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CQ Amateur Radio

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COMMUNICATIONS & TECHNOLOGY

JULY 2009

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On the Cover: Jim Briggs, WA9TIR, of Bensenville, Illinois, checks the HF antennas on his 5th-wheel camper. Details on page 92.

KENWOOD

Listen to the Future

RC-D710

The RC-D710 is a standalone 1200/9600 bps TNC with APRS firmware and now including SmartBeaconing™ Technology

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Listen to the Future

www.kenwoodusa.com

TM-G707A

TM-V7A

TM-D700A

With the supplied accessories the RC-D710 is a full upgrade to the TM-V71A. The TM-V71A will have full functionality of the TM-D710A by exchanging the TM-V71A panel with the RC-D710.

This is where it gets interesting!

PG-5J connection kit makes the RC-D710 a complete standalone APRS/TNC for your current radio. This option allows connectivity with previous and current Kenwood models* as an external modem.

**Compatible models include: TM-D710A / TM-V71A / TM-D700A / TM-G707A / TM-V7A / TM-733A / TM-255A / TM-455A*
SmartBeaconing™ from HamHUD Nichetronix

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JQA-1205 091-A
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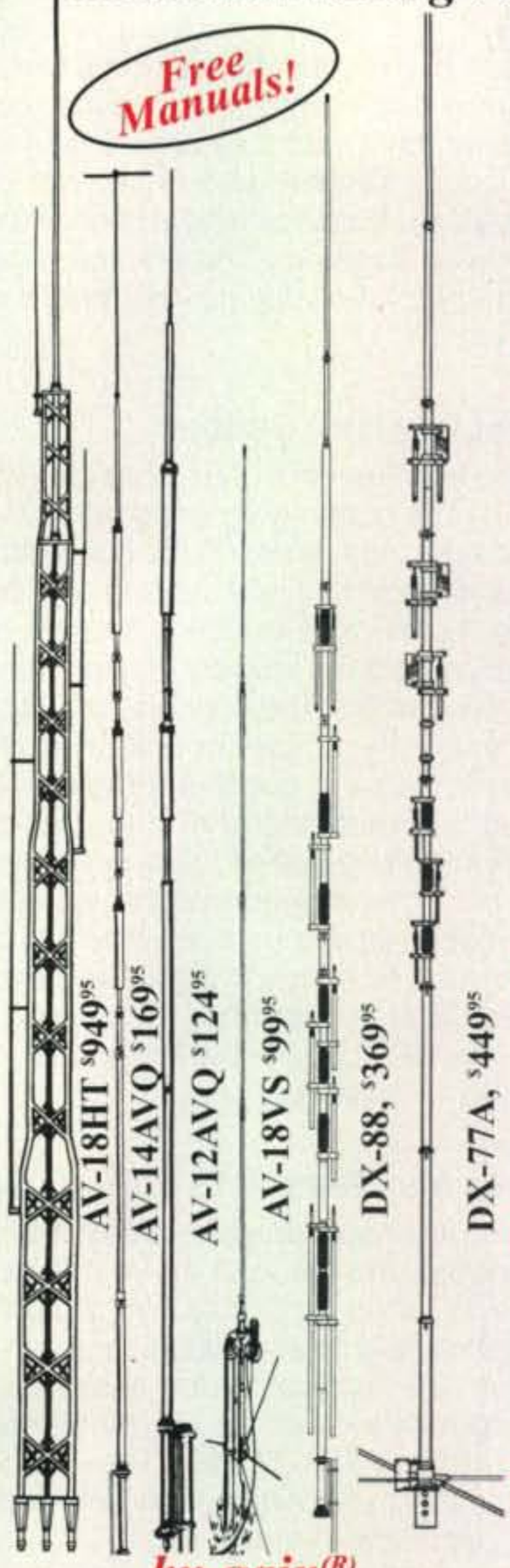
hy-gain® HF VERTICALS

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



hy-gain(R) Classics

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Hy-Gain 160-6 Meters Self-Supporting Vertical

Full 1500 Watts, 43 feet, includes base mount

New! AV-6160 **$399.95** UPS SHIPPABLE

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

Exceptional Performance

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

Just talk with automatic tuner!

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

An optimized balun design allows *direct coax feed* with negligible coax loss (typically less than 1/2 dB 60-6 Meters and less than 1 dB 160-80 Meters with good quality, low-loss coax).

Extremely low wind loading

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

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

Assembles in an hour

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

Stealth Operation

Low profile. Hide behind trees, fences, buildings, bushes. Use as flagpole. Easily telescopes down during the day.

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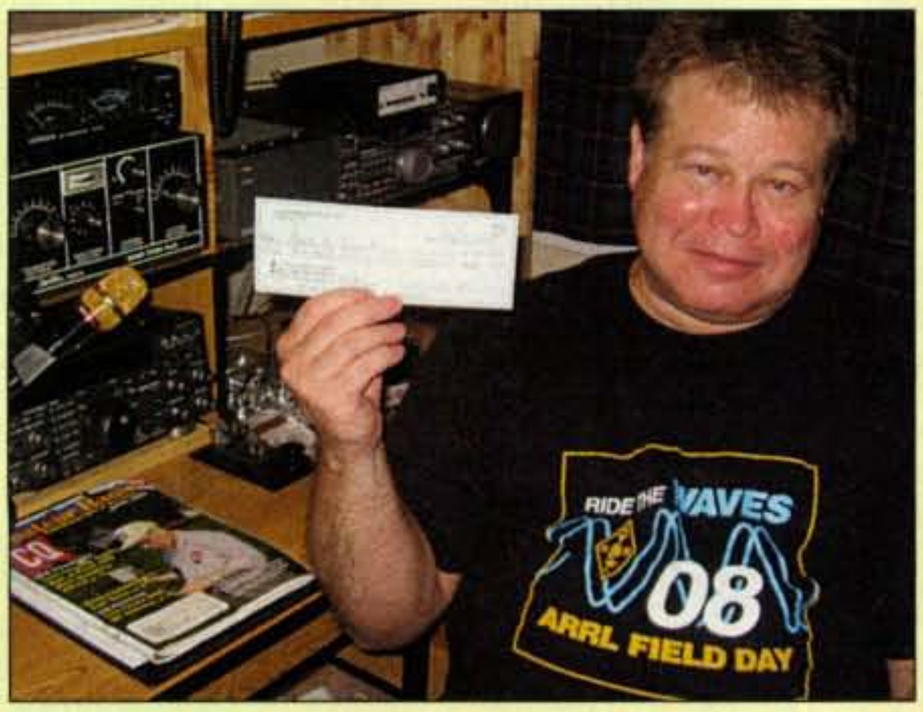

CQ Sweepstakes Grand Prize Winner

David Cowart, KR4OE, of Fayetteville, North Carolina, is the Grand Prize winner of the CQ Golden Giveaway Sweepstakes. The prize was the winner's choice of an expense-paid trip for two to the 2010 Dayton Hamvention® plus $2500 dealer cash, or a $5000 cash prize. David chose the cash prize and says he's planning on putting it toward a new truck and HF mobile setup so he can activate rare counties while pursuing his own USA-CA All Counties/All CW award. The complete list of winners was published in the June issue of *CQ* and is on our website. Congratulations to David and all the other winners!

Scientists Predict Weakest Sunspot Cycle in 80 Years

A panel of solar scientists assembled by the National Oceanic and Atmospheric Administration's Space Weather Prediction Center is now predicting that Solar Cycle 24, which it says most likely began last December, will peak in May 2013 with an average daily sunspot count of 90. If the prediction is correct, this will be the weakest solar cycle since Cycle 16, which peaked in 1928 at 78 sunspots per day, and the ninth weakest since records began being kept in the mid 18th century. The panel had initially predicted that Cycle 24 would begin in March 2008 and peak in late 2011 or 2012, but the unusually long and deep solar minimum of recent months prompted the revised forecast. *CQ* Propagation Editor Tomas Hood, NW7US, will continue tracking the new cycle as it progresses.

Clyburn Nominated to FCC

Mignon Clyburn, a longtime member of South Carolina's Public Service Commission, has been nominated by President Obama to the Federal Communications Commission. If confirmed by the Senate, Clyburn will complete the term of Commissioner Jonathan Adelstein, who was appointed head of the Rural Utilities Service in the U.S. Department of Agriculture. Clyburn, a former newspaper publisher, has served on her home state's utility regulatory board since 1998. She is the daughter of Rep. James Clyburn (D-SC), the House Majority Whip.

FCC Resumes Posting Enforcement Letters

The FCC's Enforcement Bureau has once again begun posting copies of amateur-radio-related enforcement letters. The site had remained unchanged since the retirement last July of Riley Hollingsworth, K4ZDH. The newly-posted letters date back to this past February, when Laura Smith took over as Special Counsel for amateur radio.

In the initial update, 29 letters were posted. Sixteen of them went to utility companies in 11 states. All allegedly are causing power-line interference to amateurs in their service areas and apparently have been unable or unwilling to resolve the problems directly with those affected. An additional 13 warning letters have been sent to individuals in eight states. Seven of them are for overpowered CB transmissions that allegedly are interfering with hams on 10 meters, and two are for overpowered CB transmissions messing up the neighbors' home electronics. Another two are letters warning hams to stay off repeaters whose trustees have said they are no longer welcome there; one warns a Technician licensee not to operate in the General Class HF bands, and another was for unlicensed operation on 2 meters. The enforcement letters are available at <http://www.fcc.gov/eb/AmateurActions/Welcome.html.>

FCC Releases Complete BPL Studies

The FCC, responding to a Freedom of Information Act request from the ARRL (after virtually ignoring an order from U.S. Court of Appeals), has released the complete versions of the studies on which it relied in making its Broadband over Power Lines rules in 2004. According to the *ARRL Letter*, the unredacted version of one study shows a conclusion that was just the opposite of what the Commission initially said it was. The key point in three studies examined to date was the question of whether BPL is a "point source," meaning that the signal emanates only from the coupler between the power lines and the internet. The FCC had argued that the studies showed that BPL was indeed a point source, while these studies apparently showed no change in signal levels at a distance of more than 200 meters from the coupler, along the power line. The ARRL says it will continue to analyze the newly released material.

Vanity Callsign Fees May Rise to $13.40

The FCC has released its annual proposed fee schedule. If adopted as proposed, the fee for a 10-year amateur vanity callsign would go up by $1.10, from $12.30 to $13.40. This fee must be paid on application for a vanity call and on renewal. The fee has varied each year since the vanity call program took effect 15 years ago, from a low of $11.70 to a high of $70. The final fee schedule will be adopted sometime this summer. The new fees usually take effect on September 1 each year.

FCC Clarifies Vanity Rules

A close relative of *any* deceased former holder of an amateur callsign may apply for that call under the vanity program without waiting two years, according to the FCC, which issued the clarification to resolve a claim that the exception applied only to a relative of the *most recent* holder of a call. The controversy began when Winfield Brantley of South Carolina got a new call and surrendered W3ZD. Just less than two years later, Allan Corderman requested and received the call, stating that he was the son of the late Roy Corderman, who had once held the call. The following month, Richard Essen, N6CX, petitioned the FCC to reconsider Corderman's application, since Roy Corderman had not been the most recent holder of W3ZD. The Commission denied Essen's petition, reaffirming that nothing in the rules limited the close relative exemption to the most recent holder of the call. So Allan Corderman gets to keep W3ZD.

(Continued on page 10)

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The Biggest and Smallest Amps in the Industry!

HL-1.5KFX

HF/50MHz Linear Power

Outstanding for Desktop or DX-peditions!

Lightest and Most Compact 1kW HF Amplifier

Features

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

Specifications

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

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

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

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

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HL-1.1KFX

Lightweight HF Linear

NEW!

Features

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

Specifications

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

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

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Legal Limit 1.5kW HF Amplifier

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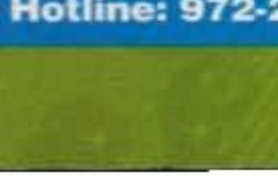

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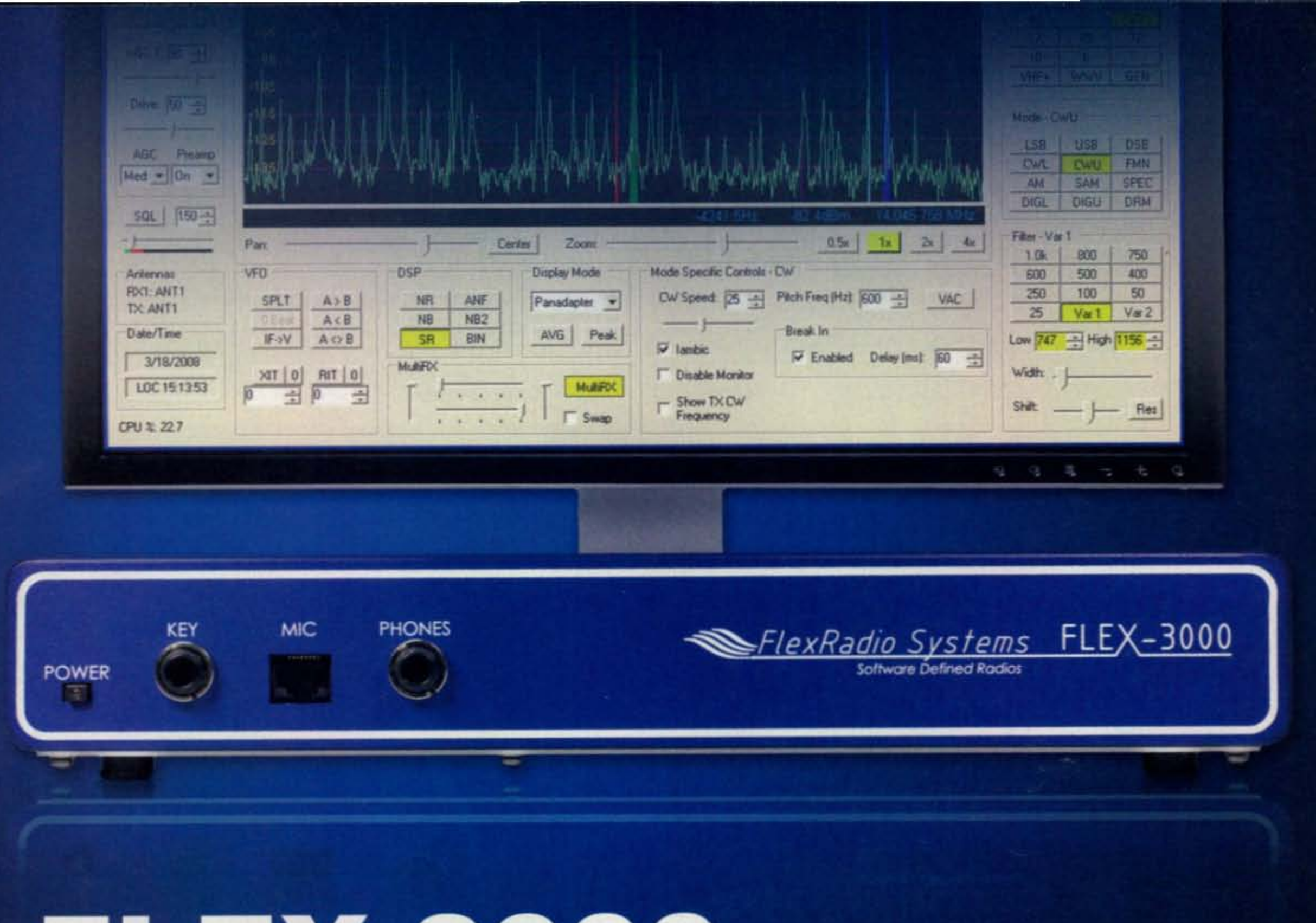

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- See the weak ones before you hear them
- Point click tuning (faster than tuning with a knob)
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- Hop on the frequency of the last station heard in a flash
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Size: 2.4" (W) x 4.7" (H) x 1.3" (D) Weight: 13.8 oz.

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Commercial Grade Field Radio
Submersible Construction

- Large Backlit LCD Display for easy operation
- 5 Watts of Stable RF Power with Minimum Components for Reliability
- 800 mW of Loud Audio for noisy field operations
- 200 Memory Channels for Serious users
- Commercial Grade Receivers Performance
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- Yaesu Exclusive Power Saving Circuit Design Guarantees Longer Operating time
- Hands Free Operation with Optional VC-24 VOX Headset

Wide Range of available Options includes:
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- VAC-370B 1.5 Hour Desktop Rapid Charger
- External DC Jack for Cigarette-Lighter adapter E-DC-5B or DC Cable E-DC-6
- FBA-25A Alkaline Battery Case (for 6 X AA cells)
- FTD-7 DTMF Paging Unit

Compact Field Radio with
Top Mounted LCD and Loud Audio

- Compact Design with Top mounted LCD Display
- 5 Watts of Stable RF Power with Minimum Components for Reliability
- 700 mW of Loud Audio for outside field environments
- 200 Memory Channels for serious users
- Yaesu Exclusive Power Saving Circuit Design Guarantees Longer Operating time
- Hands Free Operation with Optional VC-25 VOX Headset

Wide Range of available Options includes:
- External DC jack for Cigarette-Lighter adapter E-DC-5B or DC cable E-DC-6
- 6 X AA size Alkaline Battery Case FBA-25A

ULTRA-COMPACT 5 W 2 m FM HANDHELD TRANSCEIVER

FT-250R

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- 200 Memory Channels for serious users

75 WATTS

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FT-2900R

Size: 6.3" (W) x 2.0" (H) x 7.3" (D) / Weight: 4.0 lb

NEW

2 m MONO BAND

55 WATTS

Best Selling, Reliable Mobile

- 55 Watts of Solid RF Power within a compact footprint
- Loud 3 Watts of Audio Output Power for noisy enviroments
- Large 6 Digit Backlit LCD for excellent visibility
- 200 Memory Channels for serious users

NEW

ULTRA RUGGED 55 W 2 m FM TRANSCEIVER

FT-1900R

2 m MONO BAND

Size: 5.5" (W) x 1.6" (H) x 5.8" (D) / Weight: 2.2 lb

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zero bias – a CQ editorial

BY RICH MOSESON,* W2VU

Antenna Restrictions and H.R. 2160

The "Amateur Radio Emergency Communications Enhancement Act of 2009," H.R. 12160, is a bill in the House of Representatives introduced at the request of the ARRL by Texas Congresswoman Shirley Jackson-Lee. The basic goal of this bill is to get the Department of Homeland Security to say that amateur radio is important for our country and to recommend that Congress make it illegal for private land use regulations to prohibit outdoor amateur radio antennas. This is certainly a laudable goal, one with which we strongly agree.

More specifically, the bill instructs the Secretary of Homeland Security to "undertake a study on the uses and capabilities of Amateur Radio communications in emergencies and disaster relief" and to report its findings to Congress within six months. The bill also specifies that the study shall include several specific recommendations, the major one of which is whether Congress should add outdoor amateur radio antennas to the section of the Telecommunications Act of 1996 that currently prohibits private land use regulations (Covenants, Conditions and Restrictions—or CC&Rs—and homeowner association rules) from barring the installation of outdoor TV antennas and dishes for receiving satellite TV.

