Amateur Radio

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

CQ

COMMUNICATIONS & TECHNOLOGY

SEPTEMBER 2001

In This Issue

On the cover: The international team of operators at A61AJ for the 2000 CQ World WW DX CW Contest. Details on p. 28, story on p. 22.

U.S. $4.99 / Canada $6.99

01 0006580609912 2109 1 128
JACK SPEER
BUCKMASTER PUB
6196 JEFFERSON HWY
MINERAL VA 23117-3425

AMATEUR'S JOURNAL

BANK THE SAVINGS

ICOM

Limited time offers. See dealer for details.

"With the addition of yet another band (70 cm), more power on 2 meters and the incremental improvements made with each new version of this popular transceiver, perhaps the '706 has reached its zenith. There's not much left to improve."
-*QST*, July, 1999

MORE BANG. LESS BUCKS.

"An impressive transceiver for HF, 50 MHz and 144 MHz work. With loads of those features desirable to the serious HF operator *and* all modes at 100W on both 6 and 2 meters, the IC-746 is a fine choice in a mid-priced rig."
-*QST*, September, 1998

The IC-706MKIIG & IC-746

For a limited time, you can save a bundle on two of ICOM's most popular radios. The IC-706MKIIG, the best selling, most versatile compact multi-band rig ever made, is loaded with features yet small enough to take with you – it's as home in a car as in a den or shack. The IC-746 offers real HF performance *plus 6 and 2 meters*. Enjoy 100W of power on all bands and big rig features like adjustable IF-DSP and Twin Pass Band Tuning (even faint signals can't hide!). Visit your authorized ICOM dealer today, and SAVE!

IC-706MKIIG. Proven Performance.

HF/6M/2M/70CM • HF & 6M @ 100W, 2M @ 50W, 70CM @ 20W • 107 Alphanumeric Memory Channels • CTCSS Encode/Decode with Tone Scan • Auto Repeater • All Mode with DSP • Plug-n-Play Filters • Remote Head Operation*

IC-746. Real HF Performance.

HF/6M/2M • HF, 6M & 2M @ 100W • 102 Alphanumeric Memory Channels • CTCSS Encode/Decode with Tone Scan • Auto Repeater • IF-DSP & Twin Pass Band Tuning • Full Duty Cycle • Internal Antenna Tuner • PC Controllable*

*Optional equipment required.

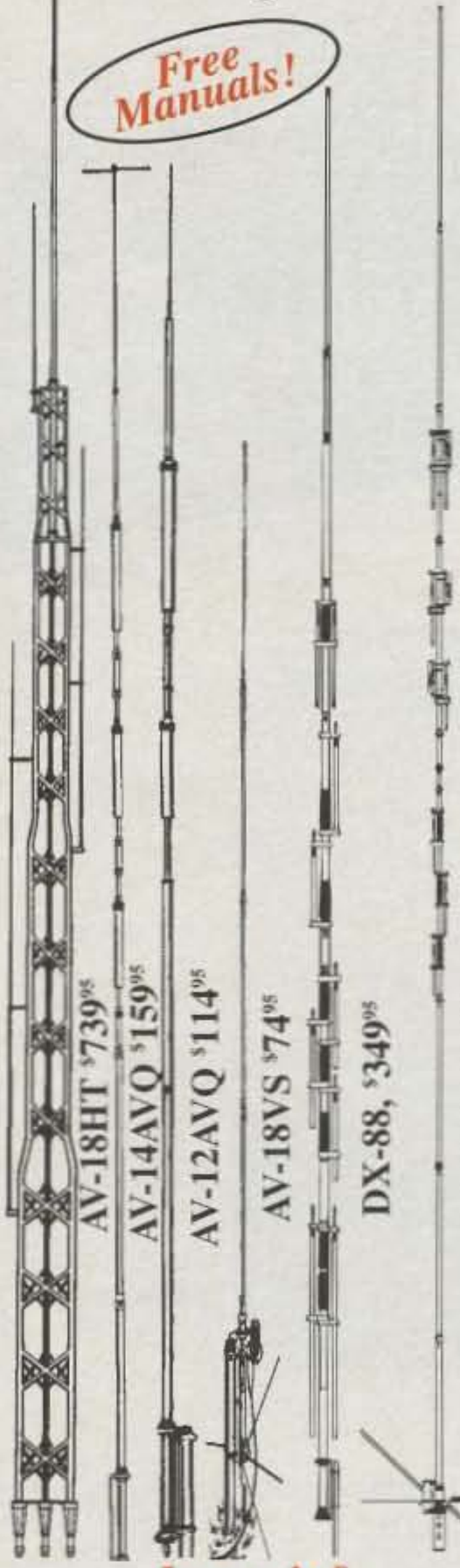
Find out more!

www.icomamerica.com

ICOM®

hy-gain HF VERTICALS...

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



hy-gain® Classics

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

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

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

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

AV-18HT, $739.95. (10, 12, 15, 20, 40, 80 Meters, 160 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. With the addition of a base loading coil (LC-160Q, $99.95), it also provides exceptional 160 Meter performance.

The 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 and lowering.

AV-14AVQ, $159.95. (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, $79.95.

AV-12AVQ, $114.95. (10, 15, 20 Meters). 13 ft., 9 lbs. The 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, $79.95.

AV-18VS, $74.95. (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, $79.95.

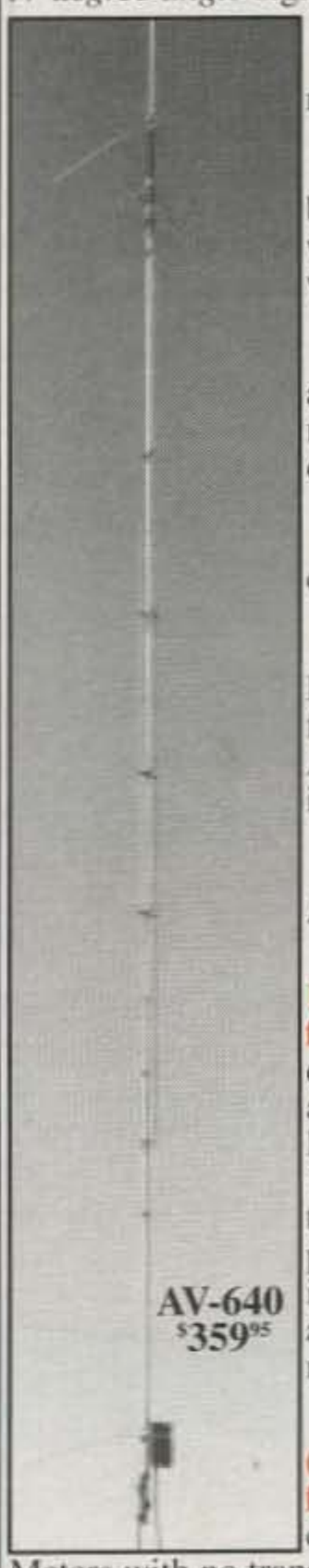
DX-88, $349.95. (10, 12, 15,17,20,30,40,80 Meters, 160 Meters optional). 25 ft., 18 lbs. All bands are *easily* tuned with the DX-88's *exclusive* adjustable capacitors. 80 and 40 Meters can even be tuned from the ground without having to lower the antenna. Super heavy-duty construction. DX-88 OPTIONS: 160 Meter add-on kit, KIT-160-88, $179.95. Ground Radial System, GRK-88, $81.95. Roof Radial System, RRK-88, $89.95.

DX-77A, $429.95. (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	$739.95	10,15,20,40,80	1500 W PEP	53 feet	114 pounds	75 MPH	------
AV-14AVQ	**$159.95**	**10,15,20,40**	**1500 W PEP**	**18 feet**	**9 pounds**	**80 MPH**	**1.5-1.625"**
AV-12AVQ	$114.95	10/15/20 M	1500 W PEP	13 feet	9 pounds	80 MPH	1.5-1.625"
AV-18VS	**$74.95**	**10 - 80 M**	**1500 W PEP**	**18 feet**	**4 pounds**	**80 MPH**	**1.5-1.625"**
DX-88	$349.95	10 - 40 M	1500 W PEP	25 feet	18 pounds	75 mph no guy	1.5-1.625"
DX-77A	**$429.95**	**10 - 80 M**	**1500 W PEP**	**29 feet**	**25 pounds**	**60 mph no guy**	**1.5-1.625"**

hy-gain® PATRIOT

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



No ground or radials needed

Effective counterpoise replaces radials and ground.

Automatic bandswitching

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

Sleek and low-profile

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

Full legal limit

Handles 1500 Watts key down continuous for two minutes.

Built-to-last

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

hy-gain® warranty

Two year limited warranty. All replacement parts in stock.

AV-640, $359.95. (6,10,12, 15,17,20,30,40 Meters). 25.5 ft., 17.5 lbs. The AV-640 uses quarter wave stubs on 6, 10, 12 and 17 meters and efficient end loading coil and capacity hats on 15, 20, 30 and 40 meters -- no traps. Resonators are placed in parallel not in series. End loading of the lower HF bands allows efficient operation with a manageable antenna height.

AV-620, $269.95. (6,10,12,15,17,20 Meters). 22.5 ft., 10.5 lbs. The AV-620 covers all bands 6 through 20 Meters with no traps, no coils, no radials yielding an uncompromised signal across all bands.

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

hy-gain

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

CQ Amateur Radio

SEPTEMBER 2001 VOL. 57, NO. 9

FEATURES

page 86

page 11

DEPARTMENTS

144 220 +440

Everything adds up: Kenwood's new FM Tribander (144/220/440MHz) offers dual-channel RX capability and prime performance in a superbly compact design.

- Receives 2 frequencies simultaneously even on the same band
- 0.1~1300MHz high-frequency range RX (B band)[1]
- FM/FM-W/FM-N/AM plus SSB/CW receive
- Bar antenna for receiving AM broadcasts
- Special weather channel RX mode
- 435 memory channels, multiple scan functions
- 7.4V 1550mAh lithium-ion battery (std.) for high output[2] and extended operation
- 16-key pad plus multi-scroll key for easy operation
- Built-in charging circuitry for battery recharge while the unit operates from a DC supply
- Tough construction: meets MIL-STD 810 C/D/E standards for resistance to vibration, shock, humidity and light rain
- Large frequency display for single-band use
- Automatic simplex checker
- Wireless remote control function
- Battery indicator • Internal VOX • MCP software

[1] Note that certain frequencies are unavailable. [2] 5W output

"Specifications subject to change without notice."

NEW

TH-F6A

FM TRIBANDER

KENWOOD
COMMUNICATIONS CORPORATION

AMATEUR RADIO PRODUCTS GROUP
3975 Johns Creek Court, Suwanee, GA 30024
P.O. Box 22745, Long Beach, CA 90801-5745, U.S.A.
Customer Support: (310) 639-5300 Fax: (310) 537-8235

01ARD- 2114 #050701

ISO 9001
JQA-1205
Communications Equipment Division
Kenwood Corporation
ISO9001 certification

INTERNET
Kenwood Website
http://www.kenwood.net
Kenwood Information
ftp://ftp.kenwood.net

Ham Radio News

From The CQ Newsroom

AO-40 in "Safe" Orbit, But Out of Gas

The AMSAT-OSCAR 40 satellite has been nudged into an orbit that should be good for at least the next 20 years, according to the ARRL and ground controllers, and that's a good thing because the engine firings apparently depleted the spacecraft's supply of maneuvering fuel. By conducting several "cold" firings of its arcjet motor using only ammonia gas, controllers were able to increase the satellite's perigee (its closest approach to Earth) to "a safe range" between 500 and 785 miles (810 and 1260 kilometers). The previous perigee had made controllers uncomfortable both with its proximity to Earth and the increase in speed that resulted as it looped around the planet.

However, the bugaboos that have plagued AO-40 since launch continued, as the engine firings raised the satellite's perigee some 300 kilometers higher than predicted and used up all of its ammonia supply. The ARRL quotes ground team member Stacey Mills, W4SM, as saying it's "quite possible" that there had already been an ammonia leak, in which case "it is very fortunate we did not wait any longer to use the remaining fuel."

AO-40's transponders were turned back on in late July, with two uplinks at 435 and 1269 MHz, and one downlink at 2401 MHz, SSB and CW only.

ARRL Introduces 12 Meter DXCC

The ARRL has introduced a new single-band award in its DX Century Club (DXCC) program. The new award will recognize those hams (ARRL members only in the US) who have confirmed contacts on the 12 meter band with 100 or more "DXCC entities," commonly referred to as countries, but not always meeting that definition in non-amateur circles (Alaska and Hawaii, for example, are DXCC entities, even though they're part of the United States). The League began accepting 12 meter DXCC applications on July 1. For details, visit the ARRL website at <http://www.arrl.org>.

KC7NHZ Very Active From Space Station

Astronaut Susan Helms, KC7NHZ, has been very active from the International Space Station, including making Field Day contacts, talking to her parents via ham radio, and conducting school contacts in US and Russia. According to the ARRL and other sources, Helms made several dozen Field Day contacts as NA1SS, the first time anyone participated in that event from space. The contacts didn't count as a new multiplier, since the space station is not in any US or Canadian section, but there were no complaints.

Helms also took time out to say hi to her parents, who were with a group of young people during a scheduled contact with the New Mexico Museum of Natural History and Science in Albuquerque. And during one pass over Russia, she switched from the US callsign of NA1SS to Russia's RSØISS, to speak with students at the Junior Technical Center in St. Petersburg. According to the *ARRL Letter,* this was the space station ham program's first scheduled school contact in Europe.

ARRL Seeks Views on Novice Bands

As the number of hams holding Novice licenses continues to decline, either through non-renewals or upgrades to General, the ARRL is looking for ideas on how best to use the HF frequencies currently set aside for Novices and Technicians with code credit. There are currently about 40,000 Novice licenses on the FCC's rolls, with the total dropping by about 6,000 per month, according to the *ARRL Letter.* There are no solid numbers, however, on how many of those Novices are active and to what extent the HF Novice bands are used by Techs with code credit. ARRL members are being asked to complete an online survey on the League's website at <http://www.arrl.org/members-only/NoviceSurvey.html> (be sure to capitalized the "N" and the "S"). Non-members are encouraged to e-mail their ideas to <novicesurvey@arrl.org>.

Patrick Clark, KC8BFD Newsline "Young Ham of the Year"

Seventeen-year-old Patrick Clark, KC8BFD, has been named the Newsline "Young Ham of the Year" for 2001. Clark is active in emergency communications and in recruiting other young people to ham radio. He lives in Elkview, West Virginia, and comes from an all-ham family. The award was scheduled to be formally presented at the Huntsville Hamfest in Alabama in August. *CQ* is a co-sponsor of the "Young Ham of the Year" award, as is Vertex Standard (Yaesu).

FCC Probes Connecticut Test Session

The FCC is looking into an amateur exam session held last May in Trumbull, CT, after the ARRL/VEC forwarded documents that the Commission says "reflect several alarming discrepancies in testing procedures." In a letter to the ten Volunteer Examiners whose names appear on the Test Session Report (and who have been suspended as VEs at least until the investigation is completed), FCC Special Counsel Riley Hollingsworth, K4ZDH, said the immediate problem related to one examinee's test papers, on which "there are a significant number of erasures to the answer sheet, to VE grading marks and to (his) score." The ten VEs were given 20 days in which to respond to a series of questions relating to their participation in the exam session and their explanations for the "discrepancies."

In other actions, an amateur in Alabama and another in Kansas have had their licenses cancelled after failing to appear for FCC-ordered retests on their Extra Class exams. Also, the FCC did a turnaround in the case of a Mississippi ham, Harold Epps, KM5KM, cancelling a retest order issued May 31. Without further explanation, Epps was told, "Your license is in good standing and it will not be necessary for you to re-test."

FCC Hits Hard: Fines, Revocations

A California man who operated an amateur station without a license and a Florida ham accused of operating a "pirate" FM broadcast station are the latest subjects of enhanced FCC enforcement. Joshie Yasin Nakamura, Sr. (aka Marvin Eugene Barnes), of East Palo Alto, California, has been fined $10,000 for operating an unlicensed amateur station, according to a July 3 Forfeiture Order from FCC Enforcement Bureau Chief David Solomon.

In a separate action, Leslie Brewer of Tampa, Florida, who the FCC says has operated a pirate FM station off and on since 1996, was fined $11,000 and stripped of his amateur (KC4HAZ) and General Mobile Radio Service (KAE1170) licenses. Brewer, whose FM station was known as the "Party Pirate," did not contest the latest FCC allegations or request a hearing. Saying that Brewer "continues to display a cavalier disregard toward his licensee obligations," the FCC said he "is unqualified to be and remain a Commission licensee and that the ... Amateur Radio and GMRS licenses held by him should be revoked." According to the ARRL, Brewer already owes the FCC another $11,000 from a previous fine.

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.

ROCK SOLID
HF Systems

There has never been a complete HF system like the TS-2000 Multi-Band Multi-Mode Transceiver. Now you can have the best of All HF worlds with the different configurations that the TS-2000 systems offers. You'll experience new levels of operating enjoyment with the TS-2000 in your shack, the TS-B2000 with a (RC-2000) in your car or with your PC. Whichever configuration you choose, you'll be amazed with the most powerful and highest performing base or mobile HF rig that's ever been made available. Discover a world of difference with Kenwood's sleek-looking TS-2000. Compare it with the competition... TODAY!

TS-2000

HF/6M/2M/70cm Multi-Mode
IF Stage DSP Main Band
AF Stage DSP Sub-Band
Built-in Auto Tuner
Built-in TNC
SkyCommand™ w/TH-D7A(G)
DX Packet Cluster AutoTune
World's First HF Backlit Keypad
Cross Band/ Cross Mode Operation
Satellite Functions
1.2 GHz Optional Band

TS-B2000

HF/6M/2M/70cm Multi-Mode
IF Stage DSP Main Band
AF Stage DSP Sub-Band
Built-in Auto Tuner
Built-in TNC
DX Packet Cluster AutoTune
Cross Band/ Cross Mode Operation
Satellite Functions
1.2 GHz Optional Band

RC-2000

Compact Mobile Controller
Amazingly Easy To Use

ARCP-2000

PC Radio Control Program
Operate Your Rig From A Mouse

KENWOOD
COMMUNICATIONS CORPORATION
AMATEUR RADIO PRODUCTS GROUP
3975 Johns Creek Court, Suwanee, GA 30024
P.O. Box 22745, Long Beach, CA 90801-5745, U.S.A.
Customer Support: (310) 639-5300 Fax: (310) 537-8235

01ARD-2123 #071101

FREE Manuals & Brochures On-Line

INTERNET
Kenwood Website
http://www.kenwood.net
Kenwood Information
ftp://ftp.kenwood.net

Zero Bias

BY RICH MOSESON, W2VU

An Editorial

Ham Radio's Secret Weapon

How is it that ham radio manages to get through when other communication services fail? Often, we're using very similar equipment and adjacent frequencies to the services we're supplementing or replacing. How can hams on 146 or 446 MHz manage to communicate when public service agencies on 154 or 470 MHz can't? We read about it all the time in our Public Service and Ham Radio News columns, especially in remote areas during forest fire season, or in the aftermath of hurricanes, tornadoes or earthquakes. We somehow stay on the air and keep vital messages flowing while their systems fail and/or messages don't get through. What's the secret?

Last month, I talked briefly about one part of the secret formula, the technical part—our FCC-sanctioned ability to change frequencies, modes of transmission, power levels and antenna configurations as needed to complete a communication circuit. Few emergency service agencies may change any of those parameters without specific FCC permission, and there's rarely time to get that during an emergency. Even software-defined radios (SDRs) won't be a panacea.

The FCC envisions SDR-equipped emergency responders being able to quickly reconfigure their radios to meet the ever-changing needs of an emergency or disaster. But your typical emergency responder is trained in responding to an emergency, not reprogramming a radio. Can you imagine a dozen different agencies converging on a disaster scene, then waiting 30–60 minutes (or longer) while one or two technicians set up their computers and begin reprogramming a couple of hundred radios to communicate with each other and the outside world? It ain't gonna happen, not in a situation in which every second counts and lives hang in the balance. Waiting around while someone reprograms radios will *not* be an option.

We hams have the ability to tune our radios to thousands of frequencies on more than a dozen bands, to establish impromptu networks and basically do whatever is necessary to establish and maintain communication. We can choose HF, VHF, UHF, microwave, satellite, FM, SSB, CW, packet, PSK-31, etc., in whatever combination works best at that time ... and then change it all on a moment's notice when conditions or circumstances change. No other non-military service has this sort of flexibility, coupled with the number of similarly-equipped operators we can bring in to communicate. And this brings us to the second part of our secret formula... us.

The unique technical nature of amateur radio is only part of our secret to success in getting through when no one else can. The other, greater, part of the secret is the unique set of skills that we amateurs bring to the table along with our radios. First of all, there's the fact that we own our own radios, so we aren't dependent on anyone else for equipment, and we don't further stress already-overburdened systems (when those systems are still working). Second, most of us know enough about our radios to be able to change frequencies, modes, etc., without requiring the services of a two-way radio technician. Moving 40 ham rigs to a new frequency requires a minimum of time and effort—a single request to all 40 operators, who simply dial in the new frequency. No waiting in line while a tech reprograms 40 radios. If conditions are marginal and voice isn't getting through well, we have a variety of digital modes at our disposal, more and more of which can be powered by just a laptop computer with a sound card and cables to and from the radio. And when all the high-tech stuff doesn't work, there's always good old CW. In theory, at least, any ham who has earned HF privileges has enough knowledge of the code to use it in an emergency. Plus, most hams know at least the basics of making an antenna from a piece of wire and getting it into a position to make contacts. And any group of hams generally contains at least one person with enough understanding of propagation to choose the best band(s) for different communication needs, and to choose a new band if needs or conditions change. On the operational side, any ham with experience in public service events or traffic handling will know the basics of net procedure and how to communicate specific information without wasting air time with unnecessary chatter.

A Unique Education System

How do we learn all this stuff? Where are the courses and the continuing education credits? Generally speaking, there aren't any*. We learn on our own, either through reading, from fellow hams, or through practical experience on the air. Generally, it's through some combination of the three. Actually, if you think about it, we hams have a very effective and absolutely unique education system.

Outside of our license exams, there is virtually no "formal" education in ham radio. There's no certification required before using a new mode or a new band, no courses on antenna installation and no training in how to use your complicated new radio before being permitted to put it on the air. Some people may think these are desirable, but if you think about it, "it ain't broke," so let's not try to fix it. Sure, there are people who don't know how to program their HT memories, just as there are people who can't figure out how to program their VCRs. And there are people who'd rather muddle along "their way" than learn from someone who's already "been there, done that." But they really are in the minority.

Most hams manage to learn—often quite a bit—by reading magazines and resource books, listening to presentations at club meetings, asking other hams for help, and perhaps most importantly, by *doing*, whether it's getting on the air and operating, building a project, putting up an antenna or providing communications during an emergency or a public service event. In some cases, there's an underlying formal education (such as those hams who are engineers), but not always. The key is that those who *do* know and understand whatever it happens to be are nearly always willing to share their knowledge with their fellow hams.

Maybe educators could learn something from our model, at least in terms of helping those students who are not being well-served by the current cookie-cutter approach to teaching that is prevalent in so many classrooms. What is our model? It is one that emphasizes learning by doing; learning how to solve real-life, practical problems; how to use various references to find information you need; how to understand and use that information once you find it; how to think for yourself. And that is the key answer to the question posed at the beginning. How do hams get through in emergencies when no one else can? It's the way we've trained ourselves to think—what can I do, using the knowledge, resources and equipment that I have or can call on, to get on the air and communicate?

How can schools begin to use our model of self-education? They can start

**The ARRL has recently begun offering courses in emergency communications, which have been certified for Continuing Education Units (CEUs).*

by joining ARRL President Jim Haynie's "Big Project," by making use of amateur radio, and radio amateurs, to bring classroom concepts to life. We collectively represent a tremendous community resource, but it's one that can be used only if our communities know that we're there and willing to share our knowledge. This is why it is essential that we succeed in our marketing challenge posed last month.

Bye-Bye, BBC

The British aren't coming anymore, at least not on the shortwave bands. On July 1, the BBC World Service shut down its English-language shortwave broadcasts aiming toward North America, Australia/New Zealand and the Pacific Islands. According to an official explanation on the BBC website, the move was prompted by the growing availability of BBC programming in those areas on FM broadcast stations and the growing popularity of listening via the internet. Well, since I'm one of those rare people who doesn't carry an internet-connected computer with me wherever I go, and I occasionally like to listen to the radio (even shortwave radio) when I'm not in front of my computer, I checked out the availability of BBC programmes (as they'd spell it) on broadcast stations in my area. Now I live in the nation's #1 media market, so I should have more options than most other people. My choices are limited to overnight programming on one of two New York City stations (I'm not within range of any of the seven New Jersey FM stations that carry the BBC Newshour weekdays between 9 and 10 AM). Hardly the options in programming and scheduling that were available when I could tune in the BBC directly on my go-anywhere shortwave receiver.

Why is this important to hams? First of all, many of us began as (or still are) shortwave listeners. It was our entry point into the radio hobby. Anything that hurts the overall radio hobby hurts amateur radio. By forcing its listeners to tune in on the internet instead of shortwave, the BBC is drawing down the pool of potential new hams by steering them away from the portability, the accessibility and the magic of radio. It is a loss to us all and, I believe, a shortsighted decision (I wrote as much in an e-mail to BBC leadership; they haven't bothered to reply).

And What About CW?

So ... if shortwave is dying as the BBC suggests, then CW must be totally dead, right? Not if the participation in the CW weekend of last year's CQ World Wide DX Contest is any indication. In fact, the results (starting on page 11 of this issue) show an increase in the number of logs submitted, along with 96 (!) DXpeditions timed to coincide with the contest. There were also 57 new all-time records** set! Managing Editor Gail Schieber, K2RED, joined one of those DXpeditions—to A61AJ. Her report, "A Dubai Adventure," begins on page 22.

Now ... here's a challenge for everyone who participated in the CQ WW CW ... get on the CW bands during off-contest times and get some practice through general DXing and ragchewing. We've been noticing lately that the CW subbands are pretty quiet (except for digital QSOs) when there's not a contest on. This month's survey will be looking at just how often those of you who operated CW are active and whether your CW operations are broad or narrowly focused (see page 40).

Update

After last month's issue went to press, we learned that Peter Heins, N6ZE ("Capt. Pete's Fly-In VUCC Certification Service," p. 41) has been sidelined by health issues and is no longer offering his "fly-in" card-checking service. We wish Pete well and encourage other hams who are qualified to become award checkpoints and close some of the gaps that Pete was trying to fill.

73, Rich, W2VU

*** Due to space constraints, the 35th annual CQ WW All-Time Records report will appear in next month's issue.*

Announcements

• **Empire Contest Club** – A new contest club is being formed in the Five Borough area of New York City. Anyone wanting information may contact Rich, AA2MF, 718-980-1104, e-mail: <aa2mf@arrl.net>.

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

W1AW/6, from ARRL Southwestern Div. Convention, Riverside, CA; Sept. 7–9 on SSB 28.450, 21.350, 14.250, 7.250, 3.860, 146.52 MHz; CW 28.030, 21.030, 14.030, 7.030, 3.530 MHz. For QSL send #6 SASE (US stations; DX via the bureau) to Fred Roberts, W6TKV, 5464 Peacock Lane, Riverside, CA 92505.

K2BR, from Miss America Pageant, Atlantic City, NJ (Absecon Island, IOTA NA111); Southern Counties ARA; 1400Z Sept. 17 to 0400Z Sept. 23; 10, 15, 20, 40 meters phone 28.325, 21.325, 14.250, 7.250, and CW 28.030, 21.050, 14.050, 7.050 MHz. For QSL send QSL and #10 SASE to SCARA, P.O. Box 121, Linwood, NJ 08221.

K5T, celebrating 80 years of amateur radio at the University of Texas, Austin; Sept. 29 – Oct. 7; SSB, CW, RTTY, and PSK31 on the HF bands, plus SSB and CW on VHF/UHF. For more info and QSL route see <http://n5xu.ae.utexas.edu/80years/>.

W5SLA, from commemoration of 37 years of community service, Slidell, LA; Ozone ARC; 1500–2300Z Sept. 15 on 14.250 and 7.280. For QSL send SASE to Michael White, 404 Holmes Drive, Slidell, LA 70460.

W6A–J, from Route 66 on the Air; 0000Z Sept. 8 to 2400Z Sept. 16. For details see <www.nadxa.com> or write to Art Phillips, NN7A, P.O. Box 201, Flagstaff, AZ 86002.

W7OTV, from Cycle Oregon 2001; Oregon Tualatin Valley ARC; 6–8 AM and 6–8 PM PDT Sept. 8–15 (Sept. 8 evening only, Sept. 15 morning only) on 7290, 14290, and 28490 kHz. QSL to the club at P.O. Box 5132, Aloha, OR 97006-0132.

W8KIT, from 75th anniversary of Heathkit, Benton Harbor, MI; Heathkit Educational Systems & Blossomland ARA; 1400–2400Z Sept. 15–16 on 7.250, 14.260, 21.360 MHz. Station equiepment will be all Heathkit. For QSL send SASE to W8KIT, c/o Heathkit Educational Systems, 455 Riverview Dr. Bldg. 2, Benton Harbor, MI 49022.

W8YAF, from Yankee Air Museum, Belleville, MI; 1200–2000Z Sept. 23 on 7.270 MHz. For certificate send QSL and 9 × 12 SASE to Frank Nagy, N8BIB, 24315 Waltz Rd., New Boston, MI 48164-9167.

• **The following hamfests, etc., are scheduled for September:**

Sept. 1, **Uniontown ARC Gabfest,** club grounds on Old Pittsburgh Rd., Uniontown, Pennsylvania. Contact Carl, WA3HQK, or Joyce, KA3CUT, Chuprinko, 304-594-3779. (Talk-in 147.045+, 147.255+)

Sept. 7–8, **Mena Hamfest**, Wilhelmina State Park, Mena, Arkansas. Contact Charlotte Lee, KC5DOR, <clee1948@yahoo.com>; website: <QWHA@org>.

Sept. 7–9, **Campbell Co. ARC Hamfest**, Yellow Pine Campground, Happy Jack Recreation Area, west of Laramie, Wyoming. Call 307-682-7839, <w7cw@arrl.net>, web: <www.w7cw.vcn.com>. (Talk-in 146.52, 7.260 & 3.923 LSB)

Sept. 8, **RC of Tacoma Electronics Fleamarket**, Pierce County Fairgrounds, Graham, Washington. Contact Lou, KB7WDB, 253-847-5124, <kd7wdb@juno.com>, <www.w7dk.org>. (Exams 10 AM)

Sept. 8, **Ak-Sar-Ben ARC Fleamarket**, Sarpy County Fairgrounds, Omaha, Nebraska. Contact Ak-Sar-Ben ARC, Box 24551, Omaha, NE 68124-0551; <k0nsa@arrl.net>, <http://www.aksarbenarc.org>. (Talk-in 146.940–)

Sept. 8, **Greater Louisville Hamfest & ARRL Kentucky State Convention**, Bullitt County Fairgrounds, south of Louisville, Kentucky. Contact Greater Louisville Hamfest Assn., P.O. Box 34444-N., Louisville, KY 40232-4444; website: <http://mx2.confluentasp.com/~glha/>.

Sept. 8, **Owen County ARA & Bloomington ARC Hamfest**, Spencer, Indiana. Contact Katie Smith, K9INU, 812-829-2140.

Sept. 8, **Pocono Area Hamfest & Electronics Exposition**, Monroe County Vo-Tech, Bartonsville, PA. Contact Bill Connelly, 570-424-2174. (Talk-in 147.046+, PL 131.8; 146.865–, PL100.0; 146.535 simplex; exams)

Sept. 9, **Saratoga County RACES Hamfest 01**, Saratoga County Fairgrounds, Ballston Spa, New York. Contact Darlene Lake, N2XQG, 518-587-2385, <lake@capital.net>. (Talk-in 146.40/147.00, 147.84/147.24; exams)

Sept. 9, **Mohawk ARC ARRL Hamfest**, Athol/Orange Elks Hall, Athol, Massachusetts. Contact John, AE1B, 978-249-5905 (6–10 PM), <ae1b@gis.net>.

Sept. 9, **SE Mass. ARA Fleamarket**, clubhouse, Donald St., S. Dartmouth, Massachusetts. Contact Tim Smith, N1TI, 508-758-3680, <rt_smith@yahoo.com>. (Talk-in 147.00/.60; exams 10 AM)

Sept. 9, **LIMARC Hamfair & Fleamarket**, Briarcliffe College, Bethpage, New York. Call 24-hr. hotline 516-520-9311; <hamfest@limarc.org>; <http://www.limarc.org>. (Talk-in 146.850)

Sept. 14–16, **Peoria Superfest 2001 & Illinois ARRL State Convention**, Exposition Gardens, Peoria, Illinois. Contact Peoria Superfest, P.O. Box 3508, Peoria, IL 61612-3508; <http://www.w9uvi.org>. (Talk-in 147.075+; exams Sunday 10 AM–1 PM)

Sept. 15, **Siloam Springs ARC Hamfest & Fleamarket**, St. Mary's Catholic Church, Siloam Springs, Arkansas. Contact Matt, N5UYK, or Sherri, N5UXI, 501-524-4797. (Talk-in 146.67)

Sept. 15, **SuperSwap 2001**, Caledonia High School, Caledonia, Michigan. Contact Ed, N8UXN, 616-458-9029; <http://www.w8dc.org>. (Talk-in 147.26+, 146.52 simplex; exams)

Sept. 15, **RI Amateur FM Repeater Service Fleamarket & Auction**, VFW Post 6342, Forestdale, Rhode Island. Contact Rick Fairweather, K1KYI, 401-725-7507 (7–8 PM); <k1kyi@arrl.net>. (Talk-in 146.76)

Sept. 15, **W9DXCC DX Convention & Banquet**, Holiday Inn, Rolling Meadows, Illinois. <http://www.qth.com/w9dxcc>

Sept. 16, **Garden State ARA Hamfest/Computerfest**, Jersey Coast Chapter, American Red Cross, Tinton Falls, New Jersey. Contact Mike, KC2Q, 732-774-1095, <kc2q@arrl.net>. (Talk-in 147.045+ (PL 67), 146.52; exams 11 AM)

Sept. 16, **Adrian, MI ARC Hamfest & Computer Show**, Lenawee County Fairgrounds, Adrian, Michigan. <http://users.aix.cc/w8tqe>

Sept. 16, **Western CT Hamfest**, Edmond Town Hall, Newtown, Connecticut. Contact Ken Weith, KD1DD, 203-743-9181. (Talk-in 146.67–, PL 100)

Sept. 16, **Cincinnati Hamfest**, Scarlet Oaks Career Development Campus, Cincinnati, Ohio. Contact Jim Weaver, K8JE, 513-459-0142; <k8je@arrl.net; <http://cincinnatiamateurradio.com>.

Sept. 21–23, **WSWSS Annual Conference**, Holiday Inn, Ventura, California. Contact Tim Marek, <timm@cccomm.net>.

Sept. 22, **BCRO Hamfest**, National Guard Armory, Bentonville, Arkansas. Contact Contact Shirley, 501-451-8626.

Sept. 22, **Pasco County Hamfest**, New Port Richey Recreational Center, New Port Richey, Florida. Contact Owen Godwin, KI4CT, 813-909-1336; <ki4ct@arrl.net>. (Talk-in 145.35)

Sept. 22, **Sonoma County RA Hamfest,** Lewis Adult Education Center, Santa Rosa, California. Contact Rick Reiner, K6ZWB, 707-575-4455; <http://cds.net/scra>. (Exams 9 AM – noon)

Sept. 22–23, **Virginia Beach Hamfest**, Virginia Beach Pavilion, Virginia Beach, Virginia. Contact Lynn Lilla, W9DJQ, 848 Stacey Place, Virginia Beach, VA 23464; or <hamfest@exis.net>; <www.vahamfest.com>. (Talk-in 146.970; exams Sat. 2:30–5) ***See us at the CQ Booth.***

Sept. 28–30, **RadioFest 2001**, Monte Carlo Inn, Oakville, Ontario, Canada. Contact Harold Sellers, 905-853-3518; fax 905-853-3169; <listeningin@home.com>; <www.odxa.on.ca>.

Sept. 29, **Kingman, AZ Fallfest**, Mohave Community College, Kingman, Arizona. Contact Bill, KAØIYS, 520-753-2293. (Talk-in 146.76, PL131.8; exams 9 AM, details Charlie, W6PNM, 520-757-7553)

A publication of

CQ Communications, Inc.
25 Newbridge Road
Hicksville, NY 11801 USA.

Offices: 25 Newbridge Road, Hicksville, New York 11801. Telephone: (516) 681-2922. FAX (516) 681-2926. E-mail cq@cq-amateur-radio.com. Website:http://www.cq-amateur-radio.com. CQ (ISSN 007-893X) is published monthly by CQ Communications Inc. Periodical postage paid at Hicksville, NY and additional offices. Subscription prices (all in U.S. dollars): Domestic—one year $31.95, two years $57.95, three years $83.95; Canada/ Mexico—one year $44.95, two years $83.95, three years $122.95; Foreign Air Post—one year $56.95, two years $107.95, three years $158.95. U.S. Government Agencies: Subscriptions to CQ are available to agencies of the United States government, including military services, only on a cash with order basis. Requests for quotations, bids, contracts, etc. will be refused and will not be returned or processed. Entire contents copyrighted CQ Communications Inc. 2001. CQ does not assume responsibility for unsolicited manuscripts. Allow six weeks for change of address.

Printed in the United States of America.

Postmaster: Please send change of address to CQ Magazine, 25 Newbridge Road, Hicksville, NY 11801.

Our Readers Say

CQ Marketing Challenge

The following letters are early responses to the "CQ Marketing Challenge" for ham radio issued in our August editorial:

Editor, *CQ*:

GREAT August column. As a promotions/marketing consultant for many years, I came across a fantastic opportunity to promote our hobby/service during vacation last week. My wife and I decided it was time for the kids to graduate from "toy" walkie-talkies, so we opted to buy some more expensive Family Radio Service two-ways. Was I ever amazed at the activity on these devices! I was so impressed, I purchased a mobile unit on sale from RadioShack! Honestly, there was more activity on I-69 from Battle Creek, Michigan to Indianapolis on that thing than *any* of the 2 meter repeaters I tossed my callsign out over.

In running into the many people I spoke to, I realized what a great tool these are for introducing ham radio! I tell the folks that I talk to "strangers" every day, only on a larger scale, through ham radio. This does get them interested. But how much more effective would it be to include a little introductory postcard with each of these units? Something to the effect that, yes, you will run into new radio friends with these FRS units, some in your own neighborhood, some in your own town. But if you're interested in meeting new friends from *all over the world*, let us introduce you to ham radio! Then supply an address where these potential hobbyists can write to and receive info.

These FRS radios are creating a whole new breed of radio enthusiasts, and we must act quickly to tap the resource.

73, Bill Lauterbach, WA8MEA
Owner, DWM Communications

Bill – What a great (and simple) idea! Many of the FRS radio manufacturers produce ham gear also, so it might be to their benefit as well as ham radio's to develop such an intro/promo tool. Thank you.

Editor, *CQ*:

Congratulations. You are the first ham I've seen who has thought through (albeit in a preliminary way) steps that might be taken to give our hobby a boost. I have two comments and a suggestion (I am not a marketing man but the next thing to it—a retiree who spent 33 years in Washington, DC as a lobbyist, and a successful one, I might add).

1. You don't have much to sell. Good lobbying (marketing) starts with a good product. My thesis is the current product is fatally defective. The first experiences of a newly-licensed ham (I am one) are bound to be either boring, frustrating, or both. An immediate upgrade is required, which is an imposition on the newcomer. (See #2)

2. The entry-level licenses now provided are inadequate. Joseph Speroni (AHØA) has unsuccessfully petitioned the FCC to expand Novice/Technician Plus HF CW privileges on the grounds that current HF CW privileges are deficient. I have submitted a similar, newer, proposal. Either the present entry-level license privileges should be made more robust (and therefore of real value) or they should be discarded. Then the General Class license, which does have real value, by default would once again serve as the first step into ham radio (albeit a large first step).

Finally, I would hope that *CQ* would consider sponsoring a roundtable of selected respondents to your column for a brainstorming session. Rent a meeting room at a hotel near LaGuardia (or O'Hare) Airport and invite people to come. I'd guess a number would, at their own expense, if they could fly in and fly out on the same day.

John Rippey, W3ULS
Montross, VA

John – First of all, your idea of a brainstorming session is excellent, and one we certainly could consider if we get sufficient response. Second, your perceptions of the value (or lack thereof) of the Technician license serves primarily to prove our abysmal failure in properly marketing ham radio. Having spent four years as Editor of CQ VHF *before moving to* CQ*, I can assure you that there is plenty of value in a Tech license, from the DXing possibilities on 6 meters and even 2 meter SSB, to satellites, public service and emergency communications, and the opportunity to use the amateur bands for developing new methods of wireless digital communications.*

I have no argument with your conclusion that the current Novice/Tech-Plus HF privileges are inadequate. One proposal being considered by the ARRL for possible submission to the FCC is to grant full General Class CW/digital privileges to Novices and Techs with code credit (voice privileges would follow after passing the General theory exam). This would add significantly to the value of those licenses and it's something we could probably support if it came to pass.

Tempest in a VE-pot

Editor, *CQ*:

I am writing to express my disappointment and anger that you would accept advertising that suggests that as long as you don't get caught, it is OK to cheat on a license exam.

I am specifically referring to the MFJ Enterprises, Inc., advertisement on page 45 of the August 2001 issue of *CQ*. In the far left column of the page in bold print, (referring to the company's new code reader,) is a plea of sorts that says, "Please, please don't use it on CW exams (or at least don't get caught!)."

I, like many other Volunteer Examiners, find the parenthetical phrase offensive because it suggests that as long as you don't get caught, it's OK to use the device to cheat on the Morse exam. I realize it's too late to do anything about the ad in the August edition. Therefore, I request that in the future, you refuse further advertisements from any advertiser that suggests cheating on a license exam is OK. Thank you.

Bob Rose, AA3RR
via e-mail

Bob – To quote another ham, William Shakespeare, "methinks the lady doth protest too much." The advertising copy was clearly tongue-in-cheek and I can't believe that anyone would seriously consider it as a green light from the manufacturer to use the device for cheating on an exam. In addition, I have seen the device demonstrated and it must be held very close to the speaker in order to properly detect and decode anything. Presumably, any VEs would notice an examinee holding a device up to a speaker or his/her headphones instead of listening and writing during a code exam.

However, you don't seem to be the only person to have over-reacted to this ad. ARRL/VEC Manager Bart Jahnke, W9JJ, received enough similar comments that he posted the following letter to the ARRL/VEC e-mail reflector. I'm sure it represents the views of other VECs as well:

Dear VE:

Several of you have contacted the ARRL and MFJ regarding your concern over the recent "MFJ Morse Code Reader" advertisements in *QST* and other media. A statement in the ad text that—while clearly in jest—has piqued concerns by VEs and others in suggesting that if one were to consider cheating by using this new pocket-sized device, to at least not get caught.

The ARRL VEC and its tens of thousands of VEs take great strides to ensure that cheating is prevented. A primary task of three or more person VE teams is to ensure that no one cheats (monitoring the test session is one of the VE's most important duties). And, when necessary, one of the more challenging tasks of VEs is that when cheating is identified, it is dealt with swiftly by the VE team.

As always, if someone is observed to be cheating by using such a device at your ARRL VEC test sessions, please handle the matter as if the device were a calculator with formulas or answers programmed in its memory. That is, notify the examinee that using such a device allows an advantage in taking the exam; and that such an advantage is prohibited. Advise the person their exam is considered failed; and direct the person to leave the examination site. Do NOT confiscate the device (just as you would not confiscate a calculator), but you can advise the examinee to not bring any such device to future exams.

We understand that the detection sensitivity of this particular device may be such that the device must be relatively close to the audio source.

Last, be sure to include in your usual public and in-person test session announcements a statement regarding the non-permitted use of any code reading devices during the examination, to follow any statement(s) you already may be making about programmable calculators, etc.

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

BURBANK, CA
2492 W. Victory Bl., 91506
(818) 842-1786
(800) 854-6046
Eric, KA6IHT, Mgr.
Victory Blvd. at Buena Vista
1 mi. west I-5
burbank@hamradio.com

OAKLAND, CA
2210 Livingston St., 94606
(510) 534-5757
(800) 854-6046
Mark, WI7YN, Mgr.
I-880 at 23rd Ave. ramp
oakland@hamradio.com

SAN DIEGO, CA
5375 Kearny Villa Rd., 92123
(858) 560-4900
(800) 854-6046
Tom, KM6K, Mgr.
Hwy. 163 & Claremont Mesa
sandiego@hamradio.com

SUNNYVALE, CA
510 Lawrence Exp. #102
94085
(408) 736-9496
(800) 854-6046
Ken, K1ZKM, Mgr.
So. from Hwy. 101
sunnyvale@hamradio.com

NEW CASTLE, DE
(Near Philadelphia)
1509 N. Dupont Hwy., 19720
(302) 322-7092
(800) 644-4476
Rick, K3TL, Mgr.
RT.13 1/4 mi., So. I-295
newcastle@hamradio.com

PORTLAND, OR
11705 S.W. Pacific Hwy.
97223
(503) 598-0555
(800) 854-6046
Rich, NF7D, Mgr.
Tigard-99W exit
from Hwy. 5 & 217
portland@hamradio.com

DENVER, CO
8400 E. Iliff Ave. #9, 80231
(303) 745-7373
(800) 444-9476
Joe, KDØGA, Mgr.
John, N5EHP, Mgr.
denver@hamradio.com

PHOENIX, AZ
1939 W. Dunlap Ave., 85021
(602) 242-3515
(800) 444-9476
Gary, N7GJ, Mgr.
1 mi. east of I-17
phoenix@hamradio.com

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

WOODBRIDGE, VA
(Near Washington D.C.)
14803 Build America Dr.
22191
(703) 643-1063
(800) 444-4799
Mike, N4MDK, Mgr.
Exit 161, I-95, So. to US 1
woodbridge@hamradio.com

SALEM, NH
(Near Boston)
224 N. Broadway, 03079
(603) 898-3750
(800) 444-0047
Chuck, KM4NZ, Mgr.
sales@hamradio.com
Exit 1, I-93;
28 mi. No. of Boston
salem@hamradio.com

Manufacturer's Day Aug 25th - Salem NH

HAM RADIO OUTLET

WORLDWIDE DISTRIBUTION

MANUFACTURER'S DAY – Aug. 25th!
Special one day only pricing at ALL 12 HRO STORES for Manufacturer's Day.
(Salem only) – *Hourly Prizes* –
– *Meet Mfr. Reps* –
– *See the latest gear* –
10:00 am - 5:30 pm
(no purchase necessary)

Call For Hot Summer Specials!

YAESU

FT-840

- 100W • 12V DC • DDS
- Gen. Cov. Rx, 100 mem.
- Optional Ext. Auto • Tuners Available

Call Now For Our Low Pricing!

$100. mfg coupon expires 9/30/01

FT-817 HF/VHF/UHF TCVR

- 5W @13.8V ext DC • USB, LSB, CW, AM, FM
- Packet (1200/9600 Baud FM)
- 200 mems, built in CTCSS/DCS
- TX 160-10M, 6M, 2M, 440
- Compact 5.3" x 1.5" x 6.5", 2.6 lbs
- 9.6v Nicad or 8 AA battery capable

NEW!

Call Now For Low Pricing!

FT-847

Ultimate Base Station, HF, VHF, UHF

- 100w HF/6M, 50w 2M/430 mHz
- DSP • Full Duplex Cross-band
- 1200/9600 Baud Packet Ready

Call for Low Price!

$300. mfg coupon expires 9/30/01

$20. mfg coupon expires 9/30/01

FT-2600M 2M Mobile

- Compact 2M 60W mobile • 12000/9600 baud
- 4 selectable power levels • Built-in CTCSS/DCS
- 175 mems, 8 character alpha-numeric display
- Low intermod Rx, Rugged

Call Now For Low Pricing!

$30. mfg coupon expires 9/30/01

FT-90R

2M/440 Mini Dualbander Transceiver

- 50w 2m, 40w 440mHz
- Wide Rx • Detachable Front Panel
- Packet Ready 1200/9600 Baud
- Built-in CTCSS/DCS Encoder/Decoder
- Less than 4" wide!

Call for Your Low Price!

$250. mfg coupon expires 9/30/01

FT-1000MP MKV HF Transceiver

- Enhanced Digital Signal Processing
- Dual RX
- Collins SSB filter built-in
- 200W, External power supply

Call Now For Low Pricing!

VR-500

Handheld Receiver

$30. mfg coupon expires 9/30/01

- 100kHz - 1300 mHz
- CW, LSB, USB, AM, FM (narrow and wide)
- Cell blocked in USA
- 1000 memory channels
- 8 character alpha-num display

NEW!

Great Sound, Call Today!

$150. mfg coupon expires 9/30/01

FT-920 HF+6M Transceiver

- 100w 160-6M, 12VDC
- Built-in DVR, CW Memory Keyer
- DSP, Auto-Notch • 99 Memories
- Computer controllable, CAT System

Call For Low Pricing!

$100. mfg coupon expires 9/30/01

FT-100D HF/6M/2M/70CM Transceiver

- Compact Transceiver w/detachable front panel
- Rx 100kHz to 970mHz (cell blocked)
- Tx 100W 160-6M, 50w 2M, 20W 70CM
- Built-in DSP, Vox, CW keyer
- 300 Memories

Call Now For Low Pricing!

VX-5R

50/2M/440HT

- Wideband RX • 6M-2M-440TX
- 5W output • Li-Ion Battery
- 220 mems, opt. barometer unit
- Alpha Numeric Display
- CTCSS/DCS built-in

Call For Low Price!

$20. mfg coupon expires 9/30/01

FT-50RD

2M/440mHz Compact HT

- DVR, Decode, Paging Built-in
- Alpha numeric display
- Wide Band receive
- Battery Saver • 112 Memories
- Mil-Spec • HiSpeed scanning

Call For Your Low Price!

NEW!

FT-7100M 2M/440 Mobile

- Ultra Compact • 50w/35w 2m/440
- 262 memories • V/V, U/U, V/U • CTCSS, DCS, ARTS
- Remotable front panel w/opt. YSK-7100

Call Now For Special Pricing

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

Look for the HRO Home Page on the World Wide Web
http://www.hamradio.com

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

Results of the 2000 CQ WW DX CW Contest

BY BOB COX,* K3EST

DX1S's QTH in the Philippines. The operator was Roland, DK3GI.

After sorting through the 3676 logs received, the 2000 CQ WW DX CW Contest can best be summarized by "Wow!" The conditions were outstanding. Even when there was a solar flare on Sunday, the consensus was that this was a contest to remember. Outstanding openings on 10, 15, and 20 meters made for lots of QSO opportunities. The number of normally hard-to-find DX stations on the air for the contest gave many new countries to a lot of contesters. The effect of the solar flare did not last long, and when good conditions returned, the QSOs kept coming.

The number of electronic logs received is increasing every year. This has allowed us to publish the results in a more timely manner. Look here on the pages of *CQ* for your call and check out the various boxes to see how the top entrants performed.

High Power

Put together a great location with great conditions to Europe and the U.S., a great operator, and lots of multipliers within easy reach and what do you have? EA8BH operated by N5TJ. Jeff took the trip over to EA8, but this time for the CQ WW CW. When the contest was over, the new World CW All Band record was in his pocket. I think his words in the DX QRM best summarize his feelings (see following pages). Second place in the world went to Jose, CT1BOH, who went down to P40E. Operating from the northern side of P4, where there is a clear shot north, José made it into many logs. Third place went to Hrane, YT1AD, who operated 3V8BB.

In the U.S. Randy, K5ZD/1, put it all together for a colossal win. Taking on both K1AR and K1ZZ, Randy was the clear winner. In second place was John, K1AR, operating from K1EA's QTH. Third was Dave, K1ZZ.

In northern Europe OH1JT looked up at the sky and didn't see a massive aurora. This was a good sign, which he really took advantage of by pushing OHØZ to first place in Europe. Second place went to Dave, G4BUO, while third was won by DL1IAO. The top entrants from each continent were North America 8P9Z, Africa EA8BH, Asia A45XR, Europe OHØZ, South America P40E, and Oceania V8A.

Low Power

Running 100 watts output is a category with a big challenge. It puts a real emphasis on location and antennas. Going to a place which can generate high QSO numbers defines the locations of all three top low power winners. Finishing on top after all the scores were certified was V26K operated by AA3B. Second place went to SU9ZZ, who not only did a fantastic job, but I am sure his efforts are appreciated by the whole contesting community. He was almost surely a double mult for everyone. World third place went to TI5N operated by K9NW.

In Europe the top scorer was SQ6Z operated by SP3RBR. It seems that northeast Europe is the place to be for low power in Europe. Second place went to LY9A operated by LY3BA, and third was taken by YZ7AA. In the U.S. K1RO pushed the paddle/keyboard to new low power heights, setting a U.S. record. Second place went to N8AA, and third to AA1ON. A special mention must be made of the scores of EY8MM, PX2W, UP6P, P29VPY, PY2NY, and VU2PAI. Each did an outstanding job from places far away from the U.S. and/or Europe. The top entrant from each continent was North America TI5N, Africa SU9ZZ, Asia EY8MM, Europe SQ6Z, South America PX2W, and Oceania P29VPY.

QRP

The QRP crowd is a dedicated bunch. Working people with 5 watts is a challenge at any time. Doing it during the CQ WW when conditions are great to disturbed is a *real* challenge. This year there were many people who took on that challenge. Setting a new U.S. QRP all band record while keying himself to the world top score was K3OO. What a great job he did. Second place went to Doug, KR2Q, the former record holder. Third-place world went to N3BJ/4. Over in Europe LY5G operated by LY2FE took top honors. He was followed by S55A and SM3C operated by SM5CCT. Outstanding efforts were made by JR4DAH, who set a new Japanese record, and PQ2Q operated by PY2WC. Both operated from areas far from population centers.

QRP 1000 QSOs: K3OO, KR2Q, N3BJ/4, LY5G, S55A, SM3C, DL6MHW, DL3KVR, SP4GFG, PA3ELD, S52P, F6OIE, JR4DAH, and PQ2Q. Winners by continent: North America K3OO, Africa none, Asia JR4DAH, Europe LY5G, South America PQ2Q, Oceania none.

Assisted

The number one score in the world was achieved by Charles, K3WW. He has learned how to combine QSO rates with callouts in a way that yields a big score. That skill is a tough lesson to learn for most assisted entrants. The number two score in the world was from KI1G.

*1816 Poplar Lane, Davis, CA 95616
e-mail: <questions@cqww.com>

CQ9K operated by Frank, DL2CC, took third place in the world, and fourth was K2NG. In Europe, Harry, RA3AUU, traveled from Moscow to Belgium to move farther west and activate ON4UN's station. It certainly helped, as he won the number one spot in Europe. Second place went to the northern Poland station of SP2FAX. YL8M operated by YL2KL was third.

Continental winners were North America K3WW, Africa CQ9K, Asia RZ9HT, Europe OTØT, South America ZX2B, Oceania none.

Multi-Single

Once again taking first place in the world, the P3A ops put their close-to-Europe location to good use. With a team made up of Russians, they

TOP SCORES

WORLD

All Band

EA8BH	18,010,765
P40E	12,524,160
3V8BB	11,797,800
8P9Z	9,176,174
A45XR	8,786,811
K5ZD/1	8,756,568
FY5KE	8,608,614
K1AR	8,559,474
CT3BX	8,554,028
K1ZZ	8,307,600

28 MHz

ZS6EZ	2,017,800
3E1DX	1,805,225
NP4A	1,649,209
EA9LZ	1,537,569
CX5X	1,357,358
FM5BH	1,119,504

21 MHz

ZX5J	1,417,644
ZF2AM	1,196,320
VE6JY	1,028,223
K2SS/1	974,440
KH7Z	923,949
OK1RF	905,382

14 MHz

4M5X	1,305,274
OH2BH	1,233,904
DJ7AA	1,133,568
OG3M	1,082,886
S59A	884,834
9A3GW	868,680

7 MHz

IH9P	1,218,145
YT7A	680,394
LY7Z	555,060
HG8M	524,004
PYØFF	506,925
W5UN	448,902

3.5 MHz

W1MK	417,240
UN7CW	230,868
EA9AZ	228,360
4N1A	215,586
9A5Y	208,680
UA9CI	174,468

1.8 MHz

A61AO	141,900
4X3A	135,364
UA9AT	121,678
ON4WW	121,002
RU9TO	98,496
LZ2FV	78,400

Low Power
All Band

V26K	6,541,600
SU9ZZ	6,423,725
TI5N	6,013,962
EY8MM	4,244,434
K1RO	3,409,245
SQ6Z	3,404,358
LY9A	3,220,284
P29VPY	3,116,616
VA7RR	2,898,432
YZ7AA	2,731,193

28 MHz

ZF2RR	851,736
WP2Z	790,230
EA8FT	704,707
LP1F	658,312
VK4DX	638,950
N2BA	589,200

21 MHz

VK4EMM	815,850
CX5AO	781,404
LU6UO	547,428
OHØN	522,415
LU4DX	518,568
RZ3QU	499,733

14 MHz

ZC4DW	597,114
3Z9XCN	566,430
VE9ST	554,439
CX9AU	466,725
RJ9J	464,163
LY2BM	394,864

7 MHz

HI3K	524,538
CO8ZZ	378,713
TA3D	360,166
PA3AAV	352,132
EU1DX	327,820
RU4PL	322,371

3.5 MHz

9A7T	89,652
EU1AZ	89,507
SP5JTF	88,666
T94OL	80,262
DL1CW	77,440
LY3NFW	77,244

1.8 MHz

9A7R	54,670
S57M	37,895
T99T	36,603
RA3DOX	16,184
VE3OSZ	15,863
OK2SNX	11,472

QRP
All Band

K3OO	1,731,450
KR2Q	1,703,808
N3BJ/4	1,460,019
LY5G	1,239,112
S54AA	1,062,165
SM3C	1,017,968
N8ET	956,921
JR4DAH	945,700
K1RC	887,356
DL3KVR	859,200

Assisted
All Band

K3WW	8,465,815
KI1G	8,117,415
CQ9K	7,046,595
K2NG	6,996,497
W2UP	6,892,360
OTØT	6,817,365
SP2FAX	6,612,940
K2XA	4,960,504
YL8M	4,891,760
K1AM	4,750,325

Multi-Operator
Single Transmitter

P3A	16,426,602
TS7N	13,140,050
RU1A	12,753,600
EA6IB	10,691,889
K1KI	10,353,042
PJ2T	10,215,532

Multi-Operator
Multi-Transmitter

CN8WW	70,046,436
HC8N	44,689,904
A61AJ	36,606,846
KC1XX	24,386,352
W3LPL	24,093,155
9G5AA	23,692,130

UNITED STATES

All Band

K5ZD/1	8,756,568
K1AR	8,559,474
K1ZZ	8,307,600
KQ2M/1	8,023,296
W9RE	7,472,178
K1DG	7,199,169
W1KM	6,871,806
N2NT	6,527,500
K2UA	6,075,104
K4ZW	5,643,253

28 MHz

W4ZV	965,874
K4OJ	701,220
N4BP	679,434
K2ZJ	672,290
K5RX	658,982
NSØZ	616,960

21 MHz

K2SS/1	974,440
K2VV	890,736
W2FU	687,309
N4PN	684,500
K4OAQ	647,879
K5SZ	598,216

14 MHz

N7CW/6	232,632
W5FO	222,003
W8TWA	144,840
K9CAN	122,225
WB4NRI	17,473
W6MVW	7,242

7 MHz

W5UN	448,902
K4VX/Ø	330,959
W6KR	218,688
KØCL	199,660
W7LGG	129,383
K9CJ	116,765

3.5 MHz

W1MK	417,240
K3SV	153,776
K8MD	25,584
W8AEF/7	18,696
K2LP	7,830
K1KO/3	2,160

1.8 MHz

K1FZ	45,270
W8UVZ	24,725
K2AXX	8,372
W2VO	3,174
W6/KH6DX	2,106
K4TEA	2,050

Low Power
All Band

K1RO	3,409,245
N8AA	2,732,951
AA1ON	2,637,522
W2TZ	2,616,094
W3EF/1	2,605,764
K1VUT	2,545,683
K1OA	2,522,482
NA2U	2,332,407
KM1X	2,143,596
WE1USA	2,069,325

28 MHz

N2BA	589,200
W1WAI	394,940
K5KLA	308,104
K4WA	273,888
K2MFY	252,142
AEØQ	185,889

21 MHz

N4MO	393,599
WQ5W	355,520
NØNR	352,160
N5DO	205,155
K9WA	163,703
W9ILY	154,420

14 MHz

KJ9C	201,001
N7WA	147,477
W8UMR	67,487
KX2S	51,345
WJ5K	28,737
WD6DX	20,075

7 MHz

KVØQ	218,988
WB2DVU	117,285
K5WA	100,620
NØRA	88,138
N4PSE	65,954
K9MMS	58,298

3.5 MHz

W2TO	17,813
WØUO/5	15,616

1.8 MHz

K1PX	3,850
WS4Y	1,334
KØUK	1,219
K8DO	110

QRP
All Band

K3OO	1,731,450
KR2Q	1,703,808
N3BJ/4	1,460,019
N8ET	956,921
K1RC	887,356
N7IR	638,352
W0MHK/2	632,214
WA3NKO	542,776
N5TW	505,078
N9CIQ	439,856

Assisted
All Band

K3WW	8,465,815
KI1G	8,117,415
K2NG	696,497
W2UP	6,892,360
K2XA	4,960,504
K1AM	4,750,325
N3AD	4,661,244
N3RR	4,569,648
N1EU	4,251,440
KQ3F	3,766,860

Multi-Operator
Single Transmitter

K1KI	10,353,042
K4XS	9,704,825
K8AZ	8,853,829
W2AA	7,810,311
K1IR	7,789,040
K4JA	7,760,124

Multi-Operator
Multi-Transmitter

KC1XX	24,386,352
W3LPL	24,093,155
N2RM	21,653,289
K3LR	21,160,267
K9NS	17,348,708
N3RS	16,509,815

EUROPE

All Band

OHØZ	5,636,403
G4BUO	5,426,826
DL1IAO	5,325,995
ZB2X	4,869,000
SP7GIQ	4,640,184
S5ØA	4,582,743
YT7R	4,319,775
OHØR	4,270,420
OZ1LO	4,245,948
OH5CW	4,202,382

28 MHz

OHØV	1,071,908
GIØKOW	1,023,930
9HØA	993,265
OK2RZ	833,341
IU2D	810,960
SP3KEY	707,658

21 MHz

OK1RF	905,382
9A5W	880,334
SN3A	757,292
OH7A	739,500
OH6AC	667,638
OTØA	658,070

14 MHz

OH2BH	1,233,904
DJ7AA	1,133,568
OG3M	1,082,886
S59A	884,834
9A3GW	868,680
T99W	716,184

7 MHz

YT7A	680,394
LY7Z	555,060
HG8M	524,004
US2IR	419,418
LA6YEA	418,876
DK5QN	387,666

3.5 MHz

4N1A	215,586
9A5Y	208,680
SP8BRQ	168,375
YZ6A	152,388
YU1KR	142,415
OK2GZ	118,637

1.8 MHz

ON4WW	121,002
LZ2FV	78,400
YL2PQ	73,430
9A2AJ	68,521
SV1NA	66,810
EU6EU	64,543

Low Power
All Band

SQ6Z	3,404,358
LY9A	3,220,284
YZ7AA	2,731,193
ER6A	2,639,718
9H1ZA	2,622,617
HA1CW	2,552,495
RM3C	2,400,685
YU7CB	2,313,468
IO3JSS	2,188,721
OM6T	2,185,099

28 MHz

YU3ØNW	465,273
YU7WW	441,543
EA6/DL8NBY	281,728
I3MLU	258,566
EI5DI	238,464
SM5NBE	238,431

21 MHz

OHØN	522,415
RZ3QU	499,733
9A2U	439,774
UA3ABJ	356,622
OTØH	354,868
OK2NN	295,336

14 MHz

3Z9XCN	566,430
LY2BM	394,864
US1ITU	242,730
GØMTN	235,840
UXØZX	228,824
4N7B	227,712

7 MHz

PA3AAV	352,132
EU1DX	327,820
RU4PL	322,371
DL1LH	321,328
S54A	216,294
UT1FA	196,826

3.5 MHz

9A7T	89,652
EU1AZ	89,507
SP5JTF	88,666
T94OL	8,0262
DL1CW	77,440
LY3NFW	77,244

1.8 MHz

9A7R	54,670
S57M	37,895
T99T	36,603
RA3DOX	16,184
OK2SNX	11,472
RN1AO	10,706

Assisted
All Band

OTØT	6,817,365
SP2FAX	6,612,940
YL8M	4,891,760
GMØGAV	4,152,636
OK2FD	4,042,104
S59AA	3,991,680
OE4A	3,764,568
RD4M	3,659,829
RX3APM	3,461,832
OH6NIO	3,130,965

QRP
All Band

LY5G	1,239,112
S54AA	1,062,165
SM3C	1,017,968
DL3KVR	859,200
DL6MHW	799,488
SP4GFG	860,749
PA3ELD	631,110
DK8ZB	580,944
S52P	521,304
F6OIE	495,610

Multi-Operator
Single Transmitter

RU1A	12,753,600
EA6IB	10,691,889
9A7A	9,798,180
OE2S	8,858,824
OM8A	8,745,810
IQ4A	8,735,222

Multi-Operator
Multi-Transmitter

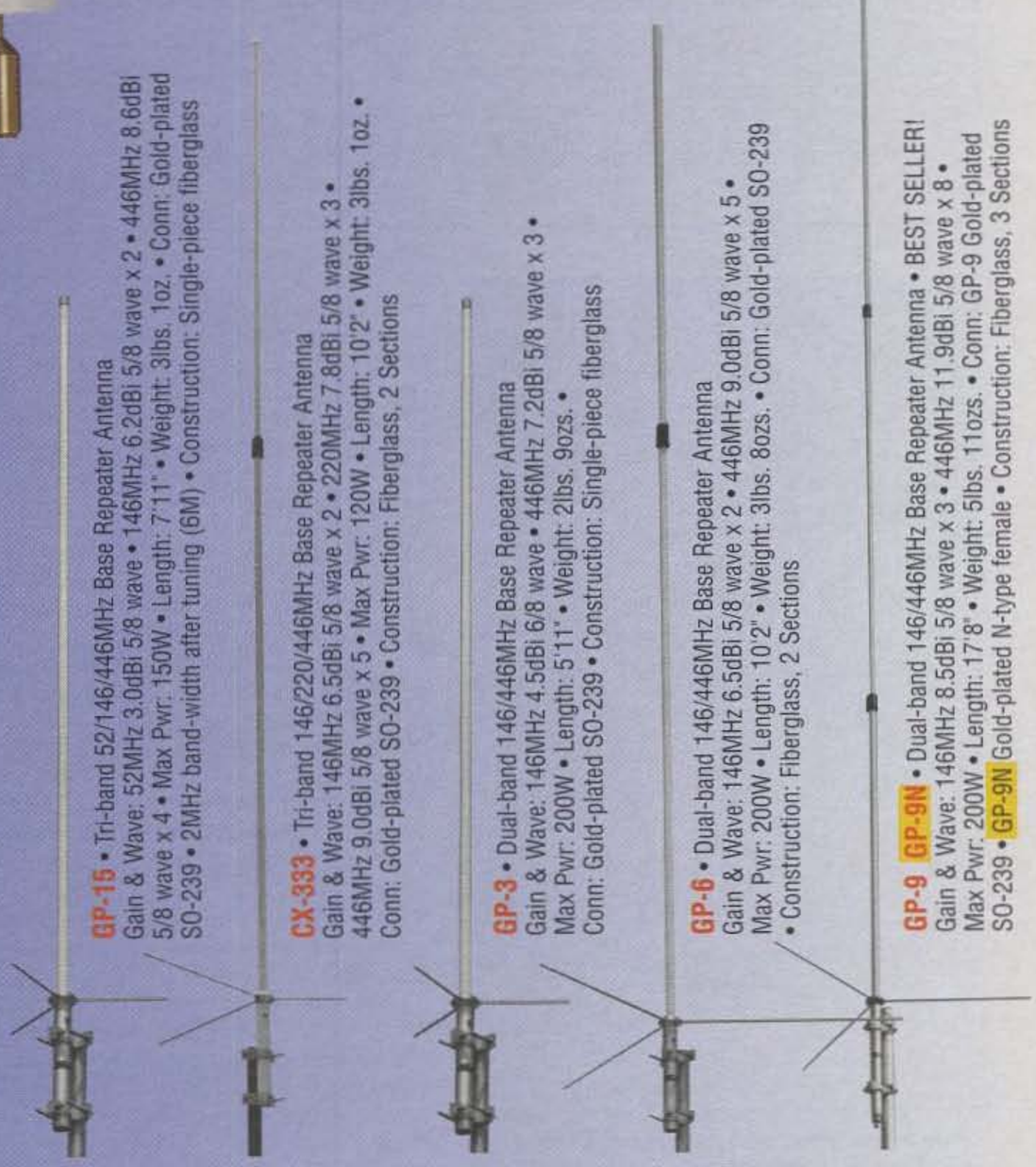
OH2U	22,154,854
RW2F	21,740,852
DFØHQ	19,859,880
HG6N	16,609,584
ES9C	15,710,400
EA4ML	12,785,300

COMET™

NCG/COMET has an extensive line of Mono-Band, Dual-Band, Tri-Band Antennas for Base Station and Repeater use.

Featuring the COMET Exclusive SLC System:

- **Linear Coil for Maximum Gain**
- **Soldered Element Joints**
- **ABS Radome Joints: Weather Proof/Invisible to RF for the Finest Radiation Pattern**



GP-15 • Tri-band 52/146/446MHz Base Repeater Antenna
Gain & Wave: 52MHz 3.0dBi 5/8 wave • 146MHz 6.2dBi 5/8 wave x 2 • 446MHz 8.6dBi 5/8 wave x 4 • Max Pwr: 150W • Length: 7'11" • Weight: 3lbs. 1oz. • Conn: Gold-plated SO-239 • 2MHz band-width after tuning (6M) • Construction: Single-piece fiberglass

CX-333 • Tri-band 146/220/446MHz Base Repeater Antenna
Gain & Wave: 146MHz 6.5dBi 5/8 wave x 2 • 220MHz 7.8dBi 5/8 wave x 3 • 446MHz 9.0dBi 5/8 wave x 5 • Max Pwr: 120W • Length: 10'2" • Weight: 3lbs. 1oz. • Conn: Gold-plated SO-239 • Construction: Fiberglass, 2 Sections

GP-3 • Dual-band 146/446MHz Base Repeater Antenna
Gain & Wave: 146MHz 4.5dBi 6/8 wave • 446MHz 7.2dBi 5/8 wave x 3 • Max Pwr: 200W • Length: 5'11" • Weight: 2lbs. 9ozs. • Conn: Gold-plated SO-239 • Construction: Single-piece fiberglass

GP-6 • Dual-band 146/446MHz Base Repeater Antenna
Gain & Wave: 146MHz 6.5dBi 5/8 wave x 2 • 446MHz 9.0dBi 5/8 wave x 5 • Max Pwr: 200W • Length: 10'2" • Weight: 3lbs. 8ozs. • Conn: Gold-plated SO-239 • Construction: Fiberglass, 2 Sections

GP-9 **GP-9N** • Dual-band 146/446MHz Base Repeater Antenna • BEST SELLER!
Gain & Wave: 146MHz 8.5dBi 5/8 wave x 3 • 446MHz 11.9dBi 5/8 wave x 8 • Max Pwr: 200W • Length: 17'8" • Weight: 5lbs. 11ozs. • Conn: GP-9 Gold-plated SO-239 • **GP-9N** Gold-plated N-type female • Construction: Fiberglass, 3 Sections

For a complete catalog of **COMET** Antenna products call or visit your local dealer. Or, contact **NCG Company** at **800/962-2611. Use NCG/COMET products, and enjoy amateur radio to it's fullest!**

NCG COMPANY™

COMET™

1275 N. Grove Street • Anaheim • California 92806
(714) 630-4541 • (800) 962-2611 • Fax: (714) 630-7024 • www.cometantenna.com

BAND-BY-BAND BREAKDOWN—TOP ALL BAND SCORES

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

WORLD TOP SINGLE OPERATOR ALL BAND

Station	160	80	40	20	15	10
EA8BH	197/17/60	541/20/82	1091/33/95	1601/39/129	1746/39/134	2375/35/133
P4ØE	280/15/39	552/20/67	1013/27/92	1012/35/107	1457/37/117	2019/35/113
3V8BB	251/11/53	633/18/70	1300/27/93	1491/33/111	1143/32/112	1366/35/105
8P9Z	123/9/18	557/20/66	1179/24/84	1110/30/86	1180/29/94	2088/32/94
A45XR	243/13/52	319/20/62	890/26/77	1107/32/101	1188/34/107	1252/30/95
K5ZD/1	104/14/40	384/19/73	971/29/103	988/33/105	848/33/104	1189/33/106
FY5KE	87/12/33	290/13/48	713/26/77	503/31/92	1177/33/108	2123/33/117
K1AR	34/10/19	398/16/69	1064/29/96	1009/35/114	865/32/112	1203/35/112
CT3BX	68/13/31	351/13/50	707/16/63	1416/29/85	1782/31/87	1612/29/85
K1ZZ	37/12/26	325/20/69	998/31/102	659/36/105	1253/35/111	1073/33/108

USA TOP SINGLE OPERATOR ALL BAND

Station	160	80	40	20	15	10
K5ZD/1	104/14/40	384/19/73	971/29/103	988/33/105	848/33/104	1189/33/106
K1AR	34/10/19	398/16/69	1064/29/96	1009/35/114	865/32/112	1203/35/112
K1ZZ	37/12/26	325/20/69	998/31/102	659/36/105	1253/35/111	1073/33/108
KQ2M/1	19/9/15	299/16/62	785/27/95	950/37/114	1009/35/114	1335/34/116
W9RE	25/12/14	112/15/48	776/30/100	1179/36/114	875/34/111	1164/32/105
K1DG	58/11/33	307/19/64	1021/28/93	671/31/99	858/33/101	1118/31/104
W1KM	65/9/38	421/23/73	731/26/86	755/36/99	769/30/93	1071/31/95
N2NT	32/12/24	248/17/69	638/25/84	937/36/102	902/34/96	1020/31/95
K2UA	25/10/17	148/13/47	686/28/94	709/29/94	835/32/100	1360/31/97
K4ZW	7/5/5	93/13/46	770/26/84	647/30/89	914/34/104	1026/35/110

WORLD MULTI-OPERATOR SINGLE TRANSMITTER

P3A	187/9/57	827/21/82	1429/30/109	1425/38/135	1619/37/128	2047/37/134
TS7N	178/10/57	366/18/79	1119/29/100	1074/35/134	2192/31/125	1419/33/119
RU1A	71/18/69	315/33/110	992/37/132	1547/38/146	1355/38/150	1390/39/150
EA6IB	236/16/63	806/29/96	1270/34/118	1357/37/142	1330/38/135	1418/39/146
K1KI	58/13/53	453/22/86	926/30/118	1010/38/143	880/37/136	1148/35/143
PJ2T	95/11/18	307/13/50	976/28/90	1207/37/113	1469/33/114	1731/36/110

USA MULTI-OPERATOR SINGLE TRANSMITTER

K1KI	58/13/53	453/22/86	926/30/118	1010/38/143	880/37/136	1148/35/143
K4XS	22/10/21	148/21/78	938/35/122	841/37/146	971/37/152	1267/38/148
K8AZ	37/14/35	97/23/77	842/32/114	1103/37/143	846/36/133	1137/34/139
W2AA	12/8/11	172/16/71	972/31/117	475/37/140	908/36/142	1112/36/144
K1IR	31/11/27	589/23/88	924/31/112	714/36/130	762/36/124	1034/32/134
K4JA	19/9/17	64/18/60	922/34/114	1008/37/143	994/36/134	826/36/136

WORLD MULTI-OPERATOR MULTI-TRANSMITTER

CN8WW	1547/22	3181/35/124	4284/38/139	5162/38/157	4482/38/159	4734/39/161
HC8N	517/18/44	1343/30/99	3083/36/128	3771/38/161	4028/38/158	4490/39/155
A61AJ	779/27/84	1730/33/118	2817/36/128	3592/39/154	3307/38/148	3422/38/146
KC1XX	243/20/63	1224/28/102	2064/35/133	2234/38/156	2033/38/148	1891/37/150
W3LPL	261/21/60	1042/29/106	1713/34/135	2285/38/159	2013/38/156	2182/37/152
9G5AA	82/14/46	200/21/56	920/31/94	3635/39/139	3985/39/143	2358/32/116

USA MULTI-OPERATOR MULTI-TRANSMITTER

KC1XX	243/20/63	1224/28/102	2064/35/133	2234/38/156	2033/38/148	1891/37/150
N2RM	142/17/47	898/27/102	2039/36/130	2175/38/148	1752/37/150	1964/36/141
K3LR	158/19/46	631/30/103	1749/36/132	2188/38/151	1901/40/158	1850/37/151
K9NS	259/21/58	451/29/100	1116/35/128	1853/38/151	1847/38/141	1798/36/148
N3RS	70/12/34	399/22/82	1730/35/127	1872/38/150	1695/38/143	1576/34/138

Pai, VU2PAI, can always be found in the CQ WW.

sure have found a home in Cyprus. Second place in the world was the special DXpedition to Tunisia by a German team operating TS7N. This was a well-publicized contest and IOTA event. They were certainly in a *lot* of logs. Third-place world and first-place Europe was RU1A. Operating near St. Petersburg, they could be found and worked easily. Second place went to the Balearic Island contesters of EA6IB. Third place was taken by 9A7A.

In the U.S. top honors went to K1KI. Tom put together a crew that anyone would consider very experienced. That skill paid off big time. Second place went to Bill, K4XS, whose tall towers and stacks in Florida made the QTH really play. K8AZ located in northeastern Ohio won the bronze. The top scorers were North America K1KI, Africa TS7N, Asia P3A, Europe RU1A, South America PJ2T, Oceania AH2R.

Multi-Multi

Once again heading south with a strong contingent of contesters, the CN8WW team was hoping to set the world on its head this year. They did, and won by 25+ million points! Being close to Europe on the low bands makes a huge difference. Second place went to another fine group of operators at HC8N. Operating from a building specially constructed to house a multi crew, the ops could look out the windows at the Pacific Ocean in the distance. Third place in the world went to A61AJ. Ali's ideas and plans reach fruition each contest season when the operators arrive in Dubai. Located over 2000 miles from any population center, their third-place finish was outstanding *(see the A61AJ story on p. 22—ed.)*.

The competition among the U.S. multis was really tough. The winner was KC1XX. Mat's station edged out a determined W3LPL team. Third place went to N2RM, who just edged out K3LR. You can look at the Band-By-Band Breakdown box to see just where each team did well. In most cases the differences were small. Most contesters do not realize the tremendous amount of work put into all the top multi efforts. Many, many weekends are devoted to making yearly improvements.

Northern zone 15 seems to the place to be for European multi-multi. OH2U took top honors and just missed beating their own European record. Second place went to the fine ops at RW2F, while third place went to DFØHQ. These three calls made a collective 34,720 QSOs in the contest with only 408 QSOs separating them. The continental winners were North America J3A, Africa CN8WW, Asia A61AJ, Europe RW2F, South America HC8N, Oceania YJØV.

Clubs

What do you call 661 million points? The Yankee Clipper Contest Club. That was the world winning club score turned in by the contesters from the New England area. Second place world was taken by perennial power house, the Frankford Radio Club. Farther down the east coast, the Potomac Valley Radio Club took third place USA. With their two massive scores from CN8WW, the Bavarian Contest Club talked and keyed its way to the top of the DX club category and third place world. It sure pays to have members go out on DXpeditions, not only for your club but it helps to make the contest more interesting for everyone. Finishing in second place was the Rhein-Ruhr DX Association. The RRDXA just edged out Contest Club Finland.

Team Contesting

Each year there is an increase in the number of teams participating in this category. Continuing its long winning streak, one of the Neiger's Tigers teams took the top position. Winning by over 20 million points is a very convincing victory. The traveling Finns won the second-place slot. Two of the Straight Key teams ended up among the top five teams. Many of the teams, such as the Straight Key teams, compete among themselves. This fall why not join a team for the CQ WW? There are calls for team members on the contest reflector in October and November. Remember that each team has five members, and they can be from anywhere. The only requirements are that the team must

EUROPE TOP SINGLE OPERATOR ALL BAND

Station	160	80	40	20	15	10
OHØZ	267/11/46	500/19/67	611/27/85	1160/32/98	1000/32/107	1039/31/102
G4BUO	281/11/49	545/16/65	558/26/79	800/31/92	798/36/102	920/31/104
DL1IAO	132/8/47	563/21/69	768/30/93	415/29/93	834/33/102	1035/33/109
ZB2X	178/12/48	405/17/64	504/20/73	823/33/95	903/29/87	1384/33/89
SP7GIQ	153/8/42	426/21/58	943/25/75	730/30/75	957/31/90	773/34/89
S5ØA	43/8/41	482/17/70	1044/29/93	355/31/85	1024/33/91	873/34/95
YT7R	102/8/49	459/15/65	901/29/82	635/29/100	806/32/107	626/34/107
OHØR	272/12/54	390/19/67	816/31/92	596/33/92	493/30/91	749/32/105
OZ1LO	351/11/51	373/13/53	546/20/69	735/30/84	799/31/91	839/31/97
OH5CW	32/7/22	204/11/50	301/22/78	867/36/90	905/30/94	1080/34/105

EUROPE MULTI-OPERATOR SINGLE TRANSMITTER

RU1A	71/18/69	315/33/110	992/37/132	1547/38/146	1355/38/150	1390/39/150
EA6IB	236/16/63	806/29/96	1270/34/118	1357/37/142	1330/38/135	1418/39/146
9A7A	111/9/56	835/22/81	1307/31/124	901/34/132	1476/35/124	1216/36/136
OE2S	220/9/53	586/20/80	1126/34/121	822/38/135	1251/35/128	1184/36/138
OM8A	135/11/59	491/21/79	1405/30/110	986/35/126	1156/34/124	1168/35/138
IQ4A	54/9/52	295/27/101	955/36/126	690/35/136	1232/36/137	1333/37/146

EUROPE MULTI-OPERATOR MULTI-TRANSMITTER

OH2U	743/16/71	1189/32/111	2169/38/140	2807/38/156	2397/38/148	2114/39/156
RW2F	1122/22/80	1511/29/103	2267/35/134	2835/38/150	1907/37/139	2185/39/152
DFØHQ	809/12/63	1590/25/94	2589/35/135	2258/39/146	2059/39/142	2169/39/153
HG6N	575/9/57	1279/23/85	2276/35/129	2152/37/143	2088/37/141	2141/37/146
ES9C	822/14/64	1511/28/98	2162/37/136	2524/37/137	1970/37/140	1639/35/137
EA4ML	445/11/64	846/20/79	1947/30/109	2349/36/140	1707/35/126	1853/32/106

be registered before the contest begins and only single operators are allowed. Intra-club competition between several five-member teams is a good way to increase a club's overall score.

New All Time Records

World: All EA8BH (N5TJ), Q3.5 5B4AGM, Q21 LU7EE, A14 S58A. **North America**: 28 3E1DX (DL5XX), 21 ZF2AM (K6AM), L7 HI3K, L14 VE9ST, L1.8 VE3OSZ, Q3.5 VY2MGY/3, Q28 WO4O, Q21 KØAV, AA K3WW, A1.8 VE3ZI. **Africa:** A EA8BH (N5TJ), AA CQ9K (DL2CC), A28 5X1Z (OH5BM), MS TS7N. **Asia:** 28 H2G (5B4AGC), LA EY8MM, L28 VU3VLH, Q3.5 5B4AGM, Q28 UP6F (UN7FZ), A21 OD5/OK1MU. **Europe:** 28 9HØA, 14 OH2BH (OH1WZ), L14 3Z9XCN, Q28 G4EDG, Q21 LY5A (LY2PAJ), MS RU1A. **Oceania:** L21 VK4EMM, A21 WH7/N6ND. **South America:** LA PX2W, L3.5 YV1OB, L21 CX5AO, Q7 LU7HHE, Q21 LU7EE, Q14 LU1FAM. **Japan:** All JH4UYB, L21 JH9KVF, QA JR4DAH, Q28 JR3RWB, A21 JS3CTQ, MS JE4VVM. **USA:** All K5ZD/1, 3.5 W1MK, 28 W4ZV, 21 K2SS/1, LA K1RO, L7 KV0Q, L28 N2BA, L21 N4MO, QA K3OO, Q28 WO4O, Q21 KØAV, AA K3WW, A28 N2EE.

Special Mention

The contest was made more interesting by the DXpeditions of the following stations. How many did you work?

C6/WA3WSJ, P3A, TS7N, EA6IB, PJ2T, AH2R, GJ2A, AF2NT, J3G, J75KG, NU2K, LX/DL4SDX, HBØ/HB2LF, 8Q7WW, VE9/ K1JB, CN8WW, HC8N, A61AJ, 9G5AA, J3A, YJØV, V26K, TI5N, P29VPY, J79GU, EA8/ DJ1OJ, KH6/W6PH, CT3/DL2RUM, ZF2SA, J8/F6AUS, ZK1VVV, C6AKP, C56VB, V26JT, HI9/DL2DXA, FG/NØJK, EA6/DL9GFB, VP9/ NC8V, 3W2LWS, PJ4/WN7T, CT3/DL2MDU, HKØER, CT3/DL7VFR, 3A/HB9APJ, OX/ LA5KW, ZF2LA, KH6/W7DRA, ZF2RR, EA8/ DK3KD, EA6/DL8NBY, OHØN, KH7/W5MYA, KH7/N5CR, MJØASP, CQ9K, HBØ/DJØIP, 5X1Z, WH7/N6ND, EA8BH, P4ØE, 3V8BB, CT3BX, 8P9Z, D4A, PZ5JR, VP5GN, V8A, 9M6NA, OHØZ, 9M6AAC, ZB2X, EX/UA3AGS, C6AKW, OHØR, OX/N6ZZ, ERØND, T88JA, 6Y7A, BW2000, NH7/N6HC, J45KLN, IH9P, KP2/OK1DXB, 3E1DX, NP4A, KP2/OK1TN, OHØV, 4X/OL7D, ZX5J, ZF2AM, OTØA, 9M8YY, XV9SW, A61AO, OH9W, NHØS.

Comments

This year there several changes in the rules. Please look in this issue on page 52 and at <http://www.cqww.com> and <www.cq-amateur-radio.com> for the full rules. In many cases the rules appear abridged in publications other than *CQ*, so please look at the full rules on the web pages. The changes will appear in bold or italics. The most significant change is the announcement of a power limit in the high power category. The second change is a clarification by changing the title of a category. The assisted category is now called "single operator with DX spotting net." This was necessary due some ops thinking that assisted meant they could have assistants helping them, which is not allowed.

A comment must be made about the words "single operator." It means ONLY one operator, not "one operator" looking for multipliers, "one operator" running, and "one operator" on another band. This describes a multi-multi category and that is allowed, but any of the single operator categories allow only ONE person. A few entrants on CW were found to have claimed single op but had one or more persons helping them. This is not obeying the rules, and these entrants have been notified that their scores will not count. Play the game fairly. Your competitors are counting on it.

The cabrillo format sure makes life easy for us as we try to compile the results. All the necessary information can easily be gathered—not so with a non-cabrilo summary. Please submit your log as a cabrillo-formatted log and send it via e-mail: for SSB to <ssb@cqww.com> and for CW to <cw@cqww.com>. It would be helpful, if you have used a computer in the contest, to take a few minutes and send in your log via the internet. It is easy and cheaper than mailing. If you do not have direct access maybe a friend of yours does and you can send it that way.

The overall skill of contesters who submit an electronic log is improving every year. It is very encouraging to see such improvement. The UBN reports that each entrant can retrieve can provide a way for each entrant to improve. We receive hundreds of letters each year from entrants asking questions and passing along their thanks for this special service that the CQ WW CC provides. Let us know if we can help you out. We are responsive and all of us are experienced contesters.

Thanks

First of all, the Contest Committee wants to thank you, the entrant, for taking the time to send an electronic log. This year we received a very high percentage of them.

None of the results would possible without the efforts of the 40 or so people behind the scenes who make it happen. The CQ WW e-mail robot was set up and is maintained by John, K2MM. Once you send your log and summary to either <ssb@cqww.com> or <cw@ cqww.com>, it is processed, decoded, and massaged by Larry, N6TW. Larry has put in many hours to make the log processing efficient and accurate. Dick, N6AA, makes the call database as accurate as is humanly possible. This process takes a lot of N6AA's time, and the CQ WW continues to be state of the art in score analysis, mostly due to Dick's efforts.

The log checkers are K1DG, N3ED, K6NA, N6ZZ, N9RV, N2NC, K3WW, and K3LR. When we receive disks that are in some strange format or are damaged, a group headed by W3ZZ, N5NJ, I2UIY, and JE1CKA solves these problems. In addition to log checking, Phil, N6ZZ, serves as a sanity check at each stage of the creation of the master database.

Each year I rely on the sage advice of our special advisors: K3ZO, N2AA, N8BJQ, G3SXW, S5ØA, KR2Q, and N5KO. The CQ WW uses the constantly updated software developed by Tree, N6TR, in order to

Aerial photo of the N5TW QRP station.

TROPHY WINNERS AND DONORS

SINGLE OPERATOR
ALL BAND
World
EA8BH (Opr. Jeffrey Steinman, N5TJ)
Donor: Albert Kahn, K4FW – W9IOP Memorial

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

World QRPp
Richard Saeger, K3OO
Donor: Gene Walsh, N2AA

World Assisted
Charles Fulp, K3WW
Donor: Snake River Contest Club

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

USA Low Power
Mark Wilson, K1RO
Donor: North Coast Contesters

USA – Zone 3
W6EEN (Opr. Doug Brandon, N6RT)
Donor: Bill Fisher, W4AN

USA – Zone 4
W9RE (Opr. Patrick Barkey, N9RV)
Donor: Bill Fisher, W4AN

Canada
VE2IM (Opr. Yuri Onipko, VA3UZ)
Donor: Jim Fisher, VE1JF

Carib./C.A.
8P9Z (Opr. John Laney, K4BAI)
Donor: Chuck Shinn, W7MAP

Europe
OHØZ (Opr. Juha Tuovinen, OH1JT)
Donor: Edward Bissell, W3AU

Europe – Low Power
SQ6Z (Opr. Bogdan Chorazyk, SP3RBR)
Donor: Scott Jones, N3RA & Tim Duffy, K3LR

Russia
Stan Pankov, RW1ZA
Donor: Roman Thomas, RZ3AA

Africa
(Second Place)
3V8BB (Opr. Hrane Milosevic, YT1AD)
Donor: Gordon Marshall, W6RR

Asia
Chris Dabrowski, A45XR
Donor: Chuck Shinn, W7MAP

Japan
Masaki Okano, JH4UYB
Donor: Japan Crazy Contesters Club

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

Oceania
9M6NA (Opr. Saty Nakamura, JE1JKL)
Donor: Peahi Contest Club

South America
P40E
(Opr. Jose Carlos Cardoso Nunes, CT1BOH)
Donor: Venezuela DX Club

SINGLE OPERATOR, SINGLE BAND
World – 28 MHz
Chris Burger, ZS6EZ
Donor: Joel Chalmers, KG6DX

World – 21 MHz
ZX5J (Opr. Simone Candotto, IV3NVN)
Donor: N5JJ Memorial (Don Busick, K5AAD)

World – 14 MHz
4M5X (Opr. Scott Cronin, W4SO)
Donor: W2JT Memorial (North Jersey DX Assn.)

World – 7 MHz
IH9P (Opr. Martin Huml, OK1FUA)
Donor: Alex M. Kasevich, VP2MM

World – 3.5 MHz
Robye L. Lahlum, W1MK
Donor: Fred Capossela, K6SSS

World – 1.8 MHz
A61AO (Opr. Alexander Lounev, RV6LNA)
Donor: Kenneth Byers, Jr., K4TEA

USA – 28 MHz
Bill Tippett, W4ZV
Donor: Wireless Institute of the Northeast

USA – 21 MHz
David Donnelly, K2SS/1
Donor: Wayne Carroll, W4MPY

USA – 14 MHz
Warren Semon, N7CW/8
Donor: Northern Illinois DX Association

USA – 7 MHz
David Blaschke, W5UN
Donor: W6AM Memorial (Jan Perkins, N6AW)

USA – 3.5 MHz
(Second Place)
William Gillenwater, K3SV
Donor: Bill Feidt, NG3K

USA – 1.8 MHz
Bruce Clark, K1FZ
Donor: Dave Patton, NT1N & Mark Obermann, AG9A

Canada (28 MHz)
Lajos Laki, VA3RU
Donor: Radio Amateurs of Canada

Carib./C.A. (28 MHz)
3E1DX (Opr. Stefan Radtke, DL5XX)
Donor: Snake River Contest Club

Europe – 28 MHz
OHØV (Opr. Jukka Klemola, OH6LI)
Donor: Jay Pryor, K4OGG

Europe – 21 MHz
Jiri Pesta, OK1RF
Donor: Robert Naumann, N5NJ

Europe – 14 MHz
OH2BH (Opr. Ilkka Korpela, OH1WZ)
Donor: G3FXB Memorial (Maud Slater)

Europe – 7 MHz
YT7A (Opr. Laslo Palfi, YU7GO)
Donor: Ivo Pezer, 9A3A/5B4ADA

Europe – 3.5 MHz
4N1A (Opr. Ceho Dusan, YU1EA)
Donor: K3VW Memorial (Frankford Radio Club)

Europe – 1.8 MHz
Mark Demeuleneere, ON4WW
Donor: Pat Barkey, N9RV & Terry Zivney, N4TZ

Japan – 21 MHz
Kenji Koishi, JH3AIU
Donor: DX Family Foundation

Japan – 14 MHz
Shoji Ebishima, JH1AZO
Donor: Mitsuhiro Nishimura, JA7WME

MULTI-OPERATOR, SINGLE TRANSMITTER
World
P3A (Oprs. RA9JX, RZ9UA, UA3AB, RW9UW)
Donor: Anthony Susen, W3AOH

U.S.A.
K1KI (Oprs. K1KI, K1CC, K1ZZ, W1RM)
Donor: Douglas Zwiebel, KR2Q

Canada
VE6SV (Oprs. VE6SV, VA6EA, VE6EZ, VO1CV, VE6NAP, VE5FN)
Donor: Eastern Canadian DX Assn.

Carib./C.A.
ZF2NT (Oprs. N6NT, W6CYX)
Donor: Octorino G. Villa, PY2KC

Africa
TS7N (Oprs. DJ5BV, DJ7IK, DJ9CB, DK7YY, DL1EFD, DL1GGT, DL7FER, DL9USA, JH4RHF)
Donor: Harry Booklan, RA3AUU

Asia
(Second Place)
UPØL (Oprs. UN9LW, UN9LO, UA9AR, RK9AC, RA9AA, RZ9AW, RX9CAZ, UA9CDC)
Donor: Steve Merchant, K6AW

Europe
RU1A (Oprs. RW1AC, RU1AA, RV1AW, RN1AM, RX1AA, UA1ACC, RA1ARJ, RA1ARZ, Alex)
Donor: Bob Cox, K3EST

Oceania – Pacific Rim
AH2R (Oprs. JG3RPL, JI3ERV, JHØUSD, JR7OMD)
Donor: Vienna Amateur Radio Club – 4U1VIC

South America
PJ2T (Oprs. KP2L, KU8E, WØCG)
Donor: Araucaria DX Group

MULTI-OPERATOR, MULTI-TRANSMITTER
World
CN8WW (Oprs. DL8WPX, DK1BT, HAØDU, DF3CB, DL3DXX, DK2GZ, S51TA, LY1DS, DL1HCM, DL2MEH, DL5LYM, DL2OAP, DL6FBL, DL2HBX, DJ9MH)
Donor: K2GL Memorial (Doug Zwiebel, KR2Q)

USA
KC1XX (Oprs. KC1XX, N6HB, W1FV, N6MJ, K1GQ, DL7ALM, N3RD, K1TR, AD1C)
Donor: N6RJ Memorial (Bob Ferrero, W6RJ)

Europe
OH2U (Oprs. OH2BVI, OH2FT, OH2HE, OH2IW, OH2JA, OH2JQS, OH2JTE, OH2LUR)
Donor: Finnish Amateur Radio League

Japan
JA5BJC (Oprs. JA5BGX, JA5BJC, JA5FDJ, JH5FIS, JH5RXS, JR5JAQ)
Donor: Ryozo Goto, JH3JYS

WORLD – SSB/CW COMBINED
CN8WW: 148,216,944
Donor: Alpha/Power, Inc.

JAPAN – MULTI-SINGLE SSB/CW COMBINED
JH7PKU: 13,372,033
Donor: Vienna Amateur Radio Club – 4U1VIC

CONTEST EXPEDITIONS
World Single Operator
FY5KE (Opr. Jacques Saget, F6BEE)
Donor: Yankee Clipper Contest Club

World Multi-Single
TS7N (Oprs. DJ5BV, DJ7IK, DJ9CB, DK7YY, DL1EFD, DL1GGT, DL7FER, DL9USA, JH4RHF)
Donor: Carl Cook, AI6V

World Multi-Multi
HC8N (Oprs. AA6RX, AG9A, K1EA, K5TSQ, K6AW, K6BL, KM3T, N5KO, N5RZ, VE3EJ, VE7ZO, W2VJN, W6NL)
Donor: Bill Schneider, K2TT

SPECIAL – SINGLE OPERATOR AWARD
World SSB/CW Combined
P40E/KH7R: 24,418,890
(Opr. Jose Carlos Cardoso Nunes, CT1BOH)
Donor: Hrane Milosevic, YT1AD

World All Band: Under 21 years old
Rafael Oliveira Martins, PY2NDX
Donor: Chuck Shinn, W7MAP

CLUB
World SSB/CW
Yankee Clipper Contest Club: 661,047,210
Donor: W1WY Memorial (CQ Magazine)

Non-USA SSB/CW
Bavarian Contest Club: 235,943,333
Donor: N6AUV Memorial
(Northern California Contest Club)

create the database. The DX advisors are CT1BOH, DL6RAI, EA3DU, F6BEE, G3SXW, RA3AUU, OK2FD, I2UIY, JE1CKA, OH2KI, ON6TT, PY5EG, S5ØA, UA9BA, and VE3EJ.

