154	44	91
*N3PPH	*	43,320	148	37	83
*KR3O	*	42,636	166	34	80
*W3IUU	*	38,073	129	38	73
*K2LNS/3	*	36,200	138	24	76
*W2GG/3	*	30,396	124	30	72
*N3CR	*	25,688	111	34	70
*K3STL	*	25,080	117	35	60
*K3YDX	*	19,796	82	37	61
*WB3IGR	*	18,200	81	36	64
*WA2EAJ/3	*	14,941	84	22	45
*WA3ERQ	*	14,301	95	17	46
*KB3TAP	*	9,152	76	14	38
*N3KUN	*	6,048	50	24	30
*WA2VQV/3	*	5,936	48	17	36
*ND3D	*	3,827	37	16	27
*KB3OPP	*	3,528	44	18	31
*WW3MM	*	1,232	19	13	15
*N9GG/3	*	1,075	20	11	14
*W3RLS	*	154	8	7	7
*KB3LNM	*	20	2	2	2
*K3FS	21	9,699	75	13	40
*K3CWF	*	3,612	43	11	31
*K3LAB	14	6,256	51	13	33
*WBØYLE/3	3.7	4	1	1	1

K4ZW	**A**	**4,844,712**	**2981**	**151**	**448**
K4SSU	*****	**1,744,424**	**1539**	**125**	**336**
			(OP: NA4BW)		
K4AB	*	1,657,408	1335	122	342
N6AR/4	*	1,542,568	1196	120	368
K3ZM/4	*	1,423,744	1153	112	342
K3XC/4	*	1,339,000	995	116	404
KZ2I/4	*	1,168,640	1004	107	333
AG4W	*	997,620	992	103	287
N4NO	*	804,616	895	88	256
N4MM	*	693,036	666	108	264
K4ZGB	*	680,043	684	91	280
KI4TZ	*	666,750	698	95	255
KA8Q/4	*	652,275	739	86	239
K4SV	*	619,634	645	94	265
W4KW	*	462,520	593	84	226
NJ2F/4	*	425,246	536	86	212
N4WZ	*	418,264	573	88	220
WØYR/4	*	317,856	530	74	184
N4AA	*	304,106	443	68	185
N3BM/4	*	303,224	471	59	173
K1GU/4	*	292,995	423	73	182
AB4GG	*	272,400	430	61	166
N4PSE	*	245,952	387	69	183
N4CU	*	231,280	374	70	166
W2OO/4	*	211,120	345	72	160
K4FX	*	194,876	342	62	144
K4RO	*	184,574	305	64	165
WB4SLM	*	184,416	338	76	150
K4NLL	*	183,217	460	65	93
W4QK	*	179,196	325	60	158
WS4WW	*	176,600	351	45	155
K4FYM	*	145,733	291	52	139
W9FW/4	*	143,948	289	64	148
K4MF	*	138,890	290	47	123
K4EU	*	138,565	275	52	133
WW4CP	*	126,564	266	59	140
KF4ZS	*	114,304	251	58	130
K4CX	*	113,904	262	48	120
NS4T	*	112,254	261	45	114
AA4LR	*	110,100	282	41	109
K4PHE	*	97,940	221	43	123
KJ4DHB	*	97,722	211	50	128
W4CYS	*	96,730	257	46	124
W4MAY	*	93,120	276	32	88
WB4MAK	*	90,354	176	67	155
AF4OX	*	90,136	236	40	112
K4JAF	*	77,108	201	52	96
KI4DT	*	68,586	178	42	100
KI4TXP	*	65,794	185	39	95
NB4M	*	63,535	259	23	74
K4SKB	*	58,362	181	44	93
AI4WW	*	56,876	175	34	84
W4UT	*	56,250	169	43	82
N4TL	*	55,296	150	52	92
WA4ZXV	*	52,416	155	56	100
WD4LUR	*	49,623	138	37	102
K7CS/4	*	49,096	148	42	94
AE4EC	*	47,886	158	50	88
K4CEB	*	43,200	156	30	90
KJ4GWE	*	40,590	132	30	80
KG4CUY	*	39,776	128	37	76
N4HXI	*	34,727	111	45	76
N3KKM/4	*	31,753	115	38	75
NE8J/4	*	31,320	133	28	59
WM2Z/4	*	30,140	121	32	78
KD4QMY	*	26,558	108	35	63
N4WPJ	*	21,489	108	30	57
W9WI/4	*	19,710	96	34	39
KB4AZX	*	18,952	95	33	59
WF1L/4	*	18,860	96	27	55
K3JWI/4	*	17,654	80	32	59
N3KN/4	*	17,385	70	31	64
KK9O/4	*	16,660	81	29	56
K4JTT	*	13,193	65	30	49
W5XB/4	*	11,680	79	27	53
NY4D	*	11,440	61	31	49
WO4O	*	9,072	68	14	34
KU4VY	*	7,168	73	22	42
NY4O	*	7,130	64	26	36
W4ZYT	*	5,547	49	18	25
N2YO/4	*	4,896	46	19	29
N6CLN/4	*	2,592	34	21	27
W4BCG	*	1,620	23	16	20
KJ4MUY	*	4	1	1	1
KØEJ/4	**21**	**509,151**	**1217**	**33**	**124**
N4OX	*****	**441,071**	**1077**	**32**	**119**
N4JA	*	176,715	93	21	33
KM4HI	*	124,932	415	29	87
N4LZ	*	14,592	93	16	41
KK9A/4	**14**	**680,628**	**1760**	**38**	**118**
W8BLA/4	**7**	**29,656**	**168**	**23**	**65**
K4IE	*	13,192	93	18	50
W4QNW	**3.7**	**27,334**	**161**	**20**	**59**
***NA4K**	**A**	**852,208**	**801**	**100**	**292**
***N4XL**	*****	**619,570**	**757**	**89**	**245**
***N4JF**	*****	**593,044**	**712**	**90**	**256**
*AA4XA	*	412,902	549	88	251
*WB4JFS	*	280,108	439	68	171
*N9CM/4	*	265,132	412	67	171
*KJ4EX	*	264,393	384	69	192
*KS4X	*	239,628	389	68	160
*W6DVS/4	*	215,622	338	64	178
*W4YE	*	213,616	384	54	154
*NA4CW	*	182,352	302	72	160
*WA4JUK	*	157,504	315	63	151
*W3TB/4	*	112,412	256	57	122
*W4FT	*	104,880	235	62	128
*NG4L	*	103,850	252	49	106
*K4MCK	*	90,972	232	56	115
*KC1SS/4	*	84,150	210	45	125
*KC4TIX	*	63,801	212	43	96
*AI4GR	*	62,926	174	51	95
*KA4JPB	*	61,908	196	40	94
*W9NWY/4	*	61,438	196	40	99
*K4FJW	*	58,976	186	55	97
*K4ML	*	58,240	168	38	92
*WD4MW	*	53,165	179	57	98
*N8ESW/4	*	52,576	163	39	85
*WA4EMU	*	50,760	156	44	97
*N4ARO	*	42,390	129	45	90
*AJ4HZ	*	38,420	148	35	78
*N4WO	*	38,115	128	41	80
*N4EK	*	37,818	133	30	69
*W4OTN	*	35,919	131	40	77
*N4DBR	*	33,012	154	49	82
*N4LKE	*	32,130	134	40	79
*K4FTO	*	29,590	123	39	71
*WB4ZPF	*	26,800	110	30	70
*N2WN/4	*	25,813	121	32	51
*N4MIK	*	25,560	117	42	78
*N3TG/4	*	25,515	96	39	66
*KF7CG/4	*	24,640	113	43	69
*W4FRA	*	23,500	99	35	59
*KQ4Y	*	23,232	107	26	62
*K4JC	*	21,960	105	33	57
*WX4RM	*	21,733	86	37	66
*WB4FEV	*	21,186	100	42	57
*W4MJW	*	20,564	89	41	65
*KM4JA	*	19,039	106	27	52
*KG4ZOD	*	17,578	94	36	58
*N4APR	*	16,791	94	32	55
*AJ4GL	*	16,600	88	25	58
*W1ATA/4	*	16,554	64	35	58
*AA4ZU	*	15,051	88	35	52
*NY4JB	*	14,790	98	28	57
*N4DTF	*	14,130	62	37	53
*AI4UN	*	12,956	66	30	49
*KD4YDD	*	12,950	93	25	45
*AJ4FV	*	12,600	65	31	44
*KC4EZN	*	11,557	85	34	57
*KS4L	*	10,808	71	18	38
*K4GOP	*	10,716	69	27	49
*WU4B	*	9,954	60	30	49
*K4BSC	*	9,308	62	13	39
*W5TDY/4	*	6,993	51	29	34
*KM4RK	*	6,848	46	25	39
*WA4NOT	*	5,824	53	23	29
*KC4JD	*	5,763	54	19	32
*AA4DD	*	5,712	40	18	33
*WV4V	*	5,356	40	19	33
*KI4MGA	*	5,120	44	26	38
*KS4YX	*	4,680	60	17	28
*NØRZT/4	*	4,464	38	21	27
*W4PC	*	4,459	58	19	30
*WA4MAE	*	4,176	36	21	27
*KG4WPD	*	3,784	49	20	24
*K4TOJ	*	2,652	31	16	23
*WB3JKQ/4	*	2,146	29	16	21
*KO4OL	*	1,961	28	17	20
*K4CWA	*	1,848	25	16	17
*W4RLR	*	1,755	31	18	21
*N4FY	*	1,530	33	16	18
*KJ4IWX	*	1,288	22	9	19
*K4GRE	*	1,230	19	13	17
*KD4VVC	*	1,104	17	10	14
*NR4C	*	1,064	24	13	15
*KW4G	*	567	12	9	12
*NR4VT	*	432	15	8	10
*W1LZ/4	*	330	9	7	8
*W4EBA	*	240	8	6	6
*KD4NH	*	221	8	7	6
*ND1Y/4	*	28	8	4	3
***K4WI**	**28**	**27,550**	**222**	**15**	**35**
***WW4LL**	*****	**21,114**	**179**	**15**	**31**
*KJ4AOM	*	3,528	56	9	19
*W4JIK	*	2,562	49	8	18
*K3MAF/4	*	756	20	5	9
*KJ4YWU	*	6	1	1	1
***K4MDX**	**21**	**147,896**	**405**	**32**	**107**
***N4IG**	*****	**145,386**	**423**	**30**	**93**
*N4CT	*	37,386	146	24	69
*W4SUL	*	16,066	100	13	45
*K4NVJ	*	11,098	69	18	44
*KV1P/4	*	8,694	64	20	43
*N3TL/4	*	2,343	31	13	20
*NO4K	*	936	18	5	13
***N4MO**	**14**	**117,588**	**358**	**28**	**95**
***WB2TFM/4**	*****	**96,485**	**315**	**26**	**89**
*KØRRP/4	*	2,250	27	9	21
*KI4RXE	*	210	9	7	7
***WB2REM/4**	**7**	**57,600**	**440**	**26**	**74**
*W4PGM	*	6,996	102	12	41
***KG4NEP**	**3.7**	**5,544**	**62**	**13**	**31**
*NA4W	1.8	128	9	4	4
			(OP: K4WI)		

K5TR	**A**	**2,962,683**	**2438**	**150**	**407**
NR5M	*****	**2,172,958**	**1913**	**127**	**339**
K5ER	*	583,412	734	87	227
K5LAD	*	404,061	566	75	196
K5MV	*	382,910	493	80	215
N5XZ	*	286,638	469	74	184
AD5XD	*	218,544	397	80	152
N5VU	*	213,527	444	52	147
K7IA/5	*	197,451	374	56	157
AB5C	*	179,249	335	66	137
K5KM	*	143,200	297	59	120
N5SV	*	69,580	200	51	91
K7RSM/5	*	55,125	169	44	103
WT5U	*	30,264	114	34	70
W5RI	*	11,210	124	16	43
KE1R/5	*	7,104	66	31	33
W5RAW	*	5,880	56	28	32
KU5B	**28**	**55,784**	**322**	**22**	**54**
W5PR	*****	**51,148**	**273**	**24**	**52**
W5MK	*	1,245	37	6	9
N5MV	**21**	**164,700**	**545**	**32**	**103**
K5ENS	*	22,826	87	27	86
AC5O	**14**	**45,011**	**243**	**27**	**76**
K5YM	*	22,831	134	23	56
W5WMU	**7**	**157,122**	**567**	**33**	**96**
			(OP: W5XZ)		
K5RX	**1.8**	**12,705**	**122**	**15**	**40**
***N5AW**	**A**	**1,537,704**	**1141**	**135**	**369**
***N5DO**	*****	**902,088**	**861**	**109**	**293**
*W5GFI	*	271,040	462	73	169
*N5MOA	*	230,328	339	84	168
*N4IJ/5	*	210,720	352	71	169
*AD5UQ	*	192,425	339	69	146
*K5DHY	*	135,708	309	54	118
*WA5SOG	*	93,744	223	52	116
*N5CLK	*	92,160	232	56	104
*W1JCW/5	*	87,376	204	56	116
*K3TD/5	*	84,162	218	62	104
*KE5LQ	*	80,931	193	60	99
*W5FIT	*	72,380	215	42	98
*AA5BE	*	54,026	177	35	84
*N5KF	*	53,460	151	49	83
*K5BZH	*	43,772	152	48	76
*AA5JG	*	37,247	143	50	69
*W8DM/5	*	29,393	101	41	78
*K1HG/5	*	16,926	96	34	44
*W5ESE	*	12,238	79	22	36
*KB6OJE/5	*	5,390	47	24	31
*WA5RML	*	4,343	58	18	25
*WW5Q	*	3,894	52	29	30
*AE5NO	*	2,880	32	21	27
*W6KCJ/5	*	2,535	50	19	20
*KB5DRJ	*	1,036	19	13	15
*KD2KW/5	*	924	24	16	17
*N5OTT	*	368	11	8	8
*N7FF/5	*	220	7	5	6
***KZ5J**	**28**	**8,864**	**100**	**10**	**22**
***K8OZ/5**	**21**	**90,354**	**303**	**26**	**85**
*WA5AU	*	950	20	8	11
*WA5RHG	*	665	13	9	10
*W5GUZ	*	230	8	5	5
*KE5LHC	14	1,104	33	10	13
*W6HH/5	3.7	3,040	39	15	23

K6NA	**A**	**2,467,150**	**1974**	**140**	**335**
W6YI	*****	**1,913,302**	**1805**	**125**	**284**
K6XX	*	1,701,080	1493	131	299
W6PH	*	899,080	905	117	263
KF6T	*	773,463	845	110	237
W6TK	*	581,179	743	100	189
WA6KHK	*	393,317	595	83	168
W6UM	*	377,298	476	105	201
K6LRN	*	363,424	492	88	189
KE1BYL/6	*	326,025	623	67	140
KM6XX	*	249,839	449	83	146
W1RH/6	*	198,306	352	59	148
N6TV	*	195,600	372	81	119
N6BM	*	194,200	398	67	133
WC6H	*	172,050	303	79	143
K6JAT	*	126,540	293	70	110
K6YK	*	123,516	239	66	122
KG6AO	*	107,910	261	70	95
KI6QDH	*	102,718	272	62	92
AA6PW	*	84,609	246	53	100
WT6G	*	78,971	222	53	104
N6NF	*	74,236	201	45	89
W4EF/6	*	56,760	155	58	74
WB6JJJ	*	47,472	154	58	71
AD6KA	*	40,188	153	43	59
WØYK/6	*	38,586	148	44	65
WA6PZK	*	31,825	136	34	61
W6SX	*	29,304	127	39	60
W6RFF	*	28,250	141	50	63
K6HRT	*	25,662	117	40	51
K6DGW	*	18,357	94	35	52
N6RI	*	16,490	74	35	50
K6KAL	*	16,376	78	43	46
AJ6V	*	16,020	72	41	48
K9JM/6	*	14,145	71	28	41
K6XC	*	11,418	71	30	36
N3FAW/6	*	510	20	8	9
W6YA	**21**	**425,859**	**1029**	**34**	**113**
W6DCC	*	53,361	262	27	72
K6HNZ	**14**	**127,908**	**474**	**31**	**83**
WD6FTB	*	54,802	198	30	76
K2SOM/6	*	126	24	1	1
			(OP: K6III)		
***N6RV**	**A**	**493,000**	**655**	**93**	**197**
*AA6K	*	243,798	406	86	141
*NN3V/6	*	213,210	489	71	135
*W6AQ	*	161,196	317	76	126
*K7XE/6	*	103,740	279	59	97
*K6TV	*	97,050	248	48	102
*W6ZL	*	95,211	234	59	90
*WW6O	*	75,761	223	51	86
*N6ORB	*	73,968	206	47	87
*N6IEF	*	68,442	232	46	76
*NU6C	*	60,071	185	49	78
*KE6WC	*	57,792	194	57	72
*KC6MMU	*	46,046	198	37	54
*KI6JJW	*	43,815	170	46	69
*KE6SHL	*	34,944	135	48	64
*K7LA/6	*	27,930	121	37	58
*KR6LH	*	24,992	117	41	47
*NZ6Q	*	24,610	112	47	60
*N6DZR	*	22,072	99	40	49
*N6FD	*	21,995	105	37	46
*NU6N	*	18,630	98	42	48
*NN6CH	*	14,760	91	37	53
*AA6DX	*	14,000	89	35	45
*KI6DRN	*	13,987	89	33	38
*KA6MIB	*	12,903	83	28	41
*AA6EE	*	12,596	79	31	36
*NA6G	*	11,573	80	31	40
*WA2OOB/6	*	10,626	63	30	36
*K6BIR	*	10,530	67	32	33
*KI6WOX	*	10,317	67	26	31
*K6GHA	*	8,906	63	37	36
*K6ACJ	*	6,837	50	26	27
*AD6LV	*	5,320	58	16	22
*W6JWP	*	4,335	52	24	27
*K6CSL	*	3,710	46	28	25
*KL1WE/W6	*	3,525	33	18	29
*KY6LA	*	3,485	36	20	21
*KI6ORO	*	3,456	47	25	23
*NY6U	*	3,016	69	12	17
*AE6XC	*	1,736	25	16	15
*K6MUG	*	1,288	24	14	14
*W6RTW	*	912	20	10	9
*K6DSW	*	756	21	15	13
*AA6GZ	*	704	30	17	15
*N6PCD	*	560	14	10	10
***W6/VK2IMM**	**28**	**936**	**25**	**6**	**7**
*AE9F/6	21	18,113	122	23	36
*AE6YB	*	16,473	108	21	36
*WV6N	*	10,502	83	22	37
*W6MIL	*	5,165	47	18	27
			(OP: OP:N6WR)		
*W6RPH	*	2,430	35	13	17
*WA6GFR	*	340	13	8	9
***W6IEE**	**14**	**242**	**12**	**5**	**6**
***WA6WPG**	**3.7**	**8,967**	**76**	**18**	**31**

K5RR/7	**A**	**1,524,135**	**1401**	**120**	**297**
W7AT	*****	**1,383,360**	**1340**	**133**	**260**
			(OP: W7EW)		
N7TT	*	1,002,400	1120	116	242
N9RV/7	*	705,870	1079	79	174
K7EDX	*	489,114	749	83	178
W7IJ	*	395,472	632	85	146
W7TSQ	*	319,278	491	93	161
K7HP	*	316,008	483	86	178
W7WW	*	280,800	465	77	183
NF7E	*	256,088	447	84	154
WA7LT	*	205,504	426	81	127
KF7TY	*	196,032	399	61	131
K7XC	*	165,834	256	86	163
N6TW/7	*	159,929	308	76	141
K6PJ/7	*	124,000	254	81	119
KE2VB/7	*	119,048	258	70	114
N3RC/7	*	103,600	292	47	93
KD7DCR	*	87,320	236	52	96
W7CAR	*	78,474	249	49	74
W7PU	*	73,593	273	32	85
W7EPA	*	68,061	198	38	109
WI7F	*	61,490	192	54	89
K9JDV/7	*	57,960	168	51	75
W7JDE	*	53,176	165	52	84
N7QS	*	46,830	177	41	64

WA7PRC	"	45,136	142	47	65
WG7X	"	43,452	144	59	83
NI7R	"	37,120	122	46	70
AD7XZ	"	32,606	132	49	70
W7ABC	"	31,878	129	49	77
W6ZQ/7	"	29,008	119	31	67
N7WS	"	23,941	104	31	58
WY7LL	"	22,680	102	39	69
KK7X	"	11,058	71	23	34
KE7GRL	"	10,512	73	32	41
KB7AZ	"	2,088	33	14	15
KK7CG	"	1,482	35	19	19
N7CW	21	160,868	443	33	98
N7LD	"	89,688	312	30	81
KI7DG	"	16,569	105	21	42
W6AEA/7	14	192,816	488	34	110
W7KKR	"	26,334	125	22	55
K7ABL	"	9,396	68	17	37
NE9Z/7	"	5,610	58	16	35
NG7Z	"	4	1	1	1
W7WA	7	396,648	1134	36	90
*NQ7R	A	461,776	550	96	208
*K7ACZ	"	434,868	512	107	227
*K7JE	"	295,427	438	78	173
*N3XRU/7	"	190,848	342	71	142
*N7IR	"	153,078	300	65	121
*KS6A/7	"	133,056	307	58	110
*KD7MSC	"	122,472	293	70	98
*W7YAQ	"	112,395	252	60	117
*N7VR	"	109,018	317	62	120
*NX7TT	"	103,230	235	55	131
*WAØWWW/7	"	100,776	258	53	99
*K7XV	"	97,940	225	53	113
*NG7A	"	91,784	239	53	101
*WA7PVE	"	79,776	218	58	86
*N7UR	"	79,599	213	58	99
*N7VZU	"	73,235	193	47	104
*K7DNH	"	64,722	189	54	84
*AA7DK	"	59,024	205	43	81
*W7QN	"	47,908	168	45	73
*N7ESU	"	39,376	145	37	70
*K6UM/7	"	33,128	126	35	66
*K7BBR	"	27,260	139	37	57
*WE6EZ/7	"	25,688	116	45	59
*KE7VUX	"	23,220	104	42	48
*WB7FJG	"	19,789	96	32	45
*KD7RUS	"	19,197	101	33	46
*K6WSC/7	"	17,015	93	37	46
*NR7Q	"	16,290	82	42	48
*N7BXX	"	16,068	93	30	48
*NE7D	"	15,663	91	19	50
*K7TR	"	14,196	94	35	43
*W7YVK	"	14,137	78	33	34
*KG7WZ	"	13,680	86	30	46
*W8BFX/7	"	12,728	68	35	39
*KF7GYE	"	7,560	67	31	32
*KR7DX	"	7,488	58	25	27
*W7JFF	"	6,477	51	23	28
*WØPAN/7	"	6,450	63	16	27
*KY7K	"	4,947	71	23	28
*AE7IX	"	4,545	47	19	26
*WB4UIC/7	"	4,094	36	20	26
*KD7YOZ	"	3,920	67	17	23
*W7LKG	"	3,818	34	19	27
*WS7V	"	3,713	35	21	26
*KD7HGS	"	3,200	34	19	21
*KGØAL/7	"	2,128	40	19	19
*KF7AMY	"	2,058	26	19	23
*AD7XV	"	1,566	22	15	14
*N7AM	"	1,508	20	15	14
*KC7MIQ	"	1,140	22	16	14
*AD7OG	"	952	18	14	14
*KO7P	"	756	17	14	13
*KF7MAX	"	690	29	11	12
*K7KFB	"	425	17	8	9
*KC7H	"	288	10	8	8
*W7JAZ	"	210	11	5	5
*W8TK/7	"	160	6	5	5
*K7HRW	"	63	5	4	3
*KD7GHZ	"	15	5	3	2
*K7ULS	28	8,241	108	17	24
*W7UPF	21	57,469	238	27	74
*WA7NWL	"	19,734	108	21	48
*K7RF	"	8,307	77	17	22
*KJ7QT	"	6,125	50	21	28
*K6TUJ/7	"	2,412	46	15	21
*KL1SF/K7	"	1,364	24	14	17
*KC7UP	"	216	8	5	7
*W7FP	14	123,380	373	33	91
*N7BK	"	119,925	368	31	86
*KF7BNO	"	140	14	5	5
*N7VTD	"	24	3	2	2
*AB7E	7	51,000	229	26	74
*N7ZG	3.7	8,316	85	20	24
N8BJQ	A	1,647,030	1237	123	360
WB8TLI	"	630,125	656	95	260
N8DE	"	447,913	553	81	226
K8FL	"	424,125	495	95	230
W8GG	"	329,574	438	94	200
K8ZZU	"	285,124	447	67	171
W8ZA	"	253,690	410	63	167
AD8W	"	246,159	390	67	176
K8BZ	"	178,162	300	74	155
KG8CW	"	170,765	330	63	142
K8ESQ	"	154,251	294	55	142
W8PG	"	140,999	306	50	131
W8OHT	"	91,455	217	69	132
W8HMK	"	83,655	219	63	106
N8BHL	"	60,112	172	36	100
WA8FRE	"	53,046	195	38	88
N8IVE	"	41,888	135	35	84
K8PTT	"	41,230	126	40	93
N9RC/8	"	28,840	111	35	68
K8LO	"	22,791	89	35	72
AA8BV	"	13,845	81	18	47
N8RLG	"	3,015	32	19	26
K8ALM	"	700	15	13	15
WA8WV	"	624	13	13	13
N8II	28	17,050	127	17	33
W8TWA	14	183,446	500	32	102
W8KTQ	"	54,439	230	26	75
KD8SQ	"	44,896	193	24	68
NF8J	"	13,410	100	8	37
*WZ8T	A	327,555	505	69	182
*WD8EOL	"	318,570	508	69	190
*K8LY	"	182,554	357	53	141
*W8KNO	"	125,685	270	54	135
*N8VV	"	117,820	267	57	115
*KB8UUZ	"	114,480	255	58	122
*N8BV	"	112,852	306	58	120
*K8YYY	"	96,148	241	47	125
*KE8FO	"	80,631	203	48	105
*WS6K/8	"	71,651	219	46	91
*W8TM	"	64,260	175	40	95
*K8DV	"	50,126	134	40	102
*KB8KE	"	47,712	132	47	95
*AA8HH	"	44,375	135	35	90
*WA8RSA	"	38,784	147	45	83
*KA8NJW	"	29,498	142	30	68
*KD8JAM	"	29,432	111	33	71
*N8OQQ	"	21,712	116	32	60
*KN8J	"	18,920	78	29	57
*KJ8O	"	17,336	98	33	55
*WB8NXG	"	17,004	84	29	49
*N8AA	"	15,428	89	26	50
*KC8HQS	"	14,274	83	27	51
*KC8YLD	"	13,725	83	26	49
*W8IDM	"	12,212	70	29	42
*N8PPF	"	9,728	72	26	38
*WA8UMT	"	9,360	53	24	41
*W8DW	"	8,988	75	39	45
*AC8GI	"	7,021	57	22	37
*WD8KNC	"	4,982	46	17	36
*NF8M	"	1,785	20	17	18
*KD8HHG	"	1,175	21	12	13
*KC8UNR	"	1,166	27	7	15
*W8IDW	"	418	15	10	12
*N2OPW/8	"	405	13	8	7
*KD8FDK	"	143	8	6	5
*KD8GOX	21	9,744	63	20	38
*AF8C	14	18,630	115	18	51
*N8WAV	"	9,408	71	14	35
*NA8V	3.7	33,680	174	20	60
W9RE	A	4,472,940	2843	154	433
K9CT	"	432,345	568	85	200
K9ZM	"	317,460	458	72	188
K9MMS	"	212,268	350	71	157
W9NY	"	201,438	433	51	135
N9WKW	"	178,503	350	63	136
K9BGL	"	76,020	260	29	76
WT9U	"	71,994	197	42	100
W9COX	"	61,056	222	39	89
K9BTQ	"	45,375	150	43	82
N9UY	"	44,511	176	36	75
NJ9Z	"	37,625	128	52	73
NV9X	"	35,919	138	42	75
K3WA/9	"	34,970	100	39	91
N9JZN	"	20,000	77	42	58
K9WMS	"	11,376	60	27	45
KØTQ/9	"	10,074	64	29	44
K9JIG	"	4,410	42	7	28
WB9AYW	"	16	2	2	2
N9MW	21	171,855	515	31	104
W9OP	"	119,888	364	29	98
N9GH	"	9,996	73	15	36
WB9Z	14	885,764	2074	39	125
K9SH	3.7	12,784	111	16	52
WO9S	1.8	168	17	3	3
*N4TZ/9	A	988,603	909	103	304
*KD9MS	"	381,066	491	86	215
*K9JE	"	246,228	433	59	154
*KF9TI	"	169,983	326	53	134
*N9LYE	"	129,204	271	66	128
*W9VQ	"	121,344	251	60	132
*WD9CIR	"	82,880	211	50	110
*W9QL	"	68,391	197	51	98
*KV9W	"	58,293	182	44	83
*K9KMD	"	53,875	184	37	88
*KR9E	"	28,336	108	43	69
*W9LW	"	26,418	103	41	70
*WC9B	"	22,244	108	30	53
*KC9LIF	"	19,928	107	38	56
*W9OA	"	19,050	102	17	58
*KC9LQS	"	15,372	103	35	49
*KC9KKM	"	13,520	84	30	50
*KB9YGD	"	12,390	66	26	44
*AA9RT	"	10,626	69	34	43
*WB9LRK	"	9,060	66	22	38
*N9BT	"	6,588	53	24	30
*N9LB	"	6,336	43	27	39
*K9DEB	"	5,292	48	24	30
*K9TCD	"	4,836	33	22	30
*KC9OYE	"	4,361	66	26	23
*K9XB	"	3,741	46	16	27
*KB9KAK	"	3,431	41	21	26
*N9VPV	"	3,280	33	17	23
*KE9EX	"	3,000	29	23	27
*K9GY	"	2,600	26	16	24
*KC9IL	"	1,664	24	14	18
*WB8RFB/9	"	1,540	27	12	16
*WD9E	"	1,110	33	13	17
*WB9LPW	"	1,081	18	12	11
*K9ES	"	1,026	20	11	16
*WR9Y	"	378	13	10	8
*KA9OBZ	"	220	7	5	6
*K2UR/9	21	108,840	328	29	91
*KD9AC	"	7,590	68	17	38
*KA9JAC	"	475	10	10	9
*WI9H	14	21,930	103	25	60
*WB8BZK/9	"	360	12	8	7
*W9ZRX	7	20,935	108	20	59
WØUA	A	2,945,013	2235	149	374
NCØB	"	528,640	667	83	212
KØOU	"	459,563	601	84	215
NEØU	"	450,216	641	82	214
K9MWM/Ø	"	215,754	423	79	152
KØAP	"	164,116	321	44	134
WØBH	"	160,826	347	64	130
KØBUD	"	150,844	347	49	123
KØPK	"	147,030	276	70	125
KØJPL	"	140,003	270	61	130
K5VYT/Ø	"	134,400	292	43	125
KØFA	"	124,080	285	57	119
WØRX	"	112,288	247	63	113
KØJJR	"	97,350	237	61	104
WØGG	"	85,169	198	48	113
NØOST	"	78,435	222	39	96
WØZQ	"	72,864	204	54	90
WMØL	"	65,520	198	53	91
NØIM	"	35,055	123	45	78
KØVK	"	33,156	183	44	64
KØXTR	"	24,605	102	41	54
WØZA	"	23,571	128	35	46
NAØBR	"	21,505	95	30	55
WØDET	"	20,331	101	25	56
NØOK	"	11,368	68	15	43
KSØT	"	7,137	59	26	35
KØYR	"	850	21	8	9
N7DR/Ø	21	54,720	215	27	68
KBØYH	"	41,132	159	25	66
KØIZ	14	138,861	395	33	106
WØPPF	"	13,514	121	18	40
NØZC	"	798	35	8	11
WØGJ	7	57,908	246	34	90
WØDD	3.7	120	7	6	6
*KBØEO	A	584,064	705	91	221
*WØETT	"	354,830	561	78	181
*KØCN	"	351,722	505	81	178
*KØJJM	"	222,939	435	62	145
*KØFX	"	181,068	330	76	161
*NØUY	"	176,300	328	66	139
*KØBJ	"	174,240	355	48	128
*KØCF	"	119,660	286	45	110
*WØRK	"	98,115	241	51	104
*WAØLJM	"	71,346	198	43	95
*WØRAA	"	49,028	170	43	76
*K1WY/Ø	"	43,287	113	42	99
*WBØLJK	"	40,600	151	43	73
*KDØCVZ	"	39,809	138	44	77
*WØYJT	"	38,760	149	37	77
*AGØA	"	36,288	143	43	83
*K9WN/Ø	"	31,800	121	34	66
*KØBWQ	"	28,013	154	44	65
*NYØT	"	23,958	79	44	77
*NØBUI	"	23,205	105	23	62
*WØPI	"	16,093	80	31	46
*NØWCH	"	14,325	83	29	46
*KDØMKT	"	10,011	95	35	36
*NØGOS	"	9,184	79	22	34
*KCØJFY	"	7,788	51	26	40
*KJØP	"	7,371	92	30	33
*WØNFS	"	5,356	49	18	34
*KDØBSY	"	4,462	46	23	23
*ACØLL	"	3,627	72	19	20
*W1JEQ/Ø	"	3,276	41	27	36
*KØIV	"	3,168	49	17	19
*N9GC/Ø	"	2,871	42	12	17
*N1WQ/Ø	"	2,485	28	15	20
*KAØCSW	"	1,537	37	10	19
*KAØEIC	"	925	20	12	13
*KCØUUT	"	888	14	11	13
*KDØMJT	"	638	23	12	10
*KCØYHU	"	504	18	10	11
*AAØK	"	391	17	8	9
*NØCKC	21	6,204	54	16	28
*NØAX	"	1,725	34	11	12
*KØANS	"	720	20	7	11
*NØLZ	"	629	14	8	9
*KCØRQH	"	540	15	6	9
*NGØT	14	19,734	111	21	48

Alaska

KL7AC	A	176,276	627	50	77
NL8F	7	18,096	265	11	15
KL7RA	3.7	40,020	312	23	35
*WL7BDO	A	73,480	384	42	46
*KL7R	"	10,920	110	21	21
*KL2R	"	6,600	93	18	15
(OP: KL1JP)					
*WL7UQ	14	22,836	135	22	44

Barbados

8P5A	A	483,550	1132	50	140
(OP: W2SC)					

Belize

*V31MH	A	118,244	307	59	105
(OP: W7ASF)					

Bermuda

VP9AD	21	7,296	59	16	32
*VP9/N1SV	A	1,507,158	2747	73	206

Canada

VY2ZM	A	9,863,138	5832	148	486
(OP: K1ZM)					
VY2TT	"	2,401,990	2408	98	303
(OP: K6LA)					
VY2LI	"	1,344,952	1745	73	219
VE1ZJ	"	486,336	734	84	214
VA1MM	"	427,700	862	69	166
VE9SIX	28	2,860	51	6	14
(OP: VE9AA)					
VO1MP	14	911,880	2288	35	114
VE9AA	7	141,246	532	28	86
*VE1ZA	A	725,340	942	75	239
*VE1ZD	"	311,736	750	48	138
*VE1JS	"	304,200	558	51	149
*VO1TX	"	182,728	495	52	130
*VE1SQ	"	182,422	390	57	140
*VO1DJT	"	104,258	267	44	110
*VE9IS	"	65,500	223	31	94
*VO1BBN	"	59,059	158	40	103
*VA1CHP	21	206,248	731	25	91
*VE1AL	"	44,678	197	20	69
*VE9ZX	3.7	41,808	300	15	52
VE2IM	A	8,803,289	5877	134	443
(OP: VE3DZ)					
VE2GSO	"	1,532,493	2460	71	198
VE2FXL	"	20,100	204	17	33
VE2FBD	7	12,426	92	14	43
(OP: VA2UP)					
*VA2OP	A	309,624	758	52	142
*VE2AWR	"	166,940	371	45	125
*VE2HIT	"	119,990	288	45	124
*VE2EZD	"	72,574	228	38	93
*VE2AXO	"	45,588	160	34	82
*VE2VJP	"	21,389	128	23	50
*VA2UTC	"	7,008	68	18	30
*VE2JMK	"	6,533	79	18	29
*VE2GLA	"	896	18	12	16
*VA2SG	1.8	91	11	4	3
VC3A	A	7,447,734	5397	137	412
(OP: VE3AT)					
VE3JM	"	5,236,938	4382	111	356
VE3CX	"	3,384,368	3542	110	314
VE3BW	"	2,043,366	1841	119	323
VC3X	"	1,937,320	2195	97	277
(OP: VE7VR)					
VE3RTU	"	1,451,952	1411	105	327
VE3KKB	"	214,338	333	73	184
VE3RER	"	83,640	221	48	116
VE3MM	"	65,094	271	36	78
VE3FTM	"	27,714	113	27	66
VA3LUK	"	6,327	52	23	34
VA3PGL	"	680	21	12	8
VA3ACZ	"	36	4	3	3
VE3KZ	21	605,052	1541	32	115
VA3TTU	14	8,845	62	24	37
VA3XH	7	53,820	238	26	66
VE3BDN	3.7	29,348	540	10	19
*VA3YP	A	917,007	1288	72	201
*VE3FDT	"	625,856	893	88	220
*VA3SWG	"	559,251	1075	61	170
*VE3YF	"	266,190	359	72	213
*VE3AD	"	221,704	387	64	150
*VE3BVA	"	147,261	294	51	140
*VE3OX	"	136,338	320	62	124
*VA3GD	"	100,636	328	46	93
*VE3JDF	"	94,958	256	54	104
*VE3RSA	"	45,276	135	43	89
*VE3OM	"	44,196	140	32	84
*VE3RCN	"	40,716	142	39	78
*VE3MCF	"	40,228	147	34	79
*VE3TU	"	31,396	153	39	55
*VE3GFN	"	24,426	85	33	85
*VA3TPV	"	9,709	63	31	42
*VA3FS	"	8,690	80	16	39
*VE3NQM	"	6,105	46	23	32
*VE3AJ	"	1,674	30	8	19
*VA3MAH	"	1,333	19	12	19
*VE3FH	21	71,540	265	22	76
*VA3FP	"	69,201	230	21	78
*VE3IAE	"	31,450	165	17	57
*VA3GUY	14	15,984	112	12	42
*VA3FN	"	24	4	3	3
*VA3DF	7	147,960	545	29	91
*VE3EDY	1.8	5,040	194	6	9
VE4EAR	A	1,676,346	2308	99	235
VA5LF	A	105,610	412	40	78
VE5CPU	"	33,945	149	33	60
VE5FX	14	258,255	812	36	99
VE5UA	1.8	16,160	273	12	20
*VE5ZX	A	462,848	1000	65	161
*VE5UO	"	1,836	41	13	14
*VE5AAD	14	13,145	101	18	37
VE6EX	A	966,492	2120	75	153
VA6UK	"	192,700	494	53	111
VE6EPK	"	145,635	475	46	87
VE6CMV	"	12,922	86	29	42
*VE6ZC	A	44,198	229	43	55
*VE6TD	"	23,712	130	36	42
*VA6AM	"	20,930	137	30	40
*VE6GEL	"	9,591	88	32	37
*VE6VS	"	1,856	39	16	13
*VE6DKC	14	12,006	101	18	40
VA7ST	A	596,232	1145	80	154
VE7AX	"	138,528	417	52	92
VA7BS	"	3,422	65	15	14
VE7XF	21	188,540	690	29	81
XM7CPR	14	277,200	983	35	97
*VE7BC	A	249,480	601	70	110
*VE7ABC	"	188,097	514	60	99
*VE7NS	"	95,580	256	48	87
*VA7RN	"	49,060	177	43	67
*VE7RSV	"	26,910	127	40	50
*VA7CRZ	21	33,528	196	23	43
*VE7WWW	"	13,432	111	19	27
*VE7TJL	"	288	16	5	4
*VE7CV	14	77,623	334	26	65
*VE7AIF	1.8	64	12	2	2
*VE8GER	A	117,092	321	56	90
*VYØJA	"	1,100	24	11	9
(OP: VY1JA)					