The ARRL has asked its members, and by extension all hams, to urge their representatives in Congress to support this bill (the full text is available online at <http://thomas.loc.gov/cgi-bin/query/z?c111:H.R.2160:>). We join in this call, but do so with some reservations.

Our support is qualified because, as worthy a goal as this bill aims to achieve, we believe the ARRL is going about the effort in the wrong way. There are several reasons behind our opinion:

1) This is a "study" bill. Generally speaking, study bills are a waste of the government's time and the taxpayers' money, because there is no requirement that Congress act on the recommendations it has requested. More often than not, study bills result in reports being written, recommendations being made and nothing ever really happening as a result. In addition, there is no guarantee that the recommendations made will be those that the bill's original supporters want. The ARRL's investment in political capital in the possible passage of this bill will result, at best, in the need to invest additional political capital in securing the introduction and passage of a follow-up bill to enact the recommended changes. At worst, we will have the Department of Homeland Security saying that its needs regarding amateur radio are met as things stand, and that there is no need to make legislative changes.

2) The language of the bill provides answers in advance for some of the questions it asks to be studied. In the introductory "Findings" section the bill states that Congress "finds the following," and goes on to detail the value of amateur radio communications in emergencies and disasters. If, by enacting this bill, Congress agrees to these "findings," then why is it necessary to have a study to determine what Congress already has determined to be the case? Why not just go straight to a Congressional finding that CC&Rs and HOA rules that prohibit outdoor ham antennas are unreasonable impediments to our providing emergency communications and propose the desired changes to the Telecommunications Act of 1996, or better yet, direct the FCC to apply the limited federal preemption of PRB-1 to private land use regulations as well as state and local laws? (The FCC's stated refusal to act in this area without a specific Congressional mandate suggests it is prepared to do so if it has one.) An action bill is a better use of resources than a study bill whose answers are already known.

3) This bill, like other ARRL efforts in this area, is very tightly focused on amateur radio. It is, of course, the ARRL's job to protect and promote amateur radio in the United States, but the problem with CC&Rs and HOA restrictions extends far beyond ham radio and ham antennas. The much bigger, much broader, problem here is that people who purchase homes in communities covered by these restrictions are forced to give up a host of individual rights. In many areas, these HOA-controlled communities are the only affordable, safe, living option available, and the only choice for a potential homebuyer is *which* of these neighborhoods to live in, not whether or not to live in one.

The FCC has refused to get into these matters without a specific directive from Congress, because it considers CC&Rs to be a matter of contract law, and the federal government has historically—and correctly—tried to avoid putting restrictions on what individuals and/or companies can agree to in a contract. But this assumes that both parties to a contract are equal negotiating partners, and that the terms of their contract are negotiable by both parties. In the vast majority of cases involving CC&Rs, however, this is not so. The developer or HOA has total leverage, and the prospective buyer has none whatsoever, except to purchase elsewhere ... and most likely still be subject to similar restrictions.

Plus, in most cases, homeowner association boards are not accountable to anyone for their actions, and are not subject to oversight by elected officials or state agencies, despite their ability to impose taxes, levy hefty fines and even force you to give up your home. And as Lord Acton once famously said, "Power corrupts, and absolute power corrupts absolutely."

There is a growing resistance movement to the often unreasonable restrictions imposed by HOA rules and CC&Rs that extend far beyond amateur radio antennas. It would do the ARRL well, along with such efforts as H.R. 2160, to join forces with one or more of the groups that have been formed to combat CC&R abuses, and thus to speak with an even louder voice. The voices of these groups are beginning to be heard, even within the Community Associations Institute, the trade organization representing HOAs. Preferring self-initiated change to restrictions imposed by government, the CAI has recently published a book for HOAs, titled *Reinventing the Rules: A Step-By-Step Guide for Being Reasonable.* Perhaps this new "reasonableness" at CAI could provide an opening for the ARRL to work with the group on inserting "reasonable" rules regarding amateur radio antennas into the boilerplate regulations that the institute provides for its member associations.

At the moment, H.R. 2160 is the best option we have going for antenna-restriction reform, so we encourage you to urge your representative to support it. But all avenues must be pursued, including working with other like-minded groups, trying to work with HOAs to find middle ground, and promoting legislation that is more than window-dressing.

Dayton

I am writing this just after returning home from the 2009 Dayton Hamvention®. It was its usual semi-controlled chaos, and a shot of ham radio adrenaline for anyone who attended. Our impression, without having seen any numbers from the sponsors or even having time to fully assess our own numbers, is that attendance may have been *up* slightly from the past couple of years. There was lots of good stuff in the flea-market. Even the city itself had more life than we've seen in recent years. The primary impact of the recession seemed to have been that people were favoring smaller, less-expensive radios and accessories over big-ticket items. Even so, that didn't stop one Japanese tower company from shipping in and displaying a huge motorized crankup tower with an equally huge price tag of more than $50,000! As we've said in this space many times before, not too bad for a hobby that's supposedly at death's door (as it has been for at least the past 60 years). As always, a visit to Dayton in mid-May is, to steal a line from the popular books, chicken soup for the ham radio soul.

73, W2VU

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

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Brake Power	**800 in.-lbs.**
Brake Construction	Disc Brake
Bearing Assembly	**Dual race/48 ball brings**
Mounting Hardware	Clamp plate/steel U-bolts
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Brake Power	**450 in.-lbs.**
Brake Construction	Disc Brake
Bearing Assembly	**Dual race/12 ball bearings**
Mounting Hardware	Clamp plate/steel bolts
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Brake Construction	solenoid operated locking
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Mounting Hardware	stainless steel bolts
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announcements

The following Special Event stations are scheduled for July:

WØWIT, from 40th anniversary of Winnebago-Itasca Ham Travelers Club, Forest City, Iowa; 1300–2300 Z July 18–19 on 14.263, 7.253, 3.970, 147.27+. QSL to Frank Krizan, 1005 Talley Road, Garland, TX 75044. <www.orgsites.com/ia/witcars>

ZP15MWC, from 15th Mennonite World Conference, Asuncion, Paraguay; 1300–2200Z July 12–19 on 28.450, 21.350, 14.290, 7.080 MHz. QSL via PAØHEL direct (see <www.qrz. com> and include green stamp) or via the bureau.

The following hamfests, etc., are slated for July:

July 4, **W3UU EPA Convention**, Emerick Cibort Park, Bressler, Pennsylvania. Contact Terry, WB3BKN, e-mail: <hracw3uu@gmail.com, phone 717-979-9515; <http://hrac.tripod.com>. (Talk-in 146.16/76 PL 100 Hz)

July 5, **Murgas ARC Hamfest & Computerfest**, Luzerne County Fair Grounds, Wilkes-Barre, Pennsylvania. Contact Carol Nygren, e-mail: <murgasarc@gmail.com>, phone 570-477-2294. (Talk-in 146.61 [PL82.5]; exams 10 AM)

July 11, **Union City & Wattsburg Wireless Assn. Hamfest**, Greene Township Municipal Building, Erie, Pennsylvania. Contact Ron Rycek, 814-833-6829; <http://wattsburg-wireless.us/>. (Talk-in 146.700 PL 186.2)

July 11, **South Milwaukee ARC Swapfest**, American Legion Post 434 grounds, Oak Creek, Wisconsin. For information e-mail: <ryatex@aol.com>, phone 414-762-3235, <www.qsl.net/ WA9TXE>. (Talk-in 146.52)

July 18, **Slidell, LA Hamfest**, city auditorium, Slidell, Louisiana. For details e-mail: <w5py@arrl.net>, phone 985-641-0831, <www.w5sla.net>. (Exams)

July 19, **BRATS Hamfest**, Howard County Fairgrounds, West Friendship, Maryland. For details e-mail: <brats@baratsatv. org>, phone 410-461-1212, <http://www.bratsatv.org>. (Talk-in 147.03, 448.325)

July 24–25, **Ham Holiday 2009**, Moore/Norman South Penn Conference Center, Oklahoma City, Oklahoma. Information at <www.HamHoliday.org>. (Talk-in 147.21, positive offset 141.3; exams)

July 25, **Deuel County ARC Hamfest**, City Park, Clear Lake, South Dakota. Contact Robert Schmidt, NØTAW, e-mail: <rjtaw1@itctel.com>, phone 605-695-0219, <www.W0GC. org>. (Talk-in 147.315+ PL136.5, 444.300+ PL136.5, 145.390–; exams)

ham radio news

(from page 2)

House Bill Aims to Reform FCC Decision-Making

Rep. Joe Barton (R-TX) has introduced a bill to try to keep the public better informed about the FCC's decision-making process. Barton is the Ranking Minority Member of the House Energy and Commerce Committee, which oversees the FCC. Under his bill, HR 2183, the Commission would be required to publish in advance the specific language of any regulations that it proposes to adopt, change, or delete, and subject those proposed changes to public comment before final adoption. In addition, it would have to ensure that each commissioner has adequate time to review a proposed decision before having to vote on it, and would have to establish deadlines for action on various categories of petitions and other filings seeking commission action. The bill would also require the FCC to publish a weekly summary of proposed decisions currently "on circulation" among the commissioners, and to publish the name of any commissioner who has not cast a vote within 60 days. The bill was referred to the Energy and Commerce Committee.

Another bill before that committee, H.R. 2160, is an effort to get Congress to ban homeowner associations from completely prohibiting outdoor amateur radio antennas. See this month's "Zero Bias" editorial for commentary on that bill.

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

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Saudi Arabia has been active on the ham bands for more than 50 years, but its small number of licensed stations has always made it an elusive catch. Now, says AL7HG, there is both good news and bad news in recent developments.

Update from Saudi Arabia: Reciprocal Licensing OKd; Famed Club Station Permanently Closed

BY DAVE KAISER,* AL7HG

We don't hear too much too often about ham radio in Saudi Arabia (HZ), but some changes over the past five years are remaking the face of our hobby there. The bad news is that many hams' first Saudi contact over the years , the U.S. Military Training Mission club station, HZ1AB, active in Dhahran since 1947, has been disbanded and its callsign has been reassigned. The good news is that the Saudi government has authorized reciprocal licensing for foreign hams, making it more likely for hams around the world to have a chance to work the desert nation. In this article, we'll profile one expatriate ham currently operating from Saudi Arabia and look at

*5395 N. Tumblewood Drive, Crystal River, FL 34428
e-mail: <dave@floridapublishing.com>

If you ever wondered what a SteppIR MonstIR antenna looks like in a 50-mph wind, here it is … atop HZ1GW's tower in the Saudi desert. (Photos by Kenneth G. Dyer, HZ1GW)

the history of club station HZ1AB, as well as my own experiences there before the days of reciprocal licensing.

HZ1GW On The Air

Kenneth G. Dyer, HZ1GW, an expatriate from Wales with the home callsign GWØRHC, is one of the first foreigners licensed under the reciprocal licensing rules. Dyer has been working in Saudi Arabia for more than a decade and at first was limited, like other foreign hams, to operating from the Dhahran Amateur Radio Club, HZ1AB. Ken joined the club in 1993 and served as its last president, from 1999 until the station shut down permanently in 2004.

Dyer obtained his Saudi reciprocal license from the Communications and Information Technology Commission in Riyadh in late 2004, soon after CITC issued Article 4 of its Spectrum Management General Services which says:

1) Those wishing to obtain a Radio Amateur License should meet the following conditions:

a) He shall be a Saudi National or in official residence in the kingdom;

b) His age shall not be less than 18 years;

c) Has good moral conduct, never being sentenced under codified Islamic law of committed a crime related to honesty and honor—unless proved otherwise and the defamation legally removed; and

d) Has successfully passed the Radio Amateur Test.

2) Without prejudice to the terms of paragraphs (1-A, 1-B, 1-C, and 1D of this article), the non-Saudi shall equally be allowed to operate a licensed Amateur Radio Station inside the kingdom or in its territorial waters or its space in each of the following two cases:

a) If he has a valid license from his country authorizing him to operate such a station; and

b) If he obtained a license for such station from CITC in accordance with this regulation.

Ken first set up a home station about 150 miles southeast of Medina in 2006, using a 40-foot tower and a three-element SteppIR beam. He later raised the tower to 60 feet and installed a SteppIR MonstIR antenna, operating at this location until November 2007 and racking up 213 countries with 173 confirmed. At the end of 2007, Ken moved back to Dhahran, where he is currently operating.

When Dyer returned to Wales on vacation at the end of 2005, he bought an ICOM IC-7000 with a Codan 9350 antenna for mobile operating. He installed the gear in his Ford Expedition and has spent the past year operating mobile, 40 meters

The HZ1GW shack near Medina, Saudi Arabia, consists of an ICOM 7800 transceiver, ICOM PW1 amplifier, and Heil PR-781 microphone.

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through 10 meters, along Saudi Arabia's east-west pipeline between Riyadh and Yanbu. He also soon expects to have a portable quad antenna that he will use while on the job at Pump Station 7 on the Saudi Arabian Oil Company (Saudi Aramco) East-West Pipeline that pumps crude oil from the east to the west coast of Saudi Arabia.

Changing Times

A sign of the changing attitude toward foreign hams in Saudi Arabia played out at the airport when Ken returned with the equipment. Customs agents confiscated it, as has been their long-standing habit, but two weeks later Ken was able to go back to Customs and pick it up. This is quite different from the experiences I had over my nearly 25 years working in the kingdom.

My wife Sabia, WB4RUN, and I lived in Saudi Arabia from 1980 to 2004. As part of my initial agreement to work in the country, the company I worked for promised to obtain a license for my wife and me to operate there. When we flew into Jeddah, on the west coast, I hand carried a Kenwood 430, which was immediately confiscated by Customs.

Even though my employer at the time, a daily newspaper named *Arab News*, made an effort to get me an amateur license and have the transceiver released, the only time I was allowed to take it with me was when I was leaving the country. That 430, and subsequently a 440, traveled around the world several times without ever getting on the air. Each year when I went back to the U.S. on vacation, Customs would

Here is Ken's Ford Expedition outfitted for ham radio expeditions in the desert!

Ken's IC-7000 (lower left) shares space with a variety of other electronics, and a couple of water bottles, inside his Ford Expedition.

A close-up view of Ken's front-mounted mobile antennas. The multiband HF antenna is a Codan 9350.

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release the radio and I would carry it back to the U.S., and every year the companies I worked for would promise I could get it back in. But like Charlie Brown trying to kick a football only to have Lucy pull it away time after time, I would bring back a rig each year, only to have it sit in Customs until my next trip home.

It was only through the HZ1AB club station that I was able to operate at all. In 1989, when I began working for Saudi Aramco and moved to Dhahran, hundreds of miles northeast of Jeddah, I looked forward to joining HZ1AB. At that time, being a member of the club was the only way to legally get on the air from Saudi Arabia.

In 1990, during the invasion of Kuwait and the Gulf War, the Dhahran Amateur Radio Club officially closed down. However, about a dozen radio operators, including me, spent many hours operating HZ1AB as a MARS station and passing traffic from Saudi Arabia back and forth between troops stationed there and their families in the U.S., Canada, and Britain.

While the Gulf War was going on a MASH (Mobile Army Surgical Hospital) unit resided on HZ1AB's antenna farm and the Beverage was destroyed. It was subsequently rebuilt several years later.

When I first joined the group, the station was located in a set of barracks on the military base. The location moved around a lot. At one time it was in a Quonset hut and later on, in the early 2000s, it was moved into a trailer away from the barracks area. The security restrictions became harder to deal with, and the number of amateurs working and living in Saudi Arabia lessened as expatriates accepted jobs in safer parts of the world. During 2002 and 2003 the number of active hams operating the station dropped to a handful, and several conscientious members often drove hundreds of miles whenever they had time off during the weekend or vacation to keep the station active. By 2004, changes in licensing rules made it impossible to keep the station operating. It was permanently dismantled and the license was given up (see the sidebar "HZ1AB's History" for more).

As noted above, the HZ1AB callsign has been reissued. The current holder is Bandar Salah Al-Harby of Al-Qasim. If you hear Bandar on the air, by all means try to work him. Just be aware that it's not the HZ1AB you might have expected. Also, do listen for Ken and any fellow expatriate hams who take advantage of Saudi Arabia's relaxed reciprocal licensing rules. Information on amateur licensing in Saudi Arabia is available online at <http://www.citc.gov.sa>. Click on "English," then "Spectrum Management," and then "Spectrum Management Services and Application Forms." Scroll down the page a bit and you will find several choices for information about amateur licenses. Information should also be available via the ARRL.

HZ1AB's History

For nearly half a century, HZ1AB was often the first worked and confirmed Saudi Arabian contact for DX enthusiasts around the world, including the first HZ satellite contacts for hundreds of OSCAR users. In contests, HZ1AB provided competitors with HZ and Zone 21 on all bands and modes. The station went on the air in early 1947. From then until it shut down permanently in 2004, hundreds of thousands of contacts were logged by more than 160 operators.

HZ1AB's license was issued by royal decree from the king in 1946, with the license maintained by the U.S. Military Training Mission.

According to Bob Walsh, WA8OMA, the July 1949 issue of *QST* showed a photo of W8FZL (then W8UMQ), W7KUC, WØLDK, and WØTN standing with an HZ1AB sign. The station back then was a Harvey Wells 160- to 10-meter transmitter and a Hallicrafters BC-610 and Hallicrafters SX-28.

Kenneth E. Riley, KE5TS, ex-W5HFM, who obtained his ham license in 1938, is believed to have been the first active HZ1AB operator. Riley worked for the Army Airways Communications Service and installed very high-powered radio transmitters in dozens of international locations.

"As you can imagine, my very early days using HZ1AB, the summer of 1948 as I remember, were filled with daily excitement," Riley said in an e-mail to the last club secretary, Thomas Carlsson, SMØCXU/ HX1EX. "Many times just firing up the station and saying 'hello, HZ1AB, testing and listening' was all it took to start a series of contacts all over the world, or at least that is the way it sounded, like the whole world was calling me."

Riley said 10-meter conditions and time dictated what he could hear. He usually fired up around 4 PM and found stations from Europe and the U.S. East Coast solid across the band for two to three hours of operation.

"Keep in mind that in 1947–1948 we did not have SSB, (and) there was no receive and transmit on the same frequency," Riley explained. "I would call on a crystal controlled frequency on 10-meter phone (only) using a Hallicrafters BC 610 transmitter at about 400 to 500 watts and received on an RCA AR-88 standard AM receiver."

After each CQ, Riley would advise stations to "start calling from the low end of the band and sign their calls very often while I listened and tuned up frequency for a very short time, writing down the station calling and at some point break in with my transmission and read off about 10 or 15 stations I heard and then call off, in order, the stations and briefly exchange reports and general QSO information."

Riley said it used to "flabbergast" him to have what he considered to be some of the rarest DX stations in the world ask for a QSL card from HZ1AB. He mentioned CR9AG in Macao; AR8AB in Lebanon; and AC4YN in Tibet.

Between 1950 and 1952, the station was inactive.

During the 1960s and 1970s, the club was called the Dhahran Experimental Radio Association. The first meeting of the Dhahran Amateur Radio Club was held June 9, 1980. In 1982, the club installed a 40-meter antenna and a KT-34XA, which was set up and used for CQWW on both SSB and CW. Bob Walsh operated the stations at night and operated on 160 meters, a first from HZ.