Congratulations to all the winners, and join in the CQ WW fun in 2001!

73, Bob, K3EST

DX QRM

Changes in transmitting antenna reradiated noise into European/North American Beverage. Extremely heavy static crashes the second night added to receiving problems. Since the contest have a new Beverage for that direction with 10 dB S/N improvement over the old Beverage...***4X3A.*** Currently this contest isn't over yet. However, I submit my summary. CU on my *love*, 10 meter band!...***7K2PBB.*** Second contest with my new antenna setup on 28 MHz. Fun to notice that the pile-ups were rather easy to get through. The U.S. condx were very nice this time and I enjoyed the openings...***7S2E.*** This was our first CQ WW CW outside of DL. We had much fun and hard work to handle the pile-ups under strong QRN/QRM. Hope we have next year a nice trip again...***8Q7WW.*** Excellent band conditions with lot of good DX and tremendous conditions... ***9A2EU.*** Since I need to work even Saturday morning, missing more than 5 hours to QRV...***9M2JI.*** My first 48-hour contest without sleep!...***9M6AAC (Op: OH1NOA).*** Many thanks to 5B4ADA and XYL for excellent hospitality. Not sleeping before the contest is a BIG mistake. Many thanks to all the callers... ***C4W.*** My antenna was only 80 m long off-center-fed dipole 8m above the ground...***C56VB.*** DX, Sunshine, and Key Lime Pie. What a way to spend a week! My thanks to all in the contest. S&P all the way. My wife, KD6VKN, thinks this is an RF burn, not a sun tan. Thanks to Steve Rutledge, N4JQQ, for a great place to vacation...***C6AGY.*** This contest is always fun. Enoyed being asked to QSY by likes of DFØHQ, HC8N, EA8BH, etc....***C6AKP.*** Poor antenna condxs on low bands. A pleasure to work so many excellent CW operators!...***DL2MDU.*** Had a lot of fun during my first CQWW CW! Hope to meet you in 2001...***DL7VGN.*** My baby seven days old kept me very busy and away from the radio...***EA1AK.***

WOW!...***EA8BH (Op: N5TJ).*** This time I decided to sleep during the night and work multi-band, earlier just have worked 40 and 80m. Had fun but my Butternut on 80 is not working OK, so if I make same entry next year I have to improve my low band antennas. Had fun but somehow the 10m didn't work for me either. See you next year...***EA8CN.*** My rig stinks with a wide open FI passband. I guess I'll build a new contest-grade one for year 2001. Torture gizmo: President Lincoln (Uniden 2830) at 4W Antenna: 5/8 CB GP vertical...***EC5ACA.*** Thanks for another great contest...***EI5DI.*** Struggled a bit of first day, my mult score was way down as usual although my QSO total was okay. Lots of work on the second day got me a more respectable mult total. Seems like a great silence has decended on Africa in recent years, except of course for a couple of mega-stations, a connection I wonder?...***EI6FR.*** ALL antennas were broken by an improbable glaze ice on Sunday in the afternoon...***ERØND.*** A great contest—again. DX condx on 10 very good by WW...***ES1CW.*** It was attempt to make a good result as low power entry all bands. Last year did very well as SOSB 28 LP. Very satisfied with result especially because it is higher than my high power score in 1998...***EY8MM.*** WX was very bad in the southwest France. Overcast and rainy. Antenna vertical Gap Titan 10–80m and Windom 80m. I have listened many stations from Asia but not a lot of QSOs. Propagation was good from my QTH to North America. Thanks to all for have some fun this weekend...***F5ICC.*** Thanks to all big guns who can hear a small QRP station in the noise of the 40m band!...***F5LEN.*** TR a bit too clever for its own good (or ours!!), and DX cluster reliable system...***F5VEX.***

Sunday's solar flare was terrible. It was impossible to compete in such bad conditions. I would like the sunspot count to be a bit LOWER...***F6JSZ.*** Always a very interesting contest. We do appreciate the effort of the organizers...***F8KHZ.*** Enjoyed the short amount of time I was able to operate. Fitting in an AGM then a dinner dance didn't help! Band conditions were very good and I was able to work new countries with my modest station. Thanks for organising the contest...***GØMRH.*** Nice steady contest, pleased with the multipliers...***GØMTN.*** A single band entry only. 28 Mhz was a dream, a real live wire. Conditions to VK were FB...***GØORH.*** Good contest, good conditions. At one time I could hear and work DU from the east and HC8N on the back of the quad. The severe gales in the UK meant that antenna was a continuous worry. Supprised it lasted the contest...***G3KWK.*** As always a great time with fair condxs for QRP. Beat last year's Q's but but not points. Roll on next year...***G3LHJ.*** A fun contest with even more fun caused by the disturbed conditions...***G3LZQ.*** Great conditions, great fun, but I notice an increasing tendency for some stations to send their callsigns a large number of times when trying to break a large pile-up. All it does is slow down the DX stations' QSO rates because of the QRM created!...***G3NKS.*** Had to work and so missed much of the event. I retire in two years, so things should get better!...***G3UFY.*** Operated about 40 hours! S&P mostly. Fourth year running and still improving used the Elecraft K2 at 5w output + Butternut HF6V/40m Delta Loop...***G3VPW.*** Mults seemed a little harder to come by this year but to to compensate, there was more apparent activity. 160m was superb just before dawn on Saturday: over 40 stateside QSOs in the log and in quick time too!...***G3WGV.*** After single band 15m last year, it was back to all six for 2000. There's nothing to compare with the SOAB category. I thought I was going to break 4k QSOs but then the flare hit. Found some unusual propagation in those last few hours of the contest! Looks like the semi-rare OHØ is leading Europe this year; you just can't compete from plain old G...***G4BUO.***

CLUB SCORES

DX

Bavarian Contest Club (DL)	235,943,333
Rhein-Ruhr DX Assoc. (DL)	186,010,305
Contest Club Finland	181,365,709
Marconi Contest Club (I)	91,915,760
Russian Contest Club	68,470,918
Kaunas Technical University RC	45,638,592
YU Contest Club	35,741,242
Latvian Contest Club	32,135,945
SP DX Club	30,664,113
Araucaria DX Group (PY)	29,687,473
Ural Contest Group (UA9)	29,271,205
Chiltern DX Club (G)	26,568,402
UA2 Contest Club	23,675,461
LNDX (F)	22,208,264
Ukrainian Contest Club	22,195,537
Croatian Contest Club	21,243,398
Vojvodina Contest Club (YU)	18,373,339
Aphrodite Contest Group (5B4)	18,322,789
Lithuanian DX Group	18,270,753
Top of Europe Contesters	17,310,043
LA Contest Club (LA)	15,929,323
Japan Crazy Contesters	15,364,386
Moscow Contest Club	14,452,888
LU Contest Group (LU)	13,771,801
TuPY (Brazil)	11,626,275
Czech Contest Club	10,423,960
Sky Contest Club (YU)	10,286,289
British Columbia DX Club	9,835,994
North of Scotland Contest Group	7,597,220
Z30M Club	7,550,043
Jiangsu DX Club (BY)	7,502,716
GACW (LU)	6,629,153
Danish DX Group	6,498,571
Hungarian DX Club	5,649,477
Kiev Contest Group	5,385,130
Belarus Contest Club	5,231,797
Amateur Radio Moldova	4,332,020
Berlin DX Group	4,048,372
Fox Contest Club (YU)	3,952,824
Crimean Contest Club	3,905,232
Low Land Crazy Contesters (PA)	3,800,921
Outback DX Club (SM)	3,691,800
Koryazhma DX Company (UA1O)	2,762,327
Alberta Clippers (VE6)	2,707,829
Central Siberia DX Club	2,508,895
ZCC (S5)	2,437,895
Vologna Radio Club (UA1Q)	2,218,772
Ferrara DX Team (I)	1,549,418
Sarejavo Contest Group (T9)	1,477,981
SP Contest Club	1,467,407
No. 13 (EA1)	1,422,397
Shakhan Contest Club (UA6)	1,348,942
South German DX Group	1,231,424
Ivanovo DX Club (UA3U)	1,185,575
GPDX(CT)	1,120,846
Radio Luxembourg	1,071,816
Amsterdam DX Club (PA)	994,818
Guara DX Group (PY7)	947,067
North Patagonia DX Group (LU)	797,341
Western Siberia DX Club	741,812
Taganrog Contest Club (UA6L)	675,181
Globus Contest Club (UR)	640,223
Geo DX Group (DL)	620,088
YO DX Club	602,985
Tallinn Radio Club (ES)	554,507
CW Sao Paulo (PY)	501,488
Foronda Radio Club (EA2)	455,445
QRU Club (UA3X)	444,864
YU DX Club	421,254
Domzale Radio Club	328,305

USA

Yankee Clipper Contest Club	661,047,210
Frankford Radio Club	452,155,937
Potomac Valley Radio Club	223,060,882
Society of Midwest Contesters (W)	93,542,265
North Coast Contesters	83,330,011
Northern California Contest Club	73,596,778
Southern California Contest Club	61,496,895
Florida Contest Group	55,251,567
North Texas Contest Club	50,261,993
Southeast Contest Club	35,143,233
Mad River Radio Club	36,765,909
Rochester DX Assoc.	28,165,064
Minnesota Wireless Assoc.	27,784,564
Tennessee Contest Group	24,318,990
Texas DX Society	22,636,289
Western Washington DX Club	21,005,818
Central Texas DX & Contest Club	19,823,838
Willamette Valley DX Club (W7)	16,978,822
Southwest Ohio DX Assoc.	14,890,847
North Florida DX Assoc.	14,053,369
Carolina DX Assoc.	12,494,946
Eastern Iowa DX Assoc.	9,055,128
San Diego DX Club	8,635,991
Order of Boiled Owls New York	8,234,318
Hudson Valley DX & Contest Club (W2)	7,759,318
Kentucky Contest Group	6,586,730
Oklahoma DX Assoc.	6,583,172
Contest Club Cambria (GM)	6,495,635
Grand Mesa (WØ)	5,800,384
Mile-High DX Assoc. (WØ)	5,459,096
Central Arizona DX Assoc.	5,279,201
Central Florida DX Assoc.	4,727,121
Southern California DX Club	4,123,803
Great Lakes DX & Contest Club (W8)	3,620,963
Mother Lode DX & Contest Club (W6)	3,521,553
Green Valley ARS (WØ)	3,209,537
Boring ARC (W7)	3,193,924
Kansas City DX Club	2,243,538
Western NY DX Association	2,239,281
Salt City DX Assoc. (W2)	2,201,069
Pike's Peak Contest Club (WØ)	2,024,240
American Red Cross ECS (W2)	1,907,506
Northwest Florida DX Group	1,428,483
Yegua Valley Contest Club (W5)	1,306,490
Athens County ARA (W8)	1,208,100
California Central Coast DX Club	1,175,791
Southeast DX Club	1,114,340
Northern California DX Club	946,172
West Park Radio Ops (W9)	878,451
Mt. Toppers ARC (W6)	867,162
Metro DX Club (W9)	828,495
World Radio Staff RC	803,519
Northern Arizona DX Assoc.	651,697
Mississippi Valley DX & Contest Club	3,141,561
River City Contesters (W6)	581,153
Northrop-Grumman Radio Club (W6)	330,131
Heartland DX Assoc. (WØ)	206,544
Everglade ARC(FL)	158,802
Chautauqua County Contest Club (W2)	140,918
South Jersey Radio Assoc.	31,411

First time entry. Really enjoyed it. Usually do it with the J45T team on Rhodes. Is hope to be there next year...***G4RCG.*** Another great weekend—10m just FB. Wish I coulsd get something better for antennas than the dipoles...***G5LP.*** Age 84. Tried to beat my last year's score (best ever). Though the number of my QSOs this year was nearly as high, the points and mults were much lower than last year. Felt condx not so good... ***G6QQ.*** Long in the tooth and couldn't keep it up for 48 hours. A few years ago yes, but not now Hi...***GIØGDF.*** Another enjoyable contest. Wall to wall US and EU stations. Will have to try harder next year...***GI4SNC.*** We Finns once again headed for another QSO-rich DX site...***GJ2A.*** Thanks to my family for allowing me the time to enter this year. Pleased to work CN8WW on 160m. QRP is hard...***GWØVSW.*** The very best and most stable propagation through a 48-hour contest I have ever met in my ham life since 1961. Pity I had to share with other things...***HA4YF.*** Should have had better score, but had to take time out to officiate at three ice hockey games. Operated by "hand" but typed all into TR Log as I went along...***HB2DOT.*** It was my first major contest experience. CONDX was great!...***HL2VAU.*** 8 hour electric power outage on first day of contest prevented full effort...***HSØAC.*** Many thanks to everyone who gave me points and called me! And also for patience because of huge pile-ups. The contest was fantastic and I am looking forward to next year SO SB 40m. Only seamy face of the contest is declared Unassisted category of some SOSB stations and their multiplier-score compared to big multi-op stations or big Assisted stations. Shortly "packet cheating."

Simultaneous Reception

VHF/VHF | UHF/UHF | VHF/UHF

A New Dual-Band Engineering Milestone:
Introducing the Dual Band Mobile for the 21st Century's Active Ham!

The Yaesu Engineering Team has done it again! The exciting new FT-7100M Dual Band Mobile brings you the ruggedness and operating ease of our single-band mobiles, and the convenience of remote-head mounting capability (optional YSK-7100 Separation Kit required), in an all-new 144/430 MHz Dual Band design!

Providing 50 Watts of power output on 2 meters, and 35 Watts on 70 cm, the FT-7100M has power to spare when you're in a fringe area. For repeater access or selective simplex calling, you get built-in encoder-decoder circuits providing 50 CTCSS tones and 104 DCS (Digital Code Squelch) codes. And the FT-7100M's huge 262-channel Memory System lets you store up to six Alpha-Numeric characters, for easy channel identification.

Operation of the FT-7100M is simple and straightforward, with separate Volume and Squelch controls for each band during dual-band reception, and eight single-function front panel keys provide the easy feature access you need during mobile operation. What's more, you also get three user-definable keys on the microphone to use for important control functions.

Rugged, reliable, and versatile, the FT-7100M provides the highest cost-performance available among Dual Band FM Mobiles. See your Yaesu Dealer today for a test drive!

144/430 MHz FM Dual Band Mobile Transceiver

FT-7100M

FEATURES

- Frequency Range: TX 144-148, 430-450 MHz RX 108-137 MHz (AM), 137-180 MHz, 320-480 MHz, 810-999.99 MHz (Cellular blocked)
- VHF/UHF, VHF/VHF, and UHF/UHF Dual Receive operation*
- Channel Steps: 5/10/12.5/15/20/25/50 kHz/step
- Power Output: 50 Watts (144 MHz) 35 Watts (430 MHz)
- Power Amplifier Type: 2SK3478 Power MOS FET
- Efficient Cooling System: Direct-flow heat-sink and thermostatically-controlled fan
- 262 Memory Channels: 120 "regular" memories, 5 pairs of band limit memories, and one "HOME" channel on each band
- Alpha-Numeric Memory Labels: 6 Characters on lower display field, 5 Characters on upper
- Smart Search™ Automatic Memory Loading System
- 50 CTCSS Encode/Decode Tones
- 104 DCS Encode/Decode Codes
- CTCSS and DCS Search
- ARTS™ (Auto-Range Transponder System)
- Automatic Repeater Shift (ARS)
- TMF Microphone (U.S. version): Includes 16-memory Auto-dialer, and Direct Frequency Entry
- Band Scanning, Band-Limit Scanning, and Memory Scanning
- Three Priority Channel Modes: VFO, Memory, and Home Channel Priority
- RF Squelch: Opens at user-defined signal level
- Tx Time-Out Timer (TOT)
- Automatic Power-Off (APO)
- 1200/9600 bps Packet Compatible
- Battery Voltage Meter
- Compact Size: 5.8" x 1.9" x 6.9" WHD
- Large (0.9" x 2.3") Liquid Crystal Display
- Cloning Capability: To other FT-7100M Transceivers
- Optional YSK-7100 Separation Kit
- Optional CT-39A Packet Cable

*Simultaneous reception on two different Frequencies, in-band or Cross-Band. Cross-band Repeater Function not available.

Actual Size

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

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

YAESU
Choice of the World's top DX'ers™

Vertex Standard
US Headquarters
17210 Edwards Road,
Cerritos, CA 90703 (562)404-2700

PROFESSIONAL-GRADE MONITORING IN THE FIELD

Rugged and compact, the new Yaesu VR-120 Hand-Held Communications Receiver provides leading-edge performance on the shortwave, public safety, and military-communications bands. All at a surprisingly affordable price.

- RUGGED OUTDOOR-READY CASE CONSTRUCTION
- ULTRA-LONG BATTERY LIFE
- BNC-TYPE ANTENNA CONNECTOR
- STRAIGHTFORWARD 4-BUTTON OPERATION
- WIDEBAND FREQUENCY COVERAGE WITH EASY ACCESS
- SPECIAL "PRESET MODE" AIDS IN QUICK TUNING
- CATCH ALL THE SHORTWAVE BROADCAST ACTION FROM AROUND THE WORLD
- SUPER-SIMPLE ONE-TOUCH MEMORIES FOR HIGH PRIORITY STATIONS
- VERSATILE 640-CHANNEL MEMORY SYSTEM
- WIDE SELECTION OF SCANNING MODES
- EXPANDED FUN AND GAMES
- AND MUCH, MUCH MORE...

COMMUNICATIONS RECEIVER
VR-120
Wideband Coverage: 0.1~1299.995* MHz AM/FM/WFM
*Cellular / image / restricted frequencies Blocked

Actual Size

Tomorrow's Technology - Today
THE PROFESSIONAL STANDARD

COMMUNICATIONS RECEIVER
VR-500
0.1~1299.99995 MHz*
LSB/USB/CW/AM/FM/WFM
All-Mode Wide-Band Receiver
*Cellular blocked

COMMUNICATIONS RECEIVER
VR-5000
0.1~2599.99998MHz*
LSB/USB/CW/AM-N/AM/WAM/FM-N/WFM
All-Mode Wide-Band Receiver
*Cellular blocked

YAESU
Choice of the World's top DX'ers

Vertex Standard
US Headquarters
17210 Edwards Road,
Cerritos, CA 90703 (562)404-2700

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

TOP SCORES IN VERY ACTIVE ZONES

ZONE 3

W6EEN	4,958,674
*VA7RR	2,898,432
W7GG	2,703,624
KC7V	2,530,724
N7IP	2,337,932
K4XU/7	2,081,292
W7UT	1,973,329
*K8PO/6	1,856,274
K7ZZ	1,558,917
N6CW	1,441,240

ZONE 4

W9RE	7,472,178
N2IC/Ø	5,373,745
K5MR	4,362,995
K8GL	4,010,780
N4GN	3,908,230
K8DX	3,753,630
N3BB/5	3,527,568
VE3AT	3,328,325
K5YAA	3,085,430
K9MA	2,981,500

ZONE 5

K5ZD/1	8,756,568
K1AR	8,559,474
K1ZZ	8,307,600
KQ2M/1	8,023,296
K1DG	7,199,169
W1KM	6,871,806
N2NT	6,527,500
K2UA	6,075,104
K4ZW	5,643,253
N2LT	5,574,974

ZONE 14

G4BUO	5,426,826
DL1IAO	5,325,995
ZB2X	4,869,000
OZ1LO	4,245,948
GØIVZ	3,882,900
DL4MCF	3,839,528
GM3POI	3,471,182
GM7V	3,444,584
DJ9DZ	2,847,384
DK9IP	2,674,060

ZONE 15

OHØZ	5,636,403
SP7GIQ	4,640,184
S5ØA	4,582,743
YT7R	4,319,775
OHØR	4,262,524
OH5CW	4,202,382
OH1F	4,167,387
HA8JV	3,983,990
S57DX	3,970,525
YT1AD	3,781,269

ZONE 25

JH4UYB	5,395,050
JH5FXP	4,990,272
JA8RWU	3,351,618
JH7XGN	3,349,281
JA5DQH	3,126,043
JA6GCE	2,443,060
*JH8SLS	1,906,080
*JR4PMX/1	1,789,060
JF1EQA	1,356,820
JF3CCN	1,330,020

*= Low Power

ZONE LEADERS SINGLE OPERATOR

Zone	Call	Score	Zone	Call	Score
1	KL7Y	4,381,155	21	A45XR	8,786,811
2	VE2IM	7,942,141	22	VU2PAI	2,271,412
3	W6EEN	4,958,674	23	No Entry	
4	W9RE	7,472,178	24	BW2000	1,827,738
5	K5ZD/1	8,756,568	25	JH4UYB	5,395,050
6	XE1RGL	205,014	26	XV9SW	347,760
7	TI5N	6,013,962	27	DX1S	4,886,460
8	8P9Z	9,176,174	28	9M6NA	6,925,457
9	P4ØE	12,524,160	29	VK6HG	17,520
10	HC2SL	875,892	30	VK5GN	1,270,698
11	PX2W	2,893,267	31	KH7R	6,183,408
12	XQ3ZW	2,338,959	32	A35RK	1,116,310
13	L99D	3,161,248	33	EA8BH	17,949,552
14	G4BUO	5,426,826	34	SU9ZZ	6,423,725
15	OHØZ	5,636,403	35	D4A	7,237,932
16	RW1ZA	3,080,165	36	No Entry	
17	UA9CDV	4,262,622	37	5X1Z	1,121,596
18	RKØAXX	5,208,507	38	ZS6EZ	2,017,800
19	RUØLL	1,933,104	39	FR5FD	2,105,685
20	JY9NX	7,753,179	40	TF3IRA	1,904,158

Operation time: 40 hrs.; S&P time: 8 hrs. 20 min; Ant: 4-Square, dipole @ 17m, vertical...***IH9P.*** Really an exellent experience! This is my first contest SOSB at my QTH. Please accept my very best wishes! Thanks for the nice contest...***II2B.*** Good conditions even if a strong storm forced me to interrupt trasmission on Sunday evening...***IK6SNQ.***

The main target was the Italy All Time Score Record on 10 meters, Low Power. Made 200K+ points, record broken by a 30% increase!...***IR2V.*** I could enjoy 2k WW CW. See you next season...***JA6ZLI.*** My first experience to work on 1.8 MHz from JA! This was my desire in JA. Nice to work you guys on the same freq. Worked East Coast (W3LPL) first time ever. Easy to ask QSY(only one freq). Tks KH7R (op Jim)! We wish someday on SSB as well for *us* and *you*!...***JA8RWU.*** I broke my previous best. I'm satisfied with my score...***JE3UHV.*** I am satisfied that I made a new self record on 15m mono. I expect a bigger pile-up from stateside next year...***JH3AIU.*** I enjoyed the contest with a mobile whip and 50 watts...***JJ1LRD.*** Nice condition on 10m band. I enjoyed mainly 15m and 10m bands in this contest. Thank you very much for all stations. Hope to meet you again in the new century contests!...***JM1LRQ.*** I am first enter for the worldwide contest, moreover QRP 5W. It is very good job, and so I am very excited! Many thanks to all of CQ WW's Great Contesters...***JM1OZP.*** Operated at the park on top of the hill near my apartment house. I'm very glad to have a lot of QSOs...***JR1NKN.*** I found that I did not any QSO with JAs on 15 just 15 minutes before the ending. Then QSYed to 15 from 10m, but missed it finally...***JR4PMX.*** I was portable at "the old meteorological station" at west Jan Mayen, 71N, 008W. I laughed when KH7R sent 'WOW!' when I called him during the middle of my nighttime. They were 599+20 dB on 28 MHz! The portable operation at the west side of the island really payed off."...***JX7DFA.*** Again very happy working the CQ WW DX CX Contest, our great party!...***LU7EE.*** Sorry just to play when condx were so FB! But often traveling and a lot to do at home didn't permit me more...***LY2OX.*** Nice condx! First night worked three Hawaian stations, but heard more...***LY3JY.***

Really great contest with my little power and bad low band antennas...***LZ3YY.*** Thanks to OE1SZW and OM3LA for support! Great contest! First day was good with 2400 QSOs. Second day was black Sunday....1300 QSOs only Henry 5K and TS-850SAT damaged! Run lasted 24 hours with TI-922 with 400 watts (at least new OE record!)...***OE4A.*** First I planned to hand out a few points; turned out I was hooked again by the CQ WW phenomenon!...***OE5OHO.*** Very nice contest. I am very happy about my best contest result ever...***OE8CIQ.*** My second "serious" CQ WW CW SOAB. The first one was in 1990. The propagation was okay on Saturday, Sunday was not so good any more (specially 7–8 last hours). Well, I took only 15 minute nap during the contest, so in practice my continuous wake-up time was almost 68 hours! (Friday 5 UTC – Monday 1 UTC). It was a little too much for efficient operation...***OH1F.*** First time ever in QRP class. Most fun and amazingly easy to get even rare DX. If only had more time to operate but... ***OH2BSQ.*** My first contest on 40m band with new transceiver FT900 and new vertical antennas. It was beautiful. Congratulation for this excellent contest...***OK1IF.*** There was good conditions. I am sorry for too low results cause of 160m antenna missed and high bands beam was fixed to USA because of rotor damaged during a first few minutes of the contest...thanks Dr. Murphy!...***OK1SI.*** Excellent condx this year (1st time in the world contest after 20 years)...***OK2QX.*** Very good contest and perfect operators...***OK2SWD.*** I never saw the cabrillo before. It is time for the hams to decide of a unique system...***ON6LO.*** I utilize only the S&P method. This is a renewed pleasure to find all my friends in this great annual contest. I am crazy love of the CW. I hope to come back in 2001...***ON6TJ.***

Two big handicaps—the aurora (very active on Saturday, less on Sunday), and no Beverages for the low bands, as the corn was still on the farmer's field! Harry put in about 46 hours, like a real champion. After all he is the world vice champion (re: WRTC 2000)...***OTØT.*** A strange start of the contest with no S-meter readings on 160 and 80m. Saturday turned out to be the best day with almost 900 QSOs. Disappointing to hear so many stations not correcting callsigns, but just continue their test with R TEST, instead of really sending the correct c/s. Sunday at 1700 UTC condx went down, but returned at 1900 UTC. Later W7 on 10 meters, but still missed zone 1 and zone 29. Where were you? Is it due to the high radio activity from the contesters that we have this aurora-like condx every year on Sunday evening on 20 meters? Hi. My highest score ever and can do a lot better, but next time. The highlight of this season so far. Last year I didn't take part in the CQ WW, as I had to sit next to my mother. She got very ill, and died on Sunday evening at 2328. So she won the CQ WW 1999 contest. This one dedicated to her...***OZ8AE.***

Luckily my health permitted a few hours of operating...***PA1AW.*** It was great fun to work all this DX on 40m with my new Kelemen dipole and 100 watts. Never thought I could work so many stations so easily... ***PA1XA.*** It was absolutely thrilling. Will be next year on the air again...***PA2DGR.*** What a contest! Just listen on the bands what's going on: WOW! Still it's my second favorite contest after the PACC FB WW contest (hi). Thanks for organizing, I really did enjoy operating and had great fun...***PA3BFH.***

Worked with QRP and had a great time! Fantastic operators on the DX side. Found out that high speed CW can be used to break the pile-up...***PA3ELD.*** Unable to believe 40 meters was amazing, and 20 even better...***PY2NY.*** I made a wrong assumption that condx were bad due to second RX short on antenna input! But it was a fun for 36 hours...***S56A.*** For first time running with two stations and TR software...***S57U.*** Well, it is a high time to learn using the keyboard of PC for keying and not for sole purpose of logging. I'll be back!...***S58DX.*** Mistake to use my contest call 7S6W. Too many did not see this call as bonifide, should have used SM6DER...***7S6W.*** First time working single band. This 7 MHz band is fantastic. I'll sure be back on this as again as singel band! Aurora is NOT needed though. I did miss a lot of zones, why I believe 40mb could need to be worked being in the assisted class to get more multipliers as there is a big decision of whether or not to chase multipliers and leave a good running frequency or stay put and just go for QSOs...***SM6FUD.*** I enjoyed only ALS-500M and R-7000+R80 on the beach of the island...***T88JA.*** Enjoyed much and put EU, RU, and zone 16 records...***UA3DPX.*** We have to say to the XX century a lot of thanks that gave to us wonderful hobby...***UA9BS.*** Cool!!!...***UR3PFX.*** This was my first CW contest in over 30 years. What kept me away for so long? What a blast! Admittedly having two computers to monitor and send the CW helped greatly to enhance the rusty CW skills. Although an annual family gathering kept me away from the contest for most of Saturday it was still a good way to return to CW contesting. Thanks to everyone for the contact(s)... ***VE3BUC.*** Nice to catch all continents in just a few hours for the first time...***VE3KZ.*** I believe our local packetcluster had a better score!...***VE6SV.***

My first serious effort at contesting. I am now hooked!... ***VE6TN.*** I have not done a CW effort for some time. Sure enjoyed the contest to brush up about a 10 wpm increase to my CW speed. Looking forward to another CW effort...***VE6VW.*** Great to operate from the VE6JY superstation. Don is a great host...***VE6WQ.*** I am just getting back to using CW after about 20 years absence so there are probably quite a few mistakes in my log. However, the contest was a lot of fun and I am looking forward to the next one...***VE9FX.*** G'day to all contesters...***VK4TT.*** Still learning about CW. Pity I still lack stamina on this mode! I will get better with time, still pleased to hand out mults! The packet spotting is getting to be very difficult to handle, The massive pile-ups that occur require high level operating skill which may be a turn-off to newbie contesters...***VK5GN.*** I love CQ WW, and this contest was the first time I was QRV on 160!...***VU2PAI.*** There were a lot of new DXCC countries for me!...***YB1KOR.*** This is our first international contest and our low band antennas did not perform well. We will try better in the next contest...***YC1ZTC.*** Anything this fun should probably be illegal. Imagine snagging a passion fruit from just outside the door. Imagine a freshly-plucked coconut, opened with a machette. Imagine a pinapple bought in the local market that will spoil pineapple back in the states forever for you. Imagine a host that invites, sight unseen, six hams from the opposite side of the world to take over his house for two weeks, 24 hours each day, putting up Montana Dipoles. Imagine having the multipliers come to YOU, and not having to worry about them. Imagine the land of James Michener, a land we decided after visiting there, that he did not exaggerate...***YJ0V.*** Just for fun I started to work the contest. Finally it was nice...***YO3JW.***

Boy, am I glad to be back in the CQ WW CW test... it's been almost 5 years since the last time. I had a blast with only 100 watts plus a vertical...***YV5DTA.*** Big thanks to the Ayios Nikolaos motorbike club for letting us use their premises as a temporary shack for the weekend. Disaster struck at about 08Z in the form of a severe migraine. I was forced to travel back home (5B4 land) which is fortunately 2 km away. Four crucial hours were lost from 08–12Z being forced to sleep off the migraine. Day 2: I was delighted not to have a repeat performance of the migraine. However a cat had found its way onto the roof, so QRX and get the ladders out to help the poor fellow down! The mults were not so forthcoming on the Sunday, but condx slighly better on day 2. I thought the run rates were good though. Couldn't break 6D2X pile-up on the first day for a double mult, and hoped to catch them on the Sunday but never found them again. Sunday afternoon and I'm looking at the Asian 20m LP record 570k, and my score stands at 500k. Hey, I should have taken this seriously from the start (damn if it wasn't for that migraine on Saturday). I never heard OY or any zone 40 on 20m, same goes for KH6 or any zone 31. USA sounding very auroral both evenings, lots of Americans worked via the aurora, some really weak, yet easily workable!.. .***ZC4DW.*** First serious try at 40m single band stopped by bad WX!...***ZS4TX.*** Great first CW contest; only looked for new countries but had great fun. Can't wait for next year! New call helped (old call ZS6VER)...***ZS6DX.*** A 15 hour power failure, lashing winds, and a broken computer and radio didn't make this my easiest contest ever!...***ZS6EZ.*** Long live CW!...***ZS6KR.***

USA QRM

As always, a great contest. Thanks to FR5FD and P29VGP for making it especially fun! I can't complain too much for running barefoot into single-element antennas less than 10 meters up...***AA8UP.*** Used my old Ten-Tec Triton IV at 5 W with a 105 ft. dipole at 40 ft...***AB9DF.*** The bands bounced back nicely after the storm hit, but they sure were noisy...***AD5Q.*** Sure wish folks would send their calls every QSO! Sure is more fun using a logging program!...***AI2L.*** Condo portable—25 watts—thanks all!...***AK6R.*** I think it will be many years before we see condtions like we had this weekend during a CQWW contest... ***K1AM.*** Thanks to my great team. You guys make it all happen. Congrats to our extremely talented and professional competitors. It's the

(Continued on page 100)

AMERITRON . . . 800 Watts . . . $799

Ameritron gives you four 811A tubes, 800 Watts and far better quality -- for less money than the competitor's 3 tube 600 watt unit . . . Why settle for less power, less quality and pay more money?

AL-811H
$799
Suggested Retail

AL-811
$649
Suggested Retail

Only the Ameritron AL-811H gives you four *fully neutralized* 811A transmitting tubes. You get absolute stability and superb performance on higher bands that can't be matched by un-neutralized tubes.

Ameritron mounts the 811A tubes vertically -- not horizontally -- to prevent hot tube elements from sagging and shorting out. Others, using *potentially damaging horizontal mounting*, require special 811A tubes to retard sagging and shorting.

A quiet, powerful computer grade blower draws in plenty of cool air. It *pressurizes* the cabinet and efficiently cools your 811A tubes. Our air flow is so quiet, you'll hardly know it's there--unlike noisy, poorly chosen blowers.

You also get efficient full size heavy duty tank coils, full height computer grade capacitors, heavy duty high silicon core power transformer, slug tuned input coils, operate/standby switch, transmit LED, ALC, dual meters, QSK compatibility with QSK-5 plus much more.

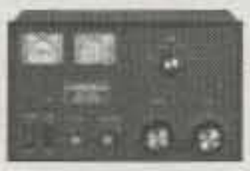
AL-811 has three 811A tubes and gives 600 Watts ouptut for only $649.

Near Legal Limit ™ Amplifier

AL-572
$1395
Suggested Retail

New class of *Near Legal Limit*™ amplifier gives you 1300 Watt PEP SSB power output for 65% of price of a full legal limit amp! Four rugged and powerful 572B tubes. Instant 3-second warm-up, plugs into 120 VAC. Compact 8½Hx15½Dx14½W in. 160-15 Meters. 1000 Watt CW output. Tuned input, instantaneous RF Bias, dynamic ALC, parasitic killer, inrush protection, two lighted cross-needle meters, multi-voltage transformer.

HF Linears with Eimac 3CX800A7



AL-800H
$2495
Two tubes, 1500 W plus

AL-800
$1695
Single tube, 1250 Watts

These HF linears with *Eimac*® 3CX800A7 tubes cover 160-15 Meters including WARC bands. Adjustable slug tuned input circuit, grid protection, front panel ALC control, vernier reduction drives, heavy duty 32 lb. grain oriented silicone steel core transformer and high capacitance computer grade filter capacitors. Multi-voltage operation, dual illuminated cross-needle meters.

AL-80B . . . Desktop Killowatt 3-500ZG Amplifier

AL-80B
$1299
Suggested Retail

Ameritron's AL-80B kilowatt output desktop linear amplifier can double your average SSB power output with high level RF processing using Ameritron's exclusive *Dynamic ALC*™!

You get cooler operation because the AL-80B's exclusive *Instantaneous RF Bias*™ completely turns off the 3-500ZG tube between words and dots and dashes. It saves hundreds of watts wasted as heat for cooler operation and longer component life.

You get a full kilowatt PEP output from a whisper quiet desktop linear. It's a compact 8½Hx14Dx15½ inches and plugs into your nearest 120 VAC outlet. Covers 160 to 15 Meters, including WARC and MARS (user modified for 10/12 Meters with license).

You get 850 Watts output on CW, 500 Watts output on RTTY, an extra heavy duty power supply, genuine AMPEREX 3-500ZG tube, nearly 70% efficiency, tuned input, Pi/Pi-L output, inrush current protection, multi-voltage transformer, dual Cross-Needle meters, QSK compatability, two-year warranty, plus much, much more! **Made in the U.S.A.**

AMERITRON offers the best selection of legal limit amplifiers

AMERITRON's legal limit amplifiers use a super heavy duty Hypersil® power transformer capable of 2500 Watts!

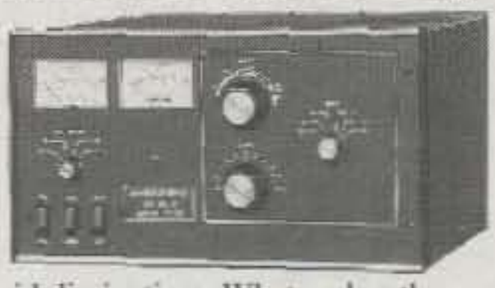
Ameritron's most powerful Linear

AL-1500
$2945
Suggested Retail

Ameritron's super powerful amplifier uses the herculean *Eimac*® 8877 ceramic tube. It's so powerful that 65 watts drive gives you the full legal output -- and it's just loafing because the power supply is capable of 2500 Watts PEP.

Ameritron's 3CX1200A7 linear Amp

AL-1200
$2495
Suggested Retail



Get ham radio's toughest tube with the Ameritron AL-1200 -- the EimacR 3cx1200A7. It has a 50 Watt control grid dissipation. What makes the Ameritron AL-1200 stand out from other legal limit amplifiers? The answer: A super heavy duty power supply that loafs at full legal power -- it can deliver the power of more than 2500 Watts PEP two tone output for a half hour.

AMERITRON no tune Solid State Amplifiers

ALS-500M 500 Watt Mobile Amp

AL-500M
$799
Suggested Retail

Ideal Mobile amplifier uses 13.8 VDC mobile electrical system, very compact 31/2x9x15 inches, extremely quiet, 500 Watts output, 1.5-22 MHz coverage, instant bandswitching, no tuning, no warm-up, no tubes, SWR protected.

ALS-600 Base 600 Watt Amp

AL-600
$1299
Suggested Retail

No tuning, no fuss, no worries -- just turn it on and operate. Includes AC power supply, 600 Watts output, continuous 1.5 to 22 MHz coverage, instant bandswitching, fully SWR protected, extremely quiet, very compact. Amp is 6x9½x12 inches.

Ameritron's dual 3-500 linear

AL-82
$2395
Suggested Retail

This linear gives you full legal output using a pair of 3-500s. Most competing linears using 3-500s can't give you 1500 Watts because their lightweight power supplies can't use these tubes to their full potential.

AMERITRON brings you the finest high power accessories!

RCS-8V Remote Coax Switch . . . $149

Replace 5 coax feedlines with a single coax. 1.2 SWR at 250 MHz. Useable to 450 MHz. 1 kW at 150 MHz. **RCS-4, $139**. 4 position remote HF switch.

ADL-1500 Dummy Load with oil . . . $59.95

Oil cooled 50 Ohm dummy load handles 1500 Watts for 5 minutes. SWR under 1.2 up to 30 MHz. Low SWR to 400 MHz.

ICP-120/240 Inrush Current Protector . . . $79

Stops power-up inrush current and absorbs momentary high voltage spikes to your amplifier. ICP-120 for 110 to 120V, ICP-240 for 220-240 V.

ATR-20 (1.2kW) Antenna Tuner . . . $459

Handles a full 1.2 kW SSB and 600 Watts CW. It's designed to safely handle the full legal SSB power of the AL-811/811H/80B/ALS-500M/ALS-600 and others.

ARB-702 (I,K,Y) amp-to-radio interface . . . $39.95

Protects your costly transceiver from damage by keying line transients, steady state current and excessive voltages.

QSK-5 Pin Diode T/R Switch . . . $349

Self-contained, connects externally to most HF amps. Handles 2.5 kW PEP, 2 kW CW. Six times faster than vacuum relay. 6x4x9½ in.

ATP-100 Tuning Pulser lets you safely tune your amplifier . . . $49.95

Pulse tuning lets you safely tune up your amplifier for full power output and best linearity. Keeps average power to low safe level to prevent overheating, tube damage, power supply stress and premature component failure.

ADL-2500 Fan cooled 2500W dry dummy load ...$199.95

Whisper quiet fan. Handles any legal limit amplifier -- 2500 Watts average power for 1 minute on, ten off. 300 Watts continuous. SWR below 1.25 to 30 MHz and SWR below 1.4 to 60 MHz.

Call your dealer for your best price! • Free Catalog: 800-713-3550

AMERITRON®

. . . the world's high power leader!

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

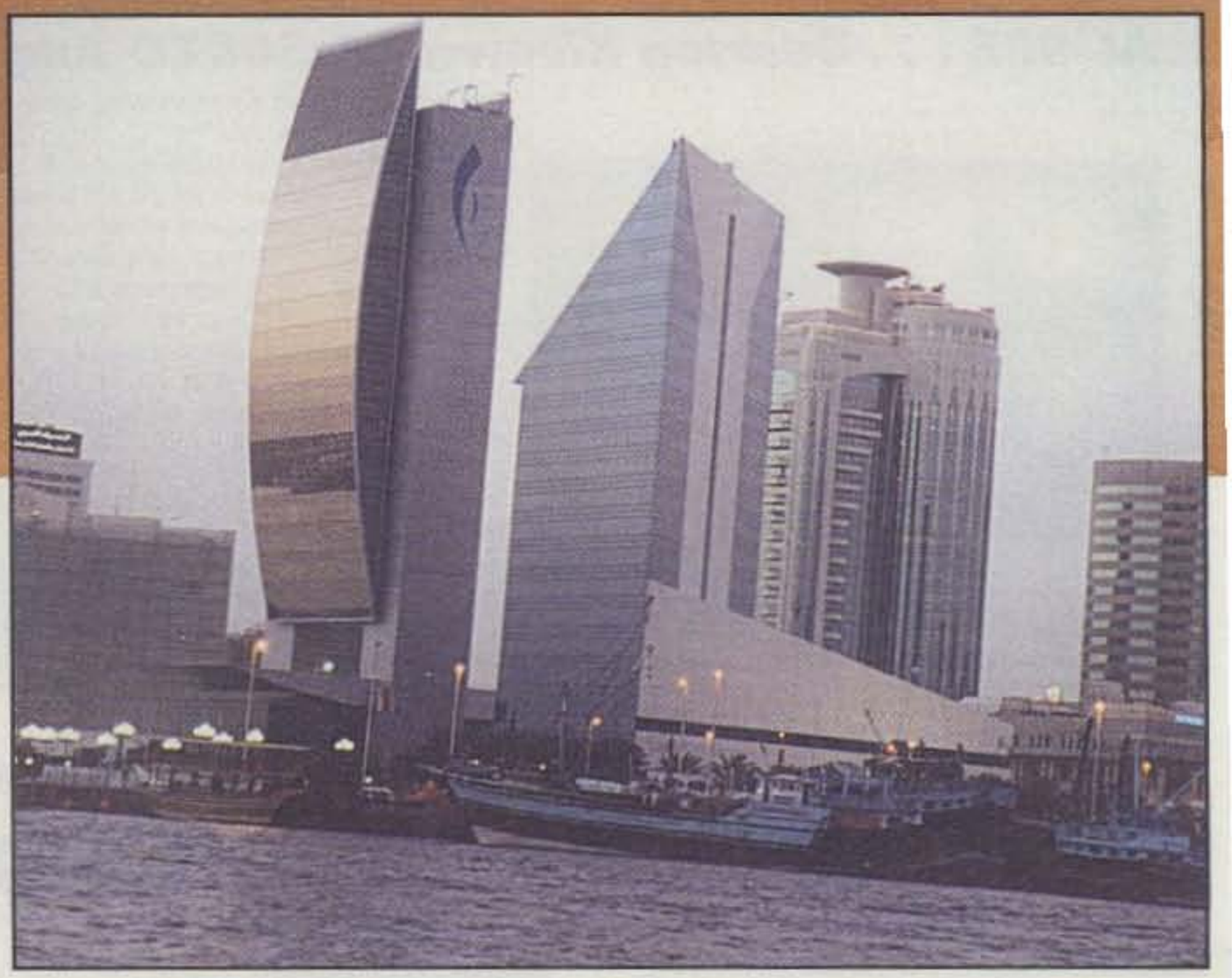
Desert nights, camel rides, and a world-class contest station, manned by world-class operators. Here's K2RED's dream introduction to big-time contesting.

A Dubai Adventure

The DX adventure of a lifetime for a long-time CQ Staffer

BY GAIL SCHIEBER, K2RED
MANAGING EDITOR, *CQ*

Photo by Joe Veras, N4QB



The skyline of the city of Dubai is dramatically modern, with few examples of traditional architecture remaining. This was nothing like I had expected in this part of the world. (Photo by K2RED)

Wow! After thinking and thinking about how to begin this story, WOW is the only word to describe my experience at A61AJ from beginning to end.

I've spent almost 22 years on the editorial staff of *CQ* magazine. I've read and edited countless stories of expeditions to far-off places for contest and DX-pedition operations. Last November I had the once-in-a-lifetime[1] chance to be a part of one of those expeditions, joining the multi-multi team for the 2000 CQ World-Wide DX CW Contest at A61AJ in Dubai, United Arab Emirates.

Travel to the United Arab Emirates? Dubai? In my mind this had to be the most exotic place I could think of, and certainly nothing like anything I had ever experienced before. *CQ* Publisher Dick Ross, K2MGA, gave me a large map of the Middle East which I taped on my office wall, with a small Post-it® note containing one word: "Wow!" The Wow pointed to Dubai. It's still there, by the way.

The Birth of an Idea

I was introduced to Ali Al Futtaim, A61AJ, at the 2000 Dayton Hamvention® by CQ WW Contest Director Bob Cox, K3EST. *CQ* Special Projects Photographer and "Radio Classics" columnist Joe Veras, N4QB, was with us, and together we began to talk about the possibility of doing a story on the A61AJ station in conjunction with the CQ WW DX CW Contest in November. This conversation was to be the starting point of a reality of which I could only dream.

The basic plan was for me to join, as a reporter and observer, the crew which was to set up and operate A61AJ. The end goal was to be able to publish a sort of "first person" account of the A61AJ operation as if I were a fly on the wall.

Preparations began almost immediately. The logistics were incredible, including flight plans, visas, computer logging networks to be set up, and about a million other details we all faced in getting ready for the trip.

Bob, K3EST, was instrumental in making so much of this happen, and I thank him for putting up with my weekly, then daily, and then almost hourly calls to finalize plans and get everything in order. E-mails from around the world flew back and forth as plans fell into place, the last piece of the puzzle being the visas that would allow us all to enter the United Arab Emirates. "Don't

[1] *Well, maybe twice in a lifetime would be more accurate.—ed.*

worry!" Those words stick in my mind. In the last weeks before our departure, K3EST would repeat over and over again, "Don't worry!" He was right.

Dubai and the United Arab Emirates

The United Arab Emirates (U.A.E.) is a union of seven sovereign sheikdoms (the largest is Abu Dhabi) and is a land of contrasts: deserts and oases, mountains and beaches, camel racing and Bedouin markets. Although the region has been a center of trade for centuries, it is rapidly becoming an important, modern world-class center of business and commerce, as well as a popular tourist destination. The city of Dubai itself is thoroughly contemporary. The architecture is astounding and well thought out, as exemplified by the Burj al-Arab hotel, a magnificent sail-shaped building. The country is growing by leaps and bounds, with buildings and roads being completed at a pace unimaginable in the U.S. From our arrival at the Dubai airport to our last-minute shopping trip, we also found the people to be friendly, polite, and very helpful.

There are not many amateurs in the U.A.E. at present, and only three are very active—A61AD, A61AO, and A61AJ. (We met A61AO, who is planning on expanding his own station in Dubai. He was also on the air for the CQ WW CW.)

Both before and after the contest we traveled through Dubai and other areas of the U.A.E., and even into Oman. Each place we visited was more fascinating than the last. From racing an SUV through the dunes (over the crests, into the valleys, at break-neck speed!), to a tour of the Burj al-Arab hotel, a walk on the beach in Fujairah, and a falconry demonstration in Dubai, we found ourselves, cameras in hand, soaking in the sights and the atmosphere of this ancient, yet modern, part of the world.

Even the most ordinary events took on an exotic flavor. A traditional dinner far out in the desert highlighted one evening. We all were outfitted in traditional Arab garb and sat on carpets at low tables for a most delicious meal. As the evening wore on, our hosts turned out the lights. Total darkness! A star-filled Arabian sky formed a canopy above our heads, a crescent moon high above. There could be no more beautiful sight, and it is one that will be etched in my mind always. Completing the evening was a camel ride for those who dared. Did I? Of course! The camera captured the terror on the face of this novice camel rider as another of the beasts headed for my leg. Dinner anyone? It also captured my broad smile as I realized I was actually riding a camel!

This rock dwelling high in the rugged mountains of Oman is the home of a solitary goat herder. How different are the lives of those of us who visited A61AJ for the contest. (Photo by K2RED)

We spent another day riding through the mountains of Oman in SUVs. The contrast between the rural areas and the city of Dubai is particularly striking. We drove for miles, seeing nothing but rugged, barren terrain before coming upon a simple rock

A camel ride? No problem! Well, it was fun after my initial fear of having a bite taken out of my leg! (Photos by Gene Walsh, N2AA)

dwelling high in the mountains, the only human inhabitant being an old man, his weathered face showing evidence of his many years in the hot Arab climate. Other than the occasional visitor, his only companions are the goats he tends. It's a harsh environment, and he and others like him lead simple, solitary lives, so different from our own.

Honestly, I was barely aware of the existence of these dynamic and diverse lands prior to this adventure, and I certainly didn't know what to expect. It was more than I ever could have imagined.

The Contest

I arrived at A61AJ at night, just two days before the CQ WW DX CW Contest was to begin. By that time all the other operators were already there, preparing the antennas, checking out the

The A61AJ 2000 CQ WW DX CW Operators

A first-class group of operators assembled for the 2000 CQ WW DX CW Contest, in terms of both contesting skills and personalities. Each brought his own expertise to the well-oiled operation. Here are brief profiles of the nine main operators.

Jeff, K1ZM, and his brother George, K2DM, were the 160 meter operators. Jeff was the center of communications for all of us before our departure, keeping track of visas and arrival plans and in general making sure everything was falling into place. He coordinated tower and antenna parts shipments to Dubai for the 160 meter 4-square antenna, and through the efforts of Jeff, ON4UN, ON6WU, and George, the actual 4-square project was completed before the contest.

Gene, N2AA, along with Bob, K3EST, manned the 20 meter station for the contest. The two veteran operators made a very effective team. Gene lived in Libya for 4 1/2 years in the early 1960s, on the air as 5A1TW, and it was there that, in his words, he "became a slave to contesting." Today Gene does most of his contest operating at N2RM in southern New Jersey.

Operating 40 meters gave John, W2GD, a couple of hours off in the middle of each day when the band was dead. His goal was to beat the prior year's record. John was excited to have been a part of erecting the new towers and antennas at A61AJ for the contest, but his biggest thrill was riding the crane to the top of the 100 foot tower. John usually operates from his station in Aruba as P40W. He was a record holder from PJ1B in the 1988 CQ WW CW.

Robert, S53R, was on 15 meters for the contest. He cajoled all the logging computers into talking to one another. The best way to describe Robert's contest operating style is "a machine." "That's what it's all about. I'm used to 48-hour contests. You just force yourself to do it. For me contesting is a thrill. CW is fun, and you really have to use your brain." Robert spends about one month every year away from home for ham radio, and always goes somewhere for the CQ WW DX CW Contest in November.

Sejo, T97C, shared the 15 meter operating position with S53R and 10 meters with Ivo, 5B4ADA. He started contesting in 1967 in his native Bosnia, leaving after living through the nightmare siege of Sarajevo. He has been in Abu Dhabi for the past six years. In the 1999 IARU contest he operated T91GEZ on 40 meters as part of the multi-multi team.

Willy, UA9BA, had the shortest trip from outside the U.A.E., coming from Chelyabinsk, Russia. For the contest he manned the 80 meter station with focus and dedication. The final count on 80 was higher than he had expected. Willy set up the 2-element antenna for 80 meters (for a living he builds and erects antennas for HF, VHF, and UHF). "We had a very good team, proven by the pre-contest work and the operating. It was a true team effort that was obvious."

Ivo, 5B4ADA, was the 10 meter operator. He had hoped for a total final score of 50,000,000 points, but projected 42,000,000. "I'm happy with our score considering the propagation. We didn't have long-lasting pile-ups. We probably worked large stations with amplifiers and relatively big antennas, but the real pile-ups come from the 100 watt guys with wire antennas. That's when you hear everybody and your real skills show—when you can work lots of stations in a relatively short amount of time. . . . We all worked well together, as a team. It's not about my personal score; it's not my band. Everyone works together."

The A61AJ CQ WW DX CW team (left to right): Sejo, T97C; Jeff, K1ZM; George, K2DM; Gene, N2AA; Willy, UA9BA; Abubakr (Ali's brother, and not a ham—yet!); Bob, K3EST; Joe, N4QB; Ali, A61AJ; Gail, K2RED; John, W2GD; Robert, S53R; and Ivo, 5B4ADA. (Photo by N4QB and K2RED)

VHF MULTI MODE

IF-DSP from TEN-TEC

800-833-7373
www.tentec.com

Real innovation in a multi-mode VHF transceiver was long overdue. Introducing the Ten-Tec model 526 "6N2" VHF transceiver. Amateur radios' first IF-DSP multi-mode VHF rig. For a long time, there have been no affordable choices for either 6 or 2 meters in a single band VHF multi-mode transceiver. Active hams planted the idea with us - why not offer a single rig that has BOTH 6 and 2 meters, without sacrificing performance? Multi-mode HF/VHF rigs have been around for years, at over a thousand dollars and with compromised performance on the VHF bands at best. The "6N2" provides serious multi-mode VHF performance in a small, take-anywhere package at a significantly lower price than HF/VHF multi-mode transceivers. Why buy another HF rig to get VHF coverage, when you already own one?

Ten-Tec's years of experience designing DSP radio equipment for amateur, commercial, and military applications comes together to deliver a VHF multi-mode transceiver to meet performance demands of weaker signal VHF operators. Let's take a look:

- SSB, CW, and FM transceive operation on both 6 and 2 meters. Extended receive range from 136 - 174 MHz on 2 meters.
- 35 IF-DSP bandwidth filters are built in. No extra filtering to buy! Instantly select the best one for band conditions with the twist of a knob.
- Can be used as your main 2-meter FM rig. 100 memories, repeater splits, CTCSS tone encode are all built in. Memories will retain mode, tone, and split information. You can even program (and scan!) memories for different modes. Memory lockout function allows skipping constantly busy channels while scanning.
- Two SO-239 antenna connectors, one per band, allow you to leave antennas for both 6 and 2 meters connected. Separate amp keying lines allow connection of separate linear amplifiers for each band.
- 20 watts output power, front panel knob adjustable. Front panel meter does double duty as S-meter on receive and power output meter on transmit.
- Separate low level drive connection from 144 MHz for UHF and microwave transverters.
- All-mode squelch useful for FM repeaters or for quiet monitoring of SSB calling frequencies. Never miss a band opening again!
- Portable operation is a snap. The "6N2" is small and light enough to be carried anywhere. Only 4 1/2 pounds! Current drain is minimal - only 400 mA @ 13.8 VDC on receive.

TEN-TEC

1185 Dolly Parton Parkway
Sevierville, TN 37862
Sales Dept: 800-833-7373
Monday - Friday 9:00 - 5:30 EST
We accept VISA, Mastercard, and Discover

Office: (865) 453-7172
FAX: (865) 428-4483
Repair Dept.: (865) 428-0364 (8 - 4 EST)

FREE! HamCall CD-ROM with purchase while supplies last

705 Desk Microphone
$89.95

937 Power Supply
$89.00

S&H cost in 48 states is $16. With Power Supply, $21.

The Operation

By Bob Cox, K3EST

The building that houses the station was built in a record ten days just before the 1997 CQ WW DX CW Contest. (Photo by K2RED)

The arrangement for the contest operation allowed this editor to watch and hear all the action with ease, and it was exciting! (Photo by Gene, N2AA)

The CQ WW DX CW Contest is the biggest CW event of the contest year. The 2000 contest brought out serious competitors from many parts of the world. The A61AJ multi-multi operation finished fourth in the world in the 1999 CQ WW CW. Conditions for the 1999 contest had been outstanding, and it was hoped they would repeat themselves for the 2000 event.

It took a lot of hard work by many people before the contest to make A61AJ's signal as good as it was. The whole process began in October, when a ship container with antennas and Rohn towers was transported from Seattle to arrive in Dubai in early November. In the weeks before the contest the 160 meter 4-square using four 136 foot Rohn 25 towers was completed; three 6-element beams for 10 meters were assembled and mounted, as were two 6-element beams for 15 meters. The 80 meter setup was modified for CW, numerous Beverages were laid out, and several dipoles for 80 meters were put up.

Everything was ready. The antennas all worked, the rigs were driving the Alpha Power amplifiers fine, and the team was eager to push the paddles and keyboards. The competition was going to be tough. The CN8WW team in Morocco was fired up after its record-setting performance in 1999, and HC8N in the Galapagos was going to try multi-multi for the first time in the CQ WW.

The 80 meter antenna consisted of a 2-element beam at 150 feet on a homemade tower. The antenna worked okay, but the rotator could only be coaxed to turn the beam in one direction. Thus it was decided to point the beam northwest and leave it there. Dubai is one of those places geographically where 90% of the QSOs come from one direction—northwest. Europe and the U.S. have the same beam heading. The path to Europe does not go through the magnetic pole, but the U.S. sure does. With the West Coast coming almost right over the pole, any propagational deterioration would see few U.S. 6s and 7s making it through.

On the low bands QSOs into Europe are not as easy as one might first think, as Dubai is quite a distance from that part of the world. The path to Russia and the Ukraine is closer, and those areas are easier to put into the log. High QRN or QRM on 80 and 160 can make life tough, but try operating on 40 meters when over half the band is taken out by Iraqi jamming of Kurdish radio broadcasts. This was the case during the contest, and John, W2GD, did a great job of not going crazy in the face of impenetrable noise. The antenna on 40 meters was a 3-element linear-loaded Yagi at 100 feet. It worked and rotated fine. The long path was really quite good into the U.S.

Aside from the normal QRN and jamming stations, the low bands played very well. The operators on 160 meters reported that they worked more zone 3 stations than zone 5 stations! No zone 4 stations were heard, though. Just before the contest they worked HC8N on 160, but heard nary a trace of them during the contest. The second day brought with it a propagational disturbance which affected the low bands.

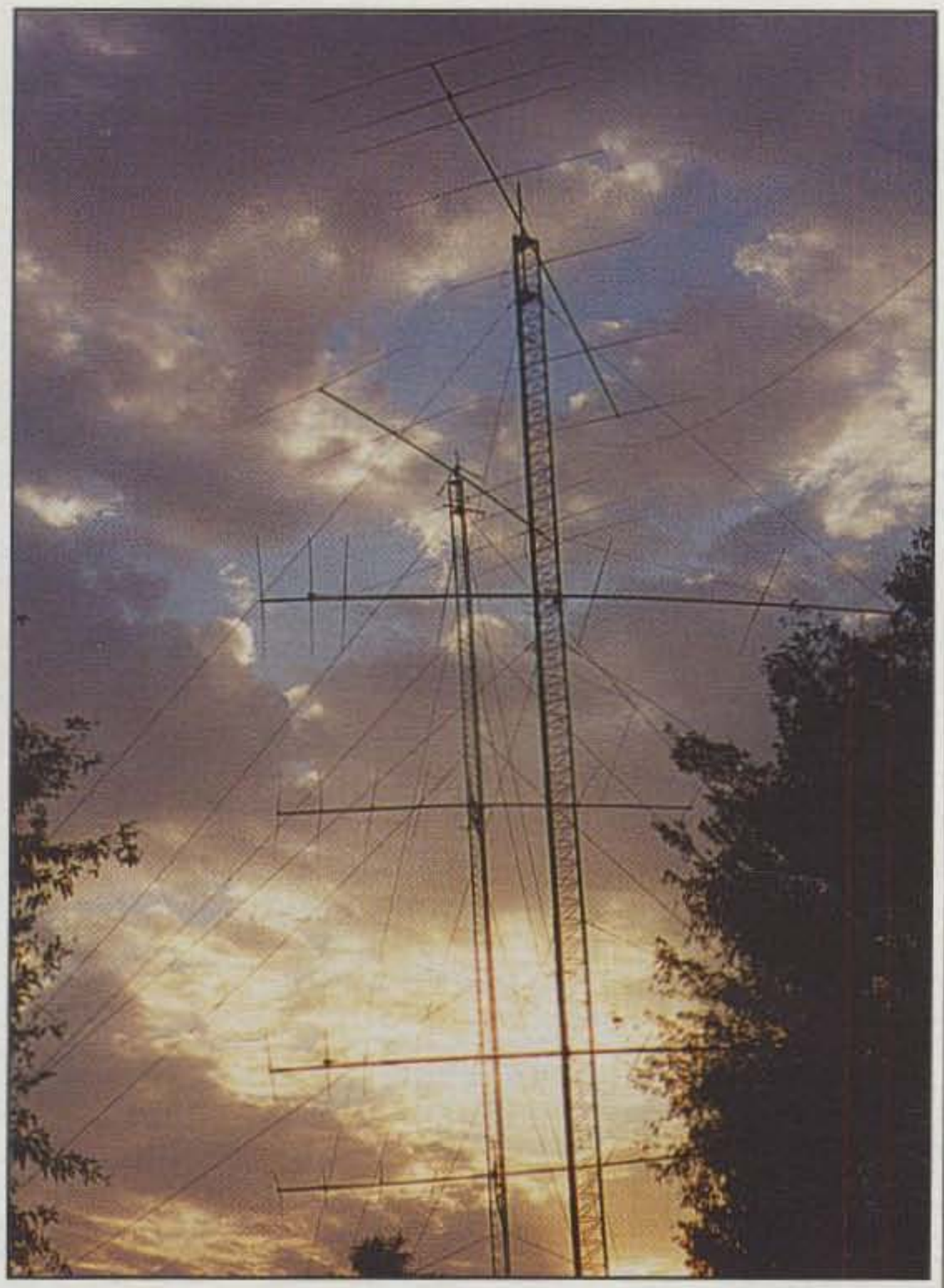
On 20 meters the antennas were three stacked 6-element beams—a 6-over-6-over-6 (6/6/6) array—all switchable using a WXØB Stackmatch. The antennas worked flawlessly. The top 6 on 20 was rotatable, while the middle and bottom beams were fixed northwest. The whole array was on a 150 foot tower. The station consisted of a Yaesu FT1000MP and an ICOM IC-R900 receiver hooked to a vertical antenna located about 700 feet from the main 20 meter Yagis. With it one of the 20 meter operators could listen fairly well on the band while the main station transmitted. New stations or multipliers were found by the second operator, and the second receiver of the 1000MP was placed on the station. This way the transmitting station could easily pick up new ones.

The 15 meter setup consisted of 6/6 on a 100 foot tower. The top antenna was rotatable and the bottom one was fixed northwest. The rig was an FT1000MP. Fifteen was open at the beginning of the contest and really picked up with the first rays of the sun.

Ten meters had 6/6/6 with the top antenna rotatable and the bottom two fixed northwest, and another FT1000MP. The band was open to the U.S. both days. Twenty, 15, and 10 meters all were open almost the entire 48-hour period.

36 Million

The 2000 team could take pride in having beaten the 1999 A61AJ score and finishing a respectable third in the world with 36 million points, not very far behind HC8N's 44 million. This, too, was with conditions down from those of the 1999 contest. It is hoped that conditions will allow the score to be improved even more in the coming years.



The sight of the towers and antennas at A61AJ, something the likes of which I had only seen in pictures before this trip, is one I will always remember. (Photo by K2RED)

equipment, setting up the logging network, and making sure all would be in place when the contest started. A massive undertaking before the contest began was the installation of the 4-square 160 meter antenna at A61AJ, an endeavor involving hams from three continents (see the May/June issue of *CQ Contest* magazine).

This was a very knowledgeable group, each with specialties, each contributing to the project in his own way, all working together toward a common goal. Nine of the operators are profiled in this article.

I found myself among people who almost instantly became friends. The team effort of a big multi-multi contest quickly creates strong bonds. This was amateur radio at its international best. A nicer, more dedicated group could not have been possible, and although I'm not a contester (yet!), I was immediately welcomed as one of the group.

Seeing the towers and antennas for the first time was amazing. Living in the metropolitan New York area, I had never seen anything like it. Yes, I had seen many pictures of towers and antennas over the years, but until I stood at the base of one of the towers and looked up at the antenna array in the clear night sky, I didn't fully realize the magnitude of the sight. I still marvel at the view that night and in the daylight the next morning, very glad to be there, very proud to be a part of ham radio.

By 4 AM Dubai time on Saturday morning, November 25th, everything was in place and all the operators were ready to go—Let the contest begin!

My code skills are not up anywhere near that of the other operators, and this was my first CQ World-Wide DX CW Contest, so

On the Cover

If you've ever wondered what a major multi-operator/multi-transmitter (multi-multi) contest station looks like, this month's cover should begin to give you a bit of an idea. The main thing is that you can't capture it all in a single photograph. Our cover is a montage of images from last year's CQ World-Wide DX CW Contest at A61AJ in Dubai, United Arab Emirates, from some of the equipment, to the sun rising behind some of the towers, to the main ingredient—the operators.

Here's a quick who's who of the people on the cover, working top to bottom and left to right. Starting next to the *CQ* logo is Willy, UA9BA, followed by the Briggs brothers, Jeff, K1ZM, in front and George, K2DM, in the rear. Beneath the *CQ* logo are Ivo, 5B4ADA, Sejo, T97C, and John Crovelli, W2GD. We also see John by himself at the right center. At the bottom of the page are *CQ* Managing Editor Gail Schieber, K2RED, who has written a first-person report in this issue on her experiences there as a novice contester at a world-class operation, and station owner/host Ali Al Futtaim, A61AJ.

Did *you* work A61AJ last November? If so, you have lots of company! The group finished third in the world in the multi-multi category. To find out who beat them, and how all the other competitors did, see our complete contest results, beginning on page 11. Gail's "Dubai Adventure" report begins on page 22. And in case you missed last year's contest and are feeling left out, don't worry. We're doing it all again this year, with the SSB contest on October 27–28 and the CW event on November 24–25. Complete rules are on page 52.

(Cover photos and montage design by Joe Veras, N4QB, with photo of K2RED by Gene Walsh, N2AA.)

Ali Al Futtaim, A61AJ

Ali was first licensed in 1986, but did not apply for a callsign until 1994, when he was issued A61AJ. In the U.A.E. licenses are issued by the Ministry of Communications. No tests are involved, but licensing is not easy, with some applicants having experienced waits of up to a year after applying.

Having initially watched his cousin, A61AB (SK), operate, Ali was amazed by amateur radio. His first contact was on VHF with A71BH in Qatar, who was instrumental in getting him on HF while at the same time introducing him to *CQ* magazine and other publications from which he would learn more about amateur radio. Ali's first HF station setup was a HyGain TH-11 antenna, an ICOM IC-781 transceiver, and an Alpha 87A amplifier. Not exactly a small start!

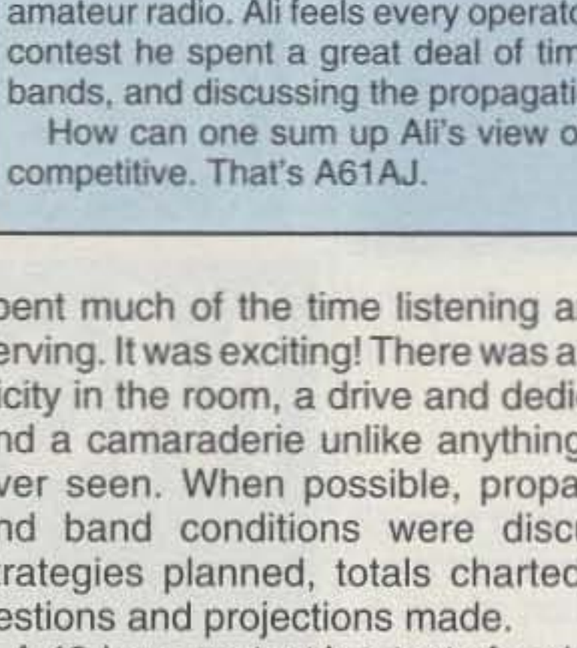


Photo by Gene, N2AA

In 1997 Ali began to plan a station for contest operation. More equipment was purchased, more antennas were erected with the help of visiting operators, and the building that houses the station was built. Each year more equipment and antennas have been added. Ali's goal is for any ham, anywhere, who wants an A61AJ contact to be able to get it, on any band, any mode.

Much of what he knows about ham radio Ali has learned from the experience of others, yet he feels there is so much more he still wants and needs to know. By watching and speaking with the "super ops," as he calls the visiting contesters, he continues to build his own skills and improve his station, which is already world-class.

In his own country Ali is seeking to draw more people into the hobby, and at the same time he is trying to make sure they will have the skills and equipment needed for the successful enjoyment of amateur radio. Ali feels every operator should be knowledgeable about the hobby. During the contest he spent a great deal of time watching the ops, keeping track of the totals on the bands, and discussing the propagation and band conditions.

How can one sum up Ali's view of amateur radio? Passionately involved and supremely competitive. That's A61AJ.

spent much of the time listening and observing. It was exciting! There was an electricity in the room, a drive and dedication, and a camaraderie unlike anything I had ever seen. When possible, propagation and band conditions were discussed, strategies planned, totals charted, suggestions and projections made.

A 48-hour contest is a test of endurance as well as on-the-air skills. The operators took breaks when the bands were quiet or spelled one another, catching a bit of sleep here and there. I did what I could to help out and spent the remainder of the time listening, watching, and taking notes. Sleep? I didn't want to miss anything, so I too took a few naps when I just couldn't stay awake another minute!

Part of the excitement of contesting is having a goal. It can be a personal one (beat your previous high score), it can be to win a particular category, or it can be to best a particular competitor. In the case of A61AJ, it was a combination of all of these, and I watched as the operators calculated their progress toward their goals at various points throughout the contest. (For an operator's perspective, see "The Operation," by K3EST.) The energy and enthusiasm were infectious. Even as an observer, their goals became mine and I found myself wanting to win as much as they did.

As the contest drew to a close, the last contacts were made with everyone gathered in the shack. Then silence . . . no click of keyboards or keyers, no one spoke. It was over. A day or so would pass before the A61AJ team knew where they stood in the world multi-multi (number three, as it turned out).

Exhaustion was the order of the day. Tired only begins to describe the feeling, but the accomplishment made it all worthwhile. There is no way I was too tired for what came next, though.

K2RED on the Air!

As if being in Dubai, U.A.E., for the contest was not enough to create that huge sense of "Wow!" having the chance to get on the air from A61AJ after the contest and actually *be* DX was the icing on the cake. My on-the-air experience prior to this was pretty slim, so the bad case of nerves was to be expected, I guess. A61AJ is a much-sought-after contact, and I had been forewarned that the activity could be pretty intense once I hit the transmit button.

I listened on SSB for a while before I could get up the courage to actually open my mouth on the air. One thing I had learned over the years is to listen, listen, and listen, and then listen some more! Now, however, it was time to bite the bullet, dive in, and get on the air. Cold, sweaty

palms, headset in place, foot on the foot switch, hand on the tuning knob . . . K3EST said, "Go!" and I jumped in.

Uh, oh . . . a pile-up! For the first few contacts (well, maybe more than a few) I was very nervous (let me see . . . "CQ, CQ, CQ, this is A61AJ, Alfa Sixty One Alfa Japan . . . You're Five Nine in Dubai . . . QSL via Whiskey Three Uniform Radio" . . . think, think, think, concentrate—get it right!). It didn't take long. I got into the swing of things and was working them at a pretty good rate, logging the contacts, relaxing some, and really enjoying myself. Gene, N2AA, said I did a good job even through the times when it got pretty crazy—quite a compliment from a seasoned contester.

After 160 contacts were in the log, I was a smiling operator. The best part? Near as we can tell, I was the first woman on the air—ever—from the United Arab Emirates! It doesn't get more special than that.

The Experience

Once again, "Wow!" is the only way I can describe the A61AJ experience, but a few special things stand out in my mind. . . .

Just seeing this part of the world was amazing. I'd never thought I would have the opportunity to go anywhere as exotic as this, and sharing that experience with this group made it all the more enjoyable. Being part of a multi-multi contest effort was a wonderful opportunity. I will always remember the sounds and images in the shack, the sight of the towers and antennas, the people I met. Reading about such operations is one thing; being a part of one is quite another.

I am so very proud to have been the first woman on the air from the U.A.E. Those hours on the air will remain one of the most special times in ham radio for me.

Ham radio has so much to offer. Whether it's contesting, DXing, public service, or one of the dozen other aspects of the hobby, the opportunities are there to join in, to learn, to have fun, to contribute. I have been a part of the hobby in one way or the other for 22 years this October, yet I've only begun to be active on the air in the last few years. In that time I've felt the excitement, the challenge, and the joy of actually doing what I have read about and edited on paper for so long. Being on the air, whether listening or transmitting, has made all the difference. Am I hooked now? You bet I am!

The A61AJ team was an example of the best ham radio has to offer—knowledge, skill, personal integrity, team effort, and dedication.

Thank You

My gratitude to Ali, his family, and his staff for all they did to make my stay an enjoyable one. With the help of his wife Noora, Ali even surprised us with a complete Thanksgiving dinner for those of us spending the holiday away from the U.S. Ali's support of the contest effort, too, was beyond compare. He made certain we all had whatever we needed; from last-minute antenna hardware to refreshments, absolutely nothing was lacking.

I also must thank Bob, K3EST, for all he did to make this trip a reality for me and for his support and encouragement. Thank you, too, to all of the operators at A61AJ for the CQ WW DX CW Contest. You took the time to talk to me so that this story could be written, and most of all, you made this relatively new-to-the-air operator feel like one of you. You are a great group of people.

Postscript

As if going to A61AJ for the November contest was not enough, I had the opportunity to go back for the CQ WPX SSB Contest in March of this year. It was another great experience, another "Wow!" for my ham radio diary. Just when you think it couldn't possibly get any better. . .

Looking for an antenna to use on 160 meters? KD6GN came up with an approach that gave him full 160 meter coverage with low SWR and no need for an antenna tuner. Here's how he did it.

A 160 Meter Inverted-V Antenna

BY CARTER ROSE,* KD6GN

Last year I expanded my ham station by adding a transceiver that covered the 160 meter band as well as the frequencies up to 10 meters. It had lots of features I wanted, including a built-in antenna tuner. Unfortunately, the transceiver's tuner did not cover 160 meters, thus preventing me from operating on that band with my existing antenna system.

The desire to use the full-frequency capability of the transceiver triggered some trial-and-error experimental development on my part that ultimately resulted in an antenna with excellent capability on 160 without the need for an antenna tuner, and operation on all the other bands when the built-in tuner was employed. The steps I followed and the resultant design are described here.

Before presenting the details of my design, however, let me cover the "good" side and "bad" side of my approach:

Advantages

- Simple and easy to construct.
- Uses common readily available materials.
- Balanced system that does not require an RF ground.
- Omnidirectional radiation pattern on 160 meters.
- Provides 160 meter operational capabilities without the need for an antenna tuner. Simple radiating element length changes maintain an SWR of 1:1 over the full 160 meter band.
- Requires only one high support point
- Uses only one impedance matching element.
- With clear space around the central high point, the antenna easily converts to a high-gain V-beam on 20–10 meters.
- Antenna has been especially effective on 40 meters in the daytime, even under poor propagation conditions.

* P.O. Box 152, Wolf Creek, OR 97497
e-mail: <caro97497@yahoo.com>

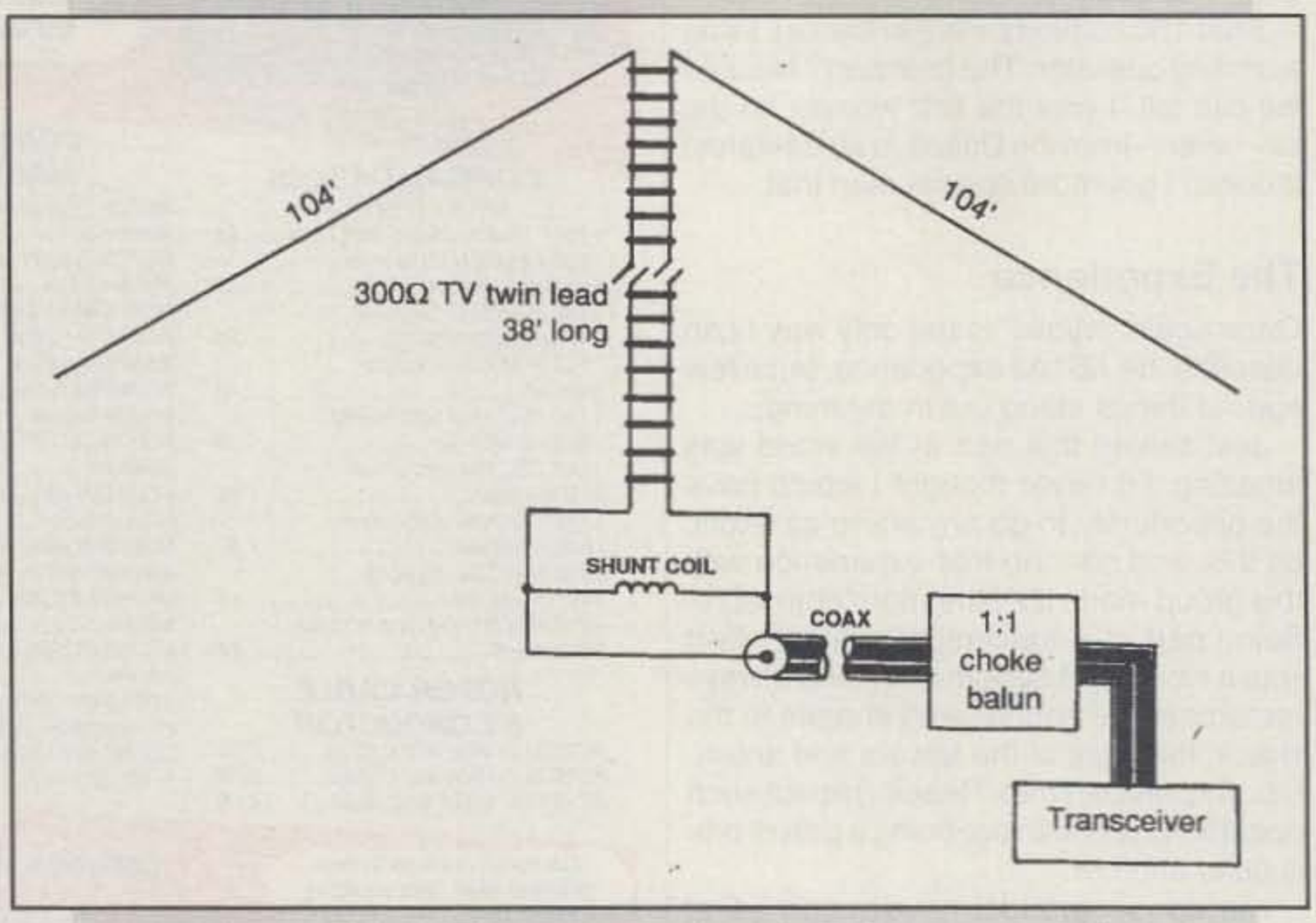


Fig. 1– The 160 meter inverted-V antenna.

Disadvantages

- Approximately 240 feet of space required between the end points of both legs.
- A 4:1 balun may be required to maintain a low SWR on 17, 15, and 12 meters.
- Difficult to maintain low SWR on 20–10 meters when TV twin line is wet.
- Design is based on a power limitation of 100 watts.

Design Evolution

A survey of my station site confirmed several facts. First, I had a single support point available 35 feet up (a 2×2 vertical pole adjacent to my chimney), and second, I had sufficient space around this support so that there was no limitation on the placement of the antenna end points.

Based on these facts, I decided to try an inverted-V with my 35 foot high point as an apex. With 160 meters as my major objective, I used two 120 foot wires as radiating elements. With the elements supported at the apex and slanting down in straight lines toward the ground, the end points of the V were about 120 feet each side of center and 8 to 10 feet above ground (see fig. 1).

I connected a 38 foot length of 300 ohm TV twin lead (left over from a recent TV antenna removal) between the radiating elements and the transceiver. A test of this first antenna system revealed that the antenna was resonant well below 1.8 MHz. Shortening each leg length to 104 feet changed the resonant frequency to 1.975 MHz, but the SWR could not be adjusted below 1.8 to 1.

My previous experience with conjugate admittance matching and calculations (see reference to M. W. Maxwell article in 1976 *QST*) led me to insert a shunt coil (about 5.5 microHenrys) across the input leads. This addition dropped the SWR to 1:1. During my

Affordable Multi-Mode 6 Meters

You just got your ham ticket, the club has been looking at increasing 6 Meter activity or it's just time to get away from 2 meters. You look at the ads, check the bank account and figure, maybe next year...Not anymore!

Need a reliable rig for 6-meter band openings or public service and emergency operations? Wondering why you have to pay for bands you don't plan to or can't use with your present license?

We have the answer.

Ranger Communications again sets the standard for value with a multi-mode, 6 Meter transceiver that is long on performance and short on price. The RCI-5054DX is perfect for the newly licensed ham who wants to try his hand at local FM operation as well as the experienced DX enthusiast who wants an economical SSB or CW 6 meter rig featuring a quiet receiver, all-mode squelch, extensive shielding and the performance and reliability that up to now you could only get with the multi band "high dollar" rigs.

The RCI-5054DX covers the full 6 meter band with an output power of 10W RMS or 25W PEP. Like the popular RCI-2950DX 10 & 12 Meter rig, the RCI-5054DX also has programmable repeater split (up to ±2 MHz in this model), optional CTCSS tone, 10 frequency memory and two programmable scanning modes. Add a large easy to read display and you have the perfect rig for home, mobile or field day. At a suggested retail price of only $329.00, the RCI-5054DX is an excellent buy for new or old hams alike.

Come see the new RCI-5054DX at the Ham Radio store near you. Don't know where? Call us Toll Free for help in finding the dealer nearest you.

RANGER
Communications, Inc.

Toll-free: (877) 536-0772

Email: rci@rangerusa.com **website:** www.rangerusa.com
401 West 35th Street National City, CA 91950

tests I detected undesirable RF voltage on the transceiver chassis. I successfully eliminated this problem by inserting a 1:1 choke balun between the transceiver and the shunt coil. A method of easily changing the length of each antenna wire completed the fundamental design of this antenna.

Performance

I have used this antenna for over a year with extremely satisfactory results. The performance on 160 meters has exceeded my expectations, and the operation on the higher bands has also been excellent. The easiest way to show how the antenna performs is to present the radiation patterns modeled by Tom Lindstrom, W7VDQ, shown in figs. 2(A–B), as well as the SWR data shown in fig. 3.This data clearly shows the performance that results from the unique combination of the TV twin-line length and the 5.5 microHenry shunt coil.

On the 160 meter band this antenna achieves radiation performance equal to an isotropic antenna, only at elevation angles of 60 degrees or more. This characteristic is controlled by the height of the antenna; 35 foot elevation is quite low for 160 meters. With added height, the radiation performance will improve at lower angles of elevation. The lower the angle of elevation, the better the DX performance.

Now on to the actual construction, installation, and test.

Construction

The following steps are recommended:

1. Separate the 117 foot twin vinyl- covered wire by carefully slicing the insulation between the wires (If speaker wire or the equivalent is used, the wires can be carefully pulled apart.). Be careful not to break or cut the insulation on each wire, exposing the copper itself. Wind each length on corrugated cardboard panels for ease of handling. Remove about 1 inch of insulation from one end of each wire.

2. Form a center-loop insulator of about 3 inches in diameter from one of the black nylon ties. Fasten each length of wire to this insulating loop, leaving the stripped ends exposed.

Bill of Materials

117 feet of #18 twin vinyl-covered stranded wire. (I used speaker wire.) This wire is separated into two separate wires for use as the radiating elements.

38 to 40 feet of (good quality) 300 ohm TV twin line.

3 black nylon ties for use as the center and end insulators (ceramic insulators certainly are acceptable.).

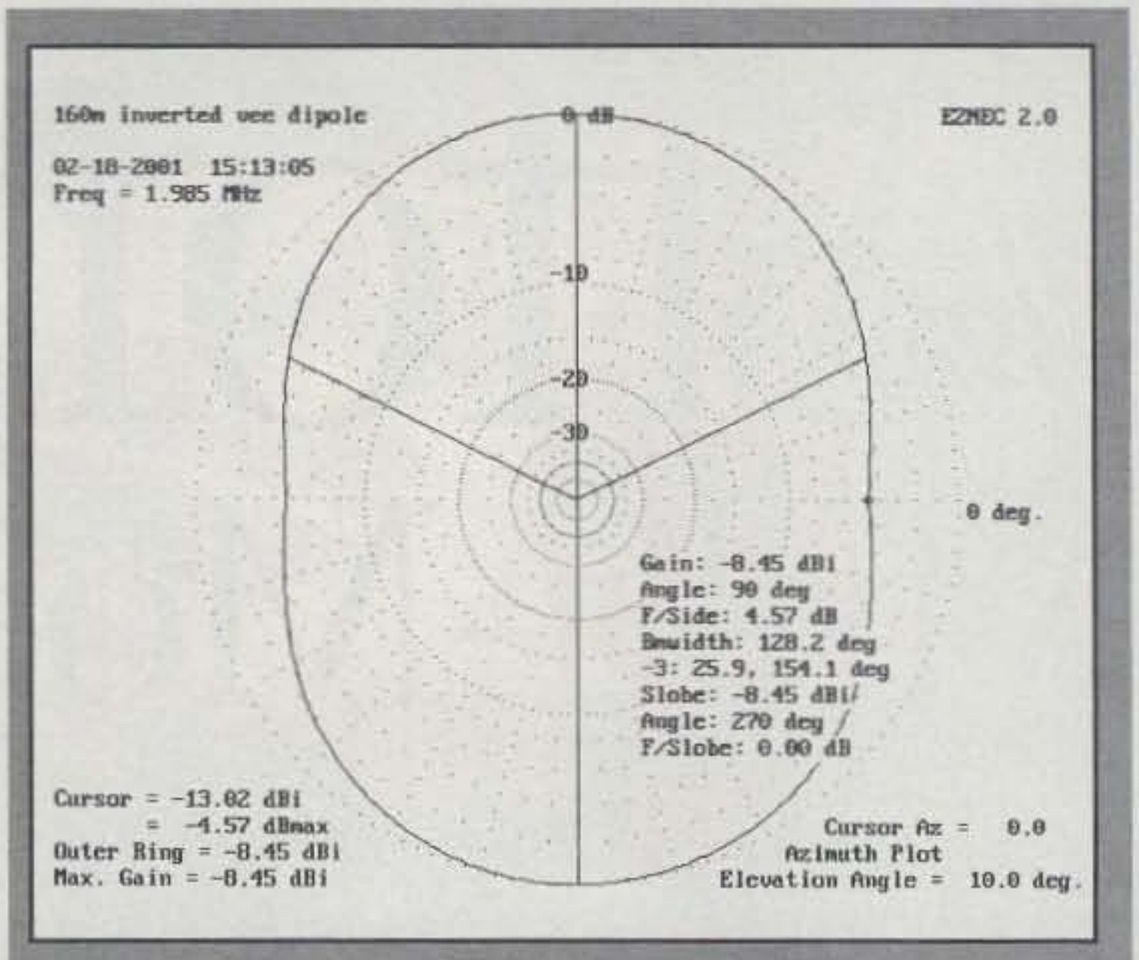
Plastic cord to support the ends of the radiating elements and attach the TV twin line to the apex insulator.

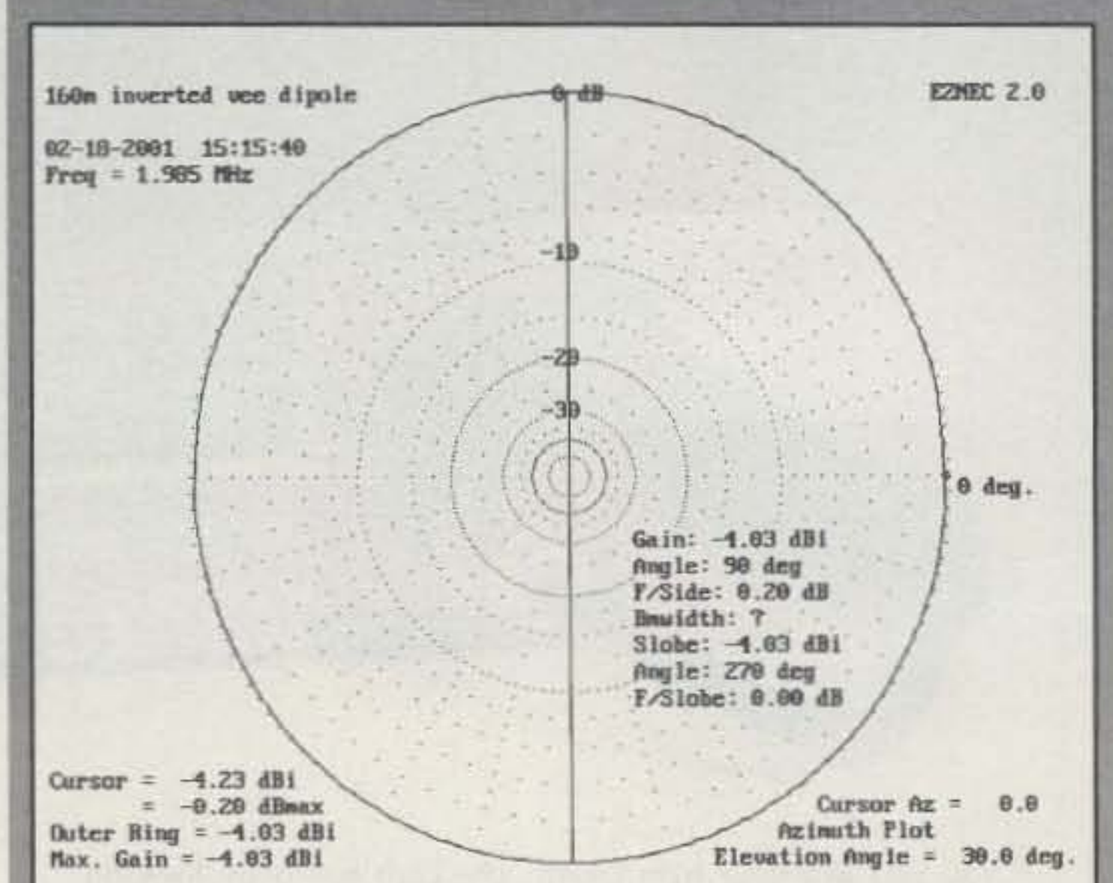
2 one-foot long "bobbins" made of wood, metal, or plastic, each capable of holding approximately 12 feet of wire from the ends of the radiating elements. Wire is wound on each bobbin for the shortest antenna and unwound when increasing length for best SWR on 160 meters. See fig. 7 for a simple bobbin made from a wire coat hanger.

One 5.5 microhenry shunt coil. Made by winding 11 turns of #12 solid house wire on a $2\frac{1}{2}$ inch diameter plastic tube, or by winding a 9-turn, 2 inch long coil of #18 solid wire on a $\frac{3}{8} \times 3$ inch ferrite rod (from the AM broadcast band antenna of a transistor radio)—see fig. 4.

1:1 choke balun (see fig. 5).

4:1 choke (current) balun (if needed).





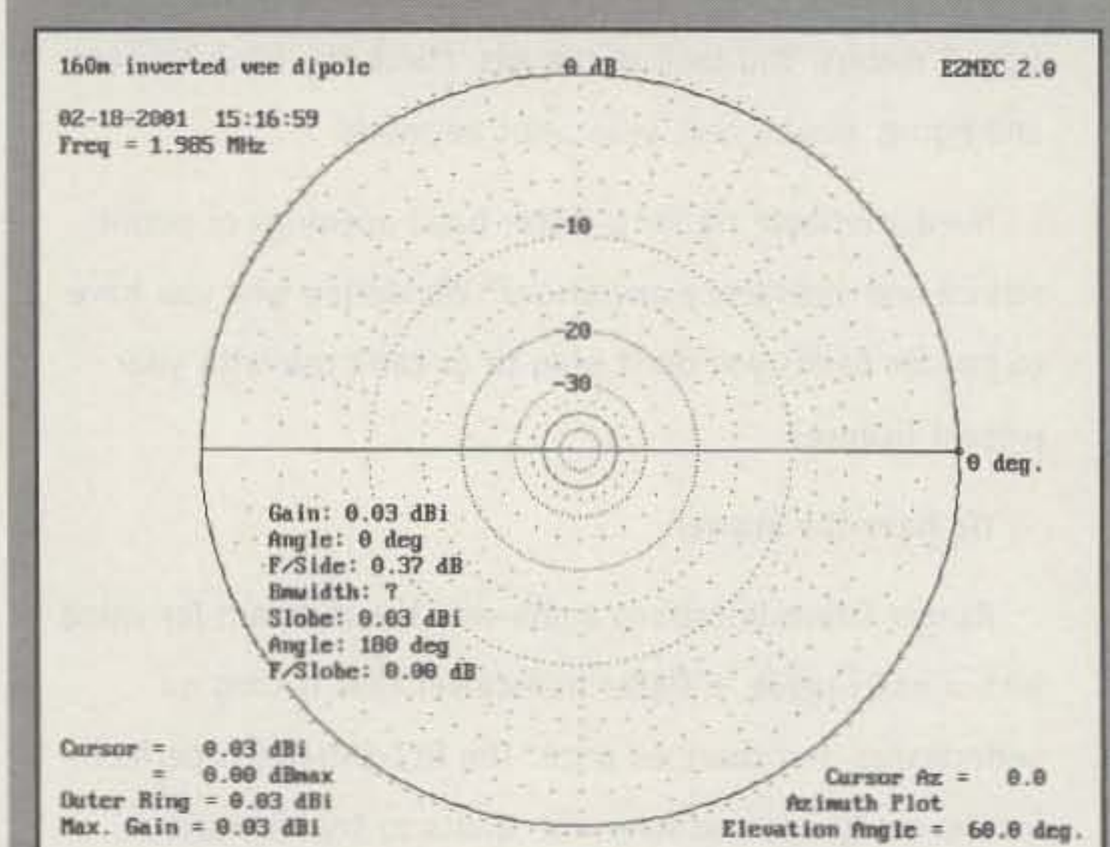


Fig. 2– (A) The 160 meter inverted-V antenna azimuth plot at 10 degree elevation angle; (B) azimuth plot at 30 degree elevation angle; (C) azimuth plot at 60 degree elevation angle.

Frequency (MHz)	Resistance	Reactance	VSWR
1.93	89.31	+35.85	2.17
1.94	76.97	+12.17	1.60
1.95	58.65	+1.24	1.17
1.96	43.68	−0.58	1.15
1.97	32.41	+1.45	1.54
1.98	24.88	+4.76	2.03

Fig. 3– VSWR calculations with 3.34 microHenry shunt coil installed as shown in fig. 1.

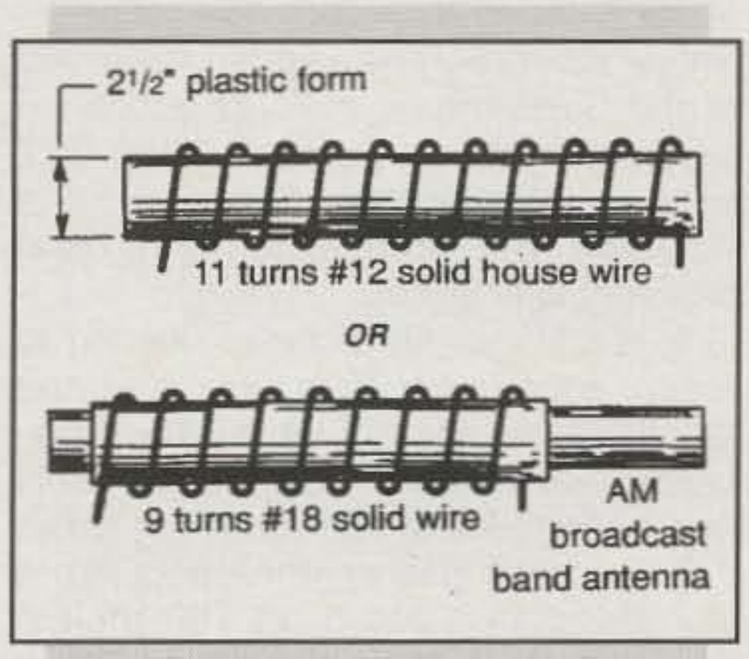


Fig. 4– Construction details of the shunt coil (two alternatives).

3. Strip the insulation from about 1 inch of the TV twin line and fasten the twin line to the same center-loop insulator. Solder the stripped ends of the radiating wires and transmission line together. Seal the connections with putty to provide protection from the elements.

4. Attach the center insulator to the apex support point and elevate it to 35 feet. Extend the radiating elements out in straight lines (see fig. 1) and wind about 6 turns (12 feet) of each end onto the "'bobbins." Secure the wound wire with the black nylon ties. Support these bobbins about 6 to 10 feet above the ground, but keep the wires extended in straight lines. I have used trees, vertical poles, and fence posts for such supports. The length of wire from each bobbin to the apex should now be 104 feet.

I currently am using a pulley at the top of the 35 foot pole to permit the antenna to be dropped quickly if necessary. This is a very important consideration in Tucson, where lightning is a serious hazard at any time of the year.

5. Connect the twin line, shunt coil, balun, and transceiver coax as shown in fig. 1.

That completes the assembly and installation process.

Testing and Use

The testing and operational requirements are quite simple:

1. Tune the transceiver to 1970 kHz and feed a little power to the antenna. The SWR should read 1:1. Tune to 1945 kHz and 1995 kHz; at each frequency the SWR should read about 1.5 to 1.

2. Lengthen each radiating element 6 feet by unwinding from each bobbin. Tune to 1880 kHz; SWR should be 1:1. Lengthen the radiating elements another 6 feet and tune the transceiver to 1820 kHz. Again SWR should read 1:1. The exact length of wire extension to achieve 1:1 SWR may vary for different locations. Experiment and record the exact lengths you should use.

3. While the transceiver, ungrounded, shows an SWR of 1.5:1, connect the transceiver chassis to ground while

feeding about 20 watts to the antenna. There should only be a small movement of the SWR meter, indicating that the antenna system is closely balanced, only a small common mode current is flowing to ground, and an RF ground has very little effect.