Cuba

*CM5FZ	A	101,680	307	45	110
*CM8WAL	28	9,210	114	12	18
*CO8AW	21	29,106	257	18	45
*CO6LP	14	342,912	1414	30	98
*CO8CY	7	34,861	231	18	53
*CO6YAC	3.7	131,475	895	19	56

Dominican Republic

HI8PJP	28	11,662	150	14	20
*HI3TEJ	A	5,414,118	5388	111	327
*HI3EPR	28	14,756	228	13	18
*HI3K	21	605,968	2206	29	92
*HI3CC	14	185,163	970	27	66
*HI3FVA	7	229,104	999	29	82

Greenland

OX2A	A	3,065,904	2951	104	319
(OP: OX3KQ)					

Grenada

*J39BS	A	18,798	108	38	40

Guadeloupe

*FG1PP	A	48,954	282	36	46

Guantanamo Bay

*KG4EM	A	54,524	309	37	49

Honduras

*HR1RTF	A	40,810	159	41	69

Martinique

TO7A	A	8,200,120	6026	152	468
(OP: UT5UGR)					

Mexico

4B2S	A	1,288,701	2185	94	185
(OP: XE2S)					
XE1V	"	124,160	315	71	123
XE2AC	28	55,055	385	20	45
4B1B	14	366,798	1617	30	83
(OP: XE1B)					
*XE3N	A	699,699	1137	79	194
*XE1ZTW	"	89,235	269	52	83
*XE1AY	"	38,129	198	41	50
*XE2JA	"	30,624	261	28	30
*4B2ANT	"	8,352	274	10	6
(OP: XE2ANT)					
*XE2JTS	"	663	24	7	6
*XE1TD	28	840	21	6	8
(OP: XE1GRR)					
*XE2HWB	"	516	52	9	12
*XE1GRR	21	80,400	519	25	50
*XE2WWW	"	17,478	497	8	10
*XE1BY	14	161,680	849	27	67
*XE2YWH	7	5,412	75	12	21
*XE1CQ	3.7	140,798	811	25	64

Montserrat

VP2MDG	A	5,394,420	4812	120	340
(OP: K2DM)					

Nicaragua

YN2AA	A	5,721,522	5146	123	375

Panama

HP1/IZ6BRN	A	179,334	725	46	77
HP1RSB	28	210	10	3	4
*HP3FTD	A	15,975	85	29	42
*HP1RAT	28	735	18	7	8

Puerto Rico

WP4WW	28	1,656	56	6	6
(OP: KP4JRS)					
NP4DX	7	350,280	1294	29	97
(OP: KP4WW)					
*WP3GW	A	104,490	249	51	111
*KP4JFR	"	18,565	97	26	53

Sint Maarten

PJ7MF	21	7,209	139	13	14

St. Kitts & Nevis

V48M	A	3,534,342	3989	102	297
(OP: W2OX)					

U.S. Virgin Islands

KV4FZ	1.8	59,904	497	18	46
*KP2DX	A	37,754	215	33	53
(OP: KP2BH)					

AFRICA

African Italy

IG9/I2ADN	28	149,124	564	24	78
*IH9YMC	21	90,798	458	16	58

Canary Islands

EA8CDI	A	941,680	1134	78	220
EF8G	"	10,557	75	21	30
(OP: EA8CNB)					
ED8D	21	312,732	932	28	98
EA8LS	"	23,052	167	13	38
EA8BVX	7	420	10	5	9
EA8CMX	3.7	388,065	1158	25	98
(OP: OH2BYS)					
*EA8OM	A	800,172	1023	65	214
(OP: DJ1OJ)					
*EA8AJO	"	149,240	346	49	115
*EA8CVW	"	92,322	245	39	99
*EA8CST	"	63,726	189	39	90
*EA8BQM	"	52,002	182	38	69
*EA8DG	"	8,001	50	27	36
*EA8AQV	"	7,725	43	32	43
*EA8TX	28	359,476	1001	24	100
*EA8CQW	21	49,468	225	22	61
*EA8VD	14	89,832	292	27	87
*EA8BPX	7	12,805	87	20	45

Djibouti

*J28AA	A	53,958	198	28	74
(OP: E7ØA)					

Kenya

5Z4EE	A	172,520	337	64	126

Madagascar

*5R8UI	A	54,655	220	24	61
(OP: IK5ZUI)					

Madeira Islands

CR3L	A	9,005,582	5731	121	417
(OP: DJ8OG)					
*CT3FJ	14	28,512	177	17	55

Morocco

CN2R	A	14,462,305	7020	161	554
(OP: W7EJ)					
*CN8YE	A	166,690	376	40	118
*CN8KD	21	166,950	802	20	55
*CN8VO	14	37,417	190	15	56

Namibia

*V51YJ	A	1,603,386	1774	84	233

Rep. of Congo

*9Q6CC	28	59,616	300	18	63
(OP: CX2CC)					

Senegal

6W1RY	A	6,858,838	4777	124	394
(OP: F5VHJ)					

South Africa

ZS6GF	A	909,891	1182	89	224
ZS5NK	"	320,252	530	74	162
ZS1EL	"	160,208	405	48	104
ZS6BRZ	"	3,168	32	22	26
ZS6TQ	28	461,992	1180	29	107
ZS1SR	14	142,600	411	35	89
*ZS2I	A	114,180	248	49	124
*ZS2NF	"	75,153	199	52	89
*ZS6KU	"	13,464	97	17	49
*ZS6ELI	"	8,236	53	29	42
*ZS1JY	"	7,076	47	22	36

Sudan

*ST2AR	A	4,290,087	2955	113	390
(OP: S53R)					

Tunisia

*3V8SS	A	2,329,155	2028	91	314
(OP: KF5EYY)					

Zimbabwe

*Z23MS	A	315,240	621	55	130
*Z2/AC7GP	"	108,375	334	34	91
(OP: AC7GP)					

ASIA

Afghanistan

*T6MB	A	205,965	490	54	145
(OP: SP8UFB)					
*T6AF	"	6,519	57	12	29
(OP: WA2EWE)					

Armenia

EK3SA	21	403,920	1179	31	101
*EK3GM	A	238,590	486	43	155
*EK8WA	"	1,824	22	13	19
*EK6TA	7	557,370	1883	21	89

Asiatic Russia

R9DX	A	5,942,250	3985	132	438
RC9O	"	4,825,212	3982	112	364
(OP: N5ZO)					
RO9O	"	3,842,476	3159	116	368
RA9AE	"	1,798,173	1651	94	329
UA9JDP	"	1,240,616	1483	76	240
UA9BS	"	560,700	731	72	228
RA9AN	"	533,172	640	70	244
RT8O	"	398,985	792	52	149
RL9I	"	386,298	814	52	146
UA9FGJ	"	266,063	494	46	153
R9MJ	"	234,234	404	57	177

RZ9UO	"	74,549	264	39	88
RZ9OW	"	63,440	237	37	93
RU9UC	"	34,768	141	30	76
RX9KD	"	28,880	191	22	58
RV9LM	**28**	**44,688**	**306**	**12**	**44**
RV9CX	**21**	**277,290**	**886**	**30**	**105**
RU9I	"	238,952	883	24	95
R9CB	"	150,591	597	22	79
RK9AWT	"	32,406	262	15	51
			(OP: UA9AB)		
RV9JR	**14**	**238,464**	**703**	**35**	**109**
UA9XHT/9	"	43,142	273	17	57
R9QQ	**7**	**24,824**	**172**	**13**	**45**
RX9UKF	3.7	2,496	55	10	16
RA9FW/9	**1.8**	**121,346**	**540**	**16**	**70**
UA9KAA	"	44,814	256	10	56
***RG9A**	**A**	**2,792,153**	**2342**	**98**	**329**
***UA9R**	**"**	**1,026,431**	**1228**	**78**	**253**
*RT9S	"	915,486	944	79	284
*RW9TR	"	268,814	525	53	158
*RX9CCJ	"	210,375	419	45	142
*RA9YAI	"	204,626	453	54	148
*R9FR	"	186,732	425	49	140
*RN9N	"	185,952	418	53	155
*RW9OX	"	160,648	393	40	132
*UA9OAI	"	152,698	421	54	128
*RW9QA	"	147,552	323	50	124
*UA9SUX	"	130,606	393	33	100
*RX9DJ	"	100,392	297	35	106
*RT8X	"	95,160	290	35	95
*RW9YW	"	92,919	328	41	100
*UA9AX	"	76,818	216	57	120
*RX9JD	"	70,484	218	37	97
*RV9MA	"	55,278	151	59	107
*RX9AI	"	55,224	186	23	95
*UA9XF	"	53,824	176	28	88
*RV9WND	"	46,355	203	36	91
*R9UG	"	44,000	149	44	81
*UA9CBM	"	41,895	151	50	97
*UA9YTN	"	39,690	177	24	66
*UA9XZ	"	35,844	155	29	74
*RM9X	"	30,690	129	24	66
*RA9FEU	"	24,846	114	24	58
*UA9OSB	"	21,400	119	34	66
*RV9YP	"	20,203	124	23	66
*UA9YTH	"	5,880	56	17	32
*RA9JB	"	132	6	5	6
***RZ8U**	**28**	**35,394**	**296**	**15**	**36**
*RU9WZ	"	33,733	240	17	44
*UA9SIV	"	21,330	163	18	36
*UA9CIM	"	10,919	83	16	45
*RZ9YF	"	10,803	124	10	29
*R9FA	"	3,040	42	9	23
***RZ9AN**	**21**	**126,882**	**449**	**27**	**87**
***RA9FEL**	**"**	**119,416**	**516**	**20**	**72**
*RN8W	"	80,416	309	24	88
*R9WS	"	68,338	305	21	73
*RZ9UMA	"	67,840	366	19	61
*RZ9CQ	"	35,469	219	13	50
*RU9AZ	"	19,320	120	14	55
***RZ9OQ**	**14**	**230,652**	**721**	**31**	**98**
*UA9OMT	"	173,040	541	32	88
*RX9KT	"	156,030	568	26	79
*RA9AP	"	130,804	458	24	82
*RK9UAC	"	71,604	354	19	62
*RX9FG	"	69,615	326	17	68
*RA9SPF	"	46,746	205	22	76
*RV9AZ	"	13,770	107	10	41
***UA9UBL**	**7**	**56,712**	**217**	**26**	**76**
*UA9FLK	"	22,055	188	13	42
*R9RA	"	16,120	116	15	47
*UA9SMU	"	304	9	8	8
***RW9CD**	**3.7**	**49,985**	**301**	**12**	**53**
*UA9ACJ	"	9,900	108	8	28
*RW9UDS	1.8	406	14	7	7

RCØF	**A**	**2,792,850**	**2947**	**132**	**298**
UAØYAY	**"**	**1,081,884**	**1266**	**103**	**253**
RUØLQ	"	990,340	1836	88	172
RTØQ	"	512,973	1012	66	177
RWØUM	"	292,576	752	71	152
RWØLT	"	270,345	319	109	226
RAØQQ	"	145,888	359	62	132
RØQA	"	102,912	317	39	89
RZØSR	"	42,666	269	36	42
RUØLL	"	476	18	9	8
UAØBA	"	323	9	8	9
RXØAK	**28**	**5,244**	**99**	**6**	**13**
RKØAB	**21**	**108,504**	**488**	**22**	**77**
RAØUF	"	88,131	575	21	66
UAØSW	"	11,800	118	18	41
RKØUT	**14**	**107,640**	**498**	**25**	**67**
UAØCM	**7**	**153,855**	**590**	**32**	**85**
RØAA	"	34,085	178	24	61
***UAØSDX**	**A**	**323,400**	**495**	**73**	**202**
***UAØZS**	**"**	**257,950**	**663**	**63**	**112**
*RAØQW	"	187,775	484	59	116
*UAØCNX	"	158,762	704	61	102
*RZØAO	"	155,718	347	65	146
*RØ/KE5JA	"	77,625	473	60	75
*RUØUA	"	33,276	177	27	67
*RAØLE	"	29,100	141	42	60
*UAØQNV	"	28,413	142	35	64
*RAØUBI	"	26,329	201	43	70
*UAØSOX	"	11,857	80	25	46
*RAØSCJ	"	8,400	91	17	39
*RZØSW	"	2,625	51	15	20
*UAØZC	"	1,178	26	16	22
***UAØWY**	**28**	**18,520**	**196**	**14**	**26**
***UAØUK**	**21**	**126,779**	**717**	**24**	**73**
*UAØSJ	"	65,832	346	17	61
*RUØSU	"	20,800	122	18	62
*RZØSO	"	288	11	5	7
***UAØIT**	**14**	**64,240**	**340**	**23**	**57**
*RWØCV	"	9,922	109	18	23

Asiatic Turkey

TA3IW	**A**	**272,282**	**519**	**55**	**163**
YM2W	**28**	**170,016**	**675**	**24**	**72**
			(OP: OK1MU)		
***TA2/DL7BC**	**A**	**1,964,088**	**2117**	**66**	**258**
*TA7EB	"	71,306	254	21	80
*TA2KN	"	68,580	207	32	103
			(OP: TA1GE)		
***TC6IK**	**21**	**89,311**	**628**	**19**	**48**
*TB2MYE	7	1,800	25	5	19
***TC87TC**	**3.7**	**7,178**	**74**	**8**	**29**
			(OP: TA1HZ)		

Azerbaijan

***4K9W**	**A**	**139,288**	**306**	**50**	**134**
***4K8M**	**28**	**23,241**	**175**	**17**	**44**
***4K6FO**	**14**	**148,409**	**571**	**25**	**82**

China

BD2SH/7	**A**	**100,620**	**435**	**46**	**83**
BD4CN	"	4,539	45	22	29
BD3PTH	"	3,096	39	19	24
BG5FBR	"	24	2	2	2
***BA8CY**	**A**	**132,756**	**613**	**54**	**102**
***BD4CD**	**"**	**125,580**	**349**	**64**	**118**
***BD2VWW**	**"**	**114,448**	**319**	**68**	**116**
*BD4SS	"	69,600	293	57	88
*BH7OZG	"	66,000	394	46	74
*BG2AUE	"	59,500	255	50	90
*BD4HZ	"	57,288	346	49	75
*BG5FFK	"	54,365	264	47	84
*BY1DX	"	54,306	262	42	84
*BD9BU	"	45,136	257	41	71
*BD3EO/1	"	20,520	139	33	57
*BD5HSV	"	18,841	99	31	52
*BD4RDU	"	17,538	127	28	46
*BD8IK	"	15,215	83	30	55
*BG7KFZ	"	12,210	87	23	43
*BD4XW	"	10,611	97	38	43
*BH7PFH	"	9,176	74	29	45
*BD7LYR	"	8,100	85	33	42
*BG6JPV	"	6,760	92	19	33
*BD7RDC	"	6,375	55	16	35
*BH4RIC	"	5,544	97	29	34
*BH4TMX	"	5,472	59	25	32
*BG5EEK	"	5,148	50	16	28
*BD5HST	"	4,416	51	22	26
*BG1TXU	"	4,029	69	21	30
*BA4SCP	"	3,996	69	23	31
*BH4RCI	"	3,393	50	15	24
*BH4TZM	"	3,363	56	24	33
*BG5HSC	"	3,321	55	18	23
*BH3OTC	"	3,276	77	16	26
*BD5DML	"	3,120	43	17	23
*BD4EP	"	3,071	55	17	20
*BG5HRE	"	3,008	42	18	29
*BG4TYQ	"	2,209	37	20	27
*BH4SKP	"	2,200	48	21	23
*BG3PFT	"	1,961	30	17	20
*BG7RCS	"	1,904	26	11	17
*BH3PRJ	"	1,512	40	11	17
*BG2SHV	"	1,472	41	16	16
*BH3PJR	"	1,225	36	11	14
*BG6JIN	"	1,100	36	12	13
*BG3RWZ	"	782	20	11	12
*BD2TBJ	"	768	27	12	12
*BG2SMH	"	720	31	10	10
*BG2RBI	"	500	19	10	10
*BG2RBK	"	496	25	8	8
*BG3NUI	"	360	13	7	11
*BG5FCH	"	351	13	6	7
*BG2TQX	"	288	19	8	8
*BH3PVC	"	288	14	7	9
***BA7IY**	**28**	**19,941**	**256**	**19**	**32**
***BD7LDM**	**21**	**35,178**	**231**	**21**	**57**
***BA1SN**	**"**	**34,358**	**212**	**22**	**60**
*BD6JJX	"	25,806	185	21	45
*BD7KQT	"	22,344	204	23	53
*BH1IIJ	"	16,281	167	21	46
*BG4WEN	"	12,036	128	17	42
*BD4RQ	"	5,424	78	14	34
*BG8BBP	"	5,341	70	15	34
*BG5PN	"	3,040	64	14	24
*BH1GXH	"	63	5	5	4
*BA5FB	"	42	3	3	3
***BD4WZH**	**14**	**53,720**	**349**	**26**	**53**
*BD7KBH	"	14,750	175	19	40
*BA6QR	"	9,724	111	19	33
*BD1EFO	"	3,420	104	13	25
*BG6QZF	"	3,230	50	13	25
*BD5CGO	"	399	13	9	10
*BD4JWU	"	64	7	4	4
*BD3RQ	"	20	3	2	2
*BD6QZ	"	8	2	2	2
*BG6QHV	"	6	1	1	1
***B5TT**	**7**	**8,142**	**103**	**18**	**28**

Cyprus

P3N	**A**	**9,182,016**	**5633**	**123**	**485**
			(OP: R2AA)		
C4W	"	8,435,425	5215	130	463
			(OP: 5B4WN)		
H2T	**3.7**	**290,981**	**1055**	**19**	**82**
			(OP: 5B4XF)		
C4M	"	80,960	382	16	72
			(OP: 5B4AGM)		
***H2E**	**A**	**699,726**	**965**	**64**	**214**
			(OP: 5B4AGE)		
***C4Z**	**21**	**346,918**	**956**	**34**	**109**
			(OP: 5B4AIZ)		

Georgia

4LØA	**A**	**10,949,688**	**6619**	**134**	**488**
			(OP: UUØJM)		
***4L6DL**	**21**	**118,368**	**494**	**25**	**71**

Hong Kong

VR2XMT	21	4,687	50	17	26
VR2YYW	**7**	**102,870**	**632**	**29**	**61**
***VR2PW**	**A**	**25,900**	**125**	**34**	**66**
*VR2VIY	"	13,446	96	34	47
***VR2ZQZ**	**28**	**100,492**	**587**	**29**	**68**
***VR2PX**	**21**	**69,757**	**404**	**19**	**60**
*VR2EH	1.8	2	1	1	1
			(OP: UA3QJC)		

India

VU2PAI	**A**	**1,358,720**	**1450**	**92**	**260**
***VU2CDP**	**A**	**102,256**	**257**	**45**	**121**
*VU2ABS	"	36,448	131	42	92
***VU2RBI**	**21**	**104,608**	**549**	**28**	**84**
*VU3DMP	"	1,830	32	9	21

Israel

***4Z5PJ**	**A**	**13,912**	**76**	**27**	**47**
*4Z5TK	"	11,900	64	21	49
*4Z5LX	"	6,936	57	19	32
***4Z5MV**	**28**	**3,924**	**41**	**10**	**26**
***4Z5FI**	**21**	**375,752**	**1290**	**26**	**78**
*4Z5MY	14	96	4	4	4

Japan

JG1ZUY	**A**	**1,218,610**	**1560**	**104**	**206**
			(OP: JG1VGX)		
JH1HIC	**"**	**399,432**	**634**	**92**	**172**
JA1DDZ	"	212,018	395	78	149
JA1IKA	"	156,364	366	73	121
JE1CKA	"	142,940	417	56	84
JA1OVD	"	64,974	299	37	54
JA1NPD	"	55,205	153	78	103
JA1IXY	"	26,574	89	54	75
JH1APK	"	15,456	71	42	50
JL1DLQ	"	15,372	78	33	51
JE1REU	"	3,404	46	17	20
7J1ABD	"	2,128	24	18	20
JH1CML	**28**	**22,976**	**149**	**22**	**42**
JJ1RDX	"	16,240	138	18	38
JA1FNO	"	1,472	36	10	13
JR1CBC	**21**	**327,474**	**1001**	**34**	**92**
JN1RQV	"	252	9	7	7
JA1QXY	**14**	**230,691**	**762**	**34**	**97**
JH1EVD	"	35,100	174	26	52
JO1SIM	7	714	22	8	9
JH1OGC	**3.7**	**173,124**	**645**	**27**	**81**
***JH1EAQ**	**A**	**533,922**	**671**	**117**	**201**
***JH1DGQ**	**"**	**240,908**	**365**	**101**	**162**
*JA1GLE	"	158,149	412	67	100
*JA1KK	"	101,898	276	56	97
*JF1MQS	"	100,558	322	48	89
*7K1MAG	"	89,100	248	59	91
*JA1PJS	"	70,886	222	48	86
*JA1VGV	"	61,146	200	54	75
*JA1AZR	"	48,510	196	45	60
*JA1KEV	"	41,664	247	46	66
*JA1BPN	"	34,648	150	50	72
*JP1IXV	"	27,348	143	30	56
*JA1UZG	"	26,319	125	36	57
*JP1HUJ	"	25,650	139	39	51
*JA1OHP	"	25,536	130	39	57
*JA1HNW	"	22,618	117	37	49
*JR1MRG	"	21,360	117	33	47
*JF1MAD	"	13,680	81	36	54
*JE1RRK	"	12,716	93	30	38
*JA1ATM	"	11,664	78	29	43
*JG1INV	"	9,360	71	28	37
*JR1ATA	"	7,695	56	28	29
*JQ1VDJ	"	5,612	51	25	36
*JH1DGB	"	5,382	45	19	27
*JK1NSR	"	4,797	45	15	24
*JI1UCL	"	4,588	50	17	20
*7N4CPT	"	2,788	32	17	17
*JA1FO	"	2,484	38	15	21
*7K4VPV	"	2,170	24	15	20
*JA1LBZ	"	1,976	33	11	15
*JF1HJX	"	1,932	29	11	17
*7L3DGP	"	1,833	32	18	21
*JA1LPQ	"	1,450	33	11	14
*JR1AHP	"	1,188	16	13	14
*JN1BBO	"	1,160	18	13	16
*JO1KVS	"	814	15	10	12
*JG1FGL	"	779	19	8	11
*7N4RIX	"	273	11	6	7
*JI1UDD	"	209	7	5	6
*JJ1LRD/BY4AOH		"	-306	27	16
18****					
***JN1IZR**	**28**	**23,424**	**184**	**21**	**40**
*JA1WWE	"	10,878	95	19	30
*JF1WQC	"	8,510	86	18	28
*JA1AJK	"	3,388	48	11	17
***JR1BTG**	**21**	**170,630**	**620**	**31**	**82**
*7K4XNN	"	133,596	490	31	77
*JL1MWI	"	86,223	301	33	90
*JH1SBE	"	60,672	281	29	67
*JI1ALP	"	49,104	220	27	61
*JH1FNU	"	42,504	225	25	59
*JA1MFR	"	30,652	180	24	55
*JI1OAB	"	24,075	146	23	52
*JF1PYJ	"	22,196	155	19	43
*JA1RYC	"	14,934	112	18	39
*JA1ANF	"	13,860	96	22	44
*JA1TBX	"	7,239	76	20	37
*JA1JLP	"	6,150	50	19	21
*JK1BII	"	3,675	51	12	13
*JA1DBG	"	2,842	44	12	17
*JA1NGW	"	1,575	22	18	17
*JG1LPL	"	1,484	46	11	17
*JG1APX	"	510	14	7	10
*JI1LAI	"	247	7	7	6
*JA1YAI	"	12	2	1	1
***JF1TEU**	**14**	**20,670**	**123**	**23**	**42**
*JG1GCO	"	2,765	36	13	22
*JL7FBV/1	"	518	15	6	8
***JA1XMS**	**7**	**37,410**	**179**	**31**	**56**
*JG1OWV	"	5,664	45	23	25
*JF1KWG	"	4,860	58	14	16
*JA9DTV/1	"	2,508	45	10	12
***JM1NKT**	**3.7**	**3,330**	**46**	**13**	**17**
*JE1SPY	"	1,872	37	10	16

JA2PAC	**A**	**1,915,128**	**2000**	**122**	**275**
JA2FSM	"	486,987	760	94	177
JA2BNN	"	281,120	546	80	144
JA2FJP	"	209,825	411	67	108
JE2DJC	"	125,376	297	65	127
JF2FIU	"	122,840	344	57	91
JA2CPD	"	10,647	63	27	36
JE2OTM	**28**	**8,256**	**99**	**15**	**28**
JH2BTM	"	2,322	41	10	17
JR2AWS	21	6	1	1	1
JA2VHO	**7**	**50,764**	**209**	**32**	**66**
***JA2CUS**	**A**	**171,855**	**347**	**71**	**130**
*JA2KPW	"	94,024	274	57	89
*JA2GHP	"	88,638	257	60	98
*JR2FJC	"	58,316	223	52	70
*JF2OHQ	"	8,932	72	21	37
*JQ2OUL	"	4,944	53	22	26
***JH2MYN**	**28**	**9,270**	**96**	**17**	**28**
***JA2PFO**	**21**	**41,340**	**209**	**24**	**54**
*JA2KKA	"	17,700	128	19	41
*JP2MRD	"	1,050	22	7	14
*JR2PAU	"	1,020	20	9	8
*JF2NRI/2	"	407	13	4	7
*JR2AAN/2	"	135	5	4	5
***JA2GTW**	**7**	**38,505**	**179**	**30**	**55**
*JF2WXS	"	7,872	58	26	38

JA3EY	**A**	**225,078**	**447**	**80**	**153**
JR3UIC	"	37,830	134	59	71
JA3AVO	"	2,432	31	14	18
JI3BFC	**28**	**20,979**	**164**	**19**	**44**
JA3ETD	"	4,760	64	15	20
JR3NZC	**21**	**538,820**	**1389**	**33**	**112**
JA3LEZ	**14**	**51,111**	**225**	**25**	**56**
JA3DAY	"	25,134	139	22	49
JF3LOP	**3.7**	**4,176**	**66**	**15**	**21**
***JH3CUL**	**A**	**624,320**	**804**	**105**	**215**
*JA3IKG	"	160,446	342	66	121
*JM3PLL	"	41,180	141	41	75
*JO3EVM	"	19,339	114	25	58
*JR3GVH	"	10,416	75	25	37
*JI3OGI	"	1,938	26	15	19
***JL3MCM**	**28**	**5,658**	**59**	**16**	**25**
*JA3QOS	"	1,825	33	11	14
***JR3RIY**	**21**	**273,120**	**848**	**33**	**87**
***JF3BFS**	**"**	**225,184**	**704**	**33**	**91**
*JF3IYW	"	59,708	286	26	66
*JO3PSJ/3	"	38,844	207	25	58
*JF3NKA	"	16,592	105	19	42
*JA3BBG	"	14,986	110	22	37
*JR3KAH	"	3,876	50	13	21
*JA3PYH	"	2,805	38	14	19
*JA3KDJ	"	1,482	30	7	12
*7L3ETZ/3	"	1,464	30	9	15
*JM3HYL	"	390	15	6	4
*JE3EVI	"	72	4	3	3
***JN3DSH**	**14**	**74,976**	**310**	**30**	**66**
*JO3RCK	7	1,026	25	9	10
*JL3RDC	3.7	56	4	4	4

JH4UYB	**A**	**4,453,610**	**3481**	**141**	**349**
JA4DPL	"	544,025	922	84	151
JA4BXU	14	6	1	1	1
JH4UTP	**7**	**84,548**	**404**	**31**	**61**
JA4NA	3.7	638	17	9	13
***JE4MHL**	**A**	**281,792**	**517**	**78**	**146**
*JR4VEV	"	175,720	415	67	124
*JR4PDP	"	57,798	222	45	69
***JA4AQR**	**21**	**20,837**	**130**	**21**	**46**
*JR4LRY	"	11,400	97	19	31
*JA4CBX	"	10,486	106	18	31
***JR4GPA**	**14**	**83,006**	**336**	**28**	**70**
***JA4CZM**	**"**	**81,810**	**318**	**29**	**72**
*JG4OOU	"	21,824	140	20	42
*JR4FLW	"	11,408	93	20	26

JA5SUD	**A**	**205,010**	**363**	**89**	**158**
JJ5GSY	"	12,528	76	30	42
JA5APU	**14**	**124,630**	**462**	**30**	**80**
***JG5UWK**	**A**	**123,904**	**326**	**68**	**108**
*JG5DHX	21	2,580	40	9	21

JA6BWH	**A**	**341,592**	**539**	**85**	**173**
JH6QFJ	"	280,665	564	70	119
JE6HUR	"	32,184	149	45	63
JA6LCJ	**28**	**37,653**	**224**	**21**	**56**
JR6VIX	21	4,352	57	11	23
***JH6WHN**	**28**	**19,344**	**144**	**20**	**42**
***JA6EFT**	**21**	**15,232**	**97**	**21**	**43**
*JA6FHF	"	2,934	60	16	54
***JA6WFM**	**14**	**68,376**	**321**	**25**	**63**
***JA6FGC**	**7**	**17,537**	**103**	**26**	**45**
*JS6RTJ	3.7	20	3	2	2

JA7NVF	**A**	**2,311,008**	**2401**	**120**	**279**
JA7BME	"	1,033,830	1219	105	210
JA7COI	"	319,665	579	79	132
JA7VEI	"	170,799	344	74	123
JH7DUM	"	83,201	219	56	95
JH7KTI	"	15,840	91	28	38
JA7QFU	**28**	**23,249**	**154**	**22**	**45**
JA7DOT	**21**	**239,268**	**720**	**31**	**96**
JA7BJS	**14**	**133,848**	**595**	**26**	**62**
***JH7CUO**	**A**	**336,056**	**573**	**85**	**153**
*JP7AWQ	"	10,584	70	29	43
*JE7HYK	"	5,980	53	23	29
*JA7AXP	"	782	16	8	9
*JI7FKU	"	152	9	11	8
***JE8KGH/7**	**28**	**1,134**	**33**	**9**	**12**
*JJ7ENB	21	555	13	6	9
***JA7ADV**	**14**	**6,028**	**59**	**18**	**26**
*JI7EMD	"	1,176	32	13	15
*JR7XGL	7	2,958	40	13	16

JA8ECS	**A**	**456,595**	**675**	**90**	**175**
JA8DIV	"	155,394	307	67	127
JA8CJY	**14**	**54,528**	**216**	**32**	**64**
***JA8CSY**	**A**	**151,844**	**319**	**74**	**129**
*JA8IJI	"	28,665	153	36	55
*JA8IBU	"	12,444	77	29	39
*JL8MBF	"	8,901	75	25	44
*JE8CRA	"	5,992	52	27	29
*JF8DSO	"	2,310	38	14	16
***JA8CLN**	**28**	**4,512**	**60**	**13**	**19**
*JG8TDZ	"	912	28	10	14
*JF8DSN	21	2,205	45	14	21
*JI8BUR	"	220	10	5	5
***JR8AMF**	**14**	**101,676**	**367**	**33**	**78**
***JH8DBJ**	**7**	**12,084**	**82**	**25**	**32**

JF9KVT	**A**	**106,821**	**303**	**47**	**96**
JA9CCG	**14**	**24,375**	**152**	**21**	**44**
*JA9EJG	A	350	9	6	8
***JE9MBV/9**	**21**	**17,010**	**111**	**23**	**47**
***JR9NVB**	**7**	**57,640**	**260**	**29**	**59**
*JA9LX	"	704	20	7	9

JRØWZR	**A**	**95,456**	**270**	**56**	**96**
JAØUMV	**21**	**188,748**	**698**	**32**	**75**
JEØEHE	"	11,470	112	15	22
JJØKRD	**14**	**160,080**	**577**	**33**	**83**
JAØJHA	**7**	**854,811**	**2118**	**38**	**113**
***JHØNEC**	**A**	**340,862**	**506**	**93**	**169**
*JAØBJY	"	111,899	303	49	100
*JAØAVS	"	21,534	98	39	58
*JHØCCK	"	6,480	51	16	32
*JAØRCK	"	3,840	33	15	33
***JRØBUL**	**28**	**946**	**24**	**9**	**13**
***JHØMXV**	**21**	**56,368**	**230**	**31**	**73**
*JAØIOF	"	7,728	65	18	30
***JHØEPI**	**14**	**167,028**	**517**	**34**	**90**

Jordan

***JY5CC**	**A**	**2,422,154**	**2051**	**95**	**339**

Kazakhstan

UPØL	**A**	**5,123,568**	**3864**	**117**	**402**
UN9L	"	2,850,010	2148	121	394
UN7PL	"	1,178,820	1516	73	222
UN7EX	"	67,505	234	31	84
UN7PBY	**21**	**129,642**	**591**	**22**	**71**
UP2L	**14**	**1,775,378**	**3660**	**39**	**148**
			(OP: UA9BA)		
UN9LU	"	14,784	103	12	44
***UN1O**	**A**	**641,915**	**1054**	**55**	**178**
*UN7FDP	"	83,142	246	41	108
*UN6QC	"	12,789	88	19	44
*UN7CAD	"	12,096	89	17	39
***UN6P**	**28**	**23,460**	**168**	**12**	**39**
***UN6LN**	**21**	**256,875**	**837**	**26**	**99**
*UN8PT	"	49,374	273	18	60
***UN7RL**	**14**	**63,756**	**296**	**21**	**63**
*UN7JX	"	19,140	180	23	37
***UN7PCZ**	**7**	**32,634**	**180**	**20**	**54**

Kyrgyzstan

EX8AB	**A**	**141,504**	**446**	**42**	**92**
EX2X	**14**	**317,988**	**948**	**32**	**100**
EX2T	"	26,042	199	17	41
*EX8MAT	1.8	444	28	5	7

Macau

***XX9AU**	**21**	**3,131**	**89**	**14**	**17**

Maldives

*8Q7EJ	14	144	6	6	6
			(OP: G3VDB)		

Mongolia

*JT1DN	14	918	42	9	8

Ogasawara

***JD1AHC**	**A**	**18,836**	**247**	**26**	**42**

Oman

A41OO	**14**	**336,474**	**1135**	**34**	**100**
***A41MX**	**A**	**54,609**	**200**	**33**	**76**

Saudi Arabia

***HZ1PS**	**A**	**129,232**	**275**	**54**	**110**
*7Z1OO	"	9,849	63	23	44
*HZ1HN	"	3,570	40	9	25
***7Z1SJ**	**21**	**531,872**	**1235**	**38**	**138**
*7Z1TT	"	227,198	898	20	74
***HZ1DG**	**14**	**55,826**	**227**	**26**	**77**

Singapore

9V1YC	**21**	**332,588**	**1178**	**33**	**101**

South Korea

DS5QLJ	**A**	**11,562**	**85**	**32**	**50**
HL5JCB	"	810	23	16	14
***HL1VAU**	**A**	**318,792**	**721**	**80**	**142**
*DS3BNU	"	16,016	116	33	44
*HL5YI	14	6,721	72	18	29

Sri Lanka

***4S7AB**	**A**	**471,884**	**745**	**75**	**191**

Taiwan

BX5AA	**21**	**497,420**	**1673**	**32**	**101**
***BW2/KU1CW**	**A**	**882,336**	**1403**	**98**	**214**
*BV1EK	"	131,165	314	71	114
*BV1EL	"	65,698	425	40	67
***BV4VQ**	**28**	**1,717**	**88**	**7**	**10**
***BU2AE**	**14**	**12,993**	**143**	**22**	**39**

Tajikistan

EY7AD	**A**	**551,754**	**770**	**75**	**227**
EY8/UA4LCQ	**28**	**75,740**	**437**	**15**	**55**
EY8MM	**3.7**	**350,295**	**1124**	**25**	**96**
***EY8CC**	**21**	**288,995**	**1002**	**26**	**89**
***EY8DD**	**"**	**210,771**	**852**	**23**	**76**
*EY8AR	"	63,388	312	22	70
*EY8BJ	"	29,388	205	16	46
*EY7BJ	"	3,564	53	11	16

Thailand

HSØZEE	**A**	**744,396**	**938**	**97**	**259**
HSØZCW	**21**	**319,275**	**1157**	**33**	**102**
HSØZDG	"	229,822	755	35	116
***E21YDP**	**A**	**415,512**	**765**	**76**	**185**
*HSØZJD	"	77,875	230	61	114
*HSØZGW	"	23,912	113	32	66
***HSØZIN**	**28**	**21,054**	**190**	**21**	**45**
***E2ØYLM**	**21**	**26,791**	**190**	**24**	**49**

United Arab Emirates

A61BK	**A**	**2,838,136**	**2313**	**122**	**350**
***A65BB**	**28**	**11,500**	**96**	**15**	**35**
			(OP: S57CQ)		
***A65BU**	**21**	**6,720**	**51**	**16**	**32**

Uzbekistan

***UK9AA**	**3.7**	**126,910**	**508**	**20**	**78**

Vietnam

***XV4TUJ**	**A**	**6,670**	**57**	**26**	**32**
***XV2RZ**	**14**	**11,515**	**208**	**21**	**28**
			(OP: OX3RZ)		

West Malaysia

9M2JKL	**A**	**85,988**	**246**	**55**	**111**
***9M2ODY**	**A**	**166,014**	**354**	**65**	**142**
*9M2TO	"	99,000	505	50	100
*9M2ZAK	"	6,875	73	23	32
*9M2MRS	"	6,800	51	29	39
*9M4CMR	"	3,864	44	20	26
***9W2ESM**	**28**	**13,735**	**106**	**23**	**44**
*9W2VVH	"	4,305	58	15	26
*9W2CBL	"	204	15	7	10
***9M2PS**	**14**	**43,043**	**231**	**23**	**68**

EUROPE

Aland Islands

OHØB	**A**	**5,761,276**	**5082**	**144**	**517**
			(OP: OH2UA)		
OHØ/SP7VC	"	363,324	1121	62	212
OHØYY	**14**	**195,306**	**1073**	**33**	**96**
			(OP: OH2YY)		
OHØV	**7**	**492,632**	**2372**	**33**	**119**
			(OP: OH6LI)		
OHØJFP	"	423,605	2299	34	99

Andorra

*C31VM	A	595	28	12	23

Austria

OE3K	**A**	**5,815,260**	**4974**	**146**	**459**
			(OP: OE3DIA)		
OE6MDF	"	868,840	1225	92	314
OE9MON	"	434,016	791	66	208
OE3KAB	"	14,013	130	18	63
OE2IJL	"	7,326	65	21	45
OE3WMW	**28**	**31,042**	**220**	**21**	**62**
OE6Z	**14**	**334,892**	**1375**	**28**	**88**
			(OP: OE6MBG)		
***OE6MMF**	**A**	**77,350**	**313**	**45**	**130**
*OE1BKA	"	24,354	169	36	87
*OE5ØAJT	"	14,718	133	20	46
*OE5JKL	"	10,235	99	26	63
***OE1HHB**	**14**	**102,375**	**514**	**24**	**93**
***OE6HLF**	**7**	**3,321**	**68**	**10**	**31**