In April 1983, the station's equipment was upgraded to a Yaesu FT-902 DM and an RF 103 amplifier. At the same time the club decided it needed a QSL manager and Leo, K8PYD, was approached.

In April 1984, the shack was secured at a new site. By that time, club operators had worked 305 DXCC countries, including the Laccadives, VU7.

The club installed a log-periodic antenna in November 1987, and Terry Posey and Brion Gilbert put up phased 80-meter dipoles. During this period, a Kenwood TS-940S with a 500-Hz CW filter was added to the inventory.

From 1992 to 1994, the DARC was very contest-active, working WPX, CQWW, and ARRL SSB and CW contests.

The two last serving presidents of the club were Bill Rodgers, WA5ZUQ (1998), and the subject of our main article, Ken Dyer, GWØRHC (1999–2004). HZ1AB was taken down on May 7, 2004, after 57 years in operation.

Some former operators have put up a website dedicated to the station at <www.qsl.net/hz1ab>. They have also started a radio club back in the U.S. and have received the vanity call AB1HZ, the original call transposed into a valid U.S. call!

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Results of the 2009 CQ WPX RTTY Contest

BY ED MUNS,* WØYK

Celebrating the 15th anniversary of the CQ WPX RTTY Contest, a record number of "diddlers" turned out to thumb their nose at quiet ole Sol and work together to once again break participation and performance records. Submitted logs rose another 11% to break 2000 for the first time and set a new record high of entrants for this contest. This is only 46 logs behind the 2008 CQ WW RTTY DX Contest, which set an all-time high for any RTTY contest.

The real heroes of this and many contests are the thousands of casual and not-so-serious participants who get on the air and hand out contacts to fill the logs of the more visible call-signs documented in this article. While the vast majority of the operators submitting logs fall into this army of visible RTTY enthusiasts, there were seven times more participants who got into our logs but didn't submit their own logs (please do so in the future!). 15,950 different callsigns were logged, up 17% from 2008.

Despite this impressive growth in participation, total QSOs only increased 7.5% over 2008 to 825K. Given the lack of sunspots, this is actually an impressive statistic. Moreover, at this prolonged solar activity minimum, seven of the ten world records were broken! Another factor contributing to this is the double-point value for contacts on 40 and 80 meters. This effectively made WPX RTTY a low-band contest, especially for single ops. The savvy operators spent most of their 30 hours both nights on 40 and 80. When 15 and 10 meters come back strong and the high-band rates return, the low-band bias should balance out.

Abdulla, A71CV, operating SOLP from A71BX for 1.2M points.

Multi-Operator

Multi-Operator, Multi-Transmitter (MM). The HG1S team of HA1TJ, HA1DAC, HA1DAI, and HA1DAE broke the world record by a slim margin of 70K points over the 10.4M bar set by OM8A in 2007. This, of course, is also the new European record. But wait! Yet another MM team—RD3AF, RZ3AZ, EA8AH, and EA8CAC—piloted EF8M in the African region to bury this brief world record by 143% with an unbelievable 25M points. How is that for maximizing low-band potential in WPX RTTY? Just two years ago, the 10M point barrier was broken for the first time ever (in any category) and now 25M is the new target. The LZ9W team was a close third at nearly 10M points. In the USA, the KA4RRU crew managed 3.8M for seventh worldwide.

Multi-Operator Two-Transmitter (M2). W1AN, K3IU, AJ1M, N1HRA, WP4U, and WP4N activated NP3U again this year to win the category with 9.9M, although short of the nice 14M NA record they set in 2008. Not far behind was the Z37M team (Z31MM, Z32ID, Z35T, Z35X, Z36N, Z36W) with 9.2M and a new European record. They were followed by DQ4W at 7.2M. Apparently, top-flight operators in the Canary Islands are a real threat to records, because the World M2 record still stands at 17M as set by the EA8AH team in 2008. In the USA, N2WK was sixth worldwide with 4.9M, and JA6ZPR was seventh with 4.4M.

Multi-Operator Single-Transmitter (MS). 4O3A, 4O4A, Z30A, S51D, and YU1JW broke this world record by 7% at 4O3A for an 8.7M finish. S52X (S52X, S55Y, S57LR, S50XX) took second with 6.2M, and YTØA (YT1WW, YU1KT, YU1VLA, YT1TA, YT7AW, YT2WW, YU1EXY) came in third with 5.1M points. Multi-Single continues to be dominated by Europeans, with nine of the top ten slots captured by them. RK9CWA was able to grab ninth place with 3.6M.

Single-Operator

Single-Operator, Low Power (SOL). As with MM, this category had some fireworks at the top. Both P40R (N4RR) and D4C (YL2KL) submitted nearly identical claimed scores, separated by only 535 points out of 5.8M, or the equivalent of a fraction of a QSO! Log checking was on the line, with this becoming a battle of accuracy. Roger, P40R, prevailed with less than half as much score reduction as Girts, D4C. Roger's first taste of contesting on the other side was from this same location in Aruba last year. That motivated him to add a second radio and learn how to use the two of them effectively in RTTY contesting. It sure looks like it paid off, as both contesters shattered the prior world record by 35%. Mohammed, CN8KD, the de-throned record-holder, drove 5C5W to a third-place finish with 3.7M, a bit off his 2008 score.

Single-Operator, High Power (SOH). P49X (WØYK) broke his own world record for the second year running for a score of 11.2M. UA9CLB increased his Asia record to 6.2M, and UT5UDX operated G6PZ to 5.4M, spreading the top three places across three regions. The next three positions were captured by the familiar triad of RTTY contesters from the USA East Coast: K3MM, K4GMH, and AJ1I (W1UE). Tyler (K3MM) still holds his USA record of 6.8M set last year.

*e-mail: <w0yk@cqwpxrtty.com>

Single-Operator, Single Band 28 MHz. K4WI says he gave up touring around in his Corvette that weekend to hammer on 10 meters as NA4W for a whopping 627 points and the 28 MHz world plaque. Courtney gets the perseverance award for proving 10 meters really is dead. Low power was added to the single band categories this year, and ZV2C eked out 44 points to take "top spot" (and the new world record!) for 28 MHz Low Power.

Single-Operator, Single Band 21 MHz. CX4AAJ won High Power with 653K on this currently challenging band. The current world record is 2.2M set by LS1D (LW9EOC) last year. Low Power was won by UN3M with 333K and establishes the world record for this category.

Single-Operator, Single Band 14 MHz. CT3FQ broke the High Power world record with nearly 3M points. P40YL (AI6YL) took second with 2.3M points, shy of the prior world record held by 9A5W at 2.4M, and just narrowly edging out this prior record holder, who took third place. J88DR set the initial world record in Low Power with 1.5M points.

Single-Operator, Single Band 7 MHz. I4IKW broke the High Power world record set last year with 4.0M points. Very close behind Marco was F6DVX at 3.9M and 9A7R at 3.8M points. In Low Power, IQ3UD operated by IV3DSH set the world record at 1.9M points.

Single-Operator, Single Band 3.5 MHz. OK1DIG set a new High Power world record with 2.3M at OL6X. The Low Power world record was earned by IK1DFH, with 764K followed closely by YU2A with 738K.

Club Competition

Once again the Bavarian Contest Club took top honors with over 50M points from 68 logs, which was also the highest number of club participants. Second place went to the Ukrainian Contest Club with 32M points and 28 logs. Third place was captured by the Northern California Contest Club with 25M and 44 logs. The NCCC won the North America plaque, getting past rivals YCCC and PVRC. Club competition is a fun way for clubs to get more stations on the air and increase participation in the contest.

I2UIY Memorial Award

Last year we announced the creation of the I2UIY, Paolo Cortese, Memorial Plaque recognizing a RTTY contest expedition. *CQ* magazine is sponsoring this award for both the CQ WPX RTTY and CQ DX RTTY contests each year. It is in memory of Paolo, who contributed so much to contesting, including a number of contest expeditions around the world. The purpose is to recognize people who support the contest by making an expedition. It is not entirely about score, but more about the contribution made to bettering the contest. He has left a strong, devoted legacy to the world of contesting and amateur radio in general.

For this contest, the recipient is Sue Cook, AI6YL, who operated P40YL from a new contest station in Aruba. Sue and OM Carl, AI6V, sold their first Aruba contest station ten years ago. Paolo operated RTTY contests from that station, including P40K in 2000 as M2 with Carl, eclipsing the previous world record by 250%. Just this past year, the Cooks returned to Aruba to build another contest station. Sue was been active on RTTY during the construction of the house and station. This WPX RTTY contest is only the third contest in which Sue has ever participated, and she placed second worldwide on

David, F4DVX, broke the SOHP 40-meter world record at F6KNB, but was barely surpassed by Marco, I4IKW, who is the new record holder.

20 meters single band, coming close to the previous High Power world record. This selection recognizes the lasting effect that this new Aruba contest station will have on future RTTY contests and has special ties to the history that Paolo had with the Cooks in Aruba with RTTY contesting.

Log Checking

Log-checking capability continues to improve. This, in turn, helps each of us improve our contesting and operating skills. Logs are checked so much more thoroughly than they were just a few years ago. A huge step forward was taken when K1EA, creator of CT, swung his focus to log-checking software a few years ago. Over 97% of all the QSOs in all the submitted logs were cross-checked. This is also a strong statistic about the great submittal rate of logs.

Obtaining and reviewing your log check report, LCR, is a great way to identify things you can improve on in the next contest (request from <w0yk@cqwpxrtty.com>). At the same time, don't feel bad about a non-zero error rate. Accuracy and speed should be balanced for effective communication. Also, because of the cooperative structure of radio sport, mistakes by people we work can create errors in our logs that count against us. For example, if I inadvertently erase a QSO from my log, the station I worked will lose credit for the QSO as well as receive a penalty of another QSO.

A few things stand out in this year's log checking. Paolo's mantra that he lectured after every contest was "read your Cabrillo log before submitting." He wasn't telling us to doctor our logs after the contest, but rather to make sure the Cabrillo log we submitted didn't have obvious typos and formatting errors—errors such as having the sent and received exchanges reversed, or serial numbers missing, or missing the RST column, or showing a different callsign than the one actually used in the contest, or typing a letter O instead of the number 0, etc. These things really slow down the log checking and create a lot of work for the log checkers to manually go in and fix logs before the log-check software can run effectively.

A number of single-ops had significant apparent reductions because they operated well past the 30-hour limit. In most cases, this indicates they didn't know, or manage to adhere to, the time limit. Incidentally, if you do operate beyond the time limit, or operate on bands other than your single-band entry,

2009 CQ WPX RTTY CONTEST TROPHY SPONSORS AND WINNERS

Single Operator High Power

World: Sponsored by John (Bob) Orton, WA6BOB. **Winner: P49X (Op: Ed Muns,W0YK)**
Africa: Sponsored by Andrei Stchislenok, EW1AR/NP3D (in Memory of EU1MM). **Winner: Barry Murrell, ZS2EZ**
Asia: Sponsored by Tyler Stewart, K3MM. **Winner: Vadim Ovsyannikov, UA9CLB**
Europe: Sponsored by DL-DX RTTY Contest Group. **Winner: G6PZ (Op: Sergiy Rebrov, UT5UDX)**
N.A.: Jeff Demers, N1SNB. **Winner: Tyler Stewart, K3MM**
Canada: Fabi Bertolotto, VA2UP. **Winner: Lee Sawkins, CG7CC**
USA: Sponsored by Glenn Vinson, W6OTC. **Winner: Mike Sims, K4GMH**

Single Operator Low Power

World: Sponsored by Mike Sims, K4GMH. **Winner: P40R (Op: Roger Hoffman, N4RR)**
Asia: Sponsored by RCKLog Contest Logger by DL4RCK. **Winner: Steve Hodgson, ZC4LI**
Europe: Sponsored by Trey Garlough, N5KO. **Winner: Oscar Luis Fernandez Lanza, EA1DR**
N.A.: Sponsored by Wayne King, N2WK. **Winner: HI3T (Op: Ted Jimeniz, HI3TEJ)**
Canada: Claude Duberger, VE2FK. **Winner: Fabi Bertolotto, VA2UP**
Japan: GOMAGARA Contest Club, JA6ZPR. **Winner: Masaki Okano, JH4UYB**
USA: Sponsored by Jim Reisert, AD1C. **Winner: KS1Y (Op: Jose Castillo, N1BAA)**

Single Operator Single Band

3.5 MHz World High Power: Sponsored by Fred Dennin, WW4LL. **Winner: OL6X (Op: Daniel Glanc, OK1DIG)**
7 MHz World High Power: Sponsored by NETPreSS by Simon Sintic, S51D. **Winner: Marco Venturi, I4IKW**
7 MHz World Low Power: Sponsored by Don Reed, K2OGD. **Winner: IQ3UD (Op: Ari Udine, IV3DSH)**
14 MHz World High Power: Sponsored by Steve "Sid" Caesar, NH7C. **Winner: Jose Carlos Fernandes Neves, CT3FQ**
14 MHz World Low Power: Sponsored by Kenny Young, AB4GG. **Winner: David Cree, J88DR**
21 MHz World High Power: Sponsored by R. L. "Tad" Williamson, WF4W. **Winner: Luis Espinosa, CX4AAJ**
21 MHz World Low Power: Sponsored by Doug Faunt, N6TQS. **Winner: Nikolai Pogrebnyak, UN3M**
28 MHz World High Power: Sponsored by Steve Hodgson, ZC4LI. **Winner: NA4W (Op: Courtney Judd, K4WI)**

Multi-Op Single Transmitter

World: Sponsored by Steve Merchant, K6AW. **Winner: 4O3A (Ops: 4O3A, 4O4A, Z30A, S51D, YU1JW)**
Asia: Sponsored by CT3 Madeira Contest Team/CQ9K/CT9M. **Winner: RK9CWA**
Europe: Sponsored by Toomas Soomets, ES5RY. **Winner: S52X (Ops: S52X, S55Y, S57LR, S50XX)**

Multi-Op Two Transmitter

World: Sponsored by HC8N RTTY Team. **Winner: NP3U (Ops: W1AN, K3IU, AJ1M, N1HRA, WP4U, WP4N)**
N.A.: Sponsored by Ed Muns, W0YK. **Winner: N2WK (Ops: K2TJ, N2WK, N2ZN, WA2MOP, WA2TMC)**
U.S.A.: Sponsored by CTRI Contest Group. **Winner: WX5S/6 (Ops: N6CCH, K6OWL, ND2T, W6RK, W6LD, WX5S, N6DE)**

Multi-Op Multi-Transmitter

World: Sponsored by Abroham Neal Software by K3NC. **Winner: EF8M (Ops: RD3AF, RZ3AZ, EA8AH, EA8CAC)**
N.A.: Sponsored by KA4RRU Contest Group. **Winner: KA4RRU (Ops: KA4RRU, KI4VUQ, N4DXS, K3UI, NL7VX, WA4TK, KK4KM, KI4ZKJ, KG4URW, K5VG)**

Club Competition

World: Sponsored by Potomac Valley Radio Club. **Winner: Bavarian Contest Club (DL)**
Europe: Sponsored by Doug Faunt, N6TQS. **Winner: Ukrainian Contest Club**
N.A.: Sponsored by Northern California Contest Club. **Winner: Northern California Contest Club**

Paolo Cortese, I2UIY, Memorial

Sponsored by CQ Magazine. **Winner: Sue Cook, P40YL (Op: AI6YL)**

you must leave the QSOs in your log. They won't be counted in your score, but they are needed to complement the other half of the QSO in the other logs. Otherwise, all those QSOs missing in your log will cause losses and penalties in the mating logs.

Multi-Single and Multi-Two entries must pay careful attention to the band-change rule. When the limit of 8 band-changes per clock hour is exceeded, all subsequent QSOs in that hour do not count in the final score calculation. Thus, single-op time violations and MS/M2 band-change violations accounted for significant reductions in many logs.

Rules

A few rule details were adjusted for this contest to bring them in line with the CW/SSB version. Band changes for MS and M2 were increased from 6 to 8. Low Power was reduced from 150 to 100 watts. Low Power was added to the single-band categories. Also, the award program was expanded. Wherever possible, we endeavor to achieve consistency across the modes.

Key differences still remain for RTTY: No 1.8 MHz operation, 30-hour single-op time limit vs. 36, no SO Assisted category (everyone can use packet), no QRP category, single transmitter for MS (no prefix transmitter), band-change limit rather than 10-minute rule for MS, and 2 or 4 points for country-country QSOs in all continents, not just North America. There are sound reasons and history for these distinctions.

Summary

For this contest 2080 logs were submitted, and all but two were electronic. (How does one create a paper RTTY log?!) There were 1881 distinct prefixes in those logs. The highest

Daniel, OK1DIG, set a new SOHP 80-meter world record as OL6X.

number of prefixes worked by one station was 1034. Over 825,000 QSOs were logged, about 40% of last year's WPX CW, even though the number of different callsigns logged was similar between the two modes. Seven of the ten world records were broken, and a number of the regional records as well. Most important, people had a great time and RTTY operating skill has never been better.

It is wonderful to see the excitement and growth of the CQ WPX RTTY contest, and RTTY contesting in general. Paolo, I2UIY, and Glenn, W6OTC, evolved a powerful event that is a lot of fun for everyone. It is this enthusiastic participation that enables records to be broken year after year with little help from the sun. Although it is the top scorers who win the plaques and certificates and occasionally set a new record, that is only accomplished through the team efforts of every-

one operating in the contest. We can be proud of all the individual results.

Thanks for all the help in administering the contest. Glenn, W6OTC, has provided daily support, as well as Steve, K6AW, and Trey, N5KO. Mark, K6UFO, helped with log submittal integrity, and Randy, K5ZD, is always available for consultation and ideas on rules, log checking, website, vision, etc. Ken, K1EA, has developed amazing log-check technology, and Gail, K2RED, is incredibly patient with us while working overtime to get our results published. Barry, W5GN, has selflessly added the two CQ RTTY contests to his certificate generation/mailing work, relieving a huge burden from the contest director. Mike, K4GMH, drives the plaque program, and Don, AA5AU, maintains the records and results archive.Dan, I1-12387, and Marek, SP7DQR, did the SWL log checking.