4. If a longer feed line is needed to reach your transceiver, increase the length of the coax going to the transceiver. Maintaining the 38 feet of TV twin line is important for 160 meter operation.

5. Because this antenna acts like a closely-spaced beam on 160 meters with a very high angle of radiation, it may be possible to improve performance by reducing the loss of the reflecting ground. This can be achieved by placing a wire directly under the antenna (see reference to *1993 Radio Amateur Antenna Handbook).*

6. The shunt coil is required for 160 meters but can be left in the system, because it does not adversely affect the higher frequencies.

7. Use a 4:1 balun, if needed, on the 17, 15, and 12 meter bands. Install it between the choke balun and the TV twin line.

Closing Comments

This antenna has been in use in two locations for over a year. I am very pleased with its performance and its durability. I've gotten lots of excellent signal reports from my many contacts.

Anyone interested in using it at higher power outputs must increase the wire sizes appropriately. I cannot see any restrictions in this regard.

I must point out that during the cut-and-try evolution of my antenna I became aware of the similarity of my antenna to the Varney G5RV multi-band dipole. Varney's antenna uses a total overall length of 102 feet for the radiation elements, whereas mine is approximately twice that size. Varney did indicate that the antenna could be used in the form of an inverted-V, but his fundamental approach was to maintain the radiating elements parallel to the ground.

The use of an admittance matching shunt coil with an electrical one-tenth-wavelength twin line feeding a low inverted-V is unique to my design. A 1:1 choke balun is necessary to maintain electrical balance and to minimize common mode currents on the coax shield.

To fully benefit from Varney's work and the similarities involved, it should be noted that he indicated that up to one sixth of the total antenna length can be dropped vertically, or bent at a convenient angle, to save on the space needed. I have not tried this approach on my antenna, but it may be of value to those who do not quite have enough room for the antenna described in this article.

For those of you who try my approach, I hope you have the same excellent results that I have had. Good luck and good DX!

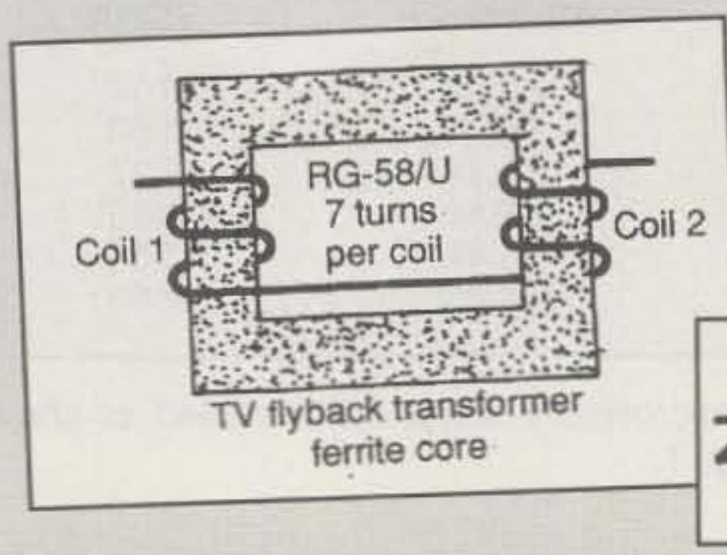


Fig. 5– The 1:1 choke balun.

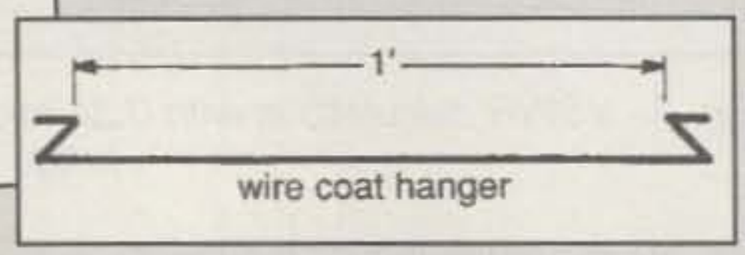


Fig. 6– Simple "bobbin" formed from a wire coat hanger.

Acknowledgements

I give special thanks to Dr. Tom Lindstrom, PhD, W7VDQ, for his excellent antenna modeling plots and analysis. I also want to thank Don, W8PEE, for his communication support.

References

F. Brown, W6HPH, "Another Balun Design," *Ham Radio,* May 1982, p. 54.

K. Kleinschmidt, NTØZ, "High Frequency Amplifiers vs. Antennas," *QST,* Nov. 1998, p. 55.

M. W. Maxwell, W2DU, "Another Look at Reflections," Part 7, *QST,* Aug. 1976, p. 15.

W. Maxwell, W2DU, "SWR Doesn't Vary Along a Feedline," *QST,* Nov. 1991, p. 53.

R. L. Measures, AG6K, "A Balanced Antenna Tuner," *QST,* Feb. 1990, p. 28.

E. M. Noll, W3FQJ, "Long Wire Inverted-V Antennas Sans Tuners," *QST,* Aug. 1969, p. 30.

E. M. Noll, W3FQJ, "73 Dipole and Longwire Antennas," 1976 (book).

W. I. Orr, W6SAI, *1993 Radio Amateur Antenna Handbook,* p. 153 (describes reflector wire under the dipole).

MFJ *Sound Card-to-Rig* Interface

Use sound card and rig for all digital modes!

Plug and Play! Includes software, audio cables, power plug . . . RFI-proof . . . Isolation transformers -- no hum, noise, distortion . . . Operate PSK-31, packet, APRS, AMTOR, RTTY, SSTV, CW, Meteor Scatter, others . . . Use as Voice Keyer, CW Contest Memory Keyer

New!

MFJ-1275/MFJ-1275M

$89.95

Plug this new MFJ-1275 sound card interface between your transceiver and computer and enjoy operating all digital modes.

Everything you need is included -- software, audio cables and power plug.

The MFJ-1275 provides fully automatic operation with audio and push-to-talk control. It matches sound card audio, eliminates ground loops and provides microphone override.

Works with all transceivers with 8-pin round or modular microphone plugs.

Operate PSK-31, packet, APRS, AMTOR, RTTY, SSTV, CW, high speed CW Meteor Scatter and many others. Also use as Contest Voice Keyer and CW Contest Memory Keyer.

Digital Modes or Normal Operation

Choose digital modes or normal transceiver/computer operation with the push of a switch.

Selecting the ON digital mode, all connections are made between your rig and computer for instant digital operation.

In the BYPASS normal mode, your transceiver and computer connections are restored for their normal operation.

Audio Isolation Transformers

Audio isolation transformers and relay eliminate ground loops, audio hum, noise and distortion.

RFI-Proof

Extensive RF suppression and line isolation eliminates RF feedback problems.

Automatic Microphone Override

You can override any digital mode and transmit microphone audio at any time by pressing mic PTT -- great for SSTV and Contest Voice Keyer operation.

More Impressive Features

Serial port -- lets computer control your radio to override and/or interrupt digital transmissions.

VOX Control -- lets you use automatic VOX control when not using computer serial port control.

Level Controls -- for transmitter drive and for receiver-to-sound card drive level. No need to adjust microphone gain or sound card level when you change modes.

Stereo or Mono Audio Input -- A front panel switch selects left, right, or both sound card audio output channels to accommodate various programs.

Off-the-air recording -- for replaying or for use with spectrum analyzer programs.

Speaker on/off switch lets you hear receiver audio when you want it.

Rugged Construction -- All aluminum cabinet and surface-mount construction gives you years of trouble-free service.

Use any Transceiver with 8-pin Mic

Internal jumpers program microphone wiring for any brand or model radio -- no soldering required. Order **MFJ-1275** for 8-pin *round* mic plug. Order **MFJ-1275M** for 8-pin *modular* mic (RJ45) plug.

Everything you need is included

MFJ-1275/MFJ-1275M includes audio cables, power plug and a CD with a collection of the most popular amateur radio software to operate PSK-31, RTTY, SSTV, PACKET, AMTOR, CW, HSCW Meteor Scatter, Contest Voice Keying and other modes. Uses 12 VDC or 110 VAC with optional adapter (**MFJ-1312B, $14.95**).

No Matter What™ Warranty

Protected by MFJ's famous *No Matter What*™ one year limited warranty. MFJ will repair or replace (at our option) your MFJ-1275/MFJ-1275M *no matter what* for one full year.

Try it for 30 Days

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

Operate PSK-31 with your MFJ-1278, MFJ/TAPR TNC 2 Clones

MultiCommHost™ for MFJ-1278 Multimode TNCs. **MFJ-1289H, $79.95.** Supports all packet, HF modes. *Adds PSK-31.* 32-bit host mode runs under Windows 95,98,Me,NT,2000,XP™. Syncs with popular logging programs. Toolbar, Hotkeys, user defined macros, quick connects, receiver buffer, more!

MultiCommHost™ for packet only. **MFJ-1284H, $49.95.** 32-bit packet terminal software gives you true multi-tasking in Windows 95,98,Me,NT,2000,XP™. Uses standard Windows commands. *Also adds PSK-31!*

Download free MFJ-1289H/MFJ-1284H demos
http://www.cssincorp.com/multicommhost
Call 800-647-1800 to order activation key.

Free MFJ Catalog
and Nearest Dealer . . . 800-647-1800

http://www.mfjenterprises.com

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

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

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

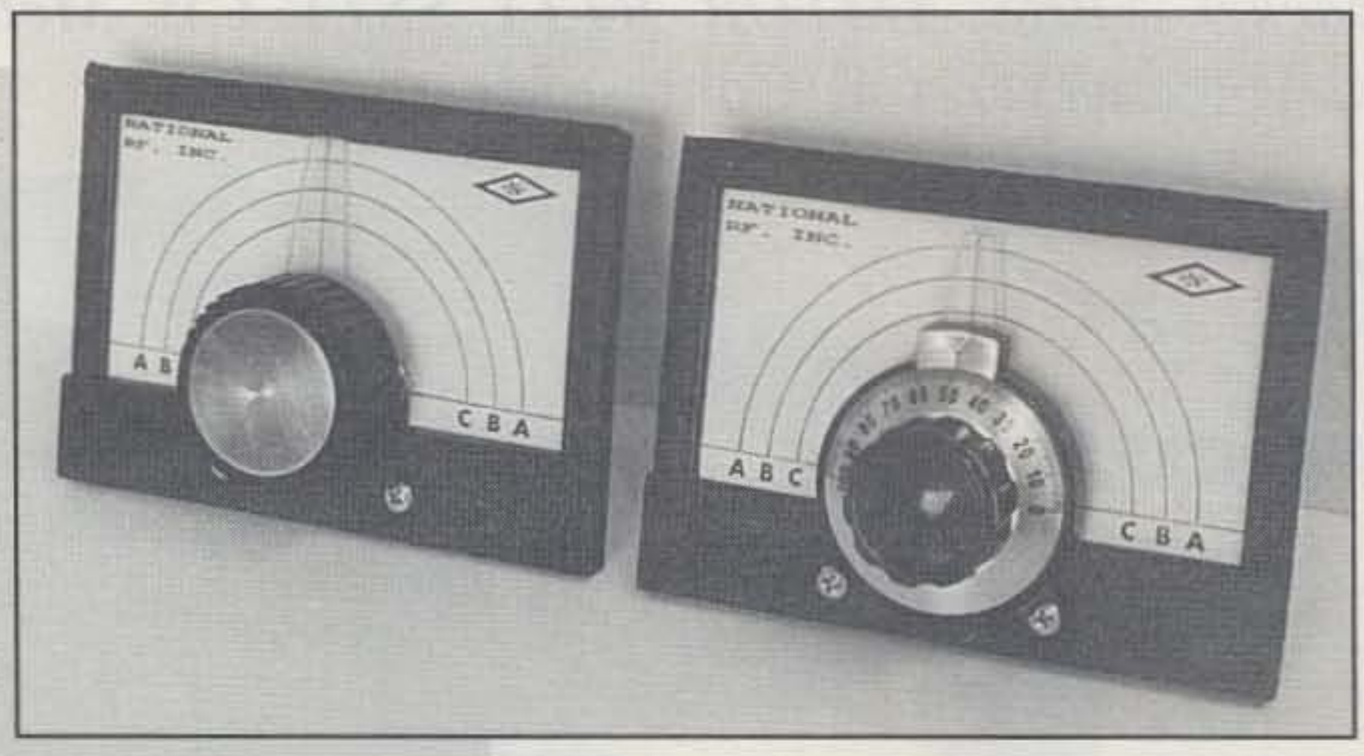
What's New

BY KARL T. THURBER, JR., W8FX

A New Column for A New Century

Super September Stuff!

This month in your "What's New" column we'll focus on some hot new radio and ham shack accessories, software, and other goodies we think will be of real interest to you. Let's dig right in!



Those classy National Radio Company vernier dials are back in the form of National RF's NPD series of analog display dials. In them, National RF's engineers incorporated existing vernier mechanisms with a baseplate, scale, and pointer to provide the affordable NPD series reduction drive assemblies. Three different analog display dials are offered; two examples are depicted here. The Type NPD-3 dial is shown to the left in this photo, while the Type NPD-2 dial is to the right. (Photo courtesy National RF, Inc.)

Accessories for the Shack

National RF NPD Analog Display Dials. Do you remember those classy National Radio Company vernier dials? Well, they're back in the form of National RF's NPD series of analog display dials. In the dials' reincarnation, National RF's engineers incorporated existing vernier mechanisms with a baseplate, scale, and pointer to provide affordable reduction drive assemblies.

Three different display dials are offered: the Type NPD-1 ($34.95), NPD-2 ($44.95), and NPD-3 ($49.95). The latter two dials are shown in photo A. The NPD series display dials all are similar, but they differ slightly in size and in drive vernier ratios. All three units use a 1/4-inch shaft coupling to the load.

According to the manufacturer, the display dial assemblies are ideal for RF tuning applications, such as receiver main tuning and antenna tuner use. For spec sheets or to order, contact National RF, Inc., Radio Engineers Division, 7969 Engineer Road, Suite 102, San Diego, CA 92111 (858-565-1319; fax: 858-571-5909).

Antennas and Accessories

Times Microwave Systems Products. Times Microwave Systems is best known for its several broad lines of business- and industry-oriented products. Nevertheless, it also offers a number of competitively priced, high-quality, low-loss communications coax and coax-related products that are of special interest to radio amateurs.

Among these relatively low-cost products is the LMR® series of water-tight, flexible, foam polyethylene cables, including the popular LMR-900, 600, 400, 240, 200, 195, and 100A cables. Also included are widely used "classic" coaxial cables such as 9914, 9913, RG-214, RG-213, RG-8X, RG-58, and RG-174.

Times Microwave Systems offers a free coaxial cable catalog and handbook that you may find very useful, especially since it includes complete cable reference data. A companion catalog and price list depicts LMR series cable and connector products. You can request copies at the Times Microwave website. The site also sports a handy online cable loss and power calculator, as well as downloadable calculators you can install on your own PC.

Contact Times Microwave Systems, 358 Hall Ave., Wallingford, CT 06492 (1-800-867-2629; e-mail: <jlanoue@timesmicrowave.com>; web: <http://www.timesmicrowave.com>).

Davis RF Co. Full-line suppliers of antenna wire, cable, and parts are relatively few and far between. Davis RF Co., a division of Davis Associates, Inc., bills itself as "your wire and cable connection to the new millennium." The

The DX Doubler (DXD) Two-Way Radio Controller is a single-operator, two-radio control box. Just plug your headphones, mic, keyer, and footswitch into the DXD, connect the DXD to your radios, and you're ready to operate. The photo shows the layout of the front control panel, which is arranged in an easy-to-understand and intuitive way. (Photo courtesy the TOP TEN Devices website)

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

The PB7A single gel cell, 7.5 ampere-hour battery from Cutting Edge Enterprises reportedly is perfect for your next outing with your HT or Yaesu FT-817, or for full power operation with your ICOM 706. The battery includes a padded, heavy-duty nylon case with buckle-down lid with room inside the lid for accessories. (Photo courtesy Cutting Edge Enterprises)

The new Worldpouch™ pack from Cutting Edge Enterprises consists of the long-life, 12 volt rechargeable battery with automatic charger; a padded radio pouch that can be used as a stand-alone unit to hold a Yaesu FT-817 on your belt; and a fanny pack with extra carrying capacity. (Photo courtesy Cutting Edge Enterprises)

firm, along with its affiliate, Orion Wire Corporation, provides electronic and electrical wire, cable, RF connectors, DSP audio filters, rope, and nonconductive guy cables for antenna or tower support, as well as sundry antenna-related parts. Davis RF also furnishes wire and cable design and end product for almost any form of speciality cable or custom application.

Besides serving radio amateurs, Davis RF provides products to the government and military services; oceanographic, marine, and automotive industries; and medical, robotics, and microwave users. Amateur products alone include about 30 different types of products, including the firm's popular BURY-FLEX™ flexible, low-loss, direct-burial cable; and the FLEX-WEAVE™ ultraflexible antenna wire. All of the Davis RF products are clearly displayed and described on the firm's attractive and easy-to-navigate website.

For more information, contact Davis RF Co., P.O. Box 730, Carlisle MA 01741 (phone 1-800-328-4773; e-mail: <davisRFinc@aol.com>; web: <http://www.davisrf.com>).

New from TOP TEN Devices. In prior columns we profiled the wide variety of TOP TEN Devices' sophisticated products which automate the selection of antennas, filters, and other devices that can remove a large burden from the competitive contest operator.

TOP TEN Devices was established in 1991 by Dave Hawes, N3RD, and George Cutsogeorge, W2VJN. Their products include band decoders and cables; a six-way antenna relay box; a tower-mounted, six-way relay box; an A/B station selector; and band reject coaxial stubs.

Now the folks at TOP TEN Devices have come up another winning product. It's the DX Doubler (DXD) Two-Way Radio Controller, a single-operator, two-radio (SO2R) control box (photo B). You plug your headphones, mic, keyer, and footswitch into the DXD, connect the DXD to your radios, and you're ready to operate. The photo shows the layout of the front control panel, which is arranged in an easy-to-understand and intuitive way. Headphone audio controls are on the left side, while the transmitter selection controls are on the right. Red and green LEDs are located on the left and right sides of the DXD. They follow the popular Yaesu FT-1000MP convention for visual indication of which of the two radios is being heard in the headphones, and which is the selected transmitter. Price of the DXD is $195 plus shipping/handling and optional cables.

For more details and specs, contact TOP TEN Devices, Inc., 143 Camp Council Road, Phoenixville, PA 19460 (610-935-2684; e-mail: <n3rd@ix.netcom.com> or <w2vjn@rosenet.net>; web: <http://www.QTH.com/topten>. The company's web page has complete specs, photographs, application notes, ordering info, and more.

Portable and Mobile Goodies

Cutting Edge Enterprises Gel Cell Battery and More. In recent columns we covered several new products from Cutting Edge Enterprises, including the PowerPort VX-5 Radio Glove™, NEO "Hold-it" neoprene pouch, and other accessories for the on-the-go amateur. We also previewed the new Worldpouch™. President Roger Hall, KC6QLB, recently told us of another new product designed to give you "power to do what you want in the wild." It's a simple, highly portable "battery in a bag"—the PB7A single gel cell, 7.5 ampere-hour battery (photo C) that he says is perfect for your next outing with an HT or Yaesu FT817, or for full-power operation with an ICOM 706. The battery includes a padded, heavy-duty nylon case with sturdy buckle-down lid and extra room inside the lid for accessories. The tough, waterproof bag has an adjustable strap handle to make it easy to carry. The price is $33.95.

When we previewed the Worldpouch in a recent column, we didn't have a photo. Now we do, and we can mention that the Worldpouch pack (photo D) actually consists of three complemen-

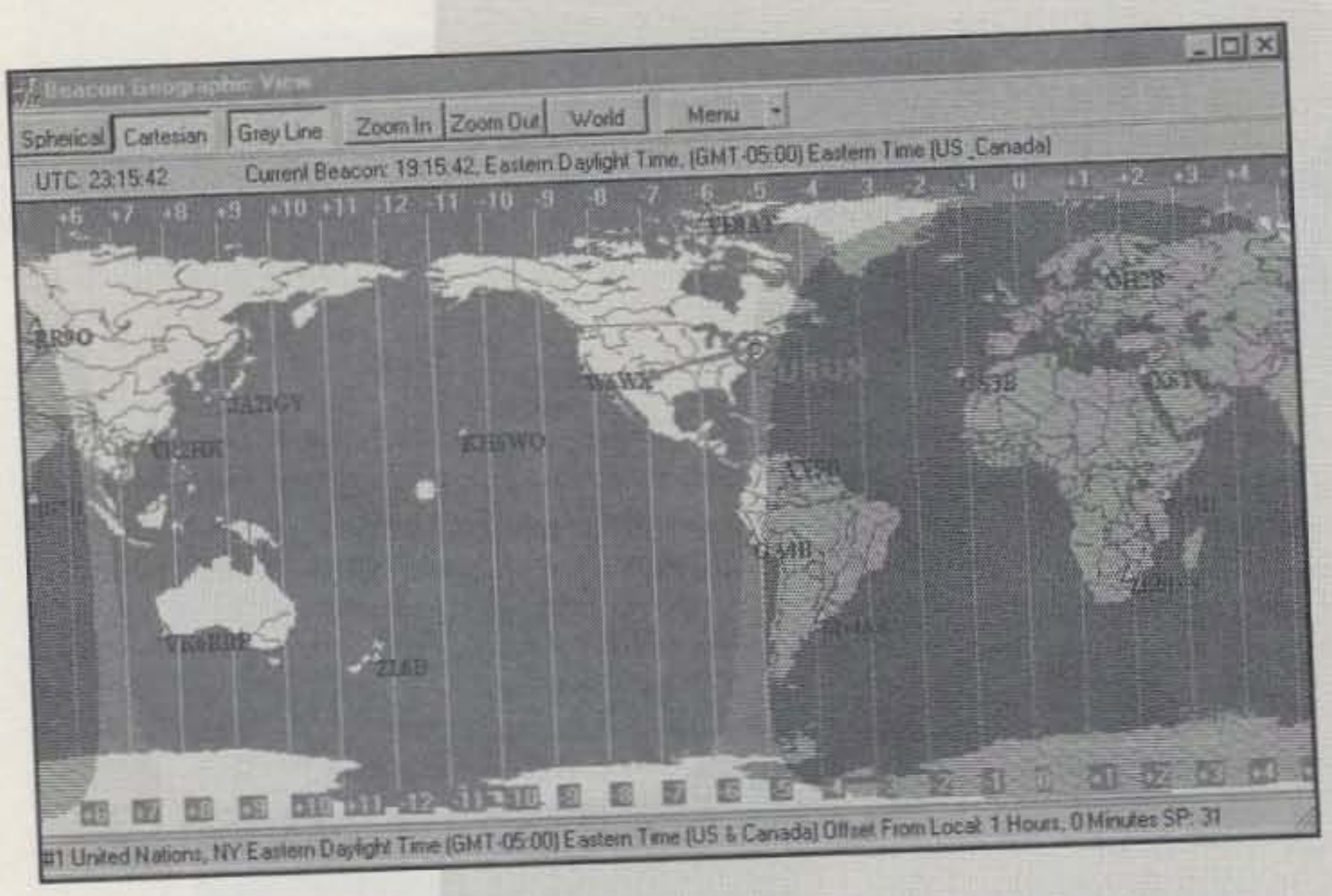


Fig. 1– Jim Tabor, KU5S, offers the Beacon-Time Wizard (BTW), which occupies but a small portion of the PC desktop. At the click of a button, various tools and views are available, including an accurate, sizable map that provides a geographic representation of the Earth and the location of each beacon station. The map, depicted here, provides several options, including display of the solar grayline. (Photo from the Kangaroo Tabor Software website)

tary parts. These are the long-life, 12 volt rechargeable battery with automatic charger to give you 5 watts radio output and 2300 milliampere-hours of storage; a padded radio pouch that you can use as a stand-alone unit to hold the Yaesu FT-817 radio on your belt; and a fanny pack to hold the radio pouch, with extra carrying capacity to fit all the accessories that we all like to carry. Check the firm's website for details and pricing.

For more information, contact Cutting Edge Enterprises, 1803 Mission St., Ste. PMB-546, Santa Cruz, CA 95060 (telephone 1-800-206-0115; e-mail: <info@powerportstore.com>; web: <http://www.powerportstore.com>).

Software and Computers

Beacon-Time Wizard. The Kangaroo Tabor Software website is sponsored by Jim Tabor, KU5S. It features several useful software programs, especially tools for those interested in communications analysis and current and future solar conditions. These include Active Beacon Wizard++, WinCAP Wizard 2.0, Alert Wizard, ID Wizard, and other tools, several of which we have profiled. Check out the Taborsoft website at <http://www.taborsoft.com>.

Recently Jim released another downloadable software program called Beacon-Time Wizard, or BTW. According to Jim, BTW is rather hard to describe. Suffice it to say it's a very useful program that provides a group of beacon information views and tools to enhance the enjoyment and usefulness of the NCDXF/IARU International Beacon Network and HF radio operation. You can download BTW at <http://www.taborsoft.com/btw>.

BTW occupies but a small portion of the PC desktop; at the click of a button, various tools and views are available. These includes "BW," an enhanced version of Jim's traditional Beacon Wizard palette; analog clocks that display time for each beacon location; and an accurate, sizable map display with solar grayline (see fig. 1). Other BTW features include a time-zone browser; a convenient method for obtaining HF propagation conditions and forecasts from the Space Environment Center; a simple network time protocol for keeping your PC's system clock in adjustment; and a calendar that lets you view sunrise/sunset and moonrise/moonset times.

For further info contact Kangaroo Tabor Software, Rt. 2, Box 106, Farwell, TX 79325-9430 (fax: 806-225-4006; e-mail: <jim@taborsoft.com>; web: <http://www.taborsoft.com> or <http://www.hamtools. com>).

PropView. In the August 2000 "What's New" column we described the popular Pathfinder software from Dave Bernstein, AA6YQ. As we noted, the free program makes it easy to find QSL information from web-accessible sources. The program searches address and manager databases, as well as country-specific callbooks.

Recently Dave told us about PropView, which uses the IonCAP propagation predication engine to forecast the minimum and maximum usable frequencies (MUFs) between two locations over a specified 24-hour period. The program renders results in an easy-to-understand, color-graphic display. Locations can be specified via direct latitude/longitude entry. As an alternative, PropView inter-operates with DXView to allow location selection by entering a DXCC prefix, or by selecting locations on a world map. PropView is free, and it contains no advertising.

To put things into perspective, I should mention that PropView and DXView are members of the DXLab Suite, a suite of inter-operating applications designed to automate DXing activities. DXLab Suite is at <http://www.qsl.net/dxlab>; you can check out PropView at <http://www.qsl.net/propview>. You can obtain DXView by navigating to Dave's DXView website at <http://www.qsl.net/dxview>.

PropMan 2000. Rockwell Collins has upgraded its highly successful HF Propagation Resource Manager software, PropMan, which we profiled in December 1995. Collins PropMan 2000 identifies and displays the best channels for an HF communications link in a user-friendly graphical Windows/Windows NT environment. The program is said to dramatically improve communications quality and reliability. Originally developed for military and government use, PropMan can help radio amateurs determine the best frequencies on which to communicate between two selected locations.

Major features include real-time plot update to user-changed HF link parameters; simplification of complex HF propagation predictions; display of current frequency summaries and recommendations; tracking, analyzing, and storing of HF propagation information for multiple-user radio-site pairs; and link degradation warnings. The program has an extensive help section and a tutorial on how to get the most from the software, priced at $99 plus s/h.

For more information, contact Rockwell Collins, PropMan Dept. 120-130, 400 Collins Road NE, Cedar Rapids, IA 52498 (phone 1-800-321-2223; e-mail:

Jameco Electronics offers a wide variety of electronic components, including transistors and integrated circuits, computer products, tools, soldering equipment, test and measuring equipment, and much more. (Photo courtesy Jameco Electronics)

published a new video on the TS2000 Multiband/Multimode Transceiver for amateur radio club presentations. The video describes this latest, state-of-the-art equipment which allows operation in many different operating configurations. The folks at Kenwood think the short video would make a great addition to your next radio club meeting.

To that end, you can request a copy of the video by contacting Kenwood at Kenwood Amateur Group Video Offer, 3975 Johns Creek Ct. #300, Suwanee, GA 30024 (fax: 678-474-4730). Please use your club letterhead with callsign when making your request, and include a UPS shipping address. This offer is for U.S. amateur radio clubs only.

Radio Amateur Callbook CD-ROM Club Discount. In April we previewed the 2001 Summer Edition of the Radio Amateur Callbook CD-ROM. Indeed, the summer edition—with a number of new features for 2001, including free instant online lookups—became available in May. (When you purchase the Callbook CD-ROM, you'll have access to the website, which contains world-wide changes that have occurred since the CD was published. This free service is in effect until the next CD is issued.)

Now Bob Hughes, the "Flying Horse" publisher, writes to tell us that he's offering amateur radio clubs a special discount if the order is shipped to one destination. For example, there's a $5.00 discount for one copy. Two to five copies are discounted 20%, 6–24 copies are 40% off, 25–99 copies are 45% off, and 100 or more copies are discounted 50%. Also, there's a final closeout sale on all antenna books while they last.

Contact Radio Amateur Callbook, 575 Prospect Street, Lakewood, NJ 08701 (phone 1-888-905-2966; e-mail: <103424.2142@compuserve.com>; web: <http://www.callbook.com>).

Wrap-Up

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

Overheard: It's trite but certainly true—the road to success in most any endeavor is rarely a straight path.

73, Karl, W8FX

<collins@collins.rockwell.com>; web: <www.propman2000.com>).

From the Bookshelf

Jameco Electronics Catalog. For more than 28 years, Jameco® Electronics has been serving radio amateurs with a wide variety of electronic components and equipment. Items offered include transistors and integrated circuits, computer products, tools, soldering equipment, test and measuring equipment, and much more. Jameco claims 99.7% product availability, and it offers a 30-day money-back guarantee, same-day shipping, nine different payment options, and two-day delivery.

For a free, 190-page, full-color catalog (photo E), contact Jameco Electronics, 1355 Shoreway Rd., Belmont, CA 94002 (1-800-831-4242; e-mail: <domestic@jameco.com>; web: <http://www.jameco.com>). Be sure to check out the website, which features an online PDF-format catalog.

Short Bursts

Kenwood Offers New Video on New Multiband/Multimode Transceiver. Kenwood Communications Corp. has

Reader Survey
September 2001

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 Reader Service Card and returning it to us. As a bit of an incentive, we'll pick one respondent each month and give that person a complimentary one-year subscription (or subscription extension) to *CQ*.

This month, since we're featuring the CW results of our CQ World-Wide DX Contest, we want to find out about your CW (Morse code) operating habits.

Please indicate... **Circle Survey Card #**

1. How you'd classify your proficiency level as a CW operator (choose only one):

Expert.....1
Advanced.....2
Intermediate.....3
Beginner.....4
Don't know CW.....5

2. Your level of CW activity versus other modes: I operate CW...

Exclusively.....6
Most of the time.....7
About half of my on-the-air time.....8
Once in a while.....9
Rarely.....10
Never.....11

3. The on-air activities in which you operate CW a *majority of the of the time* (left-hand column) and *some of the time* (right-hand column):

Contesting	12	19
HF DXing	13	20
Traffic Handling	14	21
Rag-chewing	15	22
VHF DXing	16	23
Other	17	24
None	18	25

4. Your *primary* reason for operating CW:

Enjoyment of the mode.....26
Its simplicity and efficiency.....27
CW operators are better behaved.....28
Its ability to get through in marginal conditions.....29
Other.....30
Don't operate CW.....31

5. Whether you think you would have learned CW if it was not a licensing/upgrading requirement:

Yes.....32
No.....33
Don't know.....34
Have not learned CW.....35

Thank you for your responses. We'll have more questions for you in our next reader survey.

What You've Told Us...

Our July survey asked about how you obtain and use propagation information. The basic conclusion from the results is that most of you use propagation information at least sometimes, and your main source of that information is *CQ*'s propagation column.

Nearly four out of five of you operate mostly HF or an equal mix of HF and VHF/UHF, and use propagation information at least occasionally in your station operations, with 31% doing so regularly, 26% sometimes, and 20% occasionally.

Just over one-third (35%) say having this information is an important part of knowing where and when to operate, with another 6% calling the information essential to your operating. On the other hand, 29% say you just pick a band with activity and see where it takes you, while 24% find propagation information interesting for general knowledge but not for specifics.

There is considerable variety in how you use propagation information, with 29% each using it for general knowledge and to better understand band conditions, 28% to choose bands and/or times for operating, 16% to plan DX or contest operating, and 12% to look for specific types of propagation (17% do not use the information at all).

CQ's propagation column is the main source of propagation information for 47% of you, followed by WWV and other broadcast sources (35%), other magazines (19%), e-mail propagation alerts (17%), personal propagation websites (13%), and government/university websites (7%). Other sources came in at under 10% each, except for "none" at 14%.

Finally, we asked what's most useful to you about *CQ*'s propagation column. Four out of five of you read the column, and 38% say everything is useful, followed by discussion and explanation at 26%, and DX propagation charts (17%). The more specialized last-minute forecasts and short-skip charts polled under 10% each, but those numbers are in addition to the 38% who find everything useful.

This month's winner of a free one-year subscription to *CQ* is Luther Lipfird, NC4MI, of Black Mountain, NC. As always, thank you to all who responded to our survey.

MATH, WA2NDM

se It

I t
a
c
cat
F
pub
cata
This
nies
up
reliv
you
ers
the
S
talki
jack
sect
and
ante
som
feree
tech
ty of
For t
tenn
type)
and
pane
tors. (If you don't know what a dynamotor is you are probably too young to truly appreciate how far we've come.)

It is well worth the trouble to get a copy from Fair Radio, which you can do easily by contacting the company by phone at 419-223-2196 or visiting their website at <www.fairradio.com>.

In the component area, Linear Technology has a dual ultra-fast comparator called the LT1720. This device switches in 4.5 nanoseconds and provides rail-to-rail outputs. The device only draws 4 ma from a 2.7 to 6 volt line and has 3.5 millivolts of built-in hystreresis, which goes a long way toward eliminating oscillation. The output is TTL/CMOS compatible and the input will sense around ground. This is an interesting device for those who need to clean up digital or even analog signals. Cost is only $2.95 in quantities of a thousand, slightly higher for smaller quantities. More information is available from Linear at 1-800-4-LINEAR or on the web at <www.linear-tech.com>.

From MAXIM you can now get a tiny (SOT-23) power op-amp chip that will provide up to ± 80 ma into a 32 ohm load (which works out to more than 3/4 watt). The gain-bandwidth is 5 MHz and the out-

c/o CQ magazine

e MAX4165 through
n singles, duals, and
from a single-ended
y. They are good for
such as portable
adphone amplifiers,
cell-phone drivers.
eeded are a couple
wer. What a way to
et!

nore power, consid-
amplifiers we spoke
ese devices, which
d out of a load (they
r cut off) and rely on
over analog audio,
le in SOT-23 pack-
production by such
n cut off there is no
d when saturated
dropped across the
power can be ob-
all package.

modern Class D MAXIM MAX4297. a full 2 watts from tiny package. For ot familiar with just y are, the SOT-23 package measures 5 mm (0.2") × 3 mm (0.12"). Both mono and stereo versions of these devices are described in detail at <www.maxim-ic.com>.

For even smaller devices be sure to check out Texas Instruments' website for its so-called Little Logic™ chips. These devices are single gates, inverters, etc., and are only 0.06" × 0.075", or about the size of a surface-mount 0806 resistor. Why take up the space for a 14-pin chip when you only need a gate or two? The web address for more information is <www.ti.com/sc/littlelogic>.

Finally, to help locate semiconductors and their related application notes and data sheets be sure to visit <www.freetradezone.com>. This website helps you locate semiconductors from more than 4000 manufacturers, both domestic and foreign, and boasts that it has more than 12 million individual components listed. We have found that searching is quite easy and even obsolete parts are listed. So complete is the service that we constantly use this site even for routine searches and have book-marked it. Incidentally, we have never found a part that was not listed.

That concludes our offerings for this month. 73, Irwin, WA2NDM

World Of Ideas

BY DAVE INGRAM, K4TWJ

A Look At The World Around Us

Special Operations with a Mobile Slant

A variety of exciting events and special on-the-air activities, quite a few with a mobile theme or connection, take place on our HF bands every weekend. Many of them slip by us unnoticed, however, at least until we later read about them in monthly magazines such as *CQ*. What types of events and activities am I talking about? How can you learn about them before (rather than after) they happen, and might they inspire thoughts for your own special operations? These horizon-expanding ideas are the focus of this month's column, and it contains some unique views everyone should find interesting. Hamming is a blast of fun, especially during our present high point in sunspot Cycle 23, and all of us at *CQ* want you to enjoy it to the max! How? Read on!

Photo A– A sampling of QSLs from some of the many clubs and submarines active during this year's gala "Subs On The Air" event. A similar operation is planned for April 2002. Watch the "Announcements" section here in CQ for details. (QSL photos courtesy Fred Neuenfeldt, W6BSF, and W9DK, The Mancorad Amateur Radio Club)

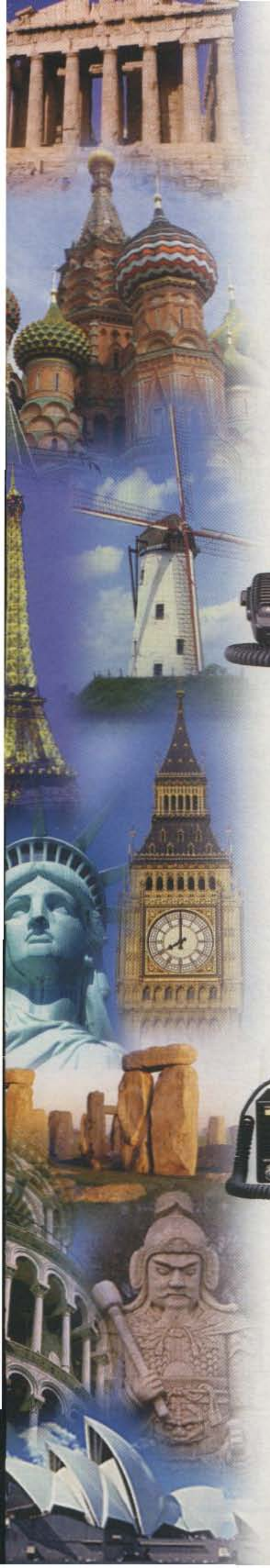
Subs On The Air!

Were you on the air enjoying the great band conditions during late April 2001? Did you contact some of the various submarines operating in our HF bands? Most of the subs were radio-activated by local area ham clubs, a large number of them operated between 14.240 and 14.280 MHz on 20 meters, and everyone had a blowout good time making "sub QSOs." All the clubs/stations offered special "Submarine QSLs" (photos A and B), and many also offered impressive color certificates for on-the-air contacts (photo C). If you missed the event, incidentally, take heart and mark your calendar for next year right now. A similar "sub operation" is already scheduled for April 2002. Yes, and it too will be complete with special QSLs and certificates. Watch the "Announcements" section here in *CQ* for exact details closer to the date—probably in the March or April issue.

One of my most memorable "sub QSOs" was with the *U.S.S. Cobia*. This diesel-powered submarine saw extensive duty during World War II and is now the star attraction in the Maritime Museum at Manitowoc, Wisconsin. I con-

Photo B– Some of the "super ships" joining the 25 subs on our HF bands this spring included the Lexington, *the* Yorktown, *and the battleship* Texas. *Incredible QSLs for sure! (QSL photos courtesy W6BSF)*

4941 Scenic View Drive, Birmingham, AL 35210
e-mail: <k4twj@cq-amateur-radio.com>



Work the World With Alinco!

Base, mobile, portable or marine, Alinco HF transceivers open a world of possibilities at prices that are down to earth. Check out this great equipment and the low Alinco price at your favorite dealer!

DX-70TH HF+6m

Mobile/Base/Portable

Rugged and versatile, DX-70 radios are recognized around the world as proven performers!

160m ~ 6m Amateur Band TX in all modes, general coverage RX 150 KHz ~ 30 MHz and 50 ~ 54 MHz, 2 VFOs, 100 memories, removable face for remote mounting, speech compressor, SSB, CW and AM narrow filters, full, semi or automatic break-in, multi-function control, RIT, TXIT, easy split operation, RF gain, CTCSS for 10 and 6m repeaters. 100w output on both HF and 6m.

DX-77T HF Desktop Transceiver

It's the radio Amateurs asked us to build!

A super performer at a tiny price, the DX-77T has solid credentials and great reviews. 160 ~ 10m Amateur Band TX in all modes, general coverage RX 500 KHz ~ 30 MHz, 2 VFOs, internal keyer (6 ~ 50 wpm), 100 memories, 13.8 VDC input, optional computer control capability, CTCSS encoder (front panel programmable), RIT, easy split operation, speech compressor, selectable AGC, large front panel speaker. The value leader in HF desktop radios!

DM-330MV Communications Grade Switching Power Supply

Tiny, powerful, 30A continuous, 32A peak output, weighs less than 5 lbs! Variable output 5 ~ 15 VDC, memory output, rear panel high-current (30A) terminals, triple circuit protection, illuminated V/A meter, ultra-quiet with patent-pending noise-shift circuit. Front panel cigar (10A) and quick-connect (5A) terminals, ripple less than 15mV p-p. Perfect for travel, station or test bench use. There's no switching supply like it! **Also available: DM-340MV IC Regulated Power Supply.**

EDX-2 Automatic Wire Antenna Tuner

Quickly tune wire antenna (from 8 to 80 feet) for any band from 10 through 160 meters (minimum 40 foot wire antenna required for 160 meter use). Perfect for base, mobile or marine use. Plugs directly into Alinco DX-70 and DX-77 transceivers. You don't have to pay more for great performance!

Simple ▪ Clean ▪ Dependable

ALINCO®

AMATEUR RADIO'S VALUE LEADER℠

www.alinco.com

Distributed in North America by ATOC Amateur Distributing LLC
23 S. High St., Covington, OH 45318 • (937) 473-2840

Photo C– The special event certificate offered by the Mancorad ARC for contacting the U.S.S. Cobia. *Now this is real ham wallpaper! (Photo courtesy Fred Neuenfeldt,W6BSF)*

sider the contact special, as I was mobile, and sub-to-vehicle QSOs are a rarity. The *U.S.S. Cobia* was one of approximately 25 submarines on the air during this year's special operating event. Since 2001 was the 60th anniversary of Pearl Harbor, the subs were joined by battleships, aircraft carriers, cruisers, and destroyers harbored around the country and in several foreign countries. That is a lot of maritime activity from any point of view! There is a special feeling that puts QSOs with ships right up there with the best DX contacts. Try it and see for yourself!

Route 66 Revisit Coming Up

Remember last year's special on-the-air activation of Route 66 by ham clubs from Chicago and Joplin to Los Angeles and Winona? (Yes, there is significance in those names.) This year marks the 75th anniversary of this famous road, and another blowout operation is scheduled for this month (September 8–16). Special Route 66 QSLs and certificates will again be available, and one (or more) mobile stations will also be passing out QSOs while traveling Route 66. This year all special event stations will use "1 by 1" calls starting with W6A, plus CW and PSK-31 will be included along with the usual SSB operations. An outline of Route 66 as shown on last year's K6C QSL plus a list of this year's participating stations and planned frequencies of operation are shown in figs. 1 and 2. Make copies for easy reference, then double check the "Announcements" section here in *CQ* for late-breaking news, additions, deletions, or changes in the operation.

I understand the Route 66 operation will again be coordinated by The Northern Arizona DX Association <www.NADXA.com> with Jerry Conover, NE7I <ne7i@arrl.net>, handling web duties. This 75th anniversary of Route 66 promises to be a biggie, and you are reading about it only a few days before it begins. Make plans now to get on the air with the boys and have fun!

Golf-Cart Mobile

Well, friends, it is not a submarine and it does not travel Route 66, but it still sparks plenty of interest and curious excitement on the air. I am referring to the unusual golf-cart mobile setup assembled by Budd Drummond, W3FF, and shown in photo D. Budd spends some snowbird time in Florida every year, so the golf-mobile idea was a natural inspiration. His rig consists of a Kenwood TS-50 and a rotary dipole that evolved from first using a regular mobile whip and then an elongated 10 meter loop. The transceiver is powered by the cart's batteries and works out great, probably because Florida is flat terrain almost surrounded by water.

Budd experienced such good luck with the golf-cart idea that he converted it to a "pedestrian mobile" setup to operate while walking in his home area of northern California (photo E). Here the TS-50 and a sealed lead-acid battery nestle in a neck-strap backpack so the rig's controls are easily visible. The antenna is a five-band, hand-rotatable dipole made from PVC tubing and two telescoping whips. The mast is a 6 foot painter's pole. The full antenna breaks down to fit in an airline carry-on bag. So fa, Budd has made over 1700 QSOs and worked over 100 countries with the setup. Cool idea, Budd!

Traveling Your Own Route

Like to try your own hand at some special type of operation? What warrants favorable consideration? Almost anything, provided it observes FCC and local regulations, is socially acceptable, ethically proper, and ham friendly. Remember, too, you need not be flaming the freeways or burning up the back roads to enjoy mobile-related fun. Op-

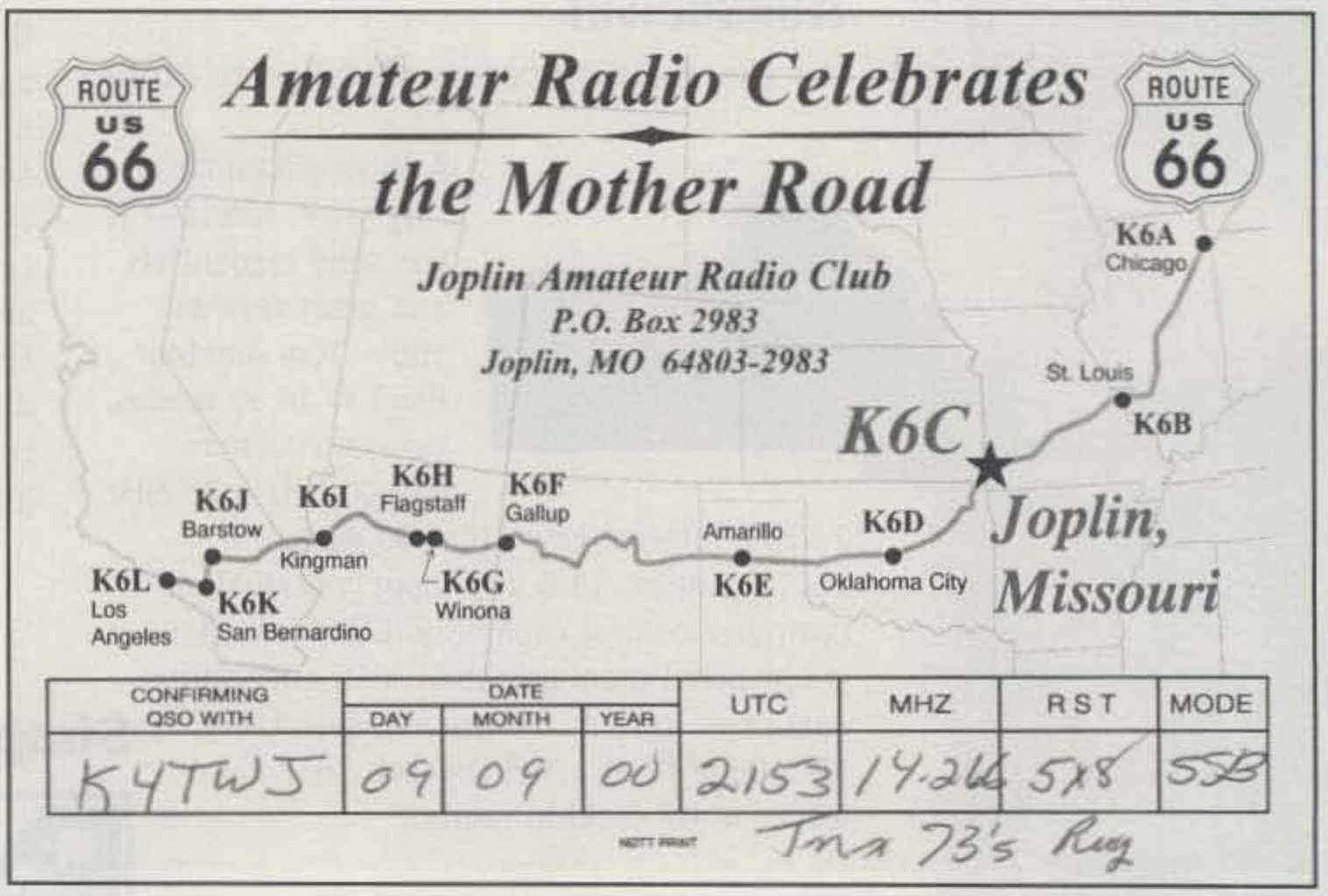


Fig. 1– Outline of Route 66 as shown on the QSL from K6C, the Joplin, Missouri Amateur Radio Club. Another big Route 66 operation is scheduled for this month (details in text).

Station	City	Club	QSL Route (send SASE)
W6A	Chicago, IL	Six-Meter Club of Chicago	Six Meter Club of Chicago, 3011 Becket Ave., Westchester, IL 60154-5621
W6B	St. Louis, MO	St. Louis ARC	John Young, WDØFPY, 427 Herman Dr., Kirkwood, MO 63122
W6C	Joplin, MO	Joplin ARC	Joplin ARC, Box 2983, Joplin, MO 64803-2983
W6D	Oklahoma City, OK	Oklahoma City Autopatch Club & Choctaw ARC	Don McDown, N5ENQ, 10330 Oak Park Dr., Midwest City, OK 73130
W6E	Albuquerque, NM	Albuquerque DX Assn	Terry Bajuk, KE5BL, 4012 Glen Canyon Rd. NE, Albuquerque, NM 87111
W6F	Flagstaff, AZ	Northern Arizona DX Assn.	Art Phillips, NN7A, Box 201, Flagstaff, AZ 86002
W6G	Williams, AZ	Bill Williams Mountain RC	Jerry Ellison, W7ST, Box 552, Ash Fork, AZ 86320
W6H	Barstow, CA	Barstow ARC	BARC, P.O. Box 451, Barstow, CA 92312
W6I	San Bernardino, CA	Citrus Belt ARC	CBARC, Box 3788, San Bernardino, CA 92413
W6J	Lebanon, MO	Lebanon ARC	Bill Wheeler, KØDEW, 272 Donna Lee, Lebanon, MO 65536

Fig. 2– List of clubs and stations participating in this year's Route 66 On-The-Air operation. Work one or more stations and you qualify for a colorful Route 66 certificate.

erating from the top of a parking deck, a ferry, or a motor scooter is also a treat.

Running an IOTA (Islands On The Air award program) expedition to a nearby island or conducting a special operation from some unusual landmark is also exciting, especially if you pass out certificates/souvenirs to QSOed stations. Such places and ideas are everywhere; just look carefully and think creatively.

Recently, for example, I conducted an (April 1) operation from Alabama's secret UFO base and passed out certificates plus magnetic alien-head souvenirs from the secret UFO base's gift shop. The pile-up occasionally grew large, so I designated callers by groups, such as the strongest stations pegging my S-meter, the weakest QRP stations, the worst-sounding stations, etc. Everyone had a ball, and that is the key—having fun and sharing good times.

Using a brand-new rig or a self-assembled antenna, especially when mobile, is another always popular idea. Hams call you to learn more about your new item—how it was made, how this connects to that, how it works out, etc. We all like building or mentally assembling easy-brew projects in our mind. It

	80m	40m	30m	20m	17m	15m	12m	10m	6m
CW	3533	7033	10110	14033	18080	21033	2499	28033	50033
SSB	3866	7266	NA	14266	18166	21366	24966	28466	50166

Fig. 3– List of planned frequencies for Route 66 On-The-Air operation. PSK-31 activities will be conducted around usual RTTY/PSK frequencies. An easy way to remember SSB frequencies is they all end in "66."

is a natural ham instinct. That is why I strive to include at least one in most columns. Speaking of that idea . . .

Mobile 'Tenna Treat

MFJ's Martin Jue, K5FLU, recently devised a clever base-loaded mini-mobile 'tenna that is perfect for weekend mobileers, and it is also a real attention grabber. He discussed it at the kit-building forum at Dayton, and everyone found it interesting—especially folks continually moving in and out of garages, carports, and parking decks. Like to build one just for fun? Some views of the antenna are shown in photos F and G, an assembly guide is included in fig. 4, and general details follow.

The antenna's radiating whip is 56 inches tall. Martin used a telescoping car-radio replacement whip from Wal-Mart so it could be retracted during non-use and raised for operation in a flash. An ultra-thin whip from a tall 2 meter antenna or two 28 inch rods joined with a coupler from a hobby shop could be substituted here, if desired.

The base coil used will depend on your preference of bands. For 6 through 20 meters, a section of B & W 3029 coil stock is used. For 6 through 40 meters, a section of B & W 3031 coil stock is used. The 3029 stock is approximately 2 inches in diameter with 6 turns per inch of number 12 wire. A 3 inch long coil section is used. That equates to approximately 18 total turns. The 3031 stock is also approximately 2 inches in diameter, but has 10 turns per inch of number 16 wire, and a 3 1/2 inch long section is used. That equates to an approximate total of 35 turns. Either coil is mounted over/supported by a piece of PVC pipe approximately 2 inches in diameter and 3 1/2 to 4 inches long. End caps, one center-fitted with a 3/8-24 bolt-and-nut for securing it in a mobile trunk lid or deck mount and one fitted with only screwstock for the whip, are attached to the center PVC pipe. A miniature 750 pFd variable capacitor is connected/mounted between the antenna cable's center conductor and shield/car's ground for fine tuning band taps and minimizing SWR.

Photo D– An unusual operation for sure! Budd Drummond, W3FF, put together this golf-cart mobile setup during his annual visit to Florida, and it proved to be a real attention grabber on the air and on the course. Station consists of a Kenwood TS-50 with cart batteries for power and a rotary dipole for a signal squirter. (Photo via W3FF)

hy-gain® Rotators

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

Hy-Gain rotators are the first choice of hams around the world!

Hy-Gain's world famous Bell Shaped Rotator™ design is the standard that other rotators are measured against.

Its bell construction gives you total weather protection for super reliable operation. Its super heavy duty steel gear drive gives you years of superior and trouble-free performance. Many Hy-Gain rotators still provide excellent service after over 25 years of outstanding performance.

The last thing you want to fall apart is your rotator that's mounted on the top of your tower. You won't make any compromises when you buy and install high quality Hy-Gain rotators.

And we're the only manufacturer to offer a full line of rotators that are completely MADE IN THE USA.

HAM-IV, $529.95. *The heavy duty Ham-IV is the most popular rotator in the world!* It is designed for medium size antenna arrays up to 15 square feet wind load area when mounted in-tower, or 7.5 square feet when mast mounted with an optional lower mast bracket. New alloy ring gear gives extra strength up to 100,000 PSI for maximum reliability. New low temperature grease permits normal operation down to -30 degrees Fahrenheit. New wire-wound potentiometer gives reliable and precision directional indication, new ferrite beads reduce RF susceptibility, new Cinch plug connector plus 8-pin plug at control box (no screwdriver needed). Dual 98 ball bearing race for load bearing strength. Strong electric locking steel wedge brake prevents wind induced antenna movement. Easy-to-use Control Box has illuminated directional meter with North or South center of rotation scale, separate snap-action brake and rotation switches. Uses low voltage control for safe operation. Accepts masts up to 2 1/16 inches diameter. Rotator size is 13 1/2Hx8D inches.

T-2X, $619.95. *Extra heavy duty Tailtwister antenna rotator!* For large antennas up to 20 square feet wind load when mounted in-tower, or 10 square feet when mast mounted with optional support bracket. Triple 138 ball bearing race, strong electric locking steel wedge brake. Control Box has an illuminated directional indicator with North or South center of rotation scale, separate snap-action brake and rotation control switches. Accepts masts up to 2 1/16 inches diameter. Rotator size is 14 1/16Hx9 3/16D in.

CD-45II, $369.95. *Medium duty antenna rotator.* Handles antenna arrays up to 8.5 square feet windload area when mounted in-tower, or 5 square feet when mast mounted with supplied lower support. Dual 48 ball bearing race, disc brake system. Control Box has an illuminated directional indicator with North or South center of rotation scale, separate snap-action brake and rotation control switches with disc brake release. Accepts mast sizes up to 2 1/8 diameter. Includes light duty lower mast support, Rotator size is 17 3/8Hx8 D inches.

AR-40, $269.95. *Lightweight antenna rotator.* Handles smaller ham antennas and large TV/FM antennas up to 3.0 square feet windload area when mounted in-tower, or 1.5 square feet when mast mounted using the supplied lower support bracket. Dual 12 ball bearing race, disc brake system. Silent, automatic control box -- just dial and touch for desired direction. Accepts mast sizes up to 2 1/8 diameter. Includes light duty mast support. Rotator size is 17 3/8Hx8D inches.

Call your dealer for your best price!

Rotator Specifications	T2X	HAM-IV	CD-45II	AR-40
Wind Load capacity (inside tower)	20 sq. ft.	15 sq. ft.	8.5 sq. ft.	3.0 sq. ft.
Wind Load (with mast adapter)	10 sq. ft.	7.5 sq. ft.	5.0 sq. ft.	1.5 sq. ft.
Turning Power (in pounds)	1000	800	600	350
Brake Power (in pounds)	9000	5000	800	450
Brake Construction	Electric wedge	Electric wedge	Disc brake	Disc brake
Bearing Assembly/How many	Tripl race/138	Dual Race/96	Dual race/48	Dual race/12
Mounting Hardware	Clamp plate	Clamp plate	Clamp plate	Clamp plate
Control Cable Conductors	8	8	8	5
Shipping Weight (pounds)	28	24	22	14
Effective Moment (in tower)	3400 ft/lbs.	2800 ft/lbs.	1200 ft/lbs.	300 ft/lbs.

HAM IV

$529.95
Suggested Retail

T-2X

$619.95
Suggested Retail

CD-45II

$369.95
Suggested Retail

AR-40

$269.95
Suggested Retail

Free Hy-Gain Catalog
Nearest Dealer/Free Catalog . . . 800-973-6572

hy-gain®

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

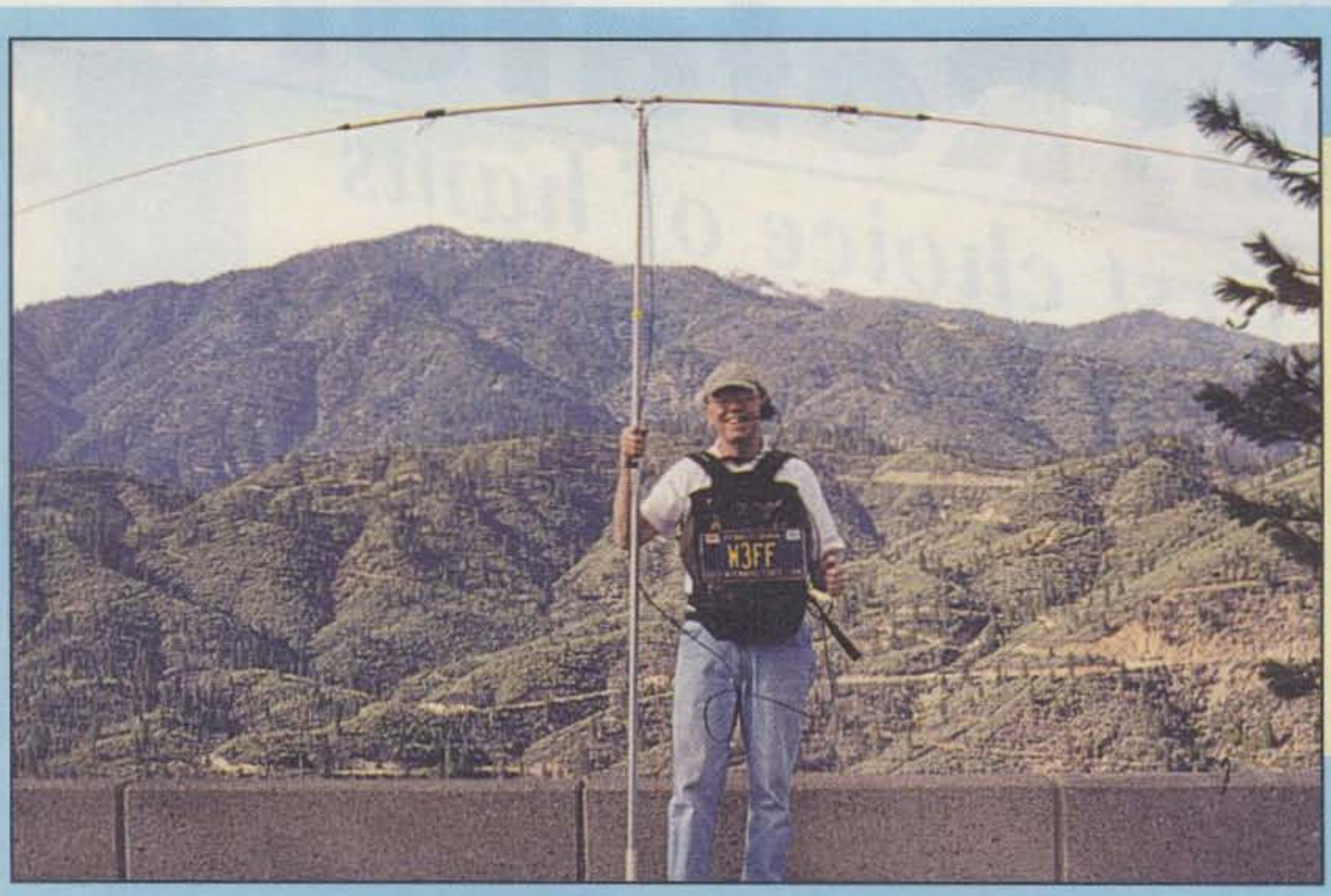


Photo E– Budd, W3FF, operating "pedestrian mobile" from the high country of northern California. A full TS-50 station complete with a 7 amp/hour battery is in the backpack around Budd's neck. Budd frequents 18.150 to 18.160 MHz on 17 meters while using this setup.

I sense you are asking where to find B & W coil stock (plus miniature capacitors, PVC pipe, screws, a trunk mount, etc.). I posed that question to Martin and he said the hardware came from Wal-Mart and the electronic/ham-related items came from his MFJ facilities in Starkville, Mississippi. After some discussion, Martin said he could supply folks with all the vital parts to homebrew the antenna. That kit should be available direct from MFJ Enterprises (1-800-647-1800) by the time you read this column, so check it out.

Initial band tapping and fine (capacitor) tuning of the base loading coil is best accomplished with the aid of an antenna analyzer such as the MFJ-259B (It shows resonance on any frequency and is not affected by high SWR.). Just start tapping up from the coil's lower end one turn at a time until resonance/a drop in SWR is noticed. (That's why I said "approximate" on previous coil dimensions; they depend on your car.) Ideally, your band tap point(s) will be slightly lower in both frequency and base impedance than desired. Adjust the variable capacitor to cancel excess inductive reactance and/or produce the lowest SWR, mark that coil tap and capacitor setting, repeat the process for other bands, and then connect your transceiver and have fun.

Now follow these three final notes. Remember to secure a solid ground connection for the coax shield and the variable capacitor at the antenna's base/mount. Remember also to reset both the band tap and the variable capacitor when changing bands. Mount this antenna on a car's rear deck or roof, not down at bumper level. More details on this antenna will probably be included in a future mobile column. Meanwhile, you can be one of the first kids on your block with this new toy and have a ball telling others about it.

Photo F– "Business end" of the K5FLU base-loaded mini-mobile 'tenna showing B & W coil on PVC support, band clips/taps, miniature tuning capacitor, etc. A kit of parts to build this gem is available from MFJ Enterprises (details in text). (Photo courtesy Richard Stubbs and MFJ)

More mobile ideas? Sure! You could operate from the parking deck of a gambling casino with this mini-tenna and

Photo G– Another view of the K5FLU mini-mobile 'tenna with miniature tuning capacitor near bottom of coil and set screw securing whip to screwstock at top of coil. End caps on top and bottom of coil support/form were cut down for custom appearance. (Photo courtesy Richard Stubbs and MFJ)

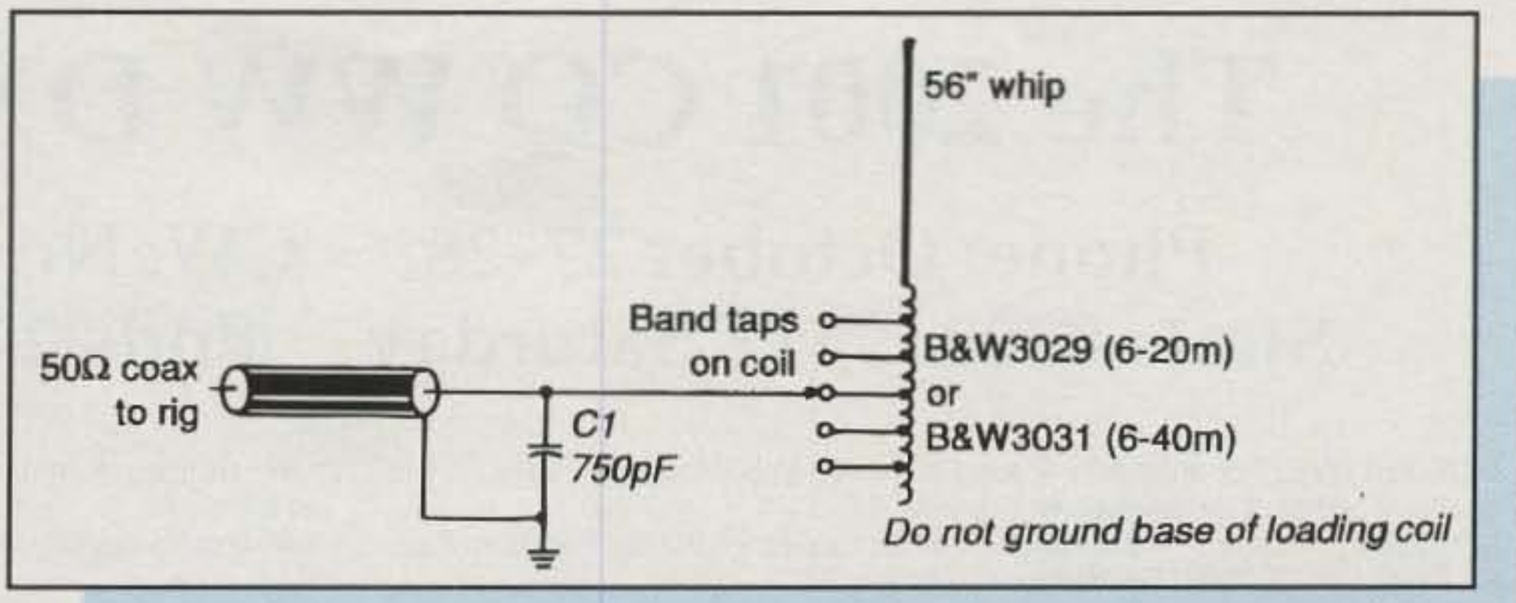


Fig. 4– Electrical details of the K5FLU base-loaded mini-mobile 'tenna. Be sure to include a 750 pFd tuning capacitor between the coax center conductor and the shield/ground/car's metal body.

give out pairs of dice to contacts. I checked out that idea at a nearby casino, and souvenir dice were only 50 cents a throw (no pun intended!).

Conclusion

As you probably surmised, the overall objective of this month's column is getting you radio-active, on the air, and having fun—not just reading about it, but *doing* it. Life in the HF lane is the most captivating aspect of amateur radio, and there is no better time than right now to enjoy HF fun. Go for it—and listen for me on 20 or 17 SSB weekend afternoons, too!

73, Dave, K4TWJ

If you enjoyed Dave's column on mobile this month, stay tuned. We're planning a special issue with a focus on mobile hamming next month. Don't miss it!—*ed.*

Looking Ahead in

CQ

Here are some of the articles that we're working on for upcoming issues of *CQ:*

- Mobile Special in the October issue
- "*CQ* Interviews: Leo Meyerson, WØGFQ," by N4XX
- "Footsteps of Wireless History," by N7XM
- "A Motorized Clothesline Antenna," by VA2ERY

Plus:

- "Ham History Web Server," by N8PB
- "Electricity Everywhere," by W6BNB
- "Transforming a Transformer," by VE3ERP

Announcing:

The 2001 CQ WW DX Contest

Phone: October 27–28 CW: November 24–25
Starts 0000 GMT Saturday Ends 2400 GMT Sunday

I. OBJECTIVE: For amateurs around the world to contact other amateurs in as many zones and countries as possible.
II. BANDS: All bands, 1.8 through 28 MHz, except for WARC bands.
III. TYPE OF COMPETITION (choose only one):

For all categories: All entrants must operate within the limits of their chosen category when performing any activity that could impact their submitted score. ***All high power categories must not exceed 1500 watts total output power on any band.*** Transmitters and receivers must be located within a 500 meter diameter circle or within the property limits of the station licensee's address, whichever is greater. All antennas used by the entrant must be physically connected by wires to the transmitters and receivers used by the entrant. Only the entrant's callsign can be used to aid the entrant's score. A different callsign must be used for each CQ WW entry.

A. Single Operator Categories: Single band or all band; only one signal allowed at any one time; the operator can change bands at any time.

1. Single Operator High: Those stations at which one person performs all of the operating, logging, and spotting functions. The use of DX alerting assistance of any kind places the station in the Single Operator Assisted category.
2. Single Operator Low: Same as III A 1 except that the output power shall not exceed 100 watts (see rule XI. 11).
3. QRPp: Same as III A 1, except that the power output must not exceed 5 watts (see rule XI.11).

B. Single Operator *with DX Spotting Net:* Same as III A 1 except the passive (self- spotting not allowed) use of DX spotting nets is allowed.

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

1. Single Transmitter: Only one transmitter and one band permitted during any 10-minute period, defined as starting with the first logged QSO on a band. Exception: One—and only one—other band may be used during any 10-minute period if—and only if—the station worked is a new multiplier. Logs found in violation of the 10-minute rule will be automatically reclassified as multi-multi.
2. Multi-Transmitter: No limit to transmitters, but only one signal and running station allowed per band.

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

IV. NUMBER EXCHANGE: Phone: RS report plus zone (i.e., 5705). CW: RST report plus zone (i.e., 57905).
V. MULTIPLIER: Two types of multiplier will be used.

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

Stations are permitted to contact their own country and zone for multiplier credit. The *CQ* Zone Map, DXCC country list, WAE country list, and WAC boundaries are standards. Maritime mobile stations count only for a zone multiplier.
VI. POINTS: 1. Contacts between stations on different continents are worth three (3) points.

2. Contacts between stations on the same continent but different countries, one (1) point. *Exception:* For North American stations *only*, contacts between stations within the North American boundaries count two (2) points.
3. Contacts between stations in the same country are permitted for zone or country multiplier credit but have zero (0) point value.

VII. SCORING: All stations: the final score is the result of the total QSO points multiplied by the sum of your zone and country multiplier.

Example: 1000 QSO points × 100 multiplier (30 Zones + 70 Countries) = 100,000 (final score).
VIII. AWARDS: First-place certificates will be awarded in each category listed under Sec.III in every participating country and in each call area of the United States, Canada, European Russia, Spain, and Japan.

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

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

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

IX. TROPHIES & PLAQUES (Donors)

PHONE

Single Operator, All Band
World: Dave Rosen, K2GM – WA2RAU Memorial
World Low Power: Slovenia Contest Club
World QRP: Lew Sayre, W7EW
World Assisted: Snake River Contest Club
U.S.A: Potomac Valley R.C. – KC8C Memorial
U.S.A. Low Power: North Coast Contesters
U.S.A. Zone 3: Dave Pruett, K8CC & Greg Surma, K8GL
U.S.A. Zone 4: Dave Pruett, K8CC & Greg Surma, K8GL
Canada: Niagara Frontier Int'l DX Assn. – VE3WT Memorial
Caribbean/C.A.: Alex M. Kasevich, VP2MM
Europe: Potomac Valley R.C. – W4BVV Memorial
Europe Low Power: Scott Jones, N3RA & Tim Duffy, K3LR
Russia: Roman Thomas, RZ3AA
Africa: Gordon Marshall, W6RR
Asia: 2 AM Dayton Pizza Gang
Japan: Japan Crazy Contesters Club
Japan Low Power: Western Washington DX Club
Oceania: Northern California DX Club
S. America: Yankee Clipper Contest Club
S. America, Mainland: Radio Club Paraguayo

Single Operator, Single Band
World—28 MHz: Joel Chalmers, KG6DX
World—21 MHz: Robert Naumann, N5NJ
World—14 MHz: North Jersey DX Assn. – K2HLB Memorial
World—7 MHz: Fred Laun, K3ZO – K7ZZ Memorial
World—3.8 MHz: Fred Capossela, K6SSS
World—1.8 MHz: Bob Wruble, W7GG
USA—28 MHz: Donald Thomas, N6DT
USA—21 MHz: World Radio
USA—14 MHz: Southern California DX Club
USA—7 MHz: Stanley Cohen, W8QDQ
USA—3.8 MHz: Arnold Tamchin, W2HCW
USA—1.8 MHz: World Radio
Carib./C.A.: Snake River Contest Club
Europe—28 MHz: World Radio
Europe—21 MHz: Tine Brajnik, S50A
Europe—14 MHz: A.G. Anderson, GM3BCL
Europe—7 MHz: Roger Burt, N4ZC
Europe—3.8 MHz: Marconi Contest Club – I3MAU Memorial
Europe—1.8 MHz: Robert Kasca, S53R
Japan—21 MHz: DX Family Foundation
Japan—14 MHz: Take Yokoyama, JL1BLW

Multi-Operator, Single Transmitter
World: Southern Calif. DX Club – W6AM Memorial
U.S.A.: Carolina DX Association
Europe: Bob Cox, K3EST
Carib./C.A.: Eric Scace, K3NA
Oceania: Junichi Tanaka, JH4RHF
Africa: *CQ* Magazine
S. America: Victor Burns, KI6IM
S. America, Mainland: Radio Club Paraguayo
Asia: Edward Campbell, NT4TT
Japan: Vienna Amateur radio Club – 4U1VIC

Multi-Operator, Multi-Transmitter
World: Dave & Barb Lesson, W6NL & K6BL
U.S.A.: Paul Hellenberg, K4JA
Europe: Finnish Amateur Radio League
Japan: Ryozo Goto, JH3JYS

Contest Expeditions
World-Single Operator: National Capitol DXA – W2GHK Memorial
World Multi-Single: Dieter Loffler, DK9KD – DJ3NG & DJ4EI Memorial
World Multi-Multi: Tachio Yuasa, JA9VDA

ASTRON CORPORATION
9 Autry Irvine, CA 92618
(949) 458-7277 • (949) 458-0826
www.astroncorp.com

E151765 E151765

...POWER ON WITH ASTRON

SWITCHING POWER SUPPLIES...

MODEL SS-10TK

MODEL SS-12IF

SPECIAL FEATURES:

- HIGH EFFICIENCY SWITCHING TECHNOLOGY SPECIFICALLY FILTERED FOR USE WITH COMMUNICATIONS EQUIPMENT, FOR ALL FREQUENCIES INCLUDING HF
- HEAVY DUTY DESIGN
- LOW PROFILE, LIGHT WEIGHT PACKAGE
- EMI FILTER
- MEETS FCC CLASS B

PROTECTION FEATURES:

- CURRENT LIMITING
- OVERVOLTAGE PROTECTION
- FUSE PROTECTION.
- OVER TEMPERATURE SHUTDOWN

SPECIFICATIONS:

INPUT VOLTAGE: 115 VAC 50/60HZ OR 220 VAC 50/60HZ SWITCH SELECTABLE

OUTPUT VOLTAGE: 13.8VDC

AVAILABLE WITH THE FOLLOWING APPROVALS: UL, CUL, CE, TUV.

MODEL SS-18

DESKTOP SWITCHING POWER SUPPLIES

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SS-10	7	10	1⅛ x 6 x 9	3.2
SS-12	10	12	1⅛ x 6 x 9	3.4
SS-18	15	18	1⅛ x 6 x 9	3.6
SS-25	20	25	2⅞ x 7 x 9⅜	4.2
SS-30	25	30	3¼ x 7 x 9⅜	5.0

MODEL SS-25M

DESKTOP SWITCHING POWER SUPPLIES WITH VOLT AND AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SS-25M*	20	25	2⅞ x 7 x 9⅜	4.2
SS-30M*	25	30	3¼ x 7 x 9⅜	5.0

MODEL SRM-30

RACKMOUNT SWITCHING POWER SUPPLIES

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25	20	25	3½ x 19 x 9⅜	6.5
SRM-30	25	30	3½ x 19 x 9⅜	7.0

WITH SEPARATE VOLT & AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25M	20	25	3½ x 19 x 9⅜	6.5
SRM-30M	25	30	3½ x 19 x 9⅜	7.0

MODEL SRM-30M-2

2 ea SWITCHING POWER SUPPLIES ON ONE RACK PANEL

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25-2	20	25	3½ x 19 x 9⅜	10.5
SRM-30-2	25	30	3½ x 19 x 9⅜	11.0

WITH SEPARATE VOLT & AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25M-2	20	25	3½ x 19 x 9⅜	10.5
SRM-30M-2	25	30	3½ x 19 x 9⅜	11.0

MODEL SS-12SM/GTX

MODEL SS-10EFJ-98

CUSTOM POWER SUPPLIES FOR RADIOS BELOW

EF JOHNSON AVENGER GX-MC41
EF JOHNSON AVENGER GX-MC42
EF JOHNSON GT-ML81
EF JOHNSON GT-ML83
EF JOHNSON 9800 SERIES
GE MARC SERIES
GE MONOGRAM SERIES & MAXON SM-4000 SERIES
ICOM IC-F11020 & IC-F2020
KENWOOD TK760, 762, 840, 860, 940, 941
KENWOOD TK760H, 762H
MOTOROLA LOW POWER SM50, SM120, & GTX
MOTOROLA HIGH POWER SM50, SM120, & GTX
MOTOROLA RADIUS & GM 300
MOTOROLA RADIUS & GM 300
MOTOROLA RADIUS & GM 300
UNIDEN SMH1525, SMU4525
VERTEX — FTL-1011, FT-1011, FT-2011, FT-7011

CIRCLE 134 ON READER SERVICE CARD

NEW SWITCHING MODELS

SS-10GX, SS-12GX
SS-18GX
SS-12EFJ
SS-18EFJ
SS-10-EFJ-98, SS-12-EFJ-98, SS-18-EFJ-98
SS-12MC
SS-10MG, SS-12MG
SS-101F, SS-121F
SS-10TK
SS-12TK OR SS-18TK
SS-10SM/GTX
SS-10SM/GTX, SS-12SM/GTX, SS-18SM/GTX
SS-10RA
SS-12RA
SS-18RA
SS-10SMU, SS-12SMU, SS-18SMU
SS-10V, SS-12V, SS-18V

*ICS – Intermittent Communication Service

Special-Single Operator Award
World-All Band Under 21 years old: Gene Zimmerman, W3ZZ
World-All Band YL: Yutaka Tanaka, JH3DPB – KA6V Memorial

CW

Single Operator, All Band
World: Albert Kahn, K4FW – W9IOP Memorial
World Low Power: Slovenia Contest Club
World Assisted – Snake River Contest Club
World QRPp: Gene Walsh, N2AA
U.S.A: Frankford Radio Club
U.S.A. Low Power: North Coast Contesters
U.S.A. Zone 4: Society of Midwest Contesters
U.S.A. Zone 3: Central Arizona DX Association
Canada: Jim Fisher, Jr., VE1JF
Caribbean/C.A.: Chuck Shinn, W7MAP
Europe: Edward Bissell, W3AU
Europe Low Power: Scott Jones, WR3G & Tim Duffy, K3LR
Scandinavia: Charles Weir Jr., W6UM – Charles Weir, Sr., W3FYS Mem.
Russia: Roman Thomas, RZ3AA
Africa: Gordon Marshall, W6RR
Asia: Chuck Shinn, W7MAP
Japan: Japan Crazy Contesters Club
Japan Low Power: Western Washington DX Club
Oceania: Peahi Contest Club
S. America: Venezuela DX Club

Single Operator, Single Band
World—28 MHz: Joel Chalmers, KG6DX
World—21 MHz: Don Busick, K5AAD – N5JJ Memorial
World—14 MHz: North Jersey DX Assn. – W2JT Memorial
World—7 MHz: Alex M. Kasevich, VP2MM
World—3.8 MHz: Fred Capossela, K6SSS
World—1.8 MHz: Kenneth Byers, Jr., K4TEA
USA—28 MHz: Wireless Institute of the Northeast
USA—21 MHz: Wayne Carroll, W4MPY
USA—14 MHz: Northern Illinois DX Association
USA—7 MHz: Jan Perkins, N6AW – W6AM Memorial
USA—3.5 MHz: Bill Feidt, NG3K
USA—1.8 MHz: Dave Patton, NT1N & Mark Oberman, AG9A
Canada: Radio Amateurs of Canada
Carib./C.A.: Snake River Contest Club
Europe—28 MHz: Jay Pryor, K4OGG
Europe—21 MHz: Robert Naumann, N5NJ
Europe—14 MHz: Maud Slater – G3FXB Memorial
Europe—7 MHz: Ivo Pezer, 9A3A/5B4ADA
Europe—3.5 MHz: Frankford Radio Club – K3VW Memorial
Europe—1.8 MHz: Pat Barkey, N9RV & Terry Zivney, N4TZ
Japan—21 MHz: DX Family Foundation
Japan—14 MHz: Mitsuhiro Nishimura, JA7WME

Multi-Operator, Single Transmitter
World: Anthony Susen, W3AOH
U.S.A.: Douglas Zwiebel, KR2Q
Canada: Eastern Canadian DX Assn.
Carib./C.A.: Octorino G. Villa, PY2KC
Africa: Harry Booklan, RA3AUU
Europe: Bob Cox, K3EST
Oceania & Asiatic Pacific Rim: Junichi Tanaka, JH4RHF
S. America: Araucaria DX Group
Asia: Steve Merchant, K6AW
Japan: Vienna Amateur Radio Club – 4U1VIC

Multi-Operator, Multi-Transmitter
World: Douglas Zwiebel, KR2Q – Hazard Reeves, K2GL Memorial
World SSB/CW Combined: Alpha/Power, Inc.
U.S.A.: Bob Ferrero, W6RJ – N6RJ Memorial
Europe: Finnish Amateur Radio League
Japan: Ryozo Goto, JH3JYS

Contest Expeditions
World Single-Operator: Yankee Clipper Contest Club
World Multi-Single: Carl Cook, AI6V
World Multi-Multi: Bill Schneider, K2TT

Special-Single Operator Award
World SSB/CW Combined: Hrane Milosevic, YT1AD
World All Band Under 21 years old: Chuck Shinn, W7MAP

Club
World SSB/CW: *CQ* Magazine – W1WY Memorial
Non-USA SSB/CW: N. California Contest Club – N6AUV Memorial

A station winning a World trophy will not be considered for a sub-area award. The trophy will be awarded to the runner-up in that area.

X. CLUB COMPETITION:

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

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

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

XI. LOG INSTRUCTIONS:

1. All times must be in GMT.

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

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

4. Logs must be checked for duplicate contacts, correct QSO points and multipliers. Submitted logs must have duplicate contacts clearly shown.

5. We want an electronic log. The Committee requires an electronic log for any possible high score.

E-MAIL Required Content: We strongly recommend you submit the Cabrillo file created by all major logging programs. If Cabrillo is unavailable, then: (1) A SUMMARY sheet in plain-text ASCII, and (2) your LOG in plain-text ASCII. These files may be sent in either one message or in separate messages. Be sure to put the **STATION CALLSIGN** and the **MODE** in the "Subject:" line of each message.

Your log should be sent in plain-text ASCII format. Every logging program has the option of producing an ASCII text log. Examples of the ASCII log file names of the three most common logging programs are the following: **CT = YOURCALL.ALL**, **NA = YOURCALL.PRN**, and **TR = YOURCALL.DAT**. Acceptable submissions can also include all other fixed-column ASCII formats. If you must send a binary file, it will have to be encoded. All popular encoding schemes are acceptable, including UUencode, Base64, and BinHex. Your software may automatically encode your log as an attachment.

Your e-mail log will automatically be acknowledged by the server. You will also receive a personal access code from the server. Use this code to view your log for completeness and later to retrieve your computer analysis. If we have trouble reading your file, we may ask you to send a disk. Submit your CQ WW SSB log to **<ssb@cqww.com>** and your CQ WW CW log to **<cw@cqww.com>**.

DISKS: If you use a computer, please send your IBM, MS-DOS compatible computer disk. A disk containing your files may be submitted in lieu of a paper log. All disks MUST be accompanied by a PAPER summary sheet satisfying all logging instructions. Label your disk clearly with YOUR CALL, files included, the mode (SSB or CW), and your category. The format we require for the most common logging programs is your CT.all file (e.g. HSØAC.all), N6TR. DAT, or NA.QDF files. Name your file correctly (for example, HSØAC.all).

6. Use a separate sheet for each band.

7. Each entry must be accompanied by a summary sheet showing all scoring information, category of competition, contestant's name and address in BLOCK LETTERS, and a signed declaration that all contest rules and regulations for amateur radio in the country of operation have been observed.

8. Sample log and summary sheets and zone maps are available from *CQ*. A large self-addressed envelope with sufficient postage or IRCs must accompany your request. If official forms are not available, make up your own 80 contacts to the page on $8\frac{1}{2}" \times 11"$ paper.

9. All entrants are required to submit cross-check sheets (an alphabetical list of calls worked) for each band on which 200 or more QSOs were made. All other entrants are encouraged to submit cross-check sheets.

10. ***Bad QSO penalty:*** three (3) additional contacts removed.

11. QRPp and low power stations must indicate same on their summary sheets and state the actual maximum power output used, with a signed declaration.

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

An entrant whose log is deemed by the Committee to contain a large number of discrepancies may be disqualified from eligibility for an award, both as a participant operator or station, for one year. If an operator is disqualified a second time within 5 years, he will be ineligible for any *CQ* contest awards for 3 years.

The use by an entrant of any non-amateur means such as telephones, telegrams, internet, or the use of packet to SOLICIT contacts during the contest is unsportsmanlike and the entry is subject to disqualification. Action and decisions of the *CQ* Contest Committee are official and final.

XIII. DEADLINE:

1. All entries must be postmarked NO LATER than December 1, 2001 for the SSB section and January 15, 2002 for the CW section. **Indicate SSB or CW on the envelope, disk, or e-mail.**

2. An extension of up to one month may be given if requested by letter or other means. The granted extension must be confirmed by letter sent to the contest director, must state a legitimate reason, and the request must be received before the log mailing deadline. Logs postmarked after the extension deadline may be listed in the results but will be declared ineligible for an award.

Both Phone and CW logs should be sent to *CQ* Magazine, 25 Newbridge Road, Hicksville, NY 11801.

Force 12

Antennas and Towers

11 Years of Leadership

>11,000 Amateur HF Antennas Shipped
Performance talks – BUY the best and forget the rest!

>150,000 Web Site Accesses for Information
People want to know information they can depend on.

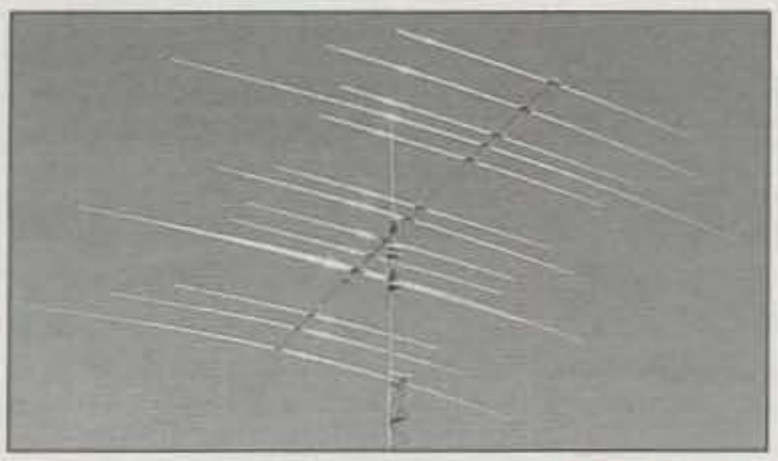
Force 12 is the leader in HF antenna design and production. Our products have revolutionized HF antennas. Besides developing new electrical designs, we evaluated, designed and selected the best mechanical techniques.

Force 12 is the originator of high-efficiency, MULTI-MONOBAND™ antennas utilizing:

> TrueSpec": only company with accurate specs since day #1
> Multi-band Antennas (Yagis & Verticals) with NO traps
> Patented Multi-Band feed systems
> EasyOn™ 2-plate antenna mounts
> Strong, tapered, low profile elements
> Pre-mounted element to boom brackets
> Pre-assembled and bundled elements
> "Plug and Play" on most designs
> Riveted Construction is the most effective and is a Force 12 signature: **"If its riveted, it's a Force 12!"**

C-19XR for 20-15-10

Powerhouse in a Small Size
19' boom 3 el/ 20, 3 el/15 and 5 el/10
Single coax feedline, 9.1 sqft windload, 58 lbs
100 mph standard rating and 120 mph optional
UPS shippable and 4' packaging available; 5KW.



C-31XR for 20-15-10

The 20-15-10 Leader
31' boom: wide spaced 3 element on 20 mtrs
4 ele /15 mtrs & 7 ele/10 mtrs
Single coax feedline, OR separate feedlines
10.7 sqft windload, 82 pounds
100 mph standard rating and 120 mph optional
UPS shippable; 5KW

SIGMA-40 VERTICAL

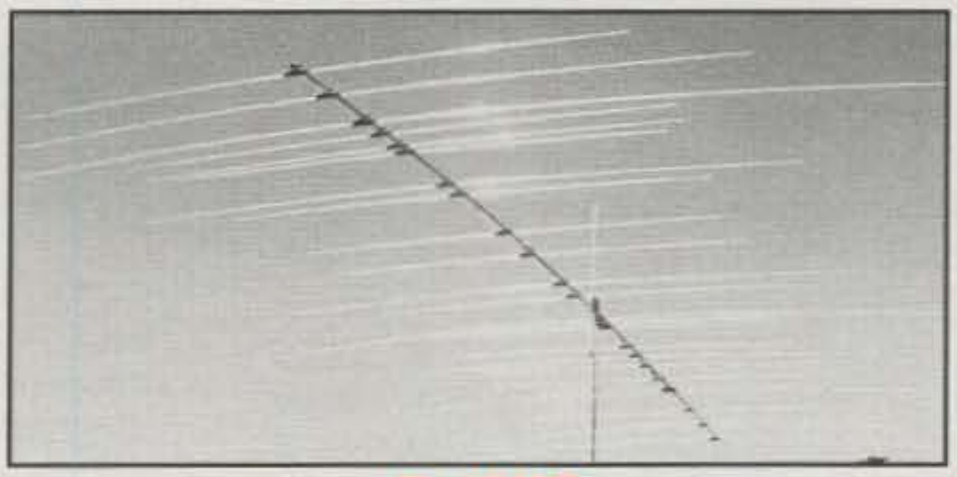
The first of the new Sigma line of verticals. 24' tall + base, 90 mph free standing, 38 lbs., 2:1vswr>300kHz, 5 kw rating. GET ALL THE DETAILS!

MAGNUM 340N

Latest Technology
3 element 40 mtr Yagi
85% Full Size, 36' boom

Can be mounted within a few feet of Force 12 antennas, such as all XR and C-series. (Shown 7' below C-3)

100 mph and 5KW



C-49XR

Equivalent to 6el20, 6el15, >8el10

Force 12 – Anything Else is Just an Antenna!

Complete line of HF and VHF Antennas, Amateur and Commercial
Available direct, through all 12 Ham Radio Outlet stores, Texas Towers and Dealers Worldwide

For FREE brochure - down-loadable, viewed on line, via mail, product info, tech tips: www.QTH.com/force12
For expanded product info, T-shirts, Debugging an Antenna, Antenna Specs and more: www.force12inc.com
E-mail to: force12e@lightlink.com Join the Force 12 Reflector – see the QTH.com Web Site

Force 12, Inc. PO Box 1349 Paso Robles, CA 93447
Order Line 1.800.248.1985 Tech Line 1.805.227.1680 FAX 1.805.227.1684

Washington Readout

BY FREDERICK O. MAIA, W5YI

Regulatory News In The World Of Amateur Radio

International Regulatory Questions from Readers

We haven't done this in a while, so let's attack the stack of general-interest questions that readers have sent in. Between the feedback/inquiry feature on our website and mailed-in letters, we have plenty to talk about! Keep them coming, since it lets us know what you are interested in and what confuses you. This month let's talk about the international regulatory aspect of amateur radio operation.

Q. I hold an amateur radio license issued by [another country]. What do I have to do to operate my ham radio equipment while in the United States on vacation and what are my operating privileges and callsign?

A. We have had many questions on this subject! The rules state that a non-citizen ("alien") may be the operator of an amateur station provided there is some sort of a reciprocal amateur radio operating arrangement between the alien's country and the United States. The FCC periodically issues lists of countries with which the U.S. has such an arrangement (see Table I). The U.S. no longer issues "reciprocal permit" documents, and the foreign amateur must carry a copy of his operator license when operating in the U.S. or its possessions. The FCC concluded in 1998 that there is "...little or no need to continue issuing the reciprocal permit" (FCC Form 610AL) for alien amateur licensees because the license from any foreign country with which the U.S. has a reciprocal agreement would "...stand as the proof that the foreign operator is qualified for the reciprocal operating authority."

Reciprocal operation is now authorized "by rule," which means no special action is necessary on the applicant's part. In short, the foreign amateur operates under the authority of the bi-lateral or multi-lateral agreement and a copy of his/her own license.

The United States also recognizes two other types of amateur radio licenses: CEPT (European) licenses and IARP (International Amateur Radio Permits.) CEPT licenses are issued by a country belonging to the European Conference of Postal and Telecommunications Administrations. There are 44 such countries. An International Amateur Radio Permit is a document issued under the terms of the Inter-American Convention . . . mostly from South and Central American countries. Amateurs operating under CEPT or IARP authorization may not be U.S. citizens or resident aliens nor may they currently hold an FCC license (see Section 97.5).

Needless to say, a foreign-licensed non-citizen must conform to all FCC (Part 97) rules when operating in the U.S. or its possessions. The rules state, "Operator privileges are those authorized by the alien's government, but do not exceed those of the FCC Amateur Extra Class operator." That means if an amateur radio frequency or band is available to a non-citizen in his/her own country and is available to an Extra Class operator here in the U.S., then that ham frequency may be used while visiting the U.S. or its possessions.

Strictly speaking, ham bands and/or frequency segments that are not available in a foreign country may not be used here by foreign amateurs visiting the United States. For example, British amateurs theoretically should not oper-

Amateur Reciprocal Operating Arrangements

Antigua & Barbuda
Argentina
Australia
Austria
The Bahamas
Barbados
Belgium
Belize
Bolivia
Bosnia/Herzegovina
Botswana
Brazil
Canada
Chile
Colombia
Costa Rica
Croatia
Cyprus
Denmark (including Greenland)
Dominica
Dominican Republic
Ecuador
El Salvador
Fed. States of Micronesia
Fiji
Finland
France (including French Guiana, French Polynesia [Gambier, Marquesas, Society, and Tubuai Islands and Tuamotu Archipelago], Guadeloupe, Ile Amsterdam, Ile Saint Paul, Iles Crozet, Iles Kerguelen, Martinique, New Caledonia, Reunion, Saint Pierre and Miquelon, and Wallis & Futuna Isl.)
Germany
Greece
Grenada
Guatemala
Guyana
Haiti
Honduras
Iceland
India
Indonesia
Ireland
Israel
Italy
Jamaica
Japan
Jordan
Kiribati
Kuwait
Liberia
Luxembourg
Macedonia
Rep. of the Marshall Islands
Mexico
Monaco
Netherlands
Netherlands Antilles
New Zealand
Nicaragua
Norway
Panama
Paraguay
Papua New Guinea
Peru
Philippines
Portugal
Seychelles
Sierra Leone
Solomon Islands
Rep. of South Africa
Spain
St. Lucia
St. Vincent & the Grenadines
Surinam
Sweden
Switzerland
Thailand
Trinidad & Tobago
Turkey
Tuvalu
United Kingdom (including Bermuda, British Virgin Islands, Cayman Islands, Channel Islands [including Guernsey and Jersey], Falkland Islands [including South Georgia Islands and South Sandwich Islands], Great Britain, Gibraltar, Isle of Man, Montserrat, Northern Ireland, Saint Helena [including Ascension Island, Gough Island, and Tristan da Cunha Island], and Turks & Caicos Isl.)
Uruguay
Venezuela

Table I– Citizens of the above countries holding a valid Amateur Service license granted by their country are authorized to operate an amateur station from the United States and its territories and possessions. These countries (in alphabetical order) have bilateral/multilateral operating arrangements in effect with the U.S.

National Volunteer Examiner Coordinator, P.O. Box 565101, Dallas, TX 75356-5101 (telephone 817-461-6443)
e-mail: <w5yi@cq-amateur-radio.com>

ate on the 2 meter band segment between 146 and 148 MHz since the UK 2 meter band extends only from 144 to 146 MHz. The 1.25 meter (222–225 MHz) ham band does not exist outside of ITU Region 2, so amateurs from outside of the Americas may not use that band while in the U.S. Also, the 40 meter 7100 to 7300 MHz band segment is only available to amateurs from the Western Hemisphere, and so on.

Having said that, I must admit that this FCC rule is frequently not *strictly* adhered to nor enforced. Many—perhaps most—foreign amateurs operating under reciprocal or other authorizations in the U.S. do indeed use spectrum available to a U.S. Extra Class amateur even though it may not be available to them at home. No one seems to care.

Actually, these amateurs seem to be limited only by whether they have a full privilege or a no-code license. In realistic terms, a foreign amateur from the countries listed in Table I *who has passed a Morse code exam* has access to all U.S. amateur frequencies, while an amateur who has not passed a code exam *is limited to VHF (above 30 MHz) and higher spectrum.*

I have been licensed nearly half a century and have never seen (nor heard of) any enforcement action ever being taken against a foreign amateur operating under reciprocal arrangements on spectrum available to U.S. amateurs but not in his/her own country. The wording in FCC rule 97.107 probably needs to be changed.