Azores

CR2X	**A**	**15,256,808**	**9411**	**172**	**619**
			(OP: N5TJ)		
***CU6AY**	**A**	**215,000**	**466**	**59**	**156**

Balearic Islands

EA6LP	**A**	**392,350**	**803**	**85**	**265**

EA6AZ	*	383,075	667	75	200
EA6XQ	*	161,455	504	60	185
EA6DX	28	38,984	254	25	63
EC6AAE	14	166,243	908	31	96
*EA6/DK5IR	A	62,832	303	43	125
*EA6OM	28	2,720	35	15	25
*EA6SX	1.8	23,450	307	11	56
Belarus					
EW2A	A	1,939,728	1993	120	432
EW8DD	*	804,335	1789	75	268
EW7BR	*	98,280	343	47	163
EW2EO	*	93,541	315	44	117
EW8MW	*	63,999	507	21	96
EW3LN	*	29,835	179	39	96
EU8MM	*	3,796	53	17	35
EU7SA	*	1,683	19	14	19
EW8EW	28	186	11	3	3
EW6GF	14	64,818	675	17	61
EU1UN	3.7	142,464	1145	21	85
EW1DO	1.8	8,772	186	7	44
*EW8OG	A	142,107	509	50	151
*EW1EA	*	122,614	406	47	155
*EU4LY	*	75,396	311	48	135
*EW2AO	*	51,667	308	29	92
*EW6EW	*	37,200	246	30	90
*EW7LE	*	12,320	100	23	65
*EW2BO	*	2,200	57	10	34
*EU1DX	*	816	15	11	13
*EW8ADX	*	550	13	11	11
*EW1KV	28	1,950	53	7	19
*EW6AF	21	102,032	496	30	82
*EU2MM	14	93,618	493	33	93
*EU6AF	*	59,850	375	27	78
*EU6AA	*	34,242	325	17	61
*EU1UA	*	4,410	83	10	35
*EU1EU	*	4,074	87	7	35
*EW4KA	7	58,275	362	25	86
*EW2TT	3.7	8,058	149	8	43
Belgium					
OS8A	A	1,649,911	1996	104	363
ON4ALY	*	306	11	9	8
OR8A	21	368,797	1050	37	106
OR2A	*	41,760	205	23	57
					(OP: ON7YX)
OQ7T	7	47,268	509	16	62
*ON4AXU	A	191,653	389	67	142
*ON3ND	*	122,622	480	43	148
*OO4A	*	99,680	428	37	141
					(OP: ON6ML)
*ON5UJ	*	96,333	280	55	142
*ON6FC	*	93,632	317	45	131
*ON3AR	*	70,839	294	38	115
*ON6MG	*	47,034	233	39	95
*ON3HLU	*	15,846	149	28	86
*ON8AR	*	13,161	86	33	74
*ON6AT	*	11,481	80	32	57
*ON7MIC	*	6,272	72	20	44
*ON4LWX	14	6,440	70	14	32
*ON4LG	*	396	14	7	11
*ON4CT	7	109,962	774	28	95
*OO4O	*	54,591	503	17	76
					(OP: ON4APU)
Bosnia-Herzegovina					
E74IW	A	640,297	1922	62	225
E73O	28	94,800	537	23	77
E77A	21	900,860	2665	36	119
E78DX	14	53,212	318	24	82
*E74AA	A	695,224	1330	76	300
*E72U	*	79,024	311	44	132
*E74KM	*	47,740	244	42	113
*E78MS	*	13,600	146	20	65
*E77R	*	7,918	80	20	54
*E77RW	*	6,930	94	17	53
*E73ECJ	*	6,588	98	13	48
					(OP: E73X)
*E78CB	*	594	18	11	16
*E73PY	*	550	17	11	14
*E71CZ	*	399	19	5	16
*E74NR	14	87,372	525	27	81
*E75MJ	7	5,304	96	9	42
*E73MJ	*	3,440	89	6	34
Bulgaria					
LZ3FN	A	1,767,040	2523	109	393
LZ5K	*	1,265,556	1955	91	310
LZ2ZY	*	185,878	448	62	176
LZ2NG	*	83,174	421	41	141
LZ2PL	*	1,848	28	12	12
LZ1YG	21	69,336	402	29	78
LZ2ZG	*	448	14	6	8
LZ1RA	14	27,380	267	15	59
LZ1VVV	7	17,168	165	13	61
*LZ2HN	A	278,883	563	75	222
*LZ2FQ	*	248,490	671	63	188
*LZ3SD	*	129,560	356	59	146
*LZ3GH	*	68,544	293	47	121
*LZ1AQ	*	66,555	323	38	107
*LZ2XF	*	40,432	195	46	106
*LZ1OJ	*	16,524	96	29	73
*LZ1VCT	*	12,502	101	31	63
*LZ1NY	*	10,595	109	17	48
*LZ1MC	*	5,824	75	16	40
*LZ1PJ	*	4,816	50	19	37
*LZ1DOT	*	3,780	61	14	31
*LZ3TL	*	3,496	61	13	33
*LZ1IKY	*	1,540	29	13	22
*LZ1YE	28	12,600	100	18	42
*LZ2FM	21	29,716	241	20	56
*LZ3DJ	14	13,420	172	13	48
*LZ5Z	*	1,102	40	6	23
					(OP: Andrey)
*LZ2PS	7	46,197	435	17	70
*LZ1DM	3.7	27,000	340	9	63
*LZ2KSB	*	1,421	37	6	23
					(OP: LZ2TEO)
Crete					
SV9OFS	A	35,721	139	55	92
SV9GPV	28	117,488	751	23	89
*SV9COL	A	240,300	459	86	184
Croatia					
9A3KS	A	55,892	173	48	109
9A4W	28	17,290	120	20	45
9A2LX	3.7	19,504	361	9	44
*9A7P	A	2,485,230	2830	116	394
*9A5RJ	*	238,908	453	77	181
*9A6KTB	*	236,726	717	57	202
*9A8A	*	85,833	318	45	142
*9A4AA	*	70,356	307	41	123
*9A3QB	*	23,980	129	32	77
*9A6C	*	18,096	143	26	78
*9A5BAA	*	15,100	123	28	72
*9A3IGY	*	6,372	114	13	41
*9A3COL	*	3,619	51	15	32
*9A1DL	*	2,501	50	16	25
*9A7IUP	*	2,209	65	14	33
*9A2DI	28	4,800	54	12	28
*9A6K	21	17,380	292	11	11
					(OP: 9A3OB)
*9A1CMS	*	11,900	111	18	32
					(OP: 9A6KZH)
*9A2GA	7	28,282	277	15	64
Czech Republic					
OK2KR	A	587,022	833	99	332
OK2EQ	*	374,256	693	81	258
OK1DBE	*	115,808	369	50	138
OK1FRO	*	10,934	125	17	60
OK1XC	28	3,910	62	14	32
OK2ABU	*	1,026	30	7	12
OK1KMG	21	688	22	7	9
					(OP: OK1ULE)
OK2SAR	1.8	20,944	422	7	49
*OK6Y	A	595,728	967	87	291
					(OP: OK2PTZ)
*OK2BEN	*	255,640	706	59	221
*OK1MKU	*	213,365	415	74	233
*OK1DKR	*	190,716	425	68	208
*OK2WYK	*	158,046	669	37	176
*OK1HEH	*	126,600	511	42	158
*OK2KFK	*	105,844	400	43	145
*OK1AY	*	103,768	398	41	177
*OK1BA	*	82,999	276	45	122
*OK1JOC	*	82,111	417	39	118
*OK1MKI	*	68,609	361	33	124
*OK7N	*	67,076	216	61	103
					(OP: OK1CJN)
*OL2T	*	65,709	406	32	117
					(OP: OK2TC)
*OK2KG	*	60,544	200	51	121
*OK2EA	*	51,332	262	41	123
*OK2PBG	*	50,544	196	46	98
*OK1BLU	*	47,232	228	39	89
*OK2BRX	*	34,188	193	29	82
*OK1ARO	*	26,164	157	33	91
*OK1VHV	*	15,106	142	21	70
*OK2SWD	*	12,512	128	21	71
*OK1AXB	*	8,701	87	21	56
*OK1DI	*	4,704	38	20	22
*OK2BNF	*	1,452	24	13	20
*OK1ZY	*	660	29	8	22
*OK1TVL	*	456	14	11	13
*OK1MCW	*	416	20	9	17
*OK2QX	21	45,408	203	29	67
*OK4RQ	*	17,136	115	20	48
*OK5AD	*	3,488	37	15	17
*OK4FD	*	169	8	7	6
*OK2BXE	14	127,958	528	33	104
*OK1IPU	*	63,428	417	25	76
*OK1CLD	*	35,720	295	17	59
*OL9M	*	18,212	192	16	42
					(OP: OK1MMN)
*OK2BWB	*	17,884	183	14	54
*OK1RAF	*	2,856	71	9	25
					(OP: OK1TIR)
*OK2ILD	7	39,757	393	17	66
*OK2XKA	*	37,536	306	20	76
*OK1LX	*	36,112	474	12	62
*OK1HFP	*	34,974	386	17	70
*OK1UG	*	30,160	306	13	67
*OK2BRS	*	29,250	316	14	61
*OK5XX	*	7,308	98	13	45
*OK1KZ	*	5,670	120	8	34
*OK4DZ	3.7	15,400	269	8	47
*OK1CRM	1.8	19,722	389	7	50
*OK1JOK	*	6,149	165	4	39
*OK2BJC	*	2,720	85	4	28
Denmark					
OZ2BKK	A	465,186	854	83	283
OZ5EV	*	438,750	560	90	322
OZ2PBS	*	325,314	772	69	210
OZ7EA	*	125,255	390	43	162
OZ8DX	*	5,320	54	22	48
OZ7X	14	1,082,154	2945	39	127
					(OP: OZ5KF)
*OV3X	A	289,674	510	85	257
					(OP: OZ8AE)
*OZ1KEF	*	261,820	691	70	177
*OZ1ACB	*	244,524	639	57	189
*OZ4NA	*	215,229	630	54	205
*OZ1KVM	*	114,460	504	41	153
*OZ1LFI	*	84,943	351	42	131
*OZ1KKH	*	33,354	130	37	116
*OZ/DJ1XT	*	24,628	137	31	63
*OZ4RT	*	22,880	104	35	69
*OZ1NF	*	21,812	192	23	59
*OZ5TL	*	18,910	182	31	91
*5P8W	*	17,271	164	24	77
*OZ6R	*	13,783	169	14	63
*OZ5BD	*	8,160	72	20	28
*OZ7DK	*	6,710	73	20	35
*OZ1DGQ	*	2,170	35	13	18
*OZ1XV	14	21,316	185	16	57
*OZ7AEI	*	777	29	8	13
*OZ1JVX	7	5,566	117	9	37
*5PØO	3.7	21,344	409	9	49
England					
G4BUO	A	1,507,158	1656	100	338
GØBNR	*	954,041	1084	108	365
M9C	*	844,940	1257	95	320
					(OP: MØUTD)
MØWLF	*	358,231	533	87	250
G3RWF	*	169,422	441	52	135
GØAZH	*	104,536	337	47	132
MØGHQ	*	91,931	285	46	115
2EØPLA	*	70,840	339	36	118
G3ZGC	*	63,441	245	46	125
G5G	*	38,745	427	24	99
GØAEV	28	48,116	339	20	72
GØHVQ	*	11,252	147	12	46
GØFWX	*	4,692	91	14	32
G5E	21	450,606	1216	36	123
					(OP: G3RAU)
M3W	*	334,410	1090	34	108
					(OP: G4FAL)
M5A	*	6,825	130	11	10
					(OP: G3WVG)
M7A	14	194,920	1156	28	82
					(OP: MØUNN)
MØIKW	*	58,860	312	22	86
G3TXF	3.7	244,272	1607	21	91
M5B	*	36,080	382	14	66
					(OP: G3WVG)
GØW	*	7,344	149	9	42
					(OP: GØVDZ)
M8M	1.8	86,545	755	19	76
					(OP: G3LNP)
G3P	*	2,923	80	6	31
					(OP: G3WPH)
*G3VAO	A	968,765	1283	99	346
*MØMCV	*	489,440	1064	63	259
*G8APB	*	378,027	637	79	280
*2EØCPT	*	340,166	890	54	229
*G4DFI	*	161,604	608	40	161
*G4DDX	*	145,642	521	42	164
*G6UBM	*	114,624	390	50	149
*G1WMJ	*	109,817	339	49	144
*G4DDL	*	106,950	398	41	145
*G4WGE	*	92,192	385	35	137
*MØUKD	*	84,042	296	44	130
*G4KIU	*	63,910	266	40	114
*MØRBE	*	53,818	257	34	108
*G4VMX	*	47,064	199	33	73
*GØCER	*	45,920	203	33	79
*G3RSD	*	33,695	201	30	85
*G7RTI	*	32,718	229	24	90
*G8ZRE	*	32,364	215	26	90
*G7WBX	*	26,325	150	32	103
*GØCPA	*	23,320	198	27	83
*MØMDR	*	22,898	148	26	81
*G4NXG	*	21,460	117	31	43
*M3PZT	*	16,198	128	30	61
*G4ILO	*	15,051	149	24	63
*M3ENF	*	13,858	115	22	60
*G3WRR	*	5,512	62	16	37
*M1ACB	*	3,773	70	10	39
*G8CCL	*	3,534	76	13	44
*MØTTE	*	3,087	51	12	37
*2EØTQR	*	2,405	46	11	26
*M6ADB	*	1,634	36	9	29
*M6AVL	*	575	22	10	15
*M1DST	14	19,840	199	14	50
*G8RCK	*	9,576	119	12	44
*GØRAH	*	8,788	121	12	40
*2E1FVS	7	15,912	166	13	59
*MØOZH	*	10,440	145	11	47
*G7AAQ	*	2,146	50	7	30
*G6UYG	*	598	26	6	20
*G3YBY	3.7	36,720	400	13	67
*G3VYI	1.8	1,632	52	3	29
Estonia					
ES5G	A	4,055,396	3636	152	495
					(OP: ES7GM)
ES2TI	*	430,494	1106	71	243
ES2BH	*	111,690	486	46	124
ES2IPA	*	87,120	392	39	137
ES6QZ	*	9,648	135	14	53
ES8BHR	28	1,316	27	9	19
ES6TX	7	29,491	302	14	63
ES5RW	1.8	83,433	859	17	70
*ES4RX	A	268,000	686	65	203
*ES7FU	*	24,752	205	21	91
*ES1BA	*	270	8	7	8
*ES1LS	21	90,970	393	28	82
*ES1CN	*	82,544	374	31	81
*ES5NHC	14	1,300	44	6	19
*ES5JR	7	177,282	1068	32	102
*ES2MC	3.7	70,300	623	17	78
*ES6KW	*	7,700	130	8	42
European Russia					
RX3APM	A	3,784,260	3563	141	449
UA4W	*	2,867,056	3303	132	460
UI4I	*	1,850,391	2460	119	394
RG3K	*	1,452,894	2107	107	356
RM2U	*	1,251,360	1714	115	380
R3CM	*	997,907	1896	84	295
RO3DX	*	933,625	1144	110	375
UA6UDV	*	874,800	1477	104	301
RN3AW	*	810,520	1091	115	345
RU5A	*	710,094	1592	75	243
R3PA	*	620,378	1064	82	264
UA3VFS	*	554,880	1136	79	261
RV2FW/1	*	459,264	719	101	283
RU1AB	*	439,674	681	92	289
R3FC	*	432,432	923	74	262
RA3N	*	381,094	762	81	253
R4RT	*	372,704	1029	72	232
RA6GW	*	366,300	668	86	247
R3OM	*	301,608	754	58	226
R5DT	*	267,582	495	84	238
RK3DK	*	256,025	669	68	207
R3QX	*	237,915	412	76	235
RK4PB	*	229,599	553	68	195
RN3ZC	*	192,500	948	36	104
UA4NC	*	147,733	482	59	182
R2DW	*	144,004	285	60	199
R3QF	*	127,368	244	80	181
RV6FA	*	111,384	240	77	144
UA3DUJ	*	107,730	340	53	137
UA4CNZ	*	105,635	494	38	147
RM4R	*	93,465	312	49	152
RA3RK	*	90,882	366	41	146
RN3BO	*	87,648	289	48	128
RU3KC	*	77,356	237	56	177
RV3FT	*	56,933	134	73	124
R3NA	*	44,388	193	49	113
RN3FS	*	40,672	146	62	102
RV3IC	*	27,795	200	20	65
UA3RAI	*	24,805	174	32	89
RX6MR	*	24,128	150	27	89
RU6FC	*	13,377	76	37	54
R7FF	*	13,328	124	27	71
UA3EAY	*	12,963	59	36	51
RV1CC	*	12,350	68	28	37
RZ3AL	*	10,440	140	15	57
UA3DAM	*	9,828	82	26	52
RA7A	*	8,875	60	34	37
UA3TCJ	*	8,118	64	26	40
RX6CC	*	7,744	53	29	35
UA3LIA	*	6,588	48	22	32
RW3QHN	*	6,534	81	16	50
UA3DPM	*	4,505	31	22	31
UA3AAB	*	3,478	37	20	27
UA6JFG	*	2,376	34	13	20
RU3DM	*	1,599	23	19	22
UA3BM	*	1,125	18	11	14
UA4CC	28	1,944	112	3	15
RK6CM	*	960	32	6	14
RW3DU	21	160,318	700	32	110
R5OE	*	77,488	372	28	88
RW2CW	*	3,901	59	16	31
RZ1ZZ	14	475,399	1993	32	99
R3KM	*	367,785	1387	37	128
RA1TU	*	93,223	712	24	77
RX3AW	*	89,182	374	30	92
RW6AH	*	39,494	251	24	74
RM3M	*	9,366	169	10	32
					(OP: RU3NIC)
RC4WA	*	5,763	87	13	38
					(OP: RA4WX)
RK3TT	*	2,176	40	9	25
RU6L	1.8	10,020	141	10	50
*RW1CW	A	1,267,556	1466	124	400
*RW2A	*	932,932	1429	105	361
*UA3BL	*	832,905	1466	95	320
*RA4AAO	*	675,684	1029	94	317
*RK3IM	*	663,104	1077	92	324
*RU4AA	*	527,742	936	81	256
*UA3ABJ	*	491,400	793	93	285
*R7AY	*	455,919	1183	70	179
*RU4FA	*	402,052	801	77	255
*UA3UNP	*	393,381	805	73	254
*UA1CUR	*	393,225	823	70	251
*RA4DR	*	330,560	752	72	248
*R2SA	*	314,432	810	57	215
*RL3AW	*	282,077	472	84	227
*RU4SO	*	253,240	683	55	205
*RA6LOO	*	236,520	454	83	241
*RT3LA	*	191,268	552	57	195
*RX6LOL	*	175,500	432	54	196
*U1BA	*	174,182	503	52	166
*UA3OQ	*	166,845	573	49	196
*UA1CEI	*	163,966	479	71	186
*UA6NZ	*	159,478	391	62	180
*RN3ZR	*	151,368	376	56	156
*UA6LN	*	150,635	404	58	177
*UC6A	*	150,134	298	63	214
*RU4F	*	146,016	420	62	172
*RQ3M	*	144,160	357	60	212
*RN3ZIC	*	139,150	311	63	190
*RW3SZ	*	119,136	358	61	158
*UA4AAC	*	116,994	460	36	150
*RA3RBL	*	108,120	343	52	160
*UA3AIU	*	106,491	343	65	166
*RW4AD	*	106,005	433	42	143
*RL3Q	*	97,644	349	42	164
*RN4NF	*	89,947	282	60	161
*RA3ATE	*	88,466	432	40	138
*RA3OO	*	82,584	218	54	132
*RA4ACX	*	81,291	307	43	104
*UA4PCM	*	79,904	206	58	118
*RA6MK	*	79,488	318	51	133
*R3AAA	*	78,895	370	36	119
*RA4PBE	*	73,948	350	36	103
*RA3YDA	*	72,576	218	49	119
*RZ6MP	*	69,362	349	35	123
*RV4CO	*	66,704	285	44	132
*UA4UT	*	66,430	249	43	139
*RV3YR	*	65,720	254	38	117
*UA1WA	*	62,415	227	49	122
*UA3DKT	*	62,328	238	52	116
*RZ7G	*	62,307	325	34	127
*RU3XY	*	57,892	295	42	122
*RN6MA	*	48,944	269	35	117
*RA1TV	*	48,764	256	37	130
*RO7M	*	48,438	199	38	100
*RN3ZJJ	*	48,363	287	27	114
*RY4W	*	46,971	255	40	113
*R4WT	*	45,795	298	35	94
*RA3QG	*	45,095	235	38	107
*R7NK	*	43,992	161	41	115
*RA3VE	*	43,032	264	30	102
*UA1WGV	*	42,504	222	41	97
*RM2T	*	41,943	298	26	97
*RA4HMT	*	39,128	215	36	98
*R3LA	*	38,482	150	49	93
*RA6FUZ	*	37,761	219	34	89
*UA6HO	*	37,062	130	40	102
*RA1AGG	*	34,840	217	34	96
*RA3DTN	*	33,040	172	36	82
*RA3XCZ	*	32,631	219	39	110
*RV4HV	*	32,186	153	37	96
*R7MM	*	31,850	136	39	91
*RN3FY	*	31,248	204	29	83
*R3ZV	*	30,326	181	31	87
*RA3RGQ	*	29,719	93	48	65
*UA3XAC	*	28,768	169	33	83
*RA3XI	*	27,140	213	25	90
*RX3VF	*	25,413	152	33	96
*RV4LS	*	24,282	105	40	74
*UA4FTA	*	24,089	126	35	74
*UA1OJL	*	23,463	137	32	67
*RD3QA	*	23,246	126	36	82
*RA3BQ	*	22,791	149	30	77
*RJ4F	*	22,355	93	38	47
*RN6LOT	*	22,344	119	30	84
*RZ3GV	*	21,840	116	35	85
*RW3VA	*	20,349	105	36	97
*RX3BP	*	19,110	79	40	65
*RX6LEM	*	18,880	111	27	53
*RA1AJF	*	18,824	115	30	74
*UA5DX	*	17,496	67	45	63
*RA3TUT	*	17,325	79	39	60
*UA3RC	*	16,626	213	10	41
*RV3DHC	*	16,058	87	30	44
*UA3VVB	*	15,824	93	30	56
*RL3OI	*	13,578	164	16	57
*RA3EA	*	12,690	61	35	55
*RK2T	*	12,354	84	30	57
					(OP: RK3TD)
*RN3ZIN	*	11,830	108	25	66
*UA3DCM	*	11,655	130	16	47
*RM7M	*	10,823	101	20	59
*RA3VKU	*	10,647	97	16	75
*RN6DR	*	10,234	73	27	59
*RW6A	*	10,140	77	25	53
*RA1AUW	*	10,050	107	17	50
*UA3EVG	*	9,315	120	22	59
*RD1AW	*	9,300	62	25	50
*UA4FER	*	9,063	67	23	34
*RM6J	*	9,024	55	27	37
*RA6AAW	*	8,436	49	34	40
*RA3TYL	*	8,190	109	13	52
*RZ3AIA	*	7,686	76	21	42
*RX6AMV	*	7,315	59	22	33
*RZ3ARO	*	6,405	93	18	43
*RV6HT	*	6,006	38	31	35
*RL3AJ	*	5,488	69	13	43
*RO5O	*	5,280	48	19	29
*RK6AQM	*	5,184	54	17	37
*UA3X	*	4,757	42	30	37
*RZ3DOT	*	4,466	45	24	34
*UA3DSS	*	4,361	62	13	36
*UA6HFI	*	4,085	50	17	26
*RA3RGD	*	3,311	59	13	30
*RA4UAT	*	3,139	33	13	30
*RM4N	*	2,184	34	11	28
*RA3RVZ	*	2,040	25	16	24
*UA6YI	*	1,935	27	18	25
*UA6FF	*	1,595	21	11	18
*RA1AKR	*	960	26	9	21
*UA1AAR	*	576	16	8	8
*RV4LC	*	361	15	8	11
*RA6DT	*	336	10	7	9
*RA6XB	*	289	12	6	11
*RV3TG	*	16	2	2	2
*RW1CX	28	9,300	70	15	45
*UA6LCN	*	6,708	72	15	28
*R6CW	*	156	9	4	8
*RZ4AG	21	139,556	585	34	105
*UA2FFX/1	*	66,033	361	27	72
*RU6YZ	*	64,158	357	31	80
*RZ3AV	*	57,240	311	26	82
*UA4ACP	*	49,848	344	20	73
*RV6BK	*	42,895	225	30	85
*UA4LW	*	42,662	361	18	65
*RU6AX	*	32,635	190	28	79
*RA3DGH	*	10,669	181	11	36
*UB4FAB	*	9,234	126	13	44
*RX3PB	*	8,732	116	18	41
*RA6YJ	*	8,652	77	23	61
*RN3DDR	*	6,171	71	16	35
*RZ4AZA	*	100	6	4	6
*UA1AQA	14	130,345	618	33	98
*RN4SN	*	105,860	420	32	102
*R7AM	*	90,688	580	26	83
*RK3SWB	*	81,396	401	28	91
					(OP: RU3SD)
*RX4W	*	45,900	323	27	75
*UA6FZ	*	45,474	317	25	81
*RX3DBG	*	38,014	281	19	64
*RA4SAT	*	32,736	223	21	67
*UA6BJY	*	27,300	255	18	66
*RV6ACC	*	23,760	203	15	65
*UA1ZLN	*	23,331	247	17	60
*RN3DHA	*	5,568	120	8	40
*R4HA	*	5,060	82	8	36
*UA3FX	7	41,499	342	18	69
*RA6ABC	*	20,350	225	15	59
*RZ3AUL	*	10,915	134	11	48
*RA3MAV	*	5,151	79	11	40
*RU3UW	*	1,980	40	7	26
*RA3IS	*	24	2	2	2
*UA3LHL	3.7	28,630	341	10	60
*R7NP	*	11,484	178	10	48
*RZ3VV	*	6,321	116	8	41
*UA6AIW	1.8	17,018	244	10	57
*UA4NDX	*	1,972	72	7	22
European Turkey					
*TA1CM	A	87,975	295	54	153
*TA1TA	*	4,270	73	21	49
*TA1BM	28	42	3	3	3
*TA1HZ	21	6,669	95	18	39
*TA1FR	14	2	1	1	1
*TA1ED	1.8	8,418	174	7	39
Finland					
OH8X	A	6,508,899	5237	152	505
					(OP: OH4JFN)
OH4BNP	*	426,071	687	86	267
OH1O	*	310,689	531	72	239
					(OP: OH1TV)
OH1XY	*	228,723	405	72	167
OH1RX	*	109,816	249	68	144
OH1B	*	7,416	74	21	51
					(OP: OH1BOI)
OH6NJ	*	7,259	45	22	39
OH6IO	*	1,173	17	10	13
OH1F	21	662,805	1854	37	128
					(OP: OH1NOA)
OH2XF	*	67,000	216	32	102
OG1T	*	6,732	80	15	21
					(OP: OH7XE)
OH5TS	14	345,245	1389	35	110
OH2BCD	*	23,075	116	17	54
OH1TN	7	468	16	5	13
OH1TX	3.7	210,330	1253	31	104
*OH2BH	A	1,845,900	2171	117	408
					(OP: OH6UM)
*OH1K	*	481,236	874	84	253
*OH1LEG	*	131,298	306	72	165
*OH2LP	*	124,236	395	52	151
*OH3KQ	*	92,684	421	43	145
*OH5NE	*	68,992	295	47	149
*OH1TD	*	65,340	296	40	125
*OH2MO	*	37,674	233	37	101
*OH1FJ	*	11,620	152	16	54
*OH8TV	*	7,176	125	18	60
*OH4TOM	*	1,710	37	10	20
*OH6GFI	*	198	10	8	10
*OH3WR	21	34,000	190	25	60
*OH3LB	*	6,860	95	14	35
*OH6JYH	7	2,628	60	8	28
France					
F5VHY	A	1,053,896	1064	99	313
F6DZU	*	808,960	1199	86	230
F5BBD	*	609,687	1291	80	271
F4ENK	*	603,856	1075	90	286
F5RAB	*	484,063	750	87	262
F4FFZ	*	448,529	910	72	241
F5CQ	*	353,934	519	83	235
F4DSK	*	147,660	358	59	171
F6CXJ	*	108,615	293	56	139
F8DHE	*	106,774	408	64	133
F4FLF	*	88,060	309	48	122
F8AAN	*	28,497	211	21	38
F8DFP	*	6,867	62	24	39
F6KCP	28	30,149	185	19	54
					(OP: F5VHN)
F8DBF	21	1,207,813	2666	38	143
TM1E	*	371,220	1518	32	83
TM4W	*	290,304	1153	29	79
					(OP: F5HRY)
F4EGD	*	98,855	562	26	59
F5JY	*	76,953	322	30	83
F1AKK	14	1,556,646	3789	40	142
TM1W	*	708,600	2392	38	112
					(OP: F1HAR)
TM2C	*	491,361	2047	32	97
					(OP: F5TRO)
TMØT	7	633,933	2562	37	122
					(OP: F/TU5KG)
F5AMH	*	37,961	568	15	62
F5VML	*	14,089	191	13	60
*F8AKS	A	530,037	990	73	220

*F2AR	*	423,384	813	74	238
*F6FDR	*	366,240	801	67	213
*F6FTB	*	256,824	711	54	192
*F5POJ	*	198,198	494	54	177
*F5PAL	*	171,564	503	51	153
*F6DRP	*	140,275	491	44	111
*F6EWX	*	108,702	397	40	143
*F4EWU	*	100,080	362	52	128
*F4GBW	*	93,415	393	42	115
*F4AGR	*	87,127	282	42	109
*F5OHH	*	74,889	335	41	118
*F4FSV	*	72,038	263	48	133
*F4GGD	*	71,070	291	40	98
*F4ERS	*	68,211	217	47	96
*F1MLN	*	56,736	244	32	64
*F5MMB	*	50,260	257	39	101
*F5RD	*	49,274	227	42	100
*F1EPQ	*	33,000	249	26	94
*F4EZG	*	30,622	161	37	85
*F5BTH	*	29,768	178	35	87
*F8DYD	*	24,651	128	31	68
*F6GPT	*	24,534	143	28	59
*F6API	*	19,272	153	26	62
*F5GGL	*	17,978	102	28	73
*F4DFR	*	13,776	113	26	58
*F4GMK	*	12,750	126	21	64
*F4DXP	*	12,600	104	22	53
*F8NUH	*	12,375	79	29	46
*F4FSB	*	12,276	111	20	46
*F4ETG	*	7,975	94	12	43
*F1SMV	*	5,264	69	17	39
*F4CUI	*	4,814	60	17	41
*F4FBP	*	4,617	79	17	40
*F1ICS	*	4,543	66	16	43
*F1SIU	*	4,176	64	14	34
*F5AGQ	*	2,400	30	15	25
*F1PYN	*	2,365	36	13	30
*F1LPN	*	2,242	47	13	25
*F1IWH	*	2,030	40	15	20
*F4FXH	*	1,540	32	12	23
*TM40FO	*	576	30	4	14
(OP: F4FOO)					
*F5MLJ	*	224	10	7	9
*F4FIA	*	221	14	5	12
*F4FWN	*	90	7	3	7
*F8AKC	28	20,033	135	18	49
*F6IRG	*	5,265	60	16	29
*F5TMJ	*	1,984	27	12	19
*F5TGR	21	3,071	44	14	23
*F1MGC	14	2,268	54	8	28
*F5CYS	7	50,512	660	14	63
*F1ICR	*	15,610	203	15	55
*F8PMO	*	8,778	121	11	46
*F5BEG	3.7	84,584	718	17	80
*F5SSK	1.8	22,995	286	11	62

Germany

DJ4PT	A	3,859,736	3414	135	401
DJ5MW	*	2,550,975	2437	122	403
DL2DX	*	2,100,636	1710	123	408
DK5EZ	*	1,264,716	1175	114	402
DG8AM	*	882,700	1421	93	295
DL9GWD	*	823,821	997	104	343
DL1DTC	*	761,229	1123	89	298
DJ6OZ	*	610,203	911	80	283
DJ3HJ	*	419,874	855	61	212
DL9OHA	*	301,320	429	87	237
DL5YM	*	275,761	675	60	197
DJ5KW	*	241,572	718	54	192
DK5JM	*	221,275	431	65	200
DF9RD	*	208,552	595	60	202
DL8NBJ	*	171,798	372	63	211
DJ5IW	*	169,384	370	70	178
DJ1TU	*	164,121	433	60	167
DF6RI	*	151,690	431	48	149
DB1BAN	*	150,984	590	53	180
DL5ST	*	147,153	330	65	206
DC9ZP	*	146,102	375	55	174
DK8EY	*	134,829	438	43	168
DL6DVU	*	129,168	378	59	175
DL8SCG	*	118,940	257	62	128
DJ6XV	*	115,632	295	56	163
DF5BX	*	111,708	382	47	167
DL5ZL	*	104,370	289	56	157
DG9MDM	*	101,475	244	63	142
DC2YY	*	90,160	234	65	131
DL6JZ	*	83,367	260	43	114
DC1JAG	*	80,183	328	45	136
DJ4QO	*	68,728	240	38	104
DH8VV	*	46,835	179	41	54
DK1BX	*	41,958	144	52	110
DL5AXX	*	41,860	180	43	87
DL9GFB	*	41,405	174	49	120
DL6UNF	*	37,530	168	37	102
DF2TT	*	23,650	97	40	70
DJ2BC	*	20,200	78	36	64
DF2IAX	*	18,718	122	35	63
DL3OHB	*	18,252	79	39	78
DKØSU	*	12,397	125	17	60
(OP: DF7SA)					
DKØASP	*	7,728	97	18	51
(OP: DJ8QA)					
DK5OA	*	6,370	63	21	44
DB3FS	*	5,022	91	16	46
DM2BPG	*	4,743	103	7	44
DO4EF	*	3,400	39	16	24
DM4DX	*	2,697	32	15	16
DK7AN	*	2,106	42	12	14
DL8DBW	*	1,944	26	14	22
DH6JL	28	448	10	7	9
DL3BQA	21	283,360	768	37	123
DK5FF	*	209,208	637	35	103
DJ6TK	*	36,893	203	27	52
DG2SRL	*	14,144	83	26	42
DHØGDS	*	3,180	50	14	16
DFØJEN	*	6	1	1	1
(OP: DL2AMD)					
DL2AMD	14	18	2	1	2
DJ7WW	7	526,848	1951	37	131
DF2QZ	*	3,503	42	11	20
DF5PK	3.7	11,130	236	7	46
DF1IAQ	*	9,180	199	6	45
DL7CX	1.8	2,623	69	8	35
*DL4MCF	A	1,508,014	1600	114	424
*DL6DCD	*	711,392	1132	79	297
*DJ9ZB	*	434,463	701	78	213
*DL1BWU	*	414,540	892	75	240
*DJ4JF	*	395,460	576	86	252
*DL4ZA	*	378,200	821	65	240
*DG1IU	*	359,964	768	68	229
*DL1NKS	*	275,379	607	70	237
*DM5JBN	*	233,208	564	61	185
*DFØBV	*	226,100	457	62	204
(OP: DL6MAO)					
*DK5D	*	225,990	373	81	229
*DK7CH	*	212,415	609	61	184
*DL2F	*	195,264	702	57	159
(OP: DL2FDL)					
*DL1DVE	*	192,413	400	65	182
*DK3WN	*	189,120	563	55	185
*DL1TRK	*	177,000	483	60	176
*DM2AWM	*	160,714	475	51	163
*DL8ULO	*	136,728	511	47	169
*DL1VJL	*	136,530	363	55	150
*DP4M	*	132,858	505	42	156
(OP: DJ4MH)					
*DF5AN	*	131,660	315	57	170
*DF9FT	*	126,672	341	52	122
*DL4OCH	*	123,578	357	54	140
*DH6BH	*	122,904	333	65	151
*DG2JA	*	114,432	362	49	143
*DF6WE	*	105,789	420	40	157
*DF3IS	*	100,455	346	49	132
*DL3ZAI	*	100,392	296	50	128
*DF6QC	*	99,328	457	38	156
*DL9LF	*	98,022	322	46	140
*DL2DQL	*	93,312	305	53	139
*DL5DTG	*	92,820	383	44	151
*DL4EBA	*	91,492	362	45	133
*DL6NAL	*	91,304	357	46	156
*DL4VAI	*	88,540	290	48	142
*DL2SWR	*	87,668	246	58	144
*DL1TPY	*	83,838	316	47	131
*DF2KD	*	78,407	347	45	116
*DL6RBO	*	73,568	246	48	104
*DL1DTL	*	72,800	273	39	101
*DO1CS	*	72,225	305	36	99
*DL3WKG	*	67,056	310	36	140
*DLØBIT	*	64,255	234	45	136
(OP: LX1ER)					
*DL5ZB	*	61,910	177	56	95
*DH7LF	*	60,345	249	42	107
*DL2VK	*	59,664	166	53	79
*DM5JL	*	57,663	283	48	101
*DO1HGS	*	57,304	263	35	81
*DF5BM	*	56,960	203	42	86
*DL1JGG	*	55,854	299	44	130
*DO1WHU	*	53,476	308	27	89
*DL2ASB	*	52,804	236	46	126
*DK7FP	*	43,335	259	28	107
*DK6AY	*	43,125	208	36	79
*DO2MS	*	40,103	229	25	94
*DM2TO	*	38,184	148	45	84
*DB2BJT	*	38,100	293	32	118
*DL5ASE	*	36,288	160	34	50
*DL3MVC	*	36,168	221	32	105
*DK6NF	*	35,708	157	36	77
*DL5SWB	*	33,660	227	25	85
*DL1HSI	*	33,276	199	34	107
*DF4TD	*	33,078	139	33	116
*DL6NDW	*	31,552	206	27	89
*DM3KZN	*	31,255	150	32	63
*DM5CQ	*	30,510	187	34	101
*DJ4WM	*	28,448	235	28	99
*DJ6UP	*	28,122	176	31	78
*DL7ATR	*	27,938	160	37	85
*DO1KRT	*	27,027	164	20	57
*DK5TX	*	26,508	146	34	60
*DF2FM	*	26,196	127	34	84
*DO1MGN	*	26,100	200	22	78
*DL4GBA	*	26,096	148	33	79
*DB1SMW	*	25,868	194	27	89
*DO3KMF	*	24,983	178	23	60
*DL2AL	*	24,975	192	24	87
*DJ5LY	*	23,800	113	34	85
*DL9ZWG	*	23,001	131	35	88
*DL7VRG	*	22,572	139	33	75
*DL5JH	*	22,420	138	31	64
*DL4RAT	*	21,271	115	31	58
*DK6RF	*	21,060	113	26	55
*DO1GAR	*	19,888	216	21	67
*DM4TNF	*	18,975	158	32	83
*DK1LRS	*	18,908	144	29	87
*DL1HW	*	18,585	152	24	81
*DL1DXF	*	18,172	107	38	80
*DO2OF	*	18,078	145	19	50
*DK2BJ	*	18,000	127	29	71
*DG6OAG	*	17,784	120	23	53
*DG1NI	*	16,974	141	25	57
*DL9FB	*	16,872	139	29	85
*DB9RZ	*	15,960	108	32	63
*DL2AWA	*	15,080	114	37	67
*DL4EAX	*	14,645	110	31	70
*DK8CB	*	13,363	115	24	59
*DL1DF	*	12,920	112	28	57
*DO1CDE	*	12,528	146	19	53
*DL6RBH	*	12,375	103	24	51
*DH1UZ	*	11,550	88	29	48
*DL8DUL	*	11,250	111	28	62
*DL6YAQ	*	11,193	137	19	72
*DO6NI	*	10,902	109	21	48
*DL8AX	*	10,858	93	27	62
*DH1JY	*	9,492	79	25	59
*DL3YDP	*	9,480	85	21	58
*DL3RCG	*	9,360	82	23	57
*DD9NT	*	8,904	84	24	60
*DO4NE	*	8,850	104	15	44
*DJ1WK	*	8,532	109	17	62
*DO9PL	*	8,228	136	15	53
*DO1DJJ	*	8,064	77	22	34
*DJ1FZ	*	7,854	75	24	27
*DL4AC	*	7,854	113	16	50
*DO5AWE	*	7,839	101	17	50
*DO8TB	*	7,250	79	20	38
*DA9L	*	7,084	62	15	31
*DO1HYL	*	7,000	96	15	41
*DO1KUB	*	6,656	107	11	41
*DK1TS	*	6,480	73	18	30
*DL1STV	*	6,448	93	15	47
*DL3SEM	*	6,050	45	28	27
*DL9HB	*	5,980	70	22	43
*DC2OC	*	5,952	92	12	50
*DO7DU	*	5,880	54	25	45
*DG4HZ	*	5,760	80	18	42
*DG6MBS	*	5,040	67	16	44
*DO3QQ	*	4,335	57	16	35
*DG4YGW	*	3,996	62	15	39
*DL1GO	*	3,575	59	14	41
*DL7ED	*	3,510	45	18	36
*DM5LK	*	3,354	39	16	23
*DC2CT	*	3,339	32	23	30
*DJ5KX	*	3,196	64	12	35
*DL7CU	*	3,168	49	14	22
*DK3FB	*	2,850	45	16	22
*DL8BTE	*	2,840	79	9	31
*DJ4PK	*	2,701	35	13	24
*DG9AK	*	2,400	44	12	28
*DG6DAF	*	2,074	21	16	18
*DL1PF	*	2,048	36	14	18
*DG1LS	*	1,920	44	13	27
*DO5FEE	*	1,887	48	10	27
*DL1AZA	*	1,794	36	13	26
*DF1MM	*	1,760	19	13	19
*DG1EHG	*	1,638	49	11	31
*DK2PZ	*	1,591	36	12	25
*DM3F	*	1,419	27	13	20
(OP: DH5FS)					
*DF7JC	*	1,152	24	11	21
*DL7FA	*	1,044	33	9	20
*DGØOSK	*	1,025	39	12	29
*DN1OSK	*	676	23	7	19
*DL7LZ	*	561	15	7	10
*DL2BUM	*	368	14	7	9
*DB1RL	*	252	15	9	12
*DK3RA	*	150	5	5	5
*DD5AN	*	18	3	3	3
*DL3VZL	28	13,797	118	15	58
*DL1ARD	*	1,512	32	8	16
*DJØMCZ	21	108,460	423	30	86
*DO6SR	*	15,372	137	19	42
*DH3RB	*	13,224	108	18	40
*DL5KUD	*	4,608	49	15	21
*DO4TP	*	2,376	33	9	18
*DL1FZZ	*	2,013	21	14	19
*DO1NPF	*	1,026	36	7	12
*DL1DWR	*	160	11	4	4
*DL9ZP	14	81,640	508	22	82
*DJ2GMS	*	15,975	151	15	56
*DL4JYT	*	9,360	92	14	51
*DL3BWF	*	5,150	57	17	33
*DL6UAM	*	3,108	56	9	28
*DL1DUU	*	1,961	46	10	27
*DB1CH	*	312	13	5	7
*DL8AAM	7	41,184	417	16	72
*DL1SBF	*	56	4	3	4
*DL3KDC	3.7	360	26	2	18
*DJ8ES	1.8	2,535	62	6	33