For expanded results of the 2009

TOP SCORES

WORLD
SINGLE OPERATOR
HIGH POWER
All Band

P49X (WØYK)	11,177,154
UA9CLB	6,237,504
G6PZ (UT5UDX)	5,440,128
K3MM	5,386,178
K4GMH	5,241,488
AJ1I (W1UE)	4,577,664
EO5M (URØMC)	3,859,840
YN2S (NP3D)	3,760,350
YR9P (YO9HP)	3,688,020
LY8O	3,662,480

28 MHz

NA4W (K4WI)	627
AY8A (LU8ADX)	72

21 MHz

CX4AAJ	652,845
9A2DQ	303,520
DP9Z (DF9ZP)	130,790
SV8CS	112,558
OK1FPS	84,810
NJ4U	74,816
EA7ZY	72,822
K4FJ	52,734
OK2PMS	3,888
OK2FB	2,449

14 MHz

CT3FQ	2,925,220
P4ØYL	2,307,084
9A5W	2,290,934
E76C	2,211,120
KH7X (KH6ND)	1,857,082
YT2T	1,746,486
CT3EN	1,545,276
UV8M (UX3MR)	1,532,678
US5IQ	1,390,158
KK5OQ	1,212,729

7 MHz

I4IKW	3,962,680
F4DVX	3,903,702
9A7R	3,842,256
S53M (S51FB)	3,510,730
IZØKBR	2,357,936
EO3Q (UW5Q)	2,291,750
WW4LL	2,170,276
GW4SKA	2,134,504
NH7C	1,960,704
YU7U	1,872,702

3.5 MHz

OL6X (OK1DIG)	2,344,086
9A1CCY (9A3NM)	2,326,032
S54E	2,294,136
HG3DX (HA3MY)	2,031,160
I4AVG	2,003,280
UX2X (UT2XQ)	1,316,014
OY3JE	1,067,396
HA3LI	895,448
HA1YI	814,756
OK2SFP	640,660

SINGLE OPERATOR
LOW POWER
All Band

*P4ØR (N4RR)	5,632,140
*D4C (YL2KL)	5,352,382
*5C5W (CN8KD)	3,741,444
*ZX2B (PY2MNL)	3,516,130
*HI3TEJ	3,102,870
*KS1Y (N1BAA)	3,101,805
*EA1DR	2,891,562
*ZC4LI	2,294,320
*HA8BE	2,172,564
*N2QT/4	2,090,808

28 MHz

*ZV2C	44
*LU3HS	8

21 MHz

*UN3M	333,064
*PY2MTV	130,474
*UK7AZ	124,956
*PT9PA	91,560
*RV9JD	74,798
*IZ8IYL	73,788
*RW9RA	65,037
*JH7RTQ	49,609
*PY2UN	48,875
*JR3RIY	35,392

14 MHz

*J88DR	1,457,875
*EO1I (UT1IA)	764,784
*EC8ADW	718,891
*EA4TD	654,434
*RVØAL	623,960
*TG9ANF	590,733
*UZ7HO	580,160
*7Z1SJ	558,258
*IW1QN	436,022
*RA9SN	393,546

7 MHz

*IQ3UD (IV3DSH)	1,858,520
*UTØEA	1,038,306
*OM5TX	904,308
*UY7C (UR3CMA)	760,572
*YY5LI	734,638
*SP8TJU	590,668
*YL2JZ	551,000
*HB9DHG	519,652
*EA2CJ	513,928
*YU7YZ	489,440

3.5 MHz

*IK1DFH	763,680
*YU2A	738,340
*SP6IHE	481,012
*USØGH	388,608
*UT5KO	382,802
*F5BEG	367,026
*SP6DMI	355,632
*LZ2JA	289,198
*SP4GL	253,000
*S57AJ	238,980

MULTI-OPERATOR
SINGLE TRANSMITTER

4O3A	8,670,269
S52X	6,236,336
YTØA	5,112,420
IW1ARB	4,836,186
RZ1AWT	4,763,520
9A5D	4,395,352
ES5Q	4,183,488
F2FZ	3,877,368
RK9CWA	3,634,176
UZ4E	3,622,164

MULTI-OPERATOR
TWO TRANSMITTER

NP3U	9,895,184
Z37M	9,211,774
DQ4W	7,190,819
DLØCS	5,924,583
UZ2I	5,167,950
N2WK	4,914,945
JA6ZPR	4,442,225
WX5S/6	3,270,652
DA3X	3,119,364
VE7UF	2,909,810

MULTI-OPERATOR
MULTI-TRANSMITTER

EF8M	25,237,996
HG1S	10,470,520
LZ9W	9,976,426
RWØA	8,129,497
OH6R	6,996,402
RA9A	4,854,762
KA4RRU	3,854,176
DM3W	1,098,197
VE5PV	488,289

UNITED STATES
SINGLE OPERATOR
HIGH POWER
All Band

K3MM	5,386,178
K4GMH	5,241,488
AJ1I (W1UE)	4,577,664
N6AR/4	2,456,720
W3FV	2,280,564
W4PK	2,213,340
K1SFA	2,026,752
ABØRX	1,974,753
AA3B	1,932,537
K5DU	1,919,212

28 MHz

NA4W (K4WI)	627

21 MHz

NJ4U	74,816
K4FJ	52,734

14 MHz

KK5OQ	1,212,729
K4WW	408,680
KZ7X	384,540
AD1L	285,360
N7BV	284,675
N4ZZ	105,840
WA8RPK	89,208
N2CU	66,882
W9SE	29,103
AI3Q	19,691

7 MHz

WW4LL	2,170,276
AE5AA (N5ZM)	1,657,920
N6MA/7	391,072
AA5AU	335,580
N5RN	206,752
K7WP	55,876
K7ZO	17,780

3.5 MHz

K4CZ	146,544
WF4W	64,740

SINGLE OPERATOR
LOW POWER
All Band

*KS1Y (N1BAA)	3,101,805
*N2QT/4	2,090,808
*WF4M (AA4U)	1,265,660
*AB4GG	964,920
*AD5XD	660,476
*W4UEF	624,429
*WB2RHM/4	605,166
*NTØF	601,692
*NN7SS (K6UFO)	550,620
*KE4KWE	525,008

21 MHz

*K5PAX	4,455

14 MHz

*W4LC	284,820
*WD5K	207,418
*K7AR	103,917
*AKØA	98,303
*W1ZD/7	63,733
*KC1UX	19,437
*K5NAA	18,928
*NY3B	12,375
*K1UO	4,560
*N6HE	3,960

7 MHz

*K3NK	121,360
*K3SV	67,626
*K2PAL	9,464
*W5GHZ	3,264

3.5 MHz

*N7ZG	23,652
*N3UA/4	6,364
*KA1CQR	2,538

MULTI-OPERATOR
SINGLE TRANSMITTER

AF4Z	2,699,398
NAØCW	2,614,354
AK4K	2,306,798
WQ2N	1,636,386
KT1I	1,512,312
NZ1U	783,510
N2BJ/9	581,160
W6OTC	540,981
NJ4F	251,175
WB8SKP/4	185,924

MULTI-OPERATOR
TWO TRANSMITTER

N2WK	4,914,945
WX5S/6	3,270,652

MULTI-OPERATOR
MULTI-TRANSMITTER

KA4RRU	3,854,176

EUROPE
SINGLE OPERATOR
HIGH POWER
All Band

G6PZ (UT5UDX)	5,440,128
EO5M (URØMC)	3,859,840
YR9P (YO9HP)	3,688,020
LY8O	3,662,480
SP9LJD	3,549,636
UW8I (UT2IZ)	3,528,090
II2CV (IK2NCJ)	3,223,163
LZ2BE	3,196,756
LY6A	3,118,800
LY1R	3,046,810

21 MHz

9A2DQ	303,520
DP9Z (DF9ZP)	130,790
SV8CS	112,558
OK1FPS	84,810
EA7ZY	72,822
OK2PMS	3,888
OK2FB	2,449
DM5TI	518
S51FB	224

14 MHz

9A5W	2,290,934
E76C	2,211,120
YT2T	1,746,486
UV8M (UX3MR)	1,532,678
US5IQ	1,390,158
YT5W (YU5RY)	1,191,561
OH7MJU	1,030,688
TM9FL (F5KFL)	987,116
OE9GHV	966,018
OL8M (OK1DRQ)	905,316

7 MHz

I4IKW	3,962,680
F4DVX	3,903,702
9A7R	3,842,256
S53M (S51FB)	3,510,730
IZØKBR	2,357,936
EO3Q (UW5Q)	2,291,750
GW4SKA	2,134,504
YU7U	1,872,702
UT7MA	1,689,888
RK3DZB (RU3DNN)	1,603,040

3.5 MHz

OL6X (OK1DIG)	2,344,086
9A1CCY (9A3NM)	2,326,032
S54E	2,294,136
HG3DX (HA3MY)	2,031,160
I4AVG	2,003,280
UX2X (UT2XQ)	1,316,014
OY3JE	1,067,396
HA3LI	895,448
HA1YI	814,756
OK2SFP	640,660

SINGLE OPERATOR
LOW POWER
All Band

*EA1DR	2,891,562
*HA8BE	2,172,564
*IZ2FOS	1,847,662
*UT5EPP	1,769,229
*UA3PAB	1,719,094
*DF4WC	1,691,361
*EA2VE	1,635,426
*ON4CT	1,572,142
*EH7H (EA7ELY)	1,463,475
*RV3FF	1,462,238

21 MHz

*IZ8IYL	73,788
*OK2CLW	27,857
*HG3IPA (HA3JB)	26,448
*YRØWL (YO9BXC)	12,462
*YL2CV	11,940
*M3UZL	11,651
*UXØUW	8,008
*YO3JW	6,120
*DO6GZ	5,934
*SP3IK	5,000

14 MHz

*EO1I (UT1IA)	764,784
*EA4TD	654,434
*UZ7HO	580,160
*IW1QN	436,022
*EA7HEG	341,734
*G2YL	248,040
*RU3SE	166,362
*YU2DX	135,864
*EA5ET	123,627
*G4ZOB	117,564

7 MHz

*IQ3UD (IV3DSH)	1,858,520
*UTØEA	1,038,306
*OM5TX	904,308
*UY7C (UR3CMA)	760,572
*SP8TJU	590,668
*YL2JZ	551,000
*HB9DHG	519,652
*EA2CJ	513,928
*YU7YZ	489,440
*SQ2RGB	344,500

3.5 MHz

*IK1DFH	763,680
*YU2A	738,340
*SP6IHE	481,012
*USØGH	388,608
*UT5KO	382,802
*F5BEG	367,026
*SP6DMI	355,632
*LZ2JA	289,198
*SP4GL	253,000
*S57AJ	238,980

MULTI-OPERATOR
SINGLE TRANSMITTER

4O3A	8,670,269
S52X	6,236,336
YTØA	5,112,420
IW1ARB	4,836,186
RZ1AWT	4,763,520
9A5D	4,395,352
ES5Q	4,183,488
F2FZ	3,877,368
UZ4E	3,622,164
DP4P	3,605,616

MULTI-OPERATOR
TWO TRANSMITTER

Z37M	9,211,774
DQ4W	7,190,819
DLØCS	5,924,583
UZ2I	5,167,950
DA3X	3,119,364
IQ5AE	1,417,680
LA1K	547,760

MULTI-OPERATOR
MULTI-TRANSMITTER

HG1S	10,470,520
LZ9W	9,976,426
OH6R	6,996,402
DM3W	1,098,197

Low Power

WPX RTTY Contest, including the full QRM and a list of operators of the multi stations, see the CQ website: <www.cq-amateur-radio.com>.

See everyone in the 2010 CQ WPX RTTY on 13–14 February 2010.

73, Ed, WØYK

DX QRM

Many tnx to all for the points. Great to work some good DX with the 5W QRP ... **2EØZWW**. Our plan was to participate as M/S with the call A71BX but somehow we faced some problems to set up the station and to connect both stations together and we could not fix it since it was first time for us to work in RTTY contest. However after 3 hours of the contest finally I decided to participate as single operator all band low power and A71BX agreed. It really was a good experience for me and I had a lot of fun on 15m when there a big pile-up on me. Also I was able to make some QSOs on 10m and 80m. I believe we are going to do better next year ... **A71CV**. Very glad to play the RTTY WPX game first time! ... **BG4AHF**. QRP, 2.5W via Tuner Z11 from Yaesu FT-817 to Windom FD3, 8m high 21m long, used on 80, 40, 20m. On 15m 2-ele mini Yagi fixed to south shows that it is possible to work QRP on 4 bands also in RTTY. Lots of fun. Thanks to the patience and receivers of the Big Guns. ... **DJ3GE**. RTTY contesting can become addictive and great fun, too! ... **G3TXF**. Enjoyed the contest very much. Conditions good on Saturday on 15m not as good on Sunday. Left mainly with 20m and 40m with some good runs on 20m. Thanks to *CQ* for the contest and all for the Q's ... **HZ1PS**. Very fine condx, at last! ... **MMØRKT**. Very interesting contest! All the best and best regards! 73! ... **RD4HD**. What a great contest. This time, I raised my 40 ft. telescopic pole and pulled up dipoles for 80m, 40m, and 20m. As before I had 20m vertical dipole with 600 ohm open feedline. First night gave a lot of Q's on 80m and some 40m, and then 20m was ok, but the real thrill was on Sunday when I kept the frequency for 4 hours until my IC-7000 switched off because of heat. It came back and I was able to continue. After dark was bad. Altogether, only 5% of all Q's were from NA which is unbelievably low. Distance champions were HZ1PS from Saudi Arabia and KH7X from Hawaii (which was my last Q). Thanks for organizing this great contest ... **TF1AM**. Well, the entry class may say SOAB but for most of the contest it was single band only after we got hit with freezing rain Thursday prior to the contest. 80m was the only functioning antenna after the storm passed through damaging the 40m array and severely icing the tribander, leaving it unusable. Coupled with the flu bug I was pretty well out of commission until approx. 16:00Z Sunday, when the tribander came back on line. Then it was a sprint to the finish line on 20m. Lots of business on both sides of the pond until around 18:00Z, when someone turned the switch on Europe. There was, however, lots of business left in the Western Hemisphere to keep this flu-wracked body busy to the end. Thanks *CQ* organizers and hope we got into your log. 73, Bill ... **VY2LI**. Great contest! Suprised at good 15m openings but couldn't get anything going on 80m. Can't wait for the next one! ... **XW1B**. Good propagation to EU, but could not reach SA ... **YB3MM**. Conditions were quite good! I installed new dipoles for 20m and 40m, which outperformed the G5RV I normally use! QSOs on 40m with US stations was a first for me! ... **ZS1JY**. A contest of two extremes: good conditions on Saturday, rotten conditions on Sunday! Satisfactory outcome though, largely due to a personal best 40m tally! ... **ZS2EZ**.

USA QRM

Great contest! We were not able to operate in 2008 so it was nice to get some of the Florida boys together and operate this year. Conditions were good and there were many prefixes to work on all the bands. 40 meters was the band that was a big point maker and we were able to run on a frequency for hours. We want to thank everyone who worked us and made this a very enjoyable contest. ... **AF4Z**. First WPX for this call and it worked well. Had good runs on 80, 40, and 20. 15 was open a little Saturday and much longer Sunday. Our final score was our best effort to date. Thanks to all who worked us. ... **AK4K**. What a contest! I had a great time, even though I came down with pneumonia just two days before, got the flu on Sunday, had a family visit Saturday afternoon, the computer

CLUB COMPETITION

UNITED STATES

Club	# Entrants	Score
NORTHERN CALIFORNIA CONTEST CLUB	44	25,163,908
YANKEE CLIPPER CONTEST CLUB	26	21,198,840
POTOMAC VALLEY RADIO CLUB	28	18,864,552
CTRI CONTEST GROUP	6	10,645,326
SOCIETY OF MIDWEST CONTESTERS	16	10,189,179
FLORIDA CONTEST GROUP	9	9,490,065
FRANKFORD RADIO CLUB	8	8,859,176
ALABAMA CONTEST GROUP	7	5,065,039
GRAND MESA CONTESTERS OF COLORADO	8	4,630,140
TENNESSEE CONTEST GROUP	18	4,023,468
WESTERN WASHINGTON DX CLUB	9	3,757,640
CENTRAL TEXAS DX AND CONTEST CLUB	4	2,061,119
BERGEN ARA	4	1,823,162
WILLAMETTE VALLEY DX CLUB	3	1,549,143
CAROLINA SHINE	5	1,417,719
SOUTHERN CALIFORNIA CONTEST CLUB	7	1,400,198
MAD RIVER RADIO CLUB	8	1,294,166
MINNESOTA WIRELESS ASSN	12	1,224,267
CENTRAL ARIZONA DX ASSOCIATION	6	1,097,672
TEXAS DX SOCIETY	3	853,835
KENTUCKY CONTEST GROUP	4	805,418
SOUTH EAST CONTEST CLUB	3	579,674
SKYVIEW RADIO SOCIETY	3	549,906
LOW COUNTRY CONTEST CLUB	4	403,702
SPOKANE DX ASSOCIATION	4	380,216
NORTH TEXAS CONTEST CLUB	3	237,748
UTAH DX ASSOCIATION	3	214,044

DX

BAVARIAN CONTEST CLUB	68	50,586,628
UKRAINIAN CONTEST CLUB	28	32,266,758
URAL CONTEST GROUP	7	18,176,738
RHEIN RUHR DX ASSOCIATION	47	17,177,540
LATVIAN CONTEST CLUB	11	13,492,117
HUNGARIAN DX CLUB	3	12,705,828
CROATIAN CONTEST CLUB	6	11,039,476
SLOVENIA CONTEST CLUB	5	10,439,556
YU CONTEST CLUB	6	10,062,435
BRITISH COLUMBIA DX CLUB	5	8,533,599
CONTEST CLUB FINLAND	5	8,154,690
CONTEST CLUB ONTARIO	18	7,078,592
BLACK SEA CONTEST CLUB	16	6,878,565
LITHUANIAN CONTEST GROUP	4	6,781,024
SOUTH URAL CONTEST CLUB	4	4,938,046
RUSSIAN CONTEST CLUB	7	4,774,952
CONTEST GROUP DU QUEBEC	7	4,481,314
DL-DX RTTY CONTEST GROUP	9	4,236,736
KAUNAS UNIVERSITY OF TECHNOLOGY RADIO CLUB	3	3,402,916
SP DX CLUB	14	3,082,595
LU CONTEST GROUP	8	2,950,836
KKKK CONTEST CLUB KRASNODARSKOGO KRAYA	5	2,750,545
CHILTERN DX CLUB	4	2,713,253
RADIO AMATEUR ASSOCIATION OF WESTERN GREECE	3	2,529,322
MOSCOW RADIO CLUB	4	2,473,316
SIAM DX GROUP	4	2,273,775
VYTAUTAS MAGNUS UNIVERSITY RADIO CLUB	4	1,920,572
BASHKORTOSTAN DX CLUB	3	1,605,422
WORLD WIDE YOUNG CONTESTERS	4	1,454,995
YO DX CLUB	3	1,415,136
599 CONTEST CLUB	4	1,174,931
GUARA DX GROUP	3	1,021,970
CSTA BUCURESTI	3	801,280
MARITIME CONTEST CLUB	3	641,378
ARAUCARIA DX GROUP	3	548,999
CANTAREIRA DX GROUP	3	523,287
HADLEY WOOD CONTEST GROUP	3	324,252
RIO DX GROUP	4	120,193

Mark, N2QT, running SO2R as SOLP and having more fun as he takes second USA and 10th in the world.

virused out right at the start time, and the mouse stopped working Sunday AM. I made more points than ever before, even though my Q's were not as high. Thanks to all who worked me. You're a great bunch! ... **KA1C**. Great fun. Lots of new contesters, which bodes well for RTTY! ... **KK1X**. Alaska is about extremes and this was extreme contesting! High solar wind, geomagnetic activity, high local winds made for a challenging RTTY contest. With all that, it was still a blast!! ... **KL8DX**. My first real attempt at using RTTY and I love it! I tried 30 years ago with the chunka-chunka-chunka mechanical system and it drove me nuts. This is a blast! ... **N6HE**. I am checking myself into rehab. I had two blondes and a brunette who wanted to go riding in the Corvette this weekend. No, I had to call CQ Test on 10m for 20 hrs with an *A* index of 30. What was I thinking? I need to make a change of plans or something! ... **NA4W**. This score beats my all-time high as a single op. The highlight was having HZ1PS call me on 20m. Got to work my friends at NP3U on 4 bands. What a great contest! ... **NG1G**. WPX RTTY doesn't have a QRP category, and I sure missed it. But with no sunspots, high *A* and *K* indexes, and operating from the Pacific Northwest it seemed a lot like operating QRP! Contacts were 75% from North America, even though I tried and tried to work some DX. 20m barely stayed open for the start of the contest and a handful of Pacific stations. Then it was slugging it out on 40m for the evening, but never managed to work a European, only NA and SA. I even got up at 3 AM local time to work the JAs on 80m and 40m. Got 23 of them in one hour and went back to sleep. The mornings provided only two dozen Europeans on 20m. 15m was only for South America, and didn't bother with 10m. I finished at about 75% of my hopes, but that leaves me room to improve next time. A few overdriven signals, a few rude frequency stealers, but many good ears and great ops. Thanks! ... **NN7SS**. Forty & 80 were miserable here. Only persistance got me 81 Q's on 40. Where are those sunspots? Maybe next year ... **WØRAA**. QRP 5 watts. First time in contest. Sure would be nice to have a QRP class ... **W5GHZ**. Had a wonderful time! As usual, did not get to operate as long as I would have liked. Broke in my new K-3 and it is an awesome RTTY machine! Many signals and pretty good propagation, a good sign that RTTY is growing. Thanks for putting on this great event. How about 4 times year? ... **WB4ROA**. Valentine's Day weekend, lots of local noise, three computer crashes. I Loved It! ... **WD4PDZ**. First RTTY contest. I'll be back. ... **WV2ZOW**.