Once a foreign amateur becomes a U.S. citizen, he/she may not operate under reciprocal operating authority and must obtain an FCC-issued license. Aliens who will be in the United States for extended periods of time (say, a year or longer) are encouraged to obtain an FCC amateur license.

Any person except a representative of a foreign government (such as a foreign diplomat) may apply for an FCC amateur license upon passing the qualifying examinations.

As for the callsign to use, a foreign amateur operating on U.S. soil under reciprocal authority simply includes a radio district location "indicator" in front of his callsign. This U.S. indicator must be separated from the assigned foreign callsign by the slant mark (/) or any suitable word that denotes the slant mark, such as the word "stroke" or "slant."

For example, the callsign of a UK-licensed amateur transmitting in New England might be W1/G3AAA on CW; W1 "slant" G3AAA on voice. At least once during the QSO the identification announcement must include the general geographical location, such as "W1/G3AAA Boston, Massachusetts" (see Section 97.119[g.]). If the non-citizen amateur is from Canada, the indicator must be given *after* the callsign—i.e., VE1AAA/W1. This is because the reciprocal operating arrangement signed in 1952 calls for this format.

Q. I'm a U.S. citizen. How do I go about getting permission to operate my ham radio equipment in another country?

A. As a general rule, you need to contact the telecommunications regulatory authority in the country you wish to visit.

As mentioned above, Canada and the U.S. have what's called an automatic reciprocal agreement. Hams licensed in either country may operate in the other country without prior written permission. You just have to add the prefix of the area you are in to the end of your callsign.

Getting authority to operate in Europe (and a couple of Caribbean islands) is also almost automatic if the country is a member of CEPT, the European Conference of Postal and Telecommunications Administrations. U.S. amateurs do

International Traffic Agreements

Antigua & Barbuda	The Gambia	Philippines
Argentina	Ghana	St. Christopher & Nevis
Australia	Grenada	St. Lucia
Belize	Guatemala	St. Vincent & the Grenadines
Bolivia	Guyana	Sierra Leone
Bosnia and Herzegovina	Haiti	South Africa
Brazil	Honduras	Swaziland
Canada	Israel	Trinidad & Tobago
Chile	Jamaica	Turkey
Colombia	Jordan	United Kingdom (only special event stations with call-sign prefix GB followed by a number other than 3)
Fed. Islamic Rep. of Comoros	Liberia	
Costa Rica	Rep. of the Marshall Islands	
Cuba	Mexico	
Dominica	Fed. States of Micronesia	
Dominican Republic	Nicaragua	Uruguay
Ecuador	Panama	Venezuela
El Salvador	Paraguay	
	Peru	

The United Nations also has arrangements with the United States to permit an FCC-licensed amateur station to exchange messages for a third party with amateur stations 4U1ITU in Geneva, Switzerland, and 4U1VIC in Vienna, Austria.

Table II– The above countries permit U.S. amateurs to exchange "third party traffic" (messages by or on behalf of someone other than a licensed amateur) with amateurs in their countries.

not have to obtain a permit or license when operating in a CEPT country.

While operating an amateur station in a CEPT country, the person must have in his or her possession (1) a copy of an FCC Public Notice entitled "Amateur Service Operation in CEPT Countries" dated October 29,1999; (2) proof of U.S. citizenship, and (3) a copy of his/her FCC license. These documents must be shown to proper authorities upon request. The Public Notice may be downloaded from the FCC's website at: <http://www.fcc.gov/wtb/amateur/ceptcountries2.pdf>.

When the privileges authorized by the FCC license grant are Technician Plus, General, Advanced, or Amateur Extra Class operator privileges, the corresponding CEPT operator privileges are CEPT radio amateur Class 1 (which is an "full privileges" license). When the privileges authorized by the FCC license grant are Technician Class, the corresponding CEPT operator privileges are CEPT radio amateur Class 2 (which allows access to all local ham bands above 30 MHz). No operating privileges are accorded to holders of the U.S. Novice license. The operator privileges are, of course, subject to the regulations of the country visited.

The participating CEPT countries are Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France (including Corsica, Guadeloupe, Guiana, Martinique, St. Bartholomew, St. Pierre/Miquelon, St. Martin, and Reunion/Dependencies), Germany, Hungary, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Monaco, Netherlands, Netherlands Antilles, Norway, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, and the United Kingdom (including Northern Ireland, the Channel Islands, and the Isle of Man).

Q. I am a foreign FCC-licensed amateur and therefore I do not have a Social Security Number. How do I renew my license?

Q. I am not a U.S. citizen. How do I obtain a new FCC amateur radio license when I do not have a SSN?

Q. How do I get a Vanity callsign for my amateur radio club? Do I have to go through one of the FCC's new "Club Call Sign Administrators"?

Q. Why do I have to give the FCC my Social Security Number? Isn't that an illegal use of the SSN?

A. We are lumping these four questions together because the situations and the answers are related. Neither non-citizens, foreign amateurs with FCC licenses, nor amateur radio clubs have Social Security Numbers, and you can't get a ham license unless you give a TIN (Taxpayer Identification Number) to the FCC. Generally, this is your Social Security Number.

As of August 1999 when the new Universal Licensing System (ULS) was implemented, all new, modified, or renewed amateur radio applications had to include the applicant's Social Security Number (SSN) or a "Licensee ID"—a nine-character identification beginning with the letter "L" and eight numerals. (SSNs have nine digits.) Applicants can give the FCC (or the VE examiners if they are taking a license test) either their SSN or their Licensee ID.

Licensee IDs are identifiers that can later be associated by the FCC to an applicant's SSN. In either case, the applicant must furnish his/her SSN. That's the law if a person wants to operate a ham station.

To register for a Licensee ID, an applicant must submit an FCC Form 605 (that's an FCC form 605, not the NCVEC form 605 used by the VECs) by mail to the FCC to register his/her SSN or registration can be done online at the FCC's website located at <http://www.fcc.gov/wtb/uls/>. The FCC Form 605 can be obtained online from <http://www.fcc.gov/formpage.html> or by fax at 202-418-0177 (request Form 000605). Once you have a Licensee ID, you may use it in place of your SSN for all future amateur license applications.

SSN required for a ham ticket. The FCC, like all government agencies, is required under the Debt Collection Improvement Act of 1996 (DCIA) to collect an applicant's SSN before granting any services. This mandate from Congress is designed to preclude the granting of government benefits to people who owe money to the U.S. Government or who are ordered to make payments by a court (such as child support).

As a result of the DCIA, the Commission and other executive agencies are required to collect Taxpayer Identification Numbers (TINs) from each entity doing business with a Federal agency, including applicants for, or recipients of, a Federal license or permit. All agencies forward the SSNs to the Treasury Dept., which administers the DCIA. One application of the Act is to facilitate collection of child support.

Some citizens are under the mistaken impression that SSNs are totally private information which cannot be collected for identification or record- keeping purposes. The fact is that local, state, and federal agencies are permitted to use—and do use—Social Security Numbers. There is no law either prohibiting or authorizing their use. Giving any agency your SSN does not give it access to your Social Security (earnings) records.

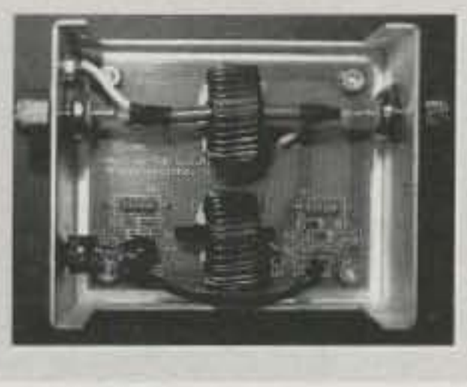
Non-citizen (foreign) radio amateurs and unincorporated ham radio clubs, however, do not have Taxpayer Identification Numbers, yet they are eligible for amateur radio station licenses and callsigns. The question then becomes, how do they obtain a TIN?

To cope with that fact, the FCC has established "Assigned Taypayer Identi-

RF Applications, Inc

- Vacuum Fluorescent Display
- 2,955 and 5000 Watt HF Version
- 300 Watt VHF Version
- 65 Element Bar graph—Better than a meter!
- Settable VSWR Alarm
- VSWR Alarm Relay Option
- RF Power Monitor Option
- Vanity Option (Callsign)
- Remote Sensor
- 12 VDC Operation
- Specifications Page

The VFD's display holds your peak PEP for about two seconds after you stop transmitting.



We use large ferrite cores that will not saturate at legal power levels. Shielding between the two cores is provided by a spot-welded plate on the cover of the sensor.

CAL-AV LABS, INC.

http://www.cal-av.com

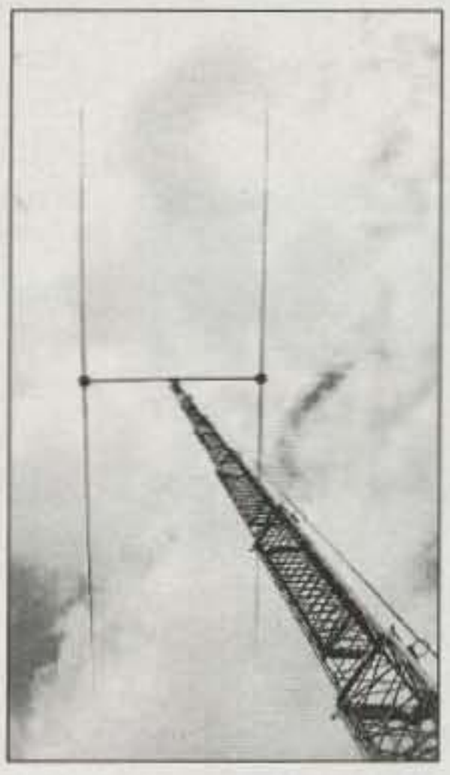
PERFORMANCE that well exceeds

Making a name for themselves with some very well-engineered, high-performance antenna products.

30 and 40 meter beams—2 full-size elements on a short boom that have performance that well exceeds a 2-element "shorty 40", and approaches a 3-element, full-size Yagi. Please see the patterns of these antennas at www.arraysolutions.com

30 and 40 meter rotary dipoles—full-size dipoles for higher performance than inverted Vs

Verticals VF series— 1/4 wave, full-size verticals with heavy-duty bases



Contact Array Solutions to discuss your specific requirements.

TIC RING
RINGROTOR

The TIC Ringrotor offers ham operators the ability to have true "On the Tower" control of single or multiple antenna arrays for a full 360' of rotation-guaranteed!

Array Solutions is the authorized dealer for TIC Ringrotors. We work closely with TIC-General to make sure our stacks on your tower are integrated properly and turn without problems.

We have three models to chose from:

TIC 1022D Maximum Tower Face Width 18½ inches
Maximum Leg Diameter 1½ inches

TIC 1032D Maximum Tower Face Width 28 inches
Maximum Leg Diameter 1½ inches

TIC 1048D Maximium Tower Face Width 40 inches

All can be driven with the new and improved Digital Controller.

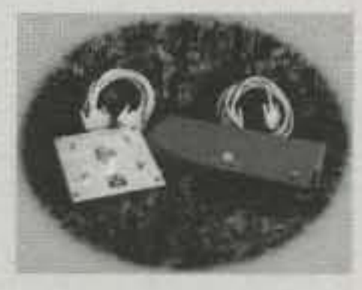
Contact Array Solutions to discuss your specific requirements.

RF switching, phasing and contesting products from

ARRAY SOLUTIONS

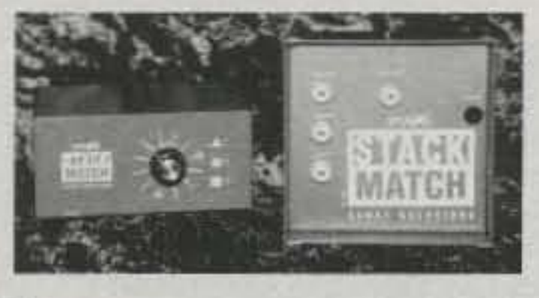
RATPAK—6 way remote antenna switch 5 kW continuous
Filters—Bandpass and BCB by W3NQN
SCK—CW and Phone message keyer, and a lot more

SO2R Master—Finally a SO2R controller for high performance contesting



StackMaster—stack/phase up to 4 mono band antennas

StackMatch—the world's leader in stacking/phasing devices mono or Tribanders.



Towers and Accessories:
Full turnkey installations of your next tower

Antennas by
Cal-Av, Titanex, Bencher, Skyhawks, M2, Tennadyne

WXØB
ARRAY SOLUTIONS

www.arraysolutions.com

Phone 972-203-2008 **FAX 972-203-8811**

Contesting products for the dedicated Contesters, DXing products for the deserving

WXØB
ARRAY SOLUTIONS

fication Numbers," or "ATINs." Simply stated, an ATIN is a manufactured identification number to use in place of the SSN when one is not available. Any foreign FCC-licensed radio amateur or domestic ham radio club must apply to the FCC for an ATIN before an application can be renewed or acted upon. This is accomplished by telephoning the FCC's Universal Licensing System (ULS) Technical Support line at 202-414-1250 or by sending an e-mail message to <ULSCOMM@fcc.gov>.

Non-citizen applicants applying for a new FCC-issued amateur radio license may be examined by a VE team who will forward the application to their VEC. Their VEC will assign an ATIN from a block that they have been allocated for that purpose.

New and renewing ham clubs, however, must telephone the FCC's Tech Support line to get an ATIN. The same procedure goes for amateur radio clubs that wish to apply for a Vanity callsign, yet have never been assigned a Taxpayer Identification Number. Once you have the ATIN, then it is simply used in place of the Social Security Number. The ATIN, along with a user-selected password, will provide licensees with access to their licensing records in order to renew or modify their licenses.

Last January the FCC designated the ARRL/VEC, the W5YI/VEC, and the W4VEC Volunteer Examiners Club of America as "Club Station Call Sign Administrators" (CSCSA). As of January 22, 2001 the FCC began accepting new, modification, and renewal applications for amateur radio club and military recreation stations only from a designated CSCSA. However, ham clubs wishing to get a Vanity callsign do not have to go through one of the FCC's new "Club Station Call Sign Administrators. You can do it yourself.

Q. May I send messages to people in foreign countries? May I run an overseas phone patch for a friend?

A. We are talking here about "third party" traffic. The international regulations state, "It is absolutely forbidden for amateur stations to be used for transmitting international communications on behalf of third parties." A *third party* is defined as anyone other than the two amateur operators involved in the two-way communication.

The next sentence, however, softens this law: "The preceding provisions may be modified by special arrangements between the administrations of the countries concerned."

Section 97.111 of the rules authorizes an amateur station licensed by the FCC to exchange messages with amateur stations located in other countries. These messages must be in plain language and " . . . shall be limited to messages of a technical nature relating to tests, and to remarks of a personal character for which, by reason of their unimportance, recourse to the public telecommunications service is not justified." What the FCC is saying here is that ham radio should not be used as a substitute for the telephone or other commercial telecommunications.

Third-party communications involving recipients other than the two radio operators is covered by Section 97.115 of the rules. It specifies that no amateur station may transmit messages for a third party to any foreign amateur station whose government has not made arrangements with the United States to allow amateur stations to be used for transmitting such communications.

The countries shown in Table II allow amateur communications to be transmitted on behalf of others. The FCC does not consider a message author to be third-party traffic if that originator is eligible to be the control operator of the station. In other words, a licensed amateur who could send the message him/ herself is *not* considered to be a third party.

We hope this month's mailbag Q&A has been helpful in clearing up confusion that is bound to result when domestic FCC regulations intersect with international radio regulations and the rules of various countries. By understanding and following these rules, you may enjoy amateur operation in many parts of the world.

MFJ *Pocket size* Morse Code Reader™

Hold near your receiver -- it instantly displays CW in English!

Automatic Speed Tracking . . . Instant Replay . . . 32 Character LCD . . . High-Performance Modem . . . Computer Interface . . . Battery Saver . . .

MFJ-461
$79.95

Is your CW rusty?

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

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

No cables to hook-up, no computer, no interface, no other equipment needed!

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

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

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

Please, please don't use it on CW exams (or at least, don't get caught!).

Automatic Speed Tracking

MFJ *AutoTrak*™ automatically locks on, tracks and displays CW speed up to 99 words-per-minute.

Simply place your MFJ-461 close to your receiver speaker until the lock LED flashes in time with the CW.

Three Display Modes

1. Bottom line scrolls and fills with text, then that entire line is displayed on top line until bottom line refills -- makes reading text extra easy!

2. Top line scrolls, bottom line displays speed in words-per-minute.

3. Both top and bottom lines scroll.

Two-line LCD display has 32 large 1/4 inch high-contrast characters.

MFJ Instant Replay

The last 140 characters can be instantly replayed. This lets you re-read or check your copy if you're copying along side the MFJ-461.

High Performance Modem

Consistently get solid copy from MFJ's high performance *PLL* (*phase-lock loop*) modem. Digs out weak signals. Even tracks slightly drifting signals.

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

Computer Interface

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

More Features

When it's too noisy for its microphone pickup, you can connect the MFJ-461 to your receiver with a cable.

Battery saving feature puts MFJ-461 to sleep during periods of inactivity. It wakes up and decodes when it hears CW.

Uses 9 Volt battery (not included).

True Pocket Size

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

No Instruction Manual needed!

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

Accessories

MFJ-26B, $4.95. Soft leather protective pouch. Clear plastic overlay for display, push button opening, strong, pocket/belt clip secures MFJ-461.

MFJ-5162, $5.95. Receiver cable connects MFJ-461 to your radio's external speaker 3.5 mm jack.

MFJ *Pocket* Morse Tutor

MFJ-418
$79.95

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

MFJ Code Oscillator

MFJ-557
$29.95

MFJ-557 Deluxe Code Practice Oscillator has a Morse key and oscillator unit mounted together on a heavy steel base -- stays put on your table! Portable. 9-Volt battery or 110 VAC with MFJ-1312, $14.95. Earphone jack, tone and volume controls, speaker. Adjustable key. Sturdy. 8½x2¼x3¾ in.

MFJ *Pocket* CW Keyer

MFJ-403P
$69.95

Built-in Iambic Paddle. Thumbwheel speed control. Adjustable weight. Adjustable sidetone with speaker. Iambic modes A or B. Fully automatic or semi-auto "bug" mode. Reversable paddle. Tune mode. RF-proof. Battery Saver. Tiny 2¼x3¼x1 in.

MFJ *miniature* Travel Iambic Paddle

MFJ-561, $19.95. 1¾Wx1¾Dx¾H in. *Formed* phosphorous bronze spring paddle, stainless steel base. 4 ft. cord, 3.5 mm plug.

Free MFJ Catalog
and Nearest Dealer . . . 800-647-1800

http://www.mfjenterprises.com

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

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

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

How It Works

BY DAVE INGRAM, K4TWJ

Theory 'n Practice

Transceiver Filters Simplified

Have you ever wondered why weak signals and DX seem easier to copy on one model of transceiver than another, or why one rig has more full-bodied audio than another rig? Possibly you have also considered adding an optional SSB or CW filter to your favorite transceiver but felt unsure of which one to choose. Your thoughts are well justified, as IF filters play an important role in a transceiver's overall performance—both on receive and on transmit. Adding or knowing the "How It Works" facts and electing not to add an optional filter also lets you tailor your transceiver to your particular needs, budget, and lifestyle.

In light of these facts, this month's column presents a plain-language discussion of filters, and it is specially written for newer amateurs anxious to learn more "inside details" of our fascinating hobby. This discussion will help you get more enjoyment from your rig—any rig—so ignore the impression filters are a "technical subject" (really?) and let's get started!

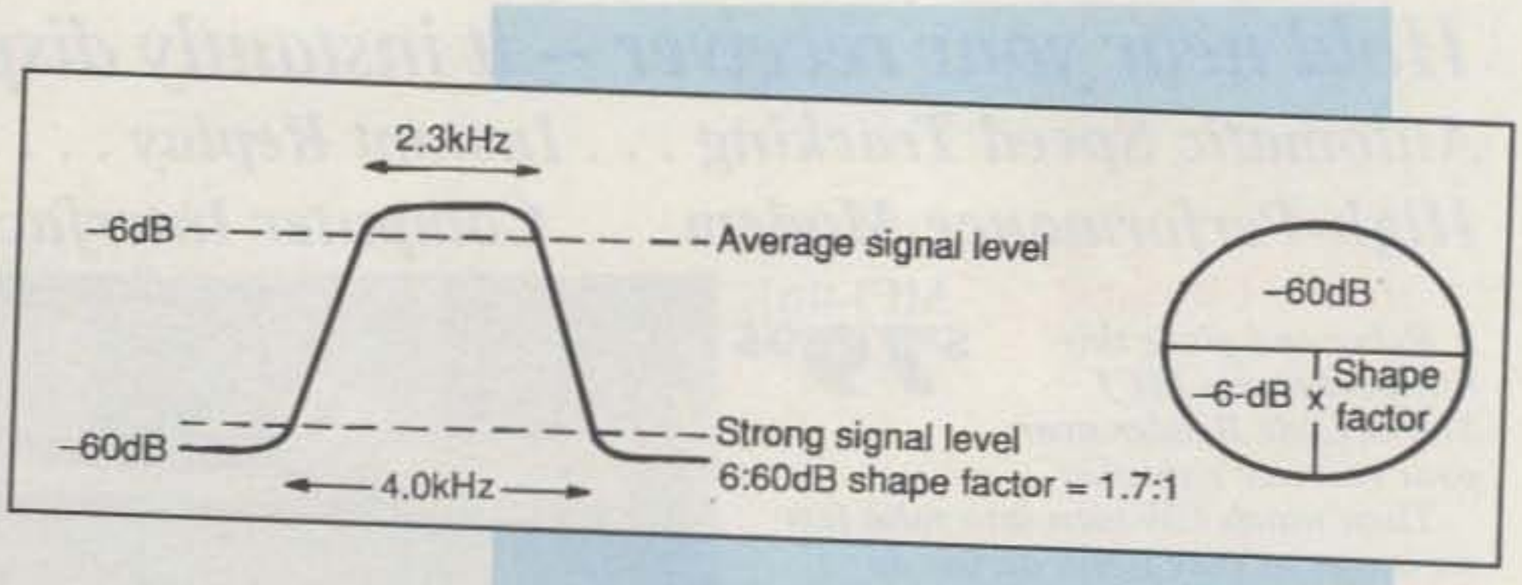


Fig. 1–Manufacturers often use IF response curves like the one illustrated here to describe their transceiver's IF selectivity with built-in or optional crystal or mechanical SSB or CW filters. (Discussion in text.)

Opening Notes

If you studied for your General class or higher license, you should recall that all modern SSB transceivers use a crystal or mechanical filter to eliminate the undesired sideband when transmitting a single sideband signal. That same SSB filter is also utilized when receiving to achieve economically-good selectivity and/or rejection of adjacent frequency signals. How effectively that filter (or any filter) performs its assigned task depends on the bandwidth and complexity (or cost!) of the filter. This is one accessory with which you truly get what you pay for.

Simply explained, a wide bandwidth filter with few sections or "poles" supports the most natural and best sounding audio but exhibits less immunity to interference than a narrow bandwidth, multi-section filter. Manufacturers usually outline this ability to sound top-notch or reject QRM in their transceiver specs as selectivity at the "average signal level" or –6 dB point and "strong signal level" or –60 dB point in its response curve. They also may illustrate this capability in equipment brochures by graphing those –6 dB and –60 dB points on response curves of one or more filters as shown in fig. 1.

Whether graphed or stated numerically, however, the ground-floor facts are the same. A –6 dB SSB width of 2.1 or 2.3 kHz and an associated –60 dB width of less than 3.57 or 4.0 kHz (a 1.7:1 ratio) is ideal for DXing and evading QRM but lacks rich, full-bodied audio. Conversely, a –6 dB SSB width of 2.5 to 3.1 kHz with a –60 dB ratio of less than 1.7:1 serves up more full-bodied audio at the expense of less immunity to QRM. The detrimental effects of a –6 dB to –60 dB ratio above 1.7:1, incidentally, are "buckshotting" on signals, excessive strong-signal interference AGC "pumping," and resulting reduced overall receiver sensitivity. You can calculate this ratio with the formula –60 dB width/–6 dB width = Shaping Factor of passband. As an example, 4.0 kHz/2.3 kHz = 1.7:1 Shape Factor. Try it with your own transceiver's built-in or optional filters. The results can be quite eye-opening. We will discuss wide and narrow SSB and CW filters more later. For now let's take a brief look at the different types of filters.

Types of Filters

Filters are produced in such a wide variety of styles, frequencies, and bandwidths that just finding a good starting point for discussing them often seems confusing (sound familiar?). If we step back and look at the overall picture, however, understanding filter differences and selecting the right one for your particular needs is a cinch.

The filters we will discuss here, incidentally, are IF stage filters—those small, rectangular items used to define a passband width and establish SSB or CW selectivity as previously discussed. These filters may be of the crystal ladder or mechanically resonating type, they may be factory installed or optional items, and they typically operate in the 8 MHz, 9 MHz, or 455 kHz range as required to match their related transceiver (photos A and B). The filters may also be available in any fixed bandwidth from 3.1 kHz to 1.8 kHz for SSB, 500 Hz or 250 Hz for CW, and 5 or 6 kHz for AM operation. Finally, the filters may be physically large for easy installation in a full-size transceiver or small to fit in an ultra-compact transceiver. Selecting a right-for-you filter thus equates to first considering your own operating preferences, then checking your transceiver's manual or sales brochure to determine the filter's number for that mode and bandwidth. Some additional tips on selecting wide- or narrow-width filters follow in the next section, but one additional point warrants mention now.

All modern SSB transceivers are sold factory-equipped with a "general pur-

4941 Scenic View Drive, Birmingham, AL 35210
e-mail: <k4twj@cq-amateur-radio.com>

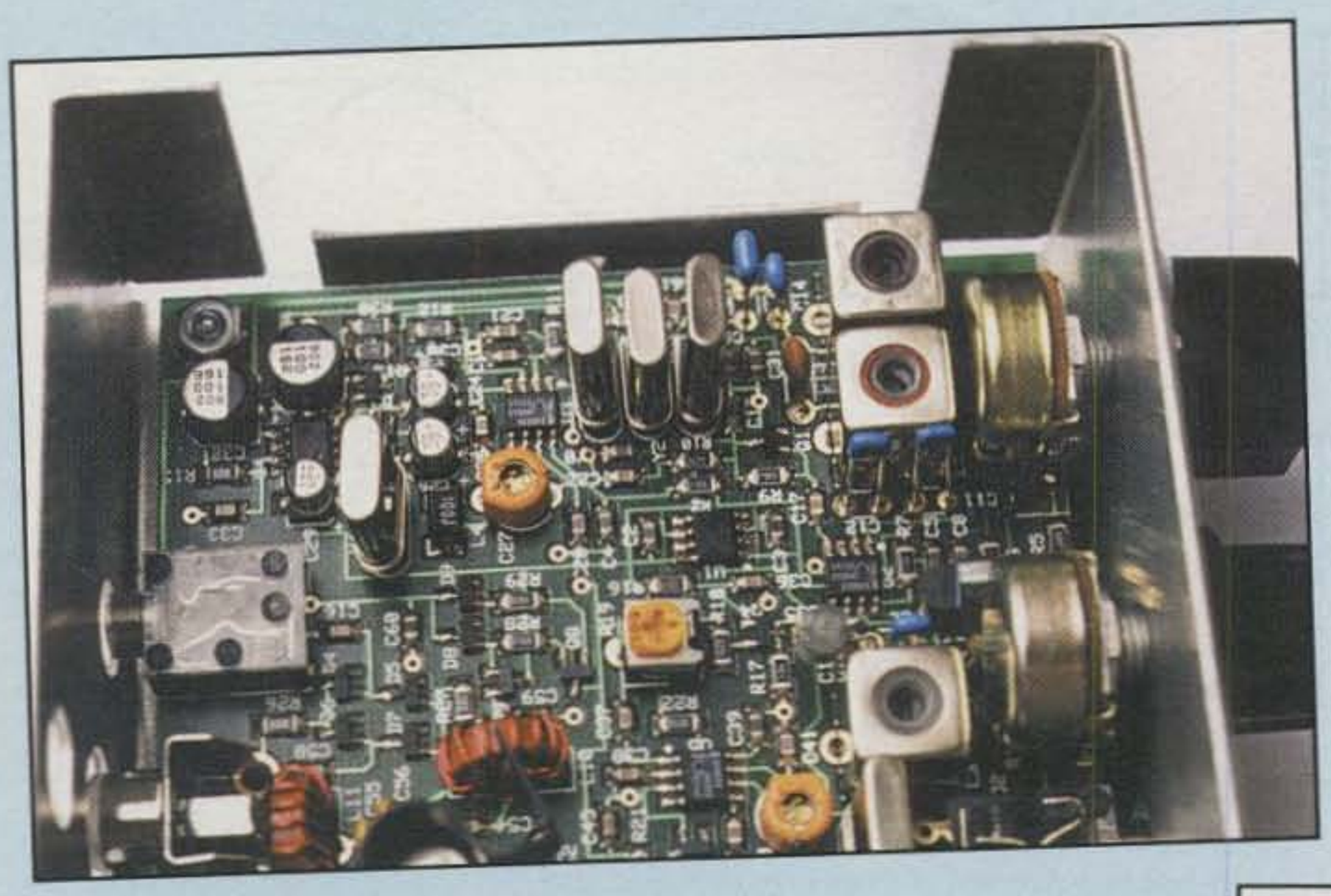


Photo A– Here you see a discrete component-type crystal ladder filter mounted on the upper section of a transceiver's PC board. This particular one is a 3-pole CW filter. It has a bandwidth of approximately 500 Hz and is used in an MFJ Cub.

Photo B– This is an optional plug-in crystal ladder filter used for full-bodied AM reception with an ICOM transceiver. It operates at approximately 9 MHz and has a bandwidth of 6 kHz. Most optional SSB and/or CW filters look similar, but have more narrow bandwidths.

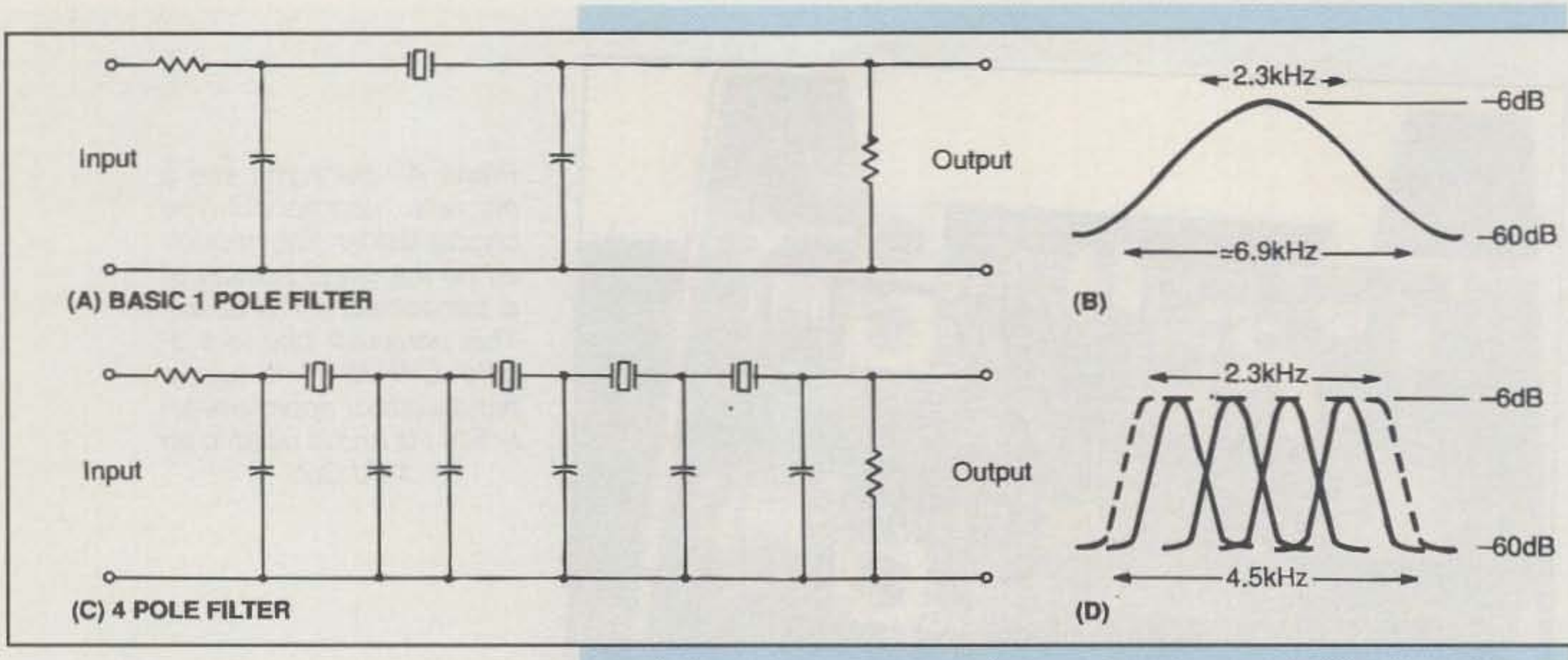


Fig. 2– A "napkin note" study of crystal filters, with (A) illustrating a single-section or single-pole crystal filter and (B) showing its related bandpass curve. A 4-pole filter is illustrated in (C), and its bandpass curve is shown in (D). Additional sections or poles produce steeper skirts or greater rejection of strong signals.

pose" crystal filter that works for both transmit and receive on both SSB and CW. If you add an optional CW or SSB filter in the transceiver, it is used only on receive. The original factory-supplied filter is still employed when transmitting (that is because it determines transmit bandwidth).

Wide vs. Narrow Filters

Whether your favorite mode is SSB, CW, or AM, use of an optional ultra-wide, narrow, or ultra-narrow filter noticeably influences your transceiver's "personality"—and your overall enjoyment in using that rig. In addressing that fact, the first factor you should consider is what your main interests are and how strong their priorities are. If you are interested only in SSB DXing, for example, investing in an optional 2.1 kHz filter is a good idea. If CW operation is your favorite activity, purchasing an optional 500 Hz filter is clever thinking. If broadcast-quality AM is your delight, an optional 6 kHz filter will bring tears of joy to your eyes. It is all a matter of going for what *you personally* like best.

In making that filter choice, I suggest avoiding extremes such as 1.8 kHz (or 3.1 kHz) for SSB and 250 Hz for CW, unless you try them beforehand and feel sure they are what you want. Why so? An ultra-narrow 1.8 kHz filter does not yield full-bodied audio like a wider filter (It tends to give received stations a "Wolfman Jack" sound.). If you can accept that fact and want mildly narrow CW filtering to boot, fine. Go for it. An ultra-wide 3.1 kHz filter sounds great on SSB, but it does not offer much QRM-reducing capabilities. A 250 Hz CW filter cuts QRM like a knife, but you need a big tuning knob, a steady hand, and (often) an optional high-stability oscillator module to successfully use it. A 500 Hz CW filter is easier to use for most serious CW work. If possible, test-tune a transceiver with a filter or bandwidth you are considering—possibly in a dealer's showroom—before making your final decision.

Crystal Filters

Crystals—those unique little devices used to generate, determine, and precisely control frequencies in oscillator circuits—are also the main components used in IF filters for transceivers. In this particular application they pass signals at the crystal's frequency and reject all other frequencies. However, crystals act like very sharp-tuned circuits and filters must pass a group of frequencies, you say. True indeed, and that also explains why additional capacitors and resistors are included in the internal make-up of crystal filters. They widen the range of frequencies that can pass through a crystal filter. The exact values of added capacitors also determine if the filter's overall width passes CW, SSB, or AM signals. Ah, but there is a rub. . . .

Widening a single crystal's response curve to achieve a desired –6 dB bandwidth causes excessive skirt flare at the strong signal or –60 dB point (fig. 2A and B). This pitfall is overcome by adding additional and identical crystals and circuits in the filter (technically called adding or cascading poles). If each crystal resonates on a slightly different and adjacent frequency and each crystal's supporting circuitry adds just enough width, their response curves will overlap or stagger tune. The desired bandwidth with steep skirts for good strong signal/–60 dB attenuation is then achieved (illustrated by the dotted line in fig. 2D). The next fact should now be obvious: If a 3- or 4-pole filter has good/steep skirts, a 6- or 8-pole filter will have even better/steeper skirts and even greater immunity to strong signals. That explains why elaborate and expensive crystal filters are more effective than basic crystal filters.

We could discuss crystal filters for several more pages (They are a complete and fascinating study of their own.), but space is limited. If you wish to learn more, I heartily recommend reading "Ladder Crystal Filters" written by John Pivnichny, N2DCH, and published by MFJ Enterprises. You can direct-order a copy from MFJ at 1-800-647-1800. In fact, Martin F. Jue, K5FLU, and I have a special offer for seriously interested readers here. The first four folks sending me (K4TWJ) a letter with a short note about what you think of this column and why you are interested in

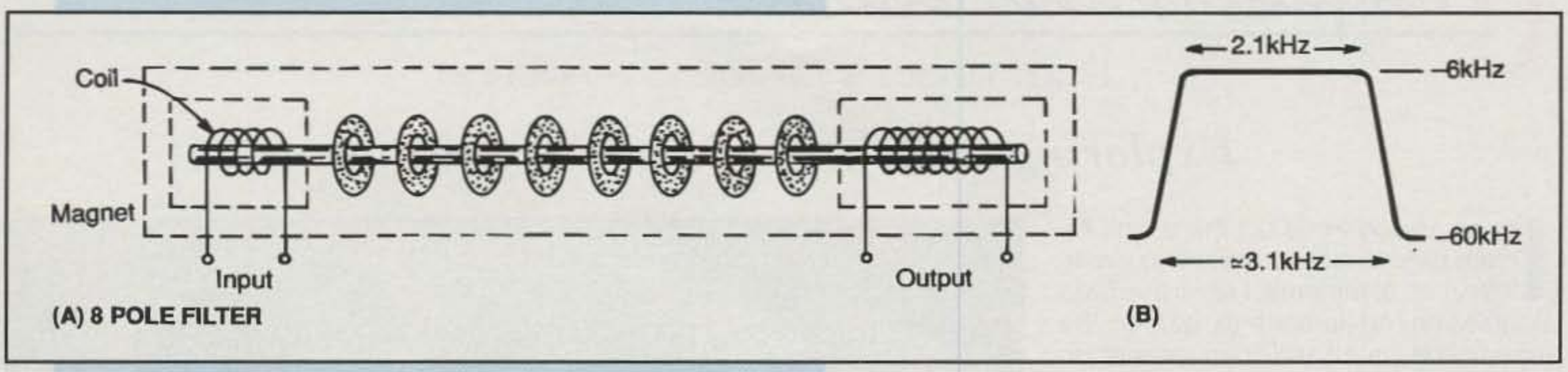


Fig. 3– Simplified sketch of a Collins mechanical filter in (A) and its related response curve in (B). The number of rings and main metal rod is comparable to the number of poles in a crystal filter. (Discussion in text.)

learning about filters will receive free copies of the "Ladder Crystal Filters" book. E-mails do not qualify here; the extra effort in handwriting a note, addressing an envelope (plus adding an SASE if you want a reply if you are not one of the top four) and adding a stamp indicate your above-average sincerity. Winners will receive books via "Book Rate" mail unless you send $3.50 for two-day Priority Mail. If you are a winner, be sure to step up and thank Martin personally at a future hamfest.

Mechanical Filters

Most amateurs have heard of Collins mechanical filters, and their reputation for steep-skirted selectivity is world famous. Exactly how these little critters work, however, is often unknown or misunderstood. Let's take a look at their operation with a quick "keep it simple" sketch and explanation.

A mechanical filter is shown in fig. 3. It consists of a small metal rod with precisely ground-to-frequency metal rings along its length and transducers comprised of magnets and coils at each end. An incoming IF signal is applied to the transducer's coil at one end, and resultant electromagnetic action causes the metal rod to vibrate at that frequency (actually at all frequencies within the filter's bandwidth). Each metal ring along the rod is a slightly different size and vibrates at its own exact frequency of resonance, like a tuning fork (remember studying tuning forks in school?). As a result of all the rings vibrating at slightly different frequencies (all within the IF's range and bandwidth of the filter), the metal rod also vibrates at that IF range/bandwidth of frequencies. As the rod's far/output end vibrates within the far/output transducer, electromagnetic action induces voltage (the bandwidth-filtered IF signal) into the coil. That voltage is amplified by following IF stages, passed on to the detector and audio amplifier, and ultimately applied to the speaker. Again, we could continue with a more complex and multipage explanation, but these ground-floor facts are all we could squeeze into available space. I am sure you will agree, however, they are quite informative.

Will DSP Outmode Crystal Filters?

The recent introduction of IF-level Digital Signal Processing (which, incidentally, was discussed in the March 2001 "How It Works" column) leads one to wonder if the days of crystal and mechanical filters are limited. That is possible if DSP is properly implemented, but "shortcut inclusion" in transceivers can also trick folks into getting less rather than more for their money here. Older high-performance (muscle?) transceivers such as ICOM's IC-761 may have the edge. How so? True IF DSP must be integrated in the "front end" or first IF stages of a good high-performance transceiver; not after gain and dynamic range have been compromised by strong signals blowing past simple pre-DSP filters. In my opinion, there are different forms of what we call IF DSP—and "front end" crystal or mechanical filtering has an obvious edge over "detector end" DSP—plus crystal filters are more economical and easy to handle.

Our discussion of filters could continue indefinitely, but we have reached the closing wire and must once again sign off. I will thus conclude with a sincere encouragement to never stop learning and growing (one and the same) and always enjoy some good HF hamming every day—always! We are in the peak months of sunspot cycle 23 and everyone should experience the thrills of great DXing!

73, Dave, K4TWJ

Computers and Internet

BY DON ROTOLO, N2IRZ

Ham Radio's Online Connection

Exploring the World of Data Acquisition

It's an analog world out there, and it's often hard to extract meaningful data from it all. In my work, I often use Data Acquisition equipment to gather the information I need and bring meaning to the operation of the systems I'm working on. In keeping with this column's unofficial theme of introducing new technologies and ideas to the above-average ham (that's you, gentle reader), I'd like to share a quick peek at the world of Data Acquisition and offer some thoughts on what you can do with it.

Data Acquisition is simply the gathering of data. You can do this by hand —read a voltage every minute and write it down—but I'm thinking more of the automated way, with a computer. Let's start with the premise that everything can be converted into a voltage. That means temperature, pressure, resistance, frequency, power, movement, etc., can all be sensed and represented by a voltage that changes in some proportion to the original "signal." Now that the world has been reduced to a set of voltages, let's apply some electrical engineering in an attempt to make sense of it all.

As I stated before, it's an analog world, but the computers we all use work in the digital world of 1's and 0's. What we need is a way to convert an analog voltage into a digital number that represents that voltage. For this we use an Analog-to-Digital Converter, or A/D for short. (You can also get a D/A, or Digital-to-Analog converter, to go the other way.) To help explain how an A/D works, think of a comparator circuit, which is a special type of operational amplifier (op-amp for short). A comparator's output has only two states, high (1) or low (0), which changes state at a pre-set "threshold" voltage. If we gather enough comparators, and set their thresholds carefully, we can sample any voltage and create a digital number which represents it. However, doing this with individual op-amps is tedious, costly, and prone to error.

In the real world we'd simply buy the A/D chip that meets our needs. The usual standard is 12 bits, offering a 1 part in 4096 resolution, while 16 bits or more is often used for precision work, and 8 bits for less-demanding applications. Look in the Digi-Key catalog or visit the Burr-Brown web site to see the wide variety of A/D offerings (see "Resources").

545 Baylor Ave., River Vale, NJ 07675
e-mail: <n2irz@cq-amateur-radio.com>

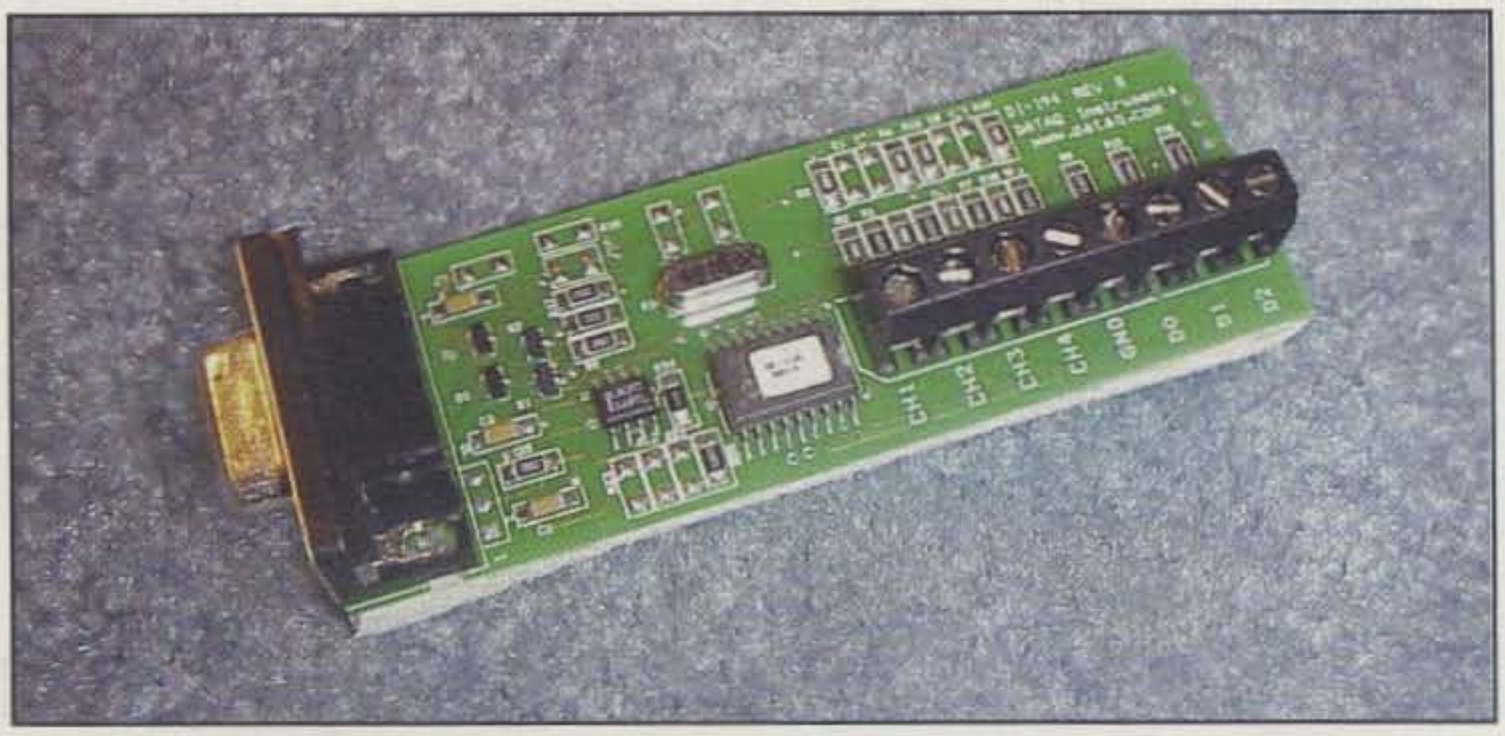


Fig. 1– The Dataq DI-194 four channel Data Acquisition board. Dataq sells these for $15 on their website, complete with software, and they're a great way to get started in DAQ. Power is derived directly from the PC's serial port, and a convenient connector block simplifies connections.

Being a quintessential ham—that is, much too cheap to buy my own hardware—I borrowed an 8-bit A/D board from my colleague Jim in order to write this article.* This board is configured as a 4-input data acquisition system, and comes complete with software, making the nuts and bolts part of the process trivial. He bought it from Dataq for $15, and spent the extra $15 for the password to enable all four channels. While its 8-bit resolution (1 part in 256) won't launch the space shuttle, it certainly is precise enough to monitor a remote repeater site (see fig. 1).

Consider this: Data Acquisition (DAQ) is much like using an oscilloscope, only slower. Instead of monitoring signals that vary in microseconds, we are able to look at and record signals that vary in timeframes of seconds to days. You wouldn't use DAQ to measure an audio signal's frequency (although you could), but you would find it useful to monitor temperature, sunlight, battery voltage—any signal that varies relatively slowly. (For the purists out there, yes, there are DAQ systems that can measure into the MHz region, but have you priced them?)

Some points to consider when using A/D converters:

Sampling speed and sample rate: Although theory (per Nyquist) implies that you can sample a 100 Hz signal at 200 samples per Second (s/S), that's a theoretical value. In the real world the results will be poor. The A/D's sampling speed is the limiting factor on how fast the signal of interest can vary. If the bandwidth of the signal being sampled is not limited, you can get some weird and misleading data, as seen in fig. 2. Remember that in a multi-channel system the sample rate is divided across all the active channels, so at a 240 s/S rate each of four channels is sampled at a speed of only 60 s/S. If this was used to look at 60 Hz power-line frequency, the results would be meaningless, since the sample speed is too slow, even though the sample rate seems adequate.

Resolution: As I mentioned before, an 8-bit A/D has a resolution of 1 part in 256. In practical terms this means I can only measure to the nearest 78 millivolts when my 8-bit Data Acquisition board has a full-scale range of –10 V to

**Jim dared me to explain in print why I didn't buy my own (Jim must not be a ham, or he'd understand!—ed.), and said I could borrow the board again sometime if I mentioned his name. Write to me and I'll ask Jim if you can borrow it, too.*

+10 V. If you spend the extra money for a 12-bit board, you can measure to the nearest 2 millivolts, but do you really need it?

The important point is that all of the A/D's bit resolution is spread out across its full input range. For the Dataq board this is –10 V to +10 V. If we have a signal that changes by only a few millivolts, we can still use the 8-bit system if we amplify the signal by a known amount. Using an amplifier with a fixed gain of 100 or 1000, we can make the signal large enough to sample with the accuracy we want, at a much lower cost. Instrumentation amplifiers are available commercially, or you can build your own using op-amps (see fig. 3).

If the signal of interest is greater than the input range of the DAQ, we risk either missing some data, or worse, damaging the DAQ itself. Again, with an input range of –10 V to +10 V, you can't measure most signals in a car, with its 12 volt electrical system. The solution here is a simple voltage divider. I generally use a 1:2 divider made of two precision 500 k resistors, tapping off the center for the DAQ. The ratio of the resistors can be varied as necessary, but keep the values high to avoid loading down the circuit under test.

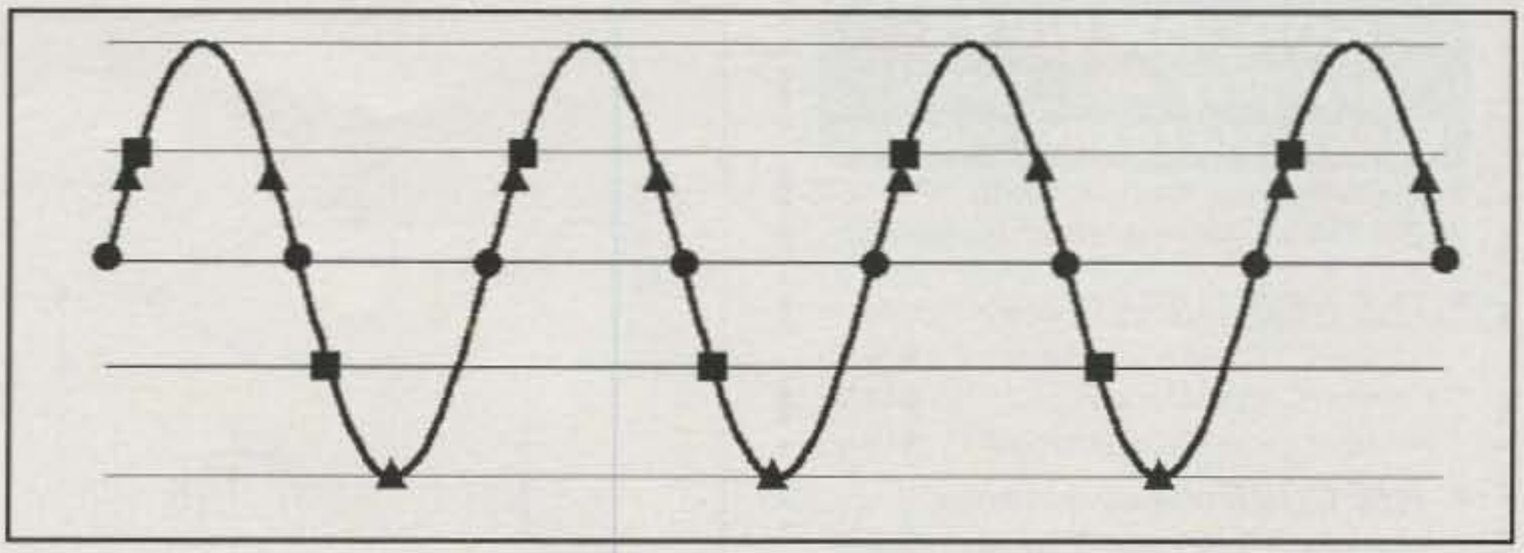


Fig. 2– The dangers of not considering sampling rate and signal frequency. Here the dots show the signal being sampled at exactly twice the frequency, but the recorded data would show no signal at all. If the sample point is shifted (squares), the frequency is correct, but the amplitude is wrong. The triangles show a higher sample rate, which results in a distorted waveform.

In both cases (amplification and voltage division) you want to keep the input signal to the DAQ as close to full range as possible to avoid losing resolution without exceeding the maximum.

Sensors

You can make or buy sensors to convert just about anything into a voltage so you can monitor it. For temperature we use thermistors or, for more accuracy, thermocouples. Without amplification, an 8-bit board generally doesn't have the resolution for either. Pressure sensors are available in a wide variety of pressure ranges and materials for resistance to nearly any chemical. A nice pressure sensor kit is sold by Fluke for use with a digital multimeter. Current measurements are done with a current shunt, while light can be measured with a solar cell or photoresistor. You can buy a frequency to voltage converter IC

Oops...

We had a typo in the "Hot Stuff at Hamvention" story in our August issue (p. 27). The high-performance version of the Commander HF-1250 amplifier *really does* put out more than 150 watts PEP on SSB! The correct number, if you haven't already figured it out, is 1500 watts PEP on SSB, along with 1000 watts key-down on CW with no time limit. Our apologies to Command Technologies and to anyone who didn't look at that and say "those dummies dropped a zero!"

And in the July issue, it seems we couldn't even get our correction correct (p. 35). Reader Tom Donohoe, W2NJS, writes:

"A correction of a correction is needed. The Icom IC-2GXAT is, indeed, a wideband receive radio, notwithstanding what the manual/service book says. I owned one for many years and I am certain of this fact. To open it up, so to speak, requires a couple of special keystrokes, as it does with many radios, but rest assured the IC-2GXAT IS a wideband VHF receive radio." Thanks, Tom!

Also in the July issue, author Dick Stroud, W9SR, caught a typo in his article ("A Large, Remote Tuned Loop for HF DX"). In the parts list on page 52, C21 should be 10-1000 pf. rather than 10-100 pf. as shown. We regret any inconvenience.

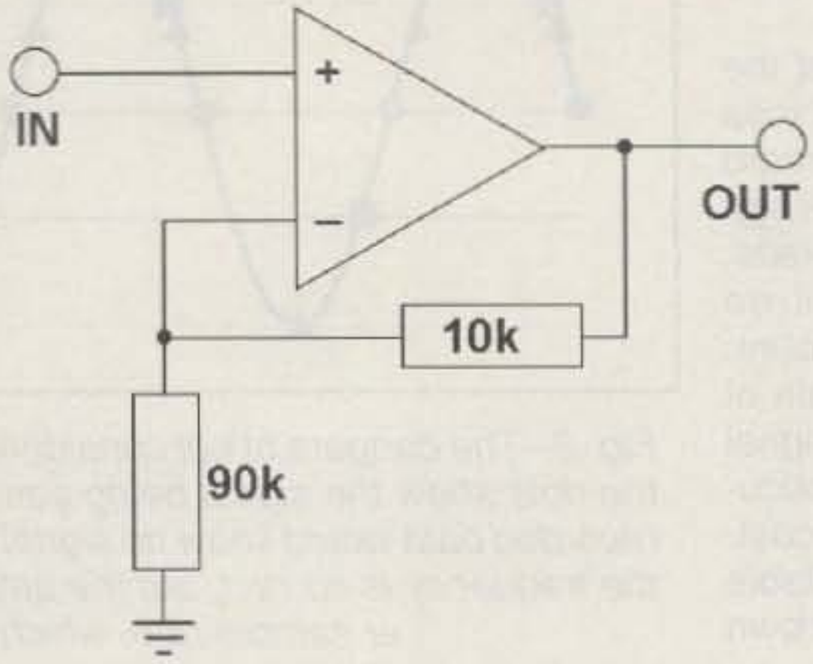


Fig. 3– A simple instrumentation amplifier with a gain of 10. This basic circuit can be built with most any op-amp, and perform well, but don't expect laboratory-quality results. This should be powered from a split power supply (+10 and –10 V) to allow full voltage swing. Any DC bias can be removed using a small capacitor at the input, although some measurements might require DC coupling. High–quality amplifiers are commercially available.

for a dollar or two. There are sensors to detect chemical properties (such as pH), acceleration, and lots more. Resistance is measured using a constant current source to convert the variable resistance to a varying voltage. With a potentiometer, you can sense rotational position or, if you add some string, linear position. Small movements or stresses can be measured with strain gauges. You could write a book on sensors alone.

Inputs

There are three basic input methods: single-ended, differential, and isolated. If we want to monitor a simple voltage, such as the output of a solar cell, we can use a "single ended" input. This means that only one signal wire goes to the DAQ input and a common ground point for all inputs is used. Single-ended signals are not very resistant to electrical noise, and you need to be careful that multiple input signals don't influence each other.

To increase noise resistance we use differential inputs. Here we use two inputs per signal, one for each sensor wire, and then compare them afterwards to determine the input voltage. Any electrical noise induced into the system will affect both wires nearly equally. This leaves the difference between the two wires unchanged; thus the noise doesn't affect the measurement.

If the system you're testing shares a ground with your DAQ's power supply, you can get a ground loop, which can greatly affect your measurements. Also, if the system under test carries hazardous voltages—hazardous to your equipment, to you, or both—you want to use an isolated input. The use of an optoisolator would handle this nicely, and many of the more expensive DAQs offer isolated inputs as standard equipment.

Software

Software is the key to successful data acquisition. DAQ software can be as simple as a dumb terminal program, which gathers the raw data for later analysis, perhaps using a spreadsheet program such as Microsoft Excel®, or it can be as sophisticated as National Instrument's LabView®, which allows

Resources

Dataq (http://www.dataq.com) offers a complete line of Data Acquisition systems ranging from the $15 DI-194 system I borrowed to ones costing thousands of dollars. Their WinDAQ software is particularly easy to configure and use.

Burr-Brown (http://www.burrbrown.com) makes A/D and D/A converters, as well as instrumentation amplifiers.

National Instruments (http://www.ni.com) is another large company selling DAQ systems. Their LabView software is the industry standard.

Omega (http://www.omega.com) offers an extensive line of sensors, instrumentation amplifiers, and DAQs. Their catalog is a college education in Data Acquisition, and I highly recommend asking for one.

There are literally hundreds more companies offering DAQ related products. Look in any engineering magazine or search the web; the resources to learn about this fascinating area are boundless.

you to drag and drop virtual instruments, calculation and filtering modules, and more, into the "path" of the data channel, greatly simplifying data interpretation. One key feature to have is a real-time data display— you want to see what you're recording. The WinDAQ Lite® software that comes with the Dataq board is adequate for most tasks, assuming you're running Microsoft Windows®. Strawberry Tree makes software for the DOS environment, allowing that old 8086 computer to serve as a dedicated DAQ recording system.

I'll close this month's column with some ideas for using a simple data acquisition system.

After adding a room to my house, I wanted to monitor the effectiveness of the central air-conditioning system, since calculations showed the system capacity was not quite enough for the load. I set up four channels—outside, inside, and cooled air temperatures, and sunlight (using a solar cell)—and sampled once every 30 seconds for a month. With this data, I learned that the system was marginal, but not enough to justify replacing it.

A very remote packet node was monitored over the winter (from home, via packet) to verify that its heating and battery systems were really up to the task (they were). A repeater can be monitored for environmental conditions: Is a cooling fan needed, and how often is it being used? I once monitored the weather for months just for the learning experience. Just how cold does it get out in my garden shed, where all my packet gear is located?

Data Acquisition is nothing more than gathering information. Automated systems can ease the task, and often do a better job. Nearly any signal can be converted into a voltage for easy recording, and sensors for just about anything exist. You can get into this fascinating field for less than a nice lunch, and the possibilities are endless. Once you have a DAQ system, ideas for its use will flow freely. Despite the fact that I took the cheap way out, I encourage you to get a DAQ system and see for yourself what I mean.

In closing, I want to once again thank everyone who writes with questions, comments, and ideas for future columns. Most of us regular writers don't do this for the money; our real pay is mail from you, the readers. I enjoy hearing from each of you. Until next time . . .

73, Don, N2IRZ

Public Service

BY BOB JOSUWEIT, WA3PZO

Public Service and Emergency Communications

Flooding Activates Many Hams—Training Keeps Them Prepared

Heavy rains and some of the worst flooding in decades caused by Tropical Storm Allison brought out amateur radio operators from Texas to the Mid-Atlantic States in early June to provide emergency communications. The flooding claimed more than twelve lives in the south and seven in eastern Pennsylvania. The need for emergency communications was so great in Texas that the FCC declared a general communications emergency, requiring amateurs to refrain from using 7285 kHz during the day and 3873 kHz after dark, ±3 kHz, unless they were taking part in the handling of emergency traffic.

In Texas telephone service was lost in most of downtown Houston, including the medical center. Hospitals were not only without telephone service, but often lost water and power, as basements containing emergency generators flooded. At one point Bruce Paige, KK5DO, said ham radio was a communication mainstay for the city.

The Houston Fire Department deployed amateur radio operators to each of its stations when the department lost its dispatching system. Hams helped direct emergency calls for service to the station best equipped to handle the call.

Approximately 10,000 people stayed at Red Cross shelters in Texas. Another two shelters were opened in Louisiana. Local hams provided a communications link between the shelters, Red Cross headquarters, and the emergency operations centers. Southwestern Bell employees relied on local hams to communicate with each other as they reinstalled a telephone trunk line in Houston that was shut down because of the flooding. In addition, many health-and-welfare messages were passed from the affected area to the outside.

The Salvation Army Team Emergency Network's Jerry Jennison, N5OKQ, reported that SATERN operators were providing communication for five primary Salvation Army service locations in Houston.

During the height of the flooding calls went out for additional amateur radio support to provide additional communications for the Red Cross, Salvation Army, and the Baptist Men's Kitchen relief operations. Needs included amateur radio volunteers with either an HT with extra batteries or a mobile VHF radio and a portable antenna. As with any disaster, hams responded to the call.

Greeting messages for transmission to ex-servicemen confined to veterans' hospitals were collected outside the Rose Bowl, Pasadena, California, on Veterans Appreciation Day last year. Photo shows Orlo Brown, K6SUJ/military callsign AM9ACS; Jim Hurl, AB6EM/AAR9HP; Nancy Romero, KD6LUV/AAR9KG; Dick Kelly, W6BKY/AAM9TCS; and Chris Romero, KM6ZZ/AAA9CS, California South state director of Army MARS. (Photo courtesy Army MARS)

As the storm moved up the east coast, amateurs participating in Skywarn activities supplied weather observations to local weather-service offices.

Training

In any emergency or public-service activity amateur radio operators are on site to provide communications that will allow for the timely and accurate delivery of messages. As we go to press, Field Day is over for another year and the ARRL Simulated Emergency Test weekend is scheduled for next month.

I received several Field Day messages from around the country. It was great hearing from so many groups participating in Field Day. However, a few messages arrived in slightly altered states from the way they were sent. For example, one message that was probably passed on CW at some point said the originator of the message enjoyed my articles in C-M-A. The letters M and A sent together equal the letter "Q."

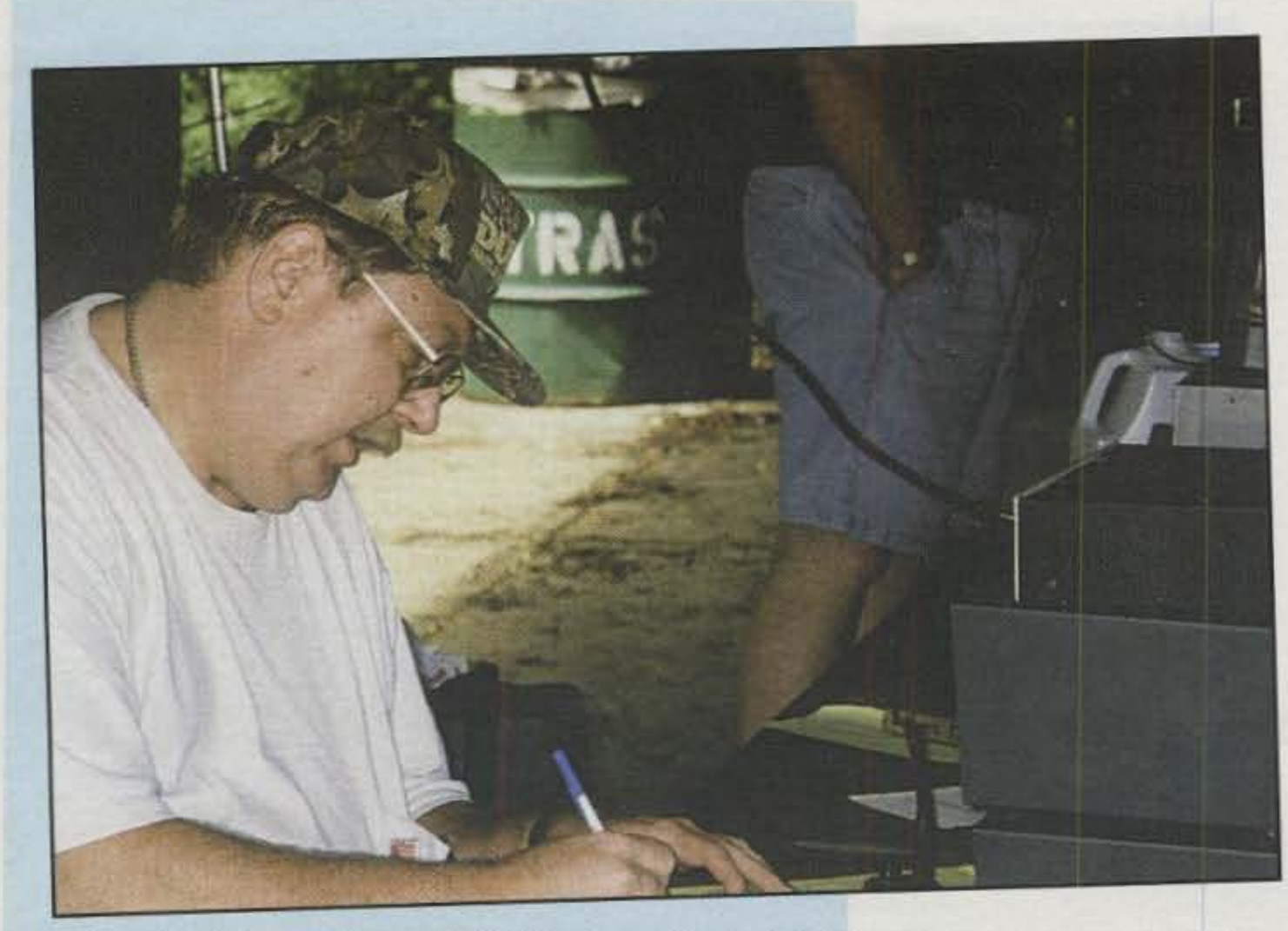
Field Day is an exercise in which we practice setting up a station under emergency situations. It is one of the few times when we start a generator, check the line voltage, and somehow manage to operate a radio, log a contact, and swat a mosquito or two. It is a time when exchanging state or ARRL section abbreviations becomes a challenge on the air.

In the Philadelphia area several groups practiced their emergency skills just miles from areas hardest hit by Tropical Storm Allison. To many, it made the need to practice emergency communications that much more important.

Simulated Emergency Test

Next month the ARRL will sponsor the annual Simulated Emergency Test, or SET. This is a nationwide exercise in

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



Copying information on Field Day requires a high level of concentration. Here Mike Wurgley, N3LXN, is making contacts on 40 meters. (WA3PZO photo)

emergency communications. The SET weekend gives amateur radio operators the opportunity to focus on the emergency communications capability within their communities while interacting with traffic- or message-handling nets.

The goal of the SET is to find out the strengths and weaknesses of groups providing emergency communications, such as ARES (Amateur Radio Emergency Service), NTS (National Traffic System), and RACES (Radio Amateur Civil Emergency Service). It also provides the opportunity to give served agencies such as the Red Cross and Emergency Management a public demonstration of the value ham radio offers, particularly in time of need. It provides a way to help radio amateurs gain experience in communications using standard procedures and a variety of modes under simulated emergency conditions.

According to the ARRL, the SET encourages both recruitment of new hams and the use of digital modes for handling high-volume traffic and point-to-point welfare reports out of the affected simulated-disaster area. As many found out over Field Day, an emergency is not the time to sit down and learn how to run a new computer program or new radio and make contacts at the same time. One challenge facing many groups is the ability to interface between local and HF traffic nets. The SET provides an opportunity to strengthen that link at the local level, thereby ensuring that ARES and NTS are working in concert. The SET will give all levels of NTS the chance to handle exercise-related traffic.

Tech Rally

Chester County, Pennsylvania ARES holds Tech Rallies periodically to repair or upgrade a particular system, and at the same time uses the opportunity to make sure operators are proficient in operating the equipment at the EOC or other location. It's a great idea and an opportunity to learn before the disaster hits. Recent events included upgrading some antennas and learning how to operate the HF radio at the county EOC.

Walt DeBous, K5YFW, of San Antonio, Texas, posted a message on the TAPR HF Special Interest Group mail list. He wrote, "Recently, some emergency managers in Texas met at their regular meeting to discuss common emergency management issues. Not surprisingly, the flooding in Houston was the 'hot' topic. . . . It is no news to anyone in Texas that internet connectivity to Houston and much of the surrounding area was nonexistent for 24–36 hours and after that spotty in many areas . . . even 72 hours later, there was still some internet connectivity missing. Many 'nodes' were decimated and some are still not back up."

"Additionally, many of the cell phone 'cells' were decimated," DeBous continued, "especially in the hardest hit areas,

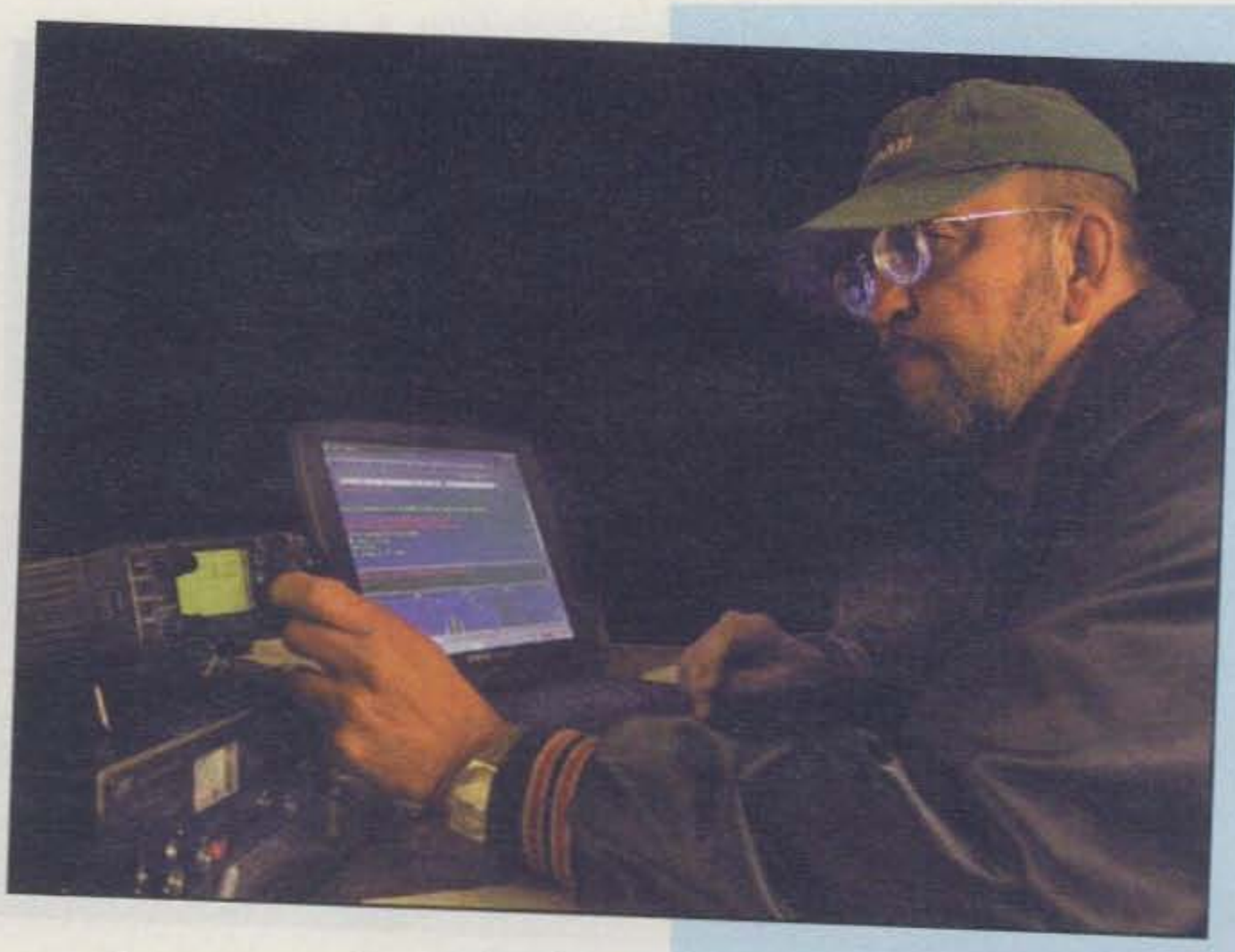
and in those areas emergency communications was lacking. Not just the cell phones were lost, but regular telephone connectivity as well. Much of the local government 800–900 MHz trunking capability was lost or severely curtailed as well as local government VHF and UHF communications as a result of the rain and flooding. The Houston Emergency Operations Center had a very hard time getting communications out of the area to the state emergency management offices as normal communications circuits were spotty or nonexistent."

Club Help?

In many areas of the country interest in packet radio is not the same as it used to be several years ago. After all, who wants to communicate at 1200 baud when high-speed access or even 56K modem service is available? However, when there are no telephone circuits available, one can appreciate even the slow 1200 baud of AX.25.

Are clubs in a position to encourage members to use higher speed communications? DuBous said he has used 19.2 KBPS on a wide FM channel on 70 cm and it worked very well. Wouldn't it be great to exchange digital information at high speed via ham radio?

There is now a greater appreciation of ham radio in the Houston area. After experiencing the lack of telephone and internet service, some Houston residents are asking how hard it is to get a ham license.



A real emergency is not the time to learn complex computer programs. Birmingham (AL) Amateur Radio Club member Ed Bruchac, N4ZUM, searches for contacts from BARC's PSK-31 digital station, which logged 124 contacts. (Photo by N4ZUM)

Army MARS Plans Program For Hospitalized Veterans

Plans are being made to allow radio amateurs across the country to forge a link to former servicemen and women now in veterans' hospitals. The "kickoff" took place last year at the Rose Bowl in southern California.

Inside the stadium a spirited football game was taking place between Stanford University and the University of California – Los Angeles (UCLA) before a crowd that included 16,000 invited service members and veterans. Outside the stadium five members of Army MARS were passing messages to former service personnel hospitalized some 2000 miles away in Michigan. The effort was part of a new program of the U.S. Army's Military Affiliate Radio System designed to facilitate delivery of "health and welfare" messages to hospitalized former service personnel. Army, Air Force, and Navy-Marine Corps MARS members traditionally have provided free delivery of messages to and from families and friends of active-duty personnel, particularly those overseas. A greeting addressed to "Any Veteran Patient" was relayed to a VA hospital in Michigan or New Jersey, the initial participating states. A return address on the MARSgram, as it's called, made it possible for a patient to respond and perhaps begin a continuing correspondence.

Chris Romero, KM6ZZ/ AAA9CS, of San Juan Capistrano, California, the Army MARS state director for California South, organized the mobile transmitting station in the fairground-like venue just outside the Rose Bowl gates. His wife Nancy, KD6LUV/AAR9KG, provided signs inviting public participation.

In Michigan, Frank Wegori, WD8NIK/ AAA9AX, enlisted the help of U.S. Senator Carl Levin (D-MI) in activating VA hospital support. Wegori is a national staff member of MARS and state gateway coordinator. State director Doug Burke, WB8CFV/AAA5MI, of Kalamazoo pitched in with the operation. News Jersey MARS member and VA staffer Steve Brickman, KC2CEO/AAR2DT, of Phillipsburg, inaugurated the program at the Lyons campus of the New Jersey Veterans Health Care System.

From Pasadena, the Romero crew radioed messages, using PACTOR, to the MARS message center at Fort Huachuca, Arizona. Wegori's Michigan gateway downloaded the traffic and redistributed the messages on state networks. A total of 71 messages were handled in this initial tryout. Apart from its humanitarian aspects, the project offered excellent practice in establishing emergency long-distance communication links when a disaster destroys normal lines.

The Pasadena operation, set up on barely a day's notice, offered a real training challenge. "They don't call it the Rose Bowl for nothing," said Romero. "Very high mountains surround it, so VHF was out of the question." But the crush of booths and people outside the stadium also ruled out a long-wire antenna. The crew made do with a screwdriver antenna and relay operation.

"The benefit of this event goes to the veterans who received these messages of appreciation for their sacrifice for our country," Romero said in his after-action report to Army MARS chief Robert Sutton. "I hope we made their day."

This year there is the possibility for both amateur and MARS groups to participate. Bill Sexton, N1IN/AAA9PC, reported that Army MARS headquarters is now working on a program to allow members of the public to send a greeting to *any* patient at a veterans' hospital. Sexton says "promoting and collecting messages to veterans from the public at large would be an out-

standing contribution for ham clubs to undertake."

"Many, if not most, Americans may not know the name of a hospitalized veteran, and that was really the point of the Rose Bowl operation," explained Sexton. "In 1999 the VA had 42,700 veterans in institutional long-term care and 60,036 more in in-patient care at any one time. Our work is cut out for us."

Here's an opportunity to promote amateur radio and MARS to the public, a local veterans' hospital, the VFW, and other service organizations. The program is being centered around Veteran's Day, November 11. One possibility under consideration is a cross-band operation similar to that conducted each year between military and ham frequencies on Armed Forces Day.

We'll provide additional information as it becomes available. Also watch the Public Service forum on the *CQ* web page for further information.

A Salute to Youth

Earlier this year a newspaper in the North Richland Hills, Texas area told a story of a youth extending a helping hand. The *Star-Telegram* reported that during a telephone outage volunteer radio operators were needed. Ben Fogt, KD7IJW, picked up his 2 meter HT and phoned police to see if help was needed. The police accepted his offer. The response was "Sure. Just drive to the fire station and get to work."

Fogt replied that he was only 15 years old and not old enough to drive, so the police sent a patrol car to his home. Fogt joined about 30 amateur radio operators in a communications relay to help with problems created when a waterline break flooded a Southwestern Bell switching station in Watauga, Texas affecting over 25,000 residents. Fogt and other amateurs operated from each of the North Richland Hills fire stations while the fire trucks and ambulances patrolled the neighborhood. The amateur radio system worked.

Also this year Patrick Clark, KC8BFD, of Elkview, West Virginia was selected as the 2001 Amateur Radio Newsline Young Ham of the Year, which is partially underwritten by *CQ*. This 17-year-old is deeply involved in both public service and emergency preparedness. Patrick has been involved in emergency-service work from the day his ham radio ticket arrived in the mail. During Field Day in 1998 the exercise took on real-life meaning as the hams responded to a flood emergency.

In addition to his ARES activities, KC8BFD is a Certified Severe Weather Spotter with Skywarn and holds certification in Basic Life Support and use of a defibrillator.

Have a Story To Tell?

Every once in a while I get an e-mail asking why I didn't cover a particular event. The answer is simple. No one told us about it! While all of *CQ*'s columnists take pride in their work, this is not their full-time job. If you have a story to tell, drop us a note. If your group publishes a newsletter which includes public-service information, please feel free to e-mail me a copy. Many of our stories are not covered in other amateur radio publications. We hope to bring you that unique look at amateur radio public service.

This month we would like to thank the ARRL, Army MARS, and Amateur Radio Newsline for supplying some of this information. Until next time . . .

73, Bob, WA3PZO

VHF Plus

BY JOE LYNCH, N6CL

All About The World Above HF

First Meteor Scatter DX from Costa Rica

This summer has been quite busy for the VHF+ operators, particularly on 6 and 2 meters, so we'll start out with on-the-air reports, including a first from Costa Rica.

From Keko Diaz, TI5KD: "I am happy to announce what I believe are the first DX QSOs from Costa Rica on meteor scatter: On the morning of May 24, 2001 between HC8N and TI5KD/2 (EJ79) on 6 meters using 5-element Yagi and 100W on SSB. On the morning of June 10, 2001 between W4WHN (EL94) and TI5KD/2 (EK80) on 2 meters using 2M5WL 17-element Yagi and 100W on SSB. I will continue to pursue meteor scatter and other exotic VHF modes from Costa Rica as well as promote this type of activity in Central America."

From **Howard Sine, WB4WXE:** A synopsis of 50 MHz DX is as follows: All QSOs via 2XSSB unless otherwise noted. 10 June: HH7PV, HR1RMG; 11 June: TG9NX, VE9AA; 12 June: ZF2MU, PZ5RA; 13 June: TI5MMB, TI2ALF, YS1RR, HR1BY, HR2KOS; 23 June: C6AIE; 26 June: WP4KJJ, V31TE, CO2OJ; 30 June: NP2JV, KG4ZI, CO8DM, WP4KJJ; 1 July: KG4ZI; 7 July: XE1KK, XE1UN, XE1/AA6RX, 9Y4AT, FG5BG, KP2BH (heard), WP4LNY, YV1DIG, NP4NP, YV4DDK, and YV4YC.

From **John Butrovich, W5UWB:** "Nice E_s opening on 2 meters today (8 July) and perhaps one of the longer ones that I have experienced. First QSO at 1448 UTC and the final one at 1826.

"Signals were in and out the entire time, and surprisingly one of the strongest was VE3AX at 1435 miles! We tried on 222 but no luck. However, he did work K5LLL (EM10KF – FN02CW) on 222 at about 1297 miles. That's assuming VE3AX's locator is correct per Buckmaster.

"I had a total of 41 Qs in 22 grids. The best DX was VE3AX. Another notably strong and persistent signal was K8TQK, at times 30 over 9. We also tried 222 with no luck. Apparently I was too near the edge of the 'footprint' to see the higher MUF.

"Grids worked here: FM05, EM92, FM17, EM96, EM75, EM86, FM08, FM19, FM07, EM89, EN80, EM76, EM98, EM78, EM88, EN91, FN02, EM79, EN81, EN92, EN70 and EN82."

P.O. Box 73, Oklahoma City, OK 73101
(phone 918-627-6625; fax 918-835-9785)
e-mail: <n6cl@cq-amateur-radio.com>

VHF Plus Calendar

Aug. 31-Sep. 2	Eastern VHF Conference (See text for details.)
Sept. 2	Full Moon. Moderate EME conditions.
Sept. 8-10	ARRL September VHF QSO Party. (See text.)
Sept. 9	Poor EME conditions.
Sept. 10	Last quarter Moon.
Sept. 12	Highest Moon declination.
Sept. 15	Moon perigee.
Sept. 15-16	Second weekend of ARRL 10 GHz and Up Contest. (See text.)
Sept. 16	Excellent EME conditions but just one day away from a New Moon.
Sept. 17	New Moon.
Sept. 21-22	Pacific Northwest VHF Conference. (See text.)
Sept. 23	Very poor EME conditions.
Sept. 24	First quarter Moon.
Sept. 25	Lowest Moon declination.
Sept. 27-30	Microwave Update Conference. (See text.)
Sept. 28	Moon apogee.
Sept. 30	Moderate EME conditions.

• EME conditions courtesy W5LUU

From **Julio Medina, WP4LNY:** "I include my log on 6 meter band on June 2001: 1 June: KE9I, N9NS, N9QX, NN9K, K9AB; 2 June: KAØRYT, WØBV, K4DY, K9RJ, W4PFM, KE1BO, W9RPM, W4WA, K2DP/Ø, AD4OK, N4XC, FY5KE, K3KYR, K8ZES, KB8GSV, K4DY, W8PAT, N4JOJ, K8MFO, K4DY, W9GA, PZ5RA (heard only); 9 June: N4IS, K2RTH, W4DTA, K3NXH, W4ZRZ, AE4RO, NW4E, EH8BPX, KG4IVW; 10 June: HK4CZE, HK4SAN; 11 June: HP1AC, ZF2MU, TI2LAK/HP4, K1KI (heard only); 13 June: K4QI, KD4ESV, K4SC, K2NB; 21 June: KI8CA, N8ZVB, N8KM, W4MYA, EH8BPX, EH5NO, VE1RG, VE9AA; 22 June: CT1DYX; 29 June: CO8DM, KE8FD, WO9S, K9HWR, N4BG, VE3FF, VE3FIT, K1EY, W8UNS, KB9XLV, W4DTA, KC8OYV, VE3DSS, VE3LBZ, KG4IVW. W3EUH, KU4IU, KF4QQT, W4OV, W9FS, W7XY/Ø, KMØT, and VE3LZB."

From **Rick Tucker, WØRT:** "Stations worked via sporadic-*E* on June 28: W7ID, K7YVZ, WA7GSK, KØIP, N7EU, N7ART, K7SMA, and again N7ART. Both WA and ID were new states for me on terrestrial modes. They were number 45 and 46. Guess I'll get fired up about meteor scatter and try to finish up."

From **Oscar Morales, CO2OJ:** "Sunday started with a good opening on 6m to KS, AR, and OK, most of the stations with very good signal. Very early in the morning I checked 2m (I had a feeling...) and had a long chat with Dean, W4WHN, EL94, in Big Pine Key, but cdx were nothing special. Nevertheless, I felt that something could happen later because the day was special for a 2m E_s (very hot, no clouds, no wind, very dry). All E_s openings in 2m in the last years happened around this date and in days with these conditions.

"From 1210 UTC to 1349 UTC I worked 42 stations on 6m and the band finally got calm. I kept listening on 6m and 2m (just in case) and at 1429 UTC the ICOM 251 came to life with a very strong KCØFCL calling CQ on 144.200 MHz! (At the beginning I thought he was on 6m!) Between that time and 1442 UTC I worked 10 stations in 5 grids. The log for my first 2m SE this year ended: NØPB, KCØFCL, KCØHFL, WØEKZ, KCØEMK, K5MGM, W5VTM, W7FG, WG5Z, and NØLL.

"KCØHFL was very strong on 144.190 MHz for more than half an hour and I was still copying W7FG's CQs with S9 +++ at 1609 but didn't copy anyone, so seems band was opened for about an hour but people didn't know it.

"By the way, there was another station from Oklahoma, EM25 that was *very* strong. I copied the report, the grid, and the state but could not copy his callsign any of the three times I asked him to repeat it, so he ended the QSO without knowing I couldn't log him. Please don't forget that English is not the mother language outside USA. If you are working a DX, it will be always better if you speak slowly, use the phonetic language, and be sure the other station copied your call."

From **Sam Whitley, K5SW:** "Although I missed the earlier opening EM25-EM90 my local buddies WB5YWI and KM5ES worked it about 2240 UTC on 27 June. About 0045 UTC 28 June I began working on 144 MHz (only 50 watts). I worked Idaho and Washington states—grids DN13, DN17, DN44, and CN96. I heard others but 50 watts with marginal conditions I missed them. The CN96 and DN17 stations were in as late as 0415 UTC. I listened for FAI but nil."

Again from Sam: "I got on about one hour after opening started here, so I missed CO2OJ, but others in area got him. I got on at 1613Z and farthest south

station worked was W4WHN EL94 in the Florida Keys. I worked 6 grids in FL and EM81 in GA. Then the band dropped out about 1700 UTC to return again about 1822 UTC to NC, FM05, east TN EM75 (vy short EM25 to EM75), EM86 TN, and FM06 VA. I tried 222 MHz when I heard shorter skip but nil, although I called from time to time and listened all the time. The 6 meter band did not show or alert me that 144 MHz was open, as there was only sparse activity on 50 MHz at the time; nothing out of the ordinary as far as I picked up on."

From **Jon Jones, NØJK:** "Saw a spot on DX Summit by K5CM for KG4ZI at 2350 UTC July 1 on 50.102. Listened and Pat came up out of the noise and had a CW QSO with KG4ZI at 0001 UTC July 2! A few minutes later KG4ZI switched to SSB and called CQ with no takers. Pat's signal was building and now pretty loud. I asked my wife, Pat, NØHKT, if she wanted to work Gitmo Bay on 6 meters but she said 'not now' as she was watching a PBS special on TV. I worked Pat on SSB for an insurance Q. He then worked a few 4s, then a loud HH7PV FK28 called him. After HH7PV worked KG4ZI on 50.102. I asked HH7PV to please QSY up to 50.105. He followed me up there and I worked HH7PV at 0007 UTC.

"Nice double play on two new ones. HH7PV also worked WØEKZ here in Wichita (called Bud on the phone to alert him. I also called NØLL but no answer). Bud also worked KG4ZI. I suspect the reason HH7PV was QRV this evening was to work the Gitmo Bay 6 meter DXpedition. Appreciate him following me up for a QSO. HH7PV made a few more QSOs then went QRT. My 6 meter station at home consists of aan ICOM IC-706MII and a dipole antenna in the attic."

From **Jay Kesterson, KØGU:** "On July 3 I was sitting in front of my radio tuning a dead 6 meter band. Checked for video signals from Europe and heard 49750 at S5. Called CQ on 50.103 CW for about two minutes and was answered by UT5JCW KN64sn (6024mi/9695km) at 1652 UTC. Weak when he first called but moving the meter a bit after that. Sure seemed like the band was dead."

From **Chip Margelli, K7JA:** "Saturday afternoon at 0125 UTC (8 July UTC) WB6NOA (Gordon West – DM13) and I worked Larry Lambert, NØLL, in EM09 on a brief *E* opening on 144.200 MHz. NØLL was a solid 59 at K7JA (DM03), but no other signals were heard. The total opening time was probably less than 15 minutes.

"Six meters at the time was displaying some propagation into New Mexico, which is slightly short from here in southern California, but nothing particularly remarkable was going on. The following day (Sunday) 6 went very short into southwestern Utah, but no 2 meter *E* opening was observed.

From **Brian Derx, N5BA:** "Great *E*-skip opening on 2 meters from ~1700 to 1845 UTC on 8 July into EL29fx. W5UWB in EL17 and K5LLL were into the zone before I was, but it eventually sporadically hit my antenna. I'll try to graphically display my results. I had 18 Qs in hour and a half. VE3AX and VA3ARC frequently came *booming* in. I tried 222 MHz with AX with no success (drat). Need a bigger antenna here I guess. Grids worked included EN82, EN92, FN02, EN71, EN81, EN91, EN70, EN80, EM79, EM89, and EM86. I'm ready for *more!*"

From Mike King, KMØT: "On 28 June I experienced a nice opening here for 2 meter sporadic-*E*; not as nice as others however. It seems my paths were results of crossing over the main paths in terms of geometry.

"It appeared that the main paths I observed from notes on the prop loggers were as follows: Around 2145 to 2200 UTC around EM70 to DM95 and EM12 to FM05. Around 0230 to 0330 from EM09 and some more the east to the Pacific NW, CN85 area. I'm assuming these were two separate E_s events.

"The first E_s opening with the East West path I never got in on. I called and called to the SE and never heard boo, then had to go for dinner in a local park with my family, prior commitment. Well, I knew the band would open. It looks like our area, en10, EN12 worked into EM70 a few minutes after I left.

"So, when I got back, guys to the east of me were working fellows in DM37. Others, I think in TX, were working into the NW. I did not hear anything for a half hour or so pointed at DM37, but the notes on the prop loggers indicated that the cloud might be shifting. Sure enough, two stations popped in and were only in for 5 to 8 minutes here, very strong for 4 minutes or so, lots of QSB: 0120 K7CA DM37 59++ and K7ICW DM37 59++.

"Then a long wait. The reports appeared to have the cloud moving, or another cloud that was coming up in the MUF was directly to the west of me. I kept listening and then at 0258 I worked W7MQY CN82 and W7ID DN13 (much shorter path; it was in very, very briefly).

"I got Matt, KAØPQW (EN33), and Dale, WØDMR (EN34), on tape working the CN82 station; could hear both sides just great—kinda neat.

"A few more minutes passed. I really don't think there were many stations at the end of the path from the geometry standpoint: 0311 K7QXA CN80 and K7AXE CN80—both in California. I tried to help them link up with some guys in MN, but the path did not pan out, they were in for about 4 or 5 minutes. I think they were briefly heard there.

"Never did hear to the NW from here even with many calls. Heard K2YVZ finish up with NLL, but then he was gone. It was fun!"

From **Doug Beck, K6ZX:** "On 28 June I was watching major video E_s most of the afternoon. Finally at 0254 KMØT broke through and we made a contact. Now EN13 from CN82 is not bad. New grid, new state, feels *so* good!"

Current Conferences

The 27th Annual **Eastern VHF Conference** sponsored by the Eastern VHF Society and the Northeast Weak Signal Group is scheduled for August 31 – September 2 at the Radisson Hotel (1 Bright Meadow Blvd. [off Rt.5], Enfield, CT 06082; 860-741-2211). The conference will include a Friday night hospitality suite, Saturday formal talks, lab demonstrations (noise figure measurements to 10 GHz), manufacturers' displays, dinner banquet, and door prizes. Sunday will host an outdoor flea market and antenna measurements from 2 meters to 10 GHz. Speakers to date include: DSP by Roger, W3SZ; K8GP Contesting by Owen, K6LEW; What's New at SSB by Jerry, K3MKZ; 2/3 & 5/10 GHz Packaging by Stan, KA1ZE; Meteor Scatter by Phil, VE3ACK; Dish Construction by Tom, WA8WZG; and New Products at DEM by Steve, N2CEI. Please consult the website for updated information. Additional information not contained on the website for the conference may be obtained from Bruce Wood, N2LIV, 3 Maple Glen Lane, Nesconset, NY 11767; phone 631-265-1015 home or 631-293-9600 work; or e-mail at <bdwood @erols.com>. Information on the flea-market may be obtained from Mark Casey, K1MAP, 303 Main Street, Hampden, MA 01036; phone 413- 566-2445 or e-mail at <map@map.com>.

The **Pacific Northwest VHF Conference** is set for September 21—22, 2001. This year, Jim Aguirre, W7DHC, and Lynn Burlingame, N7CFO, have agreed to organize the annual conference. The organizers have booked space at the Best Western Tacoma Inn in Tacoma, Washington, for September 21–22. A VHF dinner is scheduled for Friday evening, September 21, and a full day of programs is being arranged for Saturday, September 22. Among the presenters already scheduled for Saturday is well-known Canadian VHFer and contester Gabor Horvath, VE7DXG. Mark your calendar and plan to attend both events.

The first **Microwave Update** to be held on the West Coast will be in the heart of Silicon Valley. The 50 MHz and Up Group welcomes you to the conference to be held at the Four Points Hotel in Sunnyvale, California on September 27–30, 2001. The co-chairmen are Will Jensby, WØEOM, <w0eom@aol.com>, and Jim Moss, N9JIM, <n9jim@aol.com>.

A hotel group rate of $289 has been arranged for the conference for Thursday, Friday, and Saturday nights. There is a special four-night discount for $516. Mention Microwave Update 2001 when you make reservations, at 1-800-325-3535. The hotel website is <www.fourpointssvl.com>. Shuttle service is provided from the San Jose airport. The hotel is about 15 minutes from San Jose airport, just off 101 at Lawrence Expressway, and about 50 minutes from the San Francisco airport. American Airlines has been designated as the official airline for the meeting. Reservations can be made via 1-800-433-1790 or through your travel agent. Mention authorization number AO39140.

Conference registration forms are available at the conference website. <www.microwaveupdate.org>. The conference will follow the schedule of previous events, with a surplus tour and a tour of the Stanford dish on Thursday, presentations on Friday and Saturday, and antenna measurements on Sunday. Noise figure and RF tests will be Friday, along with a tabletop swapmeet Friday evening. A parking-lot swapmeet will be held Thursday starting at about 3 PM.

Current Contests

Another couple of opportunities to hone and practice your skills are the September VHF QSO Party and the ARRL 10 GHz and Up Cumulative Contest. The September VHF QSO Party is just like the June VHF QSO Party except that it is held in September. This year's contest will be held on 8–10 September. Full details can be found on the ARRL website or in August *QST*. The second weekend of the 10 GHz and Up Cumulative contest will be on 15–16 September.

Current Meteor Showers

Two minor showers, the *Piscids* (two peaks, 8 and 21 September) and the *Aurigids* (30 September) can be seen this month. However, their activity has not been much above what is considered sporadic activity.

Feedback

The following e-mails came to me concerning previous columns: In June I mentioned that Peter Shilton, VE3AX, was the VHF editor for *The Canadian Amateur.* I know better. It has been Dana Shtun, VE3DSS, for about 14 years. I received the following from Dana: "Not sure where exactly you have been getting your information (I'd be interested in knowing...eh?) but just to let u know that I am still editing the VHF and UHF column in our national society's magazine *TCA (The Canadian Amateur).* The column is entitled "Six Metres and Down" and has been running continuously for some 14 years now.

"By the way, the Ontario VHF Association VE3VHF was reactivated last night at the 51st annual meeting of the VHF UHF group here in Toronto. The meeting was hosted at our local community college (Humber College), with Bob, VE3BFM, Dana, VE3DSS, and Peter, VE3AX reactivating the meetings that we had run regularly through the mid '80s and early '90s ... The meeting included a buffet dinner and presentations covering 50 MHz through 24 GHz ME...with papers by VE4MA, VE3BFM, VE3AX, VE3OIL, VE3SMA, VE3IEY, and VE3DSS....we also published a 'proceedings' of all the papers...! The meeting was a big hit with 50 attendees. I'll be posting the pix on our soon-to-be-ready website: <http://www.arvotek.net/~dshtun>.