Greece

SY2V	A	467,058	1228	69	254
(OP: SV2GJV)					
J48P	*	126,629	785	33	106
(OP: HA7PL)					
SV1GRD	*	31,640	202	34	106
SV1JGX	14	112,744	595	31	105
J43J	7	115,787	784	24	95
(OP: DJ5JH)					
*SV8/DK3SJ	A	42,625	243	36	119
*SV1UT	21	92,082	621	27	76
*SV1JG	*	48,510	302	30	69
*SV2YC	14	32,980	277	19	66
*SV2JAO	7	68,172	529	25	89
*SV2KBE	1.8	3,234	95	6	36

Guernsey

*MUØFAL	28	580	21	7	13

Hungary

HA3NU	A	151,605	684	33	102
HA3OU	*	77,027	225	56	141
HA7JTR	3.7	91,089	959	14	73
*HG3FUG	A	49,608	237	32	85
*HAØML	*	48,776	235	39	95
*HA2MN	*	31,680	185	30	69
*HA7JQK	*	5,418	91	14	49
*HA3FT	28	1,054	26	10	21
*HA7MB	21	14,308	114	17	32
*HA7AVU	3.7	11,715	201	7	48
*HG1ØØVA	*	5,684	139	8	41

Iceland

TF3Y	A	287,272	905	45	104
TF3AM	*	268,640	1057	47	183
TF3CW	14	996,853	3028	34	109
TF3SG	1.8	19,527	206	15	54
*TF8GX	A	45,510	219	31	80

Ireland

EI2II	A	169,136	436	50	126
EI4DJB	*	100,224	358	45	129
EI9HX	14	680,060	2184	34	114
EI2CN	*	629,888	2358	34	99
*EI8GQB	A	928,085	1347	88	331
(OP: ON4EI)					
*EI5GSB	*	391,996	845	65	237
*EI3ENB	*	93,055	336	40	145
*EI4GAB	*	79,704	316	41	121
*EI2KA	*	78,942	311	43	134
*EI9KC	*	70,942	292	40	118
*EI4JZ	14	21,744	240	15	57

Isle of Man

GD4WBY	A	73,075	309	50	135
*GD4IHC	A	2,516	37	12	25

Italy

IR4B	A	532,650	813	85	250
(OP: IK4AUY)					
IZ7ECL	*	518,245	1027	84	251
IZØBVU	*	329,475	538	89	256
I4XNN	*	288,900	587	64	206
I4AUM	*	217,348	518	72	196
IZ8FBU	*	144,834	419	47	155
IWØGTA	*	130,500	305	58	167
IZ1CQZ	*	121,875	320	56	139
IZ6CLN	*	108,996	600	29	157
IW5ELR	*	87,416	276	54	142
IK5AFJ	*	85,008	228	47	114
I5/DK1ROB	*	83,721	353	40	137
IZØPMV	*	73,528	230	56	126
IZØPAU	*	67,760	441	36	104
IK2MPR	*	61,180	233	50	111
IRØZ	*	57,240	502	26	82
IZ4EFP	*	56,160	199	51	109
IZ2KRZ	*	52,530	149	56	114
IK1MNG	*	51,088	215	40	84
IZ5RNC	*	33,320	205	38	102
IZ8DEJ	*	25,536	231	22	90
IZ4BQV	*	21,312	187	31	80
IZØEGA	*	17,289	119	31	82
IZ1LAT	*	16,800	110	31	69
IZØFWD	*	9,440	58	29	51
IZ2GMT	*	7,920	74	21	45
IZØIWU	*	2,268	21	15	21
IK4ZHH	*	1,254	24	9	13
IZØDXI	28	10,488	79	17	40
IWØBCF	21	121,347	383	36	103
IZ3DVU/3	*	8,608	140	12	20
IZ1ASN	*	6,592	40	30	34
IZ8HUJ	14	68,705	575	21	70
IZ8DSX	*	32,208	378	15	46
IZ6ERS	7	185,045	1559	30	89
IZ1GAR	*	137,600	958	27	101
I4FYF	1.8	68,769	807	12	69
*IR4T	A	1,086,912	1389	110	349
(OP: IK2NCJ)					
*IK2DZN	*	661,728	1038	94	272
*IK2QLX	*	343,098	674	72	222
*IK2SGB	*	303,490	596	77	233
*IW4EGX	*	250,498	581	63	188
*IZ2JPN	*	235,675	536	70	205
*IK7NXU	*	224,145	476	79	214
*IZ5IMD	*	217,338	434	72	195
*IK8NSR	*	182,925	447	61	164
*IKØFMB	*	181,424	544	63	169
*IWØEAC	*	180,858	366	79	179
*II7K	*	152,460	427	72	180
(OP: IZ7KHR)					
*IZ5ILK	*	109,098	255	64	145
*IK7RVY	*	94,500	332	49	131
*I5DOF	*	84,150	295	50	137
*IK3SSW	*	71,732	335	38	120
*IZ1ANZ	*	67,890	254	44	111
*IZ4DYP	*	67,068	302	45	117
*IW5ECP	*	62,266	244	46	117
*IZ7BAS	*	56,244	237	38	91
*IZ2BKA	*	55,583	233	41	122
*IK1ZOE	*	47,128	257	38	99
*IZ5OQX	*	46,305	260	31	104
*IW2FUT	*	44,712	237	35	103
*IZ5MMK	*	43,885	215	34	97
*IK2YSJ	*	38,624	241	37	105
*IK2YXP	*	33,916	151	38	84
*IK1DFH	*	32,750	184	32	99
*IZ3FJZ	*	28,413	157	31	46
*IZ5RWK	*	27,489	249	25	94
*IK7WPD	*	26,676	150	38	79
*IK2IKW	*	24,600	149	32	88
*IV3NVB	*	24,510	129	42	87
*IV3ARJ	*	22,644	167	28	83
*IK2LFD	*	19,928	130	30	64
*IWØGVG	*	19,800	78	36	64
*IK6EUH	*	19,140	102	31	79
*IK4RVG	*	17,982	172	24	87
*IV3IDP	*	17,460	141	23	74
*IW2MYH	*	16,983	120	38	73
*IW1RHR	*	14,076	110	27	75
*IK3MLF	*	14,065	113	24	73
*IK8MIG	*	13,943	146	17	56
*IN3MNS	*	13,398	107	26	61
*IZ1HDR	*	13,224	104	26	61
*IZ8GBT	*	11,178	78	30	51
*IW7BIM	*	10,836	115	25	61
*IW5EDI	*	10,153	67	26	45
*I1QBI	*	9,750	55	32	46
*IØKHP	*	8,700	94	18	57
*IZ2LQD	*	8,509	76	24	43
*IK4JQQ	*	7,800	100	15	50
*IK1YHX	*	7,760	89	19	61
*IZ1DXS	*	7,366	61	23	35
*IZ4DUX	*	7,250	69	20	38
*IK5FKF	*	7,182	75	21	42
*IW5ELA	*	7,072	46	29	39
*IZ6INR	*	6,944	59	22	40
*IK5ZQC	*	6,448	95	17	45
*IZ2JNN	*	6,370	89	16	49
*IZ8JAI	*	6,206	48	22	36
*IZ7EYA	*	6,120	49	29	43
*IZ2KTE	*	6,072	59	26	40
*IZ2RPN	*	6,059	67	22	51
*IZ1DFG	*	4,818	35	31	35
*IW6NZY	*	4,260	61	16	44
*IK4XQT	*	3,102	60	13	34
*IK8JDH	*	2,496	52	13	35
*IK5PVX	*	2,444	34	17	30
*IZ1HBC	*	2,214	53	11	30
*IK6GPZ	*	2,112	48	10	22
*IZ8CLM	*	1,815	23	15	18
*IZ1DLY	*	1,584	26	19	25
*IZ8MWG	*	1,395	17	14	17
*IZ2CSX	*	1,036	26	8	20
*IZ8ESX	*	902	17	11	11
*IZ5LZP	*	624	18	10	14
*IV3TQE	*	589	13	9	10
*IK2CFD	*	572	18	8	14
*IZ4DIG	*	500	12	9	11
*IZ3QCH	*	459	17	12	15
*IN3IZT	*	308	8	6	8
*IZ8DBJ	28	26,524	153	23	53
*IZ5OVP	*	2,688	50	10	18
*IZ8FSH	21	81,000	458	22	68
*IZ5ILF	*	36,935	202	25	64
*I4VIL	*	11,773	72	25	36
*IZ5NFD	*	11,388	93	19	33
*IQ7DV	14	56,088	652	17	65
(OP: IZ7NMD)					
*IZ2DII	*	49,692	281	25	76
*IZ1NBX	*	32,702	229	21	62
*IK8LXI	*	26,988	232	17	61
*IZ2JQP	*	25,230	176	22	65
*IZ3JDL	*	5,512	85	13	40
*IK5YJK	*	4,738	89	10	36
*IZ4MNZ	*	4,264	64	10	31
*IK8WJZ	*	2,628	49	9	27
*IZ7GAT	*	396	20	5	13
*IK3UNA/1	7	75,482	829	21	73
*IW3SNR	*	9,570	164	11	47
*IZ4AIF	*	6,050	100	11	44
*IZ3NVR	*	6,016	114	7	40
*IZØIWM	*	2,016	65	6	26
*IZ7RZF	*	736	24	7	16
*IZ3GKI	*	240	12	5	10
*IN3ADW	*	24	2	2	2
*IO3B	3.7	67,868	649	14	80
(OP: IV3KFB)					
*IW1RMD	1.8	7,448	155	6	43
*IV3GOW	*	650	29	4	21

Kaliningrad

UA2CZ	A	264,724	622	74	215
*RN2FQ	A	70,336	255	45	112
*UA2FHZ	*	38,610	210	36	94
*RA2FX	14	700	20	9	11
*RA2FB	1.8	2,816	90	5	27

Latvia

YL2SM	A	2,562,115	2936	122	413
YL2SW	*	863,555	1296	86	299
YL3DR	*	372,654	757	73	236
YL3FX	21	101,909	538	29	72
YL3FT	7	429,970	1978	38	117
*YL2TQ	A	361,335	622	80	247
*YL2CR	*	117,806	475	43	154
*YL2PN	*	75,110	378	36	149
*YL2IP	*	53,280	211	42	106
*YL2GUV	21	50,310	171	36	94
*YL3BZ	*	34,486	175	24	62
*YL2CI	3.7	50,932	698	11	57

Lithuania

LY2J	A	830,973	1494	98	331
LY2MM	*	746,736	1352	83	293
LY2XW	*	129,400	341	64	136
LY2AE	21	47,523	243	30	63
LY1XA	*	31,929	164	26	61
LY1CT	*	20,280	176	17	48
LY5R	14	544,663	1824	38	123
LY2BKT	3.7	45,895	664	8	59
LY2OU	1.8	24,759	451	9	54
*LY4T	A	873,585	1386	85	320
*LY2K	*	484,704	1007	74	250
*LY4K	*	61,272	305	37	111
*LY2N	*	51,870	219	40	90
*LY4BP	*	44,069	246	34	93
*LY1K	*	42,656	228	35	89
*LY1DJ	*	29,400	214	27	93
*LY2BBF	*	23,716	167	32	66
*LY1NDN	*	20,619	186	22	65
*LY2OM	*	11,200	90	20	50
*LY2AT	*	8,880	100	22	58
*LY2LB	*	4,746	64	15	27
*LY4B	28	440	18	8	12
*LY2ND	21	8,550	113	18	39
*LY5S	7	5,537	115	9	40
*LY1G	3.7	80,360	691	20	78

Luxembourg

LX1SG	A	389,367	1094	53	200
LX1NO	*	72,500	367	34	91
LX9DX	14	109,250	617	24	71
(OP: LX1KQ)					

Macedonia

Z3ØA	7	169,218	1182	25	94
Z36W	3.7	27,648	310	12	60
*Z37Y	A	262,524	739	60	202
(OP: Z32AJA)					
*Z35G	*	15,996	113	28	58
*Z35W	14	122,148	758	29	87

Malta

9H1XT	A	159,152	507	54	149
*9H3NO	A	50	5	5	5
(OP: LX1NO)					

Moldova

*ER3AU	A	142,131	444	57	162
*ER1DA	*	131,400	424	44	156
*ER5LL	*	14,744	97	28	48
*ER5DX	21	32,883	156	30	67

Monaco

3A2MG	A	142,444	359	58	181

Montenegro

4O3A	A	10,587,780	7009	168	588
(OP: ES5TV)					

Netherlands

PA3AAV	A	1,493,856	1548	128	418
PA1NHZ	*	556,850	1282	60	199
PAØJNH	*	396,440	725	78	262
PA1NL	*	329,574	1013	64	202
PAØLOU	*	147,459	296	80	167
PA7PA	*	63,684	183	57	117
PE1EWR	*	24,970	174	27	83
PA4B	*	16,055	110	23	42
PG9HF	*	14,706	100	27	59
PD5JFK	*	14,151	148	20	69
PA3BWK	*	11,475	100	21	54
PA1CM	*	1,512	25	15	13
PDØNXV	*	55	8	4	7
PFØX	21	300,533	928	38	111
PA5TT	14	975	25	6	7
PA2MRT	7	37,230	243	24	78
*PA8KW	A	537,460	1004	84	265
*PA2LS	*	348,861	739	76	233
*PA3T	*	254,904	646	61	197
*PAØGJV	*	252,396	595	53	175
*PA3FYG	*	226,176	591	58	190
*PAØAGA	*	215,045	866	46	159
*PB6W	*	170,240	926	28	132
*PD1KSA	*	113,696	612	31	105
*PG1R	*	97,713	370	41	148
*PA1JIM	*	75,469	281	45	118
*PA1RBZ	*	74,690	350	39	115
*PD1RP	*	72,520	323	40	108
*PAØCGB	*	70,684	337	33	131
*PE1LTY	*	68,796	303	39	108
*PA9DD	*	65,113	275	38	111
*PA3DBS	*	65,052	318	40	116
*PA3ARM	*	63,580	297	42	128
*PAØCOR	*	61,388	246	42	107
*PA3ANN	*	58,216	354	33	119
*PDØHM	*	53,424	444	21	91
*PE1RLF	*	50,958	249	34	115
*PA3ELQ	*	45,387	267	32	91
*PAØCMU	*	44,850	240	38	92
*PA4PS	*	43,056	258	32	106
*PE2JMR	*	42,291	221	35	92
*PD1B	*	40,356	250	29	89
*PD5LO	*	38,500	268	27	83
*PA3EWG	*	38,144	263	28	100
*PA3GDD	*	29,664	195	27	76
*PF9A	*	27,904	198	24	85
*PA1PAT	*	26,307	197	23	88
*PA2CVD	*	26,136	248	22	86
*PG2D	*	23,544	176	24	85
*PA3DAT	*	20,868	147	27	84
*PAØEMO	*	16,660	193	21	77
*PA5VK	*	15,708	114	25	43
*PA3J	*	14,276	143	20	63
*PA2CHM	*	11,880	100	23	49
*PA3MET	*	11,520	133	24	72
*PA3GEO	*	9,804	106	18	58
*PA1AK	*	7,020	98	19	46
*PA3AQL	*	7,006	96	15	47
*PDØPRS	*	5,238	101	13	41
*PA1W	*	4,880	61	21	40
*PA3HCD	*	4,332	94	12	45
*PE1NCP	*	4,293	65	15	38
*PAØB	*	2,704	55	13	39
*PAØWYS	*	1,702	34	12	25
*PA3EEG	*	1,596	47	11	27
*PAØFEI	*	616	17	11	17
*PA3BWD	28	6,664	95	13	36
*PD4M	14	3,393	82	10	29
*PA2REH	3.7	16,775	288	18	51

Northern Ireland

GI4XSF	A	6,786	71	17	41
***GIØKVQ**	**A**	**297,387**	**798**	**41**	**132**
*GI4AAM	"	168,948	529	48	186
*GI4JTF	"	114,680	379	39	149
*GI4DOH	"	28,569	165	26	63
***2IØGWA**	**7**	**3,264**	**39**	**14**	**37**

Norway

LA9BM	**A**	**988,144**	**1787**	**89**	**320**
LA1J	"	703,468	1499	70	214
(OP: LA8OM)					
LA1PHA	"	80,640	286	43	125
LA6KOA	"	35,860	288	25	85
LA3ZPA	"	27,060	148	38	85
LA5YJ	**28**	**3,060**	**46**	**12**	**22**
LA2QM	**21**	**72,192**	**235**	**34**	**107**
LB9RE	1.8	1,855	52	6	29
***LA2HFA**	**A**	**164,436**	**538**	**49**	**164**
*LA7GNA	"	100,488	338	51	107
*LA7TN	"	87,792	417	32	145
*LA6ALA	"	69,736	338	39	145
*LA8OKA	"	43,168	253	27	115
*LA6HJA	"	22,422	182	29	82
*LA1HSA	"	16,016	109	29	75
*LA4OGA	"	11,218	90	27	52
*LA5FH	"	5,015	67	17	42
*LA7RRA	"	4,756	59	18	40
*LA6YIA	"	1,568	27	13	15
*LA5PRA	"	1,404	21	13	13
*LA1ORA	"	1,386	33	7	15
*LA6BNA	"	456	19	7	17
*LA9VPA	"	360	18	5	13
*LA1EBA	"	228	13	8	11
***LA7JO**	**21**	**85,466**	**260**	**34**	**117**
*LA1DSA	"	7,100	102	13	37
*LA2GN	"	4,256	100	8	30
*LA6ZFA	"	2,170	37	13	22
***LA1VNA**	**14**	**13,746**	**188**	**11**	**47**
*LA1QDA	"	1,040	28	7	19
*LA8OSA	"	960	36	5	19
*LA7ARA	"	256	17	3	13
***LA5FBA**	**7**	**5,546**	**136**	**8**	**39**

Poland

SP9LJD	**A**	**4,088,993**	**3794**	**123**	**404**
SN8B	**"**	**1,364,808**	**1870**	**98**	**358**
(OP: SP8CUR)					
SN9P	"	560,142	871	83	286
(OP: SQ9GAI)					
SP3GXH	"	528,970	1007	91	247
SP6DNZ	"	365,024	452	98	254
SP9WZJ	"	356,586	637	78	231
SP8TOV	"	262,474	611	67	196
SN5V	"	229,414	554	71	180
(OP: SQ5EBM)					
SP7CCB	"	196,463	698	46	177
SP8HXN	"	162,840	323	78	152
SP5GMM	"	76,466	177	72	149
SP3PJY	"	71,445	362	34	131
(OP: 3Z3AHK)					
SP5CJQ	"	63,180	193	55	125
SP4OIZ	"	39,693	284	31	100
SP3CFM	"	37,950	124	49	101
(OP: SQ3CFM)					
SQ9LR	"	37,520	125	41	71
SP2HMN	"	13,332	109	31	70
SQ8GBG	"	7,700	96	19	58
SP2FAP	"	3,444	40	15	27
SP7HOA	"	2,346	26	16	18
SP6IEQ	"	322	9	7	7
SP5EWX	**28**	**46,452**	**299**	**23**	**75**
SQ6R	**21**	**84,370**	**335**	**30**	**88**
SQ2HNA	"	9,635	112	12	35
SP2ØØFC	**14**	**96,800**	**530**	**23**	**87**
(OP: SP7IVO)					
SP5LS	**7**	**261,476**	**1402**	**32**	**99**
SN3A	**3.7**	**448,440**	**2113**	**33**	**115**
(OP: SP3GEM)					
SP6AXW	**1.8**	**15,015**	**222**	**9**	**56**
SP5ENA	"	5,120	138	4	36
***SO2S**	**A**	**582,120**	**1009**	**84**	**308**
(OP: SP2QG)					
***SP9NWN**	**"**	**490,688**	**843**	**82**	**270**
***SP6A**	**"**	**378,316**	**768**	**77**	**272**
*SP5XOV	"	370,755	652	78	237
*SP9OYB	"	307,707	627	76	251
*SQ3WW	"	238,560	596	59	221
*SP5PX	"	215,975	521	67	198
*SP6RYD	"	211,410	577	62	181
*SN3B	"	204,850	591	63	178
(OP: SQ3JPV)					
*SP3MGM	"	196,348	580	58	199
*SP7JDA	"	191,808	412	66	222
*SP3JHY	"	135,251	330	62	149
*SQ5NAE	"	132,854	559	37	144
*SP6JZP	"	122,364	469	47	151
*SP6CCI	"	116,560	412	52	136
*SN1J	"	100,647	302	50	109
(OP: SP1MWF)					
*SQ8JMC	"	98,102	396	41	140
*SP4ICD	"	94,576	367	45	139
*SP1QXK	"	86,221	251	53	98
*SQ6NEF	"	77,525	360	42	133
*SP3MEP	"	75,168	380	41	133
*SQ8LSB	"	72,420	446	27	115
*SQ9NRY	"	64,288	328	39	125
*SQ9DXT	"	63,063	348	33	114
*SP9ODM	"	56,301	310	31	116
*SN5ØKSP	"	54,243	310	31	116
(OP: SQ9LGT)					
*SP2ØØAAZ	"	52,460	253	42	130
*SQ9IWS	"	50,784	295	29	109
*SN8J	"	50,050	253	43	100
(OP: SP8JPR)					
*SP8LXE	"	49,364	255	41	123
*SO2Ø1ØFC	"	47,874	197	51	107
(OP: SP9RQH)					
*SP6QKS	"	46,845	299	35	100
(OP: SP6QKP)					
*SQ5GVY	"	42,174	250	34	108
*SP9MAN	"	38,870	211	37	93
*SQ6STH	"	37,052	153	41	116
*SP4DDS	"	32,922	211	33	85
*SP9OHL	"	32,549	200	26	95
*SQ1FYX	"	32,032	260	19	93
*SQ9DXN	"	31,992	159	34	95
*SP3SPK	"	30,623	227	30	83
*SP9RTL	"	30,258	192	31	92
*SP9CLO	"	30,240	157	38	102
*SP4FMD	"	28,290	225	27	96
*SP3VSE	"	27,966	110	38	80
*SQ9JKS	"	27,940	170	33	77
*SP5HFS	"	26,912	132	37	79
*SQ9ANS	"	26,564	148	40	76
*SQ6LJV	"	26,465	119	36	43
*SQ7LQJ	"	26,216	194	26	90
*SQ5NBE	"	25,254	169	34	88
*SQ2EAN	"	23,246	202	26	92
*SQ3MZM	"	23,144	229	17	71
*SP4CQU	"	21,717	117	46	81
*SN9L	"	20,045	153	26	69
(OP: SQ9NIS)					
*SQ7VO	"	19,602	115	31	50
*SP9RHN	"	19,019	167	22	69
*SP7TEX	"	17,664	106	33	59
*SP9IHP	"	17,496	86	33	48
*SP6EIY	"	16,564	100	32	69
*SP7TES	"	15,104	80	31	33
*SP8YB	"	13,870	99	34	61
*SQ6STI	"	13,280	79	34	49
*SQ6WWW	"	12,750	141	26	59
*SP5DPD	"	12,483	71	35	38
*SP8SIW	"	11,700	106	30	70
*SN6A	"	9,047	129	25	58
(OP: SP6CES)					
*SP5BYC	"	8,778	78	27	39
*SQ1OD	"	8,520	48	28	43
*SP6NVK	"	7,935	92	22	47
*SP2GTJ	"	7,316	72	28	34
*SQ7PGO	"	7,280	115	23	57
*SQ9ONK	"	7,192	72	21	37
*SN8L	"	6,960	86	16	44
(OP: SQ8JCB)					
*SP2ILQ	"	6,887	102	18	53
*SQ5SDE	"	4,698	82	15	43
*SQ8JMZ	"	4,526	65	19	43
*SP3QYQ	"	4,071	59	16	43
*HF2Ø1ØFCY	"	3,700	44	20	30
(OP: SP9MDY)					
*SP6DHH	"	3,571	116	15	51
*SQ9MUO	"	3,150	34	20	25
*SP8ØMJX	"	2,695	57	14	35
*SQ6RGK	"	2,600	34	22	30
*SQ9JKG	"	1,989	47	10	29
*SQ6RGH	"	1,769	30	12	17
*SP3UQG	"	1,512	36	10	26
*SP6PAX	"	1,051	60	8	27
*SP7FBQ	"	1,026	25	8	10
*SP2Ø1ØCY	"	812	24	11	18
(OP: SP5BMU)					
*SP7CXV	"	800	15	10	15
*SQ7NSN	"	676	21	10	16
*SQ7OEK	"	432	31	3	15
*SP4AVG	"	285	13	6	9
*SP6AEG	"	260	8	6	7
*SP6BEN	"	168	6	6	6
*SQ3VV	"	28	4	3	4
*SP2GCE	28	4,329	68	9	28
*SP5TWA	"	144	6	4	5
*SP5BUJ	"	27	3	1	2
***SP5UD**	**21**	**34,577**	**177**	**24**	**47**
*SN9R	"	18,612	143	19	47
(OP: SP9BRP)					
*SP3FON	"	18,224	117	22	45
*SP9CLU	"	10,854	98	18	36
*SP4MPA	"	5,700	47	19	31
*SP1II	"	4,403	54	12	25
*SP6GTN	"	2,184	41	10	11
*SP4SHD	"	252	10	6	8
*SP2MGR	"	96	4	4	4
***SP2FUD**	**14**	**65,208**	**281**	**29**	**103**
***SP5IVC**	**"**	**56,154**	**361**	**21**	**77**
*SP4LVK	"	49,056	302	26	70
*SP2AYC	"	42,021	359	18	69
*SP3FYX	"	34,425	280	21	64
*SP8CGU	"	33,142	311	15	58
*SN1T	"	23,104	261	17	59
(OP: SQ1RET)					
*SP5DRE	"	22,050	205	17	53
*SQ3JVW	"	15,750	171	12	51
*SO8L	"	15,624	195	13	43
(OP: SQ8JLU)					
*SQ4G	"	14,012	174	14	48
*SP8BQL	"	13,398	162	12	46
*SQ4IOH	"	12,272	141	12	47
*SP9IBJ	"	9,744	167	10	38
*SQ3MVM	"	7,224	129	11	32
*SP5AYY	"	6,030	67	14	31
*SP9BMH	"	5,050	54	11	39
*SP2Ø1ØFC	"	1,196	48	7	19
*SP1MAB	"	384	12	7	9
***SQ9D**	**7**	**41,202**	**299**	**24**	**85**
(OP: SP9DLY)					
*SP1FFC	"	20,424	273	13	61
*SP9EML	"	12,772	148	15	47
*SP8ONB	"	5,054	89	9	29
*SQ8NGH	"	4,770	97	8	37
***SP1MVG**	**3.7**	**33,525**	**398**	**13**	**62**
***SQ9IAU**	**1.8**	**18,154**	**320**	**7**	**51**
*SP9CXX	"	8,784	196	7	41
*SQ5STS	"	3,080	90	5	30

Portugal

CT1IZW	**A**	**102,312**	**253**	**57**	**139**
CT1ISZ	"	45,900	195	38	97
CT1EHK	"	14,784	77	29	48
CT1JLZ	**14**	**903,210**	**2806**	**37**	**128**
(OP: OK1RF)					
CT1JRZ	"	16,287	247	11	50
***CR5M**	**A**	**868,084**	**1428**	**79**	**333**
(OP: CT1DHM)					
*CT1DIN	"	127,264	407	45	149
*CT1EGW	"	92,418	218	67	152
*CT1FOQ	"	58,450	192	47	120
*CT1DJE	"	26,190	141	21	76
*CT1EGF	"	19,458	170	17	52
*CT4DK	"	9,130	69	32	51
*CT1AGF	"	8,195	59	26	29
*CT1DKS	"	1,008	18	10	18
*CT2JBD	"	104	8	6	7
***CT2KFA**	**28**	**12,528**	**99**	**18**	**36**
***CT4QB**	**21**	**32,864**	**255**	**20**	**59**
***CT1DZY**	**14**	**10,797**	**136**	**12**	**49**
***CT2GSN**	**7**	**28,567**	**280**	**15**	**62**

Romania

YO5OEF	**A**	**601,650**	**856**	**107**	**275**
YO5QAW	"	124,334	406	54	160
YO2MIL	"	57,629	233	51	118
YO8RAC	"	3,392	65	16	37
YP3A	**21**	**325,180**	**1398**	**35**	**107**
(OP: YO3GDD)					
YO4DI	"	21,164	162	19	55
YO4AUP	**7**	**17,630**	**171**	**17**	**65**
***YO3CZW**	**A**	**1,547,757**	**2739**	**91**	**332**
*YO4RST	"	214,704	500	69	183
*YO9GSB	"	160,720	552	50	146
*YO7ARY	"	160,666	571	44	174
*YO5OHY	"	148,944	524	51	163
*YO4US	"	120,990	514	38	147
*YO8RFS	"	113,932	459	44	138
*YO9RKH	"	60,348	328	35	106
*YO8RIJ	"	59,361	299	36	105
*YO3FOM	"	59,250	172	56	94
*YO3DAC	"	47,712	287	37	105
*YO2MJZ	"	46,900	264	30	104
*YO2MHJ	"	45,708	188	49	107
*YO5CZZ	"	43,815	218	35	80
*YO5CBN	"	42,560	279	29	104
*YO2MTG	"	40,635	258	33	96
*YO7LTQ	"	27,492	196	30	86
*YO7BGB	"	26,208	212	30	82
*YO6DBL	"	23,435	142	26	83
*YO2MFC	"	19,392	138	29	72
*YO8THG	"	17,368	117	32	72
*YO5DAS	"	16,517	140	27	56
*YO9HG	"	15,700	128	30	70
*YO9IKW	"	14,536	68	36	43
*YO7AWZ	"	12,987	141	30	81
*YO3CEN	"	11,900	86	29	56
*YO6HSU	"	5,330	56	21	44
*YO8RFJ	"	3,381	63	12	37
*YO4AST	"	2,964	49	13	26
*YO4RSS	"	2,664	51	11	25
*YP2W	"	2,310	31	15	27
(OP: YO2MCK)					
*YO4BTB	"	972	24	9	18
*YO2OSV	"	728	30	7	19
*YO7DMX	"	525	18	10	15
***YO5PCY**	**28**	**12,462**	**89**	**19**	**48**
*YO5KOP	"	10,089	77	17	42
(OP: YO5PJF)					
*YO2IS	"	1,325	29	10	15
*YO2MKT	"	420	19	7	14
***YO3AIL**	**21**	**39,355**	**208**	**27**	**58**
*YO3ZA	"	34,560	206	24	56
*YO5OWB	"	18,600	177	16	46
*YO3FOU	"	5,875	60	15	32
*YO4SI	"	4,840	44	17	27
*YO8KIS	14	3,813	72	10	31
*YO5OET	"	2,240	68	6	26
***YO9AGI**	**7**	**21,846**	**291**	**13**	**53**
***YO7LBX**	**"**	**18,900**	**257**	**11**	**52**
*YO3KPA	"	9,324	146	12	51
(OP: YO3IJG)					
*YO3GW	"	195	13	3	12

Sardinia

ISØHQJ	**A**	**151,905**	**555**	**63**	**142**
IMØQMA	**28**	**3,360**	**45**	**13**	**22**
***ISØXDA**	**21**	**4,576**	**53**	**14**	**30**
***ISØGRB**	**14**	**60,400**	**649**	**15**	**65**
*ISØDFC	"	2,964	71	7	32

Scotland

GM5X	**A**	**5,369,590**	**5048**	**134**	**456**
(OP: GM4YXI)					
GM7ØAW	"	5,292	73	18	45
GM2Y	"	2,133	37	13	14
(OP: MMØDXH)					
GM2V	**14**	**1,094,317**	**3439**	**36**	**125**
(OP: GM3WOJ)					
***GM4JR**	**A**	**368,985**	**800**	**59**	**196**
*GM4W	"	77,958	253	53	130
(OP: GMØNTL)					
*MMØSVK	"	36,750	214	28	97
*GMØBKC	"	30,510	193	31	82
*MM1X	"	26,640	248	24	66
(OP: MMØXXW)					
*MMØDXD	"	25,839	223	19	80
*2MØLEW	"	7,434	102	14	49
***GM7TUD**	**21**	**104,363**	**466**	**29**	**90**
*GMØAXY	"	12,960	109	16	44
***GM4O**	**14**	**99,958**	**718**	**25**	**81**
(OP: GMØIIO)					
***MMØDRA**	**7**	**374**	**25**	**3**	**14**

Serbia

YT3H	**A**	**64,974**	**247**	**36**	**111**
YT5T	"	198	6	5	6
YT7DQ	"	93,438	757	23	64
YU4ØDW	**7**	**125,139**	**1006**	**27**	**74**
YT4A	**3.7**	**4,758**	**53**	**9**	**52**
***YT9M**	**A**	**684,864**	**1191**	**81**	**288**
(OP: YU1PJ)					
***YU1KN**	**"**	**657,186**	**1165**	**93**	**286**
*YU1AAV	"	110,556	439	41	125
(OP: YT1CC)					
*YU1CC	"	15,244	78	37	66
*YU7GM	"	12,240	107	21	64
*YU7ONE	"	6,760	98	16	49
***YT2RX**	**28**	**16,632**	**118**	**17**	**49**
*YT4T	"	8,428	77	16	33
*YU1MM	"	5,547	54	15	28
***YT1Q**	**21**	**96,921**	**390**	**31**	**90**
***YU7KM**	**14**	**53,244**	**433**	**21**	**66**
*YT2SMS	"	20,286	222	13	56
*YU5CW	"	12,685	161	12	47
***YT9C**	**7**	**54,184**	**480**	**20**	**84**
***YU1AST**	**1.8**	**1,334**	**49**	**5**	**24**
(OP: YU2EA)					

Shetland and Fair Isle

GZ5Y	**A**	**168,702**	**497**	**51**	**135**
(OP: GM4SSA)					

Sicily

IT9JOF	**A**	**866,248**	**1473**	**82**	**246**
IW9FI	"	95,709	395	56	127
IT9STX	"	41,554	240	24	55
IW9FRA	"	36,348	126	55	101
IT9BUN	**28**	**64,216**	**429**	**22**	**70**
IT9YVO	**21**	**136,928**	**894**	**23**	**65**
***IT9AJP**	**A**	**255,590**	**529**	**77**	**228**
*IU9A	"	101,231	328	52	117
(OP: IT9SSI)					
*IT9LED	"	97,335	413	54	135
*IT9WTY	"	96,727	299	53	144
*IW9HLI	"	3,068	47	17	35
***IT9PQJ**	**28**	**73,831**	**363**	**24**	**77**
*IT9ZVJ	"	25,500	133	23	45
*IT9AVN	"	2,394	33	14	24
***IT9RYJ**	**21**	**153,090**	**650**	**34**	**101**
*IT9IZY	"	39,895	303	25	76
*IR9Z	"	24,388	233	16	51
(OP: IT9VCE)					
*IT9AXQ	"	13,802	115	20	47
*IT9IMJ	"	4,429	67	14	29
***IT9YAO**	**14**	**23,184**	**352**	**14**	**49**
***IT9JDH**	**3.7**	**21,373**	**281**	**7**	**60**

Slovakia

OM3IAG	**A**	**591,660**	**1283**	**86**	**256**
OM3PA	"	574,379	1008	92	299
OM8KD	"	16,159	152	33	80
OM4J	"	16,110	98	29	61
(OP: OM4JD)					
OM7PY	**7**	**12,896**	**160**	**13**	**49**
OMØWR	**1.8**	**64,306**	**749**	**12**	**67**
***OM8DD**	**A**	**205,020**	**554**	**55**	**200**
***OM6AL**	**"**	**138,890**	**609**	**46**	**169**
*OM5FA	"	42,000	328	23	97
*OM3KPV	"	36,096	315	24	72
(OP: OM7ANT)					
*OM7AG	"	26,019	156	38	109
*OM5NA	"	23,970	219	15	79
*OM3TLE	"	21,600	192	27	81
*OM7JM	"	17,444	183	17	72
*OM6ADR	"	13,287	120	27	76
*OM8AXU	"	2,870	90	9	32
***OM5NL**	**14**	**62,759**	**395**	**20**	**77**
*OM3TB	"	12,906	210	12	42
***OM6TX**	**7**	**21,140**	**261**	**11**	**59**

Slovenia

S51F	**A**	**2,325,704**	**2481**	**119**	**417**
S51FB	"	503,475	1340	46	101
S56B	"	94,691	428	41	138
S51ZZ	"	4,050	61	13	32
S53O	**28**	**105,391**	**504**	**27**	**94**
S57S	**"**	**88,435**	**422**	**29**	**86**
S53MM	**21**	**833,796**	**2220**	**36**	**123**
S56M	"	278,125	983	35	90
S51SL	"	157,344	604	36	96
S57AL	**14**	**705,824**	**2250**	**35**	**126**
S53S	**7**	**386,570**	**1704**	**35**	**120**
(OP: S52X)					
S57LR	**3.7**	**95,795**	**1045**	**13**	**72**
S53SL	"	38,000	524	10	66
***S57U**	**A**	**233,230**	**499**	**73**	**208**
***S52OP**	**"**	**190,208**	**540**	**61**	**195**
*S52BT	"	138,750	399	45	177
*S59N	"	100,897	543	43	120
*S54A	"	93,870	267	64	146
*S59MA	"	51,152	241	39	100
*S57NTR	"	31,020	152	37	104
*S58RU	"	16,131	298	7	50
*S51JS	"	9,454	164	11	47
*S51I	"	2,610	42	14	31
***S52WW**	**14**	**123,715**	**709**	**26**	**83**
*S57NAW	"	18,200	130	21	44
***S57DX**	**7**	**319,667**	**1662**	**32**	**119**
***S54W**	**3.7**	**94,100**	**888**	**18**	**82**
*S57C	"	6,670	149	6	40
***S57WJ**	**1.8**	**4,370**	**116**	**4**	**34**