(Continued on page 107)

Announcing:

2009 Inductees CQ Amateur Radio, Contest, and DX Halls of Fame

CQ is proud to regularly honor the most accomplished members of the amateur radio community through three "Halls of Fame": the CQ Amateur Radio Hall of Fame, the CQ Contest Hall of Fame, and the CQ DX Hall of Fame. We are pleased to introduce you to this year's inductees.

CQ Amateur Radio Hall of Fame

Our ninth annual "class" of inductees to the CQ Amateur Radio Hall of Fame includes 15 individuals in one or both of the following two categories: (1) Those individuals, whether licensed hams or not, who have made significant contributions to amateur radio; and (2) Those amateurs who have made significant contributions either to amateur radio, to their professional careers, or to some other aspect of life on our planet. This year, we have a few non-hams among the group. Please note that in the cases of honorees who are Silent Keys or who are no longer licensed hams, callsigns are as issued to them when they were alive/active and may have been reissued under the vanity callsign program.

We welcome the following members (listed alphabetically) of the 2009 "class" of the CQ Amateur Radio Hall of Fame:

Baker, Bill, W1BKR. President Emeritus, WNET-TV (Thirteen), New York PBS flagship station.

Barton, Loy. Developed class B plate modulation, primary method of modulating tube transmitters for decades.

Bauer, Frank, KA3HDO. NASA Chief Engineer for Exploration Systems; International Chairman, Amateur Radio on the International Space Station (ARISS), 1996–2009; AMSAT VP Human Spaceflight, 1991–2009.

Bridges, William, W6FA. Laser pioneer; developed first "noble gas" lasers (argon, krypton, xenon) and the dominant modulation system for feeding data into fiber-optic cables; Professor Emeritus of Engineering at CalTech.

Fernandez Martin, Fernando, EA8AK. Member of the European Parliament, representing Spain, 1994-present; former President of the Government of the Canary Islands, former President of URE (Spanish IARU organization).

Floyd, George, WA4DGA (SK). Author of "Scratchi" column in *CQ* over four decades. An engineer and executive at General Electric, he also wrote (also pseudonymously) the "Lighthouse Larry" column in GE employee newsletters.

Haseltine, Eric, AB3DI. Former Associate Director of National Intelligence for Science and Technology; former Director of Research, National Security Agency; former Executive Vice President of Research and Development, Walt Disney Companies.

Hollingsworth, Riley, K4ZDH. Former Special Counsel for Amateur Radio, Federal Communications Commission. "Cleaned up" the ham bands after 15 years of neglect by the FCC.

Kilby, Jack. Inventor of the integrated circuit, which revolutionized electronics, including amateur radio equipment.

Krischke, Alois, DJØTR. Prolific German author of antenna books. *Rothammels Antennenbuch*, a 1000-page reference showing virtually every amateur radio antenna ever designed, is in its 12th edition.

Maxwell, Walt, W2DU. Antenna designer (specializing in spacecraft communications) and author.

Miller, Lt. Gen. Thomas, K4IC (SK). Deputy Chief of Staff for Aviation, USMC (1975–79), in charge of all Marine Corps aviation; "father" of short-takeoff & vertical landing (STOVL) aviation in the USMC. Close friend of Sen. John Glenn; quietly watched out for amateur radio interests on Capitol Hill.

Morgan, Wilse, WX7P.– Conducted first amateur radio license exam session under the Volunteer Examiner program in 1984; helped get VE program approved; also designed innovative antennas.

Riley Hollingsworth, K4ZDH, one of the 15 individuals inducted into the 2009 CQ Amateur Radio Hall of Fame. (Photo courtesy ARRLWeb)

Parise, Ron, WA4SIR (SK). Astronaut and active ham in space. First ham to operate packet radio from space and pioneered "telebridge" concept for making more frequent school-shuttle contacts possible. Also helped develop Radio JOVE, an educational program for monitoring natural radio signals from Jupiter.

Whitehead, Clay, W6WW (SK). First Director of the White House Office of Telecommunications Policy in the 1970s; reshaped America's television landscape by bringing competition to the domestic satellite market and making it feasible for cable companies to distribute their own programming via satellite.

AMERITRON *True Legal Limit*™ Tuner

Easily handles 1500 Watts continuous carrier even on 160 Meters . . . High-current edge-wound silver plated Roller Inductor . . . Two 500 pf high capacitance tuning capacitors with 6:1 vernier reduction drives . . . 3 core choke balun . . . Six position antenna switch . . . True peak reading Cross-Needle SWR/Wattmeter . . .

Call your dealer for your best price!

AMERITRON ATR-30

$599.95

Suggested Retail

- *Handles 1500 Watts carrier*
- *Super High Current edge-wound silver plated Roller Inductor*
- *500 pf tuning capacitors with 6:1 vernier reduction drives*
- *3 core choke balun*
- *6 position antenna switch*
- *True peak reading meter*

AMERITRON's ATR-30 *True Legal Limit*™ roller inductor antenna tuner is ham radio's toughest! It'll handle 1500 Watts *continuous carrier output* on *all* modes and *all* HF bands into most antennas -- even on 160 Meters where most antenna tuners fail.

It's perfect for Ameritron's most powerful amplifiers where the ATR-30 just loafs.

All band coverage lets you operate 1.8-30 MHz including all MARS and WARC bands.

Super High Current Roller Inductor

You'll see Ameritron's new *super high current* air core roller inductor. It's *edge wound* from a thick solid copper strip and silver plated. This produces a large surface area and a massive conductor. It can carry huge circulating RF currents and withstand tremendous heat that'll melt or burn ordinary roller inductors.

A gear driven turns counter and crank knob gives you precise inductance control.

Two 500 pf Tuning Capacitors

Two 500 pf -- *the highest of any antenna tuner* -- variable transmitting capacitors give you no-arc wide range impedance matching for true high power performance.

6:1 vernier reduction drives makes capacitor tuning smooth and easy.

Super Balun, 6 position Antenna Switch

Super heavy duty three core choke balun lets you match virtually any balanced feedline antenna without core saturation.

A 6 position antenna switch lets you select your desired operating antenna.

Read *true* Peak Power

Ameritron's active electronic *true* peak reading meter accurately reads forward and reflected power and SWR *simultaneously* on a lighted Cross-Needle meter.

Roomy Cabinet maintains High-Q

Roomy extra-strong .080 inch thick aluminum cabinet gives highest efficiency and lowest loss. 13¼Wx5⅝Hx17½D inches.

AMERITRON ATR-20 Antenna Tuner

ATR-20, $459.95 Handles a full 1.2 kW SSB and 600 Watts CW. It's designed to safely handle the full SSB power of Ameritron's AL-811/811H/80B, ALS-500M/600 and other 1.2 kW SSB amplifiers.Has vernier reduction drives.

Ameritron has the best selection of *True Legal Limit*™ HF Amplifiers

AMERITRON's legal limit amplifiers use super heavy duty Peter Dahl Hypersil(R) power transformer capable of 2500 Watts!

Ameritron's *most powerful* Amp

with 3CX1500/8877 ceramic tube

AL-1500

$3495

Eimac(R) tube

AL-1500F

$3095

Imported tube

Suggested Retail

TrueLegalLimit™

Ameritron's *most powerful* amplifier uses the *herculean* 3CX1500/8877 ceramic tube. 65 Watts drive gives you full output power -- and it's just loafing because the power supply is capable of 2500 Watts PEP. All HF bands, all modes. 77 lbs., 17Wx10Hx18½in.

Ameritron's *toughest* Amp

with Eimac(R) 3CX1200A7 toughest tube

AL-1200

$3459

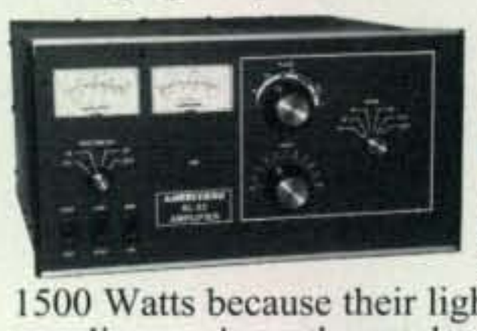
Suggested Retail

TrueLegalLimit™

Get ham radio's *toughest* tube with AL-1200. The *Eimac*(R) 3CX1200A7 has a 50 Watt control grid dissipation and the lowest history of field replacement of any modern transmitting tube that we use. 90 Watts in gives you full power out. All HF bands, all modes. 76 pounds, 17Wx18½Dx10H in.

Ameritron's *classic* Amp

with 2 graphite plate classic (R) 3-500G tubes



AL-82

$2745

Suggested Retail

TrueLegalLimit™

Most linears using 3-500Gs *can't* give you 1500 Watts because their lightweight power supplies *can't* use these tubes to their full potential. AL-82 is ham radio's *only* super 3-500G amp! 100 Watts in gives you full power out. All HF bands, all modes. Hefty 76 pounds, 17Wx10Hx18½D inches.

Desktop Kilowatt

with classic 3-500G tube

AL-80B, $1499. Gives you full kilowatt SSB PEP output (85 Watts in) from a whisper quiet compact desk-top linear. 14Wx8½Hx 15½D inches. Plugs into 120 VAC outlet. Graphite plate *genuine* 3-500G tube. Nearly 70% efficiency. Weighs 48 lbs.

AMERITRON no tune Solid State Amplifiers

500 Watt Mobile Amp

ALS-500M, $849. 500 Watts PEP/400W CW output, 1.5-22 MHz, instant bandswitching, no tuning, no warm-up. SWR, load fault, thermal overload protected. Remote on/off control. DC amp meter. Extremely quiet fan. 13.8 VDC. 9Wx3½Hx15D in., 7 lbs. **ALS-500RC, $49,** Remote Head.

600 Watt FET Amp

ALS-600, $1499. ***No tuning****, no fuss, no worries -- just turn on and operate.* 600 Watts PEP/500W CW, 1.5-22 MHz, instant bandswitching, SWR protected, extremely quiet, SWR/Wattmeter, ALC control. 120/220 VAC. Inrush protected. 9½Wx6Hx12D in. **ALS-600S, $1599,** ALS-600 with 10 lb., very low RF noise switching power supply.

Flat Mobile SWR/Wattmeter

AWM-35, $159.95. 1⅝ inch thick, flat mounts on dashboard. Remote sensor, 25 ft. thin cable. True peak reading. Cross-needle, lighted. 1.5 kW, 1.8-30 MHz. *High-SWR* LED.

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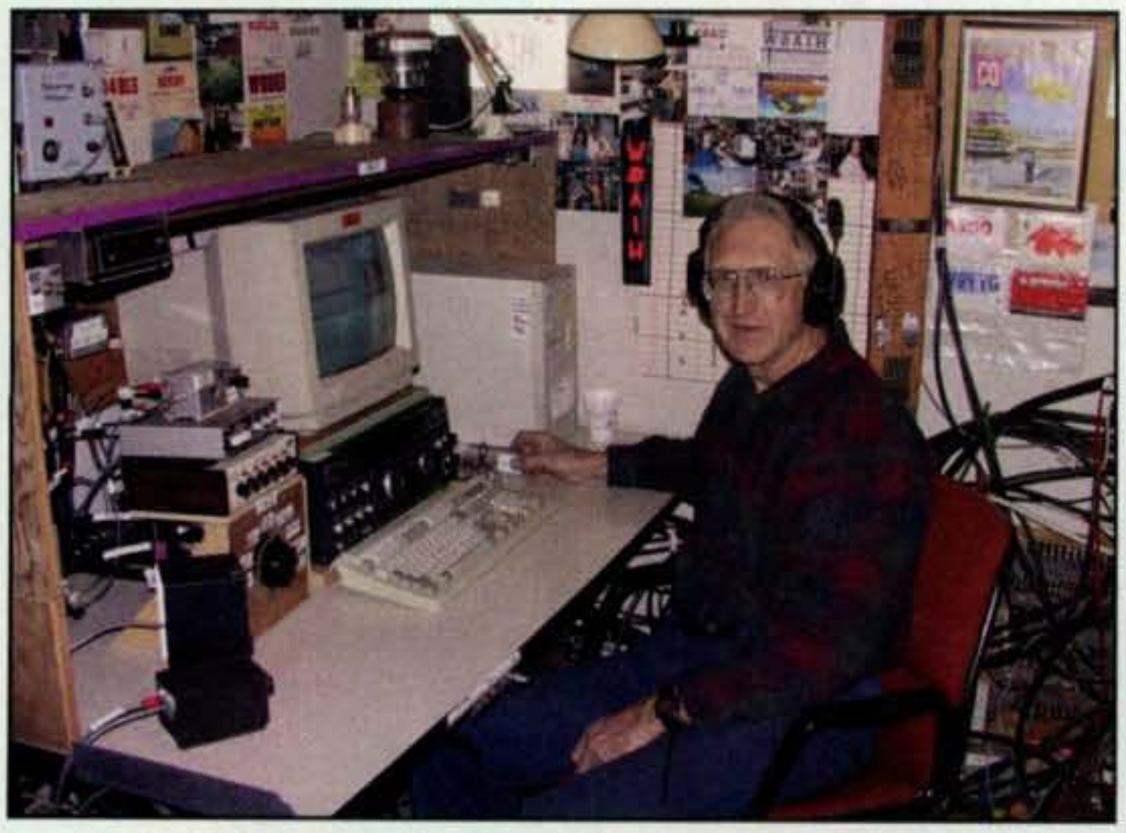

The Rev. Paul Bittner, WØAIH, is the newest member of the CQ Contest Hall of fame. (Photo courtesy WØAIH and <qth.com>)

Neville Cheadle, G3NUG, celebrating his 50th year in amateur radio, is a 2009 inductee into the CQ DX Hall of Fame. (Photo courtesy of G3NUG)

CQ Contest Hall of Fame

This year, we are inducting one new member into the CQ Contest Hall of Fame and two new members into the CQ DX Hall of Fame.

Our inductee into the Contest Hall of Fame is:

The Rev. Paul Bittner, WØAIH. Paul's contest station near Eau Claire, Wisconsin, is known in Midwestern contesting circles simply as "The Farm." Spreading across 120 acres, Paul's farm grows a wide variety of antennas as well as regular crops of new contesters. Paul constantly seeks out and trains new contesters at his multi-multi station and welcomes visiting hams from around the world. His station hosted W1AW/9 during the 1999 IARU DX Contest and special event station N98ITU during the 1998 International Telecommunication Union Plenipotentiary Conference held that year in Minneapolis, Minnesota.

In addition, Paul, who is a Lutheran minister, and his congregation started a mission in Kazakhstan, using amateur radio to open doors. As a result, several Kazakh residents who attended the mission became licensed amateurs and are active on the air today. Paul was nominated by the Minnesota Wireless Association.

CQ DX Hall of Fame

Our newest DX Hall of Fame members are:

Neville Cheadle, G3NUG. Nominated by both the Chiltern DX Club and the Southeastern DX Club, Neville this year is celebrating his 50th anniversary in amateur radio. During that time, he has confirmed 366 DX countries and nearly 1000 islands. As founder of the Five Star DX Association, Neville has been instrumental in organizing four major DXpeditions—9MØC to Spratly Island in 1998, D68C to Comoros in 2001, 3B9C to Rodrigues in 2004, and 3B7C to St. Brandon in 2007—with a fifth trip to somewhere in the Pacific planned for 2011 or 2012. These four DXpeditions have involved more than 90 hams from 14 different countries and have accounted for over a half-million radio contacts!

Neville is also the co-author, along with Steve Telenius-Lowe, 9M6DXX, of *DXpeditioning Behind the Scenes,* a handbook for hams on planning, setting up, and operating successful DXpeditions. Neville is also President of the Chiltern DX Club, a post he has held since 2001, after serving as the group's Chairman from 1994 to 2001. Under his leadership, the organization has grown to a membership of more than 600 and supports more than a dozen DXpeditions every year.

Tom Harrell, N4XP, shown here operating the ZK1XXP DXpedition, has also been inducted into the CQ DX Hall of Fame for 2009. (Photo courtesy of N4XP)

Tom Harrell, N4XP. Tom has his fingers in many DX-related pies. As an individual operator, he has confirmed 361 DXCC entities, holds 9-band DXCC, 5-band Worked All Zones, and WPX awards for SSB, CW, and mixed-mode. Tom has also operated from 19 different DXCC entities, including two DXpeditions on which he was Team Leader and three on which he was co-Team Leader. The ZK1XXP DXpedition he led to North Cook Island was named DXpedition of the Year for 1997.

A decade later, he served as Director of Off-Island Support for the BS7H operation from Scarborough Reef, 2007's DXpedition of the Year, providing regular news reports for the DX community and relaying to the team reports of DXers' needs for various bands and modes. In addition, Tom has served as QSL manager for 17 stations, including several DXpeditions, over a period of 25 years. He was nominated by the German DX Foundation.

Congratulations to all of our new inductees on their outstanding accomplishments!

www.hamfest.org www.hamfest.org www.hamfest.org

Huntsville Hamfest and ARRL Alabama Section Convention

August 15-16, 2009
At the Von Braun Center in Huntsville, Alabama

Program Highlights

- **Huntsville Hamfest** – Featuring huge new dealer show, manufacturers, giant flea market, and more!
- **International DX, contest, technical, and public service forums.**
- **DX Banquet** (sponsored by the North Alabama DX Club) featuring Tim Pearson, K5AC, speaking on the K5D Desecheo Island DXpedition.
- **DXCC Card Checking**
- **ARRL Program Representatives**
- **Youth Activities**
- **2009 YHOTY** (Young Ham of the Year) Award Presentation.