"The OVHFS sponsors two awards, which have been in existence since the 1950s: Worked 100 Ontario Stations on 144 MHz, and Worked All Canadian Provinces/Territories on 50 MHz. We intend to dust these off and reactivate them. We are planning an expanded meeting next year one week after the June VHF QSO party."

I wrote to Dana that either I was asleep while writing that portion of the column, or I pulled in a quote from an internet report. Either way, it was my fault and it is now corrected. Bottom line: Don't try to write a column on deadline at 3 in the morning. You're courting disaster if you do.

Regarding my report on sealing connectors, I received the following from **Jim Bolinger, N8EE:** "You may be interested in the results of an experiment I did at my last job. I was working as an RF engineer for Airtouch Cellular (now part of Verizon), and was given the task of evaluating some 'brand X' connectors and comparing them with Andrews. (I say brand X because I simply cannot remember the brand name.) The brand X salesman had given me some samples of both connectors and cable and said that they were interchangeable, with Andrews but cost less.

"Besides the typical network analyzer tests I decided to do a waterproofing test, so I assembled some short pieces of cable and connectors in various combinations (Andrews/Andrews, Andrews/X, X/Andrews, and X/X). This was with both 7/8 and 3 inch foam core heliax. When used at a cell site the connectors are normally sealed with cold-shrink tubing, but for this test I did not do this. The cable assemblies were then placed under about 4 inches of water and left overnight.

"To make a long story short, the next day I disassembled the connectors. The Andrews were bone dry, but I poured a quarter cup of water out of each of the 3 inch brand X connectors! The water was in the back part of the connecter, where it

goes over the cable. There was a lesser amount in the 7/8 inch connectors.

"It did not matter what brand cable the connectors where on. In fact, the Andrews connectors worked fine on the brand X cable. The moral of the story, as always, is that you get what you pay for!"

Regarding my comments on ham radio usage while driving, **Bill Folkerts, W2HDN**, wrote the following: "I believe consideration should be given to the difference between full-duplex cell phone and half-duplex conversations. Hams don't have the same stress level in quick banter back and forth that you get with ordinary phone usage."

"Regarding my CW forever comments, **Mark Morgan, KB9RQZ**, wrote: "I saw with a real interest the heading in your column "Why CW Forever." I hoped to find someone therefore with a rational or even close to rational reason to keep Morse code requirements in our hobby. Instead I found a number of statements while each true in and of themselves, none of them seemed to have anything to do with the idea of continuing to require Morse code for HF access.

"I, for example, agree that the real remaining uses for that mode are indeed in the VHF and up range, but there, as I am sure you already know, it is not legally required. Indeed your line of reasoning would support the notion that (absent the treaty, of course) a VHF code requirement and no HF one would make more sense than the current system (an idea that I agree happens to be the case, but I still oppose it).

"As to whether I would expect to use your example EME ops to accommodate my lack of skill at Morse, well, I must also agree that I would not expect either out of the hams I have encountered on the air. OTH if I saw the hams I knew in my teens when trying and failing to obtain a license because of the then required send and receive test for Novice license. I would indeed expect other hams with the ability to do so to try and work with me rather than shutting me out altogether.

"Finally, given the nature of the VHF Plus column, I really must continue to wonder how any discussion of the HF requirement has any purpose there."

My only comment to Mark is that many of us VHF weak signal ops also work 160 meters, mainly because of the challenge of picking out weak signals, often by way of CW. Indeed, to complete my WAS on that band, my Alaska contact was with a station that had such a very weak signal that I could not have completed the contact via SSB.

Does this illustration of mine justify a *requirement* for knowing Morse code? No, but it does justify a *need* for knowing Morse code, which is precisely what I attempted to demonstrate in my previous column.

W7HAH Memorial Station On the Air

The following is from Pat Connell, WA7PDC: "I am pleased to alert everyone that as of this morning, 13 July 2001, W7HAH is the memorial call for the Northern Rockies VHF Society. As a result, Shep's beacon at McGregor Lake will remain active for the time being. Between Lance, W7GJ; John, W7KNT; Tom, WA7KHO; and myself, I can assure Shep's friends that W7HAH will continue to be active in the future."

And Finally . . .

It seems somehow fitting to announce the W7HAH memorial station in this month's column. Those of you who have *CQ*'s 2001–2002 calendar will notice the September picture of the Old Man himself proudly leaning onto a dish that he used for EME work. Thanks to Larry Mulvehill, WB2ZPI, for taking Shep's picture.

As I mentioned last month, too many of our pioneers are becoming Silent Keys. It's up to us to get their stories and share them with the rest of us while we can.

As you can see by reading the Current Conferences and Current Contests sections of this column, this is a busy month. I hope you find plenty to do and plenty of band openings in which to do them.

73, Joe, N6CL

Beginner's Corner

BY PETER O'DELL, WB2D

For the Newcomer to Ham Radio

Amateurs Built the Ark; Professionals Built the Titanic

This month we are celebrating "low tech" solutions to typical ham problems. Even if you are not plagued by any of the problems mentioned here, you may find some inspiration to use your ingenuity. Just because everybody else solves a problem one particular way doesn't mean it is the only way. It may not even be the best.

When I got my first phone rig (back in the dark ages), it was very modern and up to date for the time. Among other bells and whistles, it had a VOX circuit (voice operated transmit). Everyone said that VOX made talking on the radio just like carrying on a conversation in your living room. If you paused, VOX would switch from transmit to receive, and you would notice if the other operator was attempting to interject a comment. However, it never worked very well for me. The clanging of the relays drove me nuts. If you have an older rig or have ever used one, you know what I am talking about. Kerchunk!! Then you start wondering about the pauses in your communication. Being self-conscious always helps to make you sound more natural. Sure. Heck, this is a formula for creating stuttering!

Okay, I figured I'd tweak the hang-time relay to hold a little longer. Maybe that would help. Nothing made a significant difference, though. After a few weeks I gave up on VOX operation. I went back to using the PTT button on the microphone. That had worked well on FM, and it was an improvement (for me) over VOX on SSB. Some people love VOX and use it all the time. More power to them.

For rag chewing, mine was an adequate system. Then I got interested in DXing and contesting. Punching a PTT button may be okay for rag chewing, but for contesting it really slows you down. For one thing, there is all that writing (or keyboarding). Thus, it was back to the VOX circuits, which were now proving to be the lesser of evils, by a slim margin.

One day I was discussing this problem with Chod Harris, WB2CHO. He suggested that I use a foot switch. Now there was a good idea if I had ever heard one. But where could I find a foot switch? It would be expensive, too, wouldn't it? I immediately thought back to a switch that had come with my mother's Singer sewing machine. She called it the "pedal," but I don't know if that was Singer's term for it or not. Also, when I had worked for a Motorola service shop, the desoldering tool used a foot switch to activate the vacuum pump. Both had been heavy-duty commercial switches. The thought of spending $50 or more for a "replacement" switch deeply offended my tight-wad sensibilities.

This is a RadioShack foot switch fresh out of the box. It is very similar to the one the author has used for the past 25 years. (Photos by WB2D)

Then Chod piped in with, "You can buy a foot switch at RadioShack for under $5."

"Why does RadioShack sell them?"

"People use them to turn tape recorders on and off," Chod replied.

So it was off to RadioShack to check out this idea. Sure enough, Chod was right. RadioShack offered a very decent foot switch for about $4—even better. It came with a short cable and a standard mono 1/8 inch phone plug. That was about 25 years ago. I've used it ever since. It may not have been built like the Singer "pedal," but it has held up just fine for 25 years. No more VOX. No more fumbling with the PTT switch on the desk mic while I'm trying to write or type. For a while, I tried to promote it as the "FOX" system (foot-operated transmit), but that acronym never seemed to catch on. A few years back I did replace the cable on the switch because it had become frayed.

How do you wire the switch into your radio? The first time around it was ridiculously easy. The mic connector came apart simply by removing a couple of screws. I just tack-soldered a couple of short insulated wires to the PTT pin and the ground pin. Then I soldered a 1/8 inch jack to the two wires. When I bought my next radio, I moved the jack from the microphone plug to a plug for one of the auxiliary jacks on the rear panel. This made for a neater installation by removing the wire going to the foot switch from the front operating area. Also, if your microphone has a molded plug, then using one of the jacks on the rear panel is even more attractive.

By the way, I walked through a Radio Shack store a few days ago, and they are still in the foot-switch business. The unit I looked at seemed to be similar to the one I had purchased 25 years ago, and the price was still under $10.

To add the foot switch to your radio, you will have to pull out the schematic diagram of your rig and see exactly what happens when you push the PTT switch. All the radios I have ever worked with short a low-voltage line to ground through the switch. Therefore, one contact goes to the PTT line and the other goes to ground. If your rig works the same way, this is all you have to do. If not, then figure out what your PTT

*123 NW 13th Street, Suite 313, Boca Raton, FL 33432
e-mail: <wb2d@cq-amateur-radio.com>

switch does and wire the foot switch in parallel with the PTT.

One other thing that could cause a minor problem is this: Some microphones are wired so that audio only passes through to the jack when the mic PTT switch is depressed. If that is the case in your mic, you will have to wire around the PTT switch.

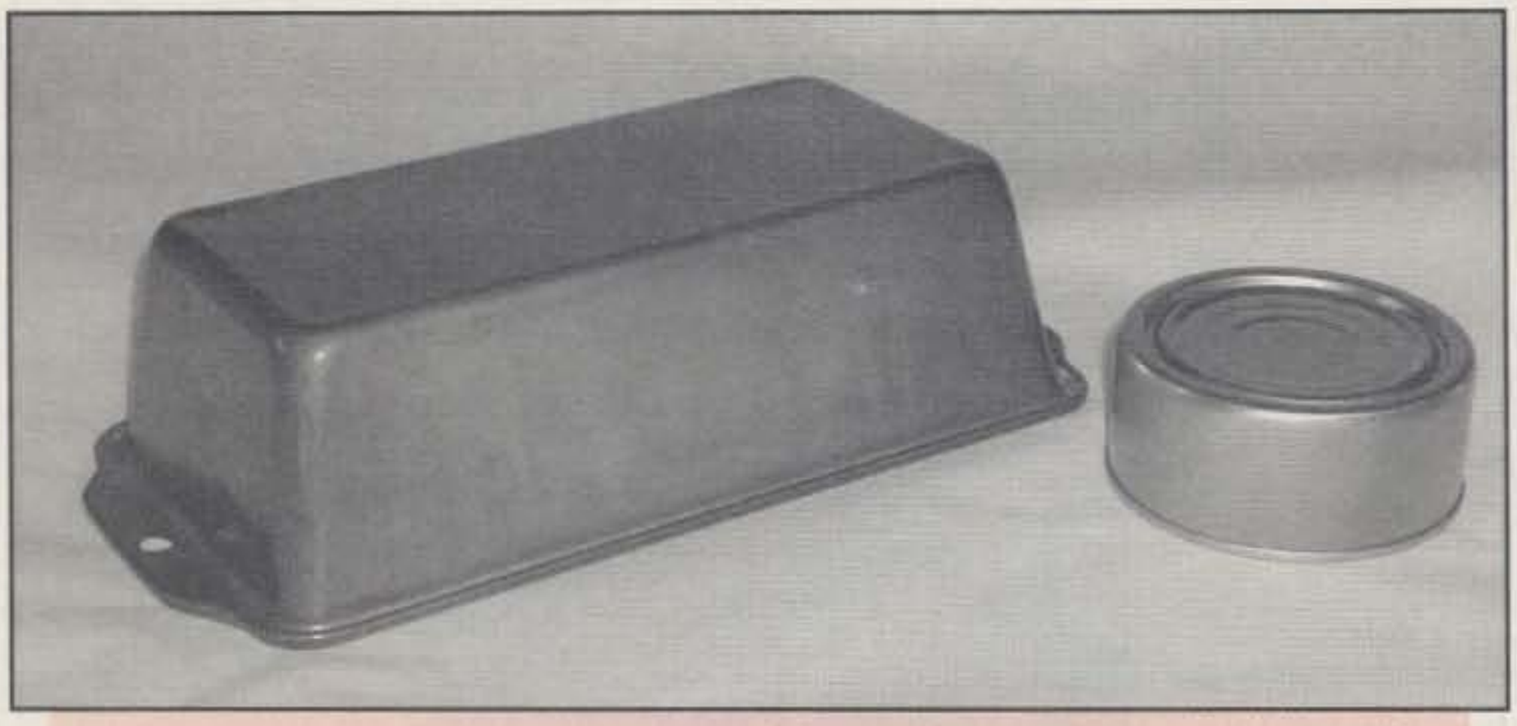
I've also used the foot switch on CW. Semi-break-in operation was about like VOX operation on SSB for me. I felt as if I had a lot more control. I could let up on the switch and listen when I wanted to. No waiting for the hang timer to drop.

Project Chassis Source

If you are into building projects, finding a suitable (inexpensive) chassis/box can be a problem. When I was first licensed, I attempted to build a transmitter from spare parts. My budget didn't include the amount needed to order an aluminum chassis from the Allied catalog. I "found" a No-Parking sign that the city didn't need any longer. It was too rigid for me to bend into shape, so my father took it to the factory at which he worked. They had a sheet-metal brake, and so the sign came home as a nicely shaped chassis with plenty of room for the transmitter. Actually, there was enough room for a transmitter, receiver, antenna tuner, and keyer, and that was in the days of tubes! Not knowing any better, I spread the transmitter components out over the whole chassis. It looked better that way! By the way, the transmitter did work, after a fashion. However, the stray inductances and capacitances made it very unstable and unsuitable to put on the air.

My "Elmer" suggested that I rebuild it with component spacing that minimized component spacing. I forgave him, because I knew he had never tried to use a hole saw on a piece of metal like this. I think it had six or seven tubes! There was no way that I was going to try to rework that piece of metal. Falstaff's credo is good advice in some situations: Discretion is the better part of valor. Eventually, I was able to borrow a transmitter from one of the older hams. Thus, if you are looking for a nice piece of metal to use for a chassis/box, I would recommend against "borrowing" street signs from the city—much too difficult to work with.

There is, however, a convenient source of inexpensive metal containers that can be used for small projects. Next time you are about to start a project, check out the baking pans in your local grocery store. They come in a variety of



Here (left) is a bread pan that the author has not yet used for a project. On the right is a tuna can. Is the tuna can really more attractive than the bread pan?

sizes. Most are probably too large for projects that we would build today, but a few of them have served me quite well over the years. My personal favorite is the loaf pan.

A typical loaf pan is about four inches wide, three inches deep and about eight inches long. They are usually tapered, so the base is a bit narrower than the top. All you have to do is turn it upside down. Now you have a chassis/box that is suitable for a number of smaller projects. I've seen them available in both aluminum and steel. I prefer the steel variety over the aluminum. The aluminum seems to be just too light weight and often "tears" when you try to work with it. One drawback to the steel variety is that there is often some sort of "no stick" surface applied to the inside of the pan. Most of these compounds are pretty decent insulators. This can make clean-up after baking a bit easier, but it can make getting a good ground difficult. If you are mounting things with screws, you will want to scrape off some of the non-stick compound where the screw/washer touches the pan.

In the early '80s, I built a 5 amp 12 volt regulated power supply (with a transformer) on one of these bread-pan chassis. The transformer was relatively heavy, but the chassis worked just fine, as did the power supply. It held up nicely over the ten-plus years that I had it. Of course, it was not receiving a lot of abuse just sitting there on the operating table.

One thing you should be aware of is this: Projects built into baking pans tend to look funny—even ugly. When I built the power supply, I worked in the Technical Department at the ARRL. Doug DeMaw, W1FB, was head of the department then. Doug thought my construction projects were about the ugliest things he had ever seen. If I recall correctly, he nicknamed my power supply "The Ugly Duckling." Beautiful? No. Functional? Yes. Besides, Doug had come up with one of the most popular construction projects ever—the "Tuna Tin Two." It was a two-transistor QRP transmitter built on a discarded (but washed) tuna can. Honestly, now do you think a tuna can is any less ugly than a baking tin?

If you are into project construction, you can find all sorts of items that provide "low tech" solutions to your particular problem.

Antenna Fun

At this point I think everyone knows about using sling shots, bows and arrows, and fishing poles to erect wire antennas. If you don't, write to me. Those are obvious "low tech" solutions.

When I had mostly inverted-Vee antennas, I made all my center insulators myself. I wanted something that would be weatherproof to protect the coaxial cable. It also had to have a solid means for attaching a support rope, and I wanted something that had built-in strain relief for the coax. Oh, yes . . .It had to be inexpensive, too.

What I settled on was making an epoxy cast using materials sold to repair fiberglass boat hulls. It was about $10 a quart, and you could make a dozen or more center insulators out of one can. Plus, it was available at Sears and K-Mart, among other places. What to use for the mold?

After trying paper cups, plastic cups, and several other items, I found the infamous tuna can to be the best and easiest to work with. Start by removing the tuna (duh) and washing the can. Next, use a pair of tin snips to cut slots in the sides of the can at places you want the wires to enter. Also, cut a slot for the support device. I used an eye bolt with a couple of nuts sandwiching a lock washer. Use a wrench to tighten the nuts, which will keep the eye-bolt from working its way out. You can add tightly wrapped plastic ties to the coax for strain relief, or you can place a piece of wire so that it comes out of the "bottom" of the mold.

Once you have all the slots cut to fit the various wires and bolts, put the wires into the mold and make sure that everything fits, nothing is shorted, and all exposed surfaces will be covered when the epoxy is poured in. Masking tape or putty can be used to seal the gaps between the slots and the wires. It doesn't take much, as the epoxy sets in a few minutes. Follow the instructions on the can for mixing and set up. Once the epoxy has had plenty of time to set, remove the can. I always just used the tin snips to cut it off.

Here you have a handful of "low tech" solutions to ham problems. There ares a million more where these came from—ham inspiration. If you have a favorite, let me know.

E-Mail Disaster

Recently, I installed a new e-mail program. In the installation process, it obliterated the old program and wiped out several messages from readers. Some of you had sent some very good comments about earlier columns, particularly the one on grounding. I wanted to include those comments in this issue. Unfortunately, they went to the great bit bucket in the sky, so if you sent me an e-mail and did not get a response, I apologize. Also, if you had a comment on an earlier column that has not been used, please resend it to my e-mail address at the beginning of this column.

73, Pete, WB2D

Call for Photos and Stories

We'd like to hear from you about your experiences as a newcomer. If you have questions, we'll try to incorporate them into future columns. If you have photos (color prints or slides okay) of your station or antennas, please send them along and we'll publish the best ones. If you have a solution to a common problem that new hams experience, we'd like to hear about it so we can pass it along. You can contact me at <wb2d@cq-amateur-radio.com> or Peter O'Dell, WB2D, Beginner's Corner, 123 NW 13th St., Suite 313, Boca Raton, FL 33432.

Contesting

BY JOHN DORR, K1AR

News/Views Of On-The-Air Competition

Defining Contesting—In English, That Is!

September's Contest Tip of the Month

We can all do this one. Take a few minutes and identify just one aspect of your contest station that could be improved. It could be as simple as the labeling on your antenna switches or a more significant improvement such as a new antenna. In any event, you'll be thanking yourself this fall that you took the time to make *your* station just a little better with a higher score to boot!

Everyone once in a while, I'm reminded that a contesting column has to help new contesters along as well. Here's an excerpt from an e-mail message I received recently to stress that point:

"Although I have been licensed now for many years, I never really got interested in contesting until recently. I would, of course, dabble during a contest for 30 minutes or so, but would soon get bored repeating the same thing over and over. I never submitted a score because at first I only operated for 30 minutes at a time, and second, I didn't know how. I knew the exchanges for the various contests, but that's all. I could never understand why a guy would stay up all night to repeat the same phrase over and over, especially in a contest where there is no prize except being mentioned in fine print in a magazine. Sometimes I would go out with my club for Field Day and put in my shift, but it was really more of an ordeal than anything else. To this day I am clueless about contest terminology (multipliers?), scoring, or how logs are to be submitted. Really nowhere is there a place—a website, a textbook, or anything—to teach a contest novitiate what it is all about—in simple English.

Recently, I went to the one website and all it talked about was something called Cabrillo. What the heck is that? I go to other contesting websites only to see the current topic to be SO1R vs. SO2R. Huh? What's that? Actually, I'm getting pretty sore try to figure out SOR (pun intended). Why is everything in jargon and acronyms? Why is nothing ever defined? What's the 10- minute rule and why is it there? What do the arcane words "multi-multi" and "multi-single" mean? I am trying to get interested in this aspect of the hobby, but it is difficult to find entry- level stuff on the subject.

Well, that was enough for me, and while the following hardly puts a dent in the very real concern outlined above, it's a start. If you're a knowledgeable contester, I challenge you to pass this information along to others and maybe add a few thoughts of your own.

2 Mitchell Pond Road, Windham, NH 03087
e-mail: <K1AR@contesting.com>

Calendar of Events

Aug. 25-26	Ohio QSO Party
Aug. 25-26	Hawaii QSO Party
Aug. 25-26	South Dakota QSO Party
Sept. 1-2	All Asian SSB DX Contest
Sept. 2	North American CW Sprint
Sept. 5-7	YLRL Howdy Days
Sept. 8-9	Worked All Europe SSB Contest
Sept. 9	North American SSB Sprint
Sept. 15-16	SAC CW Contest
Sept. 15-16	Washington State Salmon Run
Sept. 16-17	Tennessee QSO Party
Sept 22-23	SAC SSB Contest
Sept. 29	Louisiana QSO Party
Sept. 29-30	Texas QSO Party
Sept. 29-30	**CQ WW RTTY DX Contest**
Oct. 6-7	California QSO Party (CQP)
Oct. 13-14	Pennsylvania QSO Party
Oct. 27-28	**CQ WW DX SSB Contest**

Some of Contesting's Terms

The 10-minute rule: A rather old rule for multi-operator contesters that requires a transmitter to operate on a single band for at least 10 minutes before moving to another band. The origin of the rule was to eliminate the possibility of some stations using elaborate band-switching arrangements that could closely replicate a multi-transmitter/multi-band entry by rapidly changing bands without any limits.

Cabrillo: A computer logging standard developed by Trey Garlough, N5KO, in conjunction with the developers of most major logging software and the sponsors of most major contests. The Cabrillo format standardizes the QSO information that appears in each data column of a contest logging program's output. Its intent is to make it easier for contest judges to manage the wide-ranging use of different computer programs by the creation of a single standard for all PC-based contest log entries.

Dupes: Dupes may be a thing of the past with computer logging, but it is a word used to describe when a duplicate QSO appears in a contest log. Most major contests limit the amount of dupe to a very small number for the log to be eligible for competition and awards. Obviously, submitting a log with zero dupes is the only acceptable standard.

Exchange: Mandatory information, as defined by a contest's rules, that needs to be communicated between two stations for a valid QSO to take place in the contest. In the CQ WW Contest, for example, the exchange is a signal report and your CQ zone. Other contests commonly use serial numbers (beginning with 001), age, or location as their contest exchange.

Multi-Operator: One of many contest operating entry categories in which more than one operator is permitted. The two most common forms of multi-operator categories are a station with only a single transmitter (multi-single) or many transmitters operating on several bands simultaneously (multi-multi).

Multiplier: One of the factors contributing to a contest entry's final score as defined in the rules. Generally, a contest score is calculated by multiplying the total QSOs made in the contest by the multiplier achieved during the contest. Multipliers can often be defined as countries, zones, ARRL sections, prefixes, etc. As a general example, a score of 100 QSOs and 25 multipliers (e.g., 25 countries) worked across all bands used equals a final score of 2500 points.

Off-time: Many contests have a requirement to take time off during the contest. As an example, the ARRL Sweepstakes is a 30-hour contest that limits on-air time to only 24 hours. In this case, 6 hours of off-time are required, and that time must be taken in 30-minute or greater increments. For contests where no "official" off-time is required, you still can use the term *off-time* to indicate how much non-operating time was taken (often in the form of sleep or other time away from the radio).

Passing: This is a contest operating strategy where needed multipliers and/or QSOs are moved to other bands for another QSO. For example, while calling CQ, LX1AAA calls you from Luxembourg on 15 meters. In reviewing your log, you realize you need that country on 20 meters as well. By asking the station to QSY to 20 meters, you are "passing" the multiplier to another band to improve your score.

Penalty: Part of the log-checking process by contest sponsors. Penalties are imposed that go beyond the simple removal of an invalid QSO (in cases where the logged QSO contains a badly copied callsign, exchange, etc.). For example, a penalty of removing three

additional QSOs in your log may take place when a callsign is miscopied. The intent is to provide an incentive to being as careful as possible in the logging process. Intimidation is not the goal as much as keeping the playing field as level as possible among all competitors.

Rate: This is a common metric applied to contest logs to determine how fast you are working stations over a period of time. The timeframe most commonly used is one hour. A typical phrase is "I had a 100-hour rate," meaning you just worked 100 QSOs in the past hour.

Running: A method of making contest QSOs that takes place by calling CQ versus tuning the bands and calling people. A common expression is to say "I had a great run of Europeans this morning."

Search and Pounce: The opposite of running, this operating technique works contest QSOs by tuning the bands up and down and calling stations heard. It is often used as an alternative to running when conditions are poor, station performance is not optimal, or a more casual operating style is preferred.

Single Operator: This is the most commonly entered contest operating category. Only one operator is permitted as part of a contest entry. Typically, single operators either operate all available bands (single operator, all band) or a single band (single operator, single band). Some contests also permit assisted single operation, where a single operator can utilize the assistance of computer/packet spotting while still operating alone.

SO2R: Single Operator, 2 Radios. This is an operating strategy where single operators design their stations to allow for the use of two radios at the same time. There are many elaborate variations to this concept—for example, the operator may listen to one radio in with the left ear and the other with the

More Operating Trends on CW

Recently, I wrote about the trends in operating, particularly as they apply to phone vs. CW. It's also interesting to consider this subject from a geographical perspective.

Jim Neiger, N6TJ, provided the following data for our consideration. While statistics can be misleading, it does show an interesting shift in operating preference in the U.S. and Europe. As recently as five or six years ago, the U.S. seemed to dominate Jim's overseas CW logs when compared to his total European QSOs. However, there has been a rather dramatic shift in favor of European QSO totals in recent years, which at the very least is extremely curious. While some of this change may be geographical in nature (e.g., location of station he operated), I wonder if any of you have noticed the same thing in recent years?

Year	CW Contest	Operating Class	Callsign	EU QSOs	US QSOs	Leader
1985	CQ WW	A/B	D44BC	1644	2362	US
1986	CQ WW	A/B	D44BC	1629	2489	US
1989	CQ WW	A/B	D44BC	1579	2228	US
1991	CQ WW	A/B	IR8A	1557	760	EU
1992	CQ WW	A/B	D44BC	1288	2489	US
1993	CQ WPX	A/B	NH6T	202	932	US
1993	CQ WW	A/B	ZD8Z	1670	3115	US
1994	CQ WW	20M	V29J	558	819	US
1995	CQ WW	A/B	ZD8Z	1722	2555	US
1997	CQ WPX	A/B	ZD8Z	2287	1202	EU
1997	CQ WW	15M	ZD8Z	2211	1887	EU
1998	CQ WW	M/M	TI1C	6552	6185	EU
1999	CQ WPX	A/B	AM8ZS	2096	746	EU
1999	CQ WW	10M	ZX5J	1987	1396	EU
2000	CQ WW	A/B	KH7R	506	2544	US
2001	CQ WPX	A/B	P40T	2506	1185	EU

2000 CQ RTTY WPX Contest Addendum

Following are a few corrections to the contest results published in the July issue:

In the Single Band, 10 meter category W7TI with a score of 482,584 is the certificate winner for the W6 call area.

EA9CD should have been listed as Single Op, 20 meters, not All Band. He still is #1 Mellila & Cueta and receives a certificate.

The score breakdown for S56A, Single Op, All Band, High Power should have been: 981 QSOs, 2962 QSO points, 397 Mults, for a final score of 1,175,914.

right ear. Most contest rules restrict on-air operation to only one signal at a time, so the intent of two radios is to find additional stations on the second radio while calling CQ on the primary station. Yes, dexterity and a bit of insanity may be required to operate like this on any sustained basis!

Spot: A bi-product of DX spotting where packet (or VHF voice, if anyone still does that in contest spotting) spots are utilized by multi-operator stations (or single operator assisted) to help improve their score. Spots are useful when they come across as new multipliers or even needed QSOs.

UBN: Uniques, Bad QSOs, Not-in-log. This is a widely accepted set of criteria used by contest sponsors in the process of checking logs. Contest logs are checked to see what percentage of the total QSOs is unique contacts only worked by that one station. While scores are not reduced on this basis alone, it provides a metric that can be used to help determine if closer log checking is required. Obviously, bad QSOs (e.g., invalid/impossible callsigns) and QSOs that do not appear in the other station's log (as in the world of DXing) are part of the checking process as well. A perfect UBN report would be 0% across all categories (U-B-N).

Final Comments

That's all that time and space allow for this month. Some of you have indicated recently that you'd like me to bring back some of the contester profiles we used to run in *CQ* a few years ago. To that end, I'll get to work and see what I can do. If you have a good suggestion for a candidate (including yourself), drop me an e-mail.

Finally, if you haven't noticed yet, we now have monthly links to all published contests (with available URLs) on *CQ*'s website. Be sure to check it out at <www.cq-amateur-radio.com>.

73, John, K1AR

DX

BY CARL SMITH, N4AA

News Of Communication Around The World

On QSLs, "Insurance Contacts," and "Loud Signals"

This month I am going to focus on "problems" associated with DX-ing. Lately a number of things have come up that I feel need to be addressed, and I can't think of a better place to start the ball rolling than right here on the pages of *CQ*. I mentioned QSLing last month, but the subject just keeps coming up in conversations with DXers, so here is more.

Delayed QSLing

I recently addressed this subject in an editorial of *The DX Magazine*. I want to bring up that subject here as "food for thought." Quoting from that editorial:

I've noticed a lot of comments, well actually complaints, in recent months about QSLing, or the lack thereof. Just today I got an e-mail from a subscriber (to *The DX Magazine—ed.*) commenting on the failure of a lot of folks to answer QSL requests. As he put it, "In checking my log for 1998 CW QSOs for IOTA, I found 99 islands worked but not confirmed. In an effort to find out why my QSLs were not answered, I looked them up in QRZ *(the callbook, not the "DX Newsletter"—ed.)* and found e-mail addresses for 53. Well, 46 had no e-mail address, and 8 e-mails were returned as no longer active. Of the 53 e-mails I sent, only 17 answered. Two said they were working on it, to be patient. I thought waiting 3 1/2 years *was* being patient. One said he didn't have his cards from the printer yet. Two sent direct and 11 promised to send via the bureau. All said, 'I didn't receive your QSL,' and I paid a QSL service to forward them. My conclusion is that the art of QSLing is dead."

Could this gentleman's conclusion be even close to being right? Surely not!

Well, let's look at this for a few minutes. Did you happen to read the article in the last issue of *The DX Magazine* "30 Years of DX QSLing"? Tom, W4YOK, said in his article, " . . . one would have to assume from the data that DX stations were more likely to answer QSLs in the '60s and '70s than they were later." Although the table in the referenced article shows a rate of return averaging in the 70% range, is that acceptable? Can you just imagine the uproar if, say, VKØIR or A52A had only answered 70% of the QSLs they received? How about some of the other *major* DXpeditions? What if they only answered 70% of the QSL requests? What has happened to the old spirit of QSLing? Is it because of the sheer volume of requests that people aren't answering them? I don't know, do you? I'd like to hear from you on this subject of failure to QSL. I look forward to seeing some response to the question.

WAZ Highlights

Digital WAZ #1
was awarded to JA1ANI.

6 Meter WAZ Totals
as of July 8, 2001

Award #	Call	Zones Confirmed
1	N4CH	25
2	N4MM	26
3	JI1CQA	34
4	K5UR	25
5	EH7KW	34
6	K6EID	26
7	KØFF	26
8	JF1IRW	31
9	K2ZD	27
10	W4VHF	25
11	GØLCS	25
12	JR2AUE	36
13	K2MUB	27

Congratulations to all!

Long-time Pacific DXpeditioner Ron Wright, ZL1AMO, shown here at the operating position of H40RW in March/April 2001. Ron has said this might have been his final DXpedition. He's been at it for a long time. (Photo courtesy John, KDØJL)

The biggest complaint I hear these days is the one about it taking months, even years, for a DXpedition to respond to QSL requests. Surely, if an individual or group can come up with the funds to go on a DXpedition to even a relatively rare country, they should spend more time and effort on planning how they will answer all of the requests for the contacts they make. I know a lot of these operations have the cards donated by someone, somewhere, and the donor should be made aware of, and commit to, a reasonable time frame to supply the cards. Well, what is reasonable? This debate could go on and on, but certainly the cards could be supplied and the response process begun in no more than three or four months. (I'll no doubt hear about that time frame from DXpeditioners, but that's my opinion.)

Continuing in the same subject area, I would like to ask about "insurance contacts." Where did this term come from? Why do so many DXers these days feel that they absolutely must work a DXpedition two, three, or four times on the same band/mode?

I have been working on QSL cards for a fair-size DXpedition, and I am dumbfounded at what I see in the logs. One European station worked this DXpedition *six times on the same band/mode!* What possible reason is there for doing this? I might understand a second contact on one band under unusual band conditions, but *six*? This appears to be quite common from European and American DXers. Rarely did I see anything like this from Japan or other areas of the world. One might expect this "insurance contact" tactic to occur on the low bands where signals and/or propagation could play a role in an operator's not being sure of the first contact. What I am talking about here is contacts on the higher bands with good signals/propagation—solid-copy signals both ways. What is the point/justification for all of these "insurance contacts"?

The other related topic is in QSLing. After working the DXpedition three, four, five, or more times on the same band/mode, many of these DXers even send QSL requests with an SASE for every one of those contacts. Why? I hear complaints all the time about the high cost of QSLing—obtaining the cards for DXCC and other awards. I have no doubt that these unnamed DXers have high costs for QSLing if they send SASEs to all of their contacts with various DXpeditions. I am purposely not naming these DXers to protect the "guilty" out there who are doing all of these unnecessary things.

P.O. Box DX, Leicester, NC 28748-0249
e-mail: <n4aa@cq-amateur-radio.com>

The WPX Program

SSB

2807.....DS5ARL

CW

3071.....K9GWH
3072.....JA1OYD
3073.....IV3DYS

CW: 350 K9GWH, JA1OYD. 400 K9GWH. 450 K9GWH. 700 VE6ZT. 750 IV3DYS. 800 JG3LGD. 1200 EA2BNU. 1500 EA6AA. 4600 WA2HZR.

SSB: 350 JK7QJK. 500 WA1ECF. 650 EA5DHK. 1000 AG4W.

MIXED: 1000 VE6ZT. 1300 WZ4P. 2200 NFØN. 3350 WB2YQH.

10 meters: WA2VQV, JG3LGD
15 meters: JG3LGD, WA2VQV
20 meters: JG3LGD
40 meters: K9GNH, JG3LGD
80 meters: JG3LGD
160 meters: JG3LGD

Asia: WA2VQV, JG3LGD, EA5DHK, VE6ZT, JK7QJK
Europe: JG3LGD
Oceania: JG3LGD, VE6ZT, JK7QJK

Award of Excellence Holders: K6JG, N4MM, W4CRW, K5UR, K2VV, VE3XN, DL1MD, DJ7CX, DL3RK, WB4SIJ, DL7AA, ON4QX, 9A2AA, OK3EA, OK1MP, N4NO, ZL3GQ, W4BQY, IØJX, WA1JMP KØJN, W4VQ, KF2O, W8CNL, 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, WA8YM, SM6DHU, N4KE, I2UIY, I4EAT, VK9NS, DEØDXM, DK4SY, UR2QD, ABØP, FM5WD, I2DMK, SM6CST, VE1NG, I1JQJ, PY2DBU, HI8LC, KA5W, K3UA, HA8XX, K7LJ, SM3EVR, K2SHZ, UP1BZZ, EA7OH, K2POF, DJ4XA, IT9TQH, K2POA, N6JV, W2HG, ONL-4003, W5AWT, KBØG, HB9CSA, F6BVB, YU7SF, DF1SD, K7CU, I1PO, K9LNJ, YB0TK, K9QFR, 9A2NA, W4UW, NXØI, WB4RUA, I6DQE, I1EEW, I8RFD, I3CRW, VE3MC, NE4F, KC8PG, F1HWB, ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, KC7EM, YU1AB, IK2ILH, DEØDAQ, I1WXY, LU1DOW, N1IR, IV4GME, VE9RJ, WX3N, HB9AUT, KC6X, N6IBP, W5ODD, IØRIZ, I2MQP, F6HMJ, HB9DDZ, WØULU, K9XR, JAØSU, I5ZJK, I2EOW, IK2MRZ, KS4S, KA1CLV, KZ1R, CT4UW, KØIFL, WT3W, IN3NJB, S50A, IK1GPG, AA6WJ, W3AP, OE1EMN, W9IL, S53EO, DF7GK, I7PXV, S57J, EA8BM, DL1EY, KØDEQ, KUØA, DJ1YH, OE6CLD, VR2UW, 9A9R, UAØFZ, DJ3JSW, HB9BIN, N1KC, SM5DAC, RW9SG, WA3GNW, S51U, W4MS, I2EAY, RAØFU, CT4NH, EA7TV, W9IAL, LY3BA, K1NU, W1TE, UA3AP, EA5AT, OK1DWC, KX1A.

160 Meter Endorsement: K6JG, N4MM, W4CRW, K5UR, VE3XN, DL3RK, OK1MP, N4NO, W4BQY, W4VQ, KF2O, W8CNL, W1JR, W5UR, W8RSW, W8ILC, G4BUE, LU3YL/W4, NN4Q, VE7WJ, VE7IG, W9NUF N4NX, SMØDJZ, DK3AD, W3ARK, LA7JO, SMØAJU, N5TV, W6OUL, N4KE, I2UIY, I4EAT, VK9NS, DEØDXM, UR1QD, AB9O, FM5WD, SM6CST, I1JQJ, PY2DBU, HI8LC, KA5W, K3UA, K7LJ, SM3EVR, UP1BZZ, K2POF, IT9TQH, N8JV, ONL-4003, W5AWT, KBØG, F6BVB, YU7SF, DF1SD, K7CU, I1POR, YBØTK, K9QFR, W4UW, NXØI, WB4RUA, I1EEW ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, YU1AB, IK4GME, WX3N, WBØDD, IØRIZ, I2MQP, F6HMJ, HB9DDZ, K9XR, JAØSU, I5ZJK, I2EOW, KS4S, KA5CLV, KØIFL, WT3W, IN3NJB, S50A, IK1GPG, AA6WJ, W3AP, S53EO, S57J, DL1EY, KØDEQ, DJ1YH, OE6CLE, HB9BIN, N1KC, SM5DAC, S51U, RAØFU, UAØFZ, CT4NH, W1CU, EA7TV, LY3BA, RW9SG, K1NU, W1TE, UA3AP, OK1DWC, KX1A.

Complete rules and application forms may be obtained by sending a business-size, self-addressed, stamped envelope (foreign stations send extra postage if airmail desired) to "CQ WPX Awards," P.O. Box 593, Clovis, NM 88101 USA. ***NOTE:*** *WPX will not accept prefixes/calls which have been confirmed by computer-generated electronic means.*

Ray Gerrard, HSØ/G3NOM, is very active from his QTH in Sarika, Thailand, about 90 km northeast of Bangkok at the edge of Khao Yai National Park. Ray is the secretary of the Radio Amateur Society of Thailand and has participated in many DXpeditions. (Photo courtesy Peter, K2IXQ)

Stepic, 9A4A, is very active on the bands. In Croatia he is called "Mr. DX." He has operated under a lot of callsigns: YU2NFJ, YZ2NFJ, YT2NFJ, YZ9AA, 9A2AA, and 9A6AA. Using all of these different calls, his current DXCC totals stands at 366 Mixed and 364 Phone. (Photo courtesy John, KDØJL)

In the "old days" of DXing most of the signals from DXpeditions were relatively weak, and we had to dig in the noise to hear them. However, for the dedicated DXer the contacts were made, the QSLs were sent and received, and we went on to work more DX.

Nowadays it seems that DXpeditions that have signals less than 20 over 9 on every band/mode are frowned upon, and many complain that the DXpedition should have done this or that because the signals are "weak." I ask you, where did this idea of *loud* come from? Oh, it's nice to be able to sit back and listen to the "armchair copy" signals from DXpeditions, but not every DXpedition can afford that luxury. Those weaker DXpedition operations don't deserve to be criticized for bringing a much-needed

5 Band WAZ

As of July 15, 2001, 565 stations have attained the 200 zone level and 1217 stations have attained the 150 zone level.

New recipients of 5 Band WAZ with all 200 zones confirmed: K6VX K3FN

The top contenders for 5 Band WAZ (zones needed, 80 meters):

N4WW, 199 (26)
W4LI, 199 (26)
K7UR, 199 (34)
WØPGI, 199 (26)
W2YY, 199 (26)
VE7AHA, 199 (34)
IK8BQE, 199 (31)
JA2IVK, 199 (34 on 40m)
ABØP, 199 (23)
KL7Y, 199 (34)
NN7X, 199 (34)
IK1AOD, 199 (1)
DF3CB, 199 (1)
F6CPO, 199 (1)
KC7V, 199 (34)
GM3YOR, 199 (31)
VO1FB, 199 (19)
KZ4V, 199 (26)
W6DN, 199 (17)
W6SR, 199 (37)
W3NO, 199 (26)
K4UTE, 199 (18)
HB9DDZ, 199 (31)
RU3FM, 199 (1)
HB9BGV, 199 (31)
N3UN, 199 (18)
OH2VZ, 199 (31)
K2UU, 199 (26)
W1FZ, 199 (26)
UT4UZ, 199 (6)
SM7BIP, 199 (31)
K4ZW, 199 (23)
W9RPM, 199 (19)
PY5EG, 199 (23)
SP5DVP, 199 (31 on 40)
HC8N, 198 (36 on 80, 39 on 40)
EA5BCX, 198 (27,39)
G3KDB, 198 (1,12)
KG9N, 198 (18,22)
KØSR, 198 (22,23)
UA4PO, 198 (1,2)
JA1DM, 198 (2,40)
9A5I, 198 (1,16)
LA7FD, 198 (3,4)
K5PC, 198 (18,23)
VE3XO, 198 (23,23 on 40)
K4CN, 198 (23,26)
KF2O, 198 (24,26)
W6BCQ, 198 (37,34on40)
G3KMQ, 198 (1, 27)
W5BOS, 198 (18,23)
N2QT, 198 (23,24)
OK1DWC, 198 (6,31)
K7FL, 198 (23,37)
W4UM, 198 (18,23)

The following have qualified for the basic 5 Band WAZ Award:

KA4RRU (155 zones)
DL2MEG (170 zones)
OM3CND (168 zones)
EA5BHK (189 zones)
W4GBF (163 zones)
WX7M (162 zones)
BA4DW (180 zones)
LZ1PM (176 zones)

Endorsements:
W1JZ (196 zones)
W6YJ (194 zones)
RA3AJ (200 zones)
W4UML (198 zones)
N1KC (174 zones)

****Please note: Cost of the 5 Band WAZ Plaque is $80 ($100 if airmail shipping is requested).**

Rules and applications for the WAZ program may be obtained by sending a large SAE with two units of postage or an address label and $1.00 to: WAZ Award Manager, Paul Blumhardt, K5RT, 2805 Toler Road, Rowlett, TX 75089. 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 Paul Blumhardt. Applicants sending QSL cards to a *CQ* checkpoint or the Award Manager must include return postage. K5RT may also be reached at e-mail: <k5rt@cq-amateur-radio.com>.

The WAZ Program

Single Band WAZ

6 Meters

8.....JF1IRW (31 zones)
9 .....K2ZD (27 zones)
10 .....W4VHF (25 zones)
11.....GØLCS (25 zones)
12.....JR2AUE (36 zones)
13 .....K2MUB (27 zones)
5 ..EH7KW (endorsement 34 zones)

15 Meter SSB

557 .....HL3ERJ

20 Meter SSB

1078 .....N7YB
1079 .....W7LEB

10 Meter CW

166 .....OM3CND
167 .....W7CNL
168 .....IK4CIE

12 Meter CW

25 .....W9MJ

17 Meter CW

33 .....W9MJ
340 .....WØSF

160 Meters

166 .....PY3CEJ (39 zones)
167 .....DJ7RJ (31 zones)
168 .....SMØAJU (40 zones)
169 .....IK4GME (40 zones)
101.....G4BWP (endorsement 40 zones)
143.....OK1DWC (endorsement 34 zones)

All Band WAZ

SSB

4670.....K7KGB
4671 .....WA2POW
4672 .....AD6KQ
4673 .....N2KX
4674.....KL1V
4675.....WA1ECF
4676 .....SQ7BCG
4677.....KA8YYZ
4678.....K1JE
4679.....DS5ACV
4680 .....W5WT
4681 .....K6UNE

Mixed

8056 .....YZ1ZA
8057.....W4YDY
8058.....WB2HJV
8059.....W7LWI
8060.....ES1AKM
8061.....W7GK
8062.....KU4EC
8063 .....RA3ANL
8064 .....WA7ND
8065 .....K7ZO
8066.....N5ZJ
8067.....K1JE
8068 .....W5WT

All CW

255.....W4GBF
256.....BA4DW
257.....LZ1PM
258.....W5WT
259 .....K6UXO
260 .....K6UNE
261.....WA4DOU
262.....W7CNL (All QRP)
263 .....IK5RLS
264 .....K8VD

Digital

1 .....JA1ANI

Phone

634.....IK8NRW

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, Paul Blumhardt, K5RT, 2805 Toler Road, Rowlett, TX 75089. 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 Paul Blumhardt. Applicants sending QSL cards to a *CQ* checkpoint or the Award Manager must include return postage. K5RT may also be reached via e-mail: <k5rt@cq-amateur-radio.com>.

country on the air. Frankly, I get more satisfaction from working a DXpedition that is *not* bending my S-meter.

The comments I have mentioned here are not only coming from new DXers. I see a lot of them coming from people who have been DXing for a long time. Perhaps, as is indicated by a number of sources, DXers are getting older and their patience is growing thin. They want to get all of those countries confirmed *now,* while they still have "competitive" stations and reasonably good health. They could become incapacitated for some reason and not be able to continue DXing. I believe in being dedicated, but this would seem to be carrying it just a bit too far. With more consideration and patience all the way around, we could bring about more enjoyment in the world of DXing. We might even be able to attract some new, younger DXers.

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 333 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 sticker s 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

K2TQC 333	W2FXA 333	W1WAI 331	K9IW 329	N4CH 327	I5XIM 325	HA5DA 321	K9OW 313	KH6CF 300
K2FL 333	EA2IA 333	N4JF 331	K7LAY 329	I1JQJ 327	K5UO 325	VE7DX 320	K9DDO 312	K9HQW 299
K6JG 333	F3AT 333	WA4IUM 331	IT9QDS 329	IT9TQH 326	N5HB 325	W4UW 319	W3II 312	F6HMJ 296
K9BWQ 333	DJ2PJ 333	K6LEB 331	N4AH 329	I2EOW 326	YU1AB 325	HA5NK 319	N4OT 311	WG7A 295
K2ENT 333	K2JLA 333	PT2TF 331	WB4UBD 328	NC9T 326	K8LJG 324	K1FK 318	KF8UN 308	KD8IW 288
N7FU 333	W7CNL 333	N5FG 331	PAØXPQ 328	VE7CNE 326	DL3DXX 324	SM5HV/HK7 317	PY4WS 308	W9IL 282
K3UA 333	YU1HA 333	WØJLC 331	K1HDO 327	NØFW 326	LA7JO 324	G3KMQ 317	IKØADY 307	EA3BHK 282
K9MM 333	WØHZ 332	W2UE 330	I4EAT 327	N5FW 325	W6SR 323	YU1TR 316	W6YQ 305	YC2OK 282
K2OWE 333	N7RO 332	W6DN 330	DL8CM 327	IK2ILH 325	9A2AJ 323	K8JJC 315	W7IIT 305	XE1MD 278
N4MM 333	K4CEB 332	W8XD 330	SM6CST 327	9A2AA 325	K4JLD 323	WG5G/QRPp 315	YT1AT 304	EA2CIN 278
W4OEL 333	G4BWP 332	4N7ZZ 330	N4KG 327	OK1MP 325	KUØS 322	OZ5UR 315	N7WO 303	I3ZSX 276
W7OM 333	K6GJ 332	I4LCK 330	K8PV 327	W4LI 325	KE5PO 322	HB9DDZ 314	LU3DSI 302	G3DPX 275
F3TH 333	K4IQJ 332	KZ4V 329	W4QB 327	K3JGJ 325	K6CU 321	N1HN 313	F5OIU 302	
WB5MTV 333	K2JF 331	K4CN 329	KA7T 327	WA8DXA 325	K7JS 321	CT1YH 313	YU7FW 301	

SSB

K4MZU 333	IK8CNT 333	W2FXA 332	K3UA 330	PAØXPQ 328	K8PV 326	EA8TE 321	CT1YH 311	KE4SCY 291
K2TQC 333	VK4LC 333	W8ZET 332	VE3MRS 330	W6SHY 328	W4LI 326	XE1CI 321	W5OXA 311	YV5NWG 287
K2FL 333	N5FG 333	WØYDB 332	W6DN 330	K9PP 328	K6BZ 326	W6MFC 321	WZ3E 311	KK4TR 286
W6EUF 333	DJ9ZB 333	I8KCI 332	WA4IUM 330	K9HQM 328	W4WX 326	KØFP 320	VE3CKP 311	RW9SG 286
K2JLA 333	EA2IA 333	OE2EGL 332	YV1CLM 330	KD8IW 328	W2FKF 326	N4CSF 320	HA6NF 310	VE7HAM 285
K6JG 333	XE1L 333	KSØZ 332	K8CSG 330	KE4VU 328	IØSGF 326	N4HK 320	LU3HBO 310	F5RRS 284
K6GJ 333	W6BCQ 333	N5ZM 332	ZL3NS 330	AA6BB 327	YV5AIP 325	DL3DXX 320	SV3AQR 310	CT1CFH 284
K2ENT 333	XE1AE 333	K9OW 331	W5RUK 330	SM6CST 327	K9IW 325	EA1JG 320	K7HG 309	WØIKD 283
K6YRA 333	4N7ZZ 333	W3AZD 331	EA3KB 330	W3GG 327	WA4JTI 325	EA7TV 320	EA3BHK 307	EA3CYM 283
K4MQG 333	KE5PO 333	WA4WTG 331	LA7JO 330	CX4HS 327	NI5D 325	SV1RK 320	N1ALR 306	WN6J 281
K7LAY 333	PY4OY 333	N4JF 331	W9SS 330	N5ORT 327	KC4MJ 325	K3LC 320	XE1MDX 305	F5JSK 281
IK1GPG 333	VE1YX 333	EA1JG 331	W7FP 330	IT9TQH 327	IKØIOL 325	N6RJY 319	EA5OL 305	N5WYR 281
K5OVC 333	XE1VIC 333	VE3MR 331	WDØBNC 330	IT9TGO 327	K1EY 325	WA4DAN 319	WB2AQC 305	YU1TR 280
NØFW 333	IN3DEI 333	K1UO 331	VE2GHZ 330	WD8MGQ 327	K3JGJ 324	EA3EQT 319	KC4FW 304	KK5UY 280
OZ5EV 333	I4LCK 333	YV5IVB 331	WS9V 329	I1EEW 327	K7HG 324	CE1YI 318	YC2OK 303	KA5OER 280
K9MM 333	W4UW 332	VE3XN 331	I2EOW 329	SV1ADG 327	AC7DX 324	EA5GMB 317	WB2NQT 303	N1KC 278
ZL3NS 333	OE7SEL 332	KX5V 331	K4CN 329	DL8CM 327	KØHQW 324	YV4VN 317	VK3IR 303	EA3CWT 278
N4MM 333	K4JLD 332	VE7WJ 331	K2JF 329	W2FGY 327	ZL1BOQ 324	CT1AHU 316	W5GZI 302	VE2DRN 277
OZ3SK 333	WB4UBD 332	I8LEL 331	ZL1AGO 329	I1JQJ 327	EA3BKI 323	N5HSF 316	N5QDE 302	XE2NLD 277
N4CH 333	WB3DNA 332	EA4DO 331	N5FG 329	F9RM 327	K4JDJ 323	K6RO 316	KD4YT 302	9A9R 277
IØZV 333	VE4ACY 332	PT2TF 331	DU1KT 329	XE1MD 327	W9IL 323	WA4ZZ 315	SV3AQR 302	W6UPI 276
YU1AB 333	VE4ROY 332	VE2WY 331	4Z4DX 329	I4EAT 327	WW1N 322	K7TCL 315	YT7TY 300	VE2AJT 275
W7OM 333	K5TVC 332	W8KS 331	VE7DX 329	CT1EEB 327	F6BFI 322	WR5Y 315	LU5DV 300	Z31JA 275
KZ2P 333	K9BWQ 332	W8AXI 331	CT1EEN 329	W2CC 327	LU7HJM 322	CP2DL 314	SV2CWY 300	G4URW 275
K7JS 333	KØKG 332	OE3WWB 331	W2JZK 328	W9OKL 327	K5NP 322	NØMI 313	K6GFJ 299	
DU9RG 333	W4NKI 332	DL9OH 331	KZ4V 328	DL6KG 326	NI5D 322	K9YY 313	4X6DK 297	
W4UNP 333	VE2PJ 332	N2VW 331	K1HDO 328	W6SR 326	PY2DBU 322	YT1AT 313	K7ZM 292	
N7BK 333	YV1KZ 332	YZ7AA 331	KF8UN 328	N4KG 326	K6CF 322	KD5ZD 312	OA4EI 292	
N7RO 333	YV1AJ 332	YV1JV 331	AE5DX 328	W4QB 326	N3RX 321	VE3CKP 311	KØOZ 291	

RTTY

K2ENT 331	W2JGR 316	G4BWP 307	KE5PO 297	I2EOW 291	EA5FKI 284	W4QB 280	YC2OK 280	PAØXPQ 272
WB4UBD 325	K3UA 315	NI4H 305	W4EEU 291	I1JQJ 289				

CQ DX Awards Program

SSB

2345 ..... VE4XJ 2346 ..... HL5BLF

SSB Endorsements

320 ..... VE1YX/333	320 ..... K6CF/322
320 ..... XE1VIC/333	320 ..... K3LC/320
320 ..... I4LCK/333	310 ..... YT1AT/313
320 ..... YZ7ZZ/331	250 ..... VE7SMP/256
320 ..... KE4VU/328	
320 ..... K7HG/324	

CW Endorsements

320 ..... I4LCK/330	310 ..... K1FK/318
320 ..... K7LAY/329	300 ..... YT1AT/304

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. Rules and application forms for the CQ DX Awards Program may be obtained by sending a business-size, No. 10, self-addressed, stamped envelope to CQ DX Awards Manager, Billy Williams, N4UF, Box 9673, Jacksonville, FL 32208 U.S.A. Currently we recognize 333 active countries. Please make all checks payable to the award manager.

QSL INFORMATION

3B9FR to Robert G. Felicite, POB 31, Port Mathurin, Victoria, St., Rodriguez Is., via Mauritius
3D2QB 2001 to GM3VLB, A H G Saunders, 6 Douglas Crescent, Kelso TD5 8BB, Great Britain
3V8BB May 24/28, 2001 to YT1AD, Dr. Hrane Milosevic, 36206 Vitanovac, Yugoslavia
3V8BB June 2001 to HA5FA, Eugene Matzon, POB 213, H-1502 Budapest 112, Hungary
4J56K May/June 2001 to Box 315, Moscow 103062, Russia
4S7NE to Nelson Ranasinghe, Radio Monitor.Stn, Kadirana, Negombo, Sri Lanka
4W6MM to Thorvaldur Stefansson, POB 3699, Darwin, NT 0801, Australia
5A1A (registered mail) to Abubaker Alzway, POB 74421, Tripoli, Libya
5R8FL to Andriamarisoa Andreas, POB 5005, Tananarive, CP101, Madagascar
5W1SA starting July 2001 to JI3WLT
8R1K 1998/1999 Oct to OHØXX, Olli Rissanen, #599, 1313 So. Military Trail, Deerfield Beach, FL, 33442 USA
9V1DJ to Taka K. Shimazu, 2 River Valley Close #19-06, The Regalia, Singapore 238428
A92GE to David Smith, POB 1976, Manama, Bahrain <sm1th9@batelco.com.bh>
BD8GK to Zhang MinJie, POB 2514, ChongQing-city, 400060 China <bd8gk@sina.com>
BX5AA to Jimmy Lou, POB 1031, Changhua 500, Taiwan
C6AJR July 25/Aug 1, 2001 to Joseph B Pater, 1894 Old Oxford Rd, Hamilton, OH 45013 USA
C6DX July 25/Aug 1, 2001 to Joyce M. Swallow, 2495 Tiverton Ln., Cincinnati, OH 45231 USA
CEØZIS to Eliazar Pizarro Rojas, POB 1, Robinson Crusoe Island, Chile
DL1ZBO to Rainer Hilgardt, Hans-Sachs-Weg 38, D-64291 Darmstadt, Germany
DL6ZFG to Rolf Rahne, POB 15, D-39241 Gommern, Germany
EI4GK to John J. Donelan, Ballybride Road, Shankill, Co. Dublin, Ireland
FR5FD to Patrick Lebeaume, 40 rue Louis Desjardines, Bois de Nefles, F-97411 Saint Paul, Reunion Island via France
HA5FA to Eugene Matzon, POB 213, H-1502 Budapest 112, Hungary
HK3PDX to John J Velasquez H, POB 18765, Bogota, Colombia
HK4CZE to Jorge Alfredo Mejia Piedrahita, CLL 4SUR # 43A-195, Medellin, Colombia
HZ1MD to Mohamad Daigania, POB 864, Riyadh 11342, Saudia Arabia
LXØHQ July 14/15, 2001 to LX1KQ, Mich Friederich, 2 Rue de Heffingen, L-6170 Godbrange, Luxembourg
OD5NH only to Puzant Azirian, POB 80903, Beirut, Lebanon
OHØXX to Olli Rissanen, #599, 1313 So. Military Trail, Deerfield Beach, FL, 33442 USA
OH7KA to Ari Kosonen, Sidoskuja 3 C 11, FIN-33820 Tampere, Finland
RX3RC to Roman A. Novikov, POB 21, 392000 Tamboy, Russia
S53R to Robert Kasca, Beblerjeva 2, SI-5280 Idrija, Slovenia
SV1CEI QSL via Bureau
TI2JJP to Jose Pastora, POB 2048-2050, San Pedro Montes Oca, San Jose, Costa Rica
UR5EAW to Shevchenko Alexander I., Pelina Str 29, Dnepropetrovsk, 49107 UR , Ukraine <ur5eaw@qsl.net>
VK3IO to R P Tremayne, POB 1, Cockatoo Vic. 3781, Australia
W1AW/6 July 14/15, 2001 to ARRL, 225 Main St., Newington, CT 06111 USA
XV2A 1993 to JA1AH, Yukio Komiya 1-21-4, Komone; Itabashi, Tokyo 173; Japan
YC5XIP as of June 2001 I1WFF is NOT the QSL Manager
YK1SX via Omar, YK1AO, "There is nobody licensed under that call in Syria."
ZC4DW to Dez Watson, C.A.O., JSSU AN, BFPO 59, Cyprus

(The table of QSL Managers is courtesy of John Shelton, K1XN, editor of "The Go List," P.O. Box 3071, Paris, TN 38242; phone 901-641-0109; e-mail: <golist@wk.net>.)

Rob, VK2XZ, has been on the air for 12 years. He is dedicating his operation to 10 meter DXing for this solar cycle and hopes to concentrate on 6 meters for the next one. The stacked 5-element monobanders in the photo on the right attest to his dedication to 10 meters. (Photo courtesy John, KDØJL)

DXing this summer has been down from past summers. Although we have seen some DXpeditions, there doesn't seem to have been the number of them that I recall in recent years. Perhaps it's the world economy, or the fact that there just aren't that many rare ones to go to these days. Someone commented recently that there are a *lot* of fairly easy places to go that are much needed. A lot of African countries that are accessible are slowly climbing the Most Wanted ladder again due to a long period of inactivity. One doesn't need to go to South Sandwich or Heard Island to make a lot of DXers happy these days. A case in point is the operation from Somalia by Baldur, DJ6S, back in June.

Give some thought to the subjects I have raised in this column. If you have any comments, pro or con, feel free to convey them to me. I've been at this business for nearly 50 years now, but I don't have all of the answers.

73, Carl, N4AA

Awards

BY TED MELINOSKY, K1BV

News Of Certificate And Award Collecting

Tom Greenway, K4PI, USA-CA #1019, CW mobile.

This month we begin with the story of Tom Greenway, K4PI, USA-CA All Counties #1019. This year he not only completed USA-CA, he also achieved *CQ*'s 5 Band WAZ Award.

My beginnings in county hunting started with the state QSO parties around 1960 while I was still in high school in Elbert County, Georgia. My callsign at that time was K4TBN. This was all mostly CW with my trusty Hallicrafters SX-99 and Viking Challenger at 100 watts. I recall getting my first county hunter record book around 1961. Little did I know it would take another 40 years to fill it up. I still have it, although it has been glued back together many times.

After high school I attended an electronic tech school for a couple of years, after which I got a job with Georgia Educational TV. Now that I had a few bucks to spend I had to get one of those new SSB rigs. I traded in my SX-99 and Challenger on a new Swan 240. It mounted nicely in my Corvair with the power supply between the seats. I had all this in the Corvair when I met my future XYL, Evelyn. I think it was around this time that I ran across the county hunters net on 20 meters.

In 1964 I went into the Air Force. Evelyn and I were married in 1964, and she presently holds the call K4AM. We were sent to Jacksonville, Florida in 1965, and this is where I got into going after counties on the net. I built an AC supply for the Swan 240 so I could run it in the apartment. I ran coax out to the mobile antenna on the old Corvair. Eventually we went big time and got a fixed vertical. I used the mobile to put out north Florida and south Georgia counties.

Time marched on, and after the Air Force I worked for RCA Computer Systems and Univac for several years, eventually getting a job at Delta Airlines, where I am still employed in aircraft simulator maintenance. We live in Douglas County, Georgia.

65 Glebe Road, Spofford, NH 03462-4411
e-mail: <k1bv@cq-amateur-radio.com>

USA-CA Special Honor Roll

Gordon Nightingale, KL7GN
USA-CA All Counties #1023
May 25, 2001

Yasutada Ninomiya, JH8GWW
USA-CA All Counties #1024
June 1, 2001

Lloyd Gulash, VE4AGT
USA-CA All Counties #1025
June 19, 2001

My interest in county hunting seemed to come and go over the years as other interests took over. DXing and contesting have been my main areas of concentration. I found the CW county hunters net and have been enjoying it also.

The last few years I felt like I needed to finish working them all, so I put a little more concentration into doing that. I started trying to compile a list of everyone who had helped me over the years and it got too large, but I do want to acknowledge Jim, K2JG/KZ2P. He was always there with a signal that you have no trouble hearing even when you are mobile. I remember a lot of times in the old days when it was hard to get through to the net control if you could here them, but these last few years it seemed as if every day Jim was there keeping things in neat order. I know there were some other net controls, and my hat is off to them also.

When I got near the end I wondered what that last county would be. Unfortunately, it turned out to be Powder River, Montana. It was in mid-winter when it is hard to find mobile traveling through that area. Jim, KØEVE, contacted me and told me he was headed that way, so I made sure I was home that day. It was one of those windy days, and the power-line noise was S7 in his direction. Fortunately, I was able to pull him out of the noise, and just for good measure I went down to the CW county hunters and worked him there also.

This has been a banner year, as I finished up 5 Band WAZ, which I had been working on for years, about the same time as I got the last county. After finishing them all I still enjoy handing out counties from my present mobile—an FT-920 and screwdriver antenna. Special thanks to Evelyn for putting up with my trying to complete this award.

—73, Tom, K4PI

USA-CA Topics

June was another excellent month with three DX station completers, including the first station ever to complete USA-CA from Japan. Yas, JH8GWW, finished on June 1st, and his story will be featured in the October column.

USA-CA Honor Roll

500
KL7GN.....3161
WO8L 3162
VE4AGT 3163
LU5FT.....3164
F5MAE.....3165

1000
KL7GN.....1575
WO8L 1576
VE4AGT 1577

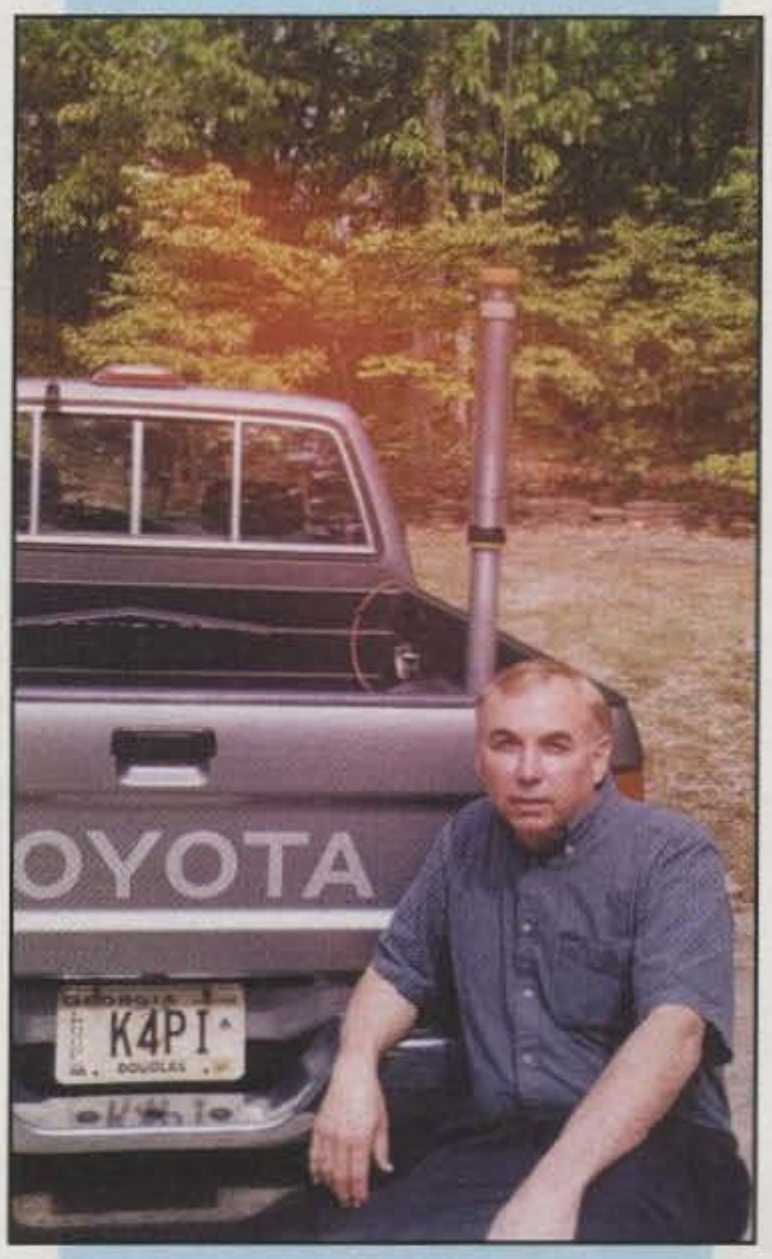
1500
KL7GN.....1314
WO8L 1315
VE4AGT 1316

2000
KL7GN.....1214
WO8L 1215
VE4AGT 1216

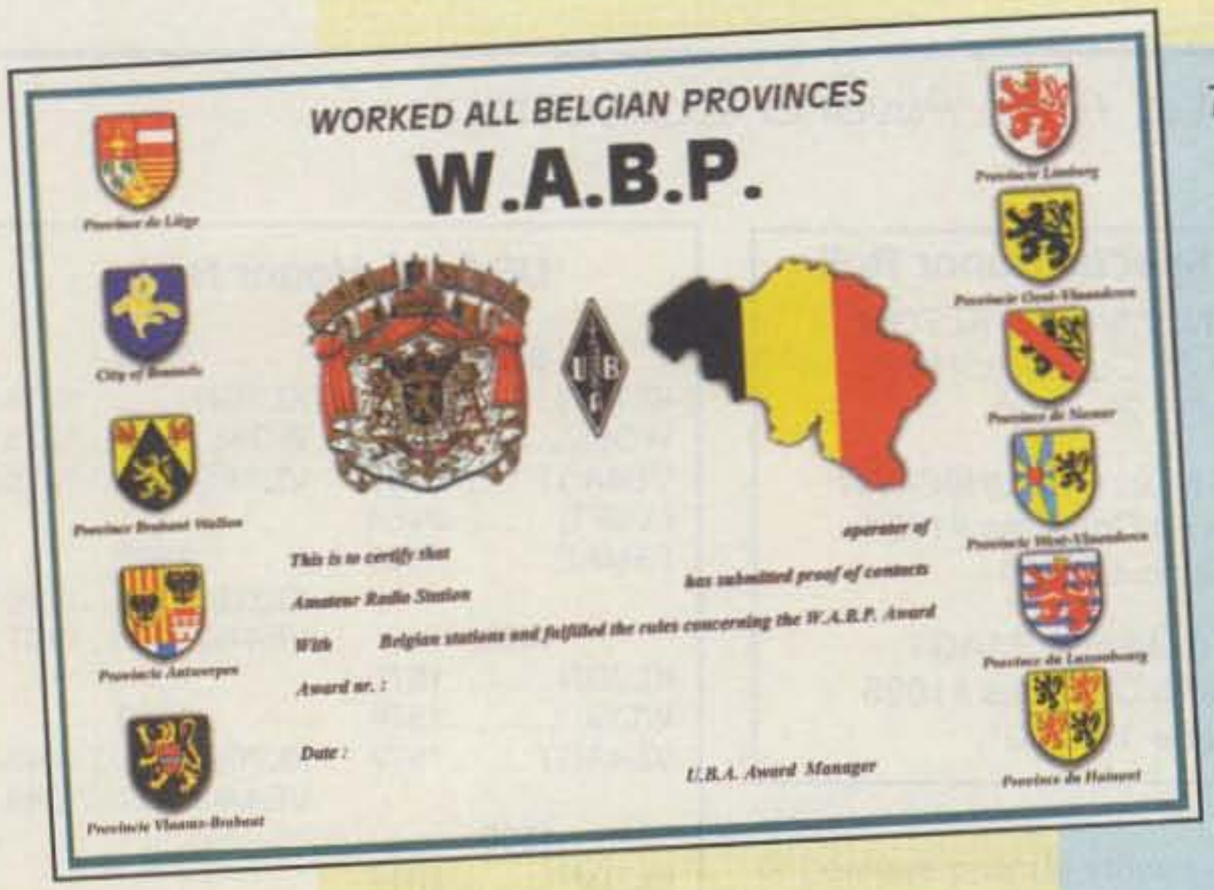
2500
KL7GN.....1136
VE4AGT 1137

3000
KL7GN.....1043
VE4AGT 1044

The total number of counties for credit for the United States of America Counties Award is 3076. 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, 65 Glebe Road, Spofford, NH 03462-4411 USA. DX stations must include extra postage for airmail reply.



K4PI hands out counties from his mobile with a Yaesu FT-920 and a screwdriver antenna.



The Worked All Belgian Provinces Award is issued by the Union Belge des Amateurs-Emetteurs.

Issued by the European Community, this award publicizes the objectives of EC member countries.

A recent question by e-mail asked if contacts made under different callsigns will count. Another asks if all contacts must be made from the same country. The answer to these questions is that all contacts made by the applicant will count for USA-CA regardless of the band, mode, date, or country from which the contact was made, or the call used as long as you made the contact. USA-CA is the least exclusionary award you will find, and if the contact is a new county, you can count it.

Belgium's UBA Award Series

This month I am pleased to be able to feature the awards program of the Belgian National Society, UBA, administered by Egbert Hertsen, ON4CAS. The MCL Award is from Egbert's own club in Mechelen. None of these awards should be very difficult to attain, as Belgians are usually available in large numbers during any of the European or World-Wide DX contests.

General Requirements: The awards are issued by Union Belge des Amateurs-Emetteurs (UBA) to amateurs and SWLs, all bands and modes. GCR lists and fee are noted with each award. Apply to: Egbert Hertsen, ON4CAS, Postbus 85, Mechelen 2, B-2800 Mechelen, Belgium.

Worked All Belgian Provinces. Europeans must contact all ten Belgian provinces and the city of Brussels on at least two bands—22 contacts in all. DX stations need one QSO in each province, plus Brussels (total of 11 contacts). Contacts after 1 January 1995 count for the award.

The Belgian provinces are: Antwerpen (AN), Hainaut (HT), Luxembourg (LU), Limburg (LB), Namur (NM), Brabant Walon (BW), Liege (LG), Oost-Vlaanderen (OV), Vlaams-Brabant (VB), and West Blaanderen (WV). (Contacts with VB [Vlaams Brabant] and BW [Brabant Walon] count only starting 1 January 1995.) Fee of $US7 or 10 IRCs.

European Community Award. This award is issued by the European Community (EC) to publicize the objectives of its member countries. The basic requirement consists of working 225 different stations from the member countries. The countries and associated prefixes are as follows: Austria (OE), Belgium (ON), Denmark (OZ), Finland (OH/OJØ), France (F/TK), Germany (DL), Greece (SV/SV5/SV9/SY), Ireland (EI), Italy (I/IS/IT), Luxembourg (LX), The Netherlands (PA), Portugal (CT/CU, starting 1 January 1995), Spain (EA/EA6), United Kingdom (G/GD/GI/GJ/GM/GU/GW/ZB2), and Sweden (SM).

There are two ways to log 15 × 15 different stations, either CW, SSB, or Mixed. There is no mode restriction or endorsement.

Outside UBA contests: Work or log 225 different stations from the EC member countries, with at least 6 different stations from each of the 15 member countries. No more than 30 stations from a single country may be used to reach the 225 contacts.

During the UBA contests: Work or log 225 different stations from EC member countries. At least two different stations from each of the 15 EC countries are required. No more than 35 stations from a single EC country may be used.

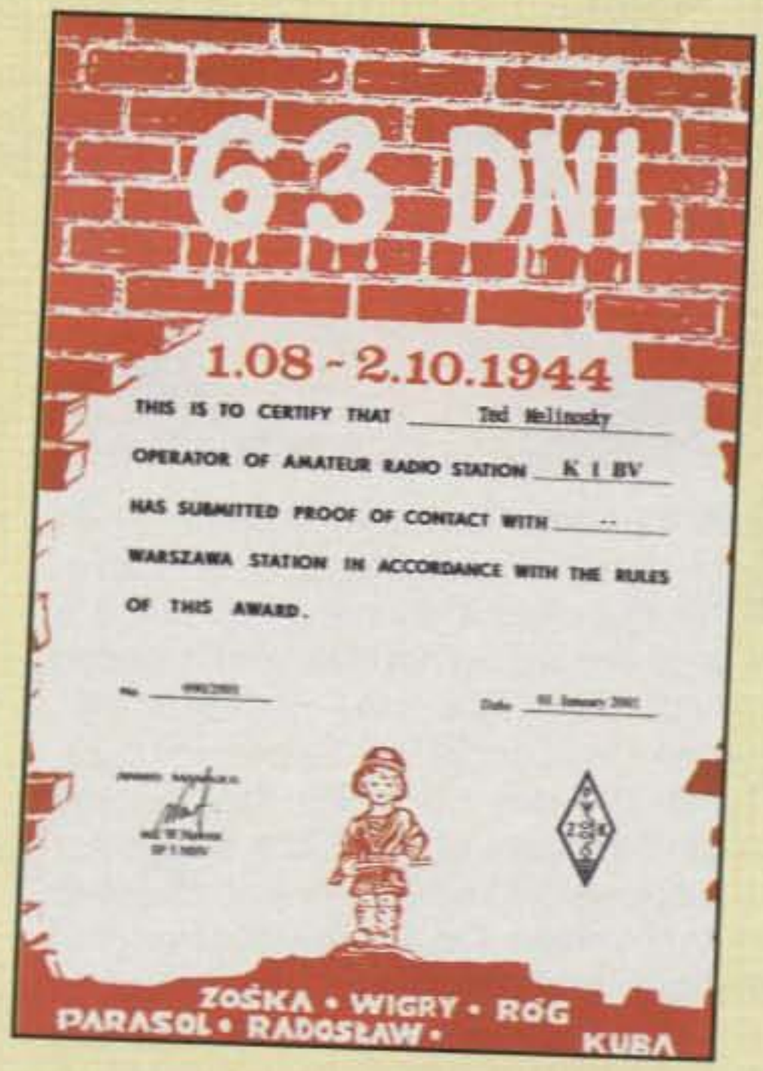
All contacts should be logged during the UBA contests from up to four consecutive years, starting not earlier than 1994. Only QSOs from UBA contests for which a log was submitted to the contest manager within the stated contest time limit may be considered. A missing LX or SV QSO during the UBA contests may be replaced by three other QSOs from the same country outside the contest.

Joker: A contact with OR5EEC, club station of the EC in Brussels, may be used to replace a maximum of three missing contacts.

Send GCR list and copies of all referenced contest logs if you are using this method. The fee for non-contest mode applications is 7 IRCs, $US4, or the equivalent. Contest mode applications are free of charge.

To achieve the MCL Award contact members of the Mechelen division of the UBA.

The Forsyth ARC sponsors the WANC award for contacting all 100 North Carolina counties.



Poland's 63 DNI Award commemorates the anniversary of the Warsaw Uprising in 1944.

MCL Award. Contact members of the Mechelen division of the UBA after 1 October 1981. SWL members also count. The award is available in two classes:

Class 1—Belgians need 15 points, other EU 7, all others 5.

Class 2—Belgians need 10 points, other EU 5, and all others 3.

There are no band restrictions. Each station may be contacted once. Point values: FM = 1, SSB = 2, other modes = 3. Belgians must include at least eight MCL members for Class 1 and at least five for Class 2. MCL club stations ON4AGL and ONL-486 count 1 point extra in each mode. The member list is available from the sponsor for an SASE.

If contacts are made during the annual ON contest, a log extract will be accepted. GCR list okay. Fee for Class 1 = BEF150, $US7, DM10, or 10 IRCs. Fee for Class 2 = BEF100, DM7, $US5, or 7 IRCs.

The 63 DNI (63 days) Award From Poland

You probably will receive this issue of *CQ* in late August. Each year between 1 August and 2 October you may work stations in Warsaw, Poland for the 63 DNI Award. This award honors the anniversary of the famous Warsaw Uprising in 1944 during the Nazi occupation of Poland. Earn a total of 63 points between the above dates with Polish stations in Warsaw. SWL okay. Point value of Warsaw stations is as follows:

• any contact with SP5NHV, SO5DC, SO5PW, SN5PW, 3Z5PW, 3Z5NHV, 3ZØPW = 23 points.

• contacts with 3Z7PW, SN7PW, SN8PW, SNØZPW, SNØPW, and SPØPW = 20 points.

• contacts with any Scout Club stations (SP5Z...) = 15 points.

• contacts with other club stations (SP5K, SP5P, SP5Y) = 8 points.

• contacts with individual stations in Warsaw = 5 points.

For non-European stations, these point values may be multiplied by two. All bands and modes. Send GCR list and fee of $US8, DM10, or 8 IRCs to: Wlodzimierz Nawrot, DL3KDC, Erzbergerallee 86, D-52066 Aachen, Germany.

Worked All North Carolina Counties Award

Not all US states have individual state awards for working their counties. For some time North Carolina was among that group. Ed Swiderski, KU4BP, and his club have just changed that with the following award.

The Forsyth Amateur Radio Club, W4NC, in Winston Salem, North Carolina, sponsors the WANC Award for any stations who submit proof of two-way contact with stations in all 100 North Carolina counties. Endorsements are available for any mode, any single band, or five bands. All contacts must be made using the same mode. No use of repeater or cross-mode contacts allowed.

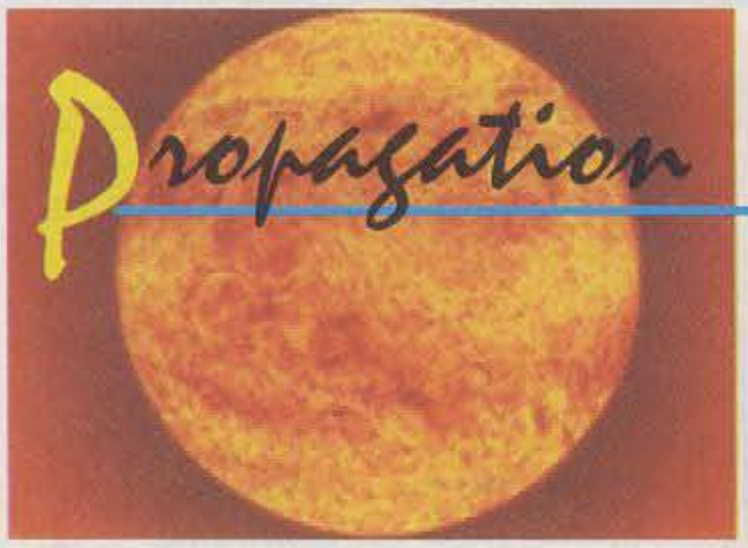
Use the application sheet available from the sponsor for an SASE or via e-mail file to the address shown below. Cards are not required. Send GCR list signed by two non-family amateur licensees General class or higher. USA-CA holders may receive the certificate by submitting their USA-CA number and award date. Fee is $US5. The sponsor reserves the right to spot check any contacts. Send completed application and county record sheets with fee to: Ed Swiderski, KU4BP, 1614 Ethel Drive, Winston Salem, NC 27127.

Website of the Month

The International Police Amateur Radio Club (IPARC) is an active organization open to hams who are employed in law-enforcement activities throughout the world. They have an excellent awards program at: <http://www.iparc.com/Awards/awards.html>.

I'm still very interested in the awards that your club, group, or organization sponsors. Send a sample with rules for the award via snail mail or e-mail listed at the beginning of this column to tell me about them. *CQ* is your source for worldwide awards information!

73, Ted, K1BV



Propagation

BY GEORGE JACOBS, W3ASK

The Science Of Predicting Radio Conditions

"Equinoctal Propagation" for the Start of Fall

It's that time of the year again when the sun is almost directly overhead at the equator. This happens twice a year, in the spring and fall, and is called an *equinox*. The fall, or *autumnal*, equinox will occur on September 22. This is the day on which the sun will cross the plane of the Earth's equator as it appears to travel from northern to southern skies. On this day the hours of daylight and darkness are equal in length throughout the world. Sunrise should take place at approximately 6 AM local time and sunset at about 6 PM local time, no matter where you are in the world.

This results in an ionosphere of almost similar characteristics over large areas of the world and is usually the best time of the year for long DX openings between the temperate regions of the northern and southern hemispheres on all HF bands. Expect considerably more frequent openings from mid-September through mid-October between the US and South America, the South Pacific, South Asia, and southern Africa, particularly on 15, 17, and 20 meters for a few hours after sunrise and during the sunset period.

Long-path openings also improve considerably during the equinoctial period. In western states look for long-path openings to Europe and Africa on 15, 17, and 20 meters shortly after sunrise and again during the early evening. Stations in eastern states can expect some long-path openings to the South Pacific during the late afternoon and early evening, and to parts of eastern Africa and Asia just after sunrise. Long-path openings should also be possible on 30 and 40 meters, and at times on 80 meters, for an hour or so *before* sunrise and just *before* sunset.

September Propagation

During most of September and early October expect variable propagation conditions on the HF bands. On some days conditions should continue to be much the same as they were earlier in the summer, but on other days the first signs of wintertime conditions should be noticeable. For this reason, this month's column contains DX Propagation Charts for the one-month period September 15 to October 15 rather than the usual two-month span. This month's column also contains Short-Skip Propagation Charts for September and October.

During September and early October expect a seasonal increase in 10 and 12 meter DX openings during the daylight hours. Expect some fairly good openings to the Caribbean and South America, and to the South Pacific area and the southern and central portions of Africa, particularly during the afternoon hours. When conditions are High Normal or better, openings should be possible to most other areas of the world as well.

A considerable improvement is expected for DX propagation on the 15 and 17 meter bands. Both bands should open for DX shortly after sunrise and remain open until after sundown. Openings should be possible to all areas of the world, with conditions best toward Europe and the northeast before noon, and to the rest of the world during the afternoon hours. Openings toward the South Pacific, Australia, New Zealand, and the Far East should be possible well into the early evening, particularly when propagation conditions are High Normal or better.

It may be a toss-up between 15 and 20 meters for the best DX band during the hours of daylight in September and early October, but the edge probably will go to 20 meters. Look for the band to open for DX at sunrise and remain open

LAST-MINUTE FORECAST

Day-to-Day Conditions Expected for September 2001

	Expected Signal Quality			
Propagation Index.....	(4)	(3)	(2)	(1)
Above Normal: 1, 5, 11-12, 28	A	A	B	C
High Normal: 13-14, 17-18, 21-23, 27, 29	A	B	C	C-D
Low Normal: 2-4, 8-10, 15-16 19-20, 24, 30-31	B	C-B	C-D	D-E
Below Normal: 6, 26	C	C-D	D-E	E
Disturbed: 7, 25	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 S9, with some fading and noise.

D—Poor opening, with weak signals varying between S1 and S6, with considerable fading and noise.

E—No opening expected.

HOW TO USE THIS FORECAST

1. Find the *propagation index* associated with the particular path opening from the Propagation Charts appearing on the following pages.

2. With the *propagation index,* use the above table to find the expected signal quality associated with the path opening for any given day of the month. For example, an opening shown in the Propagation Charts with a *propagation index* of 3 will be excellent (A) on Sept. 1st; fair-to-good (C-B) from the 2nd to the 4th; excellent (A) on the 5th; fair-to-poor (C-D) on the 7th, etc.

Smoothed Sunspot Numbers for Cycle 23

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1996	10	10	10	9	8*	9	8	8	8	9**	10	10
1997	11	11	14	17	18	20	23	25	29	32	35	39
1998	44	49	53	57	59	62	65	68	70	71	73	78
1999	83	85	84	86	91	93	94	98	102	108	111	111
2000	113	117	120	121	119	119	120	119	116	115	113	112
2001	*112*	*112*	*112*	*111*	*111*	*110*	*109*	*108*	*107*	*106*	*105*	*104*
2002	*103*	*102*	*100*	*97*	*95*	*93*	*90*	*88*	*85*	*83*	*80*	*77*

Predicted values appear in italics.
**May 1996 marks the beginning of Cycle 23's mathematical beginning.*
***October 1996 marks the beginning of Cycle 23 according to a consensus of scientists, which NGDC is now using.*

Table I– Smoothed sunspot numbers observed for Cycle 23 through December 2000, as well as predictions made by the National Geophysical Data Center, Boulder, Colorado through 2002. Note that the NGDC shows the peak of Cycle 23 occurred during April 2000 with a count of 121.

11307 Clara Street, Silver Spring, MD 20902
e-mail: <george@gjainc.com>

in all directions for a few hours. It should be possible to work into many areas of the world throughout the daylight hours, but look for a peak in DX propagation conditions during the afternoon hours. Twenty meters should remain open for DX during some of the hours of darkness as well. Nighttime conditions will favor openings toward the south and to tropical areas, but some openings will also be possible to other areas of the world, particularly when conditions are High Normal or better.

Expect an improvement in nighttime DX conditions on 30, 40, 80, and 160 meters during September and early October. This results from the increasing hours of darkness and a seasonal decline in the static level. Thirty and 40 meters should be best for worldwide DX from the sunset through the sunrise period. Check 80 and 160 meters during the hours of darkness, particularly for an hour or so before local sunrise.

For short-skip propagation during September and early October, use 80 meters during the day for openings shorter than 250 miles, and either 80 or 160 meters at night. For distances between 250 and 750 miles try 30 and 40 meters during the day and 80 meters at night. For openings between 750 and 1300 miles the best bet should be 20 meters during the day, 30 and 40 meters from sundown to midnight, and 80 meters from midnight to sunrise. For openings greater than 1300 miles try 15, 17, or 20 meters during the day and 30 and 40 meters during the hours of darkness. Check 10 and 12 meters for some fairly good openings beyond 1300 miles in the afternoon hours, particularly when conditions are High Normal or better.

Progress of Cycle 23

The Royal Observatory of Belgium reports a mean sunspot number of 113 for May 2001. Daily sunspot numbers continue to vary over a relatively wide range. The high count during May was 134 recorded on the 23rd. A low of 55 took place on May 8th.

The mean value for May results in a 12-month running smoothed sunspot number of 113 centered on November 2000. This is a drop of two from last month's smoothed number. The solar cycle is measured by its smoothed monthly numbers. A smoothed sunspot count on the order of 104 is forecast for September 2001.

A corresponding decrease in the 10.7 cm solar flux level was reported. Canada's Dominion Radio Astrophysical Observatory in Penticton, BC, reports a monthly mean of 151 for May 2001. This results in a smoothed value of 172 centered on November 2000. A smoothed level on the order of 170 is forecast for September 2001.

Table I is a listing of smoothed sunspot numbers observed for Cycle 23 from its beginning in October 1996 through December 2000, as well as predictions made by the National Geophysical Data Center (NGDC), Boulder, Colorado, through 2002.

"Solar Blast"

During May, PBS (Public Broadcast Service) featured a televised hour-long documentary, *Solar Blast*. Written, directed, and produced by Malvina Anderson Martin, it takes a dynamic look at the sun during the present period of solar maximum. *Solar Blast* is one of the finest tutorials I have seen when it comes to explaining to laypersons the fury and violence of the sun, as well as the excitement of solar researchers witnessing it. Through the eyes and explanations of these scientists, viewers discover some of the well-kept secrets of the sun.

Through vivid solar imagery and exciting animation, the program discusses a massive solar flare eruption on the face of the sun, striking the Earth's magnetic field with a billion tons of charged particles. Orbiting satellites are fried. The Global Positioning System goes haywire. Military satellites are blinded. Millions of megawatts of unwanted power surge through the Earth's power lines, exploding transformers and shutting down power over large areas of the globe. Communications and radio and television broadcasts are disrupted. Although this scenario sounds like the plot of a science-fiction movie, it all is real and has happened as shown in *Solar Blast*. It is a remarkable documentary!

Call your local PBS television station to see if there may be a rerun scheduled for *Solar Blast*. A video tape of the program is available from the PBS Home Video (item A4225) for $19.95 plus shipping and handling. The video may be ordered by calling toll-free 1-800-645-4727.

CQ WW DX Contest 2001

This year's CQ WW DX Contest will be held on the following dates:

SSB—October 27–28
CW—November 24–25

In this column's tradition for the past 50 years, next month will be devoted to a special, comprehensive forecast focusing on both weekends of the 2001 contest. Besides the usual worldwide band-opening predictions and propagation forecasts, tips also will be included for efficient operation and for maximizing scores during the contest periods. URL web addresses will also be updated for making the most out of the very valuable, useful propagation data available on the internet.

VHF Ionospheric Openings

This month Ken Neubeck, WB2AMU, one of CQ's at-large contributing editors, was invited to write the portion of this column which follows:

The month of September statistically has the lowest amount of activity for sporadic-*E* propagation on 6 meters. At the most there is the possibility of one or two sporadic-*E* openings on 6 appearing during the month and only for an hour or so. There are no long-duration events.

The possibility of *aurora* activity occurring during the month is high, as there is an

HOW TO USE THE DX PROPAGATION CHARTS

1. Use chart appropriate to your transmitter location. The Eastern USA Chart can be used in the 1, 2, 3, 4, 8, KP4, KG4, and KV4 areas in the USA and adjacent call areas in Canada; the Central USA Chart in the 5, 9, and 0 areas; the Western USA Chart in the 6 and 7 areas; and with somewhat less accuracy in the KH6 and KL7 areas.

2. The predicted times of openings are found under the appropriate meter band column (10 through 80 meters) for a particular DX region, as shown in the left-hand column of the charts. An * indicates the best time to listen for 160 meter openings.

3. The propagation index is the number that appears in ( ) after the time of each predicted opening. The index indicates the number of days during the month on which the opening is expected to take place as follows:

(4) Opening should occur on more than 22 days
(3) Opening should occur between 14 and 22 days
(2) Opening should occur between 7 and 13 days
(1) Opening should occur on less than 7 days

Refer to the "Last Minute Forecast" at the beginning of this column for the actual dates on which an opening with a specific propagation index is likely to occur, and the signal quality that can be expected.

4. Times shown in the charts are in the 24-hour system, where 00 is midnight; 12 is noon; 01 is 1 A.M.; 13 is 1 P.M., etc. Appropriate *daylight* time is used, not GMT. To convert to GMT, add to the times shown in the appropriate chart 7 hours in PDT Zone, 6 hours in MDT Zone, 5 hours in CDT Zone, and 4 hours in EDT Zone. For example, 14 hours in Washington, D.C. is 18 GMT. When it is 20 hours in Los Angeles, it is 03 GMT, etc.

5. The charts are based upon a transmitted power of 250 watts CW, or 1 kw, PEP on sideband, into a dipole antenna a quarter-wavelength above ground on 160 and 80 meters, and a half-wavelength above ground on 40 and 20 meters, and a wavelength above ground on 15 and 10 meters. For each 10 dB gain above these reference levels, the *propagation index* will increase by one level; for each 10 dB loss, it will lower by one level.

6. Propagation data contained in the charts has been prepared from basic data published by the Institute for Telecommunication Sciences of the U.S. Dept of Commerce, Boulder, Colorado 80302.