Spain

EA1DR	**A**	**3,345,741**	**3468**	**118**	**365**
EA3RR	**"**	**2,176,564**	**2506**	**111**	**383**
EA3CI	"	1,533,088	2243	94	274
EA5EV	"	628,125	921	90	285
EA7KW	"	624,588	1178	69	207
EA3AV	"	461,433	816	83	218
EA5ARC	"	282,540	535	74	203
EA3QU	"	106,000	361	66	160
EA1HV	"	101,752	322	53	131
EA5BWR	"	91,120	264	49	121
EA7HW	"	90,447	267	61	158
EA3CEC	"	62,656	169	62	114
EB1IC	"	47,385	196	50	85
EB2GMS	"	41,280	256	32	97
EA3AHZ	"	21,340	135	28	82
EA7HOJ	"	1,537	27	12	17
EE3Y	28	420	23	3	4
EA2IF	"	24	2	2	2
EE7D	**21**	**344,442**	**1316**	**36**	**103**
(OP: EC7DND)					
EA4EER	"	260,709	923	34	107
EA7HF	"	203,967	844	32	99
EA1EY	"	193,307	773	37	100
EA1OT	"	19,980	188	17	43
EA4AK	**14**	**90,258**	**307**	**33**	**114**
EA2VE	**"**	**85,092**	**781**	**22**	**62**
EA3BOX	**7**	**226,746**	**1396**	**29**	**85**
EA7ELY	"	71,730	476	22	68
EA5RU	**1.8**	**21,939**	**311**	**11**	**60**
EA1SA	"	10,647	164	9	54
EC7DX	"	792	33	4	18
***EA1BP**	**A**	**649,038**	**1045**	**78**	**240**
***EA7HLU**	**"**	**564,949**	**1153**	**81**	**238**
***EE7R**	**"**	**549,850**	**832**	**86**	**264**
*EA5SR	"	535,506	980	71	227
*EA3AKA	"	468,405	1096	73	242
*EA4DAT	"	464,848	1203	71	201
*EA4FLY	"	176,680	356	69	211
*EA1JO	"	169,274	485	55	171
*EA2RW	"	155,376	391	65	184
*EA3NA	"	139,416	335	69	153
*EA3TA	"	127,488	420	47	145
*EA2JE	"	106,420	359	47	123
*EA4GV	"	99,990	378	43	155
*EA3AYQ	"	98,118	387	51	156
*EA7BQX	"	94,844	319	50	131
*EA3ODC	"	80,384	290	46	111
*EA3HIG	"	77,608	295	49	129
*EA3FCQ	"	75,582	285	49	122
*EC4CLR	"	60,494	219	43	106
*EA2DJL	"	60,204	276	39	135
*EA5FWW	"	56,628	168	46	71
*EA4BZ	"	50,553	217	36	101
*EC1AE	"	48,650	199	39	136
*EA5GXI	"	47,144	157	62	104
*EA7VJ	"	45,994	176	36	86
*EA3WX	"	45,870	201	38	101
*EA7HNN	"	45,724	247	41	101
*EB5CS	"	45,580	221	28	78
*EA2MH	"	41,134	218	34	97
*EA7HYL	"	40,992	201	32	90
*EB1EDT	"	35,640	165	35	75
*EA1HDD	"	30,500	192	29	71
*EB1DJ	"	30,192	213	29	73
*EA2AVM	"	24,080	155	26	60
*EA3TJ	"	22,746	152	31	71
*EA1GAR	"	21,917	126	33	68
*EA3ATO	"	21,488	159	44	92
*EA3HEQ	"	21,296	210	16	72
*EA7CWA	"	21,090	111	33	78
*EA5HKE	"	18,144	120	30	66
*EA2DLX	"	16,632	140	22	62
*EA3HEU	"	14,706	121	26	60
*EA5HRM	"	12,995	81	46	69
*EA5HIH	"	12,551	96	25	52
*EA4FJJ	"	12,150	111	27	54
*EA1SB	"	11,304	66	27	45
*EA2JB	"	9,880	114	22	54
*EA7MT	"	9,240	71	26	40
*EA4GB	"	8,190	93	21	24
*EA5HEU	"	8,008	71	19	33
*EA5CZM	"	7,938	78	24	57
*EA1HVW	"	7,742	71	24	55
*EA2KK	"	7,600	66	30	50
*EA3HJC	"	7,524	88	20	46
*EA5GVZ	"	7,300	72	23	50
*EA3NT	"	5,610	38	26	29
*EA2TA	"	5,104	44	19	25
*EA1DFP	"	4,964	44	27	41
*EH2R	"	4,860	69	21	39
*EA1AQN	"	3,965	46	20	41
*EB5GIV	"	3,000	60	12	28
*EA/OE1TKW	"	2,814	43	13	29
*EC5AEI	"	1,802	29	10	24
*EA4JJ	"	1,188	35	10	26
*EA2AOS	"	888	19	12	12
*EA3FHP	"	832	29	7	19
*EA4ERJ	"	784	28	9	19
*EA4GE	"	391	23	8	15
***EE5T**	**28**	**19,344**	**159**	**18**	**44**
(OP: EB5AL)					
*EA4UV	"	16,302	114	20	46
*EA1CCM	"	11,907	117	12	37
*AN1A	"	4,176	73	10	19
*EA1ASG	"	189	9	3	4
***EA7ISH**	**21**	**379,183**	**1566**	**33**	**100**
*EA7GYU	"	96,444	563	30	84
*EA5EOR	"	91,080	404	28	82
*AM7C	"	64,640	321	24	77
(OP: EA7HMD)					
*EA4LU	"	58,984	272	27	74
*EA1VT	"	52,574	313	25	72
*AO7T	"	50,224	333	23	63
(OP: EA7KJ)					
*EA7IPP	"	47,310	269	25	70
*EA7IZJ	"	45,900	579	19	49
*EA5DD	"	42,840	226	22	63
*EA5HJO	"	41,915	288	19	64
*EA7FRX	"	20,016	134	18	54
*EC3PL	"	6,016	80	13	34
***EA1JJ**	**14**	**108,580**	**887**	**21**	**68**
*AO1B	"	77,000	482	22	78
(OP: EA1YB)					
*EH1K	"	64,092	594	19	65
*EA7NA	"	35,154	260	17	64
*EA3AEL	"	28,897	351	14	57
*AO4Y	"	22,116	150	20	56
(OP: EA4YK)					
*EB1EVX	"	20,232	224	13	59
*EA7HGX	"	15,096	167	14	54
*EA3BCK	"	8,428	84	12	37
*AN4A	"	7,380	84	13	23
(OP: EA4CWN)					
*AN5TN	"	4,056	59	9	30
*EB3GIH	"	1,696	40	7	25
*EA1HSN	"	660	25	6	16
***EA1CQ**	**7**	**38,502**	**283**	**17**	**76**
*EA2DNR	"	30,780	342	15	61
*EA7GSU	"	20,382	166	15	64
*AO3L	"	14,384	144	14	48
(OP: EA3LA)					
*EA1FCH	"	9,063	133	12	45
*EA5DIT	"	4,136	63	10	34
***EA4IS**	**3.7**	**30,212**	**244**	**16**	**75**

Sweden

SJ2W	**A**	**5,756,040**	**4835**	**139**	**451**
(OP: SM2WMV)					
SM6BGG	"	963,680	1562	82	235
SM5Q	"	789,488	1013	98	326
SLØW	"	773,280	1195	88	272
(OP: SMØAJU)					
SMØDZB	"	598,425	1734	56	181
SM5DQE	"	336,336	947	59	205
SM3C	"	277,985	798	58	207
(OP: SM5CCT)					
SMØBSO	"	252,582	534	69	198
SM6FJY	"	202,470	579	56	199
SI3A	"	112,499	297	55	136
(OP: SM3LIV)					
SM5BMB	"	86,373	221	54	135
SB6A	"	80,676	416	28	80
SM6AHU	"	48,081	247	36	105
SD3A	"	48,069	196	47	100
(OP: SM3FJF)					
SE2T	"	27,648	109	36	72
SFØX	"	22,110	114	38	72
(OP: SMØNOR)					
SA6N	21	180	8	6	6
SM6V	14	84	10	4	8
(OP: SM6VAO)					
SMØW	**3.7**	**509,268**	**2391**	**32**	**116**
***SE6Y**	**A**	**373,109**	**920**	**65**	**252**
(OP: SM6DED)					
***7S5S**	**"**	**138,638**	**493**	**48**	**158**
(OP: SM5CSS)					
*SJ7M	"	128,282	409	48	139
*SF3A	"	110,182	470	37	141
(OP: SM3CER)					
*SM6NOC	"	101,920	373	42	140
*SM3EAE	"	98,196	429	43	104
*SM5DXR	"	71,546	350	41	125
*SM7CQY	"	67,304	293	42	137
*SGØM	"	65,286	281	39	123
*SMØBDS	"	56,472	236	39	117
*SFØD	"	55,568	310	35	116
(OP: SMØDSF)					
*SM4WKT	"	44,162	197	41	101
*SI5Y	"	40,894	216	34	93
(OP: SM5BKK)					
*SM5ACQ	"	35,916	198	31	92
*SEØL	"	35,894	246	30	101
(OP: SMØLIU)					
*SE6C	"	29,294	210	26	71
(OP: SM6CDN)					
*SMØFM	"	24,931	124	32	75
*SAØE	"	20,367	232	15	58
(OP: SAØBJL)					
*SM5ISM	"	17,776	136	23	78
*SL6A	"	16,480	142	26	77
(OP: SA6AVB)					
*SA6AIN	"	15,876	150	22	62
*SM6TOL	"	11,685	98	19	38
*SA3ADT	"	11,040	129	22	70
*SM7S	"	10,890	78	22	44
*SMØHBV/3	"	8,961	118	20	67
(OP: SMØHBV/3)					

*SM7ATL	"	7,560	102	16	54
*SM6MGZ	"	4,884	68	20	46
*SA6W	"	3,540	64	17	43
(OP: SM6PVB)					
*SM5OSZ	"	2,838	43	18	25
*SM6HCX	"	2,646	63	8	34
*SM5ARL	"	2,430	27	14	16
*SA7J	"	2,294	67	9	28
(OP: SM7XGG)					
*SA7AOI	"	2,166	25	19	19
*SA3BGM	"	2,058	50	12	30
*SE3K	"	391	20	9	14
(OP: SA3ARK)					
*SM6XUZ	"	320	19	5	15
(OP: SM6XUZ)					
*SM6Z	"	2	1	1	1
(OP: SM6BZE)					
*SM4OY	28	288	12	4	8
*7S7V	21	92,701	353	34	85
(OP: SM7VZX)					
*SA6BNX	14	3,870	68	11	34
*SM5LSM	7	3,045	80	6	29
*SM5MX	1.8	6,960	148	8	40

Switzerland

HB9AUS	A	608,682	658	105	338
HB9ODP	21	24,409	151	21	56
HB9BTI	"	13,200	142	16	39
*HB9TOC	A	235,227	593	65	202
*HB9TSU	"	67,894	282	42	124
*HB9VID	"	43,806	244	40	107
*HB9SVT	"	32,340	209	32	100
*HB9RJG	"	28,917	265	26	93
*HB9BGF	"	2,337	36	13	28
*HB9ARF	21	58,707	290	31	68
*HB9AWS	7	11,210	156	11	48

Ukraine

US5D	A	3,112,246	3300	132	454
(OP: UT7DX)					
UY7MM	"	1,574,532	2457	108	370
UV5U	"	1,487,017	1685	127	426
(OP: UX1UA)					
UX4U	"	1,268,036	1576	119	387
(OP: US7UX)					
UT6EE	"	516,132	849	89	265
UZ5ZV	"	342,550	762	74	251
UX5UO	"	223,262	392	78	199
UR4EI	"	207,036	509	62	181
UR4IXM	"	195,500	676	46	184
UU4JC	"	113,400	266	60	150
UR5MBA	"	101,490	353	45	154
URØIQ	"	70,500	253	33	108
US7IB	"	39,032	168	45	91
UW2ZM	"	37,639	188	44	89
UW5M	"	16,320	112	19	49
(OP: UT7MA)					
USØSY	"	3,612	97	7	36
UUØA	"	1,064	29	9	19
(OP: UUØJX)					
UT4UB	"	990	22	15	15
UR2P	21	128,714	445	34	105
UR7QC	"	74,338	348	30	79
US5UO	"	11,245	67	28	37
UT4PZ	"	4,788	40	17	25
UW2I	14	700,188	2594	38	128
(OP: UT2IJ)					
UT5KL	7	18,400	202	18	62
UR5EAW	3.7	17,727	337	8	49
UX1VT	"	17,629	256	8	53
UY3AW	"	3,150	62	8	34
*EN7U	A	530,244	896	87	309
(OP: UR4UDI)					
*UT3UZ	"	417,950	842	77	248
*UR5MM	"	320,960	640	72	248
*UR5ETN	"	313,626	716	71	242
*UT5JCE	"	282,150	692	62	213
*US2IW	"	269,225	555	69	206
*UX7MR	"	237,056	630	61	195
*UT5UQN	"	221,368	476	76	192
*UT4XU	"	208,495	500	64	195
*US7IVW	"	205,569	546	57	194
*US2IHS	"	190,216	509	56	192
*UX7U	"	158,232	496	53	175
(OP: UX7UA)					
*US7IID	"	154,770	490	54	177
*US6CQ	"	148,240	461	51	167
*UT4TA	"	146,674	333	69	157
*US5ISV	"	132,704	399	49	183
*US6IQ	"	130,582	483	46	172
*UU6JJ	"	128,582	402	65	174
*UV5EEO	"	128,128	378	58	166
*UY5TE	"	117,900	506	35	145
*UT2AA	"	117,810	406	53	178
*UW7M	"	114,741	435	48	161
(OP: UR3MP)					
*UR3IDD	"	105,840	420	37	143
*UY4F	"	74,586	274	43	143
(OP: UR5FEL)					
*UR7HCX	"	71,890	394	35	123
*UR5WHT	"	71,736	335	39	129
*UT7UA	"	67,240	239	53	111
*UT1ML	"	56,168	282	35	101
*UX6IR	"	54,450	211	37	113
*UT5ERP	"	52,271	255	39	128
*UYØCA	"	51,590	257	39	95
*UT4MW	"	46,560	215	33	87
*UR5XMM	"	44,720	250	32	98
*US7IGN	"	43,344	221	35	109
*US2YW	"	41,160	194	43	104
*UR4QSG	"	29,631	194	27	92
*US7ILY	"	26,670	227	26	101
*UT3EK	"	22,736	130	34	82
*UY1HY	"	22,236	114	38	71
*UR3PGW	"	21,483	173	17	76
*UT5ULX	"	20,503	199	24	77
*UX6IA	"	19,332	111	33	75
*UR5FNP	"	19,136	146	27	77
*UR7CT	"	17,204	125	27	65
*UT1UW	"	16,568	99	31	45
*UT4UEG	"	13,481	227	29	84
*UTØEZ	"	10,374	69	26	52
*UT3RN	"	10,318	81	26	51
*UT7MR	"	8,265	102	19	68
*UU4JQE	"	6,634	61	18	44
*US6IKF	"	6,344	48	28	33
*UR7AA	"	6,132	68	27	57
*US1UX	"	6,020	61	26	44
*UR5EFL	"	4,512	91	9	38
*US3ITA	"	1,974	44	15	27
*UR5PG	"	1,410	33	8	22
*UT8EU	28	16,409	179	17	44
*US7IA	"	7,820	99	12	34
*US5ZCW	"	7,238	79	15	32
*UW8SM	"	2,686	34	13	21
*UR5WHQ	"	2,336	27	12	20
*UR5IFX	21	157,596	760	33	105
*UR8QR	"	63,963	318	28	75
*UY5AA	"	27,368	129	27	61
*UR5IKN	"	17,181	102	26	57
*UT7NW	"	13,340	124	16	42
*UX5TQ	"	11,972	103	19	54
*UX6IB	"	11,904	119	17	45
*UT2UB	"	10,450	107	18	37
*UT4EN	"	9,240	113	14	30
*UR5EAF	"	4,753	80	16	33
*UR3QNV	"	2,135	42	10	25
*UT3EV	14	125,760	740	28	92
*UR4CW	"	52,920	456	19	65
*US1PM	"	38,220	337	18	66
*US3WD	"	35,730	275	22	68
*US8IM	"	29,756	251	19	67
*USØHZ	7	117,215	685	24	95
*US8IGL	"	47,190	367	25	85
*UT1IM	"	41,385	344	21	72
*UR3IJI	"	24,648	260	16	62
*UR5ZLK	"	130	5	5	5
*UU2CW	"	72	9	2	2
*UT4EK	3.7	38,640	365	16	68
*UT5ECZ	"	9,918	140	9	49
*UX7IM	"	6,496	76	8	48
*US6IPD	"	42	3	3	3
*UT1AN	1.8	11,850	248	7	43
*UR7TZ	"	8,096	199	6	38

Wales

MW9W	28	2,412	40	14	22
(OP: G1VDP)					
GW4BLE	1.8	38,736	474	11	61
*GW8NBI	A	51,554	273	34	115
*GWØNPL	"	49,312	204	37	97
*MWØCVT	"	19,847	129	26	63
*MWØMWZ	"	6,708	90	12	40
*GW3YVC	"	3,404	58	13	33
*MWØOPS	"	1,558	37	12	26
*MW1LCR	28	6,952	114	13	31
*GWØGEI	14	7,952	119	10	46
*GW4EVX	7	24,920	317	12	58
*GW3R	1.8	6,942	188	5	34
(OP: GØDCK)					

OCEANIA

Australia

VK3TDX	A	1,435,790	1756	81	209
VK4EMM	"	1,109,016	1390	98	194
VK7GN	"	158,158	313	53	129
VK3AVV	"	156,692	353	63	109
VK3CAG	"	134,575	304	59	116
VK4GH	"	36,418	120	53	78
VK1MJ	"	17,982	90	31	50
VK2WAY	"	12,388	64	31	45
VK2ACC	"	9,729	57	33	36
VK2ERP	"	9,447	71	24	43
VK4QH	"	3,434	42	17	17
VK4BUI	28	17,010	176	16	19
VK3AVZ	21	1,550	24	11	14
VK7AD	14	5,632	51	14	30
VK5JDS	"	6	1	1	1
VK8AA	7	215,280	747	30	87
VK2KJJ	"	120	6	5	3
*VK4ATH	A	135,315	325	62	93
*VK4BL	"	124,016	267	67	117
*VK2HBG	"	40,290	162	46	56
*VK6HAD	"	23,562	113	42	60
*VK7FWAY	"	21,924	149	27	31
*VK4XES	"	20,790	111	32	45
*VK6FDX	"	17,010	81	29	52
*VK4TU	"	15,576	99	28	38
*VK3NRW	"	12,172	80	29	39
*VK4QC	"	10,797	73	24	35
*VK2PDX	"	9,804	81	23	34
*VK4VDX	"	6,270	51	24	31
*VK5MWH	"	6,000	53	23	27
*VK2NR	"	4,752	37	20	28
*VK2IO	"	3,168	44	18	18
*VK2GR	"	320	10	7	9
*VK6GD	"	240	10	6	6
*VK4FJ	21	102,432	417	25	63
*VK3VTH	7	9,159	80	18	25
*VK1SV	3.7	110	9	5	6

Brunei

*V85ZX	14	4,779	90	11	16

East Malaysia

9M8Z	A	4,713,919	3583	131	338
(OP: 9M6DXX)					
9M6BOB	"	477,925	1016	66	109
9M8YY	3.7	17,584	123	20	36
(OP: JR3WXA)					
*9M6YBG	A	19,872	80	37	71
*9W6ZAM	28	2,937	47	13	20

Fiji

*3D2A	A	337,952	713	62	117
(OP: VK4AN)					

Guam

WH2D	A	809,116	1191	92	167
(OP: K3UOC)					
KG6DX	28	170,829	753	26	55
WH2X	21	354,640	1273	32	72

Hawaii

KH6OA	A	6,768	58	25	23
KH7Y	21	1,259,180	3112	37	108
WH7Z	"	822,666	2726	36	70
(OP: WØCN)					
KH7Q	14	876,269	2063	35	114
(OP: K7NV)					
KH7X	3.7	306,660	1152	33	62
(OP: KH6ND)					
KH6QJ	"	6,720	79	16	19
KH7U	1.8	5,548	104	9	10
*KH7T	A	148,261	372	75	98
*KH6CO	"	58,032	204	53	64
(OP: KH6OO)					
*AH7G	"	31,140	201	25	35
*AH6KW	"	20,670	110	38	40
*NH7PE	28	2,900	38	12	17

Indonesia

YB1AR	A	822,096	1020	101	245
YB4IR	"	548,913	889	70	159
YB7BAE	"	23,600	107	31	49
YC9CCC	"	11,088	87	15	41
YC1PEI	"	5,405	51	22	25
YCØNSI	28	13,384	127	19	37
YC1LA	21	134,539	712	25	72
YD1JZ	7	23,430	137	22	44
*YB8FL	A	148,390	448	55	87
*YB3IZK	"	118,125	292	59	116
*YB1UUN	"	82,689	245	45	84
*YC2NOD	"	23,463	87	38	61
*YC9DEB	"	16,002	98	22	41
*YCØIEM	"	6,090	42	23	35
*YD1TNK	"	28	3	2	2
*YBØCOU	28	3,655	32	14	29
*YB8EL	21	108,000	417	29	71
*YB5OUB	"	64,220	318	23	53
*YC9AOS	"	31,737	180	23	48
*YC1BRS	"	17,640	117	19	41
*YF8RIM	"	5,412	54	16	28
*YB1BGI	14	26,973	138	24	57
*YC2LEV	7	16,592	127	22	46
*YC2WBF	"	14,152	103	24	37
*YG1CRR	"	1,035	21	10	13

Micronesia

V63CJB	A	1,037,523	1756	61	152
(OP: JJ2CJB)					

New Zealand

ZL4NR	A	71,980	221	40	78
ZL2UO	"	47,616	146	49	75
ZL3NB	"	42,180	152	40	74
ZL1AIX	21	146,536	571	30	74
ZL2KBR	14	38,804	158	25	64
*ZL1AAO	A	72,558	217	56	83
*ZL2MM	"	53,382	175	45	78
*ZL4NX	"	17,538	92	26	48
(OP: JM1CAX)					
*ZL3DXT	"	17,010	109	24	39

Palau

T88DL	A	307,008	800	61	95
(OP: DL2OBO)					
T88OM	21	159,740	612	29	69
(OP: JA1FMZ)					

Philippines

DU9RG	A	2,292,764	2229	109	273
DU1JI	14	77,520	494	23	37
DV9XO	7	119,626	569	31	55
*DV1JM	A	455,490	796	80	130
*DV1UBY	"	40,180	187	39	59
*DU1ACV	"	10,602	89	23	34
*DU1VHY	"	9,280	79	25	39
*DU1LC	14	42,120	285	19	41
*DU7HF	7	8,775	80	17	28

SOUTH AMERICA

Antarctica

R1ANP	A	47,502	186	36	51
(OP: RW1AI)					

Argentina

LT1F	A	5,585,142	4199	134	340
(OP: LU1FAM)					
LU8MB	"	219,268	438	66	125
LW3DC	"	176,694	468	60	87
LW9DHR	"	21,750	193	16	34
LU1HF	28	941,829	2302	34	115
LV5V	21	843,752	2409	26	96
(OP: LU5VV)					
LS6VI	7	2,871	47	12	21
(OP: LU6VOQ)					
L46V	3.7	37,072	252	20	36
LU2DKT	1.8	1,272	34	11	13
*LW6DG	A	1,526,439	2120	79	188
*LU1MSD	"	282,924	662	68	106
*LU5CAB	"	185,331	508	63	100
*LU1VZ	"	151,392	439	64	102
(OP: LU9VEA)					
*LW1HR	"	124,280	454	50	80
*LU2VC	"	69,215	281	47	80
*LW4EF	"	49,910	245	47	68
*LU8DY	"	31,395	182	25	44
*LR1A	"	24,200	144	42	58
(OP: LU1AS)					
*LU1MPK	"	24,108	274	18	24
*LU6DRN	"	18,912	102	36	60
*LU1QAH	"	17,340	147	28	32
*LU7MTC	"	16,268	154	40	58
*LU6FC	"	12,544	115	29	35
*LU6KA	"	2,665	80	19	22
*LU9EY	"	2,350	42	23	27
*LU/JH4RHF	"	80	7	5	5
(OP: JH4RHF)					
*LU6FOV	28	270,000	971	27	73
*LW7H	"	157,102	762	23	51
(OP: LW7HT)					
*LU9DPM	"	80,454	474	20	46
*LW6DAK	"	37,233	247	20	43
*LTØD	"	28,482	241	17	30
(OP: LU6DU)					
*LU6EVD	"	16,769	184	14	27
*LU6FHO	"	16,150	220	17	33
*LU1EXR	"	14,160	166	17	31
*LU5UBI	"	5,928	98	12	14
*LU7FPA	"	4,368	94	11	15
*L73DX	"	4,144	56	15	22
*LO7D	"	3,498	69	9	13
(OP: LW1DRH)					
*LU7ADR	"	2,150	50	11	14
*LW7DUC	21	200,790	857	25	65
*LU5MT	"	55,385	250	24	71
*LU7DSU	"	21,120	95	23	57
*LR1H	14	165,834	632	31	80
(OP: LU2HOD)					
*LW9ETQ	"	9,256	151	12	14

Aruba

P4ØW	A	7,927,968	5278	142	396
(OP: W2GD)					
*P4ØB	7	211,266	794	24	75
(OP: KE5OG)					

Brazil

PY2OE	A	2,803,374	2774	112	287
PP5JY	"	301,224	522	73	158
PY1SX	"	191,800	429	47	128
PY1WS	"	146,850	346	67	98
PY7VI	"	105,501	350	54	85
PV8AA	"	23,310	198	21	21
(OP: PV8DX)					
PY2KP	"	12,089	77	34	43
PY2LCN	"	11,184	127	21	27
PV8ADI	"	9,664	81	23	41
PY2AAZ	"	63	5	4	5
PW5G	28	729,355	1894	32	117
(OP: PP5WG)					
PV8ABC	"	20,384	173	17	39
PU2SGL	"	688	50	7	9
PU3AGF	"	264	16	7	5
PU2YMH	"	187	16	5	6
ZX5J	21	2,301,308	4414	37	151
(OP: PP5JR)					
PR2B	14	978,558	2181	36	125
(OP: PY2LSM)					
PR7AE	7	6,579	65	12	31
PR7AP	"	6,531	118	9	12
PV8DX	1.8	2,783	47	8	15
*PY9MM	A	358,992	690	62	154
*PY2MR	"	51,183	187	48	73
*PY3APY	"	47,382	201	43	63
*PV8AX	"	34,707	228	25	44
*PY2TKB	"	33,800	238	39	65
*PY3OZ	"	20,803	133	28	43
*PP5EJ	"	20,748	124	36	55
*PY1CD	"	18,860	232	16	30
*PY2ASS	"	12,078	149	30	36
(OP: PY2AXH)					
*PY1GQ	"	11,457	112	33	34
*PY2MPG	"	11,058	80	27	30
*PY3DJB	"	10,944	73	35	41
*PY1CX	"	9,216	101	23	41
*PY1DO	"	8,517	95	24	27
*PY3TIO	"	7,410	72	26	31
*PV8AZ	"	6,820	75	28	34
*PY2SEI	"	5,450	52	19	31
*PY3FBI	"	5,282	80	19	19
*PV8AAS	"	4,002	55	25	33
*PV8RF	"	3,984	39	19	29
*PY1PDF	"	3,872	74	21	23
*PY2DU	"	1,518	24	11	12
*PP5NS	"	380	16	10	10
*PY3KIM	"	220	15	6	5
*PU2LEP	28	263,280	836	29	91
*PU1MMZ	"	81,600	445	24	56
*PU2SDX	"	56,865	285	25	60
*PU2TRX	"	12,238	122	21	37
*PU3KNG	"	10,750	103	19	24
*PU1KTZ	"	7,359	108	14	19
*PY2DYO	"	6,732	77	17	27
*PU5AAD	"	5,715	63	18	27
*PU8TLS	"	2,059	66	12	17
*PU2UJG	"	1,440	51	10	10
*PU2TIB	"	918	38	8	10
*PU2UTC	"	480	34	7	8
*PU3KNP	"	345	20	8	7
*PU8TNT	"	208	17	6	7
*ZV2C	21	687,401	1771	32	111
(OP: PY2CX)					
*PY2BRA	"	200,016	688	29	79
*PY3OPP	"	184,419	734	26	67
*PY1PL	"	15,364	147	12	34
*PY2KPY	"	14,110	188	13	21
*PV8DR	"	7,544	190	10	13
*PY1RY	"	7,315	84	13	22
*PR7LV	"	2,278	57	12	22
*PY5JO	"	570	14	8	11
*PY4PW	"	204	12	4	8
*PR7AYE	"	36	5	3	3
*PY1TR	"	30	7	2	3
*PY2NY	14	4,662	50	17	20
*PP7LL	"	1,479	31	14	15
*PS8ET	7	3,876	45	14	43
*PV8IG	"	168	7	5	7
*PU1WJH	3.7	12	12	2	2

Chile

*CE4WW	A	454,690	962	78	127
(OP: CE4UJU)					
*CE2WZ	"	223,310	545	59	104
*CE3DNP	28	149,404	684	24	58
*XR5N	"	110,504	598	23	53
(OP: CE5WOO)					
*CE7BIY	"	7,476	74	16	26
*CE3SNA	"	4	2	2	2
*CE1UGE	21	79,292	364	26	60

Colombia

HK3JJH/1	28	222,778	1439	21	37
HK1R	21	1,071,732	3088	33	101
HK1X	14	1,591,948	3553	35	129
HK1T	7	1,189,650	2700	34	120
HK1W	3.7	197,718	776	19	74
*HK6P	A	1,791,336	1783	104	300
*HK3Q	"	50,350	218	37	69
*HK8EA	"	29,367	159	39	78
*HK6R	"	3,120	80	13	26
*HK1J	7	215,460	936	25	70

Ecuador

*HC5VF	A	383,616	673	78	144
*HC2GT	21	50,232	408	18	34
*HC1JQ	14	665,457	1567	35	116

French Guiana

FY5KE	A	10,372,524	6434	135	429
(OP: FY5FY)					

Galapagos Islands

HC8A	21	3,565,674	6571	38	151
(OP: N6KT)					

Guyana

8R1K	28	271,188	973	25	83

Paraguay

ZP5CGL	21	181,920	732	24	72
*ZP5RPO	14	48,977	313	21	46

Peru

OA4SS	A	1,716,792	2121	102	206

South Shetland

*DT8A	14	101,374	447	27	64
(OP: DS4NMJ)					

Uruguay

CX3AL	28	400,384	1153	30	98
CX4DX	"	353,880	1099	28	92
CX2DK	21	368,648	1174	28	88
CX4BW	"	331,446	1089	28	83
*CX2ABP	A	21,805	191	24	25
*CW3D	28	315,675	1220	28	87
(OP: CX4CR)					
*CX5AZ	"	92,631	472	22	55

Venezuela

4M6CQ	A	92,329	279	41	86
(OP: YV6BXN)					
YV6BFE	28	55,610	385	22	45
YV5NEA	14	54,648	203	29	79
YW4D	7	545,748	1333	34	112
(OP: YV1DIG)					
YW4V	"	51,756	168	26	88
(OP: YV4DYJ)					
YY5COR	"	3,828	55	10	23
YV5MSG	3.7	136,725	645	19	56
YV5AM	"	73,640	396	18	52
*YV5LMW	A	96,993	314	42	75
*YY5APA	"	1,612	32	12	19
*4M1F	21	269,757	1014	24	79
(OP: YV1JGT)					
*YV5ER	14	82,890	339	23	67
*YV7/UY5ZZ	"	74,814	403	22	52
(OP: UY5ZZ)					
*YV5IAL	"	1,386	42	10	12

QRP

KR2Q	A	594,943	695	78	233
RX1CQ	"	594,928	1042	81	280
DM2DX	"	411,740	695	82	264
JR4DAH	"	367,821	640	81	158
NP2Q	"	342,225	1008	64	105
KA1LMR	"	336,954	507	70	197
DL4VCG	"	325,435	656	73	232
EA3FF	"	250,230	526	72	213
NØKE	"	240,277	404	85	156
K8ZT	"	205,942	347	69	173
SP2DNI	"	166,124	547	53	185
NN7SS	"	160,769	309	70	123
(OP: K6UFO)					
EA1GT	"	153,722	488	47	155
RD3AJB	"	135,924	438	56	185
RN4HAB	"	133,056	474	40	158
UT5UUV	"	133,008	498	41	163
EA1TI	"	127,102	366	52	154
9A1CHP	"	118,810	411	55	163
(OP: 9A3BIM)					
N1TM	"	117,997	252	53	134
W6QU	"	117,694	266	61	105
(OP: W8QZA)					
US2IZ	"	103,776	400	42	142
YO4AAC	"	98,272	399	44	122
UA7G	"	97,310	305	60	125
LZ7H	"	95,460	399	39	133
DJ6YL	"	93,444	326	42	114
JA2MWV	"	85,104	246	56	88
IZ1ANK	"	82,256	493	48	164
NT4TS	"	82,160	217	51	107
F5DRD	"	77,440	325	44	132
UX8ZA	"	69,048	338	41	127
9A9L	"	68,530	216	51	103
IZ8EWD	"	63,756	253	41	113
G3UFY	"	61,451	262	36	127
US5IND	"	58,812	259	36	133
EA8IK	"	55,902	188	39	82
IK3XTY	"	52,070	260	35	92
UX2MF	"	49,984	171	41	135
SO1D	"	41,664	223	33	91
(OP: SP1JPQ)					
PE2KP	"	39,390	273	28	102
KT8K	"	38,695	137	37	72
EA3GI	"	37,944	180	32	70
YL3FO	"	37,204	218	31	100
PY2BN	"	36,360	178	44	57
W2MFT	"	33,966	133	35	76
BA4WI	"	33,708	194	42	64
KC5WA	"	33,252	140	43	59
EI4II	"	33,136	227	24	85
CT1ELF	"	28,476	160	35	91
RX3DIS	"	27,472	215	22	79
LY3G	"	26,967	225	24	77
SQ3OGP	"	20,800	181	26	74
F4EMK	"	18,231	144	26	77
PC2F	"	14,960	152	22	66
OK1XOE	"	13,114	115	24	59
KIØG/5	"	12,936	79	33	44
7K1CPT	"	11,907	87	27	36
NM2L/4	"	11,820	79	24	36
G6CSY	"	11,330	80	24	79
VA3RKM	"	10,184	77	28	39
N3XRV	"	9,425	61	23	42
N6LB/7	"	8,875	135	34	37
2EØBFJ	"	6,615	106	16	47
RV3A	"	6,208	68	19	45
PAØRBO	"	6,132	79	24	49
ON3EA	"	4,720	74	16	43
UA3TW	"	4,560	80	8	30
YO5PVA	"	4,316	51	19	33
USØYA	"	3,880	33	18	22
DO4OD	"	3,552	71	14	34
SP4CUF	"	3,283	35	23	26
DJ6FO	"	3,149	48	15	32
LY5G	"	3,080	58	12	32
JR2DAJ/2	"	2,160	28	11	19
IN3UFW	"	2,068	42	14	30
KIØOV	"	1,980	28	15	15
SJ5E	"	1,892	39	18	26
(OP: SM5MEK)					
SO2D	"	1,800	37	13	27
SP2MHC	"	1,326	29	12	22
YO8DOH	"	1,296	37	14	22
VA3WR	"	1,204	23	11	17
PD2PC	"	1,044	41	7	22
W2JEK	"	1,014	17	13	13
2EØZJO	"	992	34	7	24
JG1GPY	"	836	17	10	12
UAØSBQ	"	820	16	8	12
WA7LNW	"	816	13	11	13
N7LR/5	"	741	18	10	9
SP9DEM	"	640	12	9	11
SE5X	"	504	24	8	16
JK1TCV	"	468	10	8	10
KK7VL	"	468	10	9	9
DH4BM	"	140	12	4	10
DN1NOS	"	132	7	5	7
MIØRZA	"	18	2	1	2
LU7VCH	28	38,123	233	20	47
LU3HFA	"	21,505	163	20	35
I5KAP	"	12,096	98	17	39
HP1RIS	"	9,516	151	12	14
W5GAI	"	6,480	86	11	19
OK1DVM	"	4,128	48	13	35
LU7YW	"	3,348	50	11	20
PY4TC	"	1,840	40	10	13
(OP: PY2TI)					
YO2LEE	"	1,836	29	13	21
DL2TM	"	946	24	5	17
EC4AA	"	814	16	9	13
F4FEY	"	731	24	7	10
DF7LS	"	651	24	7	14
WB8JUI	"	602	15	5	9
PY2EJ	"	182	9	5	8
JH7RTQ	21	103,712	377	31	81
NDØC	"	62,934	234	27	75

R2AD	"	36,736	315	20	62
JH3DMQ	"	36,646	201	24	49
JR1NKN	"	29,232	179	25	47
UT6IS	"	22,242	187	20	46
YB2OK	"	17,816	102	26	42
F5ASD	"	14,946	134	17	30
SQ9AOR	"	10,100	100	19	31
ON3TO	"	9,800	112	16	40
DO8CW	"	9,648	108	16	32
WA6FGV	"	9,350	76	18	32
LA8WG	"	8,688	117	13	35
W1IG	"	8,000	60	15	35
7N4WPY	"	7,439	80	17	26
OK1XYZ	"	4,216	68	12	22
OZ6OM	"	4,200	48	17	25
JA1IWP	"	2,048	28	14	18
JF4CAD/3	"	1,625	28	10	15
IZØCKO	"	1,440	38	8	16
BG9ATY	"	1,280	42	12	20
JA1KPF	"	1,206	29	7	11
JI3CJO	"	1,173	24	12	11
DJ3GE	"	459	16	7	10
OK1AU	"	435	19	7	8
JRØQUR	"	320	13	7	9
JR2EKD/2	"	255	11	7	8
N6HI/7	"	195	9	6	7
AB8FJ	"	56	5	4	3
BG6AHU	"	2	1	1	1
IØUZF	14	61,700	391	24	76
RU9UN	"	37,293	150	24	69
VA7IR	"	28,405	229	25	40
9A2EY	"	27,048	299	11	58
HA6IAM	"	26,001	233	18	63
IV3AOL	"	21,888	175	20	52
SM6CRM	"	18,496	212	13	51
SP3DRM	"	15,568	220	10	46
9A8MM	"	15,080	178	12	53
UA1CEC	"	14,112	220	11	45
OR2F	"	14,040	187	10	50
					(OP: ON8LDS)
M/YO4RDW	"	13,629	204	12	47
CT1ESG	"	12,825	139	12	45
HAØGK	"	10,890	170	9	46
UT5UPN	"	8,316	117	12	42
SP8AWL	"	5,472	40	16	32
BD4HY	"	4,953	78	15	24
GWØVSW	"	4,440	114	6	31
SQ4O	"	4,264	82	10	31
RA9MU	"	4,247	56	8	23
E76EA	"	3,760	101	11	36
MØJBA	"	3,648	91	8	30
OM8JP	"	2,812	50	10	27
HS8JYX	"	1,826	35	7	15
IZ2QKG	"	1,824	48	6	26
W9BNO/Ø	"	1,034	21	10	12
UU7JF	"	589	27	6	13
BH7NLD	"	561	28	8	9
JA1POS	"	6	1	1	1
JK3AHS	"	6	1	1	1
S57SU	7	79,360	442	28	100
SP4GFG	"	31,275	342	15	60
ON3DI	"	20,276	250	11	63
CO6CBF	"	16,120	167	16	36
VK2DX	"	11,454	94	21	25
ES1WST	"	10,128	202	6	42
					(OP: WS4T)
CO8ZZ	"	9,911	77	12	41
SP5LM	"	8,094	104	14	43
CO6WYR	"	6,751	75	13	30
HA5BA	"	4,264	95	9	32
ZA/YT1CS	"	4,000	157	9	41
IZ1HGP	"	2,448	72	4	30
WB7OCV/2	"	1,782	30	10	17
VA3WPV	"	536	34	4	4
RAØSMS	"	196	15	7	7
SM6MIS	"	49	7	3	4
2EØVCC	"	35	5	2	5
SP2QOT	3.7	15,345	275	7	48
KH6LC	"	13,288	127	19	25
					(OP: NH6V)
RU3PE	"	7,222	147	8	38
K3TW/4	"	5,934	62	14	29
SQ8MFB	"	5,371	150	5	36
VE1SKY	"	3,971	112	7	12
SP2UUU	"	182	11	4	10
K7JCA	"	160	14	4	4
					(OP: K7SS)
ON5RZ	1.8	6,847	176	3	38
SP4GL	"	660	31	4	18
RA9UUK	"	49	6	4	3