Hotels

Holiday Inn
Group/Convention code: HAMFEST.
Reservation: **1-877-465-4329** or **1-256-553-1400.**
www.holidayinn.com/huntsvilleal

Embassy Suites Hotels
Group/Convention code: HAM.
Reservations: **1-800-362-2779** or **1-256-529-7573** or
visit www.embassysuiteshuntsville.com

Nearby Points of Interest

- ✓ U.S. Space & Rocket Center and U.S. Space Camp
- ✓ NASA Marshall Space Flight Center Tour
- ✓ Bridge Street Centre – Upscale Shopping Mall
- ✓ Huntsville Botanical Garden
- ✓ Huntsville Museum of Art
- ✓ Cathedral Caverns State Park
- ✓ Historic Huntsville Depot Museum and Alabama's Constitution Village

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Announcing:

The 2009 CQ WW RTTY DX Contest

September 26–27, 2009

Starts 0000 GMT Saturday Ends 2400 GMT Sunday

I. OBJECTIVE: For amateurs around the world to contact as many other amateurs in as many zones, countries, U.S. states, and VE areas as possible.

II. BANDS: The 3.5, 7, 14, 21, and 28 MHz bands may be used. No 1.8 MHz or WARC bands allowed.

III. ENTRY CATEGORIES (choose only one):

For all categories:

• Baudot mode only. No unattended operation or contacts through gateways or digi-peaters permitted.

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

• A different callsign must be used for each entry.

• All entrants must not exceed 1500 watts total output power, or the maximum output power of their country, or the power limit of their entry category, whichever is less, on any band.

• Self-spotting or asking other stations to spot you is not allowed.

• All operation must take place from one operating site. Transmitters and receivers must be located within a 500-meter diameter circle or within the property limits of the station licensee, whichever is greater. All antennas must be physically connected by wires to the transmitters and receivers used by the entrant.

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

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

1. Single Operator High (*SO High*): One person. One signal at a time. QSO alerting assistance of any kind is not allowed.

2. Single Operator Low (*SO Low*): Same as *SO High* except total output power per band must not exceed 100 watts.

3. Single Operator Assisted (*SOA*): One person. One signal at a time. QSO alerting assistance is allowed. No power subcategories.

Note: Each of these three entry categories can be entered as All Band (*AB*) or Single Band (*SB*). Single band logs must include all QSOs made on other bands, if any. The *AB* or *SB* entry category is specified in the log's Cabrillo header. Any QSOs in the log on bands other than the *SB* entry will be treated similar to a checklog.

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

1. Single-Transmitter High (*MS High*): Only one transmitter, limited to 8 band changes in any clock hour (00 through 59 minutes). For example, a change from 20 meters to 40 meters and then back to 20 meters constitutes two band changes. Exception: One—and only one—other transmitter may be used if—and only if—the station worked is a new multiplier. This second transmitter is also limited to 8 band changes in any clock hour. Violation of the 8-band-change rule may result in reclassification to the *MM* category. Logs must show which transmitter made each QSO ("0" for the primary transmitter and "1" for the second multiplier transmitter, shown in column 81 of the Cabrillo format).

2. Single-Transmitter Low (*MS Low*): Same as *MS High* except total output power per band must not exceed 100 watts.

3. Two-Transmitter (*M2*): A maximum of two transmitted signals at any time, each on a different band. Only one running transmitter allowed per band. Either transmitter may be used to work any and all stations. A station may be worked once per band regardless of which transmitter is used. Logs must show which transmitter made the QSO ("0" and "1" shown in column 81 of the Cabrillo format). Each of the two transmitters may make a maximum of 8 band changes in any clock hour (00 through 59 minutes). For example, a change from 20 meters to 40 meters and then back to 20 meters constitutes two band changes. Violation of the 8-band-change rule may result in reclassification of the entry to the *MM* category. No power subcategories.

4. Multi-Transmitter (*MM*): No limit to the number of transmitters, but only one signal and running transmitter allowed per band. No power subcategories.

IV. EXCHANGE: RST plus zone (e.g., 59905). U.S. and VE stations also send U.S. (48 continental states only) or VE area (see VE multipliers below.)

V. MULTIPLIERS: Three types of multipliers 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.

3. A multiplier of one (1) for each different continental U.S. state and VE area 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. One multiplier for each continental U.S. state (48) and each Canadian area (14) on each band. Please use only official U.S. Postal Service abbreviations to identify states (e.g., Michigan = MI; Massachusetts = MA, Ohio = OH). *Note*: KL7 and KH6 are counted as country multipliers only and not as state multipliers. Canadian areas (14 total) are as follows: NB (VE1, 9), NS (VE1), QC (VE2), ON (VE3), MB (VE4), SK (VE5), AB (VE6), BC (VE7), NWT (VE8), NF (VO1), LB (VO2), NU (VYØ), YT (VY1), PEI (VY2).

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, two (2) points.

3. Contacts between stations in the same country, one (1) point.

VII. SCORING: All stations—the final score is the result of the total QSO points multiplied by the sum of your zone, country, and U.S. state/VE area multipliers. *Example:* 1000 QSO points × 100 multipliers (20 Zones + 30 Countries + 40 States/Areas) = 100,000 (final score).

VIII. AWARDS: First-place certificates will be awarded in each category listed under Section III in every participating country and in each call area of the United States, Canada, Russia, Spain, Australia, 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. Single-band entrants who also operate on other bands must include those QSOs in their logs. *Note:* The single-band entry is specified in the Cabrillo header.

In countries or call areas where the returns justify, second- and third-place awards will be made.

IX. TROPHIES and PLAQUES: Plaques and trophies are awarded for top performance in a number of categories. They are sponsored by individuals and organizations. To the extent sponsors or winners purchase plaques, plaques will be awarded in the following geographical areas for each of the categories listed in Rule III for the following areas: World, North America, USA, Canada, South America, Africa, Europe, Asia, and Oceania. For a current list of plaques and sponsors, or to learn how to become a sponsor, see <www.cqwwrtty.com>.

X. CLUB COMPETITON:

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 the center of club area (except for DXpeditions specially organized for operation in the contest; club contributions of DXpeditions scores are allocated on the percentage of club members on the DXpedition).

3. To be listed, a minimum of 3 logs must be received from a club, and a club officer must supply a list of participating club members to the Contest Director.

4. Indicate your club affiliation in the Cabrillo header, using exactly the club name listed on the club web page, <www.cqww.com/clubnames.htm>.

XI. LOG INSTRUCTIONS:

1. All times must be in GMT.

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

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

E-mail Required Content: *Please submit your log in the Cabrillo file format created by all major logging programs.*

(a) Submit logs to <rtty@cqww.com>.

(b) Be sure to put the **callsign only** in the "Subject:" line of the message. (This is the callsign used during the contest which may be different than the operator or station callsign.) Logs should be sent as an e-mail attachment and the filename for the log should be **call.log** (call used in the contest).

(c) Entries from **Multi-Single, Multi-Two,** or **Multi-Multi** stations must be merged into a single chronological log. **Multi-Single** and **Multi-Two** logs must **clearly** indicate which transmitter made each QSO (see Rule III).

(d) If you are unable to submit a Cabrillo log, please contact the Contest Director for permission to submit another format.

(e) Other questions pertaining to the CQ WW RTTY DX Contest may be sent to the Contest Director, Ed Muns, WØYK, P.O.Box 1877, Los Gatos, CA 95031-1877 USA, e-mail: <w0yk@cqww.com>.

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 multipliers will be deemed sufficient cause for disqualification.

Any use by an entrant of an non-amateur means including, but not limited to, telephones, e-mail, Internet, Instant Messenger, chat rooms, VoIP, or the use of packet to *solicit, arrange, or confirm* any contacts during the contest is unsportsmanlike and the entry is subject to disqualification.

An entrant whose log is deemed by the CQ WW RTTY DX Contest Committee to contain a large number of discrepancies may be disqualified as a participant operator or station for a period of one year. If within a five-year period the operator is disqualified a second time, he/she will be ineligible for any CQ contest awards for three years.

XIII. DEADLINE: All entries must be e-mailed to <rtty@cqww.com> *no later* than **November 1, 2009.** Logs received after the deadline may be listed in the results but will be ineligible for any awards.

public service

BY RICHARD FISHER,* KI6SN

Disaster, Real and Imagined, Puts Us Squarely in the Spotlight

From events of seismic proportion in Europe and flooding in the U.S., to EmComm preparation in Tennessee and across the globe in GlobalSET 2009, emergency communications, both actual and simulated, came front-and-center in the first quarter of 2009.

Each event, whether datelined Italy, Cuba, or from around the United States, serves as a reminder of why we're into the public-service arm of amateur radio and why relentless preparation, training, and community outreach are so important in setting the stage for doing great work when it becomes "the real deal."

With the help of dedicated representatives from IARU Regions 1 and 2, North Dakota's Red River Radio Amateurs, North Carolina's Orange County Radio Amateurs, and public servants from Tennessee, this month's report is a snapshot of public service in action—with all the ingredients for success.

Rescue workers gather in the DI.COMA.C rescue operations center after the earthquake, the epicenter of which was near the Italian town of L'Aquila.

Radio Amateurs Mobilized as 5.8 Quake Rattles Central Italy

When an earthquake measuring 5.8 on the open-ended Richter scale rocked central Italy at 3:30 AM on April 6, with its epicenter near the town of L'Aquila, 70 villages in the area quickly became the focus of rescue operations.

A report filed by Alberto Barbera, IK1YLO, with assistance from Greg Mossop, GØDUB (both IARU Region 1 Emergency Communications Coordinators) described how in the ensuing hours, days, and weeks radio amateurs from around the country would be called upon to help keep information flowing as the disaster's story unfolded. According to Barbera, Rome's national Civil Protection Service Headquarters had quickly recognized the severity of the event and activated plans, calling together its Operations Committee to manage the response: "Just half-an-hour later, at 4 AM, the first convoy of vehicles with rescuers and supplies was leaving Rome for L'Aquila, 120 km [75 miles] away," he wrote.

The collapse of the main telephone central office in L'Aquila crippled local fixed lines. However, cellular phones remained operational with few problems other than initial overloading due to the high volume of calls. In response, mobile phone companies installed five additional exchanges to cope with the demand. At the same time, radio amateurs were activated to support the Civil Protection response.

In a few hours, Civil Protection set up a local rescue operations center (DI.COMA.C), where radio amateurs installed high-frequency radio stations in order to have an emergency connection with headquarters in Rome and with radio stations on VHF/UHF working with the local repeaters installed in the area. The HF connection was on 6990/7045 and 3643.5 kHz.

During the emergency, "only some of the radio amateurs arriving with the rescue convoy in the L'Aquila area from different parts of Italy were using

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e-mail: <ki6sn@cq-amateur-radio.com>

Many buildings were heavily damaged or destroyed following the earthquake that struck Italy at about 3:30 AM, April 6, 2009. (Italy photos courtesy Alberto Barbera, IK1YLO)

Fortunato Bicego, IK3GHR, is on the air after a 5.8-magnitude earthquake rocked central Italy.

the net to be in touch with the regional headquarters," Barbera wrote. "In fact, there was never a real emergency net functioning on these frequencies."

The frequencies are normally used in emergencies to connect the different Prefetture (government structures) and Civil Protection headquarters in Rome. Civil Protection created seven COMs (centers of activities for several villages) covering 68 villages and 41 Areas, supporting the more than 19,000 homeless people and sanitary facilities, Barbera reported. Radio amateurs were positioned in all COMs and areas and additional repeaters were installed for each COM to ensure good coverage of the affected area.

During the approximate 7-day emergency period, about 150 radio amateurs were involved in the response, coming from a range of emergency associations in Italy. In addition, various voluntary associations providing logistical support—health, fire protection, Red Cross, security, etc.—had radio amateurs and radio operators with them "to assure the connections between each patrol and also with each COM," Barbera said.

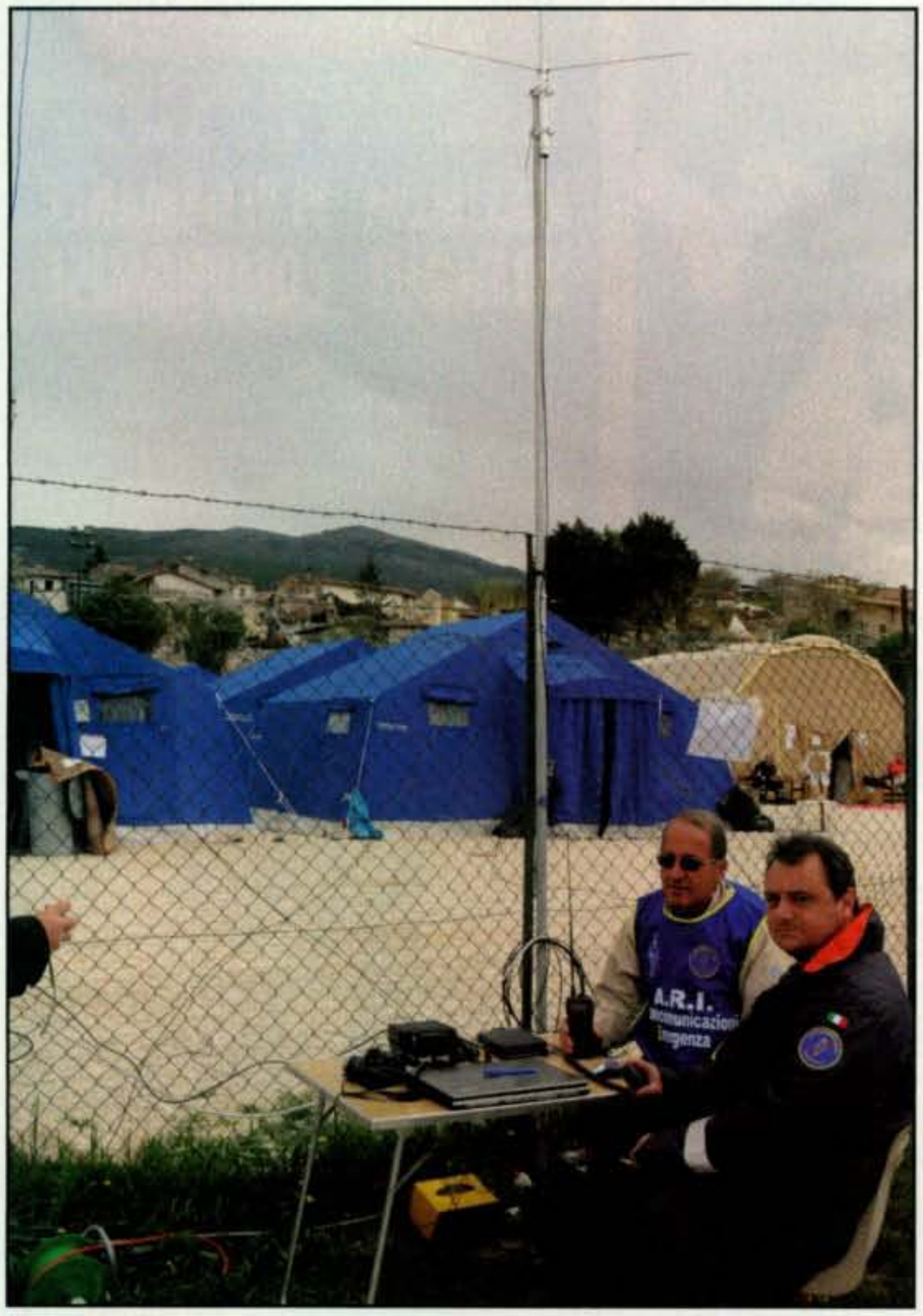
The Emergency Phase of the operation was considered complete after seven days, prompting implementation of the After Emergency Phase. The recovery process after the earthquake was expected to last several months "until a certain degree of normality is restored."

"The decision to maintain a structure on the territory with a reduced number of volunteers is a result of the experience of previous earthquakes," Barbera wrote . . . "in particular, Friuli in 1976, when a dramatic second earthquake wave happened within a few months."

During the rescue and recovery period, radio amateurs remained present with a weekly change of operators to minimize disruption and stress. Due to the geographic configuration of Italy, with three active volcanoes, two-thirds of its territory covered by mountains, and its seismic area, "we have been obliged to create an emergency structure of Civil Protection, including 1,300,000 volunteers in the different activities fields in which the radio amateurs are involved at the different levels and areas," Barbera wrote. "The validity of our Civil Protection system was also confirmed during past emergency activities around the world: Sri Lanka , Thailand, the tsunami emergency, and during our recent earthquake," he said, "bringing to mind the U.S. radio amateurs' motto: *When all else fails . . . amateur radio.*"

Volunteers Fill the Airwaves Along the Red River

In hindsight, heavy November rains were setting the table for big trouble in the Fargo, North Dakota/Moorhead, Minnesota region, recalled Mark Johnson, KCØSHM, president of Red River Radio Amateurs and one of the radio amateurs playing a key role in emergency communications during April's devastating Red River floods. Saturated ground, about 80 inches of winter snow, and three to four inches of



Francesco Del Rio, IZ5OJX, and Giampiero Nocentini, I5NOC, operate from a Red Cross area during Italian earthquake relief efforts.

spring rain combined for a perfect storm of conditions that Johnson, dozens of his fellow club members, and emergency officials could see coming. "The days preceding (the river's flood crest) were the spookiest," he said.

About 30 RRRA members, working with about 30 radio amateurs who converged on the area from out of town, provided emergency communications among agencies such as the American Red Cross, Salvation Army, and U.S. Coast Guard "running 24 hours a day," said Johnson, who logged 90 hours himself as the river level was rising.

Operators were dispatched to 11 locations in the Fargo-Moorhead area. In addition, operators from "Minneapolis, Iowa, Sioux Falls, and Michigan" offered to help. "It's amazing how a couple of e-mails and phone calls could bring out this kind of volunteerism."

Playing critical roles were Don Galitz, KCØDCF, and Val Tareski, KØQYW, emergency coordinators from the Cass County, ND EOC team, and Mike Heiler, KAØZLG, EC of Clay County, MN. Also critical to the response were Lynn Nelson, WØCQ, and Skip Jackson, KSØJ, ARRL North Dakota and Minnesota section mangers, respectively.

Brian Ward, KCØVDE, was a volunteer who drove in from Sioux Falls—"a real gung-ho trooper," as described by Johnson. All of the area's hotels were full, and despite temperatures near zero, Ward slept in his car for two nights before taking a solo assignment at the Red Cross evacuation center at West Fargo's Veteran's Memorial Arena. "They got him a cot," Johnson said. "He was on duty 24/7 by himself."

An article in the region's newspaper, *The Forum,* said the area's American Red Cross executive director described the radio amateurs' "additional layer of communications" as "invaluable." Adam Moore, captain of the local Salvation Army, said in the article that the RRRA is so reliable: "He doesn't have to call in the Salvation Army's radio team known as SATERN."

"They are invaluable to us," Moore was quoted, "and in the event we lost all communications, we could rely solely on our amateur radio operators."

As the river continued to rise, RRRA-affiliated operators helped coordinate sandbag drops and health-and-welfare traffic. "It was very exciting," Johnson said, "nerve wracking

North Carolina Club Assists in Installation of Elementary School Weather Station

Raymond "Woody" Woodward, K3VSA, president of OCRA, submitted this report and accompanying photographs detailing the organization's support of a local elementary school and a one of its teachers, who is a licensed radio amateur. – KI6SN

The Orange County Radio Amateurs (OCRA), from North Carolina's Orange County and its surrounding area, was recognized in April by the staff of the Efland-Cheeks Elementary School in Efland, NC for the technical support it provided the school in the installation of weather equipment.