September 15 - October 15, 2001
Time Zone: EDT (24-Hour Time)
EASTERN USA TO:

	10 Meters	*15 Meters*	*20 Meters*	*40/80 Meters*
Western & Central Europe & North Africa	08-10 (1) 10-11 (2) 11-13 (3) 13-15 (2) 15-16 (1)	08-09 (1) 09-11 (2) 11-14 (4) 14-15 (3) 15-17 (2) 17-19 (1)	02-04 (1) 04-06 (2) 06-10 (3) 10-12 (2) 12-15 (3) 15-17 (4) 17-21 (3) 21-02 (2)	18-19 (1) 19-21 (2) 21-23 (3) 23-02 (4) 02-03 (3) 03-04 (2) 04-05 (1) 20-22 (1)* 22-01 (2)* 01-04 (1)*
Northern Europe & European CIS	09-10 (1) 10-13 (2) 13-14 (1)	08-09 (1) 09-10 (2) 10-13 (3) 13-14 (2) 14-16 (1)	03-06 (1) 06-08 (2) 08-11 (3) 11-13 (2) 13-17 (3) 17-19 (2) 19-21 (1)	18-20 (1) 20-04 (2) 04-06 (1) 21-04 (1)*
Eastern Mediterranean & Middle East	09-10 (1) 10-12 (2) 12-14 (1)	08-09 (1) 09-12 (2) 12-14 (3) 14-16 (2) 16-18 (1)	07-09 (2) 09-15 (1) 15-17 (2) 17-21 (3) 21-23 (2) 23-01 (3) 01-03 (2) 03-07 (1)	19-21 (1) 21-00 (2) 00-01 (1) 22-00 (1)*
Western Africa	09-12 (1) 12-14 (2) 14-16 (4) 16-17 (3) 17-18 (2) 18-19 (1)	07-09 (1) 09-13 (2) 13-15 (3) 15-17 (4) 17-19 (3) 19-20 (2) 20-22 (1)	05-08 (2) 08-15 (1) 15-17 (2) 17-21 (4) 21-00 (3) 00-03 (2) 03-05 (1)	20-23 (1) 23-02 (2) 02-04 (1) 00-03 (1)*
Eastern & Central Africa	10-12 (1) 12-14 (2) 14-16 (3) 16-17 (2) 17-18 (1)	08-10 (1) 10-13 (2) 13-14 (3) 14-16 (4) 16-18 (3) 18-19 (2) 19-20 (1)	12-14 (1) 14-17 (2) 17-22 (3) 22-02 (2) 02-03 (1)	20-02 (1) 00-01 (1)*
Southern Africa	09-11 (1) 11-12 (2) 12-13 (3) 13-14 (2) 14-15 (1)	08-11 (1) 11-12 (2) 12-13 (3) 13-15 (4) 15-16 (3) 16-17 (2) 17-18 (1)	06-08 (2) 08-15 (1) 15-16 (2) 16-19 (3) 19-00 (2) 00-03 (3) 03-04 (2) 04-06 (1)	19-22 (1) 22-00 (2) 00-02 (1) 23-01 (1)*
Central & South Asia	09-11 (1) 19-22 (1)	08-09 (1) 09-12 (2) 12-13 (1) 20-22 (1)	07-08 (1) 08-10 (2) 10-12 (1) 17-19 (1) 19-22 (2) 22-01 (1)	05-07 (1) 20-23 (1)
Southeast Asia	11-14 (1) 18-21 (1)	08-09 (1) 09-11 (2) 11-13 (1) 13-15 (2) 15-19 (1) 19-21 (2) 21-22 (1)	06-07 (1) 07-10 (2) 10-12 (1) 15-18 (1) 20-21 (1) 21-00 (2) 00-02 (1)	06-08 (1)
Far East	09-11 (1) 18-20 (1)	08-09 (1) 09-11 (2) 11-13 (1) 16-18 (1) 18-20 (2) 20-22 (1)	07-08 (1) 08-10 (3) 10-12 (2) 12-14 (1) 18-20 (1) 20-22 (2) 22-00 (1) 00-03 (2) 03-04 (1)	05-08 (1) 18-19 (1) 05-07 (1)*
South Pacific & New Zealand	09-14 (1) 14-15 (2) 15-16 (3) 16-18 (4) 18-19 (3) 19-20 (2) 20-22 (1)	08-09 (1) 09-11 (2) 11-14 (1) 14-17 (2) 17-18 (3) 18-20 (4) 20-21 (3) 21-22 (2) 22-00 (1)	12-20 (1) 20-22 (2) 22-00 (3) 00-02 (4) 02-04 (3) 04-08 (2) 08-10 (3) 10-12 (2)	01-02 (1) 02-03 (2) 03-06 (3) 06-08 (2) 08-09 (1) 03-05 (1)* 05-07 (2)* 07-08 (1)*
Australasia	10-12 (1) 14-16 (2) 17-18 (3) 18-19 (2) 19-21 (1)	08-09 (1) 09-10 (2) 10-12 (3) 12-14 (2) 14-17 (1) 17-18 (2) 18-20 (4) 20-21 (2) 21-23 (1)	07-09 (2) 09-11 (3) 11-13 (2) 13-16 (1) 16-18 (2) 18-21 (1) 21-23 (2) 23-02 (3) 02-04 (2) 04-07 (1)	02-04 (1) 04-06 (2) 06-07 (3) 07-08 (2) 08-09 (1) 04-05 (1)* 05-06 (2)* 06-07 (1)*
Caribbean, Central America & Northern Countries of South America	08-09 (1) 09-10 (2) 10-17 (4) 17-18 (3) 18-19 (2) 19-20 (1)	06-07 (1) 07-08 (2) 08-11 (4) 11-13 (3) 13-18 (4) 18-20 (3) 20-21 (2) 21-22 (1)	03-05 (2) 05-07 (3) 07-10 (4) 10-14 (2) 14-16 (3) 16-23 (4) 23-03 (3)	19-20 (1) 20-21 (2) 21-04 (4) 04-06 (3) 06-07 (2) 07-08 (1) 21-23 (1)* 23-04 (2)* 04-06 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	08-09 (1) 09-13 (2) 13-15 (3) 15-17 (4) 17-18 (3) 18-19 (2) 19-20 (1)	06-07 (1) 07-08 (2) 08-11 (3) 11-15 (2) 15-16 (3) 16-19 (4) 19-21 (3) 21-22 (2) 22-23 (1)	10-16 (1) 16-17 (2) 17-18 (3) 18-00 (4) 00-03 (3) 03-05 (2) 05-07 (3) 07-10 (2)	21-00 (1) 00-04 (2) 04-06 (1) 01-05 (1)*
McMurdo Sound, Antarctica	15-19 (1)	11-15 (1) 15-17 (2) 17-21 (3) 21-22 (2) 22-23 (1)	16-17 (1) 17-20 (2) 20-03 (3) 03-05 (2) 05-07 (1) 07-09 (2) 09-10 (1)	23-01 (1) 01-05 (2) 05-07 (1) 04-06 (1)*

Time Zones: CDT & MDT
(24-Hour Time)
CENTRAL USA TO:

	10 Meters	*15 Meters*	*20 Meters*	*40/80 Meters*
Western & Southern Europe & North Africa	09-11 (1) 11-13 (2) 13-14 (1)	08-10 (1) 10-12 (2) 12-14 (3) 14-16 (2) 16-17 (1)	06-07 (1) 07-10 (2) 10-13 (1) 13-14 (2) 14-16 (4) 16-18 (3) 18-23 (2) 23-03 (1)	18-20 (1) 20-23 (2) 23-01 (3) 01-02 (2) 02-03 (1) 21-23 (1)* 23-01 (2)* 01-02 (1)*
Northern & Central	09-13 (1)	08-09 (1) 09-11 (2)	06-07 (1) 07-10 (2)	20-23 (1) 23-01 (2)

Europe & European CIS		11-12 (3) 12-13 (2) 13-15 (1)	10-12 (1) 12-13 (2) 13-17 (3) 17-19 (2) 19-21 (1)	01-02 (1) 22-01 (1)
Eastern Mediter-ranean & Middle East	10-13 (1)	08-09 (1) 09-11 (2) 11-13 (3) 13-14 (2) 14-16 (1)	06-07 (1) 07-09 (2) 09-14 (1) 14-16 (2) 16-20 (3) 20-22 (2) 22-00 (3) 00-01 (2) 01-02 (1)	20-23 (1) 21-23 (1)*
Western Africa	10-12 (1) 12-14 (2) 14-16 (3) 16-17 (2) 17-18 (1)	07-10 (1) 10-13 (2) 13-15 (3) 15-17 (4) 17-18 (3) 18-20 (2) 20-21 (1)	05-08 (2) 08-15 (1) 15-17 (2) 17-19 (3) 21-23 (3) 23-02 (2) 02-05 (1)	20-23 (1) 23-01 (2) 01-02 (1) 23-01 (1)*
Eastern & Central Africa	11-13 (1) 13-16 (2) 16-17 (1)	09-10 (1) 10-13 (2) 13-17 (3) 17-18 (2) 18-19 (1)	13-15 (1) 15-17 (2) 17-20 (3) 20-23 (2) 23-00 (1) 07-09 (1)	21-00 (1)
Southern Africa	09-11 (1) 11-12 (2) 12-13 (3) 13-14 (2) 13-15 (1)	07-09 (1) 09-12 (2) 12-13 (3) 13-15 (4) 15-16 (3) 16-17 (2) 17-18 (1)	06-08 (2) 08-14 (1) 14-16 (2) 16-19 (3) 19-22 (2) 22-01 (3) 01-05 (1)	20-21 (1) 21-23 (2) 23-01 (1) 21-23 (1)*
Central & South Asia	09-11 (1) 19-21 (1)	09-11 (1) 18-19 (1) 19-21 (2) 21-22 (1)	07-08 (1) 08-10 (2) 10-12 (1) 17-19 (1) 19-22 (2) 22-01 (1)	06-08 (1) 19-21 (1)
Southeast Asia	10-12 (1) 12-13 (2) 13-15 (1) 17-18 (1) 18-19 (2) 19-20 (1)	09-11 (1) 11-13 (2) 13-15 (1) 18-19 (1) 19-20 (2) 20-22 (1)	07-08 (1) 08-09 (2) 09-10 (3) 10-11 (2) 11-13 (1) 16-20 (1) 20-23 (2) 23-02 (1)	05-09 (1)
Far East	15-17 (1) 17-19 (2) 19-20 (1)	10-16 (1) 16-18 (2) 18-21 (3) 21-22 (2) 22-23 (1)	07-08 (1) 08-10 (3) 10-12 (2) 12-16 (1) 16-19 (2) 19-21 (1) 21-23 (2) 23-00 (3) 00-01 (2) 01-03 (1)	03-05 (1) 05-08 (2) 08-09 (1) 06-08 (1)
South Pacific & New Zealand	11-13 (1) 13-14 (2) 14-15 (3) 15-18 (4) 18-19 (3) 19-20 (2) 20-22 (1)	08-09 (1) 09-15 (2) 15-17 (3) 17-20 (4) 20-21 (3) 21-22 (2) 22-00 (1)	04-08 (2) 08-11 (3) 11-13 (2) 13-18 (1) 18-20 (2) 20-22 (3) 22-02 (4) 02-04 (3)	00-01 (1) 01-06 (3) 06-08 (4) 08-09 (2) 09-10 (1) 02-04 (1)* 04-07 (2)* 07-08 (1)*
Australasia	09-13 (1) 13-15 (2) 15-16 (3) 16-18 (4) 18-19 (3) 19-20 (2) 20-22 (1)	08-09 (1) 09-11 (2) 11-15 (1) 15-16 (2) 16-18 (3) 18-20 (4) 20-21 (3) 21-22 (2) 22-23 (1)	06-08 (2) 08-11 (3) 11-13 (2) 13-16 (1) 16-18 (2) 18-20 (1) 20-22 (2) 22-00 (3) 00-02 (4) 02-04 (3)	02-03 (1) 01-06 (3) 05-07 (3) 07-08 (2) 08-09 (1) 05-06 (1)* 06-07 (2)* 07-08 (1)*
Caribbean, Central America & Northern Countries of South America	08-09 (1) 09-10 (2) 10-12 (3) 12-16 (4) 16-17 (3) 17-18 (2) 18-19 (1)	07-08 (1) 08-09 (2) 09-11 (4) 11-14 (3) 14-18 (4) 18-19 (3) 19-20 (2) 20-21 (1)	07-10 (4) 10-12 (3) 12-14 (2) 14-16 (3) 16-23 (4) 23-03 (3) 03-05 (2) 05-07 (3)	19-20 (1) 20-21 (2) 21-22 (3) 22-05 (4) 05-06 (3) 06-07 (2) 07-08 (1) 20-23 (1)* 23-05 (2)* 05-07 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina, & Uruguay	08-09 (1) 09-12 (2) 12-14 (1) 14-15 (2) 15-16 (3) 16-18 (4) 18-19 (2)	07-08 (1) 08-09 (2) 09-11 (3) 11-15 (2) 15-16 (3) 16-20 (4) 20-22 (3)	11-16 (1) 16-17 (2) 17-20 (3) 20-01 (4) 01-04 (3) 04-06 (2) 06-08 (3)	21-00 (1) 00-05 (2) 05-07 (1) 01-06 (1)*
	19-20 (1)	22-23 (2) 23-00 (1)	08-11 (2)	
McMurdo Sound, Antarctica	16-19 (1)	12-15 (1) 15-18 (2) 18-21 (3) 21-22 (2) 22-23 (1)	16-18 (1) 18-22 (2) 22-01 (3) 01-04 (2) 04-08 (1) 08-10 (2) 10-11 (1)	23-01 (1) 01-05 (2) 05-07 (1) 05-07 (1)*

Time Zone: PDT (24-Hour Time) WESTERN USA TO:

	10 Meters	*15 Meters*	*20 Meters*	*40/80 Meters*
Western & Southern Europe & North Africa	09-12 (1)	08-09 (1) 09-10 (2) 10-12 (3) 12-13 (2) 13-15 (1) 22-00 (1)	06-07 (1) 07-10 (2) 10-12 (1) 12-14 (2) 14-17 (3) 17-19 (2) 19-21 (1) 23-01 (1)	20-21 (1) 21-23 (2) 23-00 (1) 21-23 (1)*
Central & Northern Europe & European CIS	09-11 (1)	08-09 (1) 09-11 (2) 11-13 (1)	06-07 (1) 07-09 (2) 09-12 (1) 12-17 (2) 17-18 (1) 21-23 (1)	20-21 (1) 21-22 (2) 22-23 (1) 21-22 (1)*
Eastern Mediter-ranean & Middle East	09-11 (1)	08-09 (1) 09-10 (2) 10-11 (3) 11-12 (2) 12-13 (1) 20-22 (1)	06-07 (1) 07-09 (2) 09-14 (1) 14-16 (3) 16-20 (1) 20-23 (2) 23-01 (1)	20-23 (1)
Western & Central Africa	09-11 (1) 11-12 (2) 12-14 (3) 14-15 (2) 15-17 (1)	08-10 (1) 10-13 (2) 13-15 (3) 15-17 (4) 17-18 (3) 18-19 (2) 19-20 (1)	01-07 (1) 07-09 (2) 09-14 (1) 14-15 (2) 15-16 (3) 16-20 (4) 20-23 (3) 23-01 (2)	21-00 (1)
Eastern Africa	11-13 (1) 13-15 (2) 15-16 (1)	09-13 (1) 13-14 (2) 14-16 (3) 16-17 (2) 17-18 (1)	07-09 (1) 12-15 (1) 15-17 (2) 17-19 (3) 19-21 (2) 21-23 (1)	20-23 (1)
Southern Africa	09-10 (1) 10-12 (2) 12-14 (1)	07-09 (1) 09-11 (2) 11-14 (3) 14-16 (2) 16-17 (1)	01-07 (1) 07-09 (2) 09-10 (1) 12-16 (2) 16-20 (3) 20-01 (2)	19-22 (1)
Central & South Asia	09-11 (1) 17-19 (1)	08-11 (1) 16-17 (1) 17-18 (2) 18-19 (3) 19-20 (2) 20-21 (1)	02-08 (2) 08-10 (3) 10-12 (2) 12-17 (1) 17-21 (2) 21-02 (1)	06-08 (1) 19-21 (1)
Southeast Asia	09-10 (1) 10-11 (2) 11-12 (1) 16-17 (1) 17-18 (2) 18-19 (1)	07-10 (1) 10-13 (2) 13-16 (1) 16-18 (2) 18-19 (3) 19-20 (2) 20-21 (1)	03-07 (2) 07-09 (3) 09-12 (2) 12-13 (1) 21-22 (1) 22-01 (2) 01-03 (3)	01-03 (1) 03-06 (2) 06-08 (1)
Far East	15-16 (1) 16-17 (2) 17-18 (3) 18-19 (2) 19-20 (1)	09-11 (1) 14-15 (1) 15-18 (2) 18-19 (3) 19-20 (4) 20-21 (2) 21-22 (1)	04-07 (2) 07-10 (4) 10-13 (3) 13-15 (2) 15-20 (1) 20-22 (2) 22-00 (3) 00-02 (4) 02-04 (3)	01-03 (1) 03-07 (2) 07-08 (3) 08-09 (1) 03-05 (1)* 05-07 (2)* 07-08 (1)*
South Pacific & New Zealand	10-12 (1) 12-13 (2) 13-14 (3) 14-18 (4) 18-19 (3) 19-20 (2) 20-22 (1)	07-09 (1) 09-10 (2) 10-12 (3) 12-14 (2) 14-16 (3) 16-21 (4) 21-23 (3) 23-01 (2) 01-02 (1)	14-17 (1) 17-19 (2) 19-21 (3) 21-02 (4) 02-04 (3) 04-08 (2) 08-09 (3) 09-11 (4) 11-12 (3) 12-14 (2)	21-22 (1) 22-23 (2) 23-00 (3) 00-05 (4) 05-07 (3) 07-08 (2) 08-09 (1) 23-02 (1)* 02-06 (2)* 06-07 (1)*
Australasia	09-12 (1) 12-14 (2)	07-08 (1) 08-11 (2)	08-10 (4) 10-12 (3)	01-02 (1) 02-03 (2)

	14-15 (3)	11-14 (1)	12-13 (2)	03-06 (3)
	15-18 (4)	14-15 (2)	13-15 (1)	06-08 (2)
	18-19 (3)	15-17 (3)	15-18 (2)	08-09 (1)
	19-21 (2)	17-21 (4)	18-20 (1)	02-04 (1)*
	21-22 (1)	21-22 (3)	20-22 (2)	04-06 (2)*
		22-23 (2)	22-23 (3)	06-07 (1)*
		23-00 (1)	23-02 (4)	
			02-04 (3)	
			04-08 (2)	
Caribbean, Central America & Northern Countries of South America	08-09 (1)	07-08 (1)	06-07 (3)	19-20 (1)
	09-10 (2)	08-09 (3)	07-09 (4)	20-21 (2)
	10-12 (3)	09-11 (4)	09-11 (3)	21-22 (3)
	12-15 (4)	11-13 (3)	11-14 (2)	22-04 (4)
	15-17 (3)	13-17 (4)	14-16 (3)	04-05 (3)
	17-18 (2)	17-19 (3)	16-23 (4)	05-06 (2)
	18-19 (1)	19-20 (2)	23-02 (3)	06-08 (1)
		20-21 (1)	02-06 (2)	20-23 (1)*
				23-04 (2)*
				04-06 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	07-08 (1)	06-07 (1)	09-15 (1)	21-23 (1)
	08-09 (2)	07-08 (2)	15-17 (2)	23-03 (2)
	09-12 (3)	08-10 (3)	17-18 (3)	03-05 (1)
	12-16 (4)	10-15 (2)	18-23 (4)	00-03 (1)*
	16-17 (3)	15-16 (3)	23-03 (3)	
	17-18 (2)	16-19 (4)	03-05 (2)	
	18-19 (1)	19-20 (3)	05-07 (3)	
		20-21 (2)	07-09 (1)	
		21-23 (1)		
McMurdo Sound, Antarctica	14-16 (1)	10-14 (1)	08-10 (1)	22-00 (1)
	16-18 (2)	14-16 (2)	15-17 (1)	00-05 (2)
	18-19 (1)	16-20 (3)	17-19 (2)	05-06 (1)
		20-21 (2)	19-22 (3)	03-05 (1)*
		21-23 (1)	22-00 (4)	
			00-03 (3)	
			03-08 (2)	

HOW TO USE THE SHORT-SKIP CHARTS

1. In the Short-Skip Chart, the predicted times of openings can be found under the appropriate distance column of a particular meter band (10 through 160 meters) as shown in the left-hand column of the chart. For the Alaska and Hawaii Charts the predicted times of openings are found under the appropriate meter band column (15 through 80 meters) for a particular geographical region of the continental USA as shown in the left-hand column of the charts. An * indicates the best time to listen for 160 meter openings. An ** indicates possible 10 meter openings.

2. The *propagation index* is the number that appears in ( ) after the time of each predicted opening. In the Short-Skip Chart, where two numerals are shown within a single set of parentheses, the first applies to the shorter distance for which the forecast is made, and the second to the greater distance. The index indicates the number of *days* during the month on which the opening is expected to take place, as follows:

(4) Opening should occur on more than 22 days
(3) Opening should occur between 14 and 22 days
(2) Opening should occur between 7 and 13 days
(1) Opening should occur on less than 7 days

Refer to the "Last-Minute Forecast" at the beginning of this column for the actual dates on which an opening with a specific *propagation index* is likely to occur, and the signal quality that can be expected.

3. Times shown in the charts are in the 24-hour system, where 00 is midnight; 12 is noon; 01 is 1 AM; 13 is 1 PM, etc. On the Short-Skip Chart appropriate *daylight* time is used at the path midpoint. For example on a circuit between Maine and Florida, the time shown would be EDT, on a circuit between New York and Texas, the time at the midpoint would be CDT, etc. Times shown in the Hawaii Chart are in HST. To convert to daylight time in other USA time zones add 3 hours in the PDT zone; 4 hours in the MDT zone; 5 hours in the CDT zone; and 6 hours in the EDT zone. Add 10 hours to convert from HST to GMT. For example, when it is 12 noon in Honolulu, it is 15 or 3 PM in Los Angeles; 18 or 6 PM in Washington, D.C.; and 22 GMT. Time shown in the Alaska Chart is given in GMT. To convert to *daylight* time in other areas of the USA subtract 7 hours in the PDT zone; 6 hours in the MDT zone; 5 hours in the CDT zone; and 4 hours in the EDT zone. For example, at 20 GMT it is 16 or 4 PM in New York City.

4. The Short-Skip Chart is based upon a transmitted power of 75 watts CW or 300 watts PEP on sideband; the Alaska and Hawaii Charts are based upon a transmitter power of 250 watts CW or 1 KW PEP on sideband. A dipole antenna a quarter-wavelength above ground is assumed for 160 and 80 meters, a half-wave above ground on 40 and 20 meters, and a wavelength above ground on 15 and 10 meters. For each 10 dB gain above these reference levels, the *propagation index* will increase by one level; for each 10 dB loss, it will lower by one level.

5. Propagation data contained in the charts has been prepared from basic data published by the Institute for Telecommunication Sciences of the U.S. Dept. of Commerce, Boulder, Colorado 80302.

CQ Short-Skip Propagation Chart
September & October 2001
Local Daylight Savings Time
At Path Mid-Point (24-Hour Time)

Band	*Distance Between Stations (miles)*			
(meters)	*50-250*	*250-750*	*750-1300*	*1300-2300*
10	Nil	10-19 (0-1)	08-10 (1)	08-09 (1-2)
			10-12 (1-2)	09-10 (1-3)
			12-14 (1-3)	10-12 (2-4)
			14-15 (1-4)	12-14 (3-4)
			15-17 (1-3)	14-15 (4)
			17-19 (1-2)	15-17 (3)
			19-22 (0-1)	17-19 (2)
				19-20 (1-2)
				20-22 (1)
15	Nil	08-10 (0-1)	08-10 (1-2)	08-09 (2)
		10-14 (0-2)	10-14 (2-4)	09-10 (2-3)
		14-15 (-03)	14-15 (3-4)	10-17 (4)
		15-17 (0-2)	15-17 (2-4)	17-20 (3)
		17-21 (0-1)	17-20 (1-3)	20-22 (2-3)
			20-22 (1-2)	22-23 (1-2)
			22-08 (0-1)	23-01 (1)
				01-08 (1-0)
20	12-14 (0-1)	08-10 (0-3)	06-08 (1-2)	06-08 (2)
	14-17 (0-2)	10-12 (0-4)	08-10 (3-4)	08-10 (4)
	17-22 (0-1)	12-14 (1-4)	10-18 (4)	10-14 (4-2)
		14-17 (2-4)	18-22 (3-4)	14-16 (4-3)
		17-18 (1-4)	22-01 (2-3)	16-22 (4)
		18-22 (1-3)	01-03 (2)	22-00 (3-4)
		22-03 (0-2)	03-06 (1)	00-01 (3)
		03-08 (0-1)		01-03 (2)
				03-06 (1-2)
40	08-10 (2-3)	08-10 (3-4)	08-10 (4-2)	08-10 (2-1)
	10-12 (3-4)	10-12 (4-3)	10-12 (3-1)	10-16 (1-0)
	12-18 (4)	12-16 (4-2)	12-16 (2-1)	16-18 (2-1)
	18-20 (3-4)	16-18 (4-3)	16-18 (3-2)	18-20 (3-2)
	20-23 (1-2)	18-20 (4)	18-20 (4-3)	20-04 (4)
	23-06 (0-1)	20-23 (2-4)	20-01 (4)	04-06 (3-4)
	06-08 (1-2)	23-01 (1-4)	01-04 (3-4)	06-08 (4-3)
		01-06 (1-3)	04-06 (3)	
		06-08 (2-3)	06-08 (3-4)	
80	07-09 (3-4)	07-09 (4-2)	07-09 (2-1)	07-09 (1-0)
	09-11 (4)	09-11 (4-1)	09-17 (1-0)	09-17 (0)
	11-19 (4-3)	11-17 (3-1)	17-19 (2-1)	17-19 (1)
	19-00 (4)	17-19 (3-2)	19-21 (3-2)	19-21 (2)
	00-05 (3-4)	19-21 (4-3)	21-22 (4-3)	21-22 (3-2)
	05-07 (2-4)	21-07 (4)	22-06 (4)	22-04 (4-3)
			06-07 (4-3)	04-06 (4-2)
				06-07 (3-1)
160	17-19 (1-0)	18-20 (1-0)	20-21 (1-0)	21-23 (1-0)
	19-21 (2-1)	20-21 (1)	21-23 (3-1)	23-03 (3-2)
	21-06 (4)	21-03 (4-3)	23-03 (3)	03-06 (1)
	06-08 (3-2)	03-06 (3-2)	03-06 (2-1)	06-08 (1-0)
	08-10 (2-1)	06-08 (2-1)	06-08 (1)	
	10-12 (1-0)	08-10 (1-0)		

HAWAII
September & October 2001
Openings Given in Hawaiian Standard Time

To:	*10 Meters*	*15 Meters*	*20 Meters*	*40/80 Meters*
Eastern USA	06-08 (1)	05-06 (1)	11-14 (1)	18-20 (1)
	08-12 (2)	06-08 (2)	14-16 (2)	20-23 (2)
	12-14 (3)	08-12 (1)	16-18 (3)	23-00 (3)
	14-16 (2)	12-16 (2)	18-21 (4)	00-01 (2)
	16-17 (1)	16-18 (3)	21-00 (3)	01-02 (1)
		18-20 (2)	00-04 (2)	20-22 (1)*
		20-22 (1)	04-06 (3)	22-00 (2)*
			06-07 (2)	00-01 (1)*
			07-08 (1)	
Central USA	06-08 (1)	05-06 (1)	09-14 (1)	18-20 (1)
	08-11 (2)	06-08 (2)	14-16 (2)	20-22 (2)
	11-14 (4)	08-10 (1)	16-18 (3)	22-01 (3)
	14-16 (2)	10-12 (2)	18-22 (4)	01-03 (2)
	16-17 (1)	12-14 (3)	22-00 (3)	03-04 (1)
		14-16 (4)	00-04 (2)	21-22 (1)*
		16-18 (3)	04-06 (3)	22-00 (2)*
		18-20 (2)	06-09 (2)	00-02 (1)*
		20-22 (1)		
Western USA	07-09 (1)	06-07 (1)	10-15 (2)	18-19 (1)
	09-11 (2)	07-09 (2)	15-17 (3)	19-20 (2)
	11-14 (4)	09-14 (3)	17-19 (4)	20-02 (4)
	14-16 (3)	14-17 (4)	19-00 (3)	02-04 (3)
	16-18 (2)	17-19 (3)	00-02 (2)	04-05 (2)
	18-19 (1)	19-22 (2)	02-04 (1)	05-06 (1)

Western USA	22-00 (1)	04-06 (2) 06-08 (4) 08-10 (3)	21-22 (1)* 22-23 (2)* 23-02 (3)* 02-03 (2)* 03-04 (1)*

ALASKA
September & October 2001
Openings Given in GMT

To:	*10 Meters*	*15 Meters*	*20 Meters*	*40/80 Meters*
Eastern USA	18-20 (1) 20-23 (2) 23-00 (1) 01-02 (2) 02-03 (1)	16-18 (1) 18-22 (2) 22-01 (3) 00-02 (3) 02-03 (2) 03-04 (1)	14-16 (1) 21-23 (1) 23-00 (2)	08-12 (1)
Central USA	19-21 (1) 21-00 (2) 00-02 (1)	17-19 (1) 19-22 (2) 22-00 (3) 00-02 (4) 02-03 (2) 03-04 (1)	15-17 (1) 21-23 (1) 23-00 (2) 00-04 (3) 04-05 (2) 05-07 (1)	08-11 (1) 11-13 (2) 13-14 (1)
Western USA	20-22 (1) 22-00 (2) 00-02 (3) 02-03 (2) 03-04 (1)	18-21 (1) 21-23 (2) 23-02 (4) 02-03 (3) 03-05 (2) 05-06 (1)	16-18 (1) 18-20 (3) 20-00 (2) 00-02 (3) 02-04 (4) 04-05 (3) 05-06 (2) 06-10 (1)	08-11 (1) 11-14 (2) 14-16 (1) 11-14 (1)*

See explanation in "How To Use Short-Skip Charts."

* Indicates best time for 80 meter openings. Openings on 160 mMeters are also likely to occur during those times when 80 meter openings are shown with a propagation index of (2), or higher.

For 12 meter openings interpolate between 10 and 15 meter openings.
For 17 meter openings interpolate between 15 and 20 meter openings.
For 30 meter openings interpolate between 20 and 40 meter openings.

Note: The Alaska and Hawaii Propagation Charts are intended for distances *greater* than 1300 miles. For shorter distances, use the preceding Short-Skip Propagation Chart.

increase of geomagnetic activity at this time. Based on what was seen this year during the spring equinox, there is the possibility of major solar flare activity that can translate into some powerful aurora openings on 6 and 2 meters. Keep an eye on any internet site that tracks solar flare activity and monitor the VHF bands two days after a major flare on the sun is observed. A good aurora opening can last more than three hours.

Toward the end of September *Trans-equatorial* (TE) propagation will appear occasionally on 6 meters between stations in the southern part of the US (south Florida and south Texas) and stations in Argentina. Another path that also will appear during this time is the one between southern Europe and South Africa. Openings generally will occur during the late afternoon and early evenings local time.

F2 activity may occur during the day on 6 meters with stations in the southern US going into Central America and the northern part of South America. *F2* activity on 6 meters for stations in the northern part of the US will be very rare or nonexistent for this month. There will be no east-west *F2* paths during September.

Tropo conditions are generally very good for many of the VHF bands going up to 432 MHz during September with the appearance of different weather fronts. This will be the primary mode by which fairly long-distance contacts (up to 300 miles) will be made during a major contest this month—the ARRL VHF QSO Party. Also look for a possible nighttime aurora opening during the VHF contest. It has happened before, and there is a good possibility of it happening this year in September.

No major meteor showers are expected during September. The *Piscids,* a minor shower peaking on September 19, may result in some meteor ionization in the Earth's lower atmosphere.

For a more complete review of VHF propagation, see N6CL's informative "VHF Plus" column here in *CQ.*

Web Site of the Month

Check out <http://hfradio.org>, web master Tomas Hood, NW7US. The site is loaded with HF information, up-to-date propagation information, DX news, amateur radio educational material, and much more, including a do-it-yourself equidistant azimuth map program.

Also, be sure to see this month's "Reader Survey" page for results of the July poll on the subject of propagation.

73, George, W3ASK

Results *(from page 20)*

TEAM CONTESTING

1. **Neiger's Tigers Team #5: 53,586,473.** EA8BH(N5TJ), KH7R(N6TJ), P40E(CT1BOH), 8P9Z(K4BAI), JY9NX (JM1CAX).
2. **Team Sunshine: 32,035,391.** OHØZ(OH1JT), ZB2X(OH2KI), CT3BX(OH2MA), 9M6AAC(OH1NOA, PZ5JR(OHØXX).
3. **Straight Key Knights 1: 29,918,646.** N2NT, K5ZD, K1AR, K2UA.
4. **Yu Team 1: 25,052,787.** 3V8BB(YT1AD), YT1AD(YU7NU), YU7KW, YZ7AA, YT7R(YU7BW).
5. **Straight Key Knights 2: 25,022,305.** W6EEN, K1DG, W4AN, K5TR, VP5GN.
6. **Neiger's Tigers Team #2: 23,463,091.** RKØAXX(N6AA), OX/N6ZZ, C6AKW(K3TEJ), 6Y7A(KN5H), CQ9K(DL2CC).
7. **Sky Thunderstorm: 22,297,999.** VE2IM, FY5KE, LY2TA, S56A, YT3T.
8. **Neiger's Tigers Team #4: 20,610,333.** W9RE(N9RV), N2IC/Ø, K8DX, K8GL.
9. **Neiger's Tigers Team #3: 20,578,858.** KQ2M/1, V26K(AA3B), TI5N(K9NW).
10. **CCF Aurora Ionizers: 13,720,460.** OH1F(OH1MDR), OH6NIO, OHØR(OH2PM), OH6Y(OH6YF).
11. **Tennessee Contest Group Team Uno: 12,881,697.** NA4K, K4LTA, W9WI, WO4O.
12. **Sky Heavy Rain: 9,363,861.** K8DX, G3TMA, RZ9HT, RA6LBS, 4N1FG.
13. **Vojvodina Contest Team: 9,074,490.** YT7R, YU7CF, YU7WJ, YU7CB, 4N7A.
14. **Neiger's Tigers Team #1: 8,146,795.** IH9P(OL5Y), WI9WI, W7GG, K6LA.
15. **Florida Contest Group: 7,593,799.** N2AN(WC4E), K1PT/4, N4IG.
16. **LDXG Team: 7,422,524.** LY2IJ, LY2MM, LY2MW, LY5W.
17. **Neiger's Tigers Team #6: 4,882,108.** W6TK, NA2U, OK1QM, VE5ZX.
18. **Sky 10M Beacons: 4,506,288.** EA9LZ, FM5BH, W4ZV, OK2RZ, YU1EW.
19. **Aurora Artillery Division: 3,595,693.** OH3BU, OH8L(OH8LQ), OG3M(OH1MM), OH2BH(OH1WZ).
20. **CCF Aurora Ticklers: 3,437,513.** OH9W(OH2BCI), 5X1Z(OH5BM), OH6AC(OH6CS), OHØN(DJ2QV), OHØV(OH6LI).
21. **Tennessee Contest Group Team Duo: 2,909,248.** NN4T, N4DW, KE4OAR, N4KN.
22. **CCF Self-Control: 510,191.** OH8CW, OH1EH, OH2LU, OH8VJ, OH9A(OH3WW).

high level of competition that keeps us going! Antenna projects for next year began this afternoon...***K1IR.*** Good to meet "old friends" again. Best conditions I've ever heard...***K1LI.*** Didn't do quite as well as last year, but had some great fun, as usual...***K1RC.*** Had a super time! CW is always my favorite mode. I had a scare on Sunday when the bottom dropped out of the bands. It sprang back quickly...***K1RV.*** All running stations...PLEASE sign your call with each QSO!... ***K1TH.*** Let's not invite that new op Sid next year!...***K1TTT.*** Another excellent contest. WW CW is the best...***K2FU.***

Out of hospital for only 3 days after being laid up for 5 weeks. Sure fire cure for anything...***K2NJ.*** What a remarkable contest! CQWW CW is the best of the best. Even with weird conditions, it looks like I finally achieved my goal of making the U.S. Top 10 box! Thanks for the great contest and the great log checking...***K2UA.*** First time on 80 single band. Biggest thrill working UN7CW long path on Sunday evening. It rained all Saturday evening, not good...***K3SV.*** First time using a computer for logging! TR Log worked very well...***K3SWZ.*** 40 & 80 meters only from home in a CC&R neighborhood. Anything is possible!...***K4AAA.*** Asian stations need to look for LP USA! I heard you!!...***K4OJ.*** I'm sure rusty with my 40 wpm copy. May need a computer CW copy device!...***K5DI.*** Answered a CQ—three stations sent me an exchange. Less work. More filling...***K5VG.*** All bands were great! This was so much fun I didn't want to stop, even after 48 hours in the chair...***K5ZD/1.*** Working HZ1HZ before most folks and 3W on one call...***K5ZQ.*** Fun, but too many US stations calling "CQ CONTEST"!...***K6LDX.*** Work and baby sitting the grandaughter took priority over "THE CONTEST" this year...***K7FL.*** Great conditions. WAC and almost DXCC in one weekend, QRP. Amazing!...***K7RE.*** Some really outstanding conditions on 10 this year, especially on Sunday. Even the aurora helped with paths into northern Europe Sunday afternoon...***K8IR.*** Aurora killed 80m on second night...***K8MD.*** Worked DX better than stateside with my new HB 2-ele beam...***KA6SGT.***

First time I've ever managed WAC in a single contest. Ten meters was really hot all through the period. First time I've ever managed WAC in a single contest...***KA9NZI.*** Sure had fun this year. Hope to see you all next year...***KB9KEG.*** Was feeling pretty good until the SID hit Sunday morning. After that is was grinch time...***KC7V.*** Limited operating time but unlimited fun. Worked a few new ones and new zones...***KC7WUE.*** CQWW = Euphoria!...***KC8FS.*** My first CQ WW and much fun to see how far QRP can go!...***KC7BOD.*** First contest, had a great time!!...***KD7GTI.*** My first contest ever. Used K2 transceiver and double-zepp antenna. Had a great time and admired the good conduct on the bands...***KE4R.*** Actual operating time was 28:17. The bands were great until 1640 UTC on day 2 when coronal ejection particles from a prior solar flare must have arrived. I worked a lot of new countries and had a really good time...***KE5C.*** Personal best score ever. Hope conditions hang in there next year!...***KF2O.*** Runing QRP was a chore. It was a thrill to have a big station in DX land, stumble out of full power automation, and listen for my call. Could almost feel them leaning into the speaker...***KF8JW.*** Great contest to revive a newly relicensed ham. WA6VPH now KG6ECI...***KG6ECI.*** I never sent in my CW logs. This one is for K3EST for begging on CQ Contest...***KI7WX*** *(Tks!—K3EST).* Did not think the bands would hold out as long as they did but was certainly a nice surprise when they did. That huge RF sponge made quite an appearace Sunday night. First time with LP and did not notice any huge differences other than the time it took to break a pile-up. Another fun event...***KL7AC.*** Moved and used broadband wire antenna at 40 feet until can get Yagi back up, but thank goodness the DX had good ears...***KN4Y.***

What a contest! With all the flares we had Thursday, Friday, Saturday and "the big one" on Sunday, I kept waiting for cndx to get worse like CQ WW SSB. It never happened! So much for strategy. A great thing about great competition is that you can't win with equipment failures, illness, operating mistakes, etc. Like the Super Bowl, you have to be "up" at all times and make all the right moves and even then there is still the unexpected (i.e., "the flare") and more suspense. This was the first CQ WW contest out of the last five that there were no major station failures during the contest. Amazingly, I was even able to come into the contest well-rested instead of the usual Friday exhaustion. This combined to really let me see what I and my incomplete station could do together. Clearly all my work on the high bands has paid off. Now, thanks to the scores of K1AR & K5ZD, I can plainly see where the work still needs to be done, like putting up a REAL 160 meter antenna and getting my 40-2cd to rotate. I plan to address the low bands this summer and hopefully, next CQ WW CW, I will see the improvement. The great thing about building a station is that you can look forward to score improvement and new levels of "loudness" each year. The great thing about great competition is that it motivates you to improve your skills each year which allows for new levels of accomplishment. Given how hard I work at S & P with SO2R, it still boggles my mind that I never heard a JA or KL7 on 80, or a VK on 40! Much less how I could miss P4 on 20 and my own club member V47KP on FIVE bands! Congrats to 'AR, 'ZD, and NT1N for making this the closest race in years. I hope all you guys will do it again next year!...***KQ2M.***

Ten meters before the contest spotty and sigs weak. Ten meters during contest—every freq QRL,- sigs strong. Ten meters after the contest—spotty sigs and the CBers came back to occupy the CW freq not being used anymore. Hmmm!...***KS7T.*** Great condx and Great fun, a M/M with 3 stations and only 2 operators makes for plenty of chair time for all...***KV1W.*** My first contest. Had lots of fun looking for multipliers. Put in almost 19 hours...***KX2S.*** We had some difficulties with the run station computer. Something consumed all the CPU cycles and made the clock run slow. Fortunately, we got it corrected about 6 hours before the end of the contest...***NØDY.*** Not enough time for contesting this weekend, but the few hours spent were enjoyable!...***NØHR.*** Great condx until the band faded Sunday afternoon. My best yet...***NØXB.*** The flare was quite an experience as was the subsequent aurora...***N1MD.*** Had fun with verticals on the beach at Cape Hatteras, NC. Now on to using some serious antennas next year...***N2EE.*** Still need more antennas!...***N4GN.*** Found conditions good but not as good as last year. Look forward to another great test next year. My favorite test of the year...***N4MO.*** Fun was had by all, despite the SID that we experienced on Sunday...***N4TO.*** New QTH with station and antennas under construction but already a big improvement. No antenna for 160 but HC8N heard me anyway!...***N5AW.*** Lost my rotor midway through the phenomenal Saturday morning opening; lost 6 hours repairing it and replacing it on the tower...***N6AR/4.*** Broke North American record for QRP on 10 meters...***N6MU.*** I am trying to kindle interest in contesting among our club. Enjoyed the contest. Sorry to see the solar flares. Funny that 15 and 20 were severly affected but 10 meters kept on perking along. The numbers are low but whetted the appetites of some new contesters...***N6RV.***

Aurora really killed the low bands for me...***OX/N6ZZ.*** Doing assisted on 40 is a real joy. Spent the weekend in some huge pile-ups for semi rare and rare mults. Some of these operators never quit calling. A little more listening and a bit less calling would probably let more get through. Heard several stations get chased away by the constant calling...***N8BJQ.*** Had a great time in the QRP category. I still do not have the 80 meter antennas working well, and although I did much better on 80 this year, I still feel there is a lot of room to improve...***N8ET.*** First time with contest logging program. Where were VK's/ZL's on 10?...***N8XP.*** Saturday night 40 meters was great! I worked HI on 40 for my 49th state. I heard KL7Y on 40 meters, but I couldn't break the pile-up...***N9BOR.*** Great contest. Some really good DX. A solar storm as an added challenge...***NI9C.*** Away for the holiday, back in time to make a few Q's. Always trying

books, calendars, videos...

Ham Radio Magazine on CD

Brought to you by CQ & ARRL

Here's what you've been waiting for! Enjoy quick and easy access to every issue of this popular magazine!

Hot New Item!

Three sets, each containing 4 CDs - broken down by years:

1968-1976 Order No. HRCD1 **$59.95**

1977-1983 Order No. HRCD2 **$59.95**

1984-1990 Order No. HRCD3 **$59.95**

Buy All 3 Sets and Save $29.95!
Order No. HRCD Set ***$149.95***

33 Simple Weekend Projects

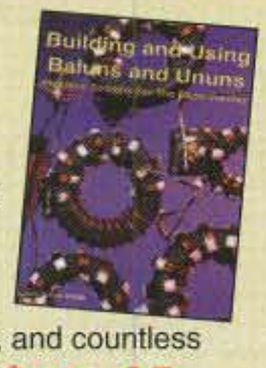
by Dave Ingram, K4TWJ

Do-it-yourself electronics projects from the most basic to the fairly sophisticated. You'll find: station accessories for VHF FMing, working OSCAR satellites, fun on HF, trying CW, building simple antennas, even a complete working HF station you can build for $100. Also includes practical tips and techniques on how to create your own electronic projects.

Order No. 33PROJ ..... ~~$15.95~~ ***$9.95***

NOW ONLY

Building and Using Baluns and Ununs



by Jerry Sevick, W2FMI

This volume is the source for the latest information and designs on transmission line transformer theory. Discover new applications for dipoles, yagis, log periodics, beverages, antenna tuners, and countless other examples.

Order No. BALUN ***$19.95***

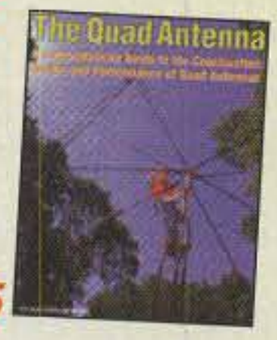
The NEW Shortwave Propagation Handbook

by W3ASK, N4XX & K6GKU

A comprehensive source of HF propagation principles, sunspots, ionospheric predictions, with photography, charts and tables galore!

Order No. SWP..... ***$19.95***

The Quad Antenna



by Bob Haviland, W4MB

Second Printing

An authoritative book on the design, construction, characteristics and applications of quad antennas.

Order No. QUAD ***$15.95***

The Mobile DXer

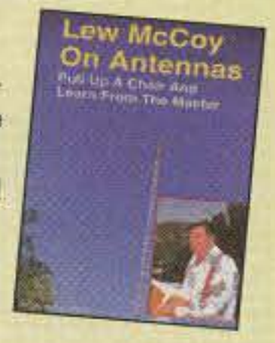
by Dave Mangels, AC6WO

An in-depth look at Mobile DXing- includes its language; versatility; selecting and installing mobile HF radios; mobile HF antennas and tuners; tuning HF antennas; utilizing tools, tactics, and techniques; and more!

NEW BOOK!

Order No. DXER ***$12.95***

McCoy on Antennas



by Lew McCoy, W1ICP

Unlike many technical publications, Lew prsents his invaluable antenna information in a casual, non-intimidating way for anyone!

Order No.MCCOY

..... ***$15.95***

W6SAI HF Antenna Handbook

by Bill Orr, W6SAI

Inexpensive, practical antenna projects that work! Guides you through the building of wire, loop, Yagi and vertical antennas.

Order No. HFANT

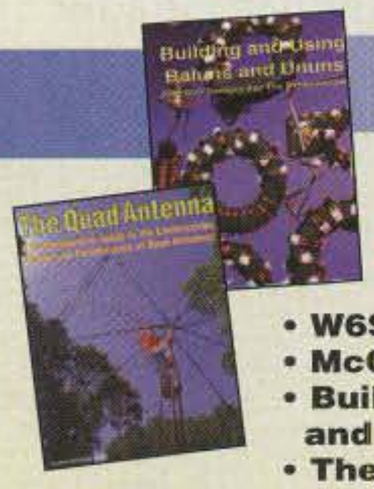
..... ***$19.95***

2001/2002 calendars sale

Only ~~$10.95~~ $6.95

Fifteen month calendars
January 2001 through
March 2002
(Specify Amateur Radio or Classic Radio)

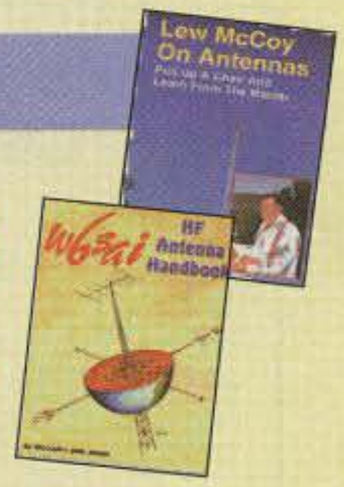
antenna book special!



4 great books for only $54.95!

- **W6SAI HF Antenna Handbook**
- **McCoy on Antennas**
- **Building and Using Baluns and Ununs**
- **The Quad Antenna**

Save $16.85!



.....Order No. ANT4

video special!

~~$19.95 ea.~~
NOW ONLY
$12.95 ea.

Ham Radio Horizons: The Video
.....*Order No. VHOR*
Getting Started in VHF
.....*Order No. VVHF*
Getting Started in Ham Radio
.....*Order No. VHR*
Getting Started in DXing
.....*Order No. VDX*
Getting Started in Packet Radio
.....*Order No. VPAC*
Getting Started in Amateur Satellites
.....*Order No. VSAT*
Getting Started in Contesting
.....*Order No. VCON*

Buy all 7 for your Club for only $69.95

fax us : 516-681-2926
call us : 1-800-853-9797

Visit Our Web Site
www.cq-amateur-radio.com

Name _____ Callsign _____

Street Address _____

City _____ State _____ Zip _____

Qty	Item #	Description	Price	Total Price
			Shipping/Handling	
			Total	

U.S. and possessions - add $4 shipping/handling. Foreign - shipping/handling charges are calculated by order weight & destination.

Method of payment ☐ Check ☐ Money Order ☐ Visa ☐ MasterCard
☐ Discover ☐ American Express

Credit Card No. _____ **Expiration date** _____

CQ Communications Inc.,
25 Newbridge Rd., Hicksville, NY 11801

to improve. Almost 900 more QSOs than last year. About 1.5M more points. Friday we had to replace the 20m Tailtwister. Saturday we had to climb to fix a connection on the 20m Stack Box wiring. The new 160m inverted-Vee worked well for us. Not the best antenna but helped our score a bunch. Lost almost two hours of running time on Sat. morning as we slept through the band openings. My fault for not staying awake to shake everyone up. One comment: This was our first contest with the new Barnstormers callsign. When you are not in the Super Partial Callsign Checklist it seems like a lot of operators had problems with the call. Many repeats needed to get NZ1U across!...***NZ1U.***

Got lucky in deciding to take a lunch break and power nap just before the flare hit. Came back to a flatline spectrum display on 20m, thought the rig had died. In the hole in foot category, I was plagued by intermittent S9 line noise on the higher bands most of Saturday night until I discovered that my electric footwarmer was the cause!...***W1CSM.*** Ten meters is a great band for low power and small antenna when the 'spots are up...***W1END.*** Great fun even with wires!...***W1UK.*** My first time over 1M. I've still got a lot to learn, but I am happy to have passed this milestone...***W2ZQ.*** I really got the hang of 2-radio operation this year. This was good fun. Excuse: liked my sleep too much and had equipment problems on 80m. The flare was fun though...thought we had had it but things soon recovered, and 10m stayed open late. Thanks again to Fred, K1VR, for the use of his excellent station. ...***W3EF.*** 4000 ft south of W3LPL...***W3EKT.*** First entry es first time on QRP hunt and pounce excellent operators out there especially on DX-peditions!...***W4NJK.*** This was my first time doing CQWW as a single op and I had a blast!...***W6EEN (N6RT).*** The solar flares made it interesting. Great fun as usual...***W6KNB***. Great conditions on 10m this year, except for the blackout for an hour on Sunday morning. Was this an aurora or a solar flare? For once conditions were good, there was no noise, and nothing failed...***W6YA.*** Was pumped to set new W7 record but propagation Gods prevented that!! This solar cycle sucks from the PNW...***W7GG.*** Thanks to Rush for hosting such a motley crew again this year!...***W7RM.*** This contest never ceases to amaze me with the tremendous participation it has...***W9IIX.***

One W9 against all of New England makes me feel like David against Goliath. This is the most competitive, exhilarating, and mentally challenging activity I can think of... ***W9RE (N9RV).*** First shot at SOAB. Interesting. Wish I was SO2R capable at high power. It would have helped...***W9WI.*** I had a great time. 160m is great. Heard some good ones could'nt get back to them...***WDØFLJ.*** My first CQ WW Contest. Didn't do as well as I would have like to, but had a lot of fun! Good contest, even though Mr. Sun had a few flairs to throw at us...***WJ5K.*** What a thrill to find C8AUZ in the clear, and work him with no trouble, only to be followed by bedlam minutes later...***WO7T.***

Station Operators
Multi-Op Single Transmitter

4G1A: 4F1FZ, 4F1AKH, 4F1GYE, 4F3XX, DU1WHO. **8Q7WW &** 8Q7TX. **8S2F:** SM3JLA, SM2LIY, SM2ODB. **9A1CMS:** 9A5TR, 9A5AVW, 9A4RJ. **9A3MR &** 9A3MA. **9A7A:** 9A7V, 9A8A, 9A2ME, 9A3OS, 9A3TR, 9A4PA, 9A4RX, 9A6DM. **9M6SMT:** JF1SQC, JH8KYU. **AA2FB &** K2QMF. **AE2F &** WR2I. **AH2R:** JI3ERV/NH2C, JR7OMD/WI3O, KH2/JE8KKX, JP1OGL/KHØJ. **B4R:** Chen/BA4RC, Michael/BD5RV. **BV2B:** BX2AB, BX4AF. **DFØCI:** DL2AQI, DL5ZL, DL8AKI. **DJ6QT &** DL1QW, DL5XL, DJ2AA. **DJ6TF &** DJ7TO, DK4WA, DL1KWK. **DKØFFO:** DL7UGN, DL5BTE, DL2BWM. **DKØIU:** DJ4KW, DJ6TK. **DKØNF:** DL4NER, DL5RDO, DL5YYM, DL9NEI, DL3NCI. **DKØOG:** DL2RMC, DF7RG, DL3MBG. **DK1II &** DJ1YFK, DJ7MG, DL5EBE. **DK1RP &** DH1TW, DL5RMH. **DK2OY &** DF1LX, DK6WL, DL1MFL, DL4RDJ. **DLØDX:** DL1BYT, DL2GK, DL5KUT, DL5JS. **DL6JFR &** others. **DL7ANR &** others. **DL8HA &** DL8FR, DK9VS, DF2VW, DL4SCZ, DL8ULY. **EA5KM &** EA5AFP, EA5DFX, EA5DWS. **EA6IB:** Club. **EW1WN:** EW1AM, EW1MN. **F5AKL &** F6CEL, F6ENO. **F5IN &** F5NLY, F5MZN, F6FGZ, F6FVY, F8CRH. **F5MUX &** F6ARC, F6DZS, F5LND, F5NGA. **F5VEX &** G4KZD. **F6KPR:** F5UB, F6BDK. **F8KHZ:** F6GKQ, F5SDH, F6GQO, F8BNV, F8BCQ, F5JU. **GJ2A:** K2WR, OH2BH, OH2TA, OH6EI. **HA6KZS:** Club. **HA8KVK:** Club. **HBØ/HB2LF:** DL1SAN, DF5UL, HB9BMZ, HB9CRV, HB9FMU, HB9KT. **HF9KRT:** Club. **II1H:** I1HJT, IK1QBT, I1NVU, IZ1BPR. **IK2AOO &** others. **IQ2A:** I2UIY, I2YSB. **IQ4A:** I4IND, I4TJE, I4EAT, I4VEQ, I4IKW, IK4DCT, IK4EWK, IK4CZF, IK4MGP, IK4XQH, IK3VIA, IK2QPR, IK2ULH, IZ4BOY. **J3G:** G3TBK, G3TXF, G3WVG. **J75KG:** K5KG, K5AF. **JA1YPA:** JA1MZM, JA1PEJ, JH1FDP. **JA1YXP:** Club. **JA1ZLO:** JM3CRK, 7N3PZJ, 7N2GHD, JM7WXN, Hashimoto. **JA2ZJW:** JH2CMI, JE2PCY, JI3NST. **JA7YAA:** JR7UOL, JE7HLZ, JHØORW, JHØNZN, JG7PSJ, 7M1JAS. **JE2YHS:** JA2OLJ, JG2NUD, JR2JVR, JI2XUT, JJ2CEE. **JE4VVM &** JG4CLV, JH4UHW, JN4FEU. **JH7PKU &** JA9SSY, JG1ILF, JN3PYQ. **JO3JYE &** JJ3TBB. **JT1R:** JT1BH, JT1BJ, JT1BL, JT1CD.

KØAB: KØMP, KRØU, N2WW, NØKV, NØZM, WØNF, WØZA. **K1GW &** K1BX, KB1T. **K1IR &** K1LZ, W1VE, K1VR, K1EP. **K1JT &** K2PT. **K1KI &** K1CC, K1ZZ, KM1P, W1RM. **K2XR &** VA3UA. **K4JA &** K9GY, K9JY, W4JVN. **K4XS &** others. **K8AZ &** K8MR, K8NZ, N8TR, W8CAR, W8GN, W8KIC, WT8C. **LA1K:** LA2RY, LA7VV, LA1BFA, LA7UJA, LA8UGA, LA5GKA, LA4OFA. **LX/DL4SDX &** DL5SEJ, DL8SCG, DL4SDW. **LY1YK:** LY2CO, LY3CI, LY2FY. **LY3AV:** Club. **LZ1ABC &** LZ1AQ. **LZ9W:** LZ1ANA, LZ1AX, LZ1FG, LZ1PM, LZ1ZD, LZ3FN, LZ3UM, LZ3UP, LZ4AX. **M4T:** GØVQR, GØLHZ, M5ACR, M5ALG. **MU2K:** OH3RB, OH8SR, OH9MM. **NØDY &** NØYY. **NØNI &** KØKD, KØRX, WØFLS, WOØV, NØAV, NØAC. **N1AO &** KT1O. **N1AU &** WC1D. **N1RR &** WM1K, N1LH. **N2BIM &** WB2BHC. **N2IW &** N2IX, N1NY, W2RE. **N2NU &** K2WI. **N3BNA &** N2WKS, NB3I. **N4RV &** N4RA, K4VV. **N4TO &** N9KM, W4IR, WD4AHZ. **N6RV &** W7IXL, N6NW, N7KFL, K6NT, WBØQPO. **NE3F &** KS3F, K3ATO. **NHØS:** JF2SKV/NHØS, JG3VEI/NHØV, JH5OXF/KD6CJF, JQ1UKK. **OE2S:** DL2NBU, DL6RAI, OE2GEN, OE2LCM, OE2VEL. **OE8CIQ &** OE6IMD. **OH6K:** OH6XX, OH6UV (ex-OH6NU). **OH7AAX:** OH7DK, OH7DI. **OH7M:** OH4JFN, OH4LYX, OH4XX, OH6LNI, OH7MHL, OH7MS. **OH7WW:** OH3BI, OH3ES, OH3LQK, OH3MYD, OH3NHF, OH3XR. **OK1KAO:** OK1FMX, OK1MPM. **OK1KSL:** OK1AHG, Jan Mikula. **OK2KOD:** OK2BNX, OK2BHM. **OK5W:** OK1AEZ, OK1CF, OK1WF, OK1FKD, OK1DDO, OK1JR, OK1JKT, OK1TA, OK2ZW. **OL2A:** OK2PDK, OK2HBY, OK2PEM. **OL3A:** OK1AY, OK1CM, OK1DC, OK1DRQ, OK1DX, OK1FM, OK1FCJ, OK1FJD, OK1FWM, OK1MR. **OL3E:** OK1MBZ, OK8ACS. **OL5Q:** OK1FFU, OK1FLC, OK1AYE, OK1HRA, OK1VSL. **OL5T:** OK1TC, OK1MD, OK8ANM, OK1WWJ, OK1FLM. **OL7R:** OK1XUV, OK1VWK, OK1WMV, OK1ZMS, OK1MZM. **OM3A:** OM8AW, OMØWR, OM8AM, OM8DM, OM3CGN, OM8AU, OM3CHL. **OM3KHE:** OM6AM, OM6TU, OM6AZ, OM6AR.

OM5M: OM1KM, OM2IB, OM2KI, OM2RA, OM3EI, OM6NM. **OM7M:** OK2BFN, OM3PA, OM3PL, OM3TZQ, OM5RM, OM5RW, OM5ZW. **OM8A:** OM2VL, OM3CW, OM3EA, OM3GI, OM3NA, OM3LU, OM3RM, OM7JG. **OTØP:** ON4GO, ON5OO, ON6AH, ON6MH, ON6VL, ON6QR, ON7ZV, ON5AV. **OZ5BAL:** Club. **P3A:** RA9JX, RZ9UA, UA3AB, RW9UP. **PB6X:** PA3HBB, PA4AO, DF5RF, DL5JQ. **PI4ZLD:** PA5KT, PA5KM, PA5TT, DF6JC. **PJ2T:** KP2L, KU8E, WØCG. **PU3A:** DL7AXD, PP5WG, PY3ACC, PY3ADY, PY3AFS, PY3BZA, PY3FOX, PY3PAZ, PY3KK, PY3MM, PY3TT, PY3YY, Daniel, Gabbardo. **R1ANF:** UA1PBA, UA1PAW. **R3K:** RV3FF, RX3DCX, RK3BY, RN3AW, RU3FM. **RF9C:** Club. **RI3A:** RK3FM, RK3FT. **RKØSXF:** RUØSN, RUØST, RXØSF, RAØSFC. **RK3FA &** others. **RK3PXP:** UA3PBE, RV3PE, UA3PMT. **RK3RWL:** RN3RC, RU3RQ, RK3RX, RZ3RZ, UA3RPM. **RK3WWA:** UA4WA, RW4WA, RU4WW, UA4WKK. **RK4WWA:** UA4WA, RW4WA, RU4WW, UA4WKK. **RK9AWN:** RK9AD, RN9AA, UA9APA. **RK9SWF:** RA9SG, RA9ST. **RL3A:** RA3ATX, RA9CO, RW3FO, RV3BA, UA9TQ. **RU1A:** RW1AC, RU1AA, RV1AW, RN1AM, RX1AA, UA1ACC, RA1ARJ, RA1ARZ, Alex. **RX3RXX:** UA3RAR, UA3RJ, UA3RV, RA3RFA. **RZ3Q:** RW3QC, RN3QO, UA3QDX, RN3QY, RX3QAK, RW3QNZ. **RZ9WWH:** RA9WR, RA9WW, RX9WR, RW9WW, UA9WUV, UA9WDR, RA9WUA. **S57AW &** S56M, S57AL, S5ØQ. **SK3W:** SM3EVR, SM3OSM, SM3SGP, SM5IMO, SMØGNU, SMØOEK. **SK6M:** SM6BGA, SM7BUA, SM6CLU, SM6DYK, SM6FKF, SM6LJU, SM6MCW, SM7NDX. **SL2ZA:** SM2UJW, SM2VHD. **SK6QW:** SM6NJK, SM6PXJ, SM6WXO. **SP3KPN:** Club. **SP3PFR:** SP3MGP, SP3FLR.

T91ESP: T95M, T94QI, T94LA, T94LP, T93R, T94QM. **TS7N:** DJ5BV, DJ7IK, DJ9CB, DK7YY, DL1EFD, DL1GGT, DL7FER, DL9USA, JH4RHF. **UA3YFA &** others. **UK8BWO:** Club. **UPØL:** UN9LW, UN9LO, UA9AR, RK9AC, RA9AA, RZ9AW, RX9CAZ, UA9CDC. **UR4LWY:** UR5LJC, UR4LQA, UR3LFU. **UR4MWU:** Club. **UTØAZA:** UT8AL, UT8AS, UT5AZ, UY2AF, UT8AQ. **UT3IZZ:** Club. **UT7L:** UR4LRG, UR4LTX, UR4LUG, US4LGW, UY5LW, UXØLL. **UT9F:** UT9FJ, UR5FJF, UR5FGN, UT7FO, UR5FEO, UT4FJ, US-F-55. **UU7J:** UU1JA, UU2JQ, UU2JZ, UU3JD, UU4JDX, UU4JMG, UU5JR, UU8JK, UUØJM, UUØJX. **VE2CQ:** VE2NZR, VE2PS, VE2MIG, VE2MY, VE2ETR. **VE3DC:** VE3BK, VE3OCY, VE3OZO, VE3RZ, VE3SS. **VE3QDR &** others. **VE6AO:** VE6CIZ, VE6JAZ, VE6KG, VE6LB, VE6TC, VE6IC, VE6KC, KE6KZ, VE6NJK. **VE6SV &** VA6EA, VE6EZ, VO1CV, VE6NAP, VE5FN. **VE9/K1JB &** K1EU. **VK8AR:** VK8TM, VK8TX. **WØTT &** NØAJ, WØRD. **W1HR:** W1JCC, W1MD. **W1SRG:** AG1C, N1GR, KA1VWX. **W2AA:** W2XX, N2TX, KD2RD. **W5TM &** W5AO, K5ZG, K5CM. **W6XR/2 &** N2AU, N2RR. **WE9V &** KA9FOX, KG9X, N9CK. **WN9O &** K9IG, N9NS, W9IU, NØFW. **WV7T &** others. **YL7C:** YL2MD, YL2GQT, YL2RQ. **YM3WW:** Club. **YR8A:** Club. **YU1INO:** L.J. Radosavljevic, S. Radosavljevic, S. Mladenovic, YZ1DQ, D. Dzordzic, B. Aleksovski, YU1EK. **YZ7A:** YU7CM, ops from YU7JDE: Lacy, Tibi, Cody. **Z3ØM:** Z31GX, Z31GB, Z32XX, Z32AF. **ZF2NT:** N6NT, W6CYX. **ZL3CW:** F2CW, JA4EKO. **ZL6QH:** JF3KNW, ZL1AZE, ZL2BSJ.

Multi-Op Multi-Transmitter

3Z1KG: Club. **9G5AA:** G3PJT, G3SXW, GM3YTS, G4BWP. **A61AJ &** K1ZM, K2DM, K3EST, N2AA, K2RED, N4QB, S53R, UA9BA, W2GD, 5B4ADA, T97C. **CN8WW:** DL8WPX, DK1BT, HAØDU, DF3CB, DL3DXX, DK2GZ, S51TA, LY1DS, DL1HCM, DL2MEH, DL5LYM, DL2OAP, DL6FBL, DL2HBX, DJ9MH. **DFØOHQ:** DK5IM, DL1AUZ, DL2KUW, DL2OBC, DL3OI, DL4MM, DL5ANT, DL7VOA, DL7ZZ, DL8WAA. **EA4ML:** EA4AMO, EA4BSC, EA4DRV, EA4ET, EA4KA, EA4MC, EA4TX, EA5FID. **ES9C:** ES1DW, ES1OX, ES2NA, ES2RJ, ES4RD, ES4TG, ES5MC, ES5MG, ES5QA, ES5QX, ES5RAH, ES5RY, ES5TV, OH3RM. **HC8N:** AA6RX, AG9A, K1EA, K5TSQ, K6AW, K6BL, KM3T, N5KO, N5RZ, VE3EJ, VE7ZO, W2VJN, W6NL. **HG6N:** Club. **HSØAC:** E2ØGMY, E2ØREX, E21EIC, HSØGBI, K3ZO, HD1CKC, HS2JFW, HS2ZIU, HS6NDK, W2YR, HSØ/SM3DYU. **J3A:** K2KQ, K2TE, NB1B, WA1S. **JA2YKA:** JG2LYJ, JN2FMH, JP2LUQ, JH3FBK, Tack.S, Masa.A, Kent.A. **JA3YBK:** JH3DPB, JH3PRR, JG3KIV, JI3OPA, JM3XKG, JP3PZD, JH4NMT, JR4ISF, JF4FUF, JL4CVB. **JA5BJC:** JA5BGX, JA5BJC, JA5FDJ, JH5FIS, JH5RXS, JR5JAQ. **JK6SEW &** JH6QIL, JI6BRB, JM6CIP, JR6GKT, JP6EGZ, JN3FPV. **KØRF &** AAØRS, KØEU, NØHF, N4VI, N9NC, SM7IWN, WØRTT, WØUA, W1XE, K1RX.

K1TTT & K1TWF, KC2FEE/RA9USU, N9KAU, WO1N, W1IA, KB1W, W1ES, NT2X, K1WD, N2NI, NF1D, KB1EKJ. **K2LE/1 &** K2SX, K2UU, N2UN, N7XM, N8UM, W1MA, W2AX, W2II, W2LK. **K3DI &** VE3GLO, W3UL. **K3II &** K3CT, WF3H, NY3D. **K3LR &** K3UA, N3RA, W3GH, K9VV, K6CT, N5ZO, NI3S, KB3AFT, W9KNI. **K3NM &** W2YC, W3CF, W3ZL, LU9AY. **K5GO &** K5ALU, K5LG, KM5G, N5DX, N5OE, NØEHW, WØJOE. **K8CC &** K8DD, K8JM, K8MV, W8MJ, W8UA, WD8S, WX3M. **K9NS:** AA9D, K9DX, K9GS, K9HMB, K9PPY, K9PW, K9QVB, K9RO, K9RS, KS9W, N9CO, WV9T. **KC1XX &** N6HB, W1FV, N6MJ, K1GQ, DL7ALM, N3RD, K1TR, AD1C. **KV1W &** W1ZT. **LY7A:** LYR346, LY2MV, LY2OC, LY2OA, LY3DA, LY3HD, LY3BAD, LY2FN, LY2BMX, LY1EE, LY3BY, LY2UF, LY2AO, LY4AA, LY2KZ, LY2NK, LY2DX. **N2RM &** K2BM, K2TW, N2NC, N5NJ, N7BG, W2REH, W2RQ, WM2H. **N3RS &** N3ED, N2SR, W8FJ, K3WU, W7CT. **N6AW &** W6KP, W6KK, KR6X, KY7M, N6WS, K6HMS, N6VR, K6ZH, N6HT, K6WS, W6RW. **NR4M &** K7SV, K4EU, K1SE, K4EC, WA4JUK, K4GMH, Daisy. **NY4A:** K2AV, K7GM, N4AF, W2CS. **NZ1U:** KB1H, K1EBY, NB1U, N1XS, AA1CE, KB1DFB. **OE3I:** OE1JNB, OE1DSA. **OH2U:** OH2BVI, OH2FT, OH2HE, OH2IW, OH2JA, OH2JQS, OH2JTE, OH2LUR OH2XX, OH4YR, OH5JOC, OH6CT, OH6DD, OH7BX, OH7JR, OH8KXK. **OL7W:** Club. **OZ5W:** OZ1FTU, OZ1KRF, OZ3W. **OZ5WQ &** OZ1AA, OZ1BIZ, OZ3ZW. **RW2F:** RA2FA, RA4LW, RN2FA, RU4HP, RZ3FA, UA2FB, UA2FC, UA2FF, UA2FM, UA2FZ. **WØAIH/9 &** others. **W2CG &** W2NO, K2WJ. **W3LPL &** K1HTV, W2GG, ND3A, ND3F, K3KU, AI3M, K3MM, N3OC, K3RA, K3RV, KT3Y, WR3Z, KD4D. **W3PP &** AA1K, N6ZO, K3FT, NW3Y, WB4FDT, N3HUV, KW3Z. **W4MYA &** WK4Y, WU4G, Lilly. **W7RM &** NØAX, WAØRJY, KI7Y, K1TA, NW7DX, K6KR, KL2A, N7OU, W7WA, K9JF, W7BX, K5ZM. **W8AV &** others. **W8ZA &** KO3GA, K8OQL, N8II, WD3A. **WT3Q &** AB2E, K3OX. **YJØV:** KF9ZZ, KF9YL, W9YK, W8LVN, N9WM, KB9QYL. **YU1ANT:** YU1UA, YU1YV, YU1RA, YT1IA, YU1KT, YU1SP, YT1TD, YT1ZI, YU1OJJ, Dragan, Bata.

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.)

CW RESULTS
SINGLE OPERATOR
NORTH AMERICA
UNITED STATES

K5ZD/1	**A**	**8,756,568**	**4484**	**161**	**531**
K1AR	**"**	**8,559,474**	**4573**	**157**	**522**
K1ZZ	**"**	**8,307,600**	**4345**	**167**	**521**
KQ2M/1	**"**	**8,023,296**	**4397**	**158**	**516**
K1DG	**"**	**7,199,169**	**4033**	**153**	**494**
W1KM	**"**	**6,871,806**	**3812**	**155**	**484**
WC1M	*	4,838,592	3370	130	398
W1WEF	*	4,827,276	3091	141	423
KR1G	*	3,874,907	2780	125	398
KS1J	*	3,523,445	2554	123	364
W1FJ	*	3,431,701	2335	128	431
NR1DX	*	3,163,424	1724	146	542
W1GF	*	2,242,968	1501	126	427
K1LI	*	2,187,158	1606	127	394
K5MA/1	*	1,508,202	1298	105	309
W1TE	*	1,444,756	1070	115	387
W1ZK	*	1,390,815	1075	117	348
W1ECT	*	1,167,885	1199	91	278
K1BV	*	576,830	828	68	195
AK1N	*	561,299	569	110	269
K1PY	*	467,937	570	88	239
K1CN	*	418,936	539	75	229
K1AJ	*	208,150	390	65	165
W1EZ	*	199,808	326	59	165
N1JW	*	184,509	326	66	183
W1AX	*	155,709	226	82	190
N1MM	*	96,416	194	53	131
KA1VMG	*	68,680	200	46	124
W1CC	*	54,813	145	32	119
W1OHM	*	30,360	113	42	73
WR1P	*	2,769	36	12	27
N1NQD	*	1,968	25	18	23
N1RY	*	475	13	8	11
W1END	**28**	**54,180**	**219**	**26**	**79**
K2SS/1	**21**	**974,440**	**2035**	**36**	**134**
N1CPC	*	1,088	66	10	24
W1PL	**7**	**37,026**	**265**	**21**	**81**
W1MK	**3.5**	**417,240**	**1273**	**26**	**96**
K2LP/1	*	1,020	34	9	21
K1FZ	**1.8**	**45,270**	**209**	**19**	**71**
				(Op: K1UO)	
***K1RO**	**A**	**3,409,245**	**2245**	**131**	**422**
***AA1ON**	**"**	**2,637,522**	**1631**	**142**	**461**
***W3EF/1**	**"**	**2,605,764**	**2039**	**112**	**357**
***K1VUT**	**"**	**2,545,683**	**1862**	**121**	**382**
*K1OA	*	2,522,482	1976	110	339
*KM1X	*	2,143,596	1683	104	349
*WE1USA	*	2,069,325	1519	133	408
*W1EQ	*	1,731,450	1456	105	320
*K1NU	*	1,590,435	1430	96	309
*K1HT	*	1,452,360	1113	116	340
*AE1B	*	735,295	854	84	235
*K1KD	*	562,716	682	76	243
*W1KT	*	542,059	589	85	282
*W1ZS	*	487,224	601	71	232
*N3MV/1	*	352,104	522	112	296
*W3TB/1	*	341,000	471	68	207
*K1VSJ	*	284,610	413	80	185
*N3KCJ/1	*	265,510	399	64	200
*K1EFI	*	263,121	410	53	176
*N1DC	*	181,792	347	67	180
*K1MY	*	126,750	263	44	151
*W1EL	*	115,934	253	42	127
*AB1BX	*	95,106	347	29	102
*N1RC	*	79,662	246	54	133
*W1SRD	*	74,529	173	54	115
*K1EP	*	74,124	204	36	106
*W1TW	*	70,684	275	50	114
*W1ZZ	*	68,060	146	54	110
*W1PJ	*	29,232	104	36	76
*KK1L	*	28,997	122	35	72
*AA1OL	*	17,136	114	20	64
*W1DEO	*	16,104	65	44	44
*K1DW	*	4,950	42	15	30
*NF1A	*	1,824	32	18	30
*KB1CJ	*	726	16	7	15
***W1WAI**	**28**	**394,940**	**909**	**31**	**124**
*KA1IS	*	178,220	513	27	106
*K1IB	*	140,094	453	29	100
*W1/YO3JW	*	18,056	141	21	53
*KD1OG	*	9,128	62	18	38
***K1PX**	**1.8**	**3,850**	**53**	**11**	**24**
N2NT	**A**	**6,527,500**	**3777**	**155**	**470**
K2UA	**"**	**6,075,104**	**3763**	**143**	**449**
N2LT	**"**	**5,574,974**	**3404**	**138**	**439**
W2EN	*	3,048,705	2229	127	368
N2AN	*	2,748,022	2139	129	349
				(Op: WC4E)	
W2LC	*	2,507,430	1867	126	372
K2NV	*	2,403,306	1655	128	403
N2GC	*	2,227,484	1452	128	425
K2FU	*	1,738,506	1270	121	376
W2ZU	*	1,466,220	1296	98	322
N2MR	*	1,115,504	1017	100	303
N2WK	*	1,038,046	883	115	348
WA2VYA	*	647,854	684	98	280
KA2D	*	630,021	628	95	304
NA2M	*	264,427	387	78	191
W2UDT	*	262,200	499	78	222
WK2H	*	245,265	388	67	182
W2EZ	*	139,320	335	57	159
W2FUI	*	77,611	186	54	114
AA2WN	*	39,550	139	34	79
KA2MGE	*	7,200	52	26	34
K2ZJ	**28**	**672,290**	**1493**	**33**	**125**
N2MF	*	560,494	1432	35	111
K2VV	**21**	**890,736**	**1833**	**37**	**139**
W2FU	*	687,309	1561	36	125
NA2X	7	40,082	151	25	73
K2LP	3.5	9,000	150	20	40
K2AXX	1.8	8,372	105	12	34
W2VO	*	3,174	46	15	31
***W2TZ**	**A**	**2,616,094**	**1970**	**114**	**364**
***NA2U**	**"**	**2,332,407**	**1740**	**116**	**367**
***N2GA**	**"**	**1,946,880**	**1811**	**92**	**292**
*WE2F	*	1,182,418	1059	99	320
*N2TN	*	903,925	718	122	353
*K2UF	*	870,714	877	87	279
*KM2L	*	788,652	814	83	259
*K2CDJ	*	729,210	636	115	331
*W2TX	*	636,378	647	90	277
*WA2EYA	*	589,743	652	84	249
*N2RD	*	485,994	607	81	240
*WA2VZQ	*	449,285	519	73	229
*WA2YSJ	*	413,848	469	93	256
*WB2FFY	*	368,186	480	80	209
*K2CS	*	329,268	462	85	191
*W2YK	*	258,379	350	70	213
*AI2L	*	181,714	309	72	169
*W2GO	*	172,347	283	74	209
*K2TV	*	161,226	316	64	170
*WA2VQV	*	112,817	243	63	132
*N2LK	*	81,260	201	53	117
*K2JL	*	79,870	176	53	110
*N2CG	*	48,339	186	43	88
*WA2OCG	*	46,718	230	54	88
*W3EH/2	*	21,560	84	35	63
*AA2AD	*	9,625	91	27	50
*KB2EOQ	*	6,254	53	23	36
*K2SZ	*	4,896	37	17	31
*K2YLH	*	100	37	11	13
***N2BA**	**28**	**589,200**	**1400**	**31**	**119**
*K2MFY	*	252,142	617	32	125
*W2CVW	*	37,224	140	25	69
*W2GDJ	*	12,805	94	17	48
*K2CF	21	22,680	189	25	65
***KX2S**	**14**	**51,345**	**220**	**25**	**80**
*WA2ASQ	*	5,547	45	11	32
*KF2EW	*	1,425	106	17	40
***WB2DVU**	**7**	**117,285**	**391**	**25**	**97**
***W2TO**	**3.5**	**20,475**	**99**	**14**	**61**
W3BGN	**A**	**5,065,658**	**3095**	**147**	**451**
W3UR	**"**	**3,976,385**	**2513**	**146**	**449**
K2PLF/3	*	2,275,806	1695	117	372
AA3TT	*	2,177,604	1657	125	343
N3JT	*	1,438,680	1247	115	341
N3KR	*	894,179	828	95	312
K3SX	*	785,583	726	119	338
W3BYX	*	681,198	778	80	263
N3UM	*	645,392	650	95	291
W2TN/3	*	572,448	733	95	261
W3KV	*	486,769	599	76	241
N3DL	*	482,690	404	109	361
N3RJ	*	426,374	643	73	226
W3AP	*	421,670	670	72	211
AA3VA	*	366,384	515	78	194
W2YE/3	*	263,675	432	70	195
W3TMZ	*	133,120	214	82	174
NZ3O	*	27,940	87	47	80
W3BG	*	26,656	94	45	74
K3MD	**28**	**248,148**	**781**	**30**	**92**
W3AZ	*	173,550	463	33	117
K3JRR	*	11,800	70	16	43
W3FAF	21	53,448	207	26	76
K3SV	**3.5**	**153,776**	**550**	**26**	**86**
K1KO/3	*	2,160	59	12	33
***WA3KPP**	**A**	**971,889**	**943**	**91**	**302**
***WF3M**	**"**	**919,770**	**1041**	**76**	**234**
*N3IXR	*	691,600	731	91	273
*NY3M	*	510,300	629	88	236
*W3IUU	*	447,552	583	78	210
*N4XU/3	*	434,520	593	79	227
*WA3SES	*	407,490	566	71	218
*KE3VV	*	373,272	494	80	222
*N3GJ	*	204,048	311	69	165
*N3TG	*	196,588	305	66	172
*WQ3E	*	157,373	359	62	179
*W3BEN	*	127,624	270	56	156
*K3DSP	*	121,824	251	55	133
*K3VA	*	76,260	203	53	111
*N3NZ	*	58,725	164	38	97
*N3EA	*	57,912	196	33	94
*WN3C	*	36,612	138	32	81
*K3MT	*	29,040	114	47	73
*W3FQE	*	28,080	167	29	75
*N9GG/3	*	25,984	109	40	76
***W3CP**	**28**	**132,480**	**377**	**28**	**100**
*K3NL	*	3,400	35	7	27
K4ZW	**A**	**5,643,253**	**3457**	**143**	**438**
W4AN	**"**	**5,389,104**	**3420**	**146**	**456**
				(Op: W4PA)	
N4GN	**"**	**3,908,230**	**2510**	**149**	**417**
W4MR	*	3,903,900	2519	134	416
K1PT/4	*	3,366,453	2354	134	403
W4RX	*	2,656,737	2061	126	363
K4PI	*	2,634,255	1660	151	434
N6AR/4	*	2,595,638	1769	130	412
K4AB	*	2,566,824	2139	123	333
K4NO	*	1,885,520	1513	125	356
N4DW	*	1,586,952	1219	113	361
W4YE	*	1,556,478	1211	108	354
K4LTA	*	1,352,982	1349	111	327
NN4T	*	1,225,495	1083	119	296
W4AU	*	1,193,150	1203	88	262
W3VT/4	*	956,252	878	104	318
KG7H/4	*	801,176	941	113	231
K4DLJ	*	774,728	880	124	328
K4YT	*	565,812	567	108	295
K4JLD	*	565,811	606	110	291
W4ZYT	*	563,244	574	95	279
W4SAA	*	396,525	519	81	230
K4PB	*	329,448	424	81	215
W4BQF	*	268,323	659	46	127
N4UH	*	203,574	339	78	184
W4IF	*	195,288	350	65	172
K4NR	*	147,084	294	70	168
NT4D	*	131,768	257	42	139
W4SI	*	122,811	271	58	143
K4IU	*	90,321	225	44	117
N4KN	*	90,249	424	52	149
KB4N	*	89,304	222	55	128
AA4KD	*	72,522	196	49	109
K4AAA	*	55,216	180	24	88
N2BT/4	*	12,636	58	32	46
AE4EC	*	12,402	126	35	71
W4ZV	**28**	**965,874**	**1984**	**37**	**137**
K4OJ	**"**	**701,220**	**1475**	**35**	**139**
N4BP	**"**	**679,434**	**1640**	**33**	**114**
N4ZZ	*	603,450	1428	34	115
KØEJ/4	*	550,836	1307	32	124
WD4PTJ	*	5,240	46	12	28
N4PN	**21**	**684,500**	**1516**	**39**	**146**
K4OAQ	**"**	**647,879**	**1674**	**34**	**105**
K4RV	*	26,705	105	34	75
WB4NRI	14	20,084	137	25	67
W4OGG	*	1,536	23	8	16
AA4ZZ	*	46	15	8	15
K4TEA	**1.8**	**2,356**	**35**	**11**	**20**
W4OV	*	740	18	6	14
***NA4K**	**A**	**1,845,486**	**1387**	**128**	**361**
***N4IG**	**"**	**1,479,324**	**1171**	**113**	**349**
***N1WR/4**	**"**	**1,443,050**	**1181**	**107**	**327**
*N4YDU	*	1,439,830	1226	118	351
*K4GKD	*	1,012,682	922	113	314
*K4FPF	*	999,570	923	98	331
*WJ9B/4	*	988,566	1083	94	272
*N4MM	*	935,771	830	113	328
*WA8WV/4	*	782,920	787	93	277
*K2YWE/4	*	692,520	730	97	301
*K4UVT	*	671,881	670	90	281
*N8LM/4	*	480,947	557	84	239
*AE4RO	*	373,584	403	91	253
*AF4OX	*	336,250	469	78	191
*K7CMZ/4	*	234,144	360	73	198
*W4/OH7KD	*	220,763	349	70	187
*W4NTI	*	165,432	288	73	153
*K4UK	*	163,924	299	56	158
*W4HM	*	124,485	234	65	150
*W4IDX	*	119,119	245	50	137
*K4WW	*	112,992	243	43	133
*WØEBA/4	*	106,380	265	50	130
*K6ETM/4	*	90,515	205	62	118
*K5VG/4	*	62,216	164	50	104
*WB4DNL	*	55,491	360	62	109
*W4ATL	*	23,750	101	32	63
*NN4K	*	21,312	96	39	72
*W4SD	*	21,165	102	21	62
*AD4OS	*	12,905	104	31	58
*AF4RK	*	9,048	112	37	67
*W4UM	*	7,314	40	31	38
*KE4OAR	*	6,552	72	32	52
*K4PTT	*	6,432	50	18	30
*AA4Q	*	2,812	28	16	21
*K3MZ/4	*	1,836	24	15	21
*N4CU	*	1,036	68	35	39
*KW4JS	*	100	37	19	33
***K4WI**	**28**	**361,532**	**979**	**32**	**102**
***WB4TDH**	**"**	**329,851**	**765**	**35**	**126**
*K4WA	*	273,888	706	32	112
*K2UFT/4	*	178,352	469	32	110
*KG4BIG	*	133,745	463	30	85
*KN4Y	*	52,532	267	21	71
*N4GJ	*	32,651	155	24	66
*KS4YX	*	28,072	147	21	67
*W9IXX/4	*	23,730	131	26	79
*NJ8J/4	*	1,610	28	12	11
***N4MO**	**21**	**393,599**	**946**	**36**	**121**
*WE4V	14	2,754	33	10	24
*N4PSE	7	65,954	255	21	77
*AA4NN	*	12,870	98	16	39
*WS4Y	1.8	1,334	35	9	14
K5MR	**A**	**4,362,995**	**2972**	**147**	**412**
N3BB/5	**"**	**3,527,568**	**2511**	**136**	**392**
K5YAA	**"**	**3,085,430**	**2105**	**136**	**402**
N8SM/5	*	2,470,440	1768	134	385
K5OT	*	1,699,808	1418	125	314
N5RG	*	1,572,537	1303	124	333
N5PO	*	1,461,005	1189	114	341
WA5SOG	*	678,170	731	100	265
N5JB	*	575,100	650	95	260
K5RA	*	256,841	346	91	208
W5RZ	*	107,758	214	55	124
W5XD	*	7,208	51	23	30
K5RX	**28**	**658,982**	**1452**	**36**	**131**
W5PR	*	411,928	1114	37	114
				(Op: W5MJ)	
N5XJ	*	24,174	125	25	54
K5SZ	**21**	**598,216**	**1290**	**37**	**135**
				(Op: K5NU)	
W5WMU	**"**	**538,692**	**1264**	**35**	**124**
K5ZO	*	94,119	359	34	103
W5FO	**14**	**222,003**	**579**	**34**	**119**
W5UN	**7**	**448,902**	**1175**	**34**	**119**
W5CWQ	*	35,010	175	22	68
***N5AW**	**A**	**1,794,925**	**1204**	**138**	**397**
***KK7JS/5**	**"**	**1,320,382**	**1104**	**131**	**387**
***WD5K**	**"**	**1,154,828**	**947**	**116**	**333**
*KE5C	*	486,400	636	87	217
*AF5Z	*	414,388	469	94	244
*KN5L	*	207,020	354	73	147
*N5DUW	*	176,175	335	89	172
*AB5C	*	144,550	251	76	169
*W5KI	*	115,101	227	56	133
*WK5K	*	105,495	230	70	125
*K5KJ	*	55,074	159	55	82
*NN5T	*	46,800	150	40	77
*NO5W	*	30,174	126	41	66
*N5AF	*	23,738	99	32	51
*N5OT	*	22,425	88	52	63
*K5CEM	*	10,974	101	39	54
*NA4M/5	*	2,924	29	11	23
*KY5S	*	2,840	29	19	21
***K8EP/5**	**28**	**332,766**	**912**	**31**	**108**
*K5KLA	*	308,104	738	33	119
***WQ5W**	**21**	**355,520**	**841**	**37**	**123**
*N5DO	*	205,155	527	32	109
*WJ5K	14	28,737	238	27	76
***K5WA**	**7**	**100,620**	**363**	**25**	**92**
*WØUO/5	3.5	15,616	113	19	45
W6EEN	**A**	**4,958,674**	**3031**	**163**	**439**
				(Op: N6RT)	
N6CW	**"**	**1,441,240**	**988**	**142**	**406**
W6YX	**"**	**1,380,460**	**1123**	**123**	**337**
AJ6V	*	533,445	774	89	176
W6NKR	*	521,904	601	99	233
W6KNB	*	497,448	615	91	203
N6IC	*	480,527	564	113	229
KI6T	*	445,500	505	97	233
WA5VGI/6	*	421,056	591	101	187
K7JJ/6	*	375,649	461	107	216
N6TW	*	312,768	413	96	192
N6YEU	*	310,726	442	78	169
K6VNX	*	179,928	315	65	139
W6UDX	*	165,352	303	81	134
KM6SE	*	99,498	215	64	142
K6JG	*	97,343	173	83	139
K6NR	*	51,342	150	48	81
W6XD	*	42,770	140	50	80
KK6F	*	39,312	141	46	71
N6ED	*	12,699	59	32	51
N6VH	*	10,360	63	22	34
W6LSN	*	4,503	90	25	32
W6YA	**28**	**555,258**	**1148**	**39**	**140**
K6KM	**"**	**541,307**	**1208**	**36**	**133**
K6KT	*	70,308	309	27	66
K6UO	*	41,601	164	29	70
WA6O	**21**	**483,859**	**1318**	**35**	**104**
N6ZB	*	173,280	565	32	82
N6NG	*	67,872	242	31	81
W6DCC	*	65,205	259	32	83
N7CW/6	**14**	**232,632**	**535**	**37**	**125**
W6MVW	*	7,242	55	18	33
W6KR	**7**	**218,688**	**776**	**34**	**100**
W6/KH6DX	**1.8**	**2,106**	**102**	**11**	**15**
***K8PO/6**	**A**	**1,856,274**	**1545**	**133**	**325**
***K6UM**	**"**	**351,713**	**449**	**94**	**195**
***KG6O**	**"**	**337,850**	**453**	**101**	**189**
*W3SE/6	*	294,336	471	103	185
*W6ZL	*	178,868	345	63	131
*K6FO	*	155,682	290	93	186
*WO6M	*	141,264	296	80	138
*AA6PW	*	140,304	368	53	95
*N6JM	*	117,537	236	71	122
*KØVA/6	*	114,255	247	69	123
*AA6EE	*	103,835	251	76	99
*K6XX	*	74,228	195	58	96
*K6LDX	*	53,157	150	56	85
*N6GL	*	52,955	193	51	68
*N6EM	*	50,112	171	57	87
*N6IBP	*	42,080	106	73	87
*W6GZ	*	40,377	148	53	76
*K6DGW	*	10,295	68	34	37
*KE6QR	*	7,955	62	16	27
*AK6R	*	1,200	42	15	15
***KF6MIC**	**28**	**176,384**	**546**	**32**	**92**
*NT6K	*	57,267	344	26	55
*K6CU	*	39,809	131	31	90
*NK6A	*	18,060	111	23	47
***W6YJ**	**21**	**114,010**	**334**	**32**	**98**
*WD6DX	14	20,075	119	24	49
W7GG	**A**	**2,703,624**	**2293**	**143**	**319**
KC7V	**"**	**2,530,724**	**1909**	**140**	**357**
N7IP	**"**	**2,337,932**	**1921**	**121**	**325**
K4XU/7	*	2,081,292	1572	139	363
W7UT	*	1,973,329	1471	135	356
K7ZZ	*	1,558,917	1575	111	280
W7VJ	*	941,640	1006	111	269
K7GQ	*	783,200	717	115	285
K7BTW	*	767,870	908	103	207
K7ABV	*	568,062	649	102	240
W7QN	*	404,984	526	94	190
KS7T	*	342,364	504	76	175
W7YS	*	299,388	440	73	171
W7IIT	*	264,813	431	85	156
W7LR	*	254,982	356	100	181
K7FL	*	248,124	346	98	178
KC7UP	*	191,864	333	74	158
KX7J	*	82,027	201	58	104
AE7EE	*	7,424	47	24	40
KC7ZFP	*	1,150	38	9	10
K7QQ	**28**	**410,848**	**1065**	**35**	**113**
N7DF	**"**	**375,288**	**1151**	**35**	**117**
N7DR	*	334,260	876	31	104
N7KU	*	308,416	1163	37	121
W7EJ	*	248,064	710	34	102
K7NV	**21**	**433,200**	**1159**	**35**	**115**
W2VJN/7	"	257,446	660	35	107
K7ZUM	"	136,488	584	29	65
W7AYY	*	20,367	102	24	49
W7LGG	7	148,716	83	18	34
W7TSQ	*	10,660	102	19	33
W8AEF/7	**3.5**	**18,696**	**159**	**21**	**36**
***K7ZA**	**A**	**1,059,232**	**910**	**125**	**294**
***AB7RW**	**"**	**543,197**	**714**	**94**	**183**
***W7QDM**	**"**	**462,372**	**574**	**97**	**221**
*NN7A	*	295,274	416	82	180
*W7HS	*	292,757	381	103	208
*W7GT	*	98,754	252	59	92
*KD7GTI	*	66,300	226	52	78
*N3AIU/7	*	59,760	199	70	96
*WS7V	*	52,290	175	50	76
*K7ON	*	43,930	148	35	80
*N7XY	*	36,720	126	54	81
*N7OR	*	29,854	100	46	72
*AK7O	*	7,040	60	26	38
*K7XN	*	6,426	56	21	42
*N7IF	*	5,763	63	20	31
*NA7R	*	4,991	60	15	16
*KC7WUE	*	3,927	49	16	17
*KT7G	*	100	8	8	8
*W8EQA/7	28	66,250	269	28	78
***N7WA**	**14**	**147,477**	**485**	**31**	**92**
K8GL	**A**	**4,010,780**	**2300**	**147**	**473**
K8DX	**"**	**3,753,630**	**2838**	**131**	**406**
N4ZR/8	**"**	**3,632,076**	**2594**	**125**	**372**
K8CX	*	908,310	837	111	300
K2UOP/8	*	760,455	789	95	292
AA8UP	*	428,168	522	82	217
W8KX	*	366,054	420	87	251
W8PN	*	219,593	380	69	173
W8CS	*	112,905	234	55	138
N8MZ	**28**	**133,770**	**394**	**31**	**99**
W8UD	**21**	**142,875**	**463**	**32**	**95**
W8TWA	**14**	**144,840**	**402**	**34**	**108**
AF8C	7	100	26	10	20
K8MD	**3.5**	**25,584**	**192**	**18**	**60**
W8UVZ	**1.8**	**24,725**	**192**	**18**	**52**
***N8AA**	**A**	**2,732,951**	**1743**	**134**	**425**
***WB8YJF**	**"**	**1,676,276**	**1424**	**116**	**341**
***K5IID/8**	**"**	**1,301,248**	**1154**	**107**	**309**
*KC8FS	*	633,916	743	94	267
*K8GT	*	573,950	657	89	236
*W8GOC	*	542,323	619	86	234
*W8VE	*	325,008	460	84	212
*W8IDM	*	278,208	404	70	182
*NS8O	*	217,342	346	77	194
*K8AAX	*	159,698	326	51	136
*W8CNL	*	153,519	264	64	155
*K8KU	*	106,729	233	56	137
*W8AN	*	85,942	226	61	133
*W8OP	*	35,046	127	31	68
*K8CV	*	23,124	99	28	66
*N8NX	*	21,008	99	36	65
*N8WS	*	6,525	68	26	49
*W8WOJ	*	3,513	76	37	68
*N8XP	*	100	266	48	134
*K8LY	*	100	182	52	101
***K8IR**	**28**	**154,560**	**400**	**31**	**107**
***W8UMR**	**14**	**67,487**	**225**	**30**	**87**
*W8IQ	*	3,444	30	14	28
*K8DO	1.8	110	18	6	5
W9RE	**A**	**7,472,178**	**4131**	**159**	**492**
				(Op: N9RV)	
K9MA	**"**	**2,981,500**	**2122**	**127**	**373**
WI9WI	**"**	**2,011,440**	**1720**	**118**	**317**
W9WI	*	1,847,516	1607	110	312
W9OP	*	1,643,694	1183	129	378
K9ZO	*	932,253	801	122	309
NF9V	*	737,760	786	95	253
K9UQN	*	594,114	746	87	222
W9OA	*	557,277	621	101	256
KI9A	*	277,524	502	70	164
W9KTP	*	179,423	411	63	206
WA2USA/9	*	127,864	220	68	162
W9MS	*	102,503	229	51	121
K9XV	*	72,455	244	69	146
W9IIX	*	23,500	112	45	80
W9CM	*	4,294	47	14	24
W9YYG	**28**	**242,747**	**673**	**33**	**107**
K9HUY	*	117,817	398	30	89
K9CAN	**14**	**122,225**	**343**	**33**	**103**
K9CJ	**7**	**116,765**	**381**	**26**	**95**
***N4TZ/9**	**A**	**1,668,753**	**1331**	**121**	**350**
***N9UA**	**"**	**1,154,560**	**951**	**113**	**327**
***W9AU**	**"**	**1,030,320**	**917**	**110**	**295**
*K9CS	*	851,067	815	112	287
*WA9AQN	*	445,269	538	91	218

*K9JE	"	384,688	503	83	223	
*W9WUU	"	370,656	489	78	210	
*W9VA	"	281,569	397	77	194	
*K9PG	"	218,845	334	85	168	
*W9EBY	"	176,911	275	77	160	
*N9BOR	"	126,672	281	63	140	
*N9PW	"	53,108	149	49	93	
*W9IL	"	49,818	126	44	94	
*W9LYA	"	6,930	42	28	38	
*W9UM	"	2,310	28	13	22	
*W9ISC	"	858	15	11	11	
***K9BG**	**28**	**56,300**	**213**	**26**	**74**	
***K9WA**	**21**	**163,703**	**449**	**30**	**97**	
*W9ILY	"	154,420	427	34	106	
*NI9C	"	143,500	423	32	93	
*W9LT	"	117,128	372	31	90	
***KJ9C**	**14**	**201,001**	**501**	**35**	**114**	
***K9MMS**	**7**	**58,298**	**215**	**24**	**79**	
N2IC/Ø	**A**	**5,373,745**	**3171**	**158**	**453**	
KØCAT	**"**	**1,924,058**	**1510**	**120**	**338**	
KØOU	**"**	**1,415,700**	**1226**	**122**	**328**	
KEØUI	"	1,271,223	1231	115	296	
WBØO	"	1,034,805	830	130	333	
NØXB	"	653,341	795	104	273	
KØIR	"	591,840	624	112	248	
WØHW	"	422,979	595	77	200	
KØJJ	"	324,046	405	99	203	
WØZP	"	279,876	446	73	176	
K7EY/Ø	"	11,928	69	31	53	
WØYK	"	7,956	56	39	39	
NSØZ	**28**	**616,960**	**1429**	**34**	**126**	
KØSR	**"**	**485,600**	**1095**	**34**	**126**	
WØTM	"	416,043	952	37	133	
KGØUA	**21**	**125,184**	**360**	**31**	**97**	
WAØOTV	"	410	21	11	9	
K4VX/Ø	**7**	**330,959**	**859**	**29**	**110**	
KØCL	"	199,660	558	29	105	
KØFX	"	97,664	383	28	81	
KØCS	1.8	1,400	25	11	17	
***KU1CW/Ø**	**A**	**1,362,300**	**1212**	**129**	**346**	
***KØPC**	**"**	**483,120**	**568**	**85**	**245**	
*WØUY	"	343,693	526	77	182	
*KØCF	"	328,882	432	84	205	
*KØCIE	"	277,817	571	74	183	
*KNØV	"	177,184	298	69	155	
*KØRY	"	155,296	317	71	140	
*KØSQ	"	153,387	316	63	144	
*AAØAI	"	111,153	325	73	164	
*NEØP	"	97,194	204	78	116	
*WAØIYY	"	97,180	227	53	119	
*WAØBNX	"	76,703	195	46	112	
*KØRC	"	55,266	178	41	81	
*KEØFT	"	40,734	103	44	102	
*KØVX	"	33,578	134	31	72	
*K2HT/Ø	"	31,024	100	42	70	
*NØIBT	"	27,248	129	46	58	
*NØHR	"	19,032	93	40	64	
*ADØH	"	11,200	59	28	42	
*WA2MNO/Ø	"	3,441	102	36	57	
***KØRS**	**28**	**326,310**	**831**	**31**	**115**	
*AEØQ	"	185,889	510	30	99	
*KØCOP	"	47,232	194	23	73	
*WBØIUN	"	19,412	148	25	67	
*NØAAA	"	9,774	65	21	33	
***NØNR**	**21**	**352,160**	**825**	**36**	**119**	
*NØED	"	82,806	277	29	82	
*WNØL	"	60,152	255	27	76	
***KVØQ**	**7**	**218,988**	**646**	**33**	**99**	
*NØRA	"	88,138	325	29	98	
*WBØB	"	2,940	42	9	19	
*KØUK	1.8	1,219	40	10	13	

ALASKA

KL7Y	**A**	**4,381,155**	**4018**	**146**	**313**
KL7RA	**28**	**674,709**	**2168**	**36**	**97**
***KL7AC**	**A**	**776,204**	**1252**	**85**	**168**
*KL7FAP	14	9,990	164	19	35

ANGUILLA

***VP2EST**	**A**	**956,056**	**1770**	**73**	**181**

ANTIGUA

***V26K**	**A**	**6,541,600**	**5048**	**126**	**394**
					(Op: AA3B)
*V26JT	"	613,680	1191	70	170

BAHAMAS

C6AKW	**A**	**4,929,348**	**4210**	**128**	**364**
					(Op: K3TEJ)
***C6AKP**	**A**	**629,926**	**1266**	**83**	**191**
					(Op: N4RP)
*C6AGY	"	102,600	453	55	135
					(Op: ND6S)

BARBADOS

8P9Z	**A**	**9,176,174**	**6237**	**144**	**442**
					(Op: K4BAI)