ASSISTED
NORTH AMERICA
United States

K1KI	A	2,684,695	1872	132	383
					(OP: KM1P)
N1DG	"	1,818,639	1138	134	445
N4BAA/1	"	1,745,562	1371	117	366
N1YX	"	1,246,152	1101	100	311
AA1V	"	1,229,229	926	117	360
W1BV	"	1,224,585	1085	105	318
KA2KON/1	"	1,152,328	931	108	350
KA1R	"	1,095,561	1089	89	280
W1EBI	"	1,016,469	884	103	320
WK1J	"	921,888	876	98	298
KK1W	"	645,808	690	86	276
W1ZT	"	512,140	630	76	214
K1JB	"	510,986	574	85	238
W1MAT	"	466,762	605	69	209
AA1QD	"	390,567	482	77	226
K1SND	"	373,237	559	64	187
W1BYH	"	363,120	427	90	250
K1TR	"	264,816	423	54	162
KT1B	"	260,160	349	69	202
AE1T	"	214,826	336	58	175
AD1L	"	204,972	312	52	176
K1RV	"	191,436	303	70	188
K1VV	"	180,930	350	46	139
W1RM	"	174,075	239	81	194
WV1M	"	166,559	313	50	143
W1NR	"	145,706	279	39	140
W1RPG	"	144,525	281	62	143
AD1DX	"	136,939	280	70	141
K1GQ	"	132,458	251	56	150
N1GLT	"	94,792	210	41	123
W1JR	"	84,840	164	78	132
KG1E	"	77,321	189	52	115
K1SD	"	77,250	204	41	109
NG1R	"	62,115	210	31	92
W1ZS	"	56,515	158	33	94
N1IW	"	52,334	150	44	93
NI1L	"	26,334	102	33	66
KK1L	"	22,320	100	30	60
WB1DXD	21	79,501	258	25	82
K1IM	14	343,640	899	34	108
K6ND/1	3.7	98,832	338	26	90
*KS1J	A	1,041,100	1021	84	275
*K2TE/1	"	1,030,000	933	94	306
*W1KT	"	646,235	571	101	320
*N1API	"	477,102	656	62	200
*K1LD	"	383,070	421	84	255
*W1CTN	"	372,465	510	77	202
*WB1DX	"	336,770	498	68	170
*NF1O	"	249,830	323	79	222
*KE1V	"	240,816	401	65	167
*W1AIR	"	148,417	291	53	140
*W1MSW	"	122,018	290	45	124
*NE1F	"	113,096	200	61	150
*K2RS/1	"	109,385	246	46	121
*KK1X	"	61,976	183	37	90
*K1LOG	"	36,652	112	38	81
*K1SUB	"	31,825	122	28	67
*AA1AR	"	31,734	105	47	76
*W1TO	"	26,315	98	24	71
*N1HTS	"	22,072	97	26	63
*AK1Q	"	7,280	55	24	41
*KB1SUN	"	2,860	27	19	25

N2MM	A	2,466,828	1766	127	419
W1GD/2	"	2,220,807	1413	135	434
W2IRT	"	2,020,200	1316	126	429
W2RD	"	1,629,824	1082	138	406
N1IBM/2	"	1,156,270	974	100	330
N2WK	"	1,010,230	756	119	375
AB3CX/2	"	1,008,435	927	94	301
W2YR	"	978,360	793	116	349
KF2O	"	876,322	629	127	394
W2LE	"	618,268	731	85	226
N2SQW	"	614,054	707	77	245
K2EP	"	613,647	599	96	273
K2ONP	"	573,699	612	92	265
W6XR/2	"	504,828	500	99	280
K2XF	"	466,872	598	74	220
W2NY	"	461,076	547	79	229
WA3AFS/2	"	369,052	399	100	259
K2KQ	"	335,610	379	87	243
K2CJ	"	247,679	374	53	180
N1EU/2	"	219,504	309	70	199
W2NO	"	174,470	299	63	176
KC2NB	"	171,891	313	52	161
WK2H	"	149,220	301	46	134
K2QMF	"	144,980	259	63	157
K2BX	"	143,934	323	39	122
AB2DE	"	123,008	202	69	179
WA2ETU	"	117,486	207	72	142
K2QPN	"	107,712	221	55	137
W2GDJ	"	102,336	199	50	142
KC2LST	"	100,386	227	43	126
W2RZS	"	42,210	144	25	80
K2GN	"	24,486	96	36	70
WF2B	"	2,812	30	15	22
NP3D/2	"	6	1	1	1
N2OO	21	31,570	148	24	58
WR2G	14	150,348	417	29	105
K2SSS	7	81,549	327	30	93
*N2FF	A	406,098	516	76	217
*K2DBK	"	96,330	218	61	134
*AD2AM	"	83,130	211	51	112
*KC2OBN	"	62,928	206	42	102
*K2SI	"	59,906	160	51	103
*K2DSL	"	48,236	148	41	83
*WB2OQQ	"	28,036	121	22	64
*KJ4IC/2	"	22,448	98	23	69

K3WW	A	3,933,024	2280	147	489
AA3B	"	3,257,263	1998	133	454
K3PP	"	2,163,216	1412	138	423
W3LL	"	2,045,748	1643	118	335
N3AD	"	1,923,768	1468	120	384
N1WR/3	"	1,729,669	1313	118	361
K3MD	"	1,653,372	1418	122	364
W3GM	"	1,399,029	1028	125	364
					(OP: K3ND)
WN3R	"	1,319,383	993	121	360
N3ZA	"	1,266,900	945	113	379
W3EKT	"	935,698	877	96	302
W3KL	"	893,835	798	115	290
K3IPK	"	845,152	783	98	294
K3OO	"	763,776	606	116	352
W3OU	"	694,414	655	97	289
K3BZ	"	677,469	686	93	284
WØBR/3	"	588,336	560	112	296
N3MX	"	569,742	610	99	254
W3EA	"	486,040	619	77	213
K3FT	"	413,275	561	77	228
N3AM	"	295,427	424	61	190
N3TR	"	290,151	400	93	216
K3ATO	"	279,588	428	80	196
W3GK	"	243,360	372	63	177
K3SV	"	227,715	342	68	187
NA3M	"	221,000	325	69	191
N3NA	"	172,704	285	54	170
NW3H	"	125,685	263	50	139
KD3NB	"	118,776	230	52	144
KQ3F	"	102,934	186	60	154
NN3RP	"	90,985	232	47	108
W3WC	"	87,870	207	53	121
W9GE/3	"	66,308	183	41	96
W6NRJ/3	"	59,985	151	42	113
N3IYX	"	37,142	148	25	73
K3PG	"	33,269	119	28	75
N3NR	"	25,755	108	23	62
K3OOO	"	20,824	100	20	56
K3GMT	"	13,200	71	33	55
W2XD/3	"	5,217	54	16	31
K3QX	"	2,553	31	13	24
K3PH	"	144	6	6	6
W3FW	14	221,700	606	35	115
N3IQ	3.7	66,267	294	28	83
					(OP: ND3F)
*W3KB	A	742,260	758	85	271
*K3NM	"	509,351	467	93	304
*NK3Y	"	367,188	597	54	168
*N3ALN	"	222,780	375	68	169
*K3AU	"	129,626	267	57	140
					(OP: K2YWE)
*W4EE/3	"	40,698	142	45	81
*N1SZ/3	"	23,115	82	41	74
*WA3V	"	19,594	98	30	67
*W3AG	"	11,880	65	27	45
*AB3GY	"	6,438	41	22	36

W4SVO	A	2,498,229	1647	147	456
N4WW	"	1,988,616	1227	154	469
K1ZZI/4	"	1,984,224	1365	128	400
N4ZC	"	1,752,261	1188	138	405
W4MYA	"	1,553,940	1185	117	368
WJ2D/4	"	1,465,713	1193	118	329
AD4EB	"	1,448,241	1226	108	345
W3GQ/4	"	1,414,272	1118	119	345
W3OA/4	"	1,398,400	1118	119	341
N4KG	"	1,131,928	887	123	353
K5EK/4	"	1,127,742	909	122	340
N4PQX	"	1,112,105	834	123	362
N3MK/4	"	1,084,272	891	112	349
N4ZZ	"	1,057,374	1066	89	277
NF4A	"	1,007,247	868	111	320
N4DJ	"	801,192	750	101	298
K3IE/4	"	792,800	741	98	302
N4RA	"	710,232	675	109	295
W4JAM	"	610,228	621	101	272
W7DO/4	"	595,712	617	89	269
WØPV/4	"	592,253	623	90	259
W2YE/4	"	547,136	603	87	245
KG4W	"	418,992	484	93	243
K4DXA	"	317,245	367	95	240
NC4MI	"	310,521	465	72	195
K3KO/4	"	294,532	351	80	234
AA4NC	"	285,516	358	89	219
KR4F	"	266,970	314	97	233
N4CW	"	251,520	289	80	240
N4DWK	"	245,644	320	77	206
W4VIC	"	219,492	358	59	175
K4KR	"	212,212	296	76	210
W4JVN	"	212,004	335	72	162
NO9E/4	"	209,000	331	79	171
N4LV	"	192,935	333	68	167
KU4V	"	182,439	313	74	159
WB4ROA	"	139,578	200	73	185
W4PHS	"	132,225	335	64	151
NW4V	"	131,733	302	44	109
AK4I	"	124,320	267	56	129
W4OV	"	112,723	260	54	115
N4TB	"	102,588	242	49	117
K4EDI	"	99,750	213	68	142
K2SD/4	"	98,379	246	47	106
AJ3G/4	"	96,292	235	51	130
N4VV	"	90,480	198	56	118
N4JOW	"	70,994	179	50	104
NV4A	"	65,376	167	41	103
K2SX/4	"	55,320	172	33	87
K1ZW/4	"	54,442	127	54	113
W4AS	"	48,450	136	48	102
N4DXI	"	46,764	162	30	78
N3FP/4	"	41,514	138	33	78
K4IDD	"	38,778	113	45	93
N4NM	"	34,020	129	35	73
W4GHD	"	29,234	115	35	59
W4AEJ	"	27,104	88	45	76
KI4VCT	"	22,724	103	32	60
KD4K	"	17,766	83	34	60
NY4I	"	16,684	80	31	55
N4UC	"	11,857	67	24	47
WA2BCK/4	"	9,450	50	22	48
KD4FMW	"	9,240	62	24	46
K8YC/4	"	7,280	43	28	42
W4ATL	"	7,089	52	16	35
NF4L	"	702	15	12	15
K4XD	"	551	14	9	10
N4BP	28	31,130	219	17	38
N4NW	"	4,968	66	7	20
N4PN	21	438,312	974	34	134
KF4VTT	"	211,431	518	31	118
W4CU	"	67,266	223	30	81
K4JPD	7	145,124	438	35	107
K4KZZ	"	65,010	236	28	82
W3YY/4	"	5,635	39	15	34
KD2JA/4	"	3,120	34	15	25
*K4LY	A	1,385,268	1081	123	359
*KT4ZB	"	958,265	921	95	290
*W4PFM	"	259,478	391	78	196
*W4UJ	"	191,648	346	58	154
					(OP: W4AMS)
*WI4T	"	126,378	265	49	128
*NV4B	"	95,589	211	60	111
*W3ZL/4	"	94,920	224	48	120
*N4VA	"	69,212	181	44	99
*K4OMG	"	59,000	180	44	81
*N4IL	"	35,960	138	48	76
*W4WNT	"	33,210	115	44	79
*KC4FWS	"	28,462	103	37	70
*W4KPG	"	20,296	85	30	56
*W4GKA	"	11,005	63	25	46
*AJ4SQ	"	9,825	51	29	46
*N4MIO	"	7,344	41	30	38
*W4STB	"	5,742	45	24	34
*N4BFR	"	4,640	50	15	25
*W4DKB	"	2,730	36	18	24
*KI4HHK	"	1,224	19	9	15
*N3UA/4	28	16,330	129	13	33
*KI4LTO	"	3,504	51	6	18

*WA1FCN/4	21	195,804	491	32	115
*W9DHD/4	"	21,280	100	23	57
*KN4QD	"	903	18	7	14

N5JR	A	1,017,900	833	112	338
W5GN	"	807,645	879	91	254
W3TZ/5	"	203,742	366	69	162
K5WBM	"	130,340	209	70	175
N5BG	"	20,758	90	43	64
W5OV	"	17,181	86	40	43
AA5AU	"	11,534	56	35	44
W5ZO	28	1,008	23	7	11
NX5M	21	540,204	1246	35	142
N5ZK	"	282,653	737	32	117
N5JB	"	57,232	206	30	82
W5JSJ	14	936	18	11	15
WD5R	7	16,836	99	21	48
*N1CC/5	A	164,020	304	73	163
*N5XJ	"	74,661	214	41	82
*NK5G	"	19,295	137	33	52
*WBØRUR/5	"	6,678	49	20	33
*W4JHC/5	"	957	22	15	14
*K5WW	"	80	4	4	4
*WA5WFE	21	49,162	187	25	69
*N5UWY	"	646	14	8	11
*K5XA	14	19,880	109	14	57

N6QQ	A	1,216,586	993	125	344
K6TA	"	1,054,044	919	128	309
KF6A	"	958,438	956	114	268
KH6YR	"	913,440	3164	121	209
					(OP: K1YR)
K9YC/6	"	875,534	912	115	259
N6PYI	"	478,500	528	109	239
KC6X	"	402,518	485	94	219
N2NS/6	"	321,468	403	93	208
K6RIM	"	320,555	398	88	217
N6AN	"	301,653	411	94	183
N6ND	"	297,140	341	109	223
N6IC	"	283,556	435	80	167
W6DPD	"	129,940	261	54	124
K6ST	"	127,982	289	66	112
N6XT	"	55,808	171	42	86
K6III	"	49,181	124	75	112
WE6Z	"	46,928	163	46	66
N6OPR	"	44,821	149	52	81
N6VH	"	35,814	140	46	48
KF6I	"	30,976	147	30	58
N6RK	"	29,116	94	45	71
W6SZG	"	26,442	96	43	70
NE6I	"	4,366	45	16	21
W6TQG	"	3,096	26	20	23
AI6Z	"	1,568	19	12	16
N6ML	21	197,136	518	34	110
W6SR	"	147,576	419	32	97
NK6A	"	52,866	218	27	62
W6RKC	"	26,220	135	26	43
K6OY	3.7	12,950	69	27	47
*N6WS	A	581,704	626	108	236
*K3FIV/6	"	144,824	319	68	104
*K6GEP	"	113,220	237	69	116
*W6KY	"	91,060	230	60	85
*N6YEU	"	69,088	201	44	83
*W4UAT/6	"	63,450	185	45	90
*K6AAB	"	58,561	165	63	94
*W6GMP	"	49,345	149	58	81
*N6EE	"	34,553	127	43	66
*WB6BET	"	16,146	96	35	43
*KD6WKY	"	13,923	90	42	49
*N1WC/6	"	8,316	55	41	43
*N6BHX	"	5,880	70	21	21
*AF6EV	"	3,234	29	21	21
*K6LE	"	2,769	29	19	20
*NO6K	"	1,134	21	14	13
*KI6NUL	"	468	14	9	9
*ND6S	28	1,241	32	8	9
*W6AFA	21	221,615	658	31	96
*N6HE	"	11,924	109	19	25
*WV6E	7	9,975	80	23	34

K6LL/7	A	1,490,951	1197	125	344
K7WP	"	1,148,112	1100	114	288
KG7H	"	688,828	790	102	235
KN5H/7	"	645,909	596	118	289
K7UA	"	612,696	776	78	216
WU9B/7	"	476,520	547	98	232
K7ABV	"	314,783	487	72	161
WX7P	"	306,735	602	63	132
K6KR/7	"	256,737	412	72	155
AF7Z	"	235,750	395	77	153
K7EG	"	216,216	405	65	133
WD7K	"	186,308	448	72	116
NW7E	"	169,460	272	74	155
W7LB	"	153,225	263	81	146
K7VIT	"	143,206	288	68	125
N7RK	"	140,700	255	78	132
K7LV	"	112,132	247	66	128
NO7T	"	111,696	271	47	109
K7KR	"	111,156	244	66	111
W6SA/7	"	74,880	197	68	88
W6GX/7	"	62,883	187	47	90
W2VJN/7	"	59,160	155	51	94
W7SO	"	56,490	193	37	68
N7LF	"	54,125	182	40	85
KE7SW	"	53,200	173	48	85
K7VC	"	38,720	132	51	70
N1KEZ/7	"	28,625	113	53	72
K7MY	"	21,114	108	27	42
W7WHY	"	19,481	100	28	49
KE7YF	"	15,330	85	29	41
N7GTW	"	12,672	78	25	41
K7EY	"	10,720	66	27	40
K7EIQ	"	5,588	50	18	26
K7AWB	"	24	2	2	2
K7LY	28	7,488	101	15	21
N7DD	21	748,356	1602	36	141
W7ZR	"	260,984	635	36	116
W7UT	"	242,242	557	35	119
KY7M	"	219,928	566	33	115
KI7M	"	150,536	514	30	94
WA1PMA/7	"	34,887	150	24	63
AA7A	"	25,026	94	27	70
AF7DX	"	12,880	58	24	56
N6MA/7	14	24,921	141	26	45
N6SS/7	7	175,692	524	34	98
K9WZB/7	"	117,938	409	34	75
W7XI	"	53,448	218	30	72
					(OP: W6XI)
*KC7DB	A	162,717	268	73	146
*N7FLT	"	78,144	200	47	101
*KE7XM	"	50,908	135	51	92
*KE7DX	"	50,196	182	58	83
*W7RV	"	48,034	148	61	85
*N7MBL	"	37,476	131	36	72
*WS7I	"	21,112	83	42	62
*W6NF/7	"	20,140	83	43	52
*AD7KG	"	14,136	72	29	47
*KE7LOQ	"	12,750	64	36	49
*K7GS	"	10,850	72	20	42
*KX7L	"	6,996	49	25	28
*AK7S	"	3,306	34	16	22
*W7ISG	28	3,536	57	11	15

N8TR	A	1,533,726	938	149	464
W8MJ	"	1,114,772	936	120	338
N8RF	"	533,370	611	90	255
W8RA	"	513,729	553	84	275
W8TE	"	473,670	514	93	249
N4TX/8	"	415,251	612	71	190
W9KB/8	"	248,412	393	72	182
N8LCU	"	211,564	365	59	168
W8KEN	"	201,825	346	62	163
N8MZ	"	182,778	293	72	174
N4ZR/8	"	169,635	284	67	148
N8HP	"	26,751	94	40	71
N8KOJ	"	14,136	77	28	48
N8AGU	"	2,618	28	9	25
K8TJM	"	575	17	12	13
W8CZN	14	430,646	993	37	126
N8BI	7	104,320	318	32	96
*AA8IA	A	60,306	183	45	93
*WO8USA	"	32,526	130	37	80
*K8GT	"	20,160	86	37	59
*W8IQ	21	11,220	79	20	46

WO9Z	A	1,122,730	959	115	315
N2BJ/9	"	1,061,424	1060	99	279
N9ZM	"	588,555	670	87	232
W9GIG	"	239,400	285	79	236
N9AKR	"	232,166	263	91	255
NS9I	"	167,790	308	57	153
K9DUR	"	88,998	197	54	128
K9EN	"	51,308	173	36	91
N9OK	"	15,036	88	36	48
KA9FOX	"	7,986	48	23	43
N7MB/9	21	107,865	310	32	103
KK9V	"	33,672	139	19	73
W9IIX	14	41,208	157	26	75
W9JA	7	54,670	205	30	80
*K9OR	A	12,495	58	30	55
*K9AIH	"	10,010	71	28	42
*KC9IRQ	"	8,415	59	18	37
*AG3R/9	"	1,815	21	15	18
*N9TF	21	72,610	255	27	79

KØKX	A	2,837,562	1918	137	409
WAØMHJ	"	1,026,422	809	117	340
NØAT	"	830,093	790	102	289
WØBM	"	598,904	658	97	247
WWØAL	"	537,900	656	104	222
KØRC	"	510,720	562	95	241
KØIR	"	386,308	448	99	224
NCØO	"	299,756	416	76	198
NØRN	"	265,335	401	82	163
WØCEM	"	252,106	415	73	160
NØBK	"	222,534	347	62	172
NØODK	"	173,376	342	55	137
WBØN	"	113,300	233	67	139
KØARY	"	100,833	216	53	130
KNØR	"	90,450	168	58	143
NØKK	"	43,473	136	39	90
AAØAW	"	40,880	142	35	77
KEØL	"	25,365	107	30	59
K4IU/Ø	"	23,674	100	28	61
AAØA	"	18,525	78	34	61
KØPIR	"	4,704	38	18	30
N3PDT/Ø	"	3,450	33	22	24
KØRH	28	5,390	63	11	24
NØUU	21	129,150	319	34	116
NØHF	"	127,246	386	29	93
AI1P/Ø	"	3,570	41	17	25
KØKT	3.7	30,014	161	27	59
*NØHR	A	1,025,188	960	106	288
*AD1C/Ø	"	506,597	642	84	209
*WBØSOK	"	170,962	329	64	145
*WØHBH	"	110,732	229	50	138
*KØPC	"	103,950	232	42	123
*KØMPH	"	73,062	200	64	98
*W4ZW/Ø	"	70,875	219	66	109
*KØAD	"	68,172	196	39	99
*KØKP	"	49,044	160	37	85
*NXØI	"	5,136	43	18	30
*KCØDEB	"	2,232	28	17	19
*KFØIQ	21	240	8	5	7
*NRØL	"	4	1	1	1

Alaska

AL9A	A	1,046,349	1795	96	165

Canada

VE1OP	A	1,188,544	1326	94	285
VO2NS	"	617,176	1508	63	143
VE1DX	21	259,616	765	28	105
*VA1TM	7	35,088	206	19	67
VC2A	A	989,120	1136	85	267
					(OP: VA2WDQ)
VA2AM	"	577,914	614	90	276
VE2DC	"	387,562	427	89	240
VA2EW	"	339,218	759	57	130
VE2NGH	"	247,744	299	88	228
*VE2XAA	A	1,492,553	1487	108	323
VE3UTT	A	3,258,063	2348	125	388
VE3MMQ	"	2,026,407	1579	112	375
VA3DX	"	232,080	355	79	161
VE3IQ	"	176,510	337	57	133
VE3IKT	"	2,604	31	20	22
VA3PL	21	273,920	783	28	100
*VE3CV	A	377,790	570	86	208
*VE3XAT	"	91,287	225	52	109
*VE3JSQ	"	9,240	61	22	44
*VE3XD	21	144,072	409	28	110
*VE3MGY	3.7	2,322	141	5	4
*VE5DLM	A	11,880	103	21	39
VE6LB	A	252,568	478	85	156
VE6JY	14	1,040,704	2264	39	145
					(OP: VE5MX)
VA7FC	A	1,602,040	2243	109	222
VE7TK	"	143,547	298	60	117
VE7IO	"	37,070	138	44	66
VA7XA	7	18,088	109	24	44
*VA7BEC	A	308,470	665	78	140
VY1EI	A	527,945	1757	51	94

Cayman Islands

ZF2AH	A	2,956,470	4206	90	240
					(OP: W6VNR)

Grenada

J3/AA8LL	21	132,522	804	20	58
*J37K	28	13,088	216	14	18
					(OP: AC8G)

Mexico

4B1GZU	A	18,942	103	32	45
4B1EE	21	124,224	620	29	67
					(OP: XE1EE)
*XE1FZE	7	17,836	174	19	33

Puerto Rico

KP3Z	A	5,644,142	4473	150	424
					(OP: NP4Z)
*NP3O	A	2,005,521	2787	98	245
*NP3CW	"	2,088	32	17	19
*WP3C	21	977,977	2917	33	118
*NP4G	14	75,816	510	19	53

St. Kitts & Nevis

V47JA	A	180,264	504	60	108
					(OP: W5JON)

St. Pierre & Miquelon

FP/KV1J	A	830,308	1484	68	183

Turks & Caicos

VP5I	21	1,136,883	3549	33	108
					(OP: I8UZA)

U.S. Virgin Islands

*KP2B	A	149,460	342	58	130
					(OP: WP3A)

AFRICA					
African Italy					
IG9S	14	1,223,320	2473	39	131
					(OP: IZ8GCE)
IG9D	3.7	290,535	1016	17	88
					(OP: IZ8TDP)
Canary Islands					
EA8/DL6MHW	A	1,944,153	2062	76	261
EC8AFM	"	367,026	549	61	188
EF8A	21	1,273,000	2965	34	118
					(OP: EA8AUW)
*EA8AJC	A	19,838	90	33	58
*EA8MT	28	276,906	744	27	106
Djibouti					
J28RO	A	411,522	692	54	160
					(OP: F5IRO)
Gabon					
TR8CA	A	495,880	748	71	174
Nigeria					
5N7M	28	302,380	862	26	104
					(OP: OM3CGN)
Senegal					
*6V7T	A	1,704,024	2014	75	247
					(OP: F5RAV)
South Africa					
ZS2DL	A	583,380	690	79	236
ZS5ZZ	"	42,700	158	36	64
ZS9Z	21	200,133	725	27	84
Tunisia					
3V8BB	A	1,146,092	1166	90	272
					(OP: YT1AD)
ASIA					
Asiatic Russia					
UA9OCQ	A	1,940,840	1657	103	337
R9WR	"	1,536,310	1828	78	257
RN9CM	"	1,295,424	1118	117	351
R8MC	"	1,219,392	1130	113	351
RK9AJZ	"	795,520	905	90	262
RA9AAA	"	666,162	828	76	230
UA9CDC	"	640,460	749	81	229
RM9RZ	"	512,952	582	88	260
R8FR	"	489,155	570	89	272
R9WW	"	383,565	537	60	213
UA9CGL	"	349,531	521	85	214
UA9AGX	"	196,928	304	68	204
UA9OC	"	167,400	309	56	160
RW6W	"	161,304	380	47	141
RA9JBA	"	157,932	421	43	121
R8TR	"	150,842	296	53	146
RK8I	"	80,343	291	31	82
RM6W	"	52,932	174	42	90
RX9CAZ	"	30,030	127	28	63
UA9LBQ	"	528	15	11	13
UA9LP	"	480	11	9	11
UA9UR	28	65,736	433	18	48
RC9F	"	33,418	209	14	48
UI9I	14	631,630	1601	35	131
					(OP: RM9I)
RK9DM	"	263,750	772	31	94
RK9YWE	"	164,992	510	32	96
					(OP: RA9YTX)
RW9USA	7	1,028,340	2426	38	136
RK9AX	"	182,308	640	28	91
RU9CK	3.7	260,837	892	23	86
UA9MA	1.8	37,700	201	9	56
*RV9UP	A	685,377	992	82	219
*RW9C	"	584,974	763	73	225
*RA9DZ	"	405,650	619	67	199
*RK9DC	"	221,184	471	48	144
*RA9CIN	"	89,490	250	42	115
*R9MC	"	83,681	236	51	106
*RA9MX	"	47,144	127	40	126
*RZ9WU	"	34,782	164	27	75
*RA9AMO	"	26,400	135	25	63
*RW9WW	"	13,040	70	25	55
*UA9OA	"	4,585	54	11	24
*RV9CP	21	220,610	714	29	101
*RA9UIV/9	"	138,572	562	23	75
*UA9CAX	"	56,357	247	23	74
*RA9UAG	"	31,416	225	19	49
*RA9UN	"	14,202	152	14	40
*RW9TP	14	74,648	238	32	92
RAØFU	A	1,574,000	1967	129	271
UBØA	"	1,330,938	1509	105	273
UAØSR	"	620,416	1002	68	194
UAØSE	"	465,850	849	71	171
UAØAGI	28	46,680	339	18	42
RXØAW	21	393,084	1340	25	97
RØCY	"	276,410	918	35	96
RWØBG	7	44,954	210	25	66
*RAØAY	A	162,560	408	45	115
*RZØSB	"	54,466	207	32	81
*RAØANO	"	8,733	56	29	42
*UAØOD	28	4,284	120	11	17
*RAØACM	21	140,712	481	26	97
*RXØSA	14	41,328	198	23	59
Asiatic Turkey					
*TA3CM	A	2,368	32	10	22
*TA4ED	14	140,580	627	21	69
*TC4I	"	38,916	223	13	56
					(OP: TAØU)
China					
BA7IO	A	214,872	616	60	108
BY3MM	"	185,442	818	66	120
					(OP: BA3CE)
BD4CB	"	105,846	289	47	130
BG3FQF	"	3,560	37	14	26
BA4KP	21	136,188	792	26	71
BA4RF	14	233,376	881	36	96
*BD5BAJ	A	224,220	592	59	143
*BD4HF	"	215,736	597	68	134
*BD4SFE	"	51,250	197	45	80
*BD7MTJ	"	47,652	216	49	83
*BD2BT	"	11,270	69	24	46
*BH7PAZ	"	5,880	61	22	34
*BA7CK	21	79,734	463	25	72
*BD6AHP	"	23,450	160	18	49
*BD2RJ	"	8,112	87	18	30
*BD7IBN	"	1,176	40	8	16
*BD4CQ	14	5,256	101	14	22
*BD3RT	7	2	1	1	1
Cyprus					
P3Z	21	541,120	1269	36	124
					(OP: 5B4AFM)
Georgia					
4L8A	14	1,101,488	2343	38	134
Hong Kong					
VR2XLN	A	821,058	1374	112	234
India					
VU3DJQ	7	11,500	95	15	35
Israel					
4XØA	21	810,805	1898	36	119
					(OP: 4X1VF)
4XØW	14	939,840	2112	37	128
					(OP: NT2X)
*4Z5KZ	A	308	8	6	8
Japan					
JO1BVI	A	2,018,975	2006	137	278
JH1NBN	"	1,545,272	1548	130	289
JK1OPL	"	405,476	503	113	221
JF1OPL	"	187,458	361	81	118
JS1KQQ	"	129,923	308	60	113
JH1OVY	"	41,184	138	39	78
JA1IZZ	"	34,102	113	51	67
JA1PTJ	"	28,244	113	33	59
JF1RYU	"	13,578	67	39	54
JH1QDB	"	2,574	37	12	14
JA1QGT	28	10,696	93	21	35
JN1NDY	21	376,887	1185	32	99
JE1LFX	"	209,088	723	31	77
JQ1NGT	"	81,224	382	24	64
JH1ACA	14	230,462	645	36	103
*JM1LRQ	A	248,235	413	91	156
*JA1IST	"	211,404	376	80	143
*JA1BJI	"	191,350	384	81	134
*7L1FFH	"	148,176	297	83	133
*JA1JQY	"	17,487	102	28	39
*7N2UQC	28	5,217	70	15	22
*JA1BPA	21	400,440	1100	36	105
*JR4PMX/1	"	180,125	518	32	99
*JO1WKO	7	23,406	108	25	58
JA2IVK	A	2,060,305	2242	125	252
JA2XCR	"	686,868	755	117	247
JH2FXK	"	419,917	549	94	195
JR2PMT	"	227,255	397	82	133
JG2REJ	"	70,176	198	49	87
*JK2VOC	A	93,562	288	65	98
*JF2OZH	"	91,609	221	60	101
*JG2KKG	14	270,413	700	37	106
JO3DDD	A	1,242,344	1594	114	218
JA3AOP	"	1,111,120	1255	108	232
JN3SAC	"	189,476	380	71	131
JS3CTQ	7	178,688	523	35	93
*JL3VUL/3	A	163,755	485	34	101
*JA3PYC	"	88,312	240	51	101
JO4CFV	A	118,816	294	72	116
JM4WUZ	21	140,530	476	31	84
JA6BZI	A	1,164,486	1107	125	296
JH6CDI	"	681,926	618	142	327
JA6SRB	3.7	7,950	74	19	34
*JA6DIJ	14	51,000	247	27	58
JA7ZP	A	291,765	424	102	163
JA7KY	"	768	15	12	12
JA7OWD	28	66,374	375	24	53
JG7AMD	14	34,320	163	26	52
*JH7XVB	A	21,576	116	38	49
*JA7KQC	21	99	5	4	5
JH8SLS	A	213,066	302	92	175
JA8JMG	14	31,836	158	30	54
JF9JTS	A	296,478	631	59	122
JR9GMS	"	10,582	51	34	40
JH9URT	7	42,504	204	28	56
*JH9JJD	21	12,862	97	17	42
JAØFVU	A	1,159,872	1320	116	220
JHØINP	"	315,715	451	90	181
JHØNOS	7	37,499	208	26	51
JHØMHR	3.7	924	18	10	12
*JAØNFP	21	33,384	203	25	53
*JJØNSL	"	22,572	138	22	54
Kampuchea					
*XU7ACY	A	444,542	994	77	149
Kazakhstan					
UN7MMM	A	1,762,611	1999	79	244
UNØL	"	1,050	23	12	18
UNØLE	"	336	9	7	9
UN4PG	28	53,898	312	21	57
UN8GV	21	498,617	1583	27	106
UN2E	"	220,288	701	29	99
UN7TO	"	120,239	577	24	65
UN9PQ	14	72,540	309	24	69
UP7A	7	313,560	1011	26	91
					(OP: UN7AL)
Kyrgyzstan					
*EX8LF	28	1,896	45	8	16
*EX7ML	21	110,688	530	22	74
Mongolia					
JT5DX	7	977,618	2558	37	130
					(OP: JT1CO)
Saudi Arabia					
HZ1FS	A	1,180,005	1440	63	228
					(OP: DL2RMC)
South Korea					
DS5DNO	A	20,800	78	40	64
*DS5TOS	A	146,700	466	54	96
*HL1/W7VOA	14	1,917	46	11	16
Taiwan					
BU2AU	A	153,550	576	66	100
Thailand					
*HS8ZCX	21	271,425	896	35	106
United Arab Emirates					
A65BP	A	1,605,730	1318	117	373
*A65CA	A	445,968	554	113	229
Vietnam					
XV1X	A	262,143	806	62	127
3W1M	21	1,056,424	2815	36	130
EUROPE					
Aland Islands					
OHØZ	A	1,846,858	1775	123	443
					(OP: OH6EI)
OHØK	3.7	119,944	1208	18	76
					(OP: OG7X)
Austria					
OE4A	A	5,371,993	3557	159	578
					(OP: OE2VEL)
OE8Q	"	675,011	1018	90	247
					(OP: OE8SKQ)
OE5UAL	28	20,661	133	18	53
OE/DJ6OI	7	28,644	349	13	64
OE2GEN	3.7	169,668	1477	17	91
OE9ICI	1.8	76,228	961	11	65
*OE5JSL	A	100,323	295	64	149
*OE5HSN	"	94,576	329	45	139
Belarus					
EU1AZ	A	1,238,890	1821	105	353
EV1R	"	979,488	1381	109	347
EW8DJ	"	286,810	767	60	230
EW8OM	"	102,720	356	43	149
EU3AR	1.8	52,779	690	12	61
*EW1IP	A	1,050,740	1509	101	327
*EW7DK	"	329,805	688	76	239
*EW8NN	14	22,336	290	13	51
Belgium					
OO5M	A	1,623,360	1806	109	371
					(OP: ON5ZO)
ON6CQ	14	106,080	558	30	90
OR7W	3.7	47,806	501	12	70
					(OP: ON4UW)
ON4WW	1.8	43,050	537	11	64
*ON6LR	A	288,215	450	80	215
*ON4CAS	"	286,895	608	64	181
*ON4VDV	"	164,416	345	68	156
*OQ4B	21	171,000	480	37	113
					(OP: ON4BHQ)
*OP4A	7	17,220	134	14	68
Bosnia-Herzegovina					
E71A	21	875,088	2296	39	138
*E74A	A	223,488	489	69	219
*E73M	14	869,568	2844	37	131
Bulgaria					
LZ1BJ	A	486,000	1128	75	225
LZ3ZZ	"	26,680	129	36	56
LZ1NG	28	35,217	216	25	66
LZ3CB	14	235,014	1391	32	106
LZ5A	7	168,960	1204	29	99
					(OP: LZ2UW)
*LZ9R	A	895,482	1501	95	319
					(OP: LZ3YY)
*LZ2A	"	185,368	597	59	173
*LZ2JA	21	220,271	807	37	120
*LZ2DB	14	182	10	4	9
*LZ1DNY	7	1,392	32	8	21
Crete					
SV9DJO	A	886,977	1949	85	314
*SV9/YL2VW	A	4,505	91	12	41
Croatia					
9A4D	A	1,676,018	1632	127	414
					(OP: 9A7DX)
9A2EU	"	102,672	219	72	135
9A4R	"	74,160	348	31	113
9A1MM	"	13,135	108	27	44
9A2U	28	71,760	332	26	89
					(OP: 9A3ZA)
9A5MT	"	5,600	55	16	34
9A5Y	21	992,892	2220	39	155
					(OP: 9A3LG)
9A9SF	"	515,928	1373	38	130
9A5D	"	467,625	1567	33	112
					(OP: 9A3ID)
*9A3XV	A	2,026,640	2162	131	386
*9A6ILI	"	115,808	339	60	164
*9A4MF	"	36,869	130	54	107
*9A4WY	28	19,788	132	20	48
*9A3TU	21	2,784	39	12	20
Czech Republic					
OK8YD	A	1,330,483	1353	112	355
					(OP: DL1YD)
OK7Y	"	713,322	1229	94	320
OK1TRA	"	133,777	396	53	150
OK7MT	"	50,550	200	38	112
OK2BHD	"	1,242	16	13	14
OL5M	28	82,038	418	26	87
OK1SKJ	"	14,518	115	17	44
OK5R	21	1,225,534	2720	39	163
					(OP: OK1RI)
OK1CDJ	"	511,670	1269	39	151
OK6DJ	"	320,580	798	39	141
OK1TN	"	26,481	116	29	68
OK1BN	14	870,872	2371	39	145
OL9Z	"	693,968	2078	40	136
					(OP: OK2PVF)
OL3R	"	527,120	1573	39	137
					(OP: OK1VWK)
OK1DX	"	440,154	1391	39	132
OL5T	"	127,300	615	26	74
					(OP: OK1BOA)
OL7M	3.7	371,416	2203	26	110
					(OP: OK2ZAW)
OK1FC	"	102,520	1110	15	73
OK2ZAW	"	12	3	1	3
OK1NY	1.8	66,048	704	15	71
OK1T	"	63,911	793	14	65
					(OP: OK1TP)
*OK1SI	A	191,456	556	50	198
*OK7GU	"	18,240	209	18	77
*OK1FHI	"	14,964	94	26	61
*OK1LO	7	37,310	391	15	67
*OK1KT	"	20,501	162	21	62
Denmark					
5P1B	A	224,238	540	73	208
OZ4O	"	166,972	361	74	173
OZ1ADL	28	22,790	165	19	67
*OU2P	A	85,722	373	41	141
					(OP: OZ1LHK)
England					
G3TBK	A	1,317,798	1379	117	420
GØVXE	"	988,505	1480	92	335
G3UEG	"	838,493	872	110	353
G3RXQ	"	707,168	1070	91	301
G3LZQ	"	212,232	345	79	217
G3SVD	"	138,908	309	60	182
MØDDT	"	119,658	306	59	163
GØRPM	"	59,885	267	33	112
G4PIQ	"	29,715	171	26	79
G3VPW	"	28,672	121	41	71
G3PHO	"	20,700	86	43	57
G4TNB	28	18,426	100	19	55
G7TWC	21	77,256	326	29	87
G3GAF	"	52,520	176	32	98
G2F	14	262,238	1106	31	103
					(OP: MØCKE)
G4ATA	7	24,735	146	21	76
*G3UHU	A	94,374	276	49	165
*MØTDW	"	25,038	146	35	72
*M1JJK	"	22,990	155	26	69
*GØKFO	"	13,770	118	23	58
*M6W	"	504	10	8	10
					(OP: G3WW)
*MØNDZ	14	25,840	214	16	60
*MØGKC	"	12,780	124	18	53
*G1N	7	1,276	31	8	21
					(OP: G3MZV)
Estonia					
ES4BG	A	1,204	27	6	22
ES5MG	28	32,850	202	24	66
ES5RY	21	677,877	1592	38	159
*ES5TF	14	85,541	481	26	87
*ES5EC	7	667	23	7	16
					(OP: ESØTJC)
European Russia					
RM3F	A	3,114,048	3373	136	452
					(OP: UA3DPX)
R5GA	"	2,518,320	3188	128	432
RT4RO	"	2,245,180	2930	124	429
RW4W	"	2,143,309	2520	132	449
UA1OMX	"	938,080	1494	102	308
UA1OMS	"	836,432	1054	118	370
R6DX	"	658,905	885	115	350
UA1AFZ	"	535,095	1039	83	262
RT4W	"	477,309	977	90	267
RN1N	"	470,407	655	99	314
RV3ZQ	"	352,260	689	65	220
R7DX	"	260,884	1042	39	134
UA4AZ	"	250,832	550	59	198
RA3NF	"	205,632	346	79	173
RN1ON	"	182,436	443	80	196
U1BD	"	151,731	556	54	153
RA3TT	"	97,470	395	42	129
RA4RO	"	65,946	209	51	123
RJ3AA	"	64,584	254	48	108
RU3AWH	"	59,184	334	37	100
RX3AGD	"	50,868	151	54	108
R3MS	"	50,796	188	47	119
RX3AEX	"	47,978	274	37	112
RU6YK	"	45,045	325	21	70
RX3MA	"	38,360	173	37	103
RW4WZ	"	30,592	162	36	92
RA4S	"	30,420	120	41	89
RT1O	"	29,393	128	37	96
RW4NN	"	12,720	65	29	51
RV6ALI	"	4,563	39	19	20
UA3RQQ	"	3,652	59	11	33
UA1ORK	"	506	16	11	12
UA6YW	"	330	10	5	6
RU7A	28	94,939	550	26	83
UA6AK	"	2,380	47	12	22
R7LV	21	549,990	1516	37	152
UA6AA	"	93,233	374	36	97
RM5P	"	26,307	188	20	59
RZ4HC	"	22,345	104	26	83
UA7A	14	352,248	1521	37	119
UA4LCH	7	285,636	1094	36	120
UA3MIF	"	248,744	989	33	103
RT3T	"	84,987	425	31	102
UA4WI	3.7	33,957	359	13	64
RT3M	"	22,908	207	13	70
RA3FD	"	15,252	203	11	51
RZ3EC	1.8	54,096	574	15	69
UA1ANA	"	27,186	389	12	57
UA3EDP	"	6,900	135	7	39
*RA1AL	A	914,681	1576	91	310
*RL6M	"	903,630	1686	84	306
*RK4YJ	"	369,772	750	86	252
*RU3U	"	189,202	489	61	186
*R2AT	"	128,125	345	63	142
*RW4FX	"	95,832	311	51	147
*RA6LIS	"	86,264	392	40	124
*RW6BD	"	34,176	215	30	98
*RG7G	"	19,665	106	41	74
*UA6LPN	"	19,203	99	42	69
*RA1QD	"	17,974	101	36	50
*RA6HJR	"	16,608	116	28	68
*RL3F	"	11,928	93	23	61
*RL3FA	"	11,808	64	30	52
*RA3TVL	"	11,193	127	21	70
*RD3TBQ	"	8,268	75	29	49
*UA3UBT	"	7,950	74	22	53
*RX3DCN	"	7,038	71	22	47
*RA4PX	"	1,512	32	10	26
*UA1WBV	"	740	13	10	10
*UA1AFT	28	24,817	151	24	59
*RU3VV	"	16,415	151	20	47
*RA4WC	21	110,262	519	30	111
*RA3DNC	"	73,008	340	31	86
*R5ACQ	"	39,600	248	23	67
*RA1QGK	"	4,200	53	11	24
*UA6LUQ	14	97,342	553	32	87
*RN7A	"	47,544	489	16	68
*RX3AA	"	864	26	6	12
*R3VA	1.8	11,985	195	7	44
European Turkey					
*TA1KB	A	41,313	418	35	106
					(OP: TA1BJ)
Finland					
OG6N	A	2,398,500	2013	130	485
					(OP: OH6NIO)
OG2A	"	1,313,104	1693	99	329
					(OP: OH2RA)
OH2BEN	"	620,464	756	101	393
OH6RE	"	553,728	714	96	352
OH6MW	"	526,399	1051	80	267
OH2CK	"	435,715	556	104	309
OH1A	"	422,055	858	68	181
					(OP: OH2FPK)
OG4T	"	312,000	517	79	233
OH2XX	"	295,358	575	76	162
OH3FM	"	181,629	443	66	213
OH1MM	"	143,451	299	65	166
OH2LU	"	79,212	279	41	120
OH6TN	"	51,060	247	32	83
OH8KA	"	8,265	99	21	66
OH2BP	28	5,700	50	15	35
OH1HB	21	97,050	292	35	115
OH3JR	"	21,888	95	24	90
OH4KA	"	30	3	3	3
OH8L	14	1,123,404	2956	38	141
					(OP: OH8LQ)
OH6M	7	189,614	1157	25	88
					(OP: OH6LBW)
OH8A	"	110,979	965	23	76
					(OP: OH4KA)
OH6DX	3.7	1,160	32	7	22
OH2BO	1.8	9,313	112	12	55
*OH3JP	A	194,910	457	66	201
*OH6OS	"	172,528	308	75	188
*OH4KZM	"	132,870	412	57	158
*OH3LQK	"	33,335	197	28	85
*OH2LNH	"	4,345	64	15	40
France					
TM7F	A	3,936,268	3580	124	408
					(OP: F6GLH)
F4FFH	"	1,477,176	1618	113	375
F1RHS	"	575,694	724	106	272
F4CPF	"	263,640	354	97	241
F5NBX	"	233,064	577	62	172
F6FLU	"	59,081	170	52	79
F5KEQ	"	53,067	268	46	87
					(OP: F5MYK)
F1UVN	21	139,384	377	35	117
F8ARK	14	355,344	1367	33	99
F4DNW	"	31,828	230	21	52
TM9R	7	917,700	3322	38	137
					(OP: F5FLN)
F5NBU	"	11,025	60	26	37
F1EBN	3.7	113,157	1071	16	83
*F4FDA	A	507,052	777	84	280
*F8CRS	"	173,664	356	68	200
*F4FEP	"	145,189	361	50	147
*F6JSZ	"	67,650	301	37	128
*F6IRA	"	40,293	214	33	78
*F4FRF	"	21,944	148	27	77
*F4FHV	"	1,749	27	14	19
*F8CGL	7	43,500	350	18	82
*TM33A	"	22,880	190	13	67
Germany					
DC4A	A	4,089,407	2685	158	575
					(OP: DL4NAC)
DJ4AX	"	2,029,839	1590	127	466
DF2UU	"	1,822,428	1508	141	498
DK5DQ	"	1,792,519	1614	119	428
DJ1AA	"	1,719,744	1984	109	398
DD2ML	"	1,695,498	2151	122	431
DL5AN	"	1,336,436	1210	124	438
DL3EA	"	1,306,621	1370	113	374
DL4LAM	"	1,114,776	1199	99	369
DL8OH	"	1,094,166	1091	135	399
DLØWW	"	1,073,541	1067	111	358
DJ9MH	"	971,872	1023	112	390
DL1RG	"	785,376	1024	104	328
DJ7YP	"	747,716	912	101	327
DM2DXA	"	730,884	741	111	351
DL5JS	"	685,923	992	91	276
DJ3WE	"	644,384	1067	83	333
DL5MEV	"	642,180	687	115	302
DL8QS	"	614,716	802	100	354
DK1KC	"	611,455	912	90	319
DK2AT	"	519,870	865	80	310
DL2IAN	"	518,760	1037	80	250
DJ2YA	"	507,640	504	119	371
DJ9HX	"	488,448	619	97	287
DK1QH	"	395,954	777	71	243
					(OP: DK1QHF)
DK1AX	"	391,950	645	85	250
DL7ON	"	382,592	521	95	297
DL4CF	"	332,640	503	80	228
DF5ZV	"	330,012	521	79	277
DL6EZ	"	292,215	564	66	187
DL7AOS	"	236,371	682	52	187
DC2KN	"	229,658	505	74	212
DG3FK	"	204,584	363	66	173
DH1PS	"	194,245	446	62	203
DF2LH	"	156,140	351	62	149
DL9HD	"	116,052	285	57	171
DL1NEO	"	105,135	300	53	162
DK5AD	"	104,858	295	56	162
DL8YR	"	104,720	321	60	160
DG2NMH	"	103,293	394	40	167
DP4X	"	97,364	397	32	69
					(OP: DJ2MX)
DL1EJA	"	85,995	185	54	135
DK6CQ	"	74,390	253	43	130
DL9NDV	"	74,052	242	45	159
DF3QG	"	71,712	206	52	114
DL1PT	"	68,276	338	42	127
DL2SWN	"	60,160	152	56	104
DL1OLI	"	59,130	201	49	97
DL9NCR	"	53,250	212	44	106
DF2MM	"	50,500	197	37	88
DL9GTB	"	48,032	118	48	104
DJ6TB	"	38,958	168	41	88
DL1TKB	"	36,432	136	48	84
DL8UAA	"	30,876	165	39	85
DL9LM	"	25,418	289	15	56
DF1IC	"	24,360	127	37	79
DL8DYL	"	22,264	101	39	82
DL1YFF	"	22,185	104	35	50
DJ2QV	"	10,089	65	26	31
DJØTP	"	9,922	80	25	57
DL7PD	"	6,440	53	20	36
DL8WX	"	1,936	30	12	10
DM3VL	"	1,813	21	17	20
DL8UAT	"	414	11	8	10
DJ8QN	28	48,924	251	27	81
DB9EX	"	798	22	7	12
DF9ZP	21	888,664	1923	39	157
DA2C	"	756,500	1853	39	139
					(OP: DL8OBQ)
DL9GS	"	202,419	588	37	116
DL5XL	"	9,672	52	19	43
DL2ARD	14	1,262,437	3119	39	148
DM3MM	"	362,023	1298	37	126
DL2QT	"	38,967	231	23	70
DK8JB	"	18,865	154	16	61
DH8BQA	7	260,026	1577	33	113
DL2AA	"	70,519	427	22	75
DD1MAT	"	31,926	181	20	82
DL2KZA	"	5,088	51	16	37