Kristin Bedell, KI4LLO, a radio amateur and teacher at the school, obtained a grant from Piedmont Electric Membership Corporation to purchase a weather fax receiver and weather station, along with the rooftop tower to mount the weather station's sensor array and the weather fax receiver's antenna. About a dozen members of OCRA made several field trips to the school over a period of a month to assist with installation.

On April 13, the station, located in the school media center, was dedicated with a special assembly of the students, along with invited guests representing OCRA, Piedmont EMC, and the Orange County School system's maintenance department. During the special assembly, everyone present was able to experience the acquisition by the weather fax receiver of a passing weather satellite and reception of its weather pictures. All the equipment worked as intended, and the school is looking forward to using the station as a teaching tool. — *K3VSA*

Kristin Bedell, KI4LLO, Academically/Intellectually Gifted teacher at Efland-Cheeks Elementary, demonstrates the weather station to students at the school. (Photo courtesy Raymond "Woody" Woodward, K3VSA)

and surreal." The team also assisted with agency-to-helicopter communications. The teams carefully coordinated efforts from one crest of the river's waters to the next.

Johnson said regular training paid off as operators swung into action for the actual event: "You never get used to (the challenge of disaster communications)," Johnson said. "The last time we had really bad flooding was in 1997." However, that previous experience and regular training, through a weekly Sunday night VHF net hot-linked on 444.875 and 145.350 MHz, provided ongoing training in the intricacies of efficiently passing information. "It's good practice in talking in an organized fashion," he said. When flooding became imminent, "we were talking sandbags instead of bicycles," Johnson said, in reference to the club's past support of civic events, such as races.

Johnson said a PDF factsheet with operating frequencies, maps, and radio programming information proved to be invaluable. Also, computer maps, internet access, and Google maps showing new developments were important tools in the club's communications portfolio.

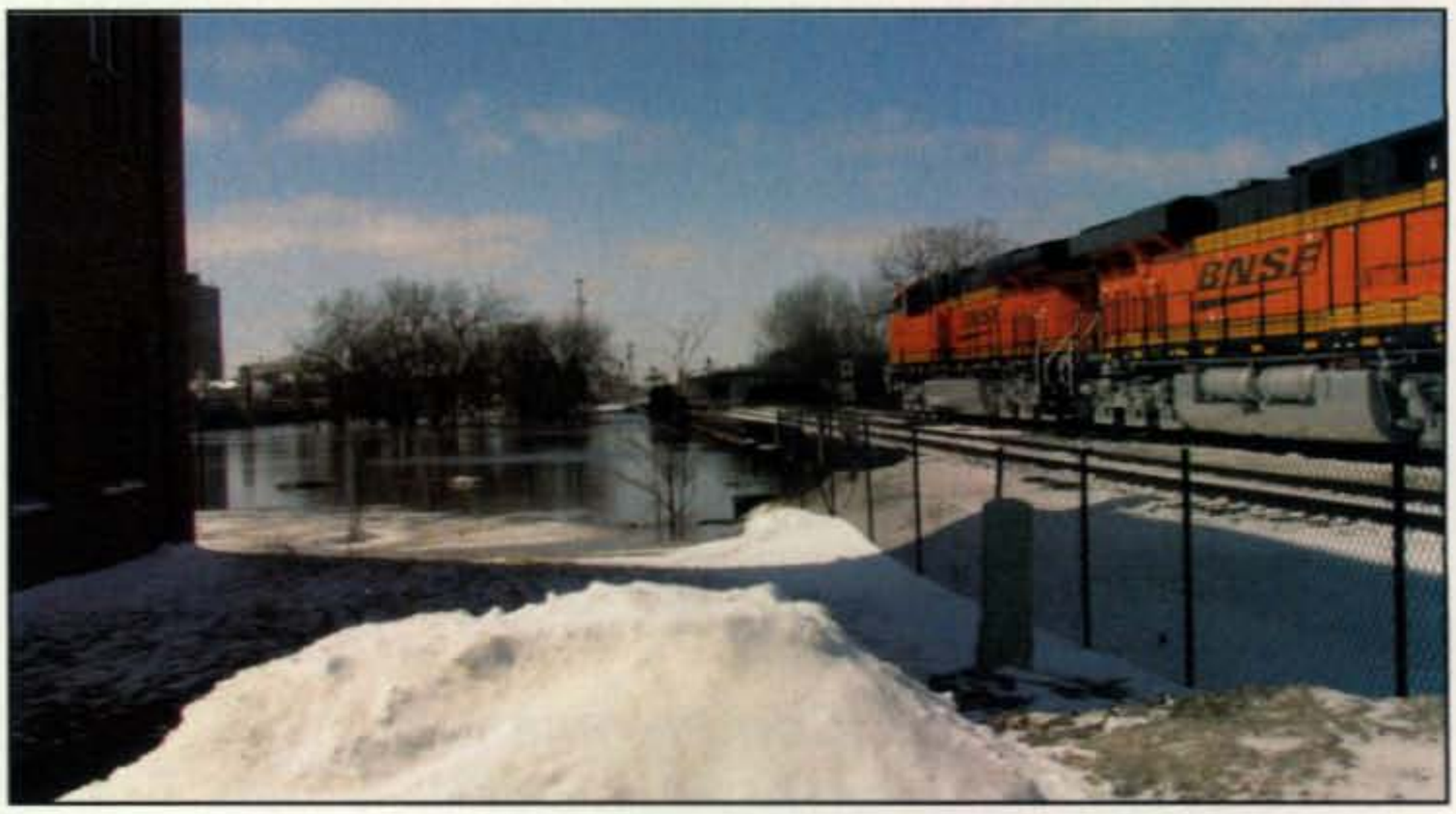
Basic log and message forms were used to keep communications organized and efficient. "They help us to avoid doubling up on information, by looking back through the logs," Johnson said.

Galitz, KCØDCF, also played a critical role by attending city commission meetings during the crisis. "Having a little bit of visibility is a good thing," Johnson said.

Looking back, Johnson said everyone "pulled together nicely as a group, willing to help out each other. The city needed a million sandbags, and they got them. It's amazing to see people respond."

Amateurs Out in Force at TN Interoperability Conference

About one-third of the attendees at Tennessee's first Interoperability Conference in late March were radio ama-



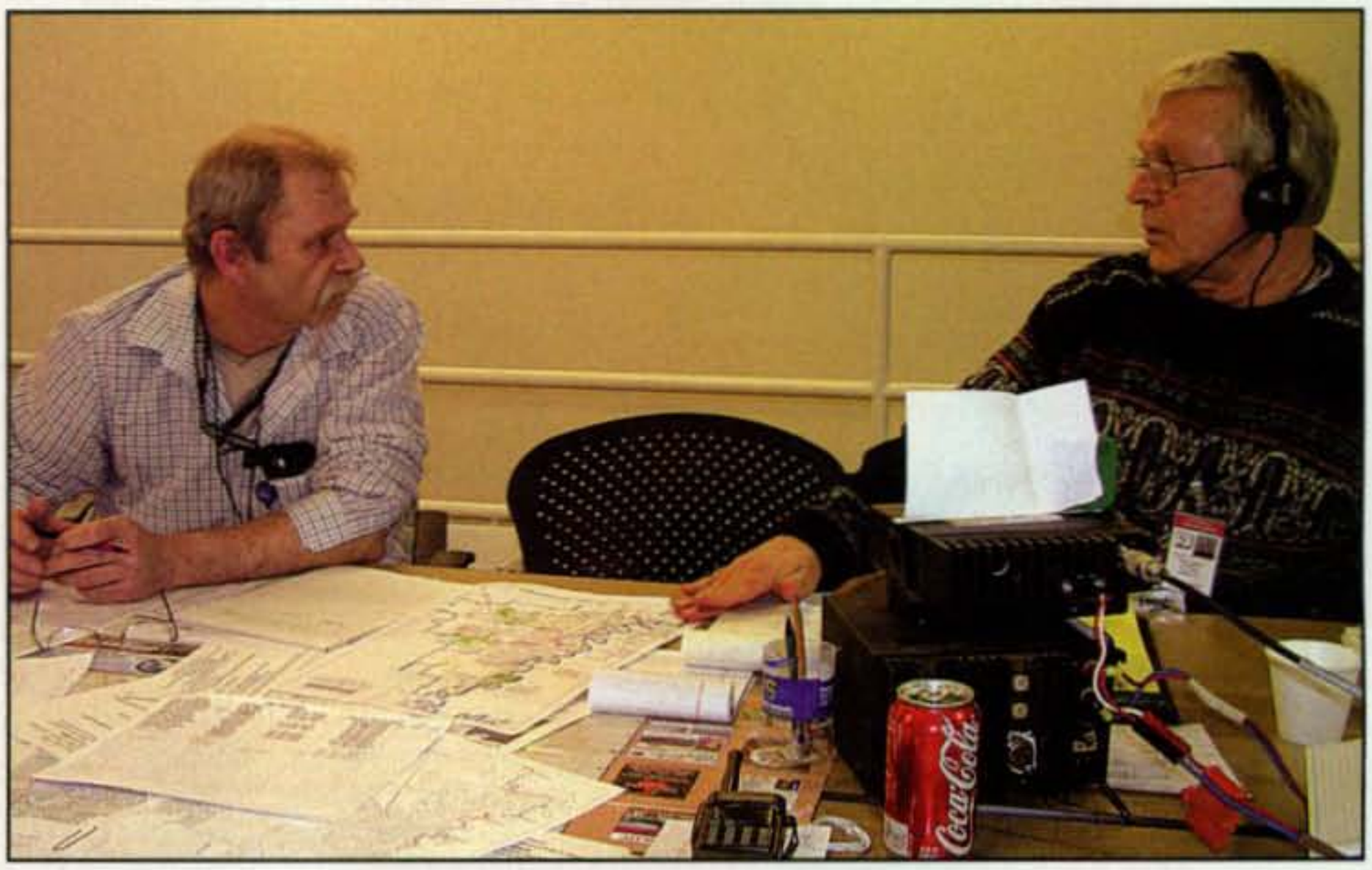
Red River waters creep closer to the base of bridges in the Fargo, North Dakota area as spring rains and melting winter snows threatened massive flooding in the region. (Red River photos courtesy Mark Johnson, KCØSHM)

teurs, according to Steve Waterman, K4CJX, a conference panel member and one of the region's leading supporters of disaster communications development. "Interoperability is built on relationships," Waterman said. "All the equipment and forms mean nothing without relationships."

Held over two days in Chattanooga, the meeting, sponsored by the Tennessee Emergency Management Agency, was attended by a wide range of federal and state agencies, including the Department of Homeland Security, and regional fire, police, EMA and EOC officials from many of Tennessee's 96 counties. "The theme here is that those agencies that take the time and trouble to identify and train their volunteers are the ones who can effectively utilize them in emergency operations," Waterman said. State MARS, ARES, WinLink, and other amateur radio organizations were well represented.

Chris Essid, director of the office of Emergency Communications for the Department of Homeland Security, spoke on "Cooperative Efforts to Enhance State and Local Government's Capability." While technical issues were a focus, Waterman said the opportunity for face-to-face interaction between government and volunteer agencies was critical.

The key is "training volunteers so they know what to do" when agencies at any level call them, Waterman said, citing deficiencies in communications procedures and protocol in past incidents.



Mike Heiler, KAØZLG (left), and Allan Bennefeld, KØCGY, man the net control station during emergency flooding operations.

"There's a tremendous push by government to provide interoperability and coordination among volunteer agencies."

The conference agenda included: "Making Sense Out of Interoperability Grant Initiatives and Exercises"; "What is the National Interoperability Information Exchange (NIIX)?"; "Lessons Learned: Ice Storm 2009"; "Where Are We On Interoperability Initiatives?"; "Best Practices on Cross Band Devices"; and "Communications Disaster Preparedness and Interoperability." There was also a panel discussion entitled "What You May Need to Know about HF Radio: Public Safety, SHARES, MARS, ARES, WinLink2000," moderated by David Wolfe, WA4VVX, chief of communications for TEMA—and featuring Hank Koebler, N3ORX, chief of operations for TEMA and MARS/ARES; Paul Drothler, WO4U, executive director of the Tennessee Emergency Communications Assn; Lowell Bennington, WD4DJW, ARRL Tennessee SEC; and Waterman, K4CJX, who is WinkLink Development Team network administrator.

Many radio amateurs called to duty in disasters "forget they have to communicate with (state and federal) agencies," Waterman said. This requires a high level of training, organization, well-thought-out assignments, call lists, and knowing who's who.

GlobalSET 2009 and a Look to Hurricane Season 2009

The three-region GlobalSET 2009 EmComm training event, organized by the International Amateur Radio Union (IARU), was held April 18, cutting a wide swath across the globe in a test of emergency preparedness.

According to Arnie Coro, CO2KK, IARU Region 2, Area C emergency coordinator and member of the Federacion de Radioaficionados de Cuba, during the four-hour exercise his country's participants, for example, were given the responsibility of contacting the coordinating station in Guatemala. Coro prepared "a special HF propagation forecast for the stations to use as a guideline to optimize the chances of getting through to the coordinating station."

"The role of the amateur radio service during emergencies is of great impor-

tance not only for the communities and nations where they take place, but also for the survival of our hobby itself," he said, "because the very valuable radio frequency spectrum areas assigned to amateur radio can be preserved in the future only if we are able to demonstrate regularly what we ham radio operators can achieve when other communications systems fail."

Coro added that with the advent of the 2009 Atlantic, Caribbean, and Gulf of Mexico hurricane season, "We are getting ready here in Cuba for what we hope will not be as bad a season as 2008's which brought three hurricanes that caused a lot of devastation but no loss of life." That was due, he said, "to the well-organized efforts to evacuate whole coastal communities well ahead of the incoming bad weather." Amateur radio operators "played a very important role," he said.

Paul Seifert, KCØNSR, of Fargo, takes on duties as net control on Day 1 of the Red River flood emergency.

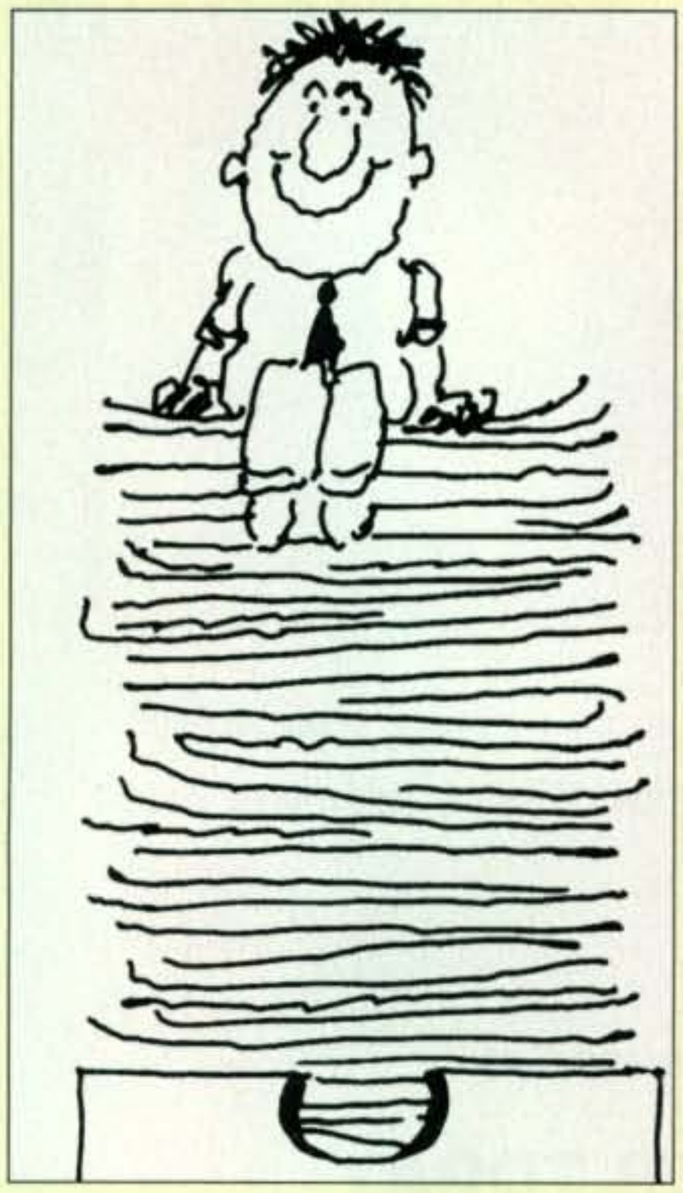
A Job Well Done, and The Big Job Ahead . . .

As the new kid on the *CQ* literary block, I want to thank Bob Josuweit, WA3PZO, for his many years of service to readers as its "Public Service" editor and for the tremendous support he's given me in taking on his duties. As the amateur radio community well knows, Bob has been a steady and trusted voice in public-service reporting for more than a decade. He has cultivated contacts from around the world in a tireless effort to tell the stories of the thousands of volunteers who have stepped forward in times of need. His passion for public service is eclipsed only by the skill he's shown in reporting about it. Bob has selflessly turned the limelight on others, while shunning it himself. He has left an indelible mark in the pages of *CQ* and *CQ VHF*, and I thank him for patiently positioning me to build on the foundation he has so solidly put in place.

As we close one chapter of the *CQ* "Public Service" column and open another, please consider entry to these pages an open door. Whether they are dispatches from the front lines of disaster, a training exercise, or communications support of a charity race, your story needs to be told.

We'll revel in your successes and chronicle those challenges and "lessons learned" in the effort to make things even better the next time around. Please keep me in the loop about your activities, e-mailing me at: <ki6sn@cq-amateur-radio.com>. We'll do our best to bring your stories to the thousands of radio amateurs who visit the pages of *CQ* every month.

73, Richard, KI6SN



What You've Told Us...

Our April survey asked about how you get your information on what's happening in the world of amateur radio. Not surprisingly, 95% of our readers who responded said they keep up on the hobby via magazines; 70% also use the internet as an information source, as well as 59% who also get info from fellow hams, 40% from club newsletters, 11% from audio news services and 7% from "other." When asked which of these is your *primary* source, 74% said magazines, followed by the internet with 27%, fellow hams at 4%, club newsletters at 3% and audio news services at 1%.

The next question asked for your *primary* source of information about ham radio equipment and accessories. Magazines retained the top spot at 74%, followed by the internet at 24%. Next came ham dealers at 12%, fellow hams at 9%, hamfests at 7%, other at 3% and club newsletters at 2%.

Our final question asked which of several radio publications you read regularly. Thankfully, *CQ* came in first among *CQ* readers, scoring a whopping 98%; Next was *QST* with 86%, followed by *WorldRadio Online* at 33%, *QCWA Journal* at 19%, *Popular Communications* at 12%, *CQ VHF* at 10%, *DX* magazine and *National Contest Journal*, each at 9%, and *Monitoring Times* and *QEX* at 8% each.

This month's free subscription winner is Steve Lewis, N8TFD, of Cincinnati, Ohio.

Reader Survey
July 2009

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

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

This month, we'd like to get a feel for how your family members feel about your hobby.