BERMUDA

***VP9/NC8V**	**A**	**215,946**	**783**	**47**	**115**

CANADA

VO1MP	**28**	**442,842**	**1402**	**30**	**108**
***VE9DX**	**A**	**1,907,936**	**1409**	**122**	**425**
***VE9ST**	**14**	**554,439**	**1763**	**32**	**105**
*VO1WET	3.5	714	28	6	15
VE2IM	**A**	**7,942,141**	**5502**	**133**	**466**
					(Op: VA3UZ)
VE2AYU	"	1,349,770	1603	86	279
VE2FFE	"	45,552	207	37	67
***VE2AWR**	**A**	**923,717**	**1158**	**90**	**247**
VE3AT	**A**	**3,328,325**	**2758**	**112**	**363**
VE3PN	"	787,355	1216	88	207
VE3OTL	"	727,216	1124	98	246
VA3RU	**28**	**847,275**	**2059**	**35**	**130**
VE3YGN	**21**	**198,688**	**788**	**25**	**87**
VE3PND	7	5,148	49	12	40
VE3UZ	3.5	1,196	25	7	19
VE3QAA	**1.8**	**27,489**	**268**	**13**	**38**
VE3KZ	**"**	**15,244**	**202**	**13**	**24**
***VE3ZPD**	**A**	**2,013,804**	**1851**	**122**	**346**
***VE3STT**	**"**	**1,454,368**	**1539**	**91**	**285**
*VE3KP	"	1,238,324	1490	92	261
*VE3RM	"	1,218,792	1556	89	255
					(Op: WA1FCN)
*VE3GFN	"	586,146	822	84	237
*VE3OM	"	488,906	566	75	238
*VE3BUC	"	303,732	594	63	173
*VE3IAY	"	19,872	72	39	57
***VE3ZT**	**28**	**335,916**	**1120**	**29**	**97**
*VE3UKR	"	40,016	212	20	62
***VE3MQW**	**14**	**130,289**	**475**	**27**	**86**
*VA3SY	"	88,224	670	23	73
***VE3FU**	**7**	**231,880**	**894**	**23**	**87**
*VA3TTT	"	166,800	710	27	93
***VE3OSZ**	**1.8**	**15,863**	**287**	**11**	**18**
VE4IM	**A**	**839,408**	**971**	**101**	**267**
***VE4YU**	**A**	**263,320**	**492**	**75**	**152**
***VC4X**	**28**	**394,335**	**1294**	**29**	**106**
					(Op: VE4VV)
***VE4MF**	**21**	**42,350**	**136**	**34**	**76**
VE5CPU	A	9,550	97	28	22
VE5ZX	**21**	**483,717**	**1553**	**35**	**122**
VE5GC	"	60,190	473	21	23
VE5AAD	"	39,630	241	24	54
***VE5SF**	**A**	**1,223,278**	**1830**	**93**	**229**
***VE5UF**	**28**	**130,086**	**617**	**27**	**72**
VA6NO	**A**	**405,720**	**940**	**81**	**126**
VE6WQ	**28**	**778,008**	**1936**	**38**	**130**
VE6JY	**21**	**1,028,223**	**2330**	**38**	**133**
***VE6ZT**	**A**	**548,821**	**943**	**85**	**174**
*VE6TN	"	464,784	822	94	182
*VE6LB	"	109,592	353	64	88
*VE6VW	"	29,700	233	48	52
***VE6BMX**	**28**	**241,123**	**1098**	**29**	**74**
***VE6BF**	**14**	**338,988**	**903**	**37**	**119**
VE7UF	**A**	**1,448,001**	**1897**	**119**	**230**
VE7QO	"	156,510	347	52	133
VA7CW	**21**	**823,446**	**2104**	**37**	**125**
VE7XR	**14**	**480,965**	**1393**	**35**	**110**
***VA7RR**	**A**	**2,898,432**	**3010**	**121**	**287**
*VE7XF	"	831,285	871	121	256
*VE7XB	"	325,134	686	75	148
*VE7VF	"	148,182	421	59	99
*VE7FO	"	69,996	352	41	73
*VE7ZBK	"	31,577	193	36	55
***VE7SV**	**28**	**549,512**	**1567**	**34**	**115**
*VE7IN	"	61,600	314	27	53
*VE7NNN	"	8,450	210	11	15

CAYMAN ISLANDS

ZF2AM	**21**	**1,196,320**	**3098**	**35**	**125**
					(Op: K6AM)
***ZF2SA**	**A**	**1,931,748**	**2656**	**96**	**252**
					(Op: K3SA)
***ZF2RR**	**28**	**851,736**	**2517**	**33**	**105**
					(Op: N9XX)
***ZF2LA**	**7**	**96,943**	**615**	**18**	**59**
					(Op: K9LA)

COSTA RICA

TI4G	**21**	**268,191**	**1890**	**30**	**99**
					(Op: TI2WGO)
***TI5N**	**A**	**6,013,962**	**5001**	**129**	**393**
					(Op: K9NW)
***TI3TLS**	**14**	**232,323**	**1343**	**28**	**83**

CUBA

CO2JD	**7**	**152,796**	**800**	**25**	**82**
***CO8LY**	**A**	**1,802,430**	**2827**	**87**	**228**
***CO8DM**	**28**	**201,941**	**1096**	**22**	**67**
*CO8TW	"	99,946	388	28	90
*CM2FN	14	703	30	9	10
***CO8ZZ**	**7**	**378,713**	**1461**	**24**	**94**

DOMINICA

***J79GU**	**A**	**2,607,579**	**3061**	**100**	**291**
					(Op: DL7VOG)

DOMINICAN REPUBLIC

***HI9**					
/DL2DXA	**A**	**567,821**	**1119**	**66**	**167**
*HI3LFE	"	65,889	389	25	60
***HI3K**	**7**	**524,538**	**1825**	**29**	**109**

GREENLAND

OX/N6ZZ	**A**	**4,252,419**	**4248**	**107**	**316**
***OX/LA5KW**	**A**	**84**	**7**	**6**	**6**

GUADELOUPE

***FG/NØJK**	**A**	**450,495**	**1052**	**72**	**141**

JAMAICA

6Y7A	**A**	**2,026,222**	**2715**	**99**	**242**
					(Op: KN5H)

MARTINIQUE

FM5GU	A	23,290	137	35	50
FM5BH	**28**	**1,119,504**	**2989**	**36**	**130**

MEXICO

***XE2MX**	**A**	**347,520**	**498**	**106**	**214**
***XE1RGL**	**28**	**205,014**	**991**	**25**	**69**
*4B1BEF	"	7,442	165	20	41

PANAMA

3E1DX	**28**	**1,805,225**	**4527**	**37**	**126**
					(Op: DL5XX)
***HP1AC**	**A**	**339,687**	**660**	**63**	**166**

PUERTO RICO

NP4A	**28**	**1,649,209**	**3788**	**36**	**137**
					(Op: K7JA)
***NP3X**	**28**	**492,320**	**1553**	**35**	**101**

SAN ANDRES/PROVIDENCIA

***HKØER**	**A**	**183,078**	**733**	**37**	**89**
					(Op: N6HR)

ST. KITTS & NEVIS

V47KP	**A**	**1,106,708**	**1471**	**84**	**253**
					(Op: W2OX)

ST. VINCENT

***J8/F6AUS**	**A**	**764,712**	**1717**	**62**	**172**

TURKS & CAICOS ISLANDS

VP5GN	**A**	**7,475,358**	**5485**	**144**	**429**
					(Op: K5GN)

U.S. VIRGIN ISLANDS

NP2L	**A**	**708,414**	**999**	**81**	**253**
KP2/OK1TN	**28**	**755,706**	**2948**	**33**	**100**
KP2					
/OK1DXB	**3.5**	**57,297**	**577**	**15**	**56**
***WP2Z**	**28**	**790,230**	**2299**	**34**	**108**

AFRICA

AFRICAN ITALY

IH9P	**7**	**1,218,145**	**2868**	**29**	**116**
					(Op: OK1FUA)

CANARY ISLANDS

EA8BH	**A**	**18,010,765**	**7555**	**183**	**634**
					(Op: N5TJ)
EA8CN	"	2,160,620	1951	94	291
EA8NQ	**21**	**117,800**	**446**	**23**	**72**
EA8IN	"	43,920	212	18	72
***EA8**					
/DJ1OJ	**A**	**2,531,513**	**2179**	**98**	**303**
*EC8AUZ	"	60,422	447	50	100
***EA8FT**	**28**	**704,707**	**1795**	**35**	**111**
*EA8/DK3KD	"	424,434	1258	29	98

CAPE VERDE

D4A	**A**	**7,237,932**	**5240**	**120**	**396**
					(Op: I2VXJ)

CEUTA & MELILLA

EA9LZ	**28**	**1,537,569**	**3552**	**39**	**128**
EA9EU	**21**	**856,044**	**2193**	**34**	**124**
EA9AZ	**3.5**	**228,360**	**1155**	**16**	**72**

EGYPT

***SU9ZZ**	**A**	**6,423,725**	**4572**	**111**	**386**

GAMBIA

***C56VB**	**A**	**463,540**	**940**	**61**	**159**
					(Op: OH2VB)

MADEIRA ISLANDS

CT3BX	**A**	**8,554,028**	**5936**	**131**	**401**
					(Op: OH2MA)
CT3KN	"	2,845,647	3086	86	271
***CT3**					
/DL2RUM	**A**	**1,648,296**	**2151**	**72**	**240**
*CT3/DL2MDU	"	190,233	365	56	151
*CT3/DL7VFR	"	125,656	238	66	138

MALI

TZ6DX	**A**	**2,752,248**	**2902**	**82**	**246**

MOROCCO

***CN8YR**	**A**	**635,996**	**1080**	**54**	**169**

REUNION

***FR5FD**	**A**	**2,105,685**	**2073**	**95**	**270**

SOUTH AFRICA

ZS6EZ	**28**	**2,017,800**	**4151**	**38**	**133**
ZS4TX	**7**	**207,108**	**792**	**27**	**72**
ZS6KR	"	31,875	178	29	56
***ZSØM**	**A**	**398,208**	**543**	**84**	**188**
					(Op: ZS6MG)
*ZS1NF	"	271,336	453	78	152
***ZS6DX**	**21**	**70,848**	**307**	**27**	**81**

TUNISIA

3V8BB	**A**	**11,797,800**	**6184**	**156**	**544**
					(Op: YT1AD)

ASIA

ASIATIC RUSSIA

UA9CDV	**A**	**4,262,622**	**3108**	**130**	**416**
UA9CLB	**"**	**4,031,566**	**2955**	**125**	**392**
RX9SX	**"**	**3,953,115**	**2800**	**127**	**408**
RW9TA	"	2,749,880	2326	110	350
RA9DZ	"	2,120,600	1787	117	343
RW9UW	"	1,521,883	1773	80	261
RW9QA	"	1,039,654	1287	73	241
UA9CKS	"	886,704	971	94	270
RA9AC	"	20,437	79	38	69
UA9OS	"	19,800	98	41	69
UA9OSV	"	7,700	65	17	38
UA9MA	**28**	**442,904**	**1279**	**36**	**118**
RA9KM	**"**	**431,750**	**1188**	**37**	**120**
RX9LW	"	213,811	810	29	91
RW9SW	**21**	**399,030**	**1081**	**32**	**109**
UA9LAC	**"**	**327,080**	**1000**	**35**	**95**
UA9BS	**14**	**402,336**	**1110**	**32**	**100**
UA9CNV	"	303,855	819	34	107
UA9LAO	"	97,820	582	19	54
UA9CI	**3.5**	**174,468**	**791**	**17**	**67**
UA9AT	**1.8**	**121,678**	**594**	**17**	**66**
RU9TO	**"**	**98,496**	**578**	**17**	**64**
UA9YAB	"	51,840	396	20	60
UA9KM	"	19,195	159	14	41
***UA9XEN**	**A**	**1,528,488**	**1340**	**107**	**319**
***RU9CI**	**"**	**1,523,942**	**1604**	**105**	**293**
***RX9JW**	**"**	**1,441,210**	**1773**	**90**	**244**
*RZ9CX	"	1,173,690	1120	103	302
*RN9RZ	"	903,647	965	101	288
*RA9XF	"	811,296	966	77	247
*UA9AX	"	508,654	533	104	290
*RA9AOL	"	269,952	490	53	169
*UA9QCP	"	231,660	522	69	201
*UA9CES	"	229,360	474	50	138
*UA9FM	"	205,706	520	46	117
*UA9FEG	"	176,528	467	43	133
*RA9AE	"	112,200	304	38	112
*RX9WN	"	75,256	164	64	120
*UA9OGC	"	69,936	180	66	122
*RV9CLF	"	52,393	194	30	91
*RA9FFB	"	33	10	6	5
***UA9OA**	**28**	**287,414**	**926**	**30**	**101**
***UA9KJ**	**"**	**287,283**	**1002**	**32**	**99**
*RA9OW	"	246,189	823	32	105
*UA9AAP	"	101,179	354	28	89
*UA9XC	"	66,440	299	19	69
*RX9FB	"	51,439	196	32	93
*UA9JQN	"	33,108	181	26	67
***RV9JR**	**21**	**317,660**	**978**	**33**	**107**
*RA9FF	"	154,092	495	30	99
***RJ9J**	**14**	**464,163**	**1349**	**36**	**125**
					(Op: RA9JR)
*UA9CBM	"	236,826	662	32	110
*RA9XE	"	113,577	409	48	90
*RA9CZ	"	46,865	259	17	50
*UA9CEP	"	5,916	76	15	14
***RA9JP**	**7**	**219,244**	**845**	**30**	**88**
RKØAXX	**A**	**5,208,507**	**3487**	**151**	**406**
					(Op: N6AA)
RUØLL	**"**	**1,933,104**	**2149**	**126**	**286**
RAØFU	"	1,012,825	1515	111	208
RAØJJ	"	685,640	1328	100	205
UAØYAY	"	318,240	549	90	182
UAØFAI	"	298,412	508	79	165
UAØJDD	"	232,232	566	66	137
UAØLS	"	202,884	328	120	199
RSØF	**28**	**416,559**	**1308**	**37**	**106**
					(Op: UAØFZ)
UAØCW	"	75,563	311	29	68
UAØKBG	"	20,925	233	18	27
UAØBA	**21**	**215,750**	**726**	**31**	**94**
RAØBA	**14**	**218,350**	**787**	**30**	**80**
RAØCG	**7**	**305,892**	**1435**	**35**	**81**
***UAØSDX**	**A**	**85,824**	**313**	**38**	**80**
***RAØFN**	**28**	**385,986**	**1164**	**37**	**101**
*RZØCQ	"	66,884	304	27	65
*RAØJD	"	47,464	226	25	67
*RAØJX	7	46,737	393	25	56
*RUØBB	"	29,766	219	18	48
*RAØFA	1.8	767	73	7	6

ASIATIC TURKEY

TA3DD	**A**	**2,122,235**	**2078**	**96**	**297**
***TA2DS**	**A**	**191,052**	**398**	**49**	**131**
***TA3D**	**7**	**360,166**	**1518**	**21**	**80**

AZERBAIJAN

4K7Z	**A**	**2,706,286**	**2509**	**98**	**324**
*4K9C	A	18,564	105	34	44

BAHRAIN

A92ZE	**3.5**	**126,000**	**498**	**26**	**79**

CHINA

***BA4TB**	**A**	**116,580**	**272**	**72**	**129**
***BD4ED**	**28**	**359,040**	**1546**	**32**	**96**

CYPRUS

C4W	**A**	**6,681,255**	**4381**	**143**	**452**
					(Op: 5B4WN)
H2G	**28**	**1,094,940**	**2598**	**35**	**123**
					(Op: 5B4AGC)

HONG KONG

VR2MY	**A**	**287,640**	**894**	**78**	**177**
VR2BG	**28**	**956,160**	**2485**	**37**	**123**

INDIA

VU2WAP	**A**	**1,459,968**	**1634**	**108**	**276**
					(Op: VU2BGS)
***VU2PAI**	**A**	**2,271,412**	**2106**	**127**	**357**
***VU3VLH**	**28**	**579,456**	**1872**	**36**	**108**

ISRAEL

4X/OL7D	**28**	**822,450**	**2196**	**35**	**115**
4X3A	**1.8**	**135,364**	**676**	**17**	**69**
					(Op: 4X4NJ)
***4Z5FW**	**21**	**128,092**	**579**	**20**	**66**

JAPAN

JF1EQA	**A**	**1,356,820**	**1413**	**105**	**253**
JA1QOW	**"**	**724,776**	**822**	**107**	**205**
JA1HP	"	417,197	680	77	176
JR1LEV	"	340,443	581	84	147
JR1GRF	"	95,148	241	49	100
JA1IFB	"	85,785	217	55	111
JA1HQ	"	44,310	150	36	69
7J1ABD	"	32,560	130	35	75
					(Op: WA6URY)
JN1BMX	"	20,090	96	39	59
JJ1JRH	"	15,120	98	22	32
JI1NJC	"	13,689	75	39	42
JH1AEP	**28**	**593,480**	**1558**	**37**	**111**
JH1FSF	**"**	**460,560**	**1151**	**38**	**114**
JR1UJX	"	252,734	935	32	75
JA1HHU	"	50,940	244	28	62
JA1SJV	"	33,020	180	21	44
JL1ANP	21	11,925	98	16	29
JH1AZO	**14**	**107,107**	**549**	**34**	**73**
JH1RFM	"	63,288	285	32	76
JA1GS	"	18,736	110	22	45
JK1LUY	"	17,608	104	20	42
JA1QZC	7	11,550	80	21	34
***JR4PMX/1A**		**1,789,060**	**1450**	**142**	**313**
***JS1OYN**	**"**	**1,070,901**	**1134**	**114**	**237**
***JE1REU**	**"**	**788,130**	**1106**	**87**	**191**
*JN1NOP	"	632,814	859	100	192
*JA1PCY	"	489,100	536	118	247
*JN1MSO	"	466,725	751	90	155
*JA1XRH	"	449,500	558	106	204
*JR1XKU	"	444,270	633	80	171
*JM1NHZ	"	434,600	633	96	169
*JA1XUY	"	381,269	570	84	167
*JG1OWV	"	324,921	487	103	174
*JH1FNU	"	299,163	541	70	153
*JA1PS	"	263,478	410	97	159
*JJ1QJP	"	262,080	485	62	146
*JA1OZK	"	234,739	500	65	126
*7L1ETP	"	213,624	367	71	145
*JH1JGZ	"	204,950	391	84	141
*JA8NSF/1	"	203,558	434	66	125
*JA1TRP	"	201,085	386	76	130
*7M2ALP	"	189,720	391	85	119
*JP1SRG	"	166,518	301	81	139
*JE1HJV	"	160,539	337	60	117
*JJ1JGI	"	141,903	300	75	114
*JH1PXY	"	111,637	267	63	103
*JA1RRA	"	106,758	310	58	104
*JA1XPU	"	106,200	240	70	107
*JA1KI	"	101,423	284	49	105
*JR7HOD/1	"	89,354	202	39	89
*7K2GMJ	"	82,423	265	52	75
*JA1IZ	"	75,704	199	61	88
*JR1LQK	"	73,396	312	50	68
*JN1IXU	"	72,228	180	60	96
*JG1TVK	"	71,573	180	61	96
*JA1SWB	"	67,728	256	35	67
*JA1HFY	"	62,250	206	53	75
*JA1BCP	"	59,230	201	37	78
*JA1AZS	"	59,132	179	43	85
*JF1QBN	"	55,762	155	57	89
*JH1MTR	"	55,255	159	52	84
*JA1WHG	"	53,785	195	63	92
*JA1BBA	"	53,689	180	43	73
*JH1SWD	"	51,975	148	51	84
*7N4KDU	"	51,709	176	41	76
*JR1UMO	"	43,232	138	37	75
*JH1NXU	"	39,829	155	43	66
*JA1EJD	"	37,723	174	40	79
*JL1EAN	"	25,330	109	27	58
*JM1SBU	"	25,100	103	40	60
*JA1MXY	"	14,070	75	26	44
*7K1EQG	"	13,735	80	31	36
*JH1UES	"	12,960	88	23	37
*7K2KJX	"	6,762	57	21	28
*JG1FGL	"	3,498	38	13	20
*JJ1GWF	"	1,840	35	16	24
***JI1RXQ**	**28**	**357,378**	**1058**	**36**	**91**
***JA1NLX**	**"**	**197,064**	**716**	**28**	**74**
*JI1HFJ	"	114,366	458	30	68
*JH1DYV	"	112,404	376	35	79
*JA1BUI	"	86,623	319	45	92
*7K4GUR	"	84,642	354	27	67
*JA1EMQ	"	79,211	307	28	65
*JA1VVH	"	78,175	328	30	66
*7J7ADB	"	72,672	298	28	68

*JA1AA	*	27,619	146	21	50
*JS1MJE	*	13,926	79	23	43
*JK1NSR	*	10,755	98	18	27
*JJ1LRD	*	10,136	81	20	36
*JA1AAT	*	7,656	60	17	27
*JL1ABR	*	1,764	23	12	16
*JE1KDM/1	*	308	14	7	7
***7K4XNN**	**21**	**277,596**	**1091**	**28**	**71**
***JA1JQY**	**"**	**162,076**	**522**	**32**	**90**
*JJ1NZA	*	99,900	372	30	81
*JA1YEW	*	38,640	212	25	55
*JE1JAC	*	34,456	184	23	50
*JA2EAB/1	*	29,526	145	23	51
*JA1TEG	*	23,310	120	21	49
*JO1WIZ	*	18,693	103	20	47
*JH1BUB	*	14,364	82	14	49
*7M1KNG	*	10,746	87	17	37
*JA1BFN	*	9,590	94	15	20
*JQ1AHZ	*	3,026	35	15	19
*JM1LPN	*	1,760	21	14	18
*JM1SZY	14	17,155	93	24	49
*JA1BE	*	6	1	1	1
***JA1KVT**	**7**	**91,601**	**350**	**31**	**76**
*JH1APZ	*	40,298	184	30	61
*JK1LYP	*	3,589	47	14	23
*JE1SPY	1.8	352	16	6	5
JH2AMH	**A**	**635,390**	**1116**	**98**	**192**
JA2FSM	*	233,893	414	82	140
JA2QVP	*	111,390	312	52	89
JF2FIU	*	85,248	253	50	78
JF2ION	**28**	**339,582**	**1000**	**35**	**97**
JG2TKH	*	207,204	713	37	87
JA2XCR	*	92,701	303	36	83
JA2DHL	*	61,500	295	27	55
JA2QXP	**14**	**54,714**	**227**	**30**	**65**
***JA2BY**	**A**	**1,078,692**	**1089**	**127**	**269**
***JA2IU**	**"**	**556,494**	**769**	**100**	**188**
*JA2CUS	*	504,155	684	97	198
*JK2VOC	*	405,187	676	104	202
*JH2NWP	*	390,264	563	92	184
*JA2BQX	*	308,096	557	75	157
*JA2JTN	*	267,632	586	53	119
*JA2OJ	*	259,063	445	81	152
*JA2KKA	*	219,971	452	71	125
*JN2AMD	*	165,388	404	61	112
*JA2UJ	*	61,104	199	42	72
*JA2MZ	*	37,467	150	40	59
*JQ2EHD	*	37,206	138	51	66
*JR2AWS	*	3,078	35	16	22
*JL2OGZ	*	3,034	30	17	20
***JR2TMB**	**28**	**77,995**	**304**	**27**	**68**
*JA2GAL	*	42,185	218	26	50
*JF2VAX	*	14,118	190	13	13
***JQ2FFS**	**21**	**222,804**	**759**	**30**	**78**
*JL2LPX	*	58,584	224	26	60
***JH2OMM**	**14**	**45,761**	**210**	**27**	**62**
*JR2VWY	*	21,942	118	20	49
JF3CCN	**A**	**1,330,020**	**1357**	**127**	**278**
JA3ARM	*	363,118	530	84	175
JR3XEX	*	155,478	341	55	130
JH3JYS	*	70,862	197	62	88
JF3MKC	*	3,168	37	10	23
JI3BFC	**28**	**434,826**	**1091**	**37**	**110**
JA3XOG	"	331,428	981	36	96
JH3AIU	**21**	**818,496**	**2093**	**36**	**111**
JH3LFL	*	29,799	177	25	52
***JG3LGD**	**A**	**372,736**	**542**	**91**	**165**
***JE3UHV**	**"**	**313,905**	**508**	**89**	**166**
*JA3JOT	*	242,780	490	68	131
*JA3UWB	*	189,831	377	74	135
*JA3AA	*	108,743	248	64	122
*JG3NKP	*	95,772	252	45	93
*JA3RSJ	*	93,614	277	50	84
*JA3HC	*	70,159	229	48	74
*JA3KZE	*	21,658	86	34	57
*JR3NDM	*	9,520	60	28	40
*JE3WOM	*	5,016	71	28	38
*JL3IVX	*	4,090	42	19	20
*JI3ZOX	*	1,897	27	13	13
			(Op: JL3IVX)		
*JG3EHD	*	1,344	22	9	12
*JA3AVO	*	322	9	7	7
***JF3BFS**	**28**	**285,251**	**890**	**33**	**92**
*JH3TXP	"	27,440	136	22	48
*JA3RK	"	21,948	141	21	41
*JN3DSH	"	18,585	114	24	39
*JA3DAY	"	12,354	75	25	33
*JA3MIB	"	9,400	78	16	31
*JH3CUL	"	2,881	41	14	29
*JA3WFQ	"	656	15	6	10
***JK3GWT**	**21**	**301,491**	**833**	**34**	**105**
*JF3NDW	*	26,625	143	24	47
*JF3XMI	*	6,880	63	17	26
*JK3AHS	*	1,550	27	11	14
*JA3AYX	14	7,473	59	20	33
JH4UYB	**A**	**5,395,050**	**3496**	**167**	**403**
JA4ESR	*	438,705	622	105	182
JJ4PPK	*	77,101	213	23	82
JA4CES	28	37,246	193	22	55
JA4AQZ	21	33,307	171	22	46
JH4CPC	3.5	11,312	90	22	34
JA4LKB	**1.8**	**4,141**	**46**	**18**	**20**
***JR4GPA**	**A**	**739,963**	**1075**	**80**	**179**
***JM4WUZ**	**"**	**303,063**	**514**	**88**	**143**
*JE4MHL	*	218,730	364	82	148
*JA4XHF	*	152,559	299	76	125
*JA4BAA	*	137,070	322	51	121
*JA4AQR	*	11,940	137	43	85
*JH4JUK	*	8,642	61	27	31
*JK4BOX	28	40,599	188	27	58
*JA4FHE	*	33,930	213	20	45
*JE4GJV	*	2,233	28	12	19
*JA4LCI	14	10,998	78	17	30
*JA4XNF	7	728	19	8	6
JH5FXP	**A**	**4,990,272**	**3331**	**160**	**393**
JA5DQH	**"**	**3,126,043**	**2618**	**129**	**302**
JA5IP	*	93,222	259	58	90
JA5AIQ	*	47,824	164	40	75
*JA5VBH	A	1,344	24	12	16
*JF5FGY	21	32,994	131	29	65
*JA5ATN	7	38,297	213	21	52
*JA5PDS	3.5	832	25	8	8
JA6GCE	**A**	**2,443,060**	**2112**	**146**	**306**
JQ6NAW	*	743,328	1114	83	184
JA6BGA	*	195,622	325	85	156
JR6LLN	*	67,067	186	47	99
JA6WIF	**28**	**412,182**	**1116**	**37**	**116**
JF6OJX	3.5	18,117	118	26	35
***JH6OPP**	**A**	**597,996**	**772**	**96**	**198**
***JH6CQY**	**"**	**345,258**	**513**	**59**	**213**
*JA6SRB	*	274,507	445	100	177
*JA6CM	*	104,640	325	62	130
*JH6TYD	*	88,114	290	41	79
*JA6BWB	*	24,368	138	30	56
*JA6PL	*	17,442	139	19	38
***JH6WHN**	**28**	**221,646**	**764**	**34**	**89**
*JA6QDU	*	31,257	177	24	48
*JA6AHT	*	5,922	50	17	30
*JM6FMW	*	2,442	89	12	21
*JHØXUP/6	*	80	4	4	4
*JA6ZLI	21	30,806	154	24	49
*JJ6DGP	*	30,096	189	25	47
*JL6IPK	7	9,944	81	17	27
JH7XGN	**A**	**3,349,281**	**2628**	**149**	**322**
JA7MJ	*	892,400	897	132	256
JR7YVE	*	20,418	157	34	49
			(Op: JH7XVB)		
JN7CPW	*	7,975	53	23	32
JA7COI	**21**	**120,016**	**445**	**31**	**73**
JA7NI	**1.8**	**3,930**	**55**	**14**	**16**
***JA7NVF**	**A**	**735,010**	**1051**	**106**	**204**
*JA7ARW	"	312,908	505	91	163
*JA7DNO	"	304,590	530	67	146
*JA7CPW	"	108,498	252	58	111
*JN7OJA	*	87,562	226	62	96
*JJ7SRA	*	34,417	121	47	68
*JF7DXT	*	14,616	97	29	27
***JH7CJM**	**28**	**88,518**	**350**	**31**	**74**
*JI7OED	*	77,634	474	20	37
*JH7MEX	*	56,745	233	30	67
*JF7GDF	*	2,784	33	15	17
*JA7AXP	*	1,547	33	12	15
*JO7BBS	*	1,222	19	11	15
JA8RWU	**A**	**3,351,618**	**2652**	**147**	**312**
JA8XQI	*	160,680	301	78	117
JA8TEZ	*	25,432	103	33	55
JA8RII	21	4,400	42	20	21
***JH8SLS**	**A**	**1,906,080**	**1703**	**127**	**291**
*JA8DIM	*	623,007	816	99	209
*JH8MWW	*	584,876	750	104	188
*JA8AJE	*	423,300	624	83	172
*JA8JCR	*	417,105	553	105	194
*JA8GTO	*	4,500	34	24	26
***JA8LN**	**28**	**128,564**	**452**	**32**	**83**
*JA8AT	*	30,774	159	23	51
JA9CWJ	**A**	**1,081,575**	**1413**	**84**	**191**
JA9XBW	**28**	**212,850**	**633**	**34**	**95**
JA9JFO	**21**	**140,770**	**480**	**30**	**85**
***JE9VOI**	**A**	**480,698**	**717**	**93**	**176**
*JA9KUG	*	128,296	282	73	130
*JA9RO	*	34,692	118	42	56
*JA9NIL	*	7,344	56	25	26
***JH9VSF/9**	**28**	**372,060**	**1156**	**36**	**99**
***JH9KVF**	**21**	**315,138**	**889**	**36**	**101**
JAØQWO	**A**	**1,205,160**	**1262**	**126**	**237**
JHØGHZ	**"**	**885,803**	**896**	**124**	**267**
JRØWZR	*	438,750	594	94	196
JHØFUW	**28**	**456,814**	**1280**	**36**	**106**
JAØHC	7	32,267	178	24	52
***JAØBJY**	**A**	**359,755**	**633**	**71**	**140**
***JHØIXE**	**"**	**312,256**	**500**	**80**	**158**
*JIØNXA	*	83,581	249	52	78
*JAØBPY	*	80,227	197	63	94
*JAØPPE	*	27,540	166	35	50
*JAØRCK	*	19,107	69	40	59
*JGØIPW	*	1,638	23	13	13
***JHØNVX**	**28**	**91,607**	**358**	**31**	**70**
*JAØGZ	*	360	10	4	3
*JAØIOF	21	28,046	201	24	50
*JAØGEY	*	16,947	106	25	38
*JAØDOW	*	1,800	22	13	17
***JHØEPI**	**14**	**222,717**	**729**	**32**	**85**
***JAØAOQ**	**3.5**	**14,616**	**155**	**22**	**34**

JORDAN

JY9NX	**A**	**7,753,179**	**4602**	**142**	**467**
			(Op: JM1CAX)		

KAZAKHSTAN

UP4L	**A**	**4,100,124**	**3190**	**132**	**400**
			(Op: UN7LZ)		
UN8FZ	*	155,310	347	54	132
UN7JX	**28**	**131,208**	**554**	**33**	**99**
UN6T	*	109,998	641	23	74
UN7TS	**7**	**150,304**	**641**	**28**	**84**
UN7CW	**3.5**	**230,868**	**1040**	**29**	**92**
***UP6P**	**A**	**1,621,854**	**2028**	**121**	**357**
			(Op: UN6P)		
*UN2O	*	557,590	688	82	260
*UN7PJO	*	494,045	883	60	178
*UN4L	*	432,630	1087	40	125
*UN8PF	*	370,006	582	72	194
***UN5J**	**28**	**186,120**	**606**	**32**	**109**
***UN9LN**	**14**	**178,619**	**638**	**33**	**86**
*UN4PD	*	140,690	475	29	81
*UN7EX	*	17,210	162	16	26
***UN4PG**	**7**	**67,522**	**299**	**23**	**68**

KOREA

HL9FK	**A**	**156,418**	**368**	**71**	**126**
HL5AP	*	100,667	263	56	157
***HL5UOG**	**A**	**386,531**	**675**	**95**	**172**
***HL1CG**	**28**	**178,593**	**706**	**32**	**71**

KYRGYZSTAN

EX/UA3AGS	**A**	**4,260,564**	**3954**	**111**	**366**
EX2X	**14**	**336,140**	**975**	**33**	**107**
EX2A	7	56,858	290	20	62

OMAN

A45XR	**A**	**8,786,811**	**4999**	**155**	**494**

SAUDI ARABIA

HZ1AB	**A**	**4,444,550**	**3109**	**134**	**416**
			(Op: SMØCXU)			
HZ1HZ	**"**	**604,392**	**718**	**87**	**241**

SINGAPORE

9V1YC	**28**	**667,128**	**2060**	**38**	**114**

TAIWAN

BW2ØØØ	**A**	**1,827,738**	**3031**	**86**	**220**
			(Op: JA1JKG)			
BV7FF	**21**	**237,759**	**1073**	**31**	**92**

TAJIKISTAN

***EY8MM**	**A**	**4,244,434**	**3100**	**140**	**426**
*EY7AF	21	45,318	314	21	57

THAILAND

HSØ/N4NX	7	37,054	172	28	69
***HS4BPQ**	**A**	**52,056**	**399**	**39**	**69**
*HSØ/G4UZN	*	50,164	207	56	99
*E2ØHHK	*	6,533	61	18	29

UK BASES ON CYPRUS

ZC4ZM	**A**	**6,075,380**	**4621**	**104**	**374**
***ZC4BS**	**28**	**352,275**	**1479**	**28**	**77**
***ZC4DW**	**14**	**597,114**	**1546**	**33**	**114**

UNITED ARAB EMIRATES

A61AO	**1.8**	**141,900**	**671**	**26**	**74**
			(Op: RV6LNA)			

VIETNAM

XV9SW	**21**	**347,760**	**1252**	**34**	**104**
			(Op: SM5MX)			
***3W2LWS**	**A**	**278,356**	**637**	**61**	**141**
			(Op: WA1LWS)			
***3W7CW**	**28**	**186,795**	**865**	**30**	**75**

WEST MALAYSIA

***9M2TO**	**A**	**1,466,624**	**1922**	**113**	**286**
			(Op: JAØDMV)			
***9M2JI**	**21**	**51,543**	**353**	**27**	**56**

EUROPE

ALAND ISLANDS

OHØZ	**A**	**5,636,403**	**4577**	**152**	**505**
			(Op: OH1JT)			
OHØR	**"**	**4,262,524**	**3316**	**157**	**501**
			(Op: OH2PM)			
OHØV	**28**	**1,071,908**	**2697**	**38**	**135**
			(Op: OH6LI)			
***OHØN**	**21**	**522,415**	**1681**	**36**	**127**
			(Op: DJ2QV)			

AUSTRIA

OE2BZL	**A**	**2,093,162**	**2303**	**111**	**367**
OE6HZG	*	428,045	934	75	220
OE3BCA	**28**	**61,387**	**303**	**28**	**77**
OE3TL	*	32,616	260	29	79
***OE1JIS**	**A**	**74,790**	**296**	**47**	**118**
***OE1BKA**	**28**	**35,774**	**200**	**23**	**57**

BALEARIC ISLANDS

***EA6 /DL9GFB**	**A**	**350,075**	**717**	**70**	**205**
*EA6YW	*	69,322	205	76	90
***EA6 /DL8NBY**	**28**	**281,728**	**1048**	**33**	**109**

BELARUS

EU1SA	**A**	**1,350,934**	**1544**	**114**	**352**
EU1PA	*	691,200	1277	84	276
EW1WZ	**28**	**294,462**	**872**	**36**	**135**
EW2AA	**21**	**346,924**	**1044**	**35**	**137**
EW6AL	*	38,720	273	20	68
EW6MM	**14**	**484,500**	**1897**	**36**	**114**
EU6DX	**3.5**	**33,740**	**498**	**12**	**58**
EU6EU	**1.8**	**64,543**	**794**	**15**	**64**
EW3LN	*	15,597	288	9	45
***EU5A**	**A**	**2,130,950**	**2555**	**110**	**315**
			(Op: EU1FC)			
*EW1EA	*	151,726	329	60	154
*EU7SD	*	150,656	308	76	198
*EW6BI	*	41,480	157	44	92
*EU3AA	28	17,068	125	22	46
***EU1MM**	**14**	**209,610**	**993**	**31**	**106**
*EU2MM	*	188,382	722	32	115
***EU1DX**	**7**	**327,820**	**1289**	**31**	**117**
*EW8OU	*	17,765	208	19	66
*EW2EG	*	1,971	28	5	22
***EU1AZ**	**3.5**	**89,507**	**1078**	**14**	**65**

BELGIUM

ON4AKL	**A**	**1,089,556**	**1642**	**85**	**214**
ON6LO	28	22,950	198	16	35
OTØA	**21**	**658,070**	**1966**	**36**	**122**
			(Op: JK3GAD)			
ON4WW	**1.8**	**121,002**	**1152**	**16**	**70**
***ON5UM**	**A**	**471,079**	**621**	**97**	**292**
***ON4XG**	**"**	**415,147**	**754**	**76**	**254**
*ON7SS	*	249,458	678	61	192
*ON5HY	*	72,480	294	47	113
*ON6BR	*	27,300	203	27	38
*ON4CHK	*	17,840	114	28	50
***ON6TJ**	**28**	**61,752**	**329**	**21**	**62**
***OTØH**	**21**	**352,972**	**1322**	**36**	**122**
			(Op: ON6HW)			
*ON4APU	*	237,674	775	36	115
*ON6CW	*	121,948	615	26	81
***ON4ATW**	**7**	**59,708**	**479**	**22**	**70**
***ON4BR**	**3.5**	**20,358**	**475**	**9**	**45**

BOSNIA-HERZEGOVINA

T94MZ	**A**	**203,269**	**610**	**50**	**137**
T99W	**14**	**716,184**	**2351**	**38**	**136**
T99C	**7**	**96,012**	**725**	**23**	**85**
***T92M**	**28**	**59,691**	**251**	**27**	**74**
*T99P	*	33,790	388	15	47
***T98R**	**7**	**163,476**	**857**	**24**	**90**
*T9ØU	*	26,274	527	13	45
			(Op: T95MOJ)			
***T94OL**	**3.5**	**80,262**	**864**	**15**	**63**
*T95LCR	*	100	122	6	28
***T99T**	**1.8**	**36,603**	**599**	**9**	**54**
*T91EHA	*	8,694	231	6	40

BULGARIA

LZ1QZ	**A**	**554,162**	**1163**	**76**	**246**
LZ1MC	**"**	**514,760**	**802**	**100**	**240**
LZ2RF	*	305,300	560	96	273
LZ2CG	*	108,854	380	50	110
LZ1NG	**28**	**485,016**	**1529**	**37**	**131**
LZ2JA	*	69,090	336	26	68
LZ2PL	**21**	**249,993**	**981**	**33**	**108**
LZ4ZP	**14**	**377,496**	**1329**	**37**	**131**
LZ1RB	**3.5**	**55,480**	**689**	**12**	**61**
LZ2FV	**1.8**	**78,400**	**891**	**14**	**66**
LZ3AB	*	410	13	6	13
***LZ3YY**	**A**	**1,608,890**	**1991**	**103**	**358**
***LZ1QV**	**"**	**919,560**	**1337**	**100**	**295**
*LZ1ZM	*	573,364	1051	77	255
*LZ2MP	*	352,704	591	87	247
*LZ1QH	*	239,581	537	72	173
*LZ1NJ	*	169,198	383	61	160
*LZ4HM	*	63,210	325	38	109
*LZ4BU	*	4,848	35	22	26
***LZ2K**	**28**	**206,220**	**673**	**33**	**107**
***LZ2GS**	**"**	**181,323**	**553**	**34**	**147**
*LZ1CF	*	122,113	385	34	111
*LZ1FH	*	93,159	464	26	73
*LZ1IA	*	73,832	336	30	74
*LZ2DL	*	25,764	133	25	51
*LZ5AZ	*	1,827	37	8	13
***LZ1CW**	**21**	**163,021**	**659**	**32**	**103**
*LZ2PB	*	57,775	354	23	60
***LZ2UZ**	**14**	**36,828**	**266**	**22**	**71**
*LZ5ZI	*	12,282	136	14	32
***LZ2FM**	**7**	**35,505**	**297**	**15**	**62**
*LZ1FJ	*	13,542	79	14	60

CRETE

***SVØLK**	**28**	**48,504**	**326**	**21**	**65**

CROATIA

9A3B	**28**	**489,744**	**1465**	**36**	**108**
9A5W	**21**	**880,334**	**2498**	**38**	**144**
9A3GW	**14**	**868,680**	**2599**	**37**	**143**
9A1AA	*	361,947	1409	34	117
9A6K	**7**	**250,240**	**1387**	**30**	**106**
9A5Y	**3.5**	**208,680**	**1357**	**27**	**93**
9A2AJ	**1.8**	**68,521**	**728**	**17**	**71**
9AØC	*	25,032	528	8	48
			(Op: 9A2HI)			
***9A4RC**	**A**	**1,190,599**	**1578**	**95**	**314**
***9A2TN**	**"**	**942,138**	**1073**	**109**	**369**
*9A2NO	*	366,390	447	101	313
*9A3SM	*	282,420	493	73	197
*9A7P	*	192,440	547	50	120
***9A7D**	**28**	**393,645**	**1076**	**36**	**125**
*9A3VM	*	348,742	1357	32	95
***9A2U**	**21**	**439,774**	**1532**	**36**	**127**
			(Op: 9A2R)			
***9A7T**	**3.5**	**89,652**	**863**	**18**	**75**
***9A7R**	**1.8**	**54,670**	**794**	**12**	**58**

CZECH REPUBLIC

OLØE	**A**	**2,634,567**	**2433**	**132**	**427**
			(Op: OK2ZU)			
OK1EP	**"**	**2,471,049**	**2435**	**121**	**428**
OK1FPS	**"**	**1,739,106**	**1998**	**116**	**358**
OK1AVY	*	1,697,868	2005	118	356
OK2PDT	*	1,518,297	1835	94	323
OK2BU	*	1,187,865	1734	99	320
OK2ABU	*	1,137,181	1441	104	339
OL4M	*	1,132,490	1565	96	325
OK1EW	*	1,078,060	2184	91	289
OL6R	*	1,049,376	1545	98	310
			(Op: OK2ZO)			
OK1DX	*	791,160	1182	84	263
OK1AOV	*	559,080	765	89	271
OL1CW	*	548,952	847	87	269
OK1AXB	*	300,656	568	81	223
OK2SG	*	250,172	437	78	205
OK1FTW	*	93,984	219	70	156
OK2XA	*	49,125	236	33	98
OK1DSF	*	10,974	57	40	53
OK2RZ	**28**	**833,341**	**2085**	**38**	**135**
OK1FZM	*	390,930	1045	34	123
OK2BJT	*	135,757	399	33	104
OK1AU	*	118,422	449	32	70
OK1DUG	*	73,616	327	29	78
OK1RF	**21**	**905,382**	**2245**	**38**	**141**
OK1XC	*	160,430	682	29	93
OK2KJ	*	29,937	177	24	50
OK2BVG	**7**	**188,088**	**874**	**30**	**106**
OK1XJ	*	86,653	479	22	81
OK2GZ	**3.5**	**118,637**	**985**	**18**	**71**
OK1CW	**1.8**	**44,022**	**543**	**11**	**55**
OK1TP	*	30,250	550	9	52
OK1DWJ	*	10,152	79	11	61
***OK2PP**	**A**	**2,175,012**	**2428**	**126**	**441**
***OK1DSZ**	**"**	**1,767,132**	**1676**	**125**	**448**
***OK1QM**	**"**	**1,667,488**	**1750**	**109**	**378**
*OK1DOL	*	1,653,264	1798	112	404
*OK1JOC	*	1,604,409	1809	113	376
*OK2YT	*	1,437,040	1473	113	393
*OK1HX	*	1,169,940	1438	96	348
*OK1RP	*	1,108,050	1577	83	332
*OK2QX	*	1,073,380	1273	109	367
*OK1GK	*	1,023,372	1458	99	335
*OK2BGK	*	1,003,842	1392	94	340
*OK2EC	*	956,314	1327	96	321
*OK1ZP	*	896,310	1163	94	320
*OK2PCN	*	753,066	1043	94	297
*OK1BA	*	734,060	949	82	258
*OK2WH	*	702,208	1175	91	325
*OK1SI	*	673,877	1130	86	267
*OK1AYY	*	651,200	998	86	284
*OK2PAD	*	635,796	951	90	258
*OK2BND	*	635,283	998	81	260
*OK1JN	*	581,434	1065	77	272
*OK2DU	*	548,060	998	74	261
*OK1MKI	*	490,245	971	77	245
*OK2RN	*	345,000	673	71	179
*OK1HCG	*	323,790	762	62	196
*OK2PBG	*	291,519	544	70	209
*OK1FNL	*	284,796	697	80	213
*OK2BMT	*	270,878	546	64	193
*OK2BRV	*	263,704	601	61	216
*OK1HGM	*	255,192	682	64	184
*OK2VP	*	249,516	638	65	196
*OK1HRR	*	233,640	726	55	165
*OK1AOU	*	232,925	577	61	174
*OK1DVK	*	180,364	325	79	192
*OK2BNC	*	88,963	157	55	121
*OK2BDF	*	46,782	232	25	88
*OK2AJ	*	44,022	253	33	66
*OK1AUP	*	42,775	143	49	96
*OK6L	*	40,612	198	42	100
			(Op: OK2SWD)			
*OK2SWD	*	32,620	144	37	103
*OK1FJD	*	4,455	31	24	31
***OLØA**	**28**	**191,835**	**599**	**33**	**114**
			(Op: OK1CZ)			
***OK1MNW**	**"**	**187,889**	**526**	**36**	**113**
***OK1FHI**	**"**	**187,442**	**500**	**35**	**114**
*OK2HZ	*	170,680	499	33	103
*OK2ON	*	168,960	569	32	96
*OK2ZV	*	162,756	538	30	102
*OK1AJY	*	123,918	470	28	95
*OK2PKY	*	56,373	263	29	68
*OK1LO	*	55,158	316	24	63
*OK2BUD	*	33,184	193	25	53
*OK2BHE	*	8,930	65	18	29
*OK1DP	*	1,196	27	11	15
***OK2NN**	**21**	**295,336**	**966**	**33**	**119**
***OK1VD**	**"**	**248,395**	**825**	**32**	**119**
*OK2WY	*	109,568	410	28	100
*OK2SGY	*	108,990	468	31	95
*OK1MMN	*	44,979	302	19	68
*OK2BMJ	*	8,178	61	15	43
*OK1XGL	*	6,678	137	11	31
*OK2XVM	*	1,288	33	7	16
***OK2SW**	**14**	**126,090**	**562**	**31**	**104**
***OK1DKO**	**"**	**124,488**	**650**	**30**	**96**
*OL3X	"	45,156	337	20	51
			(Op: OK1FC)			
***OK1EE**	**7**	**176,625**	**903**	**27**	**98**
***OK1IF**	**"**	**157,607**	**787**	**29**	**98**
*OK1FCA	*	143,260	720	25	91

*OK1GS	"	73,915	480	18	78
*OK1DXR	"	15,312	173	14	44
*OK1FOG	3.5	36,504	532	11	61
*OK1FHE	"	7,673	180	7	35
*OK2SNX	1.8	11,472	309	6	32

DENMARK

OZ1LO	A	4,245,948	3643	136	445
OZ5DX	"	323,584	690	60	196
OZ5AAH	"	16,320	270	38	98
OZ7YL	14	15,104	103	17	47
OZ4OC	7	21,827	208	14	59
*OZ8AE	A	1,686,924	1482	135	429
*OZ8SW	"	756,756	1037	90	274
*OZ5ABD	"	457,320	1015	70	239
*OZ6PI	"	416,218	648	89	243
*OZ4RT	"	247,530	522	62	161
*OZ5MJ	"	162,888	371	75	189
*OZ4FF	"	126,431	307	65	176
*OZ5RM	"	12,300	141	16	44
*OZ7JQ	14	7,314	75	15	31

DODECANESE

J45KLN	A	1,025,570	2181	70	252
					(Op: SMØCMH)

ENGLAND

G4BUO	A	5,426,826	3902	151	491
GØIVZ	"	3,882,900	3492	137	465
G3MXJ	"	3,549,840	2801	124	436
G4BJM	"	1,016,262	1627	79	224
G3VPS	"	729,008	1130	83	285
GØLZL	"	555,345	1031	75	240
G3UFY	"	81,225	237	58	113
GØORH	28	247,080	1073	31	85
G5G	21	498,636	1544	35	127
					(Op: GØLII)
G4IUF	"	23,464	198	16	46
GØCKP	7	375,089	1411	34	109
*G3WGV	A	2,126,736	2290	112	374
*G4IIY	"	1,420,608	1755	103	345
*G5LP	"	963,475	1514	96	329
*G3NKS	"	930,176	1111	99	317
*GØWKW	"	638,118	1343	63	171
*G3KKP	"	389,553	672	64	203
*G4KFT	"	370,077	585	73	208
*G6QQ	"	365,579	797	64	207
*M2W	"	317,892	834	64	172
					(Op: GØPZA)
*G4OWT	"	311,400	545	82	218
*MØBKB	"	268,332	624	56	180
*GØTYV	"	224,910	477	62	176
*G3GGS	"	201,450	378	67	221
*GØUKX	"	163,930	407	48	146
*G4ZRR	"	135,935	492	38	117
*G3VQO	"	115,995	338	51	158
*G4SLE	"	87,438	343	42	135
*G4ZME	"	74,335	297	33	86
*GØWHO	"	70,250	270	41	84
*2EØATS	"	3,850	78	17	38
*G3KWK	28	143,500	594	31	109
*G8A	"	82,859	549	22	67
					(Op: G3RTU)
*G3RSD	21	113,960	570	26	84
*G3VKW	"	16,808	121	22	66
*GØMRH	"	6,357	120	10	29
*GØMTN	14	235,840	1064	30	104
*M3C	"	22,914	270	15	42
					(Op: GØVQR)
*G4TSH	7	161,895	829	27	102
*G3JKY	"	34,517	316	13	62
*G4VGO	1.8	9,681	149	9	43
*G3XWZ	"	3,850	60	5	30

ESTONIA

ES1QD	28	265,650	734	37	124
*ES2DJ	A	496,297	718	70	244
*ESØNW	"	40,892	217	126	501
*ES1XQ	28	39,270	322	20	57
*ES6CO	"	17,479	137	23	54
*ES7FU	"	13,888	121	15	41
*ES1ABR	"	260	15	4	6

EUROPEAN RUSSIA

RW1ZA	A	3,080,165	3044	123	387
UA4LL	"	2,575,151	2382	138	439
RM4W	"	2,395,281	2173	137	364
					(Op: RW4WR)
RX3ARI	"	2,376,864	2372	126	398
UF3CWR	"	2,241,331	3043	124	403
RA4AG	"	1,992,900	2180	127	384
UA6LJ	"	1,970,376	2005	136	415
UA1QV	"	1,622,310	1904	121	389
RA3NZ	"	1,517,796	1782	120	412
UA1OMS	"	1,463,421	1655	122	379
UA3TU	"	1,376,482	1698	121	400
RV4LM	"	1,304,910	1586	130	407
RN6CF	"	1,182,346	1598	116	366
UA3AP	"	1,044,900	1280	121	365
RV3QX	"	895,125	1533	91	294
RU6AV	"	883,183	1097	115	334
UA1PAC	"	684,403	1079	78	239
RX3AEX	"	607,069	1195	86	273
RV1CC	"	569,162	680	109	342
RU3DX	"	511,290	797	112	325
RZ1ZB	"	347,147	1371	76	205
RK3FY	"	329,613	629	75	206
RW3AFY	"	314,776	429	93	199
UA4FEN	"	294,520	571	78	218
RA3ANI	"	240,092	448	84	227
RZ1AZ	"	238,048	404	83	263
UA3UCD	"	195,604	341	84	232
RW3RQ	"	119,652	285	69	167
UA6LFQ	"	103,840	218	74	162
UA3UJE	"	93,218	205	75	179
RX3AP	"	78,297	304	43	108
UA1OMX	"	75,795	211	61	94
RA6AF	"	67,392	180	65	127
UA6AAY	"	64,416	223	57	126
RK3DK	"	42,336	270	31	77
RX3RB	"	33,927	199	35	94
RA3MB	"	24,480	131	43	101
RA1OJ	"	19,173	87	37	46
UA4RF	"	9,625	54	33	44
RK6CZ	"	7,314	73	25	44
RN3RQ	"	6,930	81	19	51
RA3AJ	28	533,340	1522	38	142
RV3ACA	"	204,098	856	32	99
RA3RN	"	102,704	368	32	99
UA3SAQ	"	58,528	347	30	88
RA3XA	"	40,704	186	27	69
RV6AB	"	17,182	116	18	53
RW3GU	21	548,320	1631	37	123
UA3DPX	"	542,512	1734	37	127
RU3AA	"	378,015	1381	37	128
RA3XO	"	320,430	940	35	130
UA6LTI	"	147,004	542	35	108
UA3MDX	"	85,799	477	27	88
RV6YB	"	85,002	413	30	88
RZ6FZ	14	172,530	792	32	103
UA4HN	"	152,451	802	30	87
RZ1AK	7	12,730	97	16	51
RW4PL	3.5	116,051	781	26	87
UA3LID	"	48,034	556	12	61
RA4PO	"	37,345	377	15	62
RN6BN	1.8	30,264	348	15	63
RU1AO	"	14,135	247	8	47
UA6LP	"	1,312	34	6	26
*RM3C	A	2,400,685	2210	137	470
					(Op: RA3CW)
*RU3QW	"	2,044,311	2403	130	447
*UA4FER	"	1,797,744	1906	123	393
*RZ4FA	"	1,513,446	1673	122	384
*UA1ANA	"	1,339,888	1495	115	391
*RA3AF	"	1,307,929	1416	116	377
*RA3AUM	"	1,290,660	1639	106	333
*RW3AX	"	1,221,503	1935	107	340
*RN3AY	"	1,210,902	1576	119	343
*RN6AL	"	1,107,585	1543	115	338
*RU3FF	"	1,008,086	1565	101	325
*RK3DH	"	956,304	1118	122	400
*UAØZDA/6	"	943,999	1380	82	264
*UA4CCG	"	902,700	1171	117	393
*RN4WA	"	832,134	1278	96	323
*RU4WE	"	739,326	1312	92	314
*RK3BA	"	701,510	1198	100	310
*RW1AI	"	632,296	1003	91	301
*RA3UAG	"	602,140	1086	81	293
*UA1AQF	"	583,450	1036	86	264
*UA1OAM	"	541,260	870	100	288
*UA3DNR	"	531,810	869	87	255
*UA1TAN	"	493,875	956	79	296
*RW3TN	"	467,016	933	82	237
*UA4SS	"	397,872	1059	73	251
*RZ3AV	"	396,900	757	85	265
*UA3XBB	"	387,138	769	79	260
*RU4WT	"	317,322	702	75	231
*RA6AR	"	308,070	626	74	241
*UA1ZZ	"	293,853	692	68	213
*RZ4AG	"	283,798	588	63	226
*UA1TBK	"	282,490	523	77	188
*RX3RZ	"	266,814	650	64	179
*RW3VZ	"	257,721	496	84	233
*RW4CW	"	245,850	483	77	221
*RW3DY	"	224,238	529	69	212
*RX3DTN	"	202,236	547	64	164
*UA3UMT	"	196,846	613	49	177
*UA1ZCX	"	183,285	490	57	171
*RU3DOG	"	154,241	411	53	158
*RW3XA	"	134,992	245	90	196
*UA3WW	"	127,093	249	53	155
*RA3VR	"	118,560	510	60	200
*UA3QU	"	110,448	364	62	172
*RA6LBS	"	105,066	293	66	168
*RA3UT	"	97,767	246	65	148
*RW1QA	"	86,242	287	59	155
*RA4AR	"	69,954	303	49	129
*RA1AR	"	57,760	221	49	141
*UA1OMO	"	51,976	155	50	96
*UA3XAC	"	49,434	214	41	113
*UA4SBZ	"	37,728	226	31	100
*UA3UNP	"	36,828	179	28	104
*UA1OEX	"	5,112	57	29	43
*RA4LZ	"	4,988	69	19	39
*RN3AX	"	4,437	33	20	31
*RW3QO	28	213,720	672	35	121
*RX3AA	"	187,022	589	36	120
*RZ3DX	"	186,548	673	33	116
*RU3ACE	"	145,383	633	28	101
*RA3AN	"	111,744	685	26	71
*RA3WA	"	110,505	367	33	106
*RV3AH	"	74,130	385	26	79
*UA6AK	"	54,469	290	25	66
*RA3ANL	"	50,183	252	27	80
*UA6NZ	"	42,952	271	26	65
*RV3UK	"	41,796	254	24	62
*RU3WR	"	38,356	221	26	60
*RK6CM	"	22,066	196	15	44
*RA4UAT	"	17,728	163	16	48
*UA3LBE	"	5,852	66	13	25
*UA4CIF	"	100	2	2	2
*RZ3QU	21	499,733	1484	38	131
*UA3ABJ	"	356,622	1228	36	111
*RW4LC	"	221,770	886	33	101
*RU3D	"	190,332	686	33	120
					(Op: RU3HD)
*UA3ABT	"	45,353	193	30	100
*UA4QK	"	33,380	212	21	67
*RA3SL	14	205,424	1030	35	113
*RU6FA	"	140,432	599	32	99
*RA3FO	"	138,496	646	31	97
*RV6AA	"	82,532	472	28	84
*RW3WM	"	58,424	363	28	81
*UA1CEC	"	56,882	436	24	78
*UA3XEG	"	50,304	308	23	73
*RA1OAK	"	40,664	270	22	70
*RA1OK	"	33,915	133	30	89
*RU4PL	7	322,371	1458	36	111
*RA6FV	"	61,677	404	21	78
*RN3DY	3.5	40,508	479	14	62
*UA6AKD	"	17,880	287	9	47
*UA6ATG	"	12,200	139	13	48
*UA4HY	"	10,045	171	9	37
*RA3DOX	1.8	16,184	194	12	56
*RN1AO	"	10,706	252	9	33
*RA3WOQ	"	1,311	28	6	17

FAROE ISLANDS

OY1CT	A	1,413,600	2182	93	307

FINLAND

OH5CW	A	4,202,382	3389	140	439
OH1F	"	4,167,387	3202	143	466
					(Op: OH1MDR)
OH1VR	"	1,974,274	2054	132	382
OH8RC	"	1,786,470	2093	127	343
OH2VZ	"	564,840	819	91	269
OH2FS	"	242,034	332	98	279
OH6XY	"	190,734	372	80	169
OH4TY	"	149,120	399	59	174
OH3XR	"	141,062	340	67	184
OH1BV	"	52,961	336	65	146
OH5PT	"	29,607	97	51	88
OH8CW	"	9,348	45	34	42
OH3UU	28	235,797	759	34	125
OH2XF	"	108,524	334	35	105
OH8OB	"	54,500	196	32	93
OH7A	21	739,500	1992	37	137
					(Op: OH7MA)
OH6AC	"	667,638	1761	37	137
OH2KQ	"	32,718	117	30	103
OH2BH	14	1,233,904	3253	38	146
					(Op: OH1WZ)
OG3M	"	1,082,886	2890	38	139
					(Op: OH1MM)
OH9A	7	35,188	317	17	59
					(Op: OH3WW)
OH3JR	"	23,838	147	19	68
OH2BEN	3.5	109,782	888	22	85
OH5XL	"	97,940	839	25	93
OH2BYS	"	49,528	536	15	67
OH9W	1.8	53,956	626	17	65
					(Op: OH2BCI)
OH2BO	"	13,259	198	12	48
OH7UE	"	12,152	391	12	50
*OH6OS	A	1,303,390	1542	110	341
*OH2NN	"	1,140,615	1192	121	376
*OH3IR	"	454,460	858	77	233
*OH5NE	"	440,076	833	76	262
*OH3YM	"	300,160	689	65	215
*OH1BOI	"	272,616	463	72	224
*OH2BPA	"	262,697	483	83	247
*OH2LYP	"	256,151	865	71	230
*OH2BSI	"	198,880	324	93	259
*OH6RC	"	158,172	309	71	210
*OH1WR	"	130,128	276	69	175
*OH2EV	"	95,232	341	51	135
*OH1EH	"	91,448	257	62	122
*OH2CV	"	57,600	258	40	110
*OH7JHI	"	52,451	296	34	123
*OH3KOK	"	30,485	149	33	58
*OH3HTR	"	16,236	85	24	58
*OH6AK	"	12,615	70	32	55
*OH8SP	"	6,525	50	23	22
*OH4LJL	28	43,527	193	30	79
*OH2EJ	"	25,908	104	33	69
*OH8VJ	21	251,424	881	35	109
*OH8NLC	"	152,076	528	34	104
*OH7WD	"	104,103	464	31	98
*OH6MBQ	"	52,264	333	22	76
*OH5NZ	"	11,993	62	27	40

FRANCE

F6CWA	A	1,794,352	1966	120	398
F6HKA	"	1,789,760	2496	93	283
F8BPN	"	728,700	1429	93	254
F2AR	"	371,910	793	65	229
F5IYO	"	70,518	255	45	101
F5RZJ	28	387,777	1139	36	127
F6ABI	"	61,211	288	23	54
F6IFY	21	86,832	363	25	83
F5LEN	7	9,211	211	12	49
*F5JBR	A	1,379,268	1520	109	364
*F5PLC	"	1,093,824	1264	92	340
*F6FTB	"	857,344	1137	90	304
*F5ICC	"	767,040	1007	85	291
*F5NQL	"	605,101	1161	80	291
*F6FII	"	507,846	1000	75	243
*F5OIU	"	397,374	678	83	226
*F5SGI	"	297,824	592	63	164
*F5JLV	"	274,920	737	60	172
*F5VV	"	239,568	602	56	130
*F5JOT	"	239,154	676	51	180
*F5ROX	"	237,797	730	57	154
*F6KGC	"	225,449	711	72	229
*F5JDG	"	146,346	484	45	106
*F5TNI	"	142,576	489	78	226
*F5TVG	"	115,299	258	85	122
*F5MFL	"	110,376	368	48	120
*F5RPB	"	84,181	264	50	114
*F2RW	"	43,581	102	30	58
*F5MNK	"	37,922	167	54	80
*F5ICX	"	7,155	100	11	42
*F5NSO	"	4,240	51	18	35
*F2FX	"	1,183	31	13	14
*F8AKC	28	156,757	531	33	99
*F5LJY	"	87,205	413	29	78
*F6IIE	"	34,086	184	25	53
*F9DK	"	20,650	180	19	40
*F5MGD	"	2,808	72	9	18
*F5MLJ	3.5	1,470	121	8	34

GERMANY

DL1IAO	A	5,325,995	3747	154	513
DL4MCF	"	3,839,528	3070	147	469
DJ9DZ	"	2,847,384	2613	127	441
DK9IP	"	2,674,060	2268	138	451
DK5PD	"	2,455,986	2189	133	465
DL3YBM	"	1,741,735	1767	122	405
DL2DX	"	1,565,460	1672	123	323
DL7QU	"	1,334,686	1363	109	358
DL6RDR	"	1,295,024	1483	100	364
DL5JAN	"	1,261,442	1488	109	369
DFØFS	"	1,234,870	1797	97	316
DL6NCY	"	1,152,418	1371	111	355
DL7CX	"	1,150,878	1746	125	373
DJØMDR	"	1,060,452	1210	121	365
DL6UNF	"	967,264	1372	87	275
DK3YD	"	918,372	1226	89	288
DL1DTC	"	748,678	1109	91	280
DL8YR	"	626,808	901	81	283
DLØDA	"	613,360	776	117	323
					(Op: DL1VDL)
DL1JF	"	611,055	975	92	275
DF3OL	"	576,820	723	94	288
DL3ZI	"	543,270	1031	94	304
DLØLY	"	529,152	976	71	247
DJ2IA	"	496,836	865	91	282
DL4JU	"	485,810	770	92	278
DL8KJ	"	452,141	765	80	267
DL1NEO	"	441,130	717	75	235
DJ4QO	"	427,440	853	63	177
DL4WA	"	412,697	656	85	226
DK4RM	"	379,356	657	81	222
DL9JON	"	368,960	723	78	242
DL6AG	"	347,662	546	71	195
DL9SUB	"	321,782	713	67	184
DJ8UV	"	302,075	777	64	217
DJ2MX	"	301,080	539	69	191
DJ8QP	"	252,620	556	80	260
DL1SBF	"	239,328	504	72	205
DK9WI	"	209,804	494	64	190
DL6DVU	"	189,460	473	61	177
DJ7PT	"	154,365	466	57	148
DL4DRA	"	122,500	354	52	123
DL4KBS	"	109,686	325	57	145
DL2JRM	"	91,893	289	51	112
DL8UVG	"	84,656	311	51	125
DL7UGO	"	68,400	289	41	103
DL4HWI	"	62,928	198	52	132
DF3IAL	"	51,072	294	27	85
DL8DWW	"	47,736	199	43	93
DJ8CR	"	33,377	173	37	101
DL1ECG	"	28,420	153	46	99
DL2DSA	"	20,608	75	40	72
DL3JRA	"	15,416	105	35	59
DL8JDX	"	11,562	54	35	47
DF5AU	"	6,678	48	23	40
DL4SXB	"	1,776	26	13	24
DK3DM	28	566,402	1477	37	136
DL6JZ	"	316,368	954	33	111
DJ5JH	"	282,736	776	36	128
DL2MIH	"	84,875	277	31	94
DK7AN	"	22,348	109	26	48
DJ2RG	"	10,005	404	33	82
DL2YAK	21	2,336	47	11	21
DJ7AA	14	1,133,568	2712	38	154
DL8UAT	"	50,295	295	27	78
DK5QN	7	387,666	1611	35	127
DJ2YE	"	34,383	295	14	59
DL6KWN	3.5	23,040	325	9	51
DF9ZP	"	7,938	157	10	44
*DL5ASE	A	1,733,280	1899	115	365
*DL3JAN	"	1,281,830	1390	105	368
*DL5YM	"	1,005,300	1293	104	346
*DF6LQ	"	959,976	1317	92	310
*DL2ZAE	"	932,088	1636	96	330
*DL5KUD	"	909,324	1027	115	353
*DJ6OZ	"	882,360	1303	77	303
*DL7IZ	"	850,653	966	103	320
*DKØDO	"	773,680	1122	89	291
*DL3BRA	"	766,740	1190	86	304
*DL3ZAI	"	712,080	1042	93	294
*DL4JYT	"	660,692	1042	85	297
*DK8FS	"	570,240	711	94	290
*DK5JM	"	560,040	945	83	307
*DK5WL	"	441,170	696	84	230
*DL7UXG	"	407,994	702	79	239
*DFØIT	"	405,999	898	59	238
					(Op: DF6QC)
*DF2CH	"	371,490	798	69	221
*DJ4PT	"	368,352	597	76	212
*DL9XY	"	356,694	796	62	207
*DL2GBB	"	345,650	631	67	243
*DM3PKK	"	322,544	552	73	231
*DL8ULO	"	298,558	711	66	204
*DL1LSZ	"	282,480	769	57	183
*DL7JV	"	282,296	615	73	211
*DJ5GG	"	278,880	644	64	176
*DJ3XD	"	270,664	604	71	216
*DL1ARJ	"	267,385	707	68	197
*DL7CF	"	264,111	492	74	204
*DL6UKL	"	232,074	630	57	199
*DJ1MV	"	231,792	513	69	195
*DL2ANM	"	227,978	494	70	191
*DL8MUG	"	215,070	467	58	143
*DL8HCO	"	210,910	527	63	199
*DL5DBH	"	206,660	566	55	167
*DJ5AA	"	198,120	305	93	219
*DF4RD	"	192,156	383	63	205
*DK5ZX	"	178,698	486	44	130
*DL2RTJ	"	169,740	448	63	183
*DL1TH	"	167,580	574	51	139
*DL3DBY	"	159,019	466	53	154
*DL1ZU	"	151,409	380	60	167
*DL5SVB	"	150,266	365	70	184
*DL2FDL	"	142,926	714	60	186
*DL4FAY	"	140,175	589	72	195
*DF1LON	"	134,260	374	51	145
*DJ9FG	"	119,380	355	48	109
*DL9NDV	"	112,860	347	45	135
*DL1IA	"	110,862	234	72	174
*DJ3JD	"	110,445	312	57	142
*DL3JPN	"	109,282	290	66	136
*DL3HSC	"	104,560	336	47	134
*DL5ZB	"	103,165	182	92	143
*DF2HL	"	93,984	255	59	119
*DL5NAV	"	86,676	406	43	143
*DL3KWR	"	84,360	281	59	163
*DL2AL	"	83,820	321	60	160
*DJ3NG	"	82,149	303	42	97
*DK3AX	"	78,446	272	40	82
*DJ6OI	"	62,484	251	46	118
*DL6DSA	"	58,819	206	43	88
*DL2FDD	"	58,245	192	52	113
*DL2ZAV	"	56,658	236	39	94
*DL6MTA	"	54,855	206	39	120
*DM3XI	"	48,372	132	60	79
*DL4KUG	"	45,279	222	31	98
*DL1VTL	"	35,636	176	40	78
*DL3NBL	"	31,620	140	56	114
*DL2AMT	"	31,008	253	39	97
*DL4SL	"	29,645	173	22	55
*DL3HRF	"	27,180	259	50	130
*DL2ARG	"	27,048	144	50	97
*DL5MY	"	23,088	160	24	54
*DL4AAE	"	22,425	114	30	45
*DL9GMC	"	21,829	121	28	55
*DL1AZA	"	20,008	148	29	53
*DL3KWF	"	19,203	140	25	86
*DH1NHI	"	13,200	138	26	74
*DL5FCO	"	11,718	91	21	42
*DL5ANS	"	10,890	95	27	39
*DK9KW	"	10,404	83	23	45
*DL4RCK	"	9,855	95	27	46
*DL4ABR	"	9,102	99	22	60
*DL3EA	"	8,560	72	28	52
*DL5RBR	"	6,150	75	23	52
*DK6CQ	"	4,520	58	16	24
*DK7ZT	"	2,890	35	14	20
*DL3AMA	"	2,700	96	6	39
*DL7RAL	"	1,508	35	11	15
*DL4SKF	"	100	13	7	8
*DJ4FZ	28	162,846	618	28	101
*DL7VGN	"	153,516	514	30	102
*DL4UL	"	147,063	499	34	107
*DL3DTH	"	98,156	406	27	79
*DL3SBD	"	35,948	256	24	62
*DL1FMG	"	9,000	81	15	35
*DK7FP	"	924	24	7	7
*DH5ABC	"	648	28	8	10
*DL7BY	21	199,950	670	35	115
*DL6UBF	14	5,432	37	24	32
*DL1LH	7	321,328	1317	33	119
*DL1EMH	"	84,804	471	24	87
*DJ2XC	"	56,394	457	25	92
*DL1CW	3.5	77,440	906	14	66
*DJ3RA	1.8	5,117	125	7	36

GIBRALTAR

ZB2X	A	4,869,000	4197	144	456
					(Op: OH2KI)

GREECE

SV1DKR	3.5	16,225	373	12	47
SV1NA	1.8	66,810	748	14	71
*SV1ENG	A	235,942	556	73	193
*SV1JA	"	78,300	304	47	103
*SV1CQN	"	22,655	126	44	71
*SV1CIB	"	19,551	173	42	105
*SV2BOH	28	165,759	903	28	76

GUERNSEY

*MUØFAL	A	243,070	593	52	166

HUNGARY

HA8JV	A	3,983,990	3271	152	483

HA6NL	"	**2,052,960**	**2146**	**127**	**433**
HA3PT	*	406,636	941	92	275
HA7XQ	*	369,408	916	59	133
HA7PO	*	243,087	551	73	198
HGØD	**28**	**431,331**	**1267**	**38**	**145**
HA3NU	"	**412,227**	**1212**	**36**	**127**
HA8MT	*	322,322	889	33	128
HA8GY	*	240,702	634	35	119
HA8YU	*	32,256	161	27	57
HG4F	**14**	**234,274**	**1031**	**33**	**103**
HG8M	**7**	**524,004**	**2091**	**33**	**123**
				(Op: HA8FM)	
HG5A	**3.5**	**57,354**	**996**	**17**	**62**
HA4FV	*	51,819	741	10	59
***HA1CW**	**A**	**2,552,495**	**2611**	**135**	**464**
***HA8IH**	"	**1,757,157**	**2330**	**110**	**337**
*HA1BC	*	1,035,648	1169	109	355
*HA5NG	*	788,839	1075	93	304
*HA4YF	*	624,064	839	97	301
*HA6IAM	*	466,433	808	77	256
*HA3GE	*	220,980	515	59	195
*HAØDD	*	150,816	377	69	179
*HG8W	*	38,295	197	35	76
*HA8LQG	*	28,305	220	21	64
***HA6QD**	**28**	**14,767**	**155**	**18**	**28**

ICELAND

TF3IRA	**A**	**1,904,158**	**2702**	**99**	**332**
TF8GX	*	183,708	468	63	189
***TF3GB**	**A**	**630,936**	**1967**	**54**	**200**

IRELAND

EI8IC	**A**	**1,010,328**	**1463**	**76**	**268**
EI6BT	**28**	**198,128**	**838**	**31**	**91**
EI8GP	**21**	**358,150**	**1388**	**32**	**98**
EI4BZ	**7**	**197,912**	**1131**	**23**	**81**
***EI6FR**	**A**	**468,198**	**1540**	**43**	**128**
***EI5DI**	**28**	**238,464**	**926**	**28**	**80**
*EI4DW	*	186,676	763	27	86

ITALY

II2E	**A**	**1,910,976**	**2094**	**127**	**411**
IV3TQE	*	1,132,835	1317	110	369
I2SVA	*	599,811	888	85	238
IV3UHL	*	311,831	962	68	221
IK1FVO	*	284,382	633	63	196
IK4WMH	*	158,949	371	58	131
IV3RLB	*	60,258	328	34	87
IZØAIS	*	46,698	273	23	63
IK2SAI	*	29,808	155	33	59
IU2D	**28**	**810,960**	**2018**	**39**	**147**
				(Op: IK2QEI)	
IQ3X	*	280,410	1077	31	99
				(Op: IV3SKB)	
IQ2X	*	187,425	587	35	118
				(Op: IK2GZU)	
IZ8ANA	*	68,486	403	32	89
I3FDZ	*	25,000	191	14	36
IR4D	**21**	**613,375**	**1679**	**37**	**138**
II2B	*	124,740	801	34	92
IK7JWY	**14**	**252,927**	**986**	**34**	**123**
IZ3ALF	**7**	**188,032**	**937**	**29**	**99**
IR7A	**3.5**	**12,528**	**282**	**11**	**43**
				(Op: I7ALE)	
IK6SNQ	1.8	22,134	385	8	54
***IO3JSS**	**A**	**2,188,721**	**2239**	**119**	**402**
***IK4EWX**	"	**1,137,720**	**1369**	**103**	**353**
***IK4UNH**	"	**819,237**	**1191**	**87**	**296**
*I4FGG	*	397,375	760	74	215
*IO2A	*	267,582	610	80	197
*IN3FHE	*	263,718	472	64	209
*IN3NOR	*	220,660	539	54	182
*IK2WXV	*	203,412	637	76	192
*IK2AIT	*	162,120	484	58	152
*I6FDJ	*	159,537	480	53	160
*IK2NUX	*	150,249	384	58	99
*IK1RQQ	*	122,407	366	58	148
*IR2D	*	103,462	333	52	142
				(Op: IZ2DAY)	
*IZØANC	*	98,952	338	48	120
*IK4SDS	*	97,520	244	52	160
*IZ8BLZ	*	84,722	308	48	98
*IK2WYI	*	82,110	287	46	115
*IK3SCB	*	41,062	248	33	65
*IV3KSE	*	18,721	114	34	63
*IK5RLS/2	*	13,832	98	36	55
*IZ8DBJ	*	5,270	66	16	18
*IR4R	*	714	33	14	20
				(Op: IK4ALM)	
***I3MLU**	**28**	**258,566**	**713**	**35**	**126**
*IR2V	*	180,000	567	34	110
				(Op: I2WIJ)	
*I5OQV	*	18,813	155	21	32
***IK5FTV**	**3.5**	**18,483**	**346**	**9**	**52**
*I4JEE	*	8,851	148	9	44

JAN MAYEN

JX7DFA	**28**	**616,192**	**2580**	**31**	**97**

JERSEY

***MJØASP**	**14**	**102,691**	**703**	**20**	**83**
				(Op: F5SHQ)	

KALININGRAD

UA2CZ	**A**	**537,672**	**795**	**85**	**259**
***RV2FW**	**A**	**1,278,172**	**1672**	**118**	**360**

LATVIA

YL2KO	**A**	**2,324,952**	**2311**	**126**	**378**
YL2SM	"	**2,111,436**	**2254**	**134**	**400**
YL2MR	*	1,287,750	1927	98	327
YL2LY	*	933,878	1103	106	348
YL2GD	*	268,065	547	75	184
YL2IP	*	86,592	283	50	114
YL3DW	**21**	**492,275**	**1554**	**37**	**138**
YL2PQ	**1.8**	**73,430**	**854**	**15**	**66**
***YLØA**	**A**	**1,727,440**	**1904**	**123**	**397**
				(Op: YL2KA)	
***YL2GN**	"	**1,229,609**	**1531**	**107**	**357**
*YL1ZF	*	528,927	1101	65	202
*YL2PN	*	303,774	697	59	198
*YL2NN	*	285,935	706	62	203
*YL2FD	*	65,188	352	40	132
*YL2GTD	*	28,306	176	25	73
*YL2KF	28	45,848	243	22	66
***YL2PP**	**21**	**186,984**	**631**	**34**	**113**
***YL2BJ**	**14**	**89,088**	**477**	**29**	**87**
*YL3FW	*	73,696	469	24	74
***YL3IG**	**7**	**39,698**	**307**	**20**	**70**
***YL2PM**	**3.5**	**36,096**	**631**	**9**	**55**

LITHUANIA

LY2IJ	**A**	**3,550,560**	**3145**	**141**	**428**
LY2CY	"	**2,561,000**	**2366**	**122**	**378**
LY2VAD	"	**1,913,055**	**2505**	**109**	**336**
LY2HN	*	1,293,292	1347	132	440
LY5W	*	1,097,152	1468	107	327
				(Op: LY1DR)	
LY2KM	"	1,027,100	1218	120	375
LY2OX	"	651,634	1024	87	247
LY3CW	"	609,341	605	88	291
LY2OM	"	590,238	835	89	274
LY3BH	*	20,706	121	42	77
LY2CI	**28**	**446,148**	**1290**	**36**	**126**
LY2OU	*	218,923	626	35	119
LY2IC	*	212,350	598	35	120
LY2CX	*	158,646	536	35	102
LY7Z	**7**	**555,060**	**1896**	**37**	**137**
				(Op: LY2TA)	
LY3BX	*	264,378	1312	31	108
***LY9A**	**A**	**3,220,284**	**2742**	**136**	**470**
				(Op: LY3BA)	
***LY2MM**	"	**1,654,712**	**1669**	**125**	**404**
***LY2LA**	"	**1,432,310**	**1575**	**114**	**335**
*LY2MW	*	1,120,100	1521	104	356
*LY3IW	*	1,028,370	1471	90	323
*LY1BW	*	585,216	1332	57	231
*LY2BBF	*	583,020	1175	76	240
*LY2FN	*	172,284	572	47	149
*LY2GW	*	29,193	125	32	79
***LY2AT**	**28**	**111,561**	**372**	**31**	**92**
*LY3ID	*	71,363	254	31	95
*LY1DM	*	6,120	44	16	35
***LY3JY**	**21**	**273,780**	**899**	**34**	**122**
***LY2BM**	**14**	**394,864**	**1530**	**33**	**115**
*LY2FF	*	55,791	335	6	90
***LY2BLQ**	**7**	**99,180**	**675**	**24**	**92**
*LY3BAD	*	588	16	9	12
***LY3NFW**	**3.5**	**77,244**	**1065**	**17**	**65**
*LY1CT	*	42,884	647	11	60
*LY1DT	*	28,864	749	11	53

LUXEMBOURG

***LX1JH**	**A**	**69,248**	**277**	**39**	**89**

MACEDONIA

Z35M	3.5	6,204	115	7	37
***Z32AM**	**21**	**44,480**	**427**	**24**	**56**

MALTA

9HØA	**28**	**993,265**	**2787**	**38**	**147**
***9H1ZA**	**A**	**2,622,617**	**2773**	**135**	**454**
*9H3MM	*	1,179,430	1569	97	309
				(Op: DF4SA)	

MOLDOVA

ERØND	**A**	**3,281,488**	**3141**	**137**	**444**
				(Op: UT7ND)	
ER1CW	7	22,791	205	17	54
***ER6A**	**A**	**2,639,718**	**3792**	**112**	**365**
				(Op: ER1LW)	
***ER100**	**28**	**230,020**	**766**	**35**	**120**
*ER2GR	*	12,120	86	17	43
*ER1AA	14	13,950	142	15	47

MONACO

***3A/HB9APJ**	**A**	**67,930**	**392**	**33**	**95**

NETHERLANDS

PA5TT	**A**	**306,693**	**643**	**72**	**235**
PA5WT	"	**263,127**	**673**	**50**	**145**
PA3EMN	*	121,565	420	50	155
PI4TUE	21	36,722	269	20	41
PA3FDO	*	9,752	148	16	30
PA3CAL	**14**	**138,159**	**684**	**30**	**89**
***PA3BFH**	**A**	**1,458,288**	**1641**	**112**	**380**
*PAØJR	*	691,889	983	86	255
*PAØMBD	*	141,480	447	68	194
*PA1MRK	*	103,576	517	34	87
*PAØQX	*	96,163	351	42	80
*PA3HBI	*	84,001	295	49	118
*PAØRBS	*	65,720	273	50	105
*PA2DGR	*	48,169	342	36	115
*PA3AFF	*	38,010	227	24	81
*PA5GU	*	34,054	292	37	94
*PA3HDP	*	27,482	264	47	104
*PAØINA	*	26,260	98	35	66
***PA1CC**	**28**	**163,625**	**595**	**33**	**92**
*PAØRRS	*	161,544	502	33	94
*PAØRCT	*	160,567	668	28	93
*PAØJED	*	75,936	327	28	68
***PA7AA**	**21**	**124,530**	**663**	**22**	**83**
***PA3ADJ**	**14**	**56,628**	**397**	**27**	**72**
*PA3CLQ	*	780	20	3	13
***PA3AAV**	**7**	**352,132**	**1396**	**33**	**118**

NORTHERN IRELAND

GI4KSH	**A**	**187,941**	**554**	**39**	**144**
GIØKOW	**28**	**1,023,930**	**2644**	**39**	**147**
***GI4SNC**	**A**	**944,590**	**1893**	**70**	**225**
***GIØKVQ**	**21**	**106,110**	**651**	**23**	**58**

NORWAY

LA7DHA	**A**	**184,644**	**767**	**51**	**156**
LA6IHA	*	164,025	444	58	167
LA9HW	**21**	**474,150**	**1611**	**35**	**115**
LA5UF	*	237,357	889	36	113
LA6YEA	**7**	**418,876**	**1761**	**34**	**123**
LA2O	**3.5**	**19,096**	**438**	**8**	**48**
***LA9HFA**	**A**	**1,383,435**	**1949**	**98**	**335**
*LA3BO	*	815,994	1440	87	327
*LA2HFA	*	547,680	928	75	261
*LA1YE	*	359,076	526	83	296
*LA7MFA	*	210,399	560	62	171
*LA9GY	*	29,393	179	30	89
***LA6PB**	**28**	**53,940**	**288**	**23**	**70**
*LA8WG	*	36,181	217	23	68
***LA3R**	**21**	**57,149**	**337**	**26**	**76**
				(Op: LA5LJA)	
*LA2OG	*	25,404	150	22	65
***LA4XFA**	**7**	**22,440**	**242**	**13**	**55**

POLAND

SP7GIQ	**A**	**4,640,184**	**3982**	**149**	**429**
SP8NR	"	**2,404,002**	**2004**	**139**	**467**
SP2HPM	*	302,376	638	70	223
SP3HUU	*	285,714	644	89	244
3ZØIU	*	283,728	608	70	206
				(Op: SP2IU)	
SP3PL	*	268,576	546	81	227
SP4AVG	*	154,534	385	56	147
SP2HMT	*	92,833	290	53	140
SP5CEQ	*	40,992	138	49	63
SP2DKI	*	39,900	186	45	69
SP6CZ	*	25,334	124	38	68
SP5BNB	*	19,902	78	41	66
SP3DOF	*	9,918	86	21	37
SP7BDS	*	8,976	90	20	48
SP3KEY	**28**	**707,658**	**1785**	**36**	**138**
				(Op: SP3RBI)	
SP5DDJ	*	354,742	907	38	128
SP8GEY	*	166,446	491	36	115
SN3A	**21**	**757,292**	**2292**	**37**	**129**
				(Op: SP3HLM)	
SP4NI	**14**	**243,360**	**1051**	**34**	**110**
SP2JGK	*	41,002	361	20	63
SP9W	**7**	**194,480**	**1159**	**30**	**106**
				(Op: SP9HWN)	
SP3CCT	*	154,343	920	27	92
SP8BRQ	**3.5**	**168,375**	**981**	**28**	**97**
SP5GH	*	34,871	164	17	81
***SQ6Z**	**A**	**3,404,358**	**2978**	**133**	**425**
				(Op: SP3RBR)	
***SP9DAE**	"	**1,324,680**	**1824**	**92**	**328**
***SQ9BZ**	"	**755,776**	**1241**	**94**	**298**
*SP3VT	*	702,823	1270	77	276
*SP4TKR	*	657,783	1418	88	283
*SP8FHK	*	486,920	803	96	280
*SP3JUN	*	430,848	895	65	223
*SP6FZA	*	300,086	791	72	226
*SP9FT	*	296,970	603	71	214
*SP5ICS	*	259,515	565	59	178
*SP3HC	*	237,680	605	50	145
*SP5ASY	*	207,988	293	50	160
*SP9LAS	*	172,020	427	59	176
*SQ9DXN	*	139,125	271	75	190
*SP5ULV	*	128,400	322	57	161
*SP3CW	*	82,248	346	32	117
*SP4BOS	*	76,750	304	46	128
*SP2MKT	*	73,179	231	45	96
*SP9GFI	*	58,197	191	53	98
*SP8LBK	*	54,890	231	41	69
*SP3EQE	*	53,691	368	57	36
*SQ2HEB	*	45,504	158	50	94
*SP5XOC	*	36,860	194	31	64
*SP3MY	*	33,366	231	24	78
*SQ2AJI	*	27,707	127	27	49
*SP9WUM	*	22,113	139	32	59
*SP3XR	*	20,374	123	27	34
*SP7JQQ	*	20,253	93	43	86
*3Z3CUG	*	16,754	320	20	80
*SP6IEQ	*	6,018	66	14	20
*SP6RGC	*	5,874	79	24	42
*3Z3LPR	*	4,653	61	19	28
				(Op: SP3LPR)	
*SP2IHG	*	4,144	203	25	87
*SP5DRH	*	2,542	37	9	32
*SP7DQR	*	1,450	21	11	18
*SP1PLA	*	432	10	8	10
*SQ3GNA	*	100	110	18	49
*SP8FHJ	*	100	42	19	36
***SP5UAF**	**28**	**226,765**	**585**	**34**	**121**
***SP3LWP**	"	**217,478**	**600**	**38**	**128**
*SP3GTS	*	161,738	520	32	102
*SQ9HYM	*	157,920	576	29	91
*SP6MLX	*	88,134	281	35	99
*SP5LCC	*	81,375	302	32	93
*SP6XP	*	27,179	162	20	51
*SP3AOT	*	23,052	146	21	48
*SP3AZO	*	18,544	125	21	40
*SN4AAZ	*	12,978	83	21	42
*SP6TRH	*	10,516	107	16	28
*SP5BB	*	10,404	92	16	35
*SP9NSV/7	*	2,128	52	7	7
***SP9BBH**	**21**	**287,730**	**976**	**32**	**107**
***SP2AVE**	"	**184,939**	**703**	**30**	**112**
*SP2FWC	*	153,580	530	34	106
*SP5GDY	*	126,514	481	31	91
*SP7ENU	*	2,520	36	10	18
***3Z9XCN**	**14**	**566,430**	**1892**	**36**	**122**
*SP8BAB	*	35,534	142	30	79
*SP3FPF	*	21,840	100	27	78
*SN8M	*	16,850	181	16	56
				(Op: SP8MI)	
***SP8IMG**	**7**	**169,440**	**1248**	**28**	**92**
*SP9ABU	*	72,736	326	27	88
*SP5CNA	*	64,323	484	18	75
*SP3BGL	*	22,800	197	14	61
*SP9AKD	*	22,361	201	15	56
*SQ1EID	*	7,791	97	10	39
***SP5JTF**	**3.5**	**88,666**	**971**	**17**	**69**
*SP6GCU	*	45,171	631	11	52
*SP6MQO	*	42,210	585	11	52
*SP9DUX	*	31,030	487	12	46
*SP5OXJ	*	17,967	312	9	44
*SP6LV	1.8	5,248	126	7	34
*SP4GHL	*	3,854	93	5	36
*SP7JOA	*	1,008	26	7	21

PORTUGAL

CT1FJK	**21**	**635,580**	**2261**	**38**	**142**
***CT1DSC**	**A**	**1,059,107**	**1570**	**117**	**380**
*CT1DJE	*	19,515	91	33	42
***CT1GFK**	**28**	**107,160**	**748**	**25**	**69**
*CT1BNW	14	17,966	168	14	45
*CT1FNT	*	10,088	119	12	40

ROMANIA

YO3FRI	**A**	**702,906**	**1281**	**98**	**288**
YO4CAH	*	369,920	680	60	247
YO7BGA	*	302,235	592	79	187
YO8MI	*	43,261	182	44	109
YP3A	**28**	**519,670**	**1630**	**36**	**121**
				(Op: YO3GDA)	
YO4NF	*	427,482	1785	35	118
YO2BEH	**1.8**	**6,480**	**174**	**6**	**34**
YO4FRF	*	3,549	94	6	33
***YO3APJ**	**A**	**1,840,380**	**1837**	**126**	**429**
*YO8FR	*	726,913	867	89	267
*YO5PBF	*	330,904	780	69	197
*YO8RFS	*	233,282	448	57	161
*YO6BMC	*	208,591	540	45	195
*YO5DAS	*	185,989	618	50	160
*YO4XF	*	88,308	231	64	159
*YO6ADW	*	65,459	318	30	102
*YO8DHD	*	34,238	182	33	73
*YO9BGV	*	31,720	109	42	80
*YO4BII	*	29,640	189	30	84
*YO4RHK	*	27,398	203	34	99
*YO9IF	*	17,680	85	20	60
*YO6UO	*	6,102	44	25	29
***YO6BHN**	**28**	**170,961**	**471**	**34**	**113**
*YO2AQB	*	29,166	193	18	50
***YO9FJW**	**21**	**137,684**	**759**	**26**	**80**
*YO4BBH	*	47,810	193	32	97
*YO4ZF	*	47,680	212	16	97
*YO4KCC	*	33,610	199	19	69
				(Op: YO4BGJ)	
*YO7KJL	14	11,271	213	12	39
*YO4BTB	*	5,643	57	17	40
*YO8BGD	7	14,685	153	12	43
***YO9AGI**	**3.5**	**30,621**	**485**	**10**	**51**

SARDINIA

***ISØIGV**	**A**	**573,802**	**1126**	**72**	**221**
*ISØOMH	*	452,574	1100	36	255
*ISØHQJ	*	328,412	1041	61	198
*ISØHFE	*	5,035	112	30	65
***ISØSDX**	**21**	**59,329**	**502**	**22**	**57**
***ISØUWX**	**14**	**15,300**	**260**	**20**	**65**

SCOTLAND

GM3POI	**A**	**3,471,182**	**2774**	**135**	**448**
GM7V	"	**3,444,584**	**3083**	**132**	**440**
				(Op: GM3WOJ)	
GMØF	*	2,628,180	3244	113	358
				(Op: GM4AFF)	
GM3W	*	772,080	1678	66	174
				(Op: GM3JKS)	
GM4YXI	**28**	**506,152**	**1646**	**38**	**113**
GMØAZC	*	164,566	825	25	82
GM2T	14	29,670	254	22	64
				(Op: MMØCCC)	
***GM4SID**	**A**	**780,402**	**1171**	**87**	**270**
*MMØBQI	*	91,476	300	54	135
***GM3CFS**	**28**	**153,583**	**519**	**33**	**108**

SICILY

***IT9GAC**	**A**	**95,910**	**242**	**58**	**172**
*IT9VDQ	*	75,435	259	41	100
*IT9JOF	*	26,928	116	37	62
***IT9AF**	**28**	**109,497**	**682**	**31**	**82**
*IT9THD	14	6,055	98	15	20

SLOVAK REPUBLIC

OM8AA	**A**	**685,556**	**1076**	**91**	**276**
OM3OM	28	63,744	467	18	46
OM7PA	**14**	**195,195**	**985**	**33**	**110**
OM5LR	3.5	18,635	362	10	41
***OM6T**	**A**	**2,185,099**	**2253**	**126**	**415**
				(Op: OM5AW)	
***OM8ON**	"	**841,875**	**851**	**113**	**336**
*OM4DN	*	767,382	1172	80	283
*OM4TX	*	742,690	1109	93	301
*OM7AG	*	523,160	1072	71	248
*OM3PQ	*	492,050	828	76	249
*OM7RC	*	412,929	731	73	218
*OM7CA	*	341,334	769	65	193
*OM8HG	*	210,834	491	60	161
*OM7VF	*	198,539	516	59	183
*OM3CDZ	*	197,919	681	60	147
*OM5UM	*	135,632	454	45	151
*OM3BA	*	133,075	428	54	185
*OM3CDN	*	77,708	294	51	152
*OM3TU	*	31,826	232	31	60
*OM8MM	*	27,539	445	50	139
*OM7AT	*	10,290	86	17	42
***OM7YC**	**28**	**69,012**	**310**	**31**	**77**
*OM2EE	*	37,845	218	20	55
*OM3EQ	*	37,583	149	29	62
***OM5NL**	**21**	**170,390**	**630**	**31**	**108**
*OM4DA	*	17,619	161	13	48
*OM6RM	14	12,189	227	9	42
***OM2000**	**3.5**	**65,846**	**869**	**13**	**60**
*OM1AW	"	16,066	259	10	48

SLOVENIA

S5ØA	**A**	**4,582,743**	**3821**	**152**	**475**
S57DX	"	**3,970,525**	**3083**	**149**	**494**
S53A	"	**3,285,466**	**2370**	**145**	**502**
S56A	*	2,241,144	1796	136	476
S55A	*	1,965,540	2165	112	358
S53O	**28**	**464,260**	**1339**	**37**	**130**
S53AK	**21**	**205,080**	**996**	**33**	**87**
S59A	**14**	**884,834**	**2418**	**38**	**156**
S5ØR	*	425,440	1759	37	123
S53FO	**3.5**	**36,660**	**648**	**12**	**53**
S5ØU	**1.8**	**62,475**	**800**	**11**	**64**
***S52OP**	**A**	**1,867,899**	**2000**	**117**	**412**
***S52LW**	"	**1,498,890**	**1667**	**113**	**397**
***S51RJ**	"	**1,336,474**	**1740**	**98**	**324**
*S51F	*	1,223,200	1336	102	338
*S54X	*	1,221,760	1422	104	356
*S57U	*	1,048,560	1301	88	320
*S57J	*	902,462	1002	113	305
*S51MF	*	350,796	498	105	242
*S58MU	*	267,030	521	62	196
*S57NPR	*	100	264	28	81
***S58J**	**28**	**312,816**	**905**	**35**	**117**
*S58DX	*	214,704	682	34	108
***S51VC**	**21**	**78,416**	**333**	**29**	**87**
***S54A**	**7**	**216,294**	**986**	**34**	**107**
***S53F**	"	**188,734**	**1005**	**27**	**92**
*S57Z	*	100,776	518	22	80
***S52GO**	**3.5**	**45,658**	**554**	**13**	**61**
*S51W	*	21,838	400	11	50
*S51PF	*	12,654	238	9	48
***S57M**	**1.8**	**37,895**	**637**	**10**	**55**
*S5ØO	*	5,778	163	8	46

SPAIN

EA1EQ	**A**	**265,108**	**874**	**51**	**140**
EA3GIS	"	**218,553**	**504**	**71**	**206**
EA7MT	*	182,628	430	61	167
EA5FW	*	70,080	288	40	106
EA2AOI	*	59,182	231	35	92
EA5EOH	*	38,010	192	31	74
EA1DFP	*	5,666	36	25	36
EA3AQQ	*	4,757	49	25	46
EA5BKV	*	2,750	70	18	37
EA5AVC	**28**	**190,620**	**798**	**36**	**99**
EA3CKX	*	47,280	190	29	91
EA1JO	**21**	**108,796**	**475**	**27**	**91**
EC5JJ	*	45,018	538	15	46
EA7IL	**14**	**246,739**	**1260**	**30**	**74**
EA7ASZ	*	201,600	758	31	113
EA3EHE	*	40	92	12	28
EA7GSU	**3.5**	**44,522**	**412**	**17**	**72**
***EA2AZ**	**A**	**1,138,439**	**1554**	**92**	**309**
***EA7KN**	"	**1,091,925**	**1877**	**80**	**265**
***ED7AJR**	"	**930,036**	**1731**	**64**	**218**
*EA2BNU	*	911,905	1436	80	251
*EA5SM	*	870,732	1400	92	269
*EA3BOW	*	338,976	768	71	217
*EA4AHD	*	166,725	558	56	169
*EA1WX	*	152,901	342	56	133
*EA7CA	*	152,470	408	58	111
*EA3AXM	*	126,786	357	50	137
*EA1CS	*	91,616	221	62	162
*EA4ANN	*	74,072	386	30	60
*EA7FZ	*	47,685	224	35	91
*EA4DAT	*	43,152	209	29	58
*EA5AIH	*	41,161	181	51	70
*EA4AES	*	36,100	187	33	67
*EA5AVD	*	33,696	159	30	51
*EA1EXE	*	33,160	292	17	46
*EA4DBM	*	30,989	281	18	47
*EA5AGW	*	28,710	199	32	78
*EA4WD	*	26,059	126	38	65
*EA7TG	*	17,692	72	49	59
*EA2CR	*	16,548	109	29	55
*EA1AEH	*	14,950	79	44	71
*EA1VM	*	14,364	78	43	65