DB2B	3.7	89,531	923	16	81	(OP: DL8OBF)
DO4DXA	"	35,700	381	12	73	
DK9HN	"	22,715	297	12	65	
*DF2RG	A	480,522	713	88	269	
*DM6DX	"	377,536	579	86	261	
*DF2AJ	"	369,408	708	76	236	
*DLØNG	"	182,532	500	59	187	(OP: DK8NC)
*DL4MNG	"	161,040	472	48	192	
*DJ3HW	"	159,609	322	70	179	
*DL5GAC	"	101,712	346	44	112	
*DK4WF	"	71,050	262	62	141	
*DK6AH	"	70,928	240	54	122	
*DL8ZAJ	"	63,124	230	50	122	
*DK7ZH	"	55,096	296	33	109	
*DH4PSG	"	48,238	176	52	126	
*DL1DBR	"	44,676	211	43	110	
*DL7UIO	"	33,930	163	30	57	
*DL9ECA	"	28,672	131	40	88	
*DL5ASK	"	26,250	128	31	74	
*DK1IP	"	24,282	123	30	41	
*DL7TJ	"	22,987	141	33	94	
*DL2YCA	"	16,290	138	23	67	
*DC2CB	"	16,000	123	29	71	
*DJ2MX	"	15,826	104	22	60	
*DK4VY	"	15,456	139	26	70	
*DG8FAY	"	14,758	152	19	75	
*DL4EBW	"	13,944	128	21	63	
*DL9GTI	"	12,516	65	34	50	
*DL3DRN	"	12,250	78	30	40	
*DB5SB	"	11,088	103	26	62	
*DK4IO	"	9,177	68	28	41	
*DL1VTL	"	8,256	75	24	62	
*DG2BHB	"	7,923	108	13	44	
*DF6YC	"	4,424	44	22	34	
*DL1SVA	"	4,416	38	21	25	
*DK6RS	"	1,456	27	13	13	
*DL3EBX	"	1,218	41	5	24	
*DO6SD	"	832	19	12	14	
*DJ7IK	"	672	14	8	13	
*DO1RTO	28	1,500	36	6	14	
*DR2K	21	135,579	460	34	95	(OP: DL5OCR)
*DL5ALW	14	9,027	87	12	47	

Greece

SV1DPI	A	849,884	1209	116	392	
SV2FLQ	"	109,410	433	56	154	
SV3AQR	21	68,560	716	21	59	
SV2DCD	7	475,600	1975	37	127	
J48OV	"	208,661	1435	31	96	(OP: HA5OV)
*SV4FFL	A	650	18	10	16	
*SV2AEL	14	16,185	216	11	54	

Guernsey

*MUØGSY	21	85,578	518	26	76	

Hungary

HG1ØP	A	4,481,880	3737	153	527	(OP: HA3PL)
HG6V	"	615,459	1304	82	285	(OP: HA6ZQ)
HA1YI	21	270,036	793	36	120	
HA9PP	14	597,922	2079	36	133	
*HG8C	A	289,536	606	70	186	(OP: HA8EK)
*HA8CQ	"	96,111	393	47	134	
*HA5OO	"	20,808	118	32	70	
*HGØR	21	436,755	1093	37	128	(OP: HAØNAR)
*HA5BSW	"	69,500	215	35	90	
*HA3DX	14	457,396	1440	39	125	(OP: HA4XH)
*HA6NW	"	32,676	292	20	64	

Iceland

TF3IG	A	7,840	111	21	59	
TF3AO	21	17,689	363	9	40	

Ireland

EIØA	21	258,672	1070	31	105	(OP: EI4GXB)
EI6JK	7	162,400	1035	24	92	
*EI7CC	A	304,545	663	62	195	
*EI2KC	"	55,836	268	33	108	
*EI4CF	21	220,500	687	35	112	

Isle of Man

MD2C	A	2,717,337	2743	131	450	(OP: MDØCCE)

Italy

II2S	A	2,252,178	2704	124	413	(OP: IZ2FOS)
IW2MZX	"	794,490	1681	77	296	
IK2SND	"	731,824	905	111	313	
IR3Z	"	695,398	1067	98	335	(OP: IN3XUG)
IZ1OSP	"	635,160	1110	101	301	
I3VJW	"	503,808	730	100	284	
IZ1JLN	"	407,322	705	87	255	
I1EIS	"	376,164	532	103	284	
IZ4ORO	"	356,480	832	81	239	
IK3VUU	"	343,416	642	81	247	
IK2EGL	"	303,750	764	73	197	
IZ2ODM	"	242,138	555	73	205	
IW3HXR	"	191,135	401	77	224	
IZ2AJE	"	144,088	498	51	166	
IK3SCB	"	116,610	549	42	127	
IC8POF	"	114,540	281	64	185	
IZ8FDG	"	102,666	436	39	103	
IZ5MXA	"	99,296	354	63	151	
IKØTUM	"	99,082	247	66	148	
IWØGYC	"	80,541	248	55	116	
IKØUTM	"	60,024	220	47	117	
IZ2KPI	"	31,152	136	43	89	
IV3JCC	"	30,820	90	57	77	
IZØEHL	"	29,468	128	37	69	
IWØSAF	"	24,200	137	45	76	
IZ3LSZ	"	18,156	95	35	54	
IZ2SNI	"	10,108	97	21	55	
IZØGYP	"	9,982	56	24	38	
IK2WPO	"	5,950	44	26	44	
IV3XZG	"	984	31	15	26	
IZ4MJP	28	13,167	102	17	46	
IK8TEO	"	3,026	36	13	21	
IR2M	21	504,495	1263	38	147	(OP: IZ2FDU)
IK4TVP	"	190,646	511	37	136	
II5W	"	141,816	377	36	116	(OP: IZ5DKG)
IV3UHL	"	110,240	385	35	95	
IO3T	"	97,300	389	33	107	(OP: IZ3ESV)
IK1ZNM	"	1,705	25	13	18	
IR8R	14	472,862	1780	39	130	(OP: IK8HCG)
I5FCK	7	128,832	773	29	93	
I1NVU	3.7	47,736	367	17	85	
*IK6OIN	A	490,912	828	84	284	
*IR8W	"	238,996	537	69	229	(OP: IK8YFU)
*IZ6NCN	"	132,239	445	51	172	
*IZ5RYG	"	127,451	298	62	171	
*IZ2KTF	"	86,104	306	46	142	
*IZ2NYY	"	44,238	196	39	107	
*IZ1NES	"	30,324	139	38	95	
*IZ5RLK	"	18,432	139	29	67	
*IZ1MHY	"	5,040	40	25	35	
*IZØLHL	"	780	13	8	12	
*IW1QN	21	181,104	527	38	116	
*I7CSB	"	48,160	205	30	82	
*IZ4AFW	14	4,545	72	11	34	
*IK4SPB	7	16,745	164	16	69	
*IKØXBX	1.8	15,190	252	9	53	

Kaliningrad

*UA2FT	A	2,484	29	16	20	

Latvia

YL6W	A	2,138,334	2270	131	412	(OP: YL2GD)
YL8M	"	82,344	247	59	160	(OP: YL2KL)
YL2PP	28	3,036	33	14	30	
YL2KO	21	783,372	1860	38	156	
YL2BJ	"	586,467	1422	38	151	
*YL3AGV	21	22,120	212	15	55	

Lithuania

LY5E	A	1,521,153	1777	110	367	(OP: LY2IJ)
LY2TS	"	156,562	519	49	162	
LY2CX	"	122,175	324	68	157	
LY3CY	"	112,665	495	36	149	
LY7M	"	86,580	392	39	146	
LY1R	28	40,850	315	22	73	
*LY2BVB	A	137,108	358	57	170	
*LY2SA	"	41,922	173	43	94	
*LY2RJ	"	22,500	112	34	56	
*LY4G	14	48,500	307	25	72	

Macedonia

Z35T	21	292,060	1015	37	133	
Z37M	14	322,000	1607	32	108	
Z36N	1.8	16,245	271	8	49	

Moldova

ERØWW	A	7,862,990	5830	167	599	(OP: UT5UDX)
*ER2RM	A	340,407	707	70	257	
*ER3ZZ	"	100,156	299	55	141	
*ER3DX	"	90,060	205	65	163	
*ER3CT	"	50,680	230	41	99	

Netherlands

PA3S	A	2,329,795	2470	116	375	
PA1T	"	1,140,048	1504	91	286	
PA3C	28	17,612	120	18	56	
PA5A	21	363,728	956	38	141	
PA3EWP	14	950,152	2411	40	148	
PA1AW	7	354,731	1657	39	130	
PA1BDO	3.7	99,828	885	16	78	
*PAØMIR	A	325,428	648	73	209	
*PG6EL	"	213,864	566	58	170	
*PD4DX	"	152,866	757	36	143	
*PE1FTV	"	106,590	455	38	152	
*PD7BZ	"	81,663	346	39	124	
*PE4BAS	"	81,346	295	50	128	
*PAØGRU	"	78,873	358	43	140	
*PE1KL	"	31,773	195	34	85	
*PA2A	"	1,064	29	9	19	
*PI4WLD	21	13,920	99	19	39	(OP: PAØMIR)
*PE1PKR	"	7,598	54	21	37	
*PA5F	14	54,468	363	23	79	

Northern Ireland

GI5K	A	752,313	1698	46	137	(OP: MIØLLL)
GI6K	14	1,139,776	3105	38	138	(OP: GIØKOW)
*MIØM	A	944,674	1704	71	260	(OP: MIØSAI)
*GI4SJQ	21	62,976	305	26	70	

Norway

LN3Z	A	3,649,344	2655	142	522	(OP: LA6YEA)
LN5O	"	1,000,730	1197	108	350	(OP: LA6FJA)
LA3BPA	"	283,509	533	79	210	
LA9TJA	"	210,786	643	55	203	
LA1BFA	"	85,491	248	49	158	
LA2XPA	3.7	70,785	377	25	96	

Poland

SO8A	A	4,669,086	3555	150	512	(OP: SP8BRQ)
SO6I	"	434,400	460	115	365	(OP: SP6JIU)
SO2W	"	257,823	521	68	175	
SP9LAS	"	231,575	533	68	227	
SO7A	"	194,177	439	70	207	(OP: SP7MOC)
SQ1DWS	"	4,320	41	19	35	
SP5ELA	"	2,025	30	15	30	
SP8HKT	"	990	17	14	16	
SP6PLH	"	891	24	12	21	
SQ6OU	"	672	12	12	12	
SO9Q	28	56,814	266	24	78	(OP: SP9QMP)
SP1NY	21	325,413	909	36	135	
SP1RKT	"	269,730	731	38	147	
SQ9HZM	"	252,154	669	37	129	
SP9W	"	93,744	312	36	90	
SN2J	"	30,324	98	38	76	(OP: SP2JMB)
SN2M	"	21,829	112	27	56	(OP: SP2XF)
SN8R	14	638,206	1825	39	142	(OP: SP8ONZ)
SP4TKR	7	403,176	1923	34	123	
SO8R	1.8	70,794	895	12	69	(OP: SQ8JLA)
SP1GZF	"	27,288	421	11	61	
*SP2EWQ	A	268,150	427	86	224	
*SO9G	"	129,888	502	50	148	(OP: SP9DTE)
*SP5BNB	"	100,989	232	71	158	
*SQ8LSC	"	99,552	301	54	129	
*SP6QNU	"	99,182	345	46	156	
*SP1MWN	"	96,073	354	49	142	
*SN7S	"	73,146	363	40	106	
*SP7SZW	"	68,908	382	33	128	
*SN4W	"	67,236	341	39	117	(OP: SP4ICP)
*SP8QED	"	38,350	197	36	94	
*SQ3RX	"	27,108	189	29	79	
*SQ7OTB	"	24,565	101	34	51	
*SP6FXY	"	24,440	100	44	60	
*SP6JQC	"	18,000	164	17	63	
*SQ3LMY	"	15,960	188	18	58	
*SP6IHE	"	5,070	39	29	36	
*SQ4OLP	"	1,485	25	13	20	
*SN1Z	"	1,040	14	12	14	(OP: SQ1EIX)
*SQ7MHN	"	1,008	14	12	12	
*SQ8JLN	"	130	6	5	5	
*SP5ES	"	6	1	1	1	
*SP3LWP	28	25,596	168	19	60	
*SQ8IFG	21	87,846	308	34	87	
*SP6ZC	"	66,759	214	34	85	
*HF2Ø1ØCY	"	5,616	66	16	32	(OP: SP5ES)
*SN3C	14	117,859	412	35	114	(OP: SP3ASN)
*SP4DZT	"	112,592	577	27	97	
*SP5AUY	7	58,191	290	28	91	
*SN9Y	"	4,074	85	7	35	(OP: SP9UOP)
*SQ8JX	3.7	27,580	385	9	61	
*SP8LBK	"	16,317	271	9	54	

Portugal

CT2IPG	A	260,760	559	64	182	
CT1ETW	"	6,384	72	21	55	
CT1EAT	"	3,604	39	16	18	
CT1BOL	28	23,718	172	17	50	
CT1FJL	21	167,118	660	33	105	
CT1ETX	14	146,418	684	30	108	
*CT1HMN	A	281,488	610	61	180	
*CT2CRP	"	78,715	326	42	131	
*CT1AOZ	28	23,732	128	19	49	
*CT2IVH	"	12,906	101	16	38	
*CT2JBG	7	25,353	212	15	66	

Romania

YO9HP	A	3,542,022	3459	143	460	
YO3APJ	"	1,334,275	1764	107	368	
YO4DW	"	617,335	1253	85	226	
YR9F	"	338,250	616	81	249	(OP: YO9FNP)
YO8WW	"	175,845	349	88	197	
YRØR	"	167,968	515	53	128	(OP: YO3HKW)
YO2II	"	19,008	215	13	59	
YO2RR	21	191,018	600	35	114	
YO7DAA	"	173,901	628	36	111	
YQ6A	"	2,211	24	15	18	(OP: YO6BHN)
YR5N	1.8	26,964	407	9	54	(OP: YO5PBF)
*YO5Q	A	472,474	1017	73	264	(OP: YO5OHO)
*YO9DL	"	157,176	510	51	171	
*YO2LXW	"	48,042	222	45	112	
*YO6PIR	"	4,389	63	16	41	
*YO2AOB	28	22,278	148	20	59	
*YO4ATW	"	12,480	100	22	38	
*YO8KGA	21	477,192	1327	38	139	(OP: YO4RIU)
*YO9BXC	"	12,540	103	19	41	
*YO9CWY	14	40,662	366	16	65	
*YO3CVG	"	19,564	194	13	54	
*YO6OHS	"	11,484	167	15	51	
*YO5OAG	"	10,500	150	8	42	
*YO2AQB	1.8	2,135	79	4	31	

Sardinia

ISØIEK	7	400	14	7	13	

Scotland

MM3T	28	21,528	256	14	55	(OP: GMØELP)
*2MØETR	14	17,928	199	13	59	

Serbia

YT7R	A	2,248,305	2595	125	430	(OP: YU7BW)
YT5N	"	24,738	219	38	95	(OP: YU7AF)
YTØI	"	6,136	86	16	43	
YTØZ	21	916,146	2029	39	159	(OP: YU1ZZ)
YU5A	"	860,280	1808	40	161	(OP: YU1EW)
YT7Z	"	443,839	1265	38	119	(OP: YU7SK)
YT5A	14	649,590	2217	38	139	(OP: YT3W)
YTØW	"	625,650	2397	35	115	(OP: YU1JW)
YTØA	"	253,032	1024	36	120	
YT7W	"	245,168	969	36	118	
YUØT	7	731,916	2856	37	125	(OP: YU1WS)
YT1VP	"	557,430	2117	36	134	
*YU2A	A	2,516,631	2690	117	402	
*YT9A	"	2,188,041	2095	127	452	
*YT7TA	"	12,782	70	33	50	
*YUØU	28	3,003	47	10	23	
*YT2B	"	1,431	46	7	20	

Sicily

IT9FGA	A	1,925	21	14	21	
IU9X	28	74,774	361	30	79	(OP: IT9SPB)
IT9XTP	21	224,718	928	32	102	
IR9P	7	49,068	401	18	76	(OP: IW9HMQ)
*IT9DFI	A	87,168	280	51	141	

Slovakia

OM8LA	A	164,672	488	60	188	
OM3PC	21	847,656	1916	39	154	
OM3DX	"	58,448	232	30	74	
OM7M	14	695,352	2048	38	130	(OP: OK2BFN)
OM4MM	3.7	58,820	616	13	72	
*OM3NI	A	102,476	378	44	143	
*OM5UM	"	41,890	265	33	109	
*OM7YC	"	21,631	161	28	69	
*OM3ZBG	"	5,481	94	18	45	

Slovenia

S58M	A	2,448,516	2814	126	440	
S53M	"	1,564,500	1641	107	340	(OP: S53ZO)
S56A	"	1,304,546	1195	127	451	
S54O	"	68,952	335	38	118	
S5ØR	21	617,526	1413	39	143	
S5ØK	14	1,063,728	2932	38	140	
S51NM	"	10,304	79	16	40	
S56X	7	435,183	2060	36	123	
S51CK	"	308,980	1839	30	110	
S56P	1.8	124,896	1138	16	80	
*S59AA	A	417,197	550	95	296	
*S52DK	"	351,900	706	71	205	
*S53F	"	300,048	612	75	261	
*S57AD	"	31,553	238	26	113	
*S57EA	"	17,888	118	31	73	
*S51D	7	121,240	591	31	109	

Spain

EA5BY	A	1,494,763	1442	122	447	
EA1IR	"	847,242	1485	94	269	
EA7RU	"	830,718	1108	82	265	
ED4A	"	566,835	1037	84	261	(OP: EA4TV)
EA1PP	"	414,596	783	71	197	
EE3R	"	342,576	456	97	254	(OP: EA3OR)
EA4ETW	"	322,301	548	86	201	
EA1BLA	"	243,366	493	74	208	
EA1CDI	"	48,416	179	47	89	
EA3AR	"	40,112	216	26	66	
EA1AW	"	37,990	169	44	101	
EA4WL	"	6,783	62	16	41	
EA4DEC	"	5,520	36	27	33	
EH7Z	28	27,150	210	21	54	(OP: EA7ZY)
EA3DW	"	19,516	145	20	48	
EA1AAE	"	14,592	107	21	43	
EA1BFZ	"	528	11	6	10	
AM1Q	21	445,055	1297	39	128	(OP: EA1QA)
EE5J	"	133,181	652	23	74	(OP: EA5YJ)
EA4DW	"	63,999	247	35	82	
AN5E	"	47,975	304	23	72	(OP: EA5HAB)
EA7LL	7	471,450	1765	36	114	
EE3E	"	225,736	1107	32	107	(OP: EA3ELZ)
EA3ATM	"	144,774	861	31	95	
EA7KB	"	97,163	513	26	95	
EF7W	3.7	60,900	503	18	87	(OP: EC7KW)
ED5J	"	6,780	99	10	50	(OP: EA5DM)
*EF1W	A	880,032	1580	77	232	(OP: EA1WS)
*EA2NN	"	658,260	1101	73	192	
*EA2WD	"	201,710	540	57	173	
*EA2BNU	"	142,303	349	59	144	
*EA5DKU	"	141,056	324	68	164	
*EA1JK	"	109,158	351	50	111	
*EA5XA	"	75,218	219	48	95	
*EB3FLY	"	55,728	239	43	101	
*EA4SG	"	54,612	179	48	100	
*EA1EA	"	53,259	173	43	80	
*ED1J	"	38,969	200	35	98	(OP: EA1GPL)
*EA2CE	"	32,536	170	27	71	
*EA1GHT	"	32,248	139	38	101	
*EB3JT	"	31,034	130	41	77	
*EA7HE	"	25,984	161	31	85	
*EA3GOD	"	19,888	112	29	59	
*EH2E	"	8,580	77	20	46	(OP: EA2DCF)
*EA4EQK	"	2,982	48	12	30	
*EA5YJ	"	98	6	2	5	
*EA7JB	28	21,384	135	19	53	
*EC4CBZ	"	17,920	156	18	46	
*AO3A	21	260,286	928	36	105	(OP: EA3GXJ)
*EA3NO	"	84,720	306	32	88	
*EA1YG	"	65,538	348	25	74	
*EA3KN	"	64,749	248	30	83	
*EA2KP	14	14,885	122	17	48	
*EA3BO	"	222	16	3	3	
*EE5W	7	23,331	210	17	60	

Sweden

SM2EKM	A	446,790	834	81	200	
SM5F	"	326,898	1108	55	199	(OP: SA5BJM)
SM7E	"	228,464	583	66	196	(OP: SM7BHM)
SM5QU	"	6,270	62	23	32	
7S2E	"	3,150	58	14	36	(OP: SM2DMU)
SM5CEU	21	212,190	570	38	127	
SA1A	"	1,040	20	11	15	(OP: SM1TDE)
8SØC	14	390,052	1205	38	131	(OP: SMØMPV)
SF7WT	"	68,370	258	29	100	
SM5T	"	50,787	366	22	77	(OP: SM5TSP)
*SM5D	A	501,468	923	77	271	(OP: SM5DJZ)
*SA3V	"	229,158	587	62	199	(OP: SA3ARL)
*SM6MVE	"	84,252	344	42	135	
*SM6BSK	"	73,305	298	40	141	
*SM5IMO	"	51,000	201	37	88	
*SE5S	"	38,458	194	40	94	
*SI5S	"	19,895	129	33	82	(OP: SM5NVF)
*SM5CNQ	"	19,539	137	28	89	
*SC3A	3.7	962	37	5	21	(OP: SM3WMU)

Switzerland

HB9FBS	7	115,522	735	24	94	

Ukraine

UW5ZM	A	2,352,165	2837	127	446	
UWØK	"	1,088,199	1285	112	371	(OP: USØKW)
UR5E	"	234,837	627	64	205	(OP: UR5EDX)
UT7EZ	"	165,015	324	77	116	
UXØFF	"	140,118	347	70	172	
UR5EPG	"	108,575	303	61	154	
UT2M	"	102,476	505	48	139	(OP: UR2ML)
UT1AA	"	88,510	336	43	124	
US3IZ	"	87,636	278	53	148	
UV7QA	"	87,236	263	60	166	
UU2JQ	"	69,536	184	54	110	
UT2IW	"	41,580	150	47	93	
UTØCK	"	37,380	218	31	109	
UT3WX	"	15,264	152	21	75	
UT3UA	"	7,872	50	27	37	
UT3N	"	4,898	46	26	36	(OP: UT3NK)
UT7MW	28	54,815	409	22	73	
UZ5Q	"	5,104	64	14	30	(OP: UY5QZ)
UU7J	21	457,794	1663	37	137	(OP: UU1AZ)
UT8LN	"	280,896	857	38	138	
UR6IJ	"	107,569	427	32	89	
UT7E	14	335,550	1751	35	115	(OP: UV5EOZ)
UY4WWA	"	97,416	458	31	101	(OP: UR5WMM)
UW1M	7	816,525	2805	38	133	(OP: UR5MW)
UU9CW	"	167,702	873	32	110	
UU1AZ	"	28,314	315	19	59	
UX2X	3.7	213,250	1425	27	98	(OP: UT2XQ)
UW5U	"	187,880	1376	26	96	
UW9L	"	43,932	459	16	68	(OP: UT5LO)
UX7LL	"	440	15	7	15	
UR5AS	1.8	52,548	600	16	71	
*UT2IO	A	263,934	678	66	213	
*UR6MX	"	155,448	347	47	157	
*UT8EL	"	138,645	399	59	178	
*US7LM	"	117,943	346	51	152	
*US4IQS	"	75,816	288	39	117	
*UU2J	"	43,992	186	38	103	(OP: UU5JIB)
*UTØEA	"	42,185	134	47	96	
*UW7CN	"	33,320	132	41	78	
*UY7M	"	6,816	66	26	45	
*UT6LX	"	2,976	27	21	27	
*UX3IO	"	2,480	25	17	23	
*US4IPQ	"	754	14	13	13	
*URØEG	"	476	23	6	11	
*UT4UGJ	"	400	15	8	12	
*UT2IV	21	92,720	447	31	91	
*UT2AB	"	9,936	83	20	49	
*UT7Y	14	193,893	811	35	112	(OP: USØYW)
*UT7QL	"	129,336	617	35	101	
*US7IM	"	10,476	132	9	45	
*UY7C	7	92,352	617	27	84	
*UT3SA	3.7	57,318	705	14	68	
*UT2UU	1.8	2,656	82	6	26	

Wales

GW9T	A	4,398,070	3551	134	497	(OP: MWØZZK)
MWØJRX	14	359,682	1667	34	117	
GW4OH	"	352,872	1336	36	120	(OP: MWØJZE)
*MWØMAU	A	3,481	58	15	44	

OCEANIA

Australia

VK7XX	A	116,725	282	55	106	
VK3FM	"	63,720	208	43	75	
VK4NEF	"	11,648	141	14	18	
*VK4LDX	A	299,250	576	72	118	
*VK1OO	"	20,800	116	32	48	
*VK6DXI	"	1,380	29	8	12	
*VK4EJ	21	85,170	364	25	60	

East Malaysia

9M6LSC	A	1,705,312	1910	111	211	

French Polynesia

FO8RZ	A	2,758,312	2946	124	222	

Guam

NH2T	A	2,448,207	2143	143	274	(OP: N2NL)

Hawaii

KH7B	28	15,238	173	14	24	
*NH7RO	28	5,850	68	14	25	
*NH7FY	21	22,743	155	24	39	

Indonesia

YBØBCU	A	19,602	114	46	75	
YBØMWM	14	31,185	171	21	56	
*YC6JRT	A	133,293	319	54	103	
*YCØOHG	28	1,209	26	13	18	
*YBØNFL	7	7,310	69	18	25	
*YDØOXA	"	2,310	30	17	18	
*YB2UTX	3.7	330	20	6	9	

New Zealand

ZL1T	A	593,888	854	93	184	(OP: ZL1ANH)
ZL1BIV	"	44,387	172	41	78	
ZL3PAH	7	6,314	59	17	24	
*ZL3GA	A	4,750	45	21	29	
*ZL3TE	21	139,196	565	26	63	(OP: W3SE)

Philippines

DU1IVT	A	801,588	1474	73	128	
DU1AV	"	564,928	1251	75	107	
DU1EV	3.7	555	16	6	9	
*DU7RH	28	5,406	110	8	9	

SOUTH AMERICA

Antarctica

*8J1RL	14	233,040	752	32	88	(OP: JE5XYT)

Argentina

LU6QI	A	575	14	10	13	
LR2F	28	694,056	2092	28	93	(OP: LU2FA)
LU7HN	"	659,061	1904	30	101	
LU4DX	"	487,432	1501	26	90	
LW3EWZ	7	39,338	199	30	59	
*AYØDX	A	893,964	1260	92	184	(OP: LU3DR)

*LR4E	28	296,846	1078	25	78
			(OP: LW4EU)		
*LT4S	*	185,565	933	26	63
			(OP: LU8SAN)		
*LU7YZ	*	130,385	594	25	64
*LU7HZ	*	94,146	493	24	54
*LU3JVO	*	64,294	382	21	40
*LW5EAE	*	51,578	316	23	51
*LU7CAW	*	5,808	50	15	33
Aruba					
P4ØP	14	595,136	1572	32	104
			(OP: W5AJ)		
*P4/W5AJ	1.8	170	8	3	7
			(OP: W5AJ)		
Brazil					
PY1NB	A	5,558,720	3425	142	438
ZX2B	"	5,533,276	3720	132	386
			(OP: PY2MNL)		
PV2P	*	1,944,972	2117	103	245
			(OP: PY2DY)		
PP1CZ	*	1,847,043	2314	85	212
ZY2C	*	1,555,188	1619	104	257
			(OP: PY2ADR)		
ZV2K	*	795,981	1074	99	204
			(OP: PY2SHF)		
PS2S	*	222,185	541	60	125
PY5KA	*	77,490	342	38	52
PY3PA	*	51,555	217	51	54
PY2LGR	*	14,274	82	30	48
ZV2V	21	461,630	1286	33	97
			(OP: PY2LED)		
PY2NZ	*	341,125	1017	31	94
PY5RB	*	88,576	283	32	96
PR7AR	14	345,054	1058	34	97
PY7ZY	*	184,287	454	36	105
PT5T	7	637,604	1355	40	132
PR7DZ	*	144,531	558	26	75
PY5QW	3.7	1,104	51	11	13
*PY2SEX	A	2,430,330	2085	126	300
*PX2T	*	611,800	1313	48	127
			(OP: PY2DN)		
*PY2VM	*	316,404	727	64	124
*PY2SE	*	172,368	602	45	67
*PY2VZ	*	112,480	353	54	94
*PP2RON	*	32,076	137	35	64
*PY2LCD	*	17,340	173	28	40
*PY2DEZ	*	12,450	107	33	42
*PY4XX	*	12,432	115	38	46
*PY2ZY	28	155,040	797	22	54
*PU1KGG	*	113,040	494	26	64
*PY2IML	*	10,780	135	16	39
*PY2LUC	*	2,280	44	16	22
*PU4HUD	*	700	36	7	7
*PY2TIM	21	311,780	952	29	90
*PY4EK	*	57,904	297	25	63
*PY2VRZ	*	2,160	63	13	17
Chile					
CE1TT	A	1,210,352	2023	80	173
Trinidad & Tobago					
9Y4D	28	498,944	1516	29	99
9Y4W	21	1,376,970	3094	34	124
Venezuela					
YV5LI	28	55,610	390	22	45
YW5T	21	1,023,705	2723	32	103
			(OP: YV5JBI)		
*YY7OMF	21	89,725	390	31	66

QRP ASSISTED

RW3AI	A	222,952	641	53	195
HA7YS	"	190,384	422	76	216
SO8T	"	90,093	397	39	138
			(OP: SP8TJU)		
PU5ATX	"	75,033	512	21	42
HA7VK	"	36,822	170	39	75
JA1KEB	"	3,784	35	19	25
EA4FH	"	1,681	35	13	28
VU2LYX	28	8,823	74	14	37
			(OP: VU2UR)		
HA6NN	"	420	15	5	10
PY2XC	"	15	4	2	3
4L6QC	21	76,807	323	21	68
SV1NK	"	32,376	226	24	52
VU2UR	"	7,644	76	17	35
HG1X	14	38,556	301	20	64
			(OP: HA1RS)		
IZ5IIN	"	30,324	299	17	59
IZ3IBL	*	14,446	136	15	47
US4IRT	"	63	5	4	5
HG1DX	7	122,590	894	23	92
			(OP: HA1XR)		
SQ7FPD	"	25,038	289	15	63
UT3L	"	20,382	203	15	64
			(OP: UR5LO)		
IZ1DGG	"	14,691	233	9	50
YU1XX	"	3,960	50	13	31
JF2MBF	3.7	1,248	26	9	15
HA8BE	1.8	14,896	255	7	49
OH3BU	"	2,516	79	5	29