*EA5ABE	*	12,495	217	34	85
*EA5NU	*	9,315	57	28	41
*EA1FBB	*	8,382	64	24	42
*EA1BID	*	3,440	47	16	27
***EA7GTF**	**28**	**364,557**	**1287**	**31**	**106**
*EA7AKJ	*	126,882	614	29	85
*EA7GYS	*	117,058	539	26	81
*EA1AK	*	70,490	297	26	80
*EA4OA	*	3,696	60	11	22
***EA1NK/7**	**21**	**90,189**	**537**	**21**	**78**
*EC2ADR	*	51,243	299	24	69
*EA4BWR	*	50,285	395	20	69
*EC3AHO	*	16,120	253	16	49
*EA4CNA	*	8,413	117	14	33
***EA1FEL**	**14**	**162,756**	**891**	**30**	**102**
*EA1BSK	*	36,960	448	16	61

SWEDEN

7S5A	**A**	**1,847,828**	**2037**	**145**	**401**
SM2T	**"**	**1,689,831**	**2034**	**125**	**382**
			(Op: SM2EZT)		
SM5CLE	*	1,204,800	1258	119	361
SM6WQB	*	489,984	847	83	265
SM2CEW	*	178,248	422	54	114
SM3R	*	122,815	335	62	141
			(Op: SM3CBR)		
7SØZ	*	51,832	204	40	112
			(Op: SMØNZZ)		
SM6DUA	*	17,063	100	37	76
7S2E	**28**	**507,200**	**1673**	**37**	**123**
SM5AHK	*	31,242	120	29	94
SLØW	**21**	**525,390**	**1509**	**36**	**130**
			(Op: SMØAJU)		
SKØUX	*	392,754	1432	33	101
SMØKV	*	185,232	727	34	107
SM5RE	14	13,252	164	12	42
7S5C	*	12,768	115	1	39
			(Op: SM5CBM)		
7S6W	**7**	**205,065**	**925**	**32**	**103**
			(Op: SM6DER)		
SM6FUD	*	191,296	1198	27	85
SM5BEU	**3.5**	**17,990**	**186**	**12**	**58**
SM6DOI	**1.8**	**38,544**	**505**	**12**	**54**
***SM2KAL**	**A**	**728,926**	**1413**	**88**	**286**
*SM7EH	*	509,418	911	75	236
*SM7BHM	*	463,182	959	68	255
*SMØBDS	*	400,263	653	79	224
*SM3EAE	*	314,685	792	63	180
*SM7TKL	*	285,108	582	70	206
*SM3X	*	223,933	718	35	116
			(Op: SM3CVM)		
*SMØJ	*	210,582	531	57	187
*8S6A	*	105,681	348	49	159
			(Op: SM6DPF)		
*SM7CWI	*	97,310	292	54	131
*SM7BJW	*	95,215	306	49	88
*8SØW	*	88,252	241	79	142
			(Op: SMØNJO)		
*SM2EKN	*	66,555	392	30	105
*SM5ENX	*	5,301	41	20	37
***SKØX**	**28**	**358,869**	**1004**	**36**	**125**
			(Op: SMØDRD)		
*SM5NBE	*	238,431	775	30	111
*SM6BSK	*	213,900	565	33	117
*SM7BVO	*	73,892	358	21	77
*SM2JEB	*	47,724	242	28	69
*SM6CRM	*	27,565	147	22	67
***7S3A**	**21**	**66,681**	**407**	**24**	**69**
			(Op: SM3CER)		
*SM7BQX	*	28,470	203	20	58
*SM7BUN	*	5,586	105	13	36
*SMØW	14	30,520	295	20	50
***8S5X**	**7**	**101,473**	**543**	**29**	**98**
			(Op: SM5HJZ)		
*8S6W	*	3,256	48	13	31
*SMØKCO	*	1,080	29	9	15

SWITZERLAND

HB9HFM	A	62,250	233	42	108
HB9CPS	21	19,512	155	19	53
HB9DDZ	**7**	**45,923**	**198**	**28**	**87**
HB9FBM	3.5	13,464	315	9	42
***HB9ARF**	**A**	**1,306,248**	**1574**	**103**	**341**
*HB9DCM	*	737,919	1073	95	276
*HB2DOT	*	447,330	873	68	242
*HB2HQX	*	133,517	497	41	162
*HB9KC	*	40,539	157	42	90
***HB9CBR**	**28**	**97,200**	**404**	**30**	**78**
*HB9AFH	*	32,704	116	31	81

UKRAINE

UV5U	**A**	**2,371,896**	**2260**	**134**	**422**
			(Op: UX1UA)		
UX7IA	**"**	**2,017,762**	**2464**	**128**	**423**
UW5Q	*	1,447,663	1572	117	394
UT2UB	*	896,280	1090	114	348
UX3ZW	*	722,267	1005	104	320
UX4UA	*	632,828	784	97	291
UR5E	*	148,338	357	60	141
			(Op: UR5EDX)		
UT5JAP	*	66,348	136	67	104
UT5ECZ	*	59,113	501	18	88
UT3QT	*	51,590	211	41	93
UU9JFA	*	49,068	150	44	72
UR4VA	*	41,514	223	30	81
UT7WR	*	40,090	224	26	69
UX3MR	*	37,296	266	36	108
UR5IOK	**28**	**329,290**	**1008**	**38**	**132**
EM8I	**"**	**275,693**	**1057**	**35**	**108**
			(Op: UT8IM)		
UR3QT	*	261,404	942	34	109
UT2QQ	*	157,690	641	32	98
UR2E	*	118,476	639	27	81
			(Op: UR7ED)		
US6EX	*	38,897	197	30	67
UR4EYN	*	165	12	7	8
US6L	**21**	**464,581**	**1430**	**37**	**132**
			(Op: UR4LUG)		
UT2FA	*	319,338	1816	36	121
UU9JH	*	300,080	1056	35	120
U5WF	**14**	**272,272**	**978**	**35**	**119**
UR6IJ	*	120,596	597	27	91
UY5YA	*	6,930	109	15	48
US2IR	**7**	**419,418**	**1620**	**36**	**126**
UY3QW	*	331,491	1664	34	107
EM7Q	*	120,345	648	26	87
			(Op: UT2QT)		
UW7Q	*	91,809	679	23	78
			(Op: UR7QM)		
UY2UF	*	18,752	210	13	51
UZ4E	*	286	13	5	6
			(Op: UR4EYN)		
UT5UOC	**3.5**	**76,725**	**677**	**20**	**73**
UT2IW	*	31,680	211	22	74
UZ5M	*	23,214	381	14	59
			(Op: UX2MM)		
UR7EU	*	9,936	224	9	39
UX1VT	*	2,190	75	6	24
UR4CWM	*	32	8	2	6
UR6QA	**1.8**	**43,706**	**545**	**17**	**65**
UX5NQ	**"**	**23,255**	**482**	**8**	**47**
UX1IL	*	18,468	309	10	47
UYØZG	*	15,571	255	9	48
***UT5JDS**	**A**	**1,093,576**	**1247**	**106**	**367**
***UT4EO**	**"**	**744,960**	**1223**	**93**	**291**
***UR3PDT**	**"**	**739,893**	**1177**	**85**	**308**
*UW5U	*	507,297	969	84	273
			(Op: UY2UA)		
*UY5TE	*	486,089	963	70	243
*UX5UO	*	474,582	681	90	272
*UR3MP	*	443,020	766	83	257
*UY5ZI	*	409,276	654	81	230
*UX8IX	*	376,689	1267	94	315
*UT8IT	*	366,951	823	63	228
*UR5LBI	*	343,476	1020	65	217
*UT5HA	*	330,344	534	92	255
*US3IZ	*	316,050	797	67	227
*USØKW	*	288,864	794	68	204
*UT5UJY	*	247,314	914	57	225
*UR3PA	*	186,801	484	50	163
*UT7QF	*	120,400	245	83	218
*UX3MW	*	101,949	375	46	113
*UR5XAJ	*	72,316	238	53	126
*UT4TA	*	68,464	350	39	137
*UY2RO	*	68,276	245	41	128
*US8MX	*	43,500	247	54	91
*USØYA	*	38,220	114	49	81
*UT4XU	*	31,003	124	40	63
*UR5MID	*	16,275	67	35	58
*US4QQ	*	4,992	48	22	30
*UY5QZ	*	2,829	39	16	25
*UT1IA	*	910	40	11	24
***UU2JA**	**28**	**66,641**	**316**	**28**	**75**
***UR5UW**	**"**	**55,348**	**256**	**24**	**77**
*US9QA	*	38,982	206	26	63
*UT7ET	*	26,696	163	27	58
*UX3HA	*	19,489	211	13	44
*UT5UML	*	13,806	86	21	38
*UR5PG	*	12,700	116	19	31
***UR6QS**	**21**	**132,572**	**576**	**33**	**98**
***UX7UN**	**"**	**114,750**	**584**	**31**	**104**
*UX5EF	*	101,576	455	29	93
*UR3CMA	*	79,596	478	23	76
*UR4QOS	*	70,056	539	19	65
*UY5WA	*	60,367	359	27	74
*UT1HZM	*	19,392	149	26	70
***US1ITU**	**14**	**242,730**	**1020**	**34**	**111**
***UXØZX**	**"**	**228,824**	**906**	**34**	**114**
*US1PM	*	68,748	432	23	79
***UT1FA**	**7**	**196,826**	**912**	**31**	**100**
*UR9MM	*	31,872	228	16	67
*UR4III	*	24,529	217	19	55
*UR3PFX	*	4,656	101	10	38
***UR3HC**	**3.5**	**46,893**	**572**	**9**	**61**
*UY6IM	*	46,689	591	12	67

WALES

GW3JXN	**A**	**955,392**	**1216**	**95**	**289**
***GW3NJW**	**A**	**1,541,548**	**2527**	**85**	**273**
***GW3KDB**	**"**	**1,478,820**	**2003**	**98**	**322**
*GW3KJN	*	233,244	568	56	172

YUGOSLAVIA

YT7R	**A**	**4,319,775**	**3529**	**147**	**510**
			(Op: YU7BW)		
YT1AD	**"**	**3,781,269**	**3150**	**149**	**472**
YU7KW	*	2,422,750	2262	125	425
YU7FN	*	70,128	206	46	98
YZ1AU	**28**	**510,264**	**1346**	**37**	**134**
4N1K	**"**	**390,216**	**1438**	**36**	**106**
4N1N	*	169,875	743	36	115
			(Op: YU1BX)		
YU7SF	*	139,727	480	31	100
YU1QW	*	138,867	508	31	92
YU7AV	**21**	**583,923**	**1770**	**37**	**140**
YU7CF	*	361,473	1249	35	112
YZ9A	**14**	**564,652**	**1914**	**36**	**128**
YT7A	**7**	**680,394**	**2297**	**37**	**132**
			(Op: YU7GO)		
YZ1U	*	151,424	921	25	87
YU7HC	*	31,098	272	16	57
4N1A	**3.5**	**215,586**	**1414**	**26**	**92**
			(Op: YU1EA)		
YZ6A	*	152,388	1328	26	82
YU1KR	*	142,415	1257	19	72
YTØA	**1.8**	**38,793**	**628**	**9**	**58**
			(Op: YT7AO)		
***YZ7AA**	**A**	**2,731,193**	**2451**	**142**	**447**
***YU7CB**	**"**	**2,313,468**	**2135**	**125**	**433**
*YU7WJ	*	1,148,112	1393	108	361
*YU1PJ	*	242,105	633	51	154
*YZ1EW	*	147,356	485	40	147
***YU3ØNW**	**28**	**465,273**	**1354**	**35**	**118**
***YU7WW**	**"**	**441,543**	**1272**	**36**	**123**
*YU1HA	*	182,791	579	34	111
*YU7KM	*	80,024	231	29	84
***4N7B**	**14**	**227,712**	**1092**	**33**	**95**
			(Op: YU7BJ)		
*YT1RA	*	97,700	1089	25	75
*4N8/LZ1BJ	*	8,400	198	9	31
***4N1FG**	**7**	**115,774**	**751**	**20**	**87**
*YU7YZ	*	30,784	277	12	62
*YT1RX	3.5	10,450	311	8	42

OCEANIA

AUSTRALIA

VK5GN	**A**	**1,270,698**	**1653**	**103**	**183**
VK4XY	3.5	30,857	208	20	39
***VK2DPD**	**A**	**190,920**	**425**	**68**	**147**
***VK4DX**	**28**	**638,950**	**1771**	**33**	**97**
*VK4UC	*	256,161	959	28	75
*VK4TT	*	130,232	637	21	52
*VK6HG	*	17,520	106	22	38
***VK4EMM**	**21**	**815,850**	**1923**	**34**	**113**
*VK4XW	*	11,505	59	14	45
*VK3TZ	1.8	12	2	2	2

BELAU

T88JA	**A**	**2,543,857**	**2842**	**113**	**234**
			(Op: JA6VZB)		

BRUNEI

V8A	**A**	**6,838,155**	**4381**	**153**	**402**
			(Op: JO1RUR)		

EAST MALAYSIA

9M6NA	**A**	**6,925,457**	**4148**	**162**	**421**
			(Op: JE1JKL)		
9M6AAC	**"**	**5,023,920**	**3572**	**155**	**364**
			(Op: OH1NOA)		
9M8YY	**21**	**690,768**	**1576**	**37**	**119**
			(Op: JR3WXA)		

EAST TIMOR

***4W6MM**	**A**	**68,208**	**384**	**40**	**76**
			(Op: TF1MM)		

HAWAII

KH7R	**A**	**6,183,408**	**4241**	**168**	**360**
			(Op: N6TJ)		
NH7A	*	4,021,710	3830	135	250
NH7/N6HC	*	1,712,070	2260	103	167
KH7Z	**21**	**923,949**	**2267**	**37**	**112**
AH6OZ	7	12	2	2	2
KH6CC	**1.8**	**14,887**	**239**	**11**	**12**
***KH6 /W6PH**	**A**	**2,485,725**	**2510**	**123**	**222**
***KH7 /W5MYA**	**21**	**248,782**	**971**	**33**	**64**
***KH7 /N5CR**	**14**	**187,090**	**695**	**32**	**74**
*KH6 /W7DRA	7	15,372	160	17	25
*KH7L	*	2,140	68	10	10

INDONESIA

YB5QZ	**A**	**654,081**	**990**	**83**	**180**
YB9BON	*	287,928	508	79	137
YBØAVK	*	201,608	330	76	156
***YC1ZTC**	**A**	**43,070**	**318**	**53**	**93**
***YB2UU**	**28**	**153,450**	**687**	**27**	**63**
*YB1KOR	"	15,824	143	27	65
***YC8UFF**	**21**	**88,518**	**399**	**30**	**54**
*YC1CVA	*	29,556	249	20	56
*YCØLOW	1.8	1,216	27	9	10

NEW CALEDONIA

***FK8HC**	**21**	**182,850**	**602**	**32**	**83**

NEW ZEALAND

ZL1AIH	**28**	**72,323**	**317**	**27**	**58**
***ZL3JT**	**21**	**102,752**	**319**	**38**	**114**

PAPUA-NEW GUINEA

***P29VPY**	**A**	**3,116,616**	**2589**	**131**	**295**
			(Op: K1XM)		

PHILIPPINES

DX1S	**A**	**4,886,460**	**3601**	**154**	**386**
			(Op: DK3GI)		
DU3NXE	*	1,712,366	1985	104	207
DU1COO	28	59,475	359	21	44
***4F7RWW**	**A**	**596,138**	**951**	**89**	**165**
***DU1ODX**	**21**	**278,132**	**811**	**33**	**91**

SOUTH COOK ISLANDS

***ZK1VVV**	**A**	**815,920**	**1402**	**88**	**129**
			(Op: W7VV)		

TONGA

***A35RK**	**A**	**1,116,310**	**1447**	**97**	**180**

SOUTH AMERICA

ARGENTINA

L99D	**A**	**3,161,248**	**2731**	**126**	**320**
			(Op: LW9EUJ)		
LU1DZ	*	894,833	1447	65	176
LO7H	*	390,484	1045	49	115
			(Op: LU7HN)		
LU7DW	*	246,402	402	82	161
LU5FA	**28**	**619,648**	**2423**	**32**	**96**
LT5V	*	112,852	640	25	64
			(Op: LU8VCC)		
***LU7AWP**	**A**	**1,043,420**	**1558**	**83**	**174**
***LU1AEE**	**"**	**631,708**	**1196**	**60**	**136**
***LU1EWL**	**"**	**620,554**	**990**	**74**	**166**
*LU8DW	*	458,532	989	65	123
*LW4DIR	*	409,457	742	73	139
*LU7DIR	*	215,670	557	66	129
*L62E	*	206,467	348	65	157
			(Op: LW2EU)		
*LU4AXV	*	105,144	351	57	99
*LU1GOE	*	78,242	282	55	87
***LP1F**	**28**	**658,312**	**2140**	**30**	**92**
			(Op: LU5FC)		
***LW1EXU**	**"**	**537,480**	**1694**	**29**	**91**
*LU6EF	*	319,083	999	35	106
*LU5BB	*	203,313	940	25	76
*LU5FF	*	163,070	555	31	84
*LU7YS	*	125,685	490	27	78
*LW5DR	*	3,280	65	16	25
*LU2HJ	*	2,516	70	16	21
***LU6UO**	**21**	**547,428**	**1601**	**33**	**100**
***LU4DX**	**"**	**518,568**	**1135**	**37**	**127**
			(Op: LU2DPW)		
*LU3VED	*	58,587	462	19	40
*LU3EAQ	*	21,775	114	25	42
***LU7EAR**	**14**	**104,313**	**369**	**30**	**79**
*LW1DDE	*	22,348	150	24	50
*LU1BW	*	21,000	140	25	50

ARUBA

P4ØE	**A**	**12,524,160**	**6333**	**169**	**535**
			(Op: CT1BOH)		
P43JB	**28**	**40,590**	**341**	**24**	**58**
***P43E**	**A**	**109,395**	**453**	**48**	**95**

BRAZIL

PY2FUS	**A**	**31,443**	**88**	**55**	**86**
PT2HO	*	8,418	77	15	31
PY2NFE	*	3,243	51	25	44
ZX5J	**21**	**1,417,644**	**3246**	**35**	**124**
			(Op: IV3NVN)		
PR7FB	*	109,215	325	34	101
PY3AU	**14**	**62,295**	**241**	**28**	**74**
PY1BVY	1.8	30	5	3	3
***PX2W**	**A**	**2,893,267**	**2280**	**126**	**361**
***PY2NY**	**"**	**2,706,386**	**2594**	**105**	**289**
*PY2NDX	*	1,231,640	1325	94	234
*PQ7Q	*	1,186,966	1299	92	239
			(Op: PY7IQ)		
*PY2QI	*	729,015	1100	80	185
*PY5BLG	*	394,197	767	65	132
*PP4F	*	220,935	443	59	136
			(Op: PY4FQ)		
*PY2TNT	*	204,575	801	50	117
*ZW2Z	*	189,250	525	35	90
			(Op: PY2ZI)		
*PY2AER	*	125,960	350	39	95
*PP7CW	*	48,553	155	43	85
*PY3NH	*	11,424	82	25	31
*PY1KS	*	4,182	40	22	29
*PY2KQ	*	3,124	37	18	26
***PW2A**	**28**	**79,812**	**263**	**30**	**78**
			(Op: PT2BW)		
*PP7ZZ	*	19,024	146	23	59
*PY3AN	*	7,375	114	10	15
*PY2EDY	*	7,360	90	8	32
*PY2NZR	*	3,794	80	16	50
***PU2NYV**	**21**	**159,993**	**760**	**20**	**67**
*PT2AW	*	64,372	328	22	55
*PY3FBI	*	47,188	246	25	48
*PY3ARM	*	30,012	184	18	46
*PP2JT	*	24,409	146	24	53
*PP2RON	*	1,012	21	6	16
*PY7YL	*	176	6	5	6
*PY2APQ	14	26,846	177	18	41
*PY2FKD	7	2,350	32	9	16

CHILE

CE3F	**28**	**958,816**	**2709**	**36**	**130**
			(Op: CE3FIP)		
CE38FZ	*	55,696	366	15	44
***XQ3ZW**	**A**	**2,338,959**	**2355**	**109**	**272**
*CE3WDH	*	100	4	4	4

COLOMBIA

HK6KKK	**A**	**2,111,744**	**2346**	**120**	**332**

ECUADOR

HC2SL	**28**	**875,892**	**2417**	**35**	**106**

FERNANDO DE NORONHA

PYØFZ	**28**	**1,116,360**	**2559**	**35**	**133**
PYØFF	**7**	**506,925**	**1471**	**31**	**104**

FRENCH GUIANA

FY5KE	**A**	**8,608,614**	**4893**	**148**	**475**
			(Op: F6BEE)		

NETHERLANDS ANTILLES

***PJ4/WN7T**	**A**	**168,300**	**496**	**50**	**100**

PERU

OA4SS	**28**	**410,060**	**1236**	**30**	**86**

SURINAME

PZ5JR	**A**	**7,952,040**	**5074**	**137**	**418**
			(Op: OHØXX)		

URUGUAY

CX5X	**28**	**1,357,358**	**2803**	**38**	**135**
			(Op: CX6VM)		
CX4SS	*	102,036	590	25	41
CX5BW	**7**	**80,370**	**629**	**27**	**67**
***CX5O**	**A**	**187,731**	**619**	**48**	**105**
***CX7BY**	**28**	**135,058**	**635**	**25**	**52**
***CX5AO**	**21**	**781,404**	**1879**	**35**	**121**
*CX2AM	*	167,552	676	28	84
*CX3CY	*	48,200	358	18	32
***CX9AU**	**14**	**466,725**	**1342**	**31**	**96**

VENEZUELA

4M5X	**14**	**1,305,274**	**3012**	**38**	**140**
			(Op: W4SO)		
***YV7QP**	**A**	**372,528**	**830**	**73**	**161**
*YV6AZC	*	237,712	488	56	123
*YV5NWG	*	5,508	43	26	42
***YV1OB**	**3.5**	**44,781**	**313**	**17**	**52**

QRP

K3OO	**A**	**1,731,450**	**1299**	**114**	**371**
KR2Q	**"**	**1,703,808**	**1330**	**106**	**353**
N3BJ/4	**"**	**1,460,019**	**1206**	**103**	**350**
LY5G	**"**	**1,239,112**	**1547**	**100**	**336**
					(Op: LY2FE)
S54AA	**"**	**1,062,165**	**1134**	**120**	**387**
SM3C	**"**	**1,017,968**	**1356**	**92**	**335**
					(Op: SM5CCT)
N8ET	**"**	**956,921**	**883**	**114**	**299**
JR4DAH	**"**	**945,700**	**1033**	**110**	**240**
K1RC	**"**	**887,356**	**850**	**91**	**297**
DL3KVR	**"**	**859,200**	**1127**	**94**	**306**
DL6MHW	*	799,488	1114	87	297
SP4GFG	**"**	**748,852**	**999**	**106**	**337**
N7IR	**"**	**638,352**	**692**	**104**	**237**
PA3ELD	**"**	**631,110**	**1141**	**78**	**249**
VE3XL	**"**	**594,486**	**857**	**75**	**228**
DK8ZB	*	580,944	914	80	256
WØMHK/2	*	550,026	647	85	256
WA3NKO	**"**	**542,776**	**642**	**80**	**227**
S52P	*	521,304	1000	79	242
N5TW	**"**	**505,078**	**648**	**85**	**216**
F6OIE	**"**	**495,610**	**1007**	**62**	**228**
RA9SO	**"**	**492,896**	**617**	**64**	**228**
YU1LM	**"**	**473,154**	**832**	**75**	**246**
PQ2Q	**"**	**457,306**	**907**	**87**	**187**
					(Op: PY2WC)
N9CIQ	**"**	**439,856**	**538**	**82**	**214**
EU1CL	**"**	**375,452**	**913**	**69**	**239**
W6JTI	**"**	**368,350**	**509**	**81**	**184**
UA3AD	**"**	**366,624**	**690**	**73**	**215**
NØUR	**"**	**349,740**	**501**	**74**	**187**
S59D	*	346,773	842	82	261
UA4YJ	*	340,200	636	76	274
N1TM	*	325,888	451	69	199
AA1CA	*	325,600	451	73	202
JA5DIM	**"**	**290,950**	**473**	**85**	**145**
PAØADT	*	279,835	607	59	204
W4DEC	**"**	**278,806**	**439**	**69**	**184**
K3WWP	*	264,759	445	53	160
I3BBK	**"**	**261,360**	**658**	**64**	**156**
RZ6HGD	*	241,408	698	57	199
C6A /WA3WSJ	**"**	**235,002**	**880**	**47**	**112**
NØHJZ	*	221,298	386	78	153
ON7CC	**"**	**213,792**	**619**	**47**	**157**
IK3JLS	*	209,750	504	70	180
HC2BEV	**"**	**202,071**	**399**	**60**	**133**
					(Op: UA4WAE)
K8ZT	*	193,282	352	70	171
YO8WW	**"**	**189,202**	**458**	**70**	**177**
OH2BSQ	**"**	**173,641**	**435**	**63**	**184**
KE4R	*	152,776	265	68	158
DK4CU	*	151,143	377	58	186
N9SE	*	150,192	270	75	177
G4FDC	**"**	**141,678**	**353**	**57**	**167**
RW3VM	*	140,197	253	54	143
WZ2T	*	139,292	263	54	140
S53MA	*	134,792	385	53	113
JA5CDL	*	131,999	331	62	111
EW7DK	*	131,460	357	51	141
OM4XA	**"**	**125,424**	**622**	**29**	**127**
W6RCL	*	121,565	276	73	115
GWØVSW	**"**	**120,109**	**383**	**47**	**132**
HB9AYZ	**"**	**119,347**	**406**	**48**	**142**
DL1LAW	*	118,170	497	46	150
IØZUT	*	116,688	342	42	101
K7RE	**"**	**115,254**	**308**	**57**	**114**
EA7HCB	**"**	**114,856**	**486**	**44**	**152**

N2WG	*	112,135	251	57	148
DL5CL	*	110,016	312	53	139
SM5DQ	*	108,344	384	48	184
HB2XY	*	107,094	445	38	146
NQ7X	*	105,000	246	53	115
WA6TLA	*	99,876	230	75	130
GIØGDF	**" **	**91,504**	**389**	**39**	**113**
RV1AB	*	86,632	301	42	140
RV9COI	*	81,075	235	32	109
SP2BAS	*	78,255	214	53	88
HB2DAX	*	72,932	488	50	116
UA3LIZ	*	70,528	476	26	102
EA7AAW	*	70,200	285	34	101
YO4AAC	*	65,772	336	35	115
SP2EWQ	*	62,040	137	73	115
KL7GN	**" **	**60,248**	**225**	**38**	**87**
RW6AHO	*	57,960	441	35	124
F5IQJ	*	56,997	332	42	80
RW4LR	*	49,797	298	26	73
JN2FSE	**" **	**41,472**	**127**	**50**	**78**
DL5IAM	*	40,964	240	41	113
SV1DZB	**" **	**39,824**	**224**	**47**	**105**
PV8DX	*	38,880	198	33	48
W4ZGR	*	38,658	147	22	80
K6III	*	37,572	125	53	71
YU1BX	*	32,766	273	19	67
K7EL	*	31,995	146	38	41
F5NLX	*	31,514	183	27	62
SP5AKG	*	31,294	110	48	110
K6MI	*	31,080	127	47	64
YO4CSL	*	28,064	183	31	96
K7TQ	*	21,730	138	35	47
SM7CZC	*	18,144	85	33	39
F6JSZ	*	17,199	132	20	43
DHØJAE	*	15,575	120	28	61
DJ5QK	*	15,561	125	23	68
W9FHA	*	13,674	86	25	61
KG6ECI	*	13,193	108	37	42
NUØV	*	12,710	68	30	52
DL2VER	*	12,388	121	18	58
IK2BCP	*	10,792	86	27	49
SM3AF	*	10,608	177	29	73
RA9XX	*	10,296	121	11	33
GWØKZW	*	9,076	207	24	64
GØKZO	*	8,918	134	28	70
K4JSI	*	8,843	52	19	44
RAØZD	*	7,622	151	86	120
JM1OZP	*	5,830	66	23	32
KA9NZI	*	5,103	54	21	42
AB8DF	*	4,550	64	9	41
LZ1IQ	*	4,508	49	19	27
KD7CTF	*	3,616	49	16	16
K9DTB	*	2,024	35	22	23
WB9MII	*	1,485	26	15	18
W4NJK	*	1,271	85	21	20
VA7NT	*	954	27	10	8
OZ1BXM	*	897	21	10	13
W1DAD	*	567	20	15	12
WD3P	*	380	12	8	11
UAØSBQ	*	378	24	9	9
KD7BOD	*	100	84	21	32
KA6SGT	*	100	42	13	14
DL4GBR	*	61	9207	16	26
UP6F	**28**	**291,000**	**787**	**35**	**115**
			(Op: UN7FZ)		
JR3RWB	**" **	**248,838**	**687**	**35**	**99**
N6MU	**" **	**242,068**	**579**	**34**	**112**
WO4O	**" **	**241,914**	**643**	**32**	**106**
JG2MLI	**" **	**173,621**	**569**	**33**	**86**
G4EDG	**" **	**161,460**	**527**	**31**	**99**
VA3EU	**" **	**150,060**	**483**	**27**	**95**
NA4CW	*	149,408	456	28	88
K3SWZ	**" **	**145,148**	**409**	**29**	**102**
UR5IRM	**" **	**125,840**	**505**	**28**	**93**
OK2PYA	**" **	**122,115**	**499**	**31**	**74**
EA2CAR	**" **	**118,521**	**462**	**28**	**89**
9A2EY	**" **	**109,088**	**438**	**29**	**83**
SP5AGU	**" **	**83,771**	**788**	**31**	**87**
EW5P	**" **	**82,921**	**388**	**26**	**75**
			(Op: EW6DX)		
YO6EX	**" **	**68,777**	**347**	**25**	**69**
ES1CW	**" **	**61,320**	**224**	**33**	**107**
W7 /JR1NKN	**" **	**57,494**	**260**	**27**	**62**
9A3GU	**" **	**53,808**	**320**	**22**	**54**
HAØGK	**" **	**51,049**	**292**	**24**	**47**
WB2AMU	**" **	**44,642**	**182**	**24**	**73**
UN7CN	**" **	**31,944**	**138**	**23**	**65**
UAØWW	**" **	**28,308**	**149**	**21**	**63**
OK1FHL	**" **	**27,008**	**210**	**20**	**44**
JA2UFH	*	14,790	144	17	34
YO5ODU	*	13,944	117	19	37
DL1JGA	*	13,772	135	15	29
ES6MO	*	12,636	84	21	57
PAØRBO	*	8,480	90	7	33
OH2YL	*	6,766	83	10	24
UR5FCM	*	4,235	71	9	26
EC5ACA	*	2,880	58	10	26
JE3OZB	*	2,565	33	12	15
7K2PBB	*	903	17	10	11
K5DI	*	100	34	7	6
LU7EE	**21**	**364,344**	**973**	**34**	**102**
LY5A	**" **	**340,872**	**964**	**36**	**132**
			(Op: LY2PAJ)		
LU5FZ	**" **	**263,940**	**923**	**30**	**76**
KØAV	**" **	**186,102**	**455**	**35**	**112**
DF4ZL	**" **	**154,536**	**537**	**33**	**104**
JA5APU	**" **	**77,844**	**554**	**20**	**58**
JL3SBE	**" **	**48,384**	**221**	**24**	**60**
RZ6HX	**" **	**47,792**	**264**	**25**	**78**
OH2JXA	**" **	**41,850**	**350**	**17**	**58**
W4FMS	**" **	**29,562**	**185**	**23**	**55**
WG1Z	**" **	**25,920**	**120**	**19**	**61**
WA6FGV	**" **	**21,300**	**136**	**23**	**37**
VE3HG	**" **	**19,734**	**135**	**16**	**50**
7K1CPT/1	*	12,992	84	21	37
WB3AAL	*	10,899	74	19	44
OK1AIJ	*	8,256	104	10	38
W1CTN	*	4,365	71	11	34
JA5IDV	*	2,001	40	14	15
KØCO	*	340	16	10	10
JF3WNO	*	150	7	4	6
RZ9IB	*	100	74	10	33
OH7FF	**14**	**147,193**	**660**	**31**	**96**
UA1OZ	**" **	**101,184**	**457**	**32**	**92**
N4IJ	**" **	**94,800**	**300**	**31**	**89**
G3LHJ	**" **	**85,916**	**570**	**20**	**74**
RZ4AA	**" **	**22,550**	**281**	**15**	**49**
SN8A	**" **	**22,300**	**246**	**15**	**57**
			(Op: SP8AQA)		
DL4OBJ	**" **	**21,047**	**235**	**10**	**53**
HA1RS	**" **	**19,901**	**163**	**20**	**55**
US8UA	**" **	**15,441**	**232**	**16**	**52**
LU1FAM	*	6,591	65	16	23
DL2BQD	*	2,412	56	7	29
HB9LDO	*	759	24	6	17
HA7UG	**7**	**53,176**	**372**	**20**	**72**
G3VPW	**" **	**49,172**	**414**	**14**	**62**
HB9CEY	**" **	**33,374**	**292**	**15**	**59**
K3TW	**" **	**29,754**	**167**	**17**	**58**
K2DW	**" **	**27,792**	**179**	**14**	**58**
DL1DQY	**" **	**21,011**	**155**	**19**	**56**
RW6FO	**" **	**19,536**	**164**	**17**	**57**
JA2HUN	*	9,159	83	18	25
UT5UQV	*	7,900	81	11	39
RX6LDK	*	6,324	147	11	40
LU7HHE	*	2,278	40	13	21
KF8JW	*	552	28	6	18
SMØWKA	*	100	11	5	10
LW8EXF	*	20	6	5	5
5B4AGM	**3.5**	**106,596**	**489**	**21**	**73**
HA8LUH	**" **	**22,935**	**462**	**9**	**46**
OM3THV	**" **	**13,833**	**310**	**9**	**44**
LY1DI	**" **	**7,040**	**215**	**5**	**35**
VY2MGY/3	**" **	**6,389**	**148**	**9**	**15**
OM4APD	*	1,265	67	4	19
SQ2EEQ	*	1,166	51	4	18
OK2PMS	**1.8**	**936**	**41**	**5**	**21**
SP2DWG	*	140	13	3	11
W6QU	*	100	7	3	3
OK2ZAW	*	24	11	3	9
WDØFLJ	*	10	10	3	2

ASSISTED

NORTH AMERICA

UNITED STATES

KI1G	**A**	**8,117,415**	**3824**	**170**	**595**
K1AM	**" **	**4,750,325**	**2490**	**161**	**534**
N1EU	**" **	**4,251,440**	**2008**	**169**	**591**
W1CSM	*	2,929,780	1784	137	458
W1CU	*	2,690,224	1572	138	469
N6RFM/1	*	2,576,195	1474	138	497
N4XR/1	*	2,254,504	1304	143	491
K1HI	*	2,239,780	1581	119	411
W1NT	*	2,128,680	1571	125	415
AA1V	*	2,114,442	1163	148	501
W1UK	*	2,047,896	1514	108	391
N1CX	*	1,881,060	1179	129	457
K1VV	*	1,844,808	1224	131	425
KC1F	*	1,723,626	1123	127	414
N1DG	*	1,712,988	988	137	485
W1QK	*	1,706,273	1305	109	384
W1NG	*	1,491,000	920	145	455
K1ST	*	1,431,612	887	129	469
K1RV	*	1,418,838	990	116	418
KS1L	*	1,384,389	900	133	446
N8RA/1	*	1,235,420	991	101	345
W1RZF	*	1,234,780	1172	100	328
K1GU	*	1,129,610	935	106	324
W1BIH	*	1,122,975	839	129	396
AA1QD	*	1,033,746	859	108	345
K1TH	*	989,590	906	99	323
NQ1K	*	952,430	720	126	379
K1TS	*	902,825	902	97	288
K1YR	*	731,380	741	83	294
NM1W	*	572,424	546	91	300
W1TO	*	555,013	510	101	308
NZ1Q	*	461,040	525	75	265
W1NR	*	442,751	441	86	287
NC1N	*	356,445	481	61	206
N1MD	*	339,678	368	77	257
K1UO	*	268,074	322	90	228
K1JE	*	224,848	297	76	223
W1JR	*	212,241	290	77	192
W1AZ	*	187,308	313	71	187
KE1KD	*	144,714	209	85	186
WY1U	*	129,406	356	45	133
K1KU	*	108,805	205	66	169
WJ1Z	*	38,467	116	36	107
K1TW	*	37,296	118	34	78
WV1M	*	27,900	109	44	80
K2NG	**A**	**6,996,497**	**3167**	**173**	**638**
W2UP	**" **	**6,892,360**	**3366**	**158**	**582**
K2XA	**" **	**4,960,504**	**2507**	**157**	**555**
K2RD	*	3,765,652	2047	148	523
N2MM	*	3,426,384	2079	149	514
W1GD/2	*	3,287,048	1813	149	492
K2NJ	*	3,069,270	1814	135	468
NO2R	*	2,850,834	1584	140	519
N2MG	*	2,739,960	1810	125	415
K2ONP	*	2,612,082	1509	138	489
W2WB	*	2,563,122	1584	147	484
KF2O	*	2,518,209	1285	160	563
W2ZQ	*	1,306,193	1136	96	331
W2LE	*	1,125,466	887	108	346
N2CQ	*	1,120,064	873	111	362
WK2G	*	1,084,832	913	108	356
K2EP	*	755,730	660	88	317
W2RD	*	723,135	551	115	382
N2TK	*	711,165	581	105	350
W2KA	*	646,518	606	99	290
K2XF	*	627,585	580	104	313
K2BX	*	612,480	537	108	356
K2MP	*	600,208	648	87	281
N2FF	*	557,550	529	90	323
N2ED	*	534,968	635	92	236
N2CY	*	489,100	536	79	256
KQ2O	*	434,763	520	81	228
N2UM	*	202,912	357	77	195
WB2WPM	*	182,246	353	81	230
KD2P	*	65,250	169	59	115
N2KJM	*	50,337	149	29	90
NA2NA	*	6,450	60	33	53
K2WB	*	5,820	38	26	34
N2EE	**28**	**668,952**	**1613**	**36**	**127**
K3WW	**A**	**8,465,815**	**4091**	**166**	**589**
N3AD	**" **	**4,661,244**	**2488**	**161**	**537**
N3RR	**" **	**4,569,648**	**2241**	**161**	**583**
KQ3F	*	3,766,860	2142	141	471
N3AM	*	3,570,093	2017	143	496
K3PH	*	3,475,480	1921	147	499
W3FV	*	3,366,696	1987	140	464
K3ND	*	2,087,220	1155	146	499
W3OV	*	2,067,298	1582	115	367
K3NZ	*	2,065,154	1224	149	488
WT3W	*	1,450,161	1036	123	408
N3ZA	*	1,438,008	943	132	440
N3NA	*	1,316,244	942	117	385
K3JG	*	1,270,583	958	114	373
W3GK	*	1,230,880	972	121	369
WT3P	*	1,229,346	935	113	376
NN3Q	*	1,164,720	933	112	348
K3KO	*	1,126,047	809	127	380
K3PP	*	1,019,218	732	129	398
KB3MM	*	981,165	814	97	342
W3HVQ	*	952,160	902	111	329
KF3B	*	940,424	804	110	327
W3EKT	*	827,717	721	122	395
KB3TS	*	700,245	611	104	351
N3HF	*	576,548	599	100	313
K3CP	*	559,860	487	97	333
W3UJ	*	534,188	664	75	257
W3GN	*	517,446	619	93	249
N3QQ	*	482,258	516	74	269
W3ZJ	*	432,602	507	81	245
NY3C	*	236,434	373	69	173
KU3X	*	224,172	351	58	176
WM3T	*	201,586	339	66	176
W3OU	*	123,354	225	69	162
W3KN	*	112,476	238	49	133
W3UL	*	93,060	207	48	132
K3TG	*	13,246	62	27	47
WR3L	**21**	**218,862**	**510**	**35**	**127**
K4MA	**A**	**3,339,930**	**1946**	**149**	**489**
W4WA	**" **	**1,795,802**	**1151**	**140**	**459**
N4VV	**" **	**576,913**	**591**	**92**	**267**
W4NZC	*	468,358	561	94	255
W4DD	*	204,288	340	64	164
N4XM	*	198,744	279	84	189
W4HJ	*	171,684	287	64	187
W4TE	*	121,818	216	68	189
W4/YV5DTA	*	70,965	281	66	183
WB4ZHO	*	61,712	192	46	106
KI7WX/4	*	52,597	152	49	100
W4WNT	*	26,190	118	43	92
W4NF	*	26,068	181	11	38
K2SD/4	*	19,662	86	34	53
W3GQ/4	*	11,264	52	37	51
WX4DX	*	6,975	71	31	44
K4AMC	**28**	**411,306**	**1003**	**32**	**115**
N4GM	*	165,078	389	34	128
AB4RL	*	435	10	7	8
K5NA	**A**	**2,944,000**	**1504**	**175**	**561**
AD5Q	**" **	**2,374,437**	**1586**	**145**	**424**
K5NZ	**" **	**1,289,340**	**981**	**132**	**362**
N5JR	*	1,194,345	1109	102	303
KD5M	*	648,768	619	118	318
W5OM	*	330,630	520	87	234
W5ZO	**28**	**230,349**	**632**	**31**	**116**
NX5M	**3.5**	**32,508**	**164**	**21**	**65**
K6LA	**A**	**2,213,586**	**1567**	**146**	**412**
W6OAT	**" **	**1,724,653**	**1089**	**149**	**428**
W6TK	*	398,496	474	108	228
NF6R	*	148,013	276	78	136
WT6G	*	24,309	106	44	67
N6IYS	*	19,929	81	37	54
N6FM	*	12,705	63	42	63
K6TA	**28**	**487,536**	**1065**	**38**	**130**
KA6BIM	*	100,362	319	30	99
W7OM	**A**	**941,598**	**952**	**130**	**293**
N7UJJ	**" **	**175,655**	**307**	**76**	**139**
W7MCU	*	142,725	235	99	153
W7OT	*	53,280	154	52	108
KK7A	*	52,026	148	58	80
W7ZR	**28**	**334,050**	**872**	**36**	**114**
W7AT	*	1,710	23	15	23
ND5S/8	**A**	**1,559,370**	**993**	**147**	**443**
K8LN	**" **	**688,080**	**613**	**116**	**354**
KT8X	*	582,967	494	118	351
K8RS	*	330,165	623	98	247
W3YX/8	*	59,670	128	59	111
W8KZM	*	46,583	147	49	89
N8BJQ	**7**	**198,380**	**504**	**31**	**109**
N9AG	**A**	**3,477,521**	**1941**	**155**	**506**
K9NR	**" **	**1,876,050**	**1640**	**117**	**333**
N9QQK	*	288,785	418	70	189
W9RN	*	201,501	306	84	181
AA9RR	*	137,600	252	66	149
K9BF	*	72,254	239	66	116
KB9CRY	*	12,324	64	25	54
K9MI	*	2,806	45	25	36
N9TK	**28**	**468,993**	**1055**	**34**	**127**
W9XT	**" **	**463,968**	**1041**	**35**	**127**
KG9N	*	73,320	350	21	57
KB9KEG	*	13,370	99	21	49
N2BJ/9	*	1,155	21	13	20
N9FH	**14**	**283,635**	**671**	**37**	**128**
N9AU	**7**	**123,825**	**410**	**29**	**98**
NRØX	**A**	**2,224,456**	**1382**	**144**	**442**
KØOB	**" **	**740,960**	**656**	**111**	**310**
KGØUS	*	571,701	679	86	235
N5IN/Ø	*	481,086	531	94	260
KØHB	*	160,290	274	77	157
KØBX	*	116,805	242	58	137
KBØVVT	*	87,927	214	53	106

CANADA

VE1OP	**A**	**1,141,560**	**1370**	**86**	**274**
VE9FX	*	262,908	403	88	239
VE7AV	**14**	**379,093**	**1122**	**34**	**109**
VE3ZI	**1.8**	**67,104**	**493**	**19**	**53**

AFRICA

MADEIRA ISLANDS

CQ9K	**A**	**7,046,595**	**4076**	**149**	**486**
			(Op: DL2CC)		

UGANDA

5X1Z	**28**	**1,121,596**	**2679**	**35**	**129**
			(Op: OH5BM)		

ASIA

ASIATIC RUSSIA

RZ9HT	**A**	**4,324,376**	**2789**	**156**	**502**
UA9CR	*	156,625	342	44	131
RN9XA	**14**	**338,886**	**988**	**32**	**102**
UAØANW	**A**	**1,692,496**	**1889**	**114**	**298**
UAØAGI	*	743,652	997	108	256
RUØAT	*	520,246	960	75	194
RAØAM	**28**	**50,344**	**691**	**30**	**94**
RWØBG	7	16,320	118	19	45

CHINA

BA4DW	**A**	**1,847,288**	**1703**	**142**	**345**

JAPAN

JA2AXB	**A**	**1,729,513**	**1751**	**131**	**270**
JAØFVU	**" **	**719,073**	**826**	**100**	**227**
JR4QZH	**" **	**493,941**	**588**	**96**	**205**
JM1LRQ	*	465,520	793	73	147
7L4IOU	*	413,105	507	123	196
JH7AJD	*	292,297	477	88	151
JI1CQA	*	119,884	290	56	108
JG3WCZ	*	96,600	202	75	100
JO1VRL	*	73,853	161	68	101
JAØBMS/1	*	12,992	84	25	31
JE2HCJ	**28**	**70,840**	**259**	**31**	**79**
JHØALB	*	60,961	276	27	64
JG3DOR	*	228	7	6	6
JS3CTQ	**21**	**733,265**	**1815**	**35**	**110**
JQ1NGT	**" **	**271,090**	**840**	**34**	**92**
JR9NVB	*	188,964	605	32	88
JR9DPV	*	6	1	1	1
JK3DGX	**7**	**24,966**	**130**	**24**	**49**
JJ2QXI	*	13,420	98	21	34
JH1BBT	**1.8**	**1,924**	**31**	**13**	**13**

KOREA

HL1VAU	**A**	**480,870**	**786**	**87**	**183**

KUWAIT

9K9C	**A**	**2,212,223**	**2244**	**92**	**287**

LEBANON

OD5 /OK1MU	**21**	**971,395**	**2180**	**37**	**136**

EUROPE

AUSTRIA

OE4A	**A**	**3,764,568**	**3525**	**151**	**540**
			(Op: OE1EMS)		
OE5OHO	*	829,760	1260	90	230
OE3GSA	**28**	**226,206**	**659**	**34**	**108**
OE3ZK	**14**	**199,704**	**869**	**35**	**122**

BELGIUM

OTØT	**A**	**6,817,365**	**3758**	**181**	**656**
			(Op: RA3AUU)		
ON7NQ	*	707,408	1017	71	233
ON4CAS	*	272,157	493	70	179

BOSNIA-HERZEGOVINA

T94KW	**A**	**31,578**	**192**	**30**	**81**

BULGARIA

LZ7G	**14**	**638,232**	**2187**	**38**	**136**
			(Op: LZ1NK)		

CROATIA

9A6A	**A**	**2,125,845**	**2559**	**138**	**405**
9A2EU	**28**	**320,132**	**803**	**36**	**127**
9A3CY	*	133,284	531	29	87

CZECH REPUBLIC

OK2FD	**A**	**4,042,104**	**2599**	**163**	**569**
OK1FDY	*	2,077,821	2137	123	428
OK2ZJ	*	661,218	994	89	297
OK2ZI	**28**	**361,350**	**1007**	**36**	**129**
OK1DG	*	314,550	858	35	115
OK2ZC	*	268,422	798	34	113
OK1KT	*	253,280	678	35	125
OK1DUO	*	110,522	558	35	111
OK1FPG	**7**	**72,261**	**385**	**25**	**86**

ENGLAND

MØSDX	**A**	**2,279,178**	**2213**	**142**	**452**
G3TMA	**" **	**1,065,015**	**1234**	**110**	**331**
G3LZQ	*	996,996	984	140	406
G4RCG	*	265,356	945	45	137
G4OBK	*	78,858	175	72	162
G3XTT	**7**	**223,880**	**908**	**35**	**110**

EUROPEAN RUSSIA

RD4M	**A**	**3,659,829**	**3115**	**158**	**509**
			(Op: UA4LU)		
RX3APM	**" **	**3,461,832**	**2569**	**152**	**530**
RK3AD	*	1,442,100	1775	115	345
RW4FZ	*	1,106,852	1685	107	347
RA3AQ	**28**	**256,679**	**735**	**37**	**130**
RA6CM	**7**	**404,973**	**1568**	**35**	**124**
RM6A	**3.5**	**217,987**	**1093**	**29**	**104**
			(Op: RA6CO)		
RA1ACJ	*	138,968	954	25	91

FINLAND

OH6NIO	**A**	**3,130,965**	**2279**	**148**	**467**
OH6Y	**" **	**2,159,584**	**1871**	**149**	**473**
			(Op: OH6YF)		
OH2NRG	*	708,186	1041	97	221
OH2LU	*	122,783	349	52	147
OH6NJ	**28**	**203,100**	**733**	**34**	**116**
OH3BU	**14**	**669,945**	**1808**	**38**	**139**
OH8L	*	608,958	2063	38	124
			(Op: OH8LQ)		
OH1MA	**7**	**555,225**	**1935**	**37**	**128**
OH2BMH	*	31,320	142	28	88

FRANCE

F5PHW	**A**	**2,252,500**	**2167**	**131**	**399**
F5RBG	*	461,430	906	66	204
F6GOX	*	270,754	674	94	303
F8BQQ	*	162,710	374	79	186

GERMANY

DJ2YA	**A**	**2,926,792**	**2092**	**147**	**485**
DL7UBA	**" **	**1,337,798**	**1504**	**134**	**377**
DJ9RR	*	861,540	994	117	381
DF5ZV	*	435,456	597	100	284
DL3NM	*	278,690	556	75	215
DJ5IW	*	269,548	484	82	234
DF6QV	*	250,138	576	60	178
DL4NAC	*	213,070	1200	31	99
DL6KVA	*	101,248	175	73	151
DL8AAM	*	41,080	156	42	88
DL1YFF	*	24,600	166	38	82
DLØFR	*	525	20	10	11
DL5MBY	**28**	**139,515**	**439**	**32**	**99**
DJ4SO	**3.5**	**99,112**	**724**	**20**	**84**

GREECE

SV1BSX	**A**	**187,776**	**934**	**45**	**147**
SV/OK1YM	**7**	**436,686**	**1816**	**34**	**112**

HUNGARY

HAØHW	**A**	**1,304,870**	**1530**	**113**	**377**
HA5BSW	**3.5**	**59,408**	**783**	**13**	**66**

ITALY

IKØYVV	**A**	**3,647,096**	**2455**	**156**	**553**
IK2PFL	**" **	**1,372,696**	**1567**	**93**	**301**
IK3ORD	*	210,980	405	67	153
IV3FHH	*	148,180	505	55	184
IK2VJF	*	76,538	226	51	103
IU4T	**21**	**555,000**	**1832**	**35**	**115**
			(Op: IK4MTF)		

LATVIA

YL8M	**A**	**4,891,760**	**3500**	**168**	**584**
			(Op: YL2KL)		

LIECHTENSTEIN

HB0/DJ0IP	**A**	**483,520**	**1082**	**72**	**248**

LITHUANIA

LY2GV	**A**	**1,950,393**	**2059**	**125**	**376**
LY1FW	*	195,027	548	60	199

NETHERLANDS

PI4DEC	**A**	**1,506,428**	**2134**	**110**	**359**
PA3GRM	*	337,053	771	76	207
PA1XA	*	32,340	167	44	88
PA3EWP	**28**	**444,544**	**1229**	**38**	**146**
PA0MIR	**21**	**148,905**	**526**	**32**	**103**

POLAND

SP2FAX	**A**	**6,612,940**	**4465**	**173**	**537**
SN7N	*	1,917,142	1966	131	456
				(Op: SP7PS)	
3Z1V	*	231,608	446	83	179
				(Op: SP1MHV)	
SP6AZT	**3.5**	**41,796**	**481**	**16**	**65**

SCOTLAND

GM0GAV	**A**	**4,152,636**	**2865**	**152**	**580**

SLOVAK REPUBLIC

OM3IAG	**A**	**994,850**	**1467**	**102**	**292**
OM7PY	*	93,960	204	66	184
OM1A	**21**	**710,188**	**1947**	**38**	**134**
				(Op: OM2DX)	

SLOVENIA

S59AA	**A**	**3,991,680**	**2846**	**154**	**518**
S52ZW	*	2,175,818	2215	133	453
S53AU	*	263,529	362	89	240
S50C	**28**	**669,144**	**1822**	**37**	**131**
S58A	**14**	**795,124**	**2154**	**38**	**149**
S59CAB	**3.5**	**202,806**	**1356**	**26**	**88**

SPAIN

EA5EU	**A**	**462,582**	**1009**	**81**	**198**
EA1FBJ	*	106,050	530	48	154
EA3EU	*	65,416	237	43	105

SWEDEN

SM5D	**A**	**407,734**	**462**	**117**	**361**
				(Op: SM5DJZ)	
SM5FUG	*	235,668	590	62	184

SWITZERLAND

HB2FAP	**A**	**938,366**	**1497**	**93**	**281**
HB2HFN	*	48,048	261	36	68

UKRAINE

UT5UGR	**A**	**3,044,690**	**3245**	**144**	**478**
UR6L	*	1,779,425	1961	130	415
				(Op: UR5LCV)	

WALES

GW4BLE	**A**	**41,125**	**147**	**46**	**79**

YUGOSLAVIA

YT3T	**A**	**2,951,040**	**2723**	**142**	**498**
4N7A	*	931,662	1357	102	324
				(Op: YT7KM)	
YU1NR	**28**	**21,252**	**238**	**22**	**47**
YU1KX	**21**	**438,633**	**1706**	**37**	**126**
YU1AAX	*	409,488	1520	34	118
YT1BB	**7**	**335,835**	**1775**	**32**	**121**

OCEANIA

HAWAII

WH7/N6ND	**21**	**357,894**	**1107**	**36**	**82**

SOUTH AMERICA

BRAZIL

ZX2B	**A**	**277,000**	**434**	**64**	**186**
				(Op: PY2MNL)	
PY2EMC	*	113,878	331	59	135
PY5EG	*	30,394	119	57	110

MULTI-OPERATOR SINGLE TRANSMITTER

NORTH AMERICA

UNITED STATES

K1KI	**10,353,042**	**4475**	**175**	**679**
K1IR	**7,789,040**	**4054**	**169**	**615**
W1HR	3,654,376	2241	140	494
N1RR	2,080,000	1367	142	498
K1GW	1,770,868	1464	114	368
N1AU	1,456,832	1202	105	337
W1SRG	802,604	781	100	307
N1AO	777,705	715	95	322
K1JT	776,630	800	92	278
W2AA	**7,810,311**	**3651**	**164**	**625**
AA2FB	**6,041,602**	**3289**	**151**	**535**
W6XR/2	5,272,652	2783	166	582
N2IW	4,458,090	2513	154	556
K2XR	4,217,128	2745	143	461
N2NU	2,640,608	1432	157	559
N2BIM	1,694,880	1322	122	406
AE2F	1,649,472	1175	128	440
NE3F	**2,085,024**	**1567**	**139**	**448**
N3BNA	1,895,400	1398	127	413
K4XS	**9,704,825**	**4187**	**178**	**667**
K4JA	**7,760,124**	**3833**	**170**	**604**
N4TO	**6,395,444**	**3192**	**165**	**599**
N4RV	3,387,064	1911	157	507
W5TM	**3,091,902**	**2105**	**152**	**441**
N6RV	498,180	575	106	255
WV7T	3,969	31	17	28
K8AZ	**8,853,829**	**4062**	**176**	**641**
WE9V	**5,781,895**	**2991**	**161**	**548**
WN9O	3,911,060	2369	156	535
N0NI	**6,797,460**	**3388**	**177**	**595**
NØDY	3,120,060	1997	146	450
KØAB	2,830,500	1919	150	462
WØTT	486,855	622	95	254

CANADA

VE6SV	**4,137,546**	**3149**	**152**	**450**
VE3DC	**3,839,160**	**2668**	**143**	**455**
VE6AO	896,784	1445	95	219
VE9/K1JB	880,352	1186	82	246
VE3ODR	150,960	484	64	158
VE2CQ	150	83	9	21

CAYMAN ISLANDS

ZF2NT	**6,794,604**	**5120**	**151**	**475**

DOMINICA

J75KG	**6,771,678**	**4984**	**144**	**447**

GRENADA

J3G	**6,589,660**	**4937**	**140**	**465**

AFRICA

TUNISIA

TS7N	**13,140,050**	**6348**	**156**	**614**

ASIA

ASIATIC RUSSIA

RF9C	**8,695,610**	**4302**	**169**	**601**
RZ9WWH	4,850,679	3629	143	490
RK9AWN	3,651,054	2517	146	496
RK9SWF	1,640,704	1686	102	314
RK0SXF	**1,671,948**	**1487**	**121**	**331**

ASIATIC TURKEY

YM3WW	**113,262**	**364**	**32**	**87**

CHINA

B4R	**1,947,148**	**2580**	**119**	**275**

CYPRUS

P3A	**16,426,602**	**7534**	**172**	**645**

JAPAN

JE4VVM	**6,412,320**	**3733**	**173**	**484**
JH7PKU	**6,019,377**	**3426**	**176**	**487**
JA7YAA	5,973,982	3336	173	485
JA1ZLO	**2,705,285**	**2155**	**145**	**342**
JA2ZJW	1,921,675	1807	132	263
JA1YPA	1,362,456	1444	119	262
JO3JYE	1,297,912	1482	106	238
JE2YHS	664,686	818	126	247
JA1YXP	620,093	1308	83	158

KAZAKHSTAN

UP0L	**8,281,442**	**4594**	**158**	**561**

MALDIVE ISLANDS

8Q7WW	**1,984,064**	**1855**	**123**	**341**

MONGOLIA

JT1R	**2,426,846**	**3200**	**106**	**276**

TAIWAN

BV2B	**94,466**	**523**	**49**	**100**

UZBEKISTAN

UK8BWO	**91,171**	**655**	**28**	**87**

EUROPE

AUSTRIA

OE2S	**8,858,824**	**5189**	**172**	**655**
OE8CIQ	1,538,856	1575	140	463

BALEARIC ISLANDS

EA6IB	**10,691,889**	**6417**	**193**	**700**

BELARUS

EW1WN	**229,731**	**541**	**53**	**166**

BELGIUM

OT0P	**2,492,336**	**2833**	**129**	**449**

BOSNIA-HERZEGOVINA

T91ESP	**1,155,208**	**1854**	**92**	**302**

BULGARIA

LZ9W	**3,184,510**	**3059**	**150**	**529**
LZ1ABC	1,609,989	1891	113	378

CROATIA

9A7A	**9,798,180**	**5846**	**167**	**653**
9A3MR	2,693,628	2785	138	450
9A1CMS	846,622	1427	86	285

CZECH REPUBLIC

OK5W	**7,393,374**	**4352**	**185**	**677**
OL3A	**5,446,848**	**4058**	**157**	**547**
OL5T	4,463,710	3407	150	548
OL5Q	3,637,557	3438	124	419
OL7R	3,362,214	3028	134	448
OK1KSL	2,203,812	2356	124	430
OK2KOD	1,085,175	1264	113	364
OK1KAO	896,296	1518	87	311
OL2A	680,238	1184	85	238
OL3E	243,346	733	63	218

DENMARK

OZ5BAL	**238,872**	**564**	**56**	**145**

ENGLAND

M4T	**11,076**	**129**	**21**	**57**

EUROPEAN RUSSIA

RU1A	**12,753,600**	**5670**	**203**	**757**
RZ3Q	**6,918,683**	**4500**	**183**	**670**
RL3A	5,216,325	3820	171	614
RI3A	4,168,524	4090	141	423
R3K	4,052,715	3761	158	533
RX3RXX	2,804,850	3202	136	439
RK4WWA	2,707,992	2609	147	501
RK3RWL	1,246,696	1901	107	350
RK3WWA	1,060,752	1540	106	345
RK3PXP	812,620	1299	98	312
UA3YFA	244,180	630	62	228
RK3FA	60,606	273	32	79

FINLAND

OH7M	**7,156,520**	**4137**	**172**	**666**
OH7WW	3,271,520	2891	148	487
OH6K	2,942,111	2753	152	509
OH7AAX	103,649	260	63	158

FRANCE

F5MUX	**8,471,507**	**5027**	**169**	**612**
F5IN	**8,327,451**	**4705**	**178**	**653**
F5AKL	1,559,831	2406	100	327
F5VEX	1,238,484	1971	111	356
F8KHZ	1,151,730	1445	95	307
F6KPR	144,460	799	63	170

GERMANY

DK2OY	**6,504,498**	**4184**	**157**	**584**
DJ6QT	**4,073,240**	**3171**	**144**	**488**
DK1RP	**3,590,961**	**2749**	**145**	**484**
DK0NF	3,530,737	3080	132	449
DL7ANR	2,991,196	2610	141	457
DK1II	2,559,756	2230	146	508
DJ6TF	2,408,328	2796	126	432
DF0CI	2,185,072	2264	137	455
DL0DX	1,183,380	1852	86	277
DK0OG	863,320	1292	89	293
DL8HA	849,310	1352	91	294
DL6JFR	766,463	1146	98	316
DK0IU	572,880	762	114	320
DK0FFO	401,324	779	75	233

GUERNSEY

MU2K	**6,558,786**	**5106**	**144**	**558**

HUNGARY

HA8KVK	**1,718,560**	**2231**	**112**	**355**
HA6KZS	104,488	406	46	102

ITALY

IQ4A	**8,735,222**	**4559**	**180**	**698**
II1H	3,328,650	3234	131	438
IQ2A	2,033,200	3769	75	224
IK2A00	753,509	1203	82	235

JERSEY

GJ2A	**8,078,520**	**6031**	**151**	**539**

LATVIA

YL7C	**2,317,050**	**2915**	**122**	**420**

LIECHTENSTEIN

HB0/HB2LF	**2,232,890**	**2969**	**104**	**426**

LITHUANIA

LY3AV	**1,866,648**	**1818**	**135**	**437**
LY1YK	1,255,514	2282	132	427

LUXEMBOURG

LX/DL4SDX	**3,561,844**	**3649**	**124**	**448**

MACEDONIA

Z30M	**6,047,544**	**4984**	**154**	**542**

NETHERLANDS

PB6X	**1,995,455**	**2481**	**115**	**382**
PI4ZLD	1,942,468	2203	127	397

NORWAY

LA1K	**972,283**	**1728**	**84**	**293**

POLAND

SP3PFR	**1,555,905**	**1862**	**118**	**387**
HF9KRT	750,692	1111	101	297
SP3KPN	47,784	206	36	102

ROMANIA

YR8A	**589,006**	**1283**	**78**	**256**

SLOVAK REPUBLIC

OM8A	**8,745,810**	**5341**	**166**	**636**
OM7M	**7,978,980**	**4844**	**180**	**672**
OM3A	6,462,552	4265	173	631
OM5M	5,571,405	3586	165	640
OM3KHE	268,821	752	68	183

SLOVENIA

S57AW	**6,782,202**	**4134**	**172**	**626**

SPAIN

EA5KM	**2,302,479**	**2818**	**110**	**367**

SWEDEN

SK3W	**8,684,572**	**4548**	**186**	**700**
8S2F	4,897,065	4310	153	532
SK6M	4,632,432	3794	161	553
SK6QW	620,540	1062	91	289
SL2ZA	458,582	857	83	251

UKRAINE

UU7J	**6,318,312**	**4501**	**182**	**676**
UT9F	2,846,772	2994	147	466
UT7L	2,786,280	2660	151	491
UT0AZA	1,913,601	2898	112	327
UT3IZZ	966,911	1383	99	355
UR4LWY	107,184	242	74	158
UR4MWU	98,599	384	49	153

YUGOSLAVIA

YZ7A	**1,662,595**	**2286**	**105**	**368**
YU1INO	157,620	521	56	166

OCEANIA

AUSTRALIA

VK8AR	28,017	136	40	59

EAST MALAYSIA

9M6SMT	**4,813,824**	**3386**	**157**	**355**

GUAM

AH2R	**8,423,520**	**4744**	**167**	**477**

NEW ZEALAND

ZL6QH	**5,541,516**	**3946**	**153**	**378**
ZL3CW	3,660,618	3247	129	297

NORTHERN MARIANAS

NH0S	**7,846,272**	**4978**	**165**	**391**

PHILIPPINES

4G1A	**1,041,320**	**1571**	**99**	**181**

SOUTH AMERICA

BRAZIL

PU3A	**788,025**	**1196**	**89**	**196**

NETHERLANDS ANTILLES

PJ2T	**10,215,532**	**5785**	**158**	**495**

SOUTH SHETLAND

R1ANF	**1,273,158**	**1962**	**80**	**181**

MULTI-OPERATOR MULTI-TRANSMITTER NORTH AMERICA

UNITED STATES

KC1XX	**24,386,352**	**9689**	**196**	**752**
W3LPL	**24,093,155**	**9496**	**197**	**768**
N2RM	**21,653,289**	**8970**	**191**	**718**
K3LR	**21,160,267**	**8477**	**200**	**741**
K9NS	**17,348,708**	**7324**	**197**	**726**
N3RS	**16,509,815**	**7342**	**179**	**674**
K1TTT	14,287,268	6786	177	689
K2LE/1	13,214,348	6250	177	649
K8CC	**11,925,075**	**5934**	**175**	**624**
W3PP	11,737,603	5747	176	635
K1RX	11,666,915	5554	174	671
K0RF	**11,566,554**	**5621**	**189**	**653**
W4MYA	**11,354,364**	**5409**	**174**	**654**
W8AV	11,258,793	5269	183	636
K5GO	**10,277,952**	**5124**	**176**	**620**
W0AIH/9	9,671,904	5121	176	616
NZ1U	9,313,546	4620	160	598
NY4A	9,309,226	5503	162	536
NR4M	8,263,842	4541	164	569
N6AW	**8,206,055**	**4530**	**179**	**536**
K3NM	7,769,454	4294	164	589
W7RM	6,766,200	4026	178	522
K3II	6,319,090	3524	163	582
KV1W	5,313,328	2996	149	515
W8ZA	3,662,120	2246	147	491
W2CG	3,499,994	2007	151	511
WT3Q	2,506,770	1537	144	486
K3DI	1,582,009	1251	109	372

GRENADA

J3A	**21,195,036**	**11591**	**176**	**618**

AFRICA

GHANA

9G5AA	**23,692,130**	**11180**	**176**	**594**

MOROCCO

CN8WW	**70,046,436**	**23390**	**210**	**836**

ASIA

JAPAN

JA5BJC	**13,499,895**	**6592**	**197**	**598**
JA3YBK	**12,361,701**	**6526**	**192**	**545**
JK6SEW	**3,597,048**	**2809**	**153**	**396**
JA2YKA	955,823	1083	118	223

THAILAND

HS0AC	**2,733,510**	**3326**	**99**	**291**

UNITED ARAB EMIRATES

A61AJ	**36,606,846**	**15647**	**211**	**778**

EUROPE

AUSTRIA

OE3I	**1,957,110**	**2172**	**132**	**402**

CZECH REPUBLIC

OL7W	**6,518,292**	**5056**	**162**	**597**

DENMARK

OZ5W	**5,932,500**	**4801**	**146**	**479**
OZ5WQ	4,011,120	4072	140	479

ESTONIA

ES9C	**15,710,400**	**10628**	**188**	**712**

FINLAND

OH2U	**22,154,854**	**11419**	**201**	**782**

GERMANY

DF0HQ	**19,859,880**	**11474**	**189**	**733**

HUNGARY

HG6N	**16,609,584**	**10511**	**178**	**701**

KALININGRAD

RW2F	**21,740,852**	**11827**	**200**	**758**

LITHUANIA

LY7A	**12,003,368**	**8127**	**178**	**666**

POLAND

3Z1KG	130,878	437	48	150

SPAIN

EA4ML	**12,785,300**	**9147**	**164**	**624**

YUGOSLAVIA

YU1ANT	**2,874,190**	**3645**	**111**	**382**

OCEANIA

VANUATU

YJ0V	**3,095,064**	**3507**	**117**	**239**

SOUTH AMERICA

GALAPAGOS ISLANDS

HC8N	**44,689,904**	**17232**	**199**	**745**

CHECK LOGS

4Z5MU, AB6E, DK3RED, DK5OS, DL/RX3AHL, DL0MPI, DL1DTF, DL1DWT, DL1JFM, DL2AWW, DL2AYJ, DL2HRE, DL2HWI, DL2TG, DL3HTR, DL3JON, DL5CD, DL5DWW, DL5JMN, DL5JRA, DL5KVV, DL5MHR, DL5NA, DL6KWU, DL7VMM, DL7VPE, DL8DZV, EA1CBX, EA3CE, EA3DU, EA4BNQ, EA4KG, EA5OI, EW3CW, G0OGN, G3LKZ, GD4UOL, HA0LP, HA5AEX, HA5AF, HA7PW, HA7UW, HK3DDD, IS0/YO3RA, K4MX, K5ZR, KF3CV, LA1FW, LA2QM, LA4LN, LA4NE, LA4OGA, LA5XQ, LA5ZC, LA7SI, LA7TO, LA8LA, LA8PV, LA9TJA, LU9APM, LW9DAH, LY1FM, LZ1JZ, LZ1VQ, LZ1XZ, LZ2AG, LZ2DD, LZ2PX, LZ2SX, N3EN, OH5FA, OK1DN, OK1DSU, OK2BHD, OK2BOV, OK2CVA, OM0TT, OM5RJ, ON4CJN, OZ4EL, PA0EHF, PA0LOU, PA4DO, PT7ZAA, PY2SP, PY2YP, PY4WS, PY7OJ, R3SRR, RA3AD, RA3WDK, RA9CTK, RK3AF, RK3DZD, RN3FT, RU3DG, RV6BM, RW1QM, RZ3AA, SM0BNK, SM0BTS, SM0XG, SM2SCK, SM5APS, SM5BFR, SM5CVC, SM5MC, SM6BWQ, SM6CDN, SN1A, SP1BLE, SP2DWA, SP2DX, SP3DBD, SP4DZT, SP4IGV, SP5ATO, SP5CGN, SP5GNW, SP6BGZ, SP6CES, SP7BYM, SP7XK, SP8FHM, SP8HKT, SP8JMA, SP9DTH, SQ4GXO, SV5DZX, UA0YM, UA1WAL, UA3AGW, UA4ARL, UA4LFC, UA9JMS, UA9MBX, UN9FB, UR5EFJ, UT1EO, UU0JC, UY3AW, VA3TTN, VQ9SS, W5AN, WA2BMH, YN4/SM0HLG, YO3BWK, YO3FOM, YO4ATW, YO5BFJ, YO5OAW, YO9DAF, YU1EW, ZS0E (Op: ZS6AJS).

Disqualified: EW5O—noncompliance with the single operator rule.

Ham Shop

Advertising Rates: Non-commercial ads are 20 cents per word including abbreviations and addresses. Commercial and organization ads are $1.00 per word. Boldface words are $1.50 each (specify which words). Minimum charge $2.00. No ad will be printed unless accompanied by full remittance. All ads must be typewritten double-spaced.
Closing Date: The 10th day in the third month preceding date of publication (example: Jan. 10th for the March issue). Because the advertisers and equipment contained in Ham Shop have not been investigated, the Publisher of *CQ* cannot vouch for the merchandise listed therein. The publisher reserves the right to reject any advertisement. Direct all correspondence and ad copy to: CQ Ham Shop, 25 Newbridge Road, Hicksville, NY 11801.

CB-TO-10M CONVERSIONS: Frequency modifications, FM, books, plans, kits, high-performance CB accessories. Catalog $3. CBCI, Box 30655CQ, Tucson, AZ 85751. <www.cbcintl.com>

FOREIGN AIRMAIL POSTAGE for successful QSLing! Plus **EUROPEAN NESTING AIRMAIL ENVELOPES, QSLs, EYEBALL CARDS, QSL ALBUMS, WALLHANGERS.** Bill Plum, 12 Glenn Road, Flemington, NJ 08822-3322 (weekdays: 908-788-1020; fax: 908-782-2612).

QSLs FOR DX STATIONS: Our new "International Division" was established to handle QSL needs of DX hams. We understand the problems of packaging, shipping, and dealing with the customs problems. You can trust us to deliver a quality QSL, usually much cheaper than you can find locally. Write, call, or FAX for free samples and ordering information. "The QSL Man—W4MPY," 682 Mount Pleasant Road, Monetta, SC 29105 USA. Phone or FAX 803-685-7117.

"QRZ DX"—since 1979: Available as an **Adobe PDF file** each Wednesday or by regular mail. Your best source for weekly DX information. Send #10 SASE for sample/rates. **"The DX Magazine"—since 1989:** Bimonthly – Full of DXpedition reports, QSL Information, Awards, DX news, technical articles, and more. Send $3.00 for sample/rates. DX Publishing, Inc., P.O. Box DX, Leicester, NC 28748-0249. Phone/Fax: 828-683-0709; e-mail: <DX@dxpub.com>; WEB PAGE: <http://www.dxpub.com>.

WANTED TO COMPLETE PHOTOGRAPHY FOR BOOK: Ham transmitters manufactured prior to World War II and receivers from the same era by companies other than Hallicrafters, Hammarlund, or National. I will travel to your location to do photography. Please contact Joe Veras, N4QB. Telephone: 205-967-2384; e-mail: <n4qb@cq-amateur-radio.com>; or P.O. Box 1041, Birmingham, AL 35201.

CERTIFICATE for proven contacts with all ten American districts. SASE to W6DDB, 45527 Third Street East, Lancaster, CA 93535-1802.

TOWER HARDWARE, SAFETY EQUIPMENT, weatherproofing, T-shirts, and **MORE**. Champion Radio Products, telephone 888-833-3104, or <www.championradio.com>.

MAUI, HAWAII: vacation with a ham. Since 1990. <www.seaqmaui.com>, telephone 808-572-7914, or <terry@flex.com>.

ALUMINUM CHASSIS-CABINET KITS, UHF and VHF Antenna Parts. K3IWK, 5120 Harmony Grove Rd, Dover, PA 17315-3016; <www.flash.net/~k3iwk>.

HALLICRAFTERS Service Manuals. Amateur and SWL Write for prices. Specify Model Numbers desired. Ardco Electronics, P.O. Box 95, Dept. C, Berwyn, IL 60402.

FREE!!! Ham Radio and other CD-ROMs and software disk catalog. **MOM 'N POP'S SOFTWARE**, P.O. Box 15003-HE, Springhill, FL 34604-0111 (phone 1-352-688-9108; e-mail: <momnpop@momnpopsware.com>; website: <http://www.momnpopsware.com>).

TRYLON SELF-SUPPORTING TOWERS: Steel towers available up to 96 ft. Terrific value and reliability. The popular T-500 72-footer will take 45 square feet of antennas at 70 mph and is only $1825.00. <www.championradio.com> or 888-833-3104 for more info.

REAL HAMS DO CODE: Move up to CW with **CW Mental Block Buster III.** Succeed with hypnosis and NLP. Includes two (2) Tapes and Manual. Only $27.95 plus $5.00 s/h US. FL add $2.02 tax. Success Easy, 123 NW 13th Street, Ste 313, Boca Raton, FL 33432, 800-425-2552, <www.success-is-easy.com>.

300+ Rare DX Sound Clips, Antique QSL Gallery <http://hamgallery.com>.

PSK31, SSTV, RTTY, and Packet Radio sound card to transceiver interfacing has never been easier. The **RASCAL** (Radio And Sound Card Audio Link) is available in kit or wire-and-tested versions. The **RASCAL** is ideal for portable and field-day activities with PSK31, as it does *not* require "wall-warts" or external power transformers. The RASCAL interface includes: *Case, Cables, Connectors, Components, Custom-made PC board, Documentation, and Disk of PSK31 software.* The PC Sound Card and RS-232 comport (used for automatic PTT) are isolated from the transceiver by two separate audio transformers designed specifically for this application. The LINE IN and LINE OUT shielded cables include a large, molded ferrite choke that provides immunity from potential ground loops and RF feedback. An opto-isolator is used to activate the automatic push-to-talk (PTT) software feature without direct PTT ground contact with the PC. A separate level control is included to adjust the transmit audio to the transceiver. Choose from more than 60 RASCAL models, select the model and diagram that best fits your transceiver, at: **www.PacketRadio.com/psk31.htm.** BUX CommCo, 115 Luenburg Drive, Evington, VA 24550 (fax 804-525-7818). We accept Discover, VISA, and MasterCard. A secure online order form is also available. The "RASCAL" sound card to transceiver interface kit is $25.00 (price includes US shipping and handling). The wired and tested version is $49.00 (price includes US s&h). For shipping and handling outside the US, check the web page for details. *(Rascal is a registered trademark and copyright 1999–2001 BUX CommCo.)*

KNOW FIRST! Ham radio fanatics—you need THE W5YI REPORT, a twice-monthly award-winning Hot Insider Newsletter Acclaimed best! Confidential facts, ideas, insights, nationwide news, technology, predictions, alerts. Quoted coast-to-coast! We print what you don't get elsewhere! $19.50 annually to new subscribers! Money-back guarantee! FREE sample for SASE (two stamps). W5YI, P.O. Box 565101, Dallas, Texas 75356.

FREE Ham Gospel Tracts, SASE. KW3A, 265 West Ave., Springfield, PA 19064.

QRP Now! Today's hottest book on QRP rigs, kits, accessories, contests, DXing tips, and more! Or, **KEYS II** views & info on world's most exotic keys. Either book $16 + $3 Priority Mail. Dave Ingram, K4TWJ, 4941 Scenic View Drive, Birmingham, AL 35210.

Advertiser's Index

now including websites

A & A Engineering	102	www.a-aengineering.com
Advanced Battery Systems, Inc.	47	www.advanced-battery.com
Advanced Specialties, Inc.	39	www.advancedspecialties.net
AEA	48	www.aea-wireless.com
Alinco	45	www.alinco.com
Aluma Towers	114	www.alumatower.com
Ameritron	21	www.ameritron.com
Amsat	88	www.amsat.org
Antique Electronic Supply	110	www.tubesandmore.com
Antique Radio Classified	102	www.antiqueradio.com
Associated Radio	87	www.associatedradio.com
Astron Corp	53	www.astroncorp.com
Atomic Time, Inc.	81	www.atomictime.com
Batteries America/E.H.Yost	115	www.batteriesamerica.com
Bilal Co./Isotron Ants	98	www.rayfield.net/isotron
Burghardt Amateur Center	97	www.burghardt-amateur.com
Butternut Antennas	71	www.bencher.com
Champion Radio Products	110	www.championradio.com
Comet/NCG Company	13	www.cometantenna.com
Command Productions	50	www.LicenseTraining.com
Command Technologies	114	www.command1.com
Communication Concepts Inc	39	www.communication-concepts.com
Communications Specialists	89	www.com-spec.com
CQ Books	73	www.cq-amateur-radio.com
CQ Merchandise	101	www.cq-amateur-radio.com
Cubex Quad Antennas	113	www.cubex.com
Cutting Edge Enterprises	110,112	www.powerportstore.com
DX4WIN(Rapidan Data Systems)	97	www.dx4win.com
Datamatrix	113	www.prolog2k.com
Davis Instruments	65	www.davisnet.com
Down East Microwave	88	www.downeastmicrowave.com
EQF Software	60	www.eqf-software.com
Force 12 Antennas	55	www.force12inc.com
Glen Martin Engineering, Inc	85	www.glenmartin.com
Ham Contact, The	69	www.hamcontact.com
Ham Radio Magazine CD	57	www.cq-amateur-radio.com
Ham Radio Outlet	10	www.hamradio.com
Ham Station	73	www.hamstation.com
High Sierra Antennas	29	www.hsantennas.com/info
House of Tubes	81	www.houseoftubes.com
Hy-Gain	1,49	www.hy-gain.com
ICOM America, Inc	Cov. II,Cov.IV	www.icomamerica.com
Jensen Tools	68	www.jensentools.com
Juns Electronics	111	www.juns.com
K2AW's "Silicon Alley"	110	
K-Y Filter Co.	90	www.ky-filters.com/am.htm
Kanga US	100,114	www.bright.net/~kanga/kanga/
Kenwood, USA	3,5	www.kenwood.net
KK7TV Communications	112	www.kk7tv.com
LDG Electronics	60	www.ldgelectronics.com

FOR SALE: CQ/Ham Radio/QST/73 magazines and binders. SASE brings data sheet. W6DDB, 45527 Third Street East, Lancaster, CA 93535-1802.

P49V's ARUBA COTTAGE FOR RENT with 2 bedrooms, rig, and antennas. For info write Carl Cook, 2191 Empire Ave., Brentwood, CA 94513.

IMRA-International Mission Radio Assn. helps missioners—equipment loaned; weekday net, 14.280 MHz, 1:00–3:00 PM Eastern. Sr. Noreen Perelli, KE2LT, 2755 Woodhull Ave., Bronx, NY 10469.

<www.recycledradio.com> ESTATES PURCHASED/CONSIGNED

****

AMATEUR TV — 1250 & 2400 MHZ TX-RX MODULES: Compact, ATV 8 channel programmable, FM, PLL, Stereo and NTSC/PAL compatible. Great receiver sensitivity with 1 mile range w/rubber duck! 12 v/130 mA. Gain antennas extend range to over 30 miles. Fully assembled, tested, and complete with 1/4 wave antennas. **(1)** ATV-2400 (transmitter and receiver), **$159**; **(2)** ATV-1200, **$159**; **(3)** 3.0 GHz Wireless Freq Counter, **$129**; **(4)** 14 dbi Linear Patch 13" × 13" × 1" patch w/30 degree beam angle, **$179**; **(5)** SMA Low Loss Male-Male cables, **$10** & up. Contact our regional Dealers listed on website, or **ORDER DIRECT** ONLINE at **www.4atv.com**, fax 847-619-0852; EzATv. Also, Seeking other Dealers and Distributors; e-mail us at **sales@4atv.com**

WANTED: HAM EQUIPMENT AND RELATED ITEMS. Donate your excess gear—new, old, in any condition—to the Radio Club of Junior High School 22, the Nation's only full time non-profit organization working to get Ham Radio into schools around the country as a teaching tool using our EDUCOM—Education Thru Communication—program. Send your radio to school. Your donated material will be picked up ANYWHERE or shipping arranged, and this means a tax deduction to the full extent of the law for you as we are an IRS 501(c)(3) charity in our 18th year of service. It is always easier to donate and usually more financially rewarding, BUT MOST IMPORTANT your gift will mean a whole new world of educational opportunity for children nationwide. Radios you can write off; kids you can't. Make 2001 the year to help a child and yourself. Write, phone, or FAX the WB2JKJ "22 Crew" today: The RC of JHS 22, P.O. Box 1052, New York, NY 10002. Twenty-four hours call 516-674-4072; fax 516-674-9600; or e-mail <crew@wb2jkj. org>. Join us on the WB2JKJ Classroom Net, 7.238 MHz, 1200–1330 UTC daily and 21.395 MHz from 1400 to 2000 UTC.

TRIBANDER COMPARISON REPORT: Find out the real lowdown on HF antenna performance. K7LXC and NØAX test the KT34XA, TH7, TH11, C-3, Skyhawk, and more. Over 60 pages. $15 plus $3.00 s/h. <www.championradio.com> or 888-833-3104.

MONTSERRAT DXpedition Villa Rental. E-mail: <w4wx@bellsouth.net> for details.

PHASED ARRAY NETWORKS by COMTEK SYSTEMS deliver gain and front to back. Call 704-542-4808; fax 704-542-9652. COMTEK SYSTEMS, P.O. Box 470565, Charlotte, NC 28247.

FREE HAM CLASSIFIEDS <http://hamgallery.com>

FREE GUIDE "THE TEN MOST COMMON TOWER BUILDING MISTAKES": Written by well-known tower expert Steve Morris, K7LXC, this guide will help you avoid dangerous mistakes. TOWER TECH, Box 572, Woodinville, WA 98072; e-mail <UpTheTower@aol.com> or call 800-TOWERS8 or on the web: <www.championradio.com>.

3030 DIFFERENT AWARDS from 123 DXCC countries online at <http://www.dxawards.com/>. One year full access $6.00. Ted Melinosky, K1BV, 65 Glebe Road, Spofford, NH 03462-4411.

KK7TV COMMUNICATIONS: *See our display ad.*

PACKET RADIO AND MORE! Join TAPR, connect with the largest amateur radio digital group in the U.S. Creators of the TNC-2 standard, working on Spread Spectrum technology. Benefits: newsletter, software, discounts on kits and publications. For membership prices contact TAPR, 8987-309 E. Tanque Verde Road, #337, Tucson, AZ 85749-9399 (phone 940-383-0000; fax 940-566-2544; internet <tapr@tapr.org>; web: <http://www.tapr.org>).

Join the LAMBDA AMATEUR RADIO CLUB (LARC), since 1975, the only open and visible public-service-oriented ham club for gay and lesbian hams. Monthly newsletter, HF skeds, internet listserv and IRC, hamfest meetings, chapters, DXpeditions. Write LARC, P.O. Box 56069, Philadelphia, PA 19130-6069 or e-mail <lambda-arc@geocities.com>; <http://www.geocities.com/WestHollywood/1686>.

COUNTY HUNTERS: Worked All Texas Award. Beautiful Certificate. Temple Amateur Radio Club, P.O. Box 616, Temple, TX 76503 <www.tarc.org>

GoWeb or **GoNet** only $36 a year. RAC Call Book CD $38.50. Contact GoList, QSL Manager List at <http://www.golist.net/> or <golist@golist.net>.

PROLOG2K Logging Program . . .Visit our website at WWW.PROLOG2K.COM for full information, screenshots, and more. Datamatrix, 5560 Jackson Loop NE, Rio Rancho, NM 87124. Orders 1-800-373-6564.

SATELLITE TV: C/Ku equipment, great prices, <www.daveswebshop.com>.

COSTA RICA Ham Vacation <www.qsl.net/ti2hmg>.

KENWOOD TS-520 WANTED: Dick Myers, 30 Plochmann Ln., Woodstock, NY 12498.

EXOTIC 2002 CARIBBEAN HAMBOREE: Join us in meeting with Caribbean Hams, Visiting interesting Georgetown, Guyana, operating from great DX location. March 29–31/02. Information contact KK4WW, 8R1WD, or <www.public.usit.net/dlarsen>.

HEATH, DRAKE, KENWOOD, YAESU, More. List $1.00. SASE. Joseph Bedlovies, P.O. Box 139, Stratford, CT 06615.

DWM COMMUNICATIONS: Neat Stuff! SASE brings catalog! P.O. Box 87-CQ, Hanover, MI 49241.

TUBES, sockets, relays, over 200 types. Hand craft made CT keys and paddles. Old radios and collectible stuff. <http://www.dxham.com>

AMERITRON AL-80A: Mint condition, $700 or best offer. W2PEZ, 718-981-5450.

DRAKE TR-7/R-7: Service Kit, includes Extender and Digital Jumper Cards. See at <http://www.atnet.net/~rsrolfne>. $63.50. Bob, 2327 Malaga Road NE, Moses Lake, WA 98837; e-mail: <w7avk@arrl.net>.

ICOM IC-738, $750. Yaesu FT902DM, $495. Kenwood TS-520SE, $350. K1BW, 413-538-7861.

Advertiser's Index

now including websites

Lewallen, Roy, W7EL	84	http://eznec.com
M2 Antennas	63	www.m2inc.com
MFJ Enterprises	35,61	www.mfjenterprises.com
Midland Consumer Radio	98	www.midlandradio.com/cq
Mobile DXer	27	www.cq-amateur-radio.com
Mountain-Ops Communication	112	www.mountain-ops.com
National RF, Inc.	100	
Nemal Electronics	29	www.nemal.com
Palomar Engineers	102	www.palomar-engineers.com
Patcomm	79	www.patcommradio.com
Patent Attorney, K6UAS	90	www.patentkraft.com
Personal Database Applications	100	www.hosenose.com
Peter Dahl Co.	99	www.pwdahl.com
Popular Communications	69	www.popular-communications.com
Prolog	113	www.prolog2k.com
QRO Technologies, Inc.	98	www.qrotec.com
QSLs by W4MPY	84	www.w4mpy.com
QSLs by Star Printing	110	www.qth.com/wx9x
RF Connection	110	www.therfc.com
RF Parts	43	www.rfparts.com
Radio Club of JHS 22	84	www.wb2jkj.org
Radio Depot	113	www.hammall.com
Radio Works	85	www.radioworks.com
Ramsey Electronics, Inc.	67	www.ramseykits.com
Ranger Communications	31	www.rangerusa.com
Ross Distributing	112	www.rossdist.com
Safetenna	97	www.safetenna.com
SGC, Inc.	7	www.sgcworld.com
Solder-It	112	www.solder-it.com
Spectrum International	95	
Ten Tec	25	www.tentec.com
T.G.M. Communications	102	www3.sympatico.ca/tgmc/index.html
Timewave Technology	98	www.timewave.com
Traffie Technology	79	www.hexbeam.com
Universal Radio	48	www.universal-radio.com
Vibroplex	34	www.vibroplex.com
Virginia Beach Hamfest	27	www.vahamfest.com
W4RT Electronics	114	www.w4rt.com
W5YI Marketing	68,79,90,113	www.w5yi.org
W9INN Antennas	112	
W & W Manufacturing Co.	33	www.ww-manufacturing.com
WBØW, Inc	99	www.wbøw.com
West Mountain Radio	51	www.westmountainradio.com
Wireless Industry Assoc.	114	www.hamradiomarket.com
WXØB Array Solutions	59	www.arraysolutions.com
Yaesu Electronics	CovIII,18,19,116	www.vxstd.com

It's easy to advertise in CQ.
Let me know what I can do to help.
Arnie Sposato, N2IQO.
(516) 681-2922 or FAX (516) 681-2926
e-mail:arnie@cq-amateur-radio.com

MOBILE DX MASTER

Since its introduction over a year ago, Yaesu's FT-100 HF/VHF/UHF Transceiver has been widely acclaimed for its outstanding performance and flexibility. Now the FT-100D builds on this success story, adding the convenience of factory-installed modules for today's Ham on the go!

FT-100D HIGHLIGHTS

The FT-100D is a high-performance, ultra-compact transceiver operating on the 160-10 meter HF bands, plus the 50, 144, and 430 MHz VHF/UHF bands. Known for its outstanding receiver performance, the FT-100D's easy-to-access DSP system is the cornerstone of the outstanding receiver capability. Providing Noise Reduction, Auto-Notch, and Narrow-Bandwidth Filter selection, the DSP system also includes a Microphone Equalizer for the transmit side.

The new and enlarged speaker of the FT-100D (ϕ66 mm) provides spectacularly clean audio output, to help you dig out those weak signals.

Whether at home or away, the fantastic new FT-100D is The Choice of the World's Top DX'ers. Step up to the FT-100D, and enjoy the thrill of the sunspot peak in style!

MICRO MOBILE

FT-100D

Ultra-Compact HF/VHF/UHF Transceiver

YAESU
Choice of the World's top DX'ers™

For the latest news, hottest products:
Visit us on the Internet! http://www.yaesu.com

Real Performance for the Real World!

Today's elite-class operators demand the best RF weaponry available. Yaesu's exciting new MARK-V FT-1000MP answers the call, with an expanded array of receiver filtering, 200 Watts of power output, and Class-A SSB operation capability for the cleanest signal on the band. Enhanced front-panel ergonomics on the front panel save you seconds in a pile-up or a contest "run," and Yaesu's HF design and manufacturing know-how ensures that no short-cuts have been taken in our effort to bring you the best HF transceiver money can buy. For more QSOs in your log, and more awards on your wall, there is only one choice: the MARK-V FT-1000MP from Yaesu!

Ⅰ. Interlocked Digital Bandwidth Tracking System (IDBT) | **Ⅱ. Variable RF Front-End Filter (VRF)** | **Ⅲ. 200 Watts of Transmitter Power Output** | **Ⅳ. Class-A SSB Operation** | **Ⅴ. Multi-Function Shuttle Jog Tuning/ Control Ring**

Features

■Frequency Coverage: (RX) 100 kHz-30 MHz; (TX)160-10 m Amateur Bands ■Dual In-band Receive w/Separate "S" Meters ■Ten Pole Collins® Mechanical Filter Built-in ■RX DSP Noise Reduction and CW Peaking Filter ■High-speed Automatic Antenna Tuner ■Two TX/RX Antenna Jacks plus RX-only Jack ■TX Microphone Equalizer ■RF Speech Processor ■Direct Digital Synthesis ■CW Spot and Two Key Jacks ■Two Headphone Jacks (1/4" and 3.5 mm) ■Low-Level Transverter RF Drive Jack ■Separate FP-29 Power Supply (30 V/13.8 V DC Output)

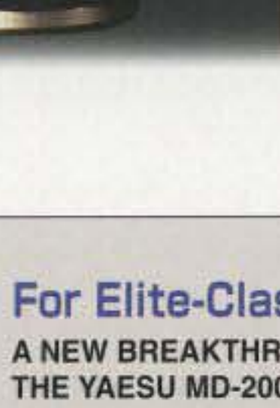
HF 200 W All-Mode Transceiver

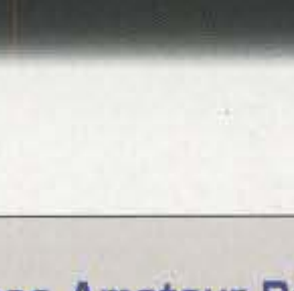
MARK-V FT-1000MP

For Elite-Class Amateur Radio Operators...

A NEW BREAKTHROUGH IN TRANSMITTED AUDIO QUALITY: THE YAESU MD-200A8X HIGH-FIDELITY DESKTOP MICROPHONE.

- New-Technology Polyethylene Terephthalate Film High-Fidelity Dynamic Microphone Element
- Vibration-Resistant Housing
- VSPC (Variable Side Pressure Control) Technique (Patent Pending)
- Ease of Operation through Ergonomic Design
- Provision for User-Supplied Additional Microphone Element





VSPC (Variable Side Pressure Control)

APPLICABLE TRANSCEIVERS

MARK-V FT-1000MP, FT-1000MP, FT-1000/-1000D*, FT-990*, FT-920, FT-900, FT-847, FT-840*, FT-817

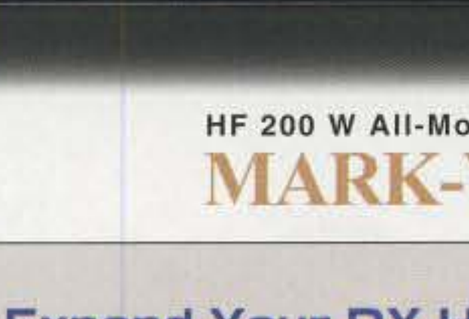
* The FT-1000/-1000D/-990/-840 do not support the illumination of the TX LED during transmission.

Ultra-High-Fidelity Desktop Microphone

MD-200A8X

Expand Your DX Horizons With The FTV-1000 50 MHz Transverter!

- 50 MHz Transverter with 200 W PEP Power Output
- Class-A Bias Selection for Low TX IMD (PO: 50 W)
- High-Performance Receiver Front End
- Automatic, Effortless Operation with MARK-V FT-1000MP
- Upgrade to High Power with VL-1000 Linear Amplifier



Specifications

Frequency Range: 50-54 MHz
Antenna Impedance: 50 Ohms
Power Output: 200 Watts PEP
Spurious Emissions: At least 60 dB down
Power Source: DC 30 V and 13.8 V (supplied by FP-29 Power Supply of MARK-V)
Dimensions: 9.6" x 5.4" x 13" WHD (243.5 x 136.5 x 331 mm)

200 W 50 MHz Transverter

FTV-1000

YAESU
Choice of the World's top DX'ers℠

Vertex Standard
US Headquarters
17210 Edwards Road,
Cerritos, CA 90703 (562)404-2700

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

New IC-V8:
It'll Take You By Storm

WHEN THE SKY TURNS DARK, TURN TO ICOM's NEW IC-V8

Easy to Use. The compact size of the 'V8 is just right; full function DTMF keys are well spaced and large enough to allow quick operation, especially when you're out on the go. An initial set mode and alphanumeric display allows for fast, frequency access and response.

Excellent Audio. Due to its acoustic design, the 'V8 has excellent recovered audio. Loud, clear and intelligible with no distortion - you won't miss any of the action with this rig.

5.5 Watts Out of the Box. You need plenty of power to punch through rugged terrain or carry a signal to the horizon. The 'V8 delivers, whether you stick with the standard Ni-Cd pack or upgrade to the available Ni-MH battery. An alkaline case is optional.

CTCSS/DTCS and Tone Scan, standard. Get onto the repeater, fast! 50 CTCSS and 38 DTCS codes gain you quick repeater access and eliminate unrelated chatter. Pocket beep keeps track of calls, and tone scan detects the subaudible tone. Don't know the input tone? The 'V8 will find it and give you the info you need!

DTMF Encode, standard. 5 DTMF memory channels with up to 24 DTMF codes allow for remote operation. Great for phone patch! An optional DTMF decoder unit (UT-108) provides code squelch operation and pager function.

Mil Spec Rugged. The 'V8 is a land mobile grade radio, built solid and ready to tackle the elements.

BC-146 Drop In Charger Included!

BC-146 Drop In Trickle Charger comes as standard equipment with the IC-V8. CP-17L In-Car Charger & OPC-515L Rapid Charger are both optional.

Whether you're chasing storms, working a repeater, or just ragchewing with your buddies, the new IC-V8 is the HT for you. For more information see your authorized ICOM dealer, visit www.icomamerica.com or call our literature hotline at 425-450-6088.

IC-U8. Tough. Simple. Green.

144-148 MHz TX • 136-174 MHz RX • 5.5/0.5W selectable • 107 Memory Channels • Fast Scanning-40 Ch/Sec • 300mW Audio Output • CTCSS/DTCS • DTMF Encode • Reverse Shift Function • Backlit LCD • Alphanumeric Display • Auto Repeater • Reversible Up/Down Switch & Rotary Selector • Drop-In Charger • PC Programmable*

More Storm Spotting Radios

www.icomamerica.com

ICOM