MULTI-OPERATOR SINGLE TRANSMITTER NORTH AMERICA

United States

K1LZ	10,193,630	4752	172	625
K5ZD/1	6,622,287	3577	158	521
W1QK	830,672	790	94	292
KA1IOR	770,445	824	85	266
NM1C	94,488	207	56	130
K2Z	2,416,168	2080	114	358
NN2W	1,791,275	1384	124	399
K2OAK	172,020	306	60	175
W3BGN	5,343,624	2831	161	531
K9RS/3	4,475,478	2540	161	517
W3MF	2,367,488	1592	132	412
W3EC	419,760	514	82	236
W3PA	363,448	502	51	200
W3LJ	101,244	235	54	123
K3OQ	23,040	119	28	68
K3PRC	3,479	32	22	27
N4RV	3,069,550	2057	133	417
K5KG/4	2,475,856	1854	128	414
AD4ES	1,834,487	1346	130	397
W4ZR	1,352,337	1026	122	375
W4NC	1,128,048	991	108	318
W2HTI/4	396,274	493	102	245
W4EEQ	22,506	98	31	62
W4UVA	22,272	99	32	64
N5DX	5,406,882	3371	160	513
N2IC/5	5,137,170	3057	166	488
K5NA	4,173,048	2460	173	553
N5YA	929,919	937	107	294
K9MBB/5	490,893	607	84	223
W5RTA	106,560	347	66	114
K6IDX	2,708,328	1748	153	435
W6LH	915,343	835	118	289
NX6T	675,816	862	105	243
KH6SP/W5	443,136	502	114	270
W6KA	167,280	383	77	128
W6YRA	45,600	183	47	67
N6EP	33,210	156	31	51
K7RL	3,135,383	2325	151	378
W7VJ	2,091,408	1783	137	329
N7VM	1,081,698	1245	128	289
N6LO/7	729,011	901	101	222
W7TVC	392,329	537	96	191
KG7C	148,604	309	62	132
K7UN	75,544	228	55	87
K8AZ	4,175,850	2287	161	518
WC5B/8	7,259	75	26	35
KD9ST	1,898,600	1307	141	409
KC9ARR	251,340	410	64	172
K9WJU	235,986	453	65	157
NØNI	4,091,373	2421	165	498
WØMA	565,160	599	99	256
KDØS	356,365	518	74	189
KØJDD	272,384	422	80	186

Alaska

KL7/NØHJZ	755,058	1904	62	121
KL5DX	236,232	621	58	95
KL7AIR	225,784	561	58	109

Antigua & Barbuda

V26B	13,060,125	7649	159	546

Bermuda

AA4V/VP9	4,461,691	4184	111	346

Canada

VO1TA	2,101,920	2948	80	222
VE9MY	870,052	729	99	344
VC2Z	1,478,280	1484	92	289
VA2TG	835,632	1472	64	188
VE2QAU	10,626	107	26	43
VE2CSL	5,395	41	28	37
VE3EJ	12,533,386	6011	180	641
VE3RZ	3,202,905	2472	134	421
VE3GYL	48,300	184	46	69
VC6A	3,782,844	3115	141	390
VE6AO	683,550	1471	62	155
VE7SZ	2,303,910	2959	121	257
VE7NA	82,368	259	56	88
VE8EV	1,405,228	2021	98	195

Costa Rica

TI5N	2,807,484	3932	109	263

Honduras

HQ2W	1,333,071	2185	81	210

Mexico

4B2AUD	38,740	291	30	35

Turks & Caicos

VP5DX	6,879,570	4924	144	501

U.S. Virgin Islands

NP2B	7,952,888	6034	136	435
NP2KW	1,312,360	2244	82	198

AFRICA

Botswana

A25HQ	2,138,500	2421	80	249

Cape Verde

D4C	22,812,320	8787	191	729

Ceuta and Melilla

EF9K	2,176,434	2004	93	300

Madeira Islands

CQ9T	12,355,194	6691	141	537
CQ3L	5,772,195	3472	133	452

Mozambique

C91WW	5,988,862	4413	119	359

ASIA

Asiatic Russia

RF9C	5,790,200	3417	144	511
UA9UZZ	2,874,088	2449	119	357
RK9JWW	1,851,256	1771	107	329
RK9CYA	1,367,271	1394	83	304
RK9XWA	861,942	1149	70	221
RN9S	670,145	894	70	217
RZ9WXK	310,479	578	58	189
RK9SWF	121,448	371	39	113
RZ9UWD	77,682	298	33	88
RTØC	4,834,242	4159	158	364
RWØA	4,833,634	3423	138	460
RKØLWW	58,660	219	62	78
RKØSXR	28,080	172	28	62

Asiatic Turkey

TA7KA	4,133,025	3397	100	371

China

BY4QA	1,041,896	1624	99	227
BT4EXPO	1,040,266	1922	103	223
BY8AC	1,020,704	1486	95	239
B5A	971,268	1473	103	245
BY6IC	606,600	1123	89	211
B7M	591,105	1262	79	172
BY3CQ	456,909	1060	91	198
B4TB	379,816	836	87	154
BY1OK	315,222	872	69	145
BY8CN	253,045	652	72	149
BY1SK	65,394	297	45	81
BD4TS	46,151	209	54	79
BG4UNB	11,280	126	26	54

Cyprus

P33W	19,267,610	7776	185	705
P39P	82,635	283	22	83

Japan

JA1YPA	777,170	1054	95	215
JE1YEM	85,888	284	52	76
JI2ZJS	3,322,053	3052	133	308
JI2ZEY	1,468,324	1686	123	251
JA2ZJW	305,440	757	57	109
JJ3YBB	353,800	665	92	152
JE7YSS	72,772	291	28	64

Kazakhstan

UO5L	3,876,930	2980	112	386
UP9L	1,423,290	1396	97	321

Kuwait

9K2HN	10,413,450	5365	162	568

United Arab Emirates

A62ER	341,620	1126	26	90
A61BM	162,900	372	67	158

West Malaysia

9M2SMC	276,230	663	76	154

EUROPE

Belarus

EW8ZO	77,441	344	48	113
EW8ZZ	6,424	75	26	47

Belgium

OP4K	2,713,880	2288	136	478
ON6BR	1,179,647	2294	93	298
OO7W	240,195	832	52	187

Bosnia-Herzegovina

E7DX	12,185,136	6992	184	704
E73ESP	410,575	1396	56	219

Bulgaria

LZ5R	4,705,855	4125	156	563
LZ4RR	2,321,487	3729	111	386
LZ4TL	1,587,168	1728	139	455
LZ6W	52,395	346	25	80

Croatia

9A3B	3,746,914	3486	138	515
9A3W	483,718	924	79	268

Czech Republic

OK5W	9,346,257	5291	178	653
OK2KOJ	978,365	1297	94	325
OL2A	555,777	940	82	251
OK2RRR	247,852	1462	27	104
OL2U	195,048	608	57	195
OK5SWL	1,406	29	11	26

Denmark

OZ7A	3,642,688	3594	140	518
5Q2J	493,164	1083	84	258
OZØW	228,904	732	57	191

England

G6PZ	6,877,350	4295	169	596
M2A	2,235,296	3082	99	377
G3B	1,262,437	1617	108	365
G5FZ	918,660	2316	70	235
M4U	818,640	1611	77	283
G1T	373,353	890	61	230
G3YNN	139,230	437	51	159
2EØNLK	25,400	255	26	101

Estonia

ES5YG	6,486	138	9	38

European Russia

RU1A	10,069,460	6045	194	696
RL3A	9,436,520	6308	190	687
RT6A	6,388,126	4945	179	644
RM5A	3,744,072	3570	154	544
RT3F	3,331,332	3248	144	522
RC3W	2,205,720	2931	127	430
RZ4CWW	2,199,161	2520	132	475
RG6G	2,157,718	2606	141	481
R3GZ	1,891,744	2447	119	377
RM3Q	1,223,068	1886	108	376
RT4F	752,128	1550	60	196
RN3T	720,762	1075	94	299
RK3VWA	583,695	1094	83	274
UD3D	523,940	1255	81	254
RK4HYT	291,375	692	70	245
RZ1AWZ	38,092	312	29	78
RF4M	30,330	269	26	64

Faroe Islands

OY6A	1,765,296	3064	92	376

Finland

OG1M	3,746,120	3019	154	526
OH6K	489,920	913	81	239
OG5B	487,188	1494	37	119
OH2BAH	178,164	500	60	142

France

TM2Y	6,213,984	4084	168	616
TM2B	5,825,376	4285	151	565
TM2S	1,437,816	2006	122	434
TM2T	1,134,189	1720	117	342
F8KGH	793,155	1601	86	259
F8CNX	347,334	775	67	152
TM5KD	252,216	2017	25	99
F6KMB	197,620	677	55	186
F5KAR	159,174	552	57	182

Germany

DLØDEF	1,714,704	1825	121	435
DR2W	1,657,566	2309	97	329
DL1WA	1,417,961	1541	120	421
DJØA	1,228,460	1267	114	364
DM5T	1,038,312	1331	113	393
DL1QW	811,072	882	104	360
DL2AGB	673,260	1620	65	229
DK1M	664,092	1092	94	302
DLØIL	607,752	1275	81	286
DM7C	560,865	977	94	323
DFØDA	510,864	975	78	289
DKØHF	334,464	714	73	195
DP9I	269,136	688	65	187
DKØALK	199,320	418	60	160
DKØRX	194,307	526	60	179
DR2P	94,050	378	52	173
DK5QN	86,020	465	26	89
DR4O	28,884	185	35	81
DKØGYB	28,336	283	34	120

Greece

SX1L	1,959,594	2535	120	426
SZ8L	132,300	892	43	132

Hungary

HG6N	8,035,965	5066	169	620
HG1Z	1,793,890	2248	124	399

Ireland

EIØW	823,880	1483	93	337

Isle of Man

GDØAMD	34,146	258	25	101

Italy

IR4M	8,100,928	4804	174	640
IR2C	7,867,286	4915	168	623
IO5O	6,802,848	4335	157	579
IQ1RY	3,402,603	2857	147	510
IW2LLH	1,945,152	2164	129	447
IQ4RN	1,918,103	2709	105	346
IR6T	1,689,225	1712	118	387
IQ3GO	1,226,556	1749	107	385
II5P	1,138,005	1931	93	270
IQ2MG	1,056,998	1599	102	341
I7PHH	1,015,959	1543	112	367
IR3Y	1,005,771	1370	108	373
IQ1NO	370,566	1018	70	236
IR1I	294,000	617	64	216
IZ5HPQ	146,400	398	69	171
IQØCV	51,100	247	38	108
IQ8CS	33,976	262	31	106

Jersey

GJ2A	1,338,531	1744	94	343

Kaliningrad

RW2F	8,156,016	5222	177	659

Latvia

YL7X	2,381,427	3091	125	454
YL1S	191,520	358	80	208
YL1XN	124,200	590	41	166

Lithuania

LY9Y	4,748,594	4070	152	570

Netherlands

PA6V	1,011,840	1437	106	359
PA5W	171,360	443	58	166

Northern Ireland

GI7AXB	563,856	1254	62	210

Norway

LN8W	4,889,760	3745	153	579
LN9Z	3,844,243	4217	124	435
LA3BKT	184,450	623	45	110

Poland

SN3R	8,292,180	5299	167	613
SN6Z	2,836,638	2609	137	521
SQ2ØØFC	363,080	1008	73	217
SN7H	361,790	911	68	231
SN9ØHRS	273,702	732	66	220
SO8N	22,834	133	36	62
SP9PKS	1,014	27	9	17

Portugal

CS2P	1,644,148	2186	109	375
CT1DWT	1,326,564	2145	77	269
CR5L	486,420	734	92	271
CR5R	396,583	774	80	261

Romania

YP7P	1,505,028	2458	115	368
YO5KUC	245,349	778	59	174
YR2X	240,975	887	48	177
YR2U	24,780	161	29	76

Scotland

GM3W	1,978,986	2174	101	353
GM7A	648,024	1008	86	317
GM4AGG	137,655	514	46	161

Serbia

YU5R	3,604,900	3443	143	507
YT6T	1,928,160	2675	113	407
YU3ZA	765,611	1160	100	327

Sicily

IU9T	7,450,245	5132	174	609
IF9A	1,875,696	2554	124	428
IT9HBT	1,145,592	1699	123	381
IW9BCW	230,994	640	61	185

Slovakia

OM8A	10,701,680	6143	190	690
OM5M	2,973,125	3036	133	492
OM3RRC	442,050	992	81	269
OM3KWZ	32,890	263	29	81

Slovenia

S51A	3,975,484	3453	154	570
S54K	758,500	1418	94	316
S59T	2,220	42	8	22

Spain

ED5T	7,337,792	4861	155	549
ED1R	6,045,819	4427	162	579
AM3SSB	5,217,100	3629	154	571
AN5C	1,841,100	2534	114	361
EA5GI	1,590,966	2092	123	384
EA3HCY	1,014,045	1696	83	252
AM5B	796,023	1029	95	272
AM1T	346,276	768	72	226
AO2W	332,656	742	70	202
EA4RCT	224,458	1030	49	145
EA5EA	222,028	1257	24	70
AO2A	169,692	574	52	185
EA1URO	133,906	454	43	99

Svalbard

JW5E	2,082,600	2149	116	329

Sweden

SI9AM	1,232,007	2766	76	281
SK7OA	955,626	1716	85	288
SK6HD	63,441	308	37	122
SCØUT	56,250	339	32	118
SK7A	14,420	119	22	48

Switzerland

HB9H	3,311,550	2897	152	523
HB9EE	1,136,220	2326	93	342
HB9OK	695,400	1395	86	294
HB9TYJ	628,942	1054	81	233
HB9LL	188,370	517	65	208

Ukraine

UZ2M	9,498,524	6765	183	685
EM7L	3,079,576	2759	161	537
UTØAZA	1,607,398	2806	90	332
UZ1I	415,008	880	77	275
UU4JYM	228,112	775	56	213
UU5A	137,280	426	59	181
UR4PWC	20,895	190	28	77
UT7AXA	1,196	38	8	18

OCEANIA

Australia

VK6NC	2,680,507	2478	117	304
VK2GGC	181,170	443	64	101

Guam

AH2R	5,640,882	3972	143	364

Hawaii

KH6MB	5,346,695	4421	149	288

Indonesia

YB1C	682,378	1000	80	191
YE1ZAL	27,962	148	24	58

Micronesia

V6B	804,650	1400	86	123

New Zealand

ZL3M	296,650	696	57	113

Philippines

DX1M	1,275,080	1924	80	171
DX1ACE	93,250	309	48	77
DX33CA	10,586	99	26	41

SOUTH AMERICA

Argentina

LS1D	5,484,882	4186	134	360
LU1MA	3,650,352	3001	120	332
LU1UM	2,336,322	2447	113	254
LO7H	1,532,330	1865	100	210
LOØH	935,550	1509	83	160
L73D	864,396	1439	76	158
L25X	248,162	687	49	118
LT5D	246,915	610	69	108
LU1YY	127,334	726	63	135
LQ4D	34,831	289	22	39

Aruba

P49Y	14,084,807	7489	159	500

Bonaire

PJ4X	13,529,100	7302	161	489

Brazil

PS2T	10,737,792	5252	171	546
ZW5B	9,109,232	4989	167	542
PQ5B	6,709,266	4737	140	382
PW2D	6,380,389	4570	141	386
PT2CM	3,827,276	3408	125	324
ZW8T	997,992	1537	70	179
PR5A	116,450	321	60	110

Chile

CE3G	2,903,404	2790	119	269
XR8T	832,833	1705	57	126
CE3W	803,430	1388	86	151

Paraguay

ZP8VAO	664,785	1111	80	157

Uruguay

CW5W	6,484,156	3836	161	470

MULTI-OPERATOR TWO TRANSMITTER NORTH AMERICA

United States

KC1XX	15,936,950	7007	181	660
K1RX	8,246,080	4695	157	549
KB1H	5,402,656	3178	141	482
KØTV/1	3,920,127	2392	143	476
W1NA	3,304,512	2224	134	442
W1DX	3,164,850	2125	136	449
K1KP	3,162,786	2268	122	397
K2LE	4,850,285	2969	141	464
K2AX	3,716,229	2218	144	483
W2YC	2,785,258	1790	135	451
W2CG	2,001,825	1418	125	400
WE3C	10,991,044	5077	181	618
N3RS	9,490,192	4912	167	557
W3CC	2,164,448	1418	138	421
WA3EKL	1,805,168	1423	124	390
NQ4I	6,342,264	3784	166	542
W4RM	5,692,212	3483	154	485
N1LN/4	5,236,224	3173	162	510
N4YT	125,649	290	63	144
W5RU	2,472,155	1590	146	435
N5RZ	1,455,762	1447	113	298
K5MDX	1,091,128	1053	122	330
KB5MZ	292,236	526	86	198
AD5OW	48,180	149	59	87
W6YX	2,831,387	2358	146	357
NK7U	6,529,756	4294	161	461
N7AT	2,385,772	1993	143	381
N7BT	2,066,922	1906	129	309
W7RN	1,697,394	1489	132	342

W8BI	**700,138**	**743**	**107**	**287**
KC8IMB	220,340	403	68	162
NØIJ/9	**2,398,284**	**1711**	**143**	**415**
KTØR	**1,500,884**	**1348**	**112**	**331**
NØMA	755,200	714	104	296
KØGEO	677,707	783	87	250
Belize				
V31BD	**4,213,343**	**5151**	**97**	**282**
Canada				
VE9ML	**776,424**	**927**	**86**	**260**
VE2DXY	**1,320,359**	**2028**	**83**	**248**
VE3RM	**3,258,450**	**3010**	**113**	**337**
VE3MIS	2,592,632	2428	119	350
VE3DC	660,804	1674	66	146
VE6FI	**3,526,352**	**3914**	**121**	**312**
VE7SV	**6,256,017**	**5120**	**140**	**387**
VE7GL	3,649,434	3752	128	315
VE7SCC	312,223	1247	55	82
Costa Rica				
TIØRC	**5,059,478**	**5168**	**123**	**344**
AFRICA				
Madeira Islands				
CR3A	**32,470,760**	**12739**	**185**	**705**
Morocco				
CN3A	**33,320,736**	**12754**	**185**	**726**
Seychelles				
S79K	**13,495,020**	**6850**	**154**	**536**
South Africa				
ZS9X	**7,479,420**	**4936**	**143**	**416**
ASIA				
Asiatic Russia				
RZØWWA	**788,385**	**1132**	**80**	**231**
China				
B1Z	**3,373,374**	**3639**	**130**	**336**
BY4IB	22,950	166	37	48
Japan				
JF2ZPA	24,250	119	33	64
EUROPE				
Austria				
OE5T	**1,438,815**	**2198**	**91**	**264**
Belgium				
OT2A	**7,462,559**	**5859**	**150**	**539**
Croatia				
9A7A	**9,106,461**	**5669**	**175**	**644**
Czech Republic				
OL1X	**5,597,820**	**4821**	**144**	**537**
OL1C	135,326	444	42	100
Denmark				
OZ5GX	**422,675**	**1432**	**64**	**211**
England				
M4A	**5,175,775**	**4448**	**147**	**502**
M9X	**3,910,920**	**4256**	**128**	**470**
G5O	2,693,668	2882	119	410
G4IIY	1,809,120	2498	96	384
G6MC	1,624,624	2115	105	367
European Russia				
RK4WWQ	**1,485,378**	**2446**	**104**	**373**
Germany				
DQ4W	**8,473,101**	**5593**	**161**	**596**
DLØCS	**7,593,795**	**5623**	**158**	**601**
DR5N	**5,631,626**	**4596**	**142**	**537**
DKØED	2,653,110	2760	130	485
DP3E	1,732,320	2033	122	418
DL3G	1,319,544	1835	108	384
DLØUM	706,537	1141	89	302
DP4W	503,338	891	82	252
DP4D	337,362	757	81	273
DLØERP	66,612	423	35	147
Hungary				
HG7T	**4,810,887**	**4455**	**141**	**480**
Ireland				
EI9E	**7,304,896**	**6507**	**137**	**491**
Italy				
IR4X	**13,885,885**	**7711**	**181**	**664**
IR8A	1,004,496	1938	93	315
IQ1BP	48,860	275	44	96
IK1TWC	31,737	127	51	98
Netherlands				
PI4DX	**6,107,400**	**5272**	**154**	**542**
PI4W	731,640	1371	87	315
PA3ØRCK	44,764	261	37	87
Norway				
LN2T	**1,073,478**	**1763**	**84**	**343**
LA1K	363,716	823	67	249
Poland				
SN2K	**5,450,025**	**4136**	**158**	**577**
SP4KNA	1,182,612	1162	130	426
Portugal				
CR5T	**1,291,206**	**1927**	**96**	**330**
Romania				
YO3KSR	**568,050**	**1373**	**85**	**265**
San Marino				
T7ØA	**8,427,883**	**7938**	**157**	**552**
Sardinia				
IMØC	202,276	734	46	198
Scotland				
GM2T	**3,927,208**	**3994**	**133**	**471**
GM6NX	1,524,755	2219	105	362
Sicily				
IR9Y	**6,840,558**	**4914**	**167**	**619**
IR9W	3,760,274	4354	128	446
Slovakia				
OMØA	**1,612,772**	**2526**	**105**	**377**
Slovenia				
S52ZW	**6,081,803**	**4796**	**151**	**528**
Spain				
EE2K	**3,654,738**	**4058**	**125**	**429**
AM1W	2,550,832	2569	112	412
AM1A	1,640,364	2259	100	373
ED1RCM	816,205	1423	86	291
ED1T	710,832	1551	83	271
Sweden				
SK3W	**3,342,628**	**2688**	**144**	**478**
SK6AW	1,139,192	2066	69	245
OCEANIA				
Australia				
VK4KW	**6,999,635**	**4858**	**147**	**374**
VK1CC	**3,121,248**	**2889**	**117**	**299**
VK4HH	450,660	778	80	142
Brunei				
V84CQ	**559,728**	**1138**	**57**	**127**
Hawaii				
KH7CW	**4,530,864**	**3801**	**139**	**285**
Indonesia				
YE2R	**4,999,390**	**3584**	**142**	**375**
YEØX	**4,516,432**	**3821**	**116**	**323**
New Zealand				
ZM4T	**5,601,050**	**4613**	**133**	**322**
Northern Mariana Islands				
AHØBT	**8,844,867**	**5928**	**149**	**382**
SOUTH AMERICA				
Argentina				
LP1H	**14,556,432**	**8270**	**157**	**470**
Brazil				
PW7T	**18,244,437**	**8749**	**167**	**586**
PR5D	2,566,025	2589	112	273
ZY6Z	1,414,230	1971	81	214
Chile				
CE4CT	**9,674,544**	**6046**	**154**	**430**
CE1Z	207,774	796	49	70
Uruguay				
CV5D	**2,094,000**	**2260**	**116**	**259**
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MULTI-TRANSMITTER				
NORTH AMERICA				
United States				
K3LR	**21,247,382**	**9143**	**190**	**717**
W3LPL	**17,824,653**	**8148**	**184**	**683**
K1TTT	**7,760,808**	**4374**	**160**	**557**
KM1W	**6,054,300**	**3247**	**151**	**549**
WØAIH/9	**5,060,268**	**3567**	**161**	**505**
N6WM	**4,445,070**	**3231**	**166**	**444**
NA2U	**3,293,920**	**2054**	**143**	**452**
K7ZSD	**2,881,578**	**2416**	**135**	**336**
WX3B	2,835,129	1857	140	443
NE3F	2,713,815	1850	142	443
W5WZ	**2,348,650**	**1951**	**137**	**398**
WG3J	1,065,600	1215	111	333
AK8E/7	840,112	923	107	257
NE1B	686,517	678	95	282
W4CAR	**22,042**	**114**	**43**	**64**
Canada				
VE5PV	**3,134,120**	**3461**	**119**	**300**
VE7HPS	49,664	199	53	75
Turks & Caicos				
VP5T	**10,848,474**	**8782**	**137**	**409**
U.S. Virgin Islands				
KP2M	**11,686,380**	**8462**	**149**	**461**
AFRICA				
Canary Islands				
EF8R	**29,023,327**	**12024**	**178**	**705**
ASIA				
Asiatic Russia				
RKØSWB	33,660	239	41	69
China				
B7P	**8,971,872**	**6170**	**171**	**501**
Japan				
8N5A	**11,462,762**	**6992**	**170**	**483**
JA3YBK	**7,659,160**	**4999**	**152**	**432**
JA7YRR	**5,927,992**	**4645**	**147**	**371**
JA2YKA	82,336	305	67	99
Qatar				
A73A	**23,364,120**	**10382**	**187**	**694**
Taiwan				
BV100	**339,456**	**1317**	**79**	**125**
EUROPE				
Andorra				
C37N	**5,636,928**	**7508**	**111**	**433**
Belgium				
OT5A	**10,659,128**	**8441**	**167**	**620**
Bulgaria				
LZ9W	**12,613,744**	**9983**	**167**	**647**
Czech Republic				
OK7O	**3,474,240**	**4025**	**125**	**403**
Dodecanese				
SX5P	**5,261,168**	**5884**	**149**	**567**
England				
MØHFC	65,512	464	37	115
European Russia				
RW3GW	**1,615,440**	**2361**	**118**	**390**
RY6Y	**1,398,123**	**2009**	**119**	**412**
France				
TM1O	**3,840,220**	**5085**	**151**	**477**
Germany				
DR1A	**21,624,680**	**12598**	**190**	**745**
DFØHQ	**16,439,906**	**10671**	**188**	**723**
DP6T	2,544,375	2472	137	488
Hungary				
HG1S	**9,635,052**	**6983**	**166**	**632**
Italy				
IQ8MD	**2,733,192**	**3573**	**128**	**433**
Liechtenstein				
HBØ/HB9AON	**4,488,926**	**5466**	**107**	**426**
Lithuania				
LY7A	**8,273,300**	**7502**	**155**	**587**
LY2W	**6,785,786**	**6127**	**152**	**555**
Netherlands				
PA6Z	**7,991,649**	**6870**	**162**	**595**
PI4D	1,424,137	2375	103	330
Poland				
SP7PDL	16,390	169	26	84
Scotland				
GMØB	**8,129,580**	**7000**	**149**	**541**
Spain				
EE2W	**9,864,040**	**7643**	**165**	**595**
EA3EBN	2,799,940	2917	129	443
Sweden				
SK6D	**1,651,184**	**2453**	**106**	**390**
Ukraine				
UR3QXX	**400,512**	**948**	**73**	**263**
OCEANIA				
Australia				
VK4UC	**3,225,156**	**2695**	**136**	**325**
VK3FRC	302,868	687	72	116
Guam				
WH2DX	**2,689,934**	**3074**	**117**	**220**
Philippines				
DX1DBT	**652,032**	**1110**	**93**	**163**
SOUTH AMERICA				
Brazil				
ZY5Z	**3,220,593**	**3405**	**110**	**271**
Chile				
CE1A	**2,315,700**	**2688**	**113**	**219**
CE1D	163,254	540	69	100
Curacao				
PJ2T	**27,984,516**	**14111**	**163**	**551**

Check Logs

4Z4DX, 8J1RL, 8M8YY, BA5CW, BD7IHN, BD8BQA, BY4XZ, BY5CD, CE3PG, CX4AD, DC2IP, DG5YIS, DJ8RS, DL1KUR, DL1LTK, DL2OE, DL4SVA, DL5CL, DL5JAG, DL5MG, DL6GV, DL7FAZ, DL7VMM, DL8MBS, DL8USA, DL9NO, DM5DX, DR2Q, E74WN, E74Y, E77M, EA1CBX, EA1CE, EA1FDI, EA1GFT, EA2IV, EA2KY, EA2RY, EA3FAX, EA3GLB, EA3JL, EA4MA, EA5HT, EA7ATX, EA7LS, EB1IFI, EB3CW, EB3FIS, EC7AMY, EE5O, EH5I, EI7JK, F4DLM, F4FDQ, F5LMJ, F5MUX, G1FON, G3RWL, G6FOP, GM3C, GW4BLE, GWØETF, HA6PX, HA7UL, HA8DM, HA8TP, HSØZDY, IKØEIE, IK2AOO, IQ3UD, IT9DAA, IW5EIJ, IW7ECJ, IZ1SCF, IZ5MOQ, JA1TRC, JA2KVD, JG3WCZ, JI2KXK, JT1CS, K3MJ, K6VAR, K8YTO, KBØL, KB2WAU, KB9WQJ, KP4KE, KTØP, LA2NI, LA2PC, LA4RT, LA8AJA, LA8HGA, LP2F, LU6DO, LY2CO, LZ1JZ, M6KLO, N2CG, N3YIM, N6MZ, N9LF, NE4W, OE6IMD, OH1BOI, OH6GDX, OH7KBF, OK1DMP, OK1ES, OK1FAI, OK2CSU, OK2PCL, OK4MM, OK7RJ, OK7SX, OM7ANO, OM7RC, OO9O, OZ1AXG, PAØRRA, PA3EBP, PA4AO, PA5O, PDØMNF, PD2EDR, PF5X, PP5VB, PYØFF, PY2EYE, PY2LED, PY2WB, R7FK, R7GX, R7HF, RA2FN, RA3DA, RA3LAL, RA3XDX, RA3ZOM, RA3ZV, RA4CON, RA9ODW, RK1AO, RN1A, RU3EJ, RU3FN, RU4CS, RU6HL, RU9YF, RV3ID, RV3LO, RWØAQ, RX9WN, RZ4FWA, S51AY, S51JQ, S59D, SMØQ, SM4DHF, SM4F, SM4YPH, SM7LPY, SN5Y, SN9Z, SO2O, SO5S, SO7O, SO8ØJ, SP2FOV, SP2MHD, SP2QCU, SP2WGB, SP3CGK, SP3DOF, SP3DSC, SP3DV, SP3HC, SP3UIW, SP4YLA, SP5ATO, SP5CIB, SP5COF, SP5EAQ, SP5ELW, SP5GDY, SP5GTI, SP5ICS, SP5LGN, SP5QNI, SP5VYI, SP6CZ, SP6M, SP6NVN, SP6ZC, SP7CVW, SP7HOV, SP8AJK, SP8EEX, SP8FHM, SP9AJM, SP9CVY, SP9FTJ, SP9GKJ, SP9HZW, SP9IKS, SP9MDY, SP9WZS, SQ1VAA, SQ5M, SQ8VJ, SQ9IWT, SQ9SBI, SV1BFW, TMØRDR, UA1AIR, UA1AJW, UA1NFA, UA1ORT, UA3AGW, UA3QLC, UA3SAQ, UA3SKV, UA6GR, UA6GU, UA9CEP, UA9LGD, UA9SOR, UN6G, UN7BEW, UN7ECA, UN7LAN, UR4IOR, UR5ZMK, UR5ZTH, US5EEK, US5NGH, US5VX, UT1HT, UT1IA, UT2XX, UT4UKW, UT4WA, UT7NY, UT7WZA, UUØJC, UU2JG, UXØZAB, UX1AA, UY5AO, VA1TM, VE2TZT, VE3KZ, VK3FGRC, W7VS, W8TN, YL2TD, YL5T, YO2CMI, YO2MKL, YO2MLC, YO3BA, YO3CCC, YO3HOT, YO4ASG, YO6CFB, YO6KNE, YO6OAF, YO8DDP, YO9KPM, ZL4CR, ZS9Z.

Violation of the Rules:
Red Cards: 4L5O – unverifiable contacts; RT5Z (RA3CW), E79D – unclaimed assistance and unverifiable contacts.
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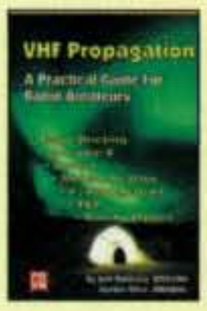

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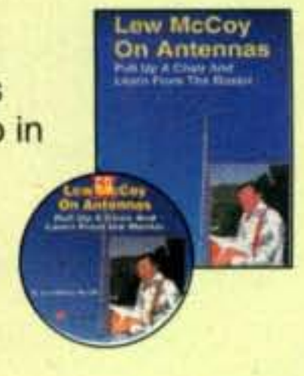

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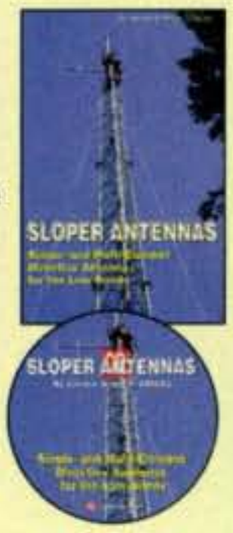

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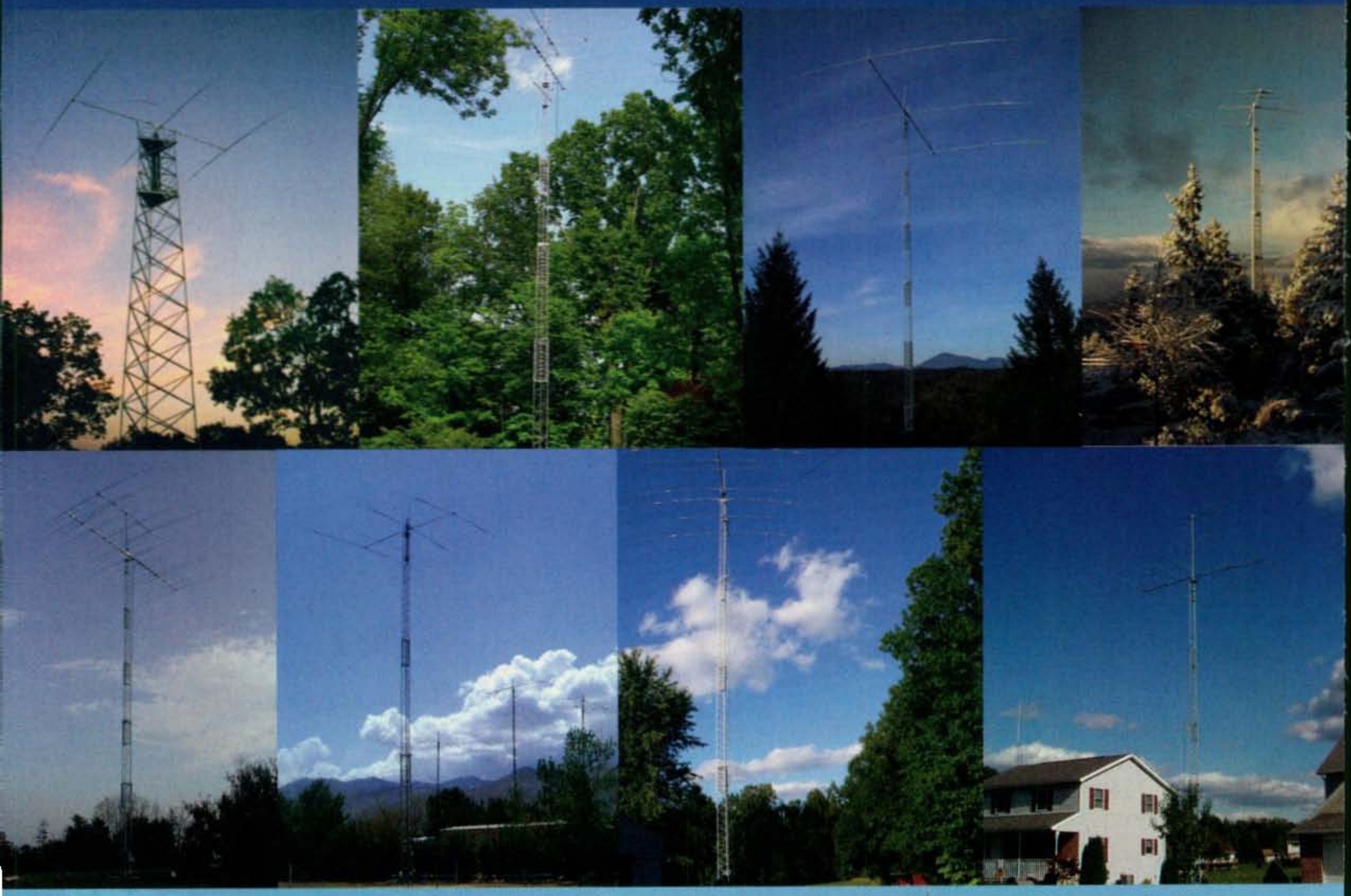

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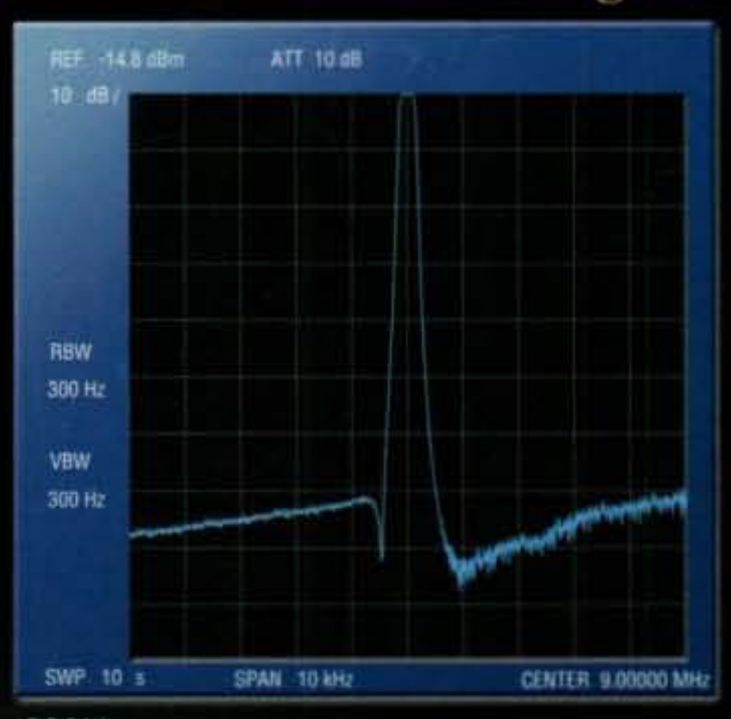

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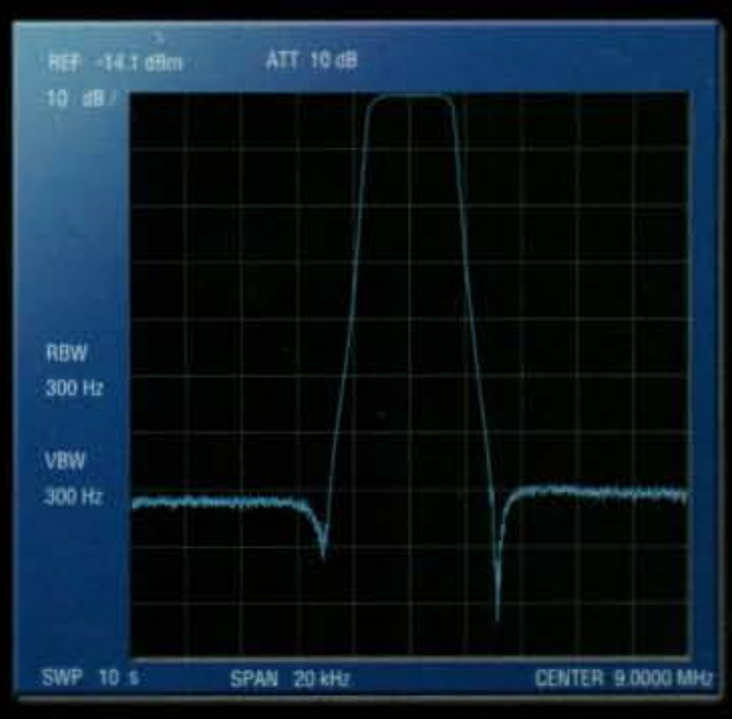

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