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

1. Which (one) phrase best describes how your spouse/significant other feels about your ham radio activity?

It's a wonderful hobby and we share it 1
It's a wonderful hobby—for you, but not for me 2
It's tolerable … in small doses 3
Be sure to shut the shack door behind you 4
At least I know where you are and what you're doing 5
It's a waste of time and money 6
Not currently married (and ham radio is part of the reason) 7
Not currently married (ham radio is *not* part of the reason) 8

2. How do your children feel about your ham radio activity?

Strongly supportive 9
Generally supportive 10
Generally tolerant 11
Don't care one way or another 12
Find it an embarrassment 13
Don't have children 14

3. Are/were any other members of your family licensed hams? (circle all that apply)

Yes, parent(s) / in-laws 15
Yes, spouse/significant other 16
Yes, child/children 17
Yes, grandchild/grandchildren 18
Yes, grandparent(s) 19
Yes, sibling(s) 20
Yes, aunt(s)/uncle(s) 21
Yes, cousin(s) 22
Yes, niece(s)/nephew(s) 23
No 24

4. When you are driving with family members in the car, do you generally operate your mobile ham rig?

Yes, local driving only 25
Yes, local driving and trips 27
Yes, trips only 27
No 28

5. When (if) you operate mobile while driving with family members in the car, do you operate *primarily* for…

General contacts 29
Keeping in touch with other members of traveling party 30
Seeking specific information (e.g., directions, restaurants, etc.) 31
Emergencies only 32
Do not operate mobile when family is in the car 33
Do not operate mobile at all 34

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

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Operate all bands through 10 Meters, even 160 Meters, with a single wire antenna!

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$44.95

The famous G5RV antenna is the most popular ham radio antenna in the world! You hear strong signals from G5RVs day and night, 24/7.

And it's no wonder . . . it's an efficient, *all band* antenna that's only 102 feet long -- shorter than an 80 Meter dipole. Has 32.5 foot ladder line matching section ending in SO-239 connector for your coax feedline.

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With an antenna tuner, you can operate all bands 80 Meters through 10 Meters and even 160 Meters with an antenna tuner and a ground.

MFJ's fully assembled G5RV handles 1500 Watts. *Hang and Play™* -- add coax, some rope to hang and you're on the air!

MFJ-1778M, $39.95. *Half-size*, 52 foot *G5RV JUNIOR* covers 40-10 Meters with tuner. Handles full 1500 Watts.

MFJ All Band Doublet

MFJ-1777 is a 102 foot *all band* doublet antenna that covers 160 through 6 Meters with a balanced line tuner. Super strong custom fiberglass center insulator provides stress relief for ladder line (100 ft. included). Authentic *glazed ceramic* end insulators. Handles full 1500 Watts.

MFJ-1777
$59.95

MFJ *Dual Band* 80/40 *or* 40/20M Dipoles

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80/40 Meters

MFJ-17758 is a short 85 foot long *dual band* 80/40 Meter dipole antenna. It's *full-size* on 40 Meters and has ultra-efficient end-loading on 80 Meters. Handles full 1500 Watts. Super-strong injection-molded center insulator with built-in SO-239 connector and hang hole. Solderless, crimped construction. 7-strand, #14 gauge hard copper wire. Connect your coax feedline directly, no tuner needed.

MFJ-17754, $59.95. Short coax fed 42 foot long *dual band* 40/20 Meter dipole antenna. *Full-size* on 20 Meters, ultra-efficient end-loading on 40 Meters. Same construction as MFJ-17758.

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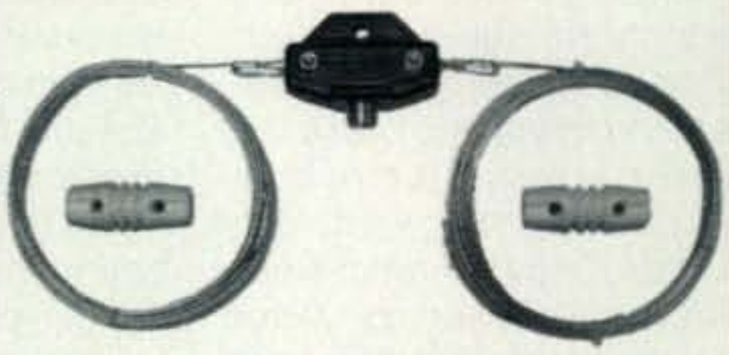

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MFJ-1779B **$49.95** 80-40M, 135 ft.
MFJ-1779C **$29.95** 20-6M, 35 ft.

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MFJ-918
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True *1:1 Current Balun/ Center Insulator* forces equal antenna currents in dipoles for superior performance. Reduces coax feedline radiation and field pattern distortion -- your signal goes where *you* want it. Reduces TVI, RFI and RF hot spots in your shack. *Don't build a dipole without one!* 50 hi-permeability ferrite beads on high quality RG-303 *Teflon*® coax and *Teflon*® coax connector. Handles full 1.5kW 1.8-30 MHz. Stainless steel hardware with *direct* 14 gauge stranded copper wire connection to antenna. 5x2 inches. Heavy duty weather housing.

RF Isolator

MFJ-915
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MFJ-915 *RF Isolator* prevents unwanted RF from traveling on the outside of your coax shield into your transceiver. This unwanted stray RF can cause painful RF "bites" when you touch your microphone or volume control, cause your display or settings to go crazy, lock up your transceiver or turn off your power supply. In mobile installations, stray RF could cause your car to do funny things even blow your car computer. Clear up these problems, plug an MFJ-915 between your antenna and transceiver. 5x2 in. Handles full 1500 Watts. Covers 1.8-30 MHz.

MFJ-919, $59.95. 4:1 current balun,1.5 kW.
MFJ-913, $29.95. 4:1 balun, 300 Watts.

Antenna Switches

MFJ-1704
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4-Positions

MFJ-1704 heavy duty *antenna switch* lets you select 4 antennas or ground them for static and lightning protection. Unused antennas automatically grounded. Replaceable lightning surge protection. Good to 500 MHz. 60 dB isolation at 30 MHz. 2.5 kW PEP. Less than .2 dB insertion loss, SWR below 1.2:1. SO-239 connectors. Handy mounting holes. 6¼Wx4¼Hx1¼D inches.

MFJ-1702C
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2-Positions

MFJ-1702C Like MFJ-1704, but for 2 antennas. 3Wx2Hx2D"

MFJ-1700C
$99.95

MFJ-1700C *Antenna/ Transceiver Switch* lets you select one of six antennas and one of six transceivers in any combination. Plug in an antenna tuner or SWR wattmeter and it's always in-line for any antenna/transceiver combination. Has lightning surge protection. Handles 2 kW PEP SSB, 1 kW CW, 50-75 Ohm loads. Unused terminals are automatically grounded. 1.8 to 30 MHz. SO-239 connectors. 4¾W6½Hx3D inches.

MFJ-1701
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MFJ-1701 *Antenna Switch* like MFJ-1700C but lets you select one of six antennas only. 10Wx3Hx1½D inches.

33 ft. Telescoping fiberglass Mast

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MFJ-18H100, $34.95. 100 feet, 450 Ohm ladder line, 18 gauge copper covered steel.

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math's notes

BY IRWIN MATH,* WA2NDM

A Low-Cost Battery Backup System

Those of you who have cordless telephones or similar small AC line-powered devices in your home or shack are well aware of the problem that can be caused by a power failure. The device stops working when a power failure occurs, and in the case of a cordless telephone it happens just when you need it to call the power company to notify them of the outage. In addition, depending on where you are, even the local cell-phone site may have lost power as well. The old hard-wired land-line, however, usually continues to work (obviously, as long as a wired phone connected to it is operational).

Having had this situation happen to me many times, I thought it would be a good idea to come up with some sort of battery backup scheme so that I would at least have a "fighting chance" in these situations. Although the example used in the following discussion will refer to a cordless phone, don't forget that it is applicable for many similar applications.

Fig. 1 is the schematic of my simple "POTS power backup." For those not in the know, POTS stands for "plain old telephone service," a term coined in the "old days" usually referring to a telephone instrument powered from voltage present at the telephone outlet. Most cordless phones, however, operate from a 6- to 9-volt "wall-wart" connected to a normal AC outlet. The AC from the outlet is then stepped down, rectified, and converted to the voltage necessary to power the telephone circuits as well as charge the battery in the handset. When power is lost, the battery in the handset may be okay if it is charged, but the power for the rest of the telephone circuits is lost.

As a result of this, the circuit I came up with produces a DC voltage equal or close to the voltage used to operate the cordless telephone both during normal conditions as well as when a power outage occurs. Furthermore, the original wall-wart is used to power the backup circuit. When AC line voltage is available, the DC output of the wall-wart is used to trickle charge a rechargeable battery pack in addition to operating the telephone. Since most cordless telephones will work with somewhat less voltage than the wall-wart produces, there is enough excess to keep the batteries charged.

R1 is provided to set the charging current to the correct value as we soon will see. A 1N4002 diode in series with the battery pack makes sure that the batteries do not discharge when AC power is available, as it is reverse biased by the somewhat higher voltage applied to the telephone. The second 1N4002 assures that only charging current reaches the batteries when AC power is also present. However, when AC line voltage is lost, the batteries take over. Now the diode in series with the batteries is forward biased and the phone continues to operate. You will notice that the voltage applied to the phone in this case is 0.7 volts less than the battery pack, but this usually is not a problem.

Now for the details. You must first determine the voltage range needed by the cordless telephone (or other appliance) you wish to connect to this system. To do this you will need to obtain a power plug that will fit the power connector of your phone. Sources such as Mouser have a wide range of such

*c/o CQ magazine

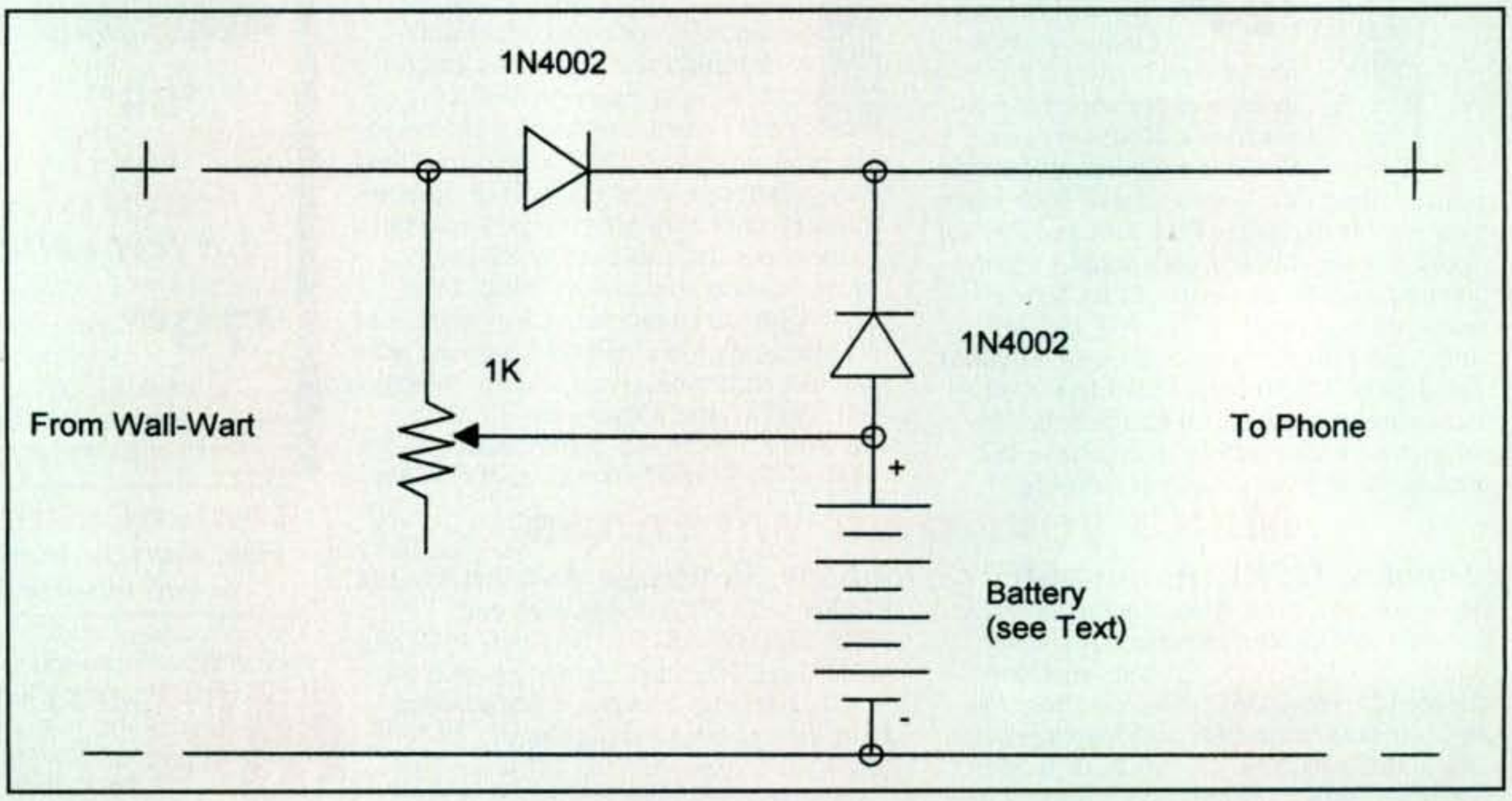

Fig. 1– Schematic of the battery backup system.

plugs, and even a local RadioShack may have something suitable.

Next connect a variable DC power supply (with the correct polarity) to the phone instead of the wall-wart and set the supply to the open circuit voltage of the wall-wart that came with the phone. This is usually marked on the wall-wart (or phone), but if it is not ,simply measure it with your DVM. We will call this value Vmax. Assure that the phone works at this level. Now slowly reduce the power-supply voltage until the phone just cuts off. This will be Vmin. The battery-pack voltage you need will be as close to Vmax as you can get. My phone had a Vmax value of about 7.5 volts, so I used six 1.2-volt NiCad AA cells that I happened to have on hand connected in series. As long as you do not drop to or below Vmin you should be okay. However, be sure to not exceed the Vmax by more than 10 percent or so or you may damage the phone.

Now disconnect the DC power supply, set the 1K pot to maximum resistance, and temporarily connect a milliampere meter in series with the battery pack. Also connect the cordless telephone and the wall-wart to the system. With the phone on-hook (hung up) slowly adjust the pot until the current flowing into the battery pack is around 1 percent (1/100) of the milliampere rating of the batteries. If you are using 1000-milliampere batteries, for example, the current should be set to 10 milliamperes maximum. Exceeding this value can damage the batteries, but at a charging current of 1 percent the batteries should remain trickle charged.

Now pick up the phone and check that the charging current does not drop significantly. If it does, re-adjust R1 until 1 percent is the maximum current under off- or on-hook condition. Once you are satisfied with the setting of the pot, remove the milliampere meter, replace the pot with a fixed resistor (if you wish), and you are in business. If for some reason you cannot achieve the values suggested, experiment with the value of the resistor and the number of batteries. As long as you are generally within the range described you should be okay.

As I *mentioned* at the beginning of this column, keep in mind that this same scheme can be used for many other devices that would benefit from a small, low-cost battery backup. While you can always purchase a commercial battery backup system similar to the ones used to run computers, the circuit described here can be built for very little cost, and if properly adjusted will be a useful addition to any amateur shack or home.

73, Irwin, WA2NDM

BY FREDERICK O. MAIA,* W5YI

Filing Applications using the FCC's Universal Licensing System

Just what do all those online screens mean and how can I best use them? Judging by the mail and phone calls we get, there is a lot of confusion and misinformation about the FCC's online Amateur Service database, the Universal Licensing System, and how it all works. This month let's talk about what you should know to more fully use the information that the FCC has available online.

First of all, there are a lot of ham radio license databases on the World Wide Web. Some are better than others, but the one that really counts, and the one that you should primarily be using, is the one posted by the Federal Communications Commission. For one thing, it is the first information available. All other databases must download and post the FCC's version.

You can get to the FCC's Amateur Radio Service database by going to the ULS home page at <http://wireless.fcc.gov/uls/>. All of the various features of the FCC's Universal Licensing System branch from this web page. Every radio amateur should have this page bookmarked on his/her computer.

ULS: A Powerful Information and Licensing Tool

The Universal Licensing System (ULS) is a secure, password-protected online electronic licensing and information system that the FCC implemented in all wireless radio services about ten years ago. The objective of ULS is to simplify and streamline the application and licensing processes and to provide a means by which the public can research needed information over the internet.

ULS's biggest feature is that it does away with "paper" applications and all information is input and accessed by the public, or a VEC (Volunteer Examiner Coordinator), using a personal computer over the internet. Although some legacy FCC keying to a licensee's record remains for those who do not have a computer, today practically all filing is done electronically.

It used to take many weeks to manually process an amateur radio license. Waiting two or three months for a new ham ticket to be issued was not unusual. Now, ULS does it almost instantaneously. The FCC relies on its licensees to keep their personal information up to date. This automated system results in huge filing time and financial savings for both applicants and the federal government.

Registering: Getting into the System

Since July 19, 2000, all new license applicants have been required to be registered in the FCC's COmmission REgistration System (CORES) and receive an FCC Registration Number (FRN) before they can use ULS. An FRN is a 10-digit number that is assigned to all individual applicants and amateur radio clubs. It is how the FCC knows who you are.

We said "applicants" rather than "licensees" because you really do not need to be licensed in order to register. Pre-registration is actually the best way, but few people do it. If you are thinking about becoming a ham operator, we advise you to pre-register. Here is how to do it.

We assume you have a personal computer. On the ULS Home page at <http://wireless.fcc.gov/uls/>, select the "Register" button. It is the top button. New applicants should again select "Register" on the next screen and then "Individual" (rather than "Business") and click on "Continue." (Amateur radio operators and clubs may not be a business even if they are incorporated.)

If you do not have a computer, you may also file manually by completing and filing an FCC Form 160 (CORES Registration) document. The form is available online at <http://www.fcc.gov/formpage.html> or by telephoning 1-888-CALL-FCC (888-225-5322).

Fill in your personal information: name, Social Security number (SSN), and address. The SSN is necessary because the Debt Collection Improvement Act of 1996 (DCIA) requires all federal agencies to collect this information to improve collection of delinquent government debts.

Unincorporated ham clubs and non-U.S. citizens will not have an SSN and should select "Exempted activity" or "foreign" applicant from the drop-down box. Clubs that are incorporated should enter their Employers Identification Number (EIN, also known as a federal tax identification number). Entering your phone number, fax number, and e-mail address on the registration form is helpful, but not required,

The ULS Password and Personal Security Question (PSQ) sections are very important. The FCC implemented enhanced security features a year ago in CORES to include a requirement for strong passwords. New passwords must now include a minimum of six characters with a combination of at least three different types of characters: numeric, upper-case letters, lower-case letters, and "special characters." (Special characters are the ones above the numbers on a keyboard, such as ! @ ? # $ % ^ & (*). For example: Harris84, Art@home, and xzER$6d4 would be CORES accepted passwords.

The PSQ allows you to reset your password in the event you forget it. The drop-down box contains some common Personal Security Questions, although you can make up your own custom question. Enter the answer to the PSQ in the appropriate box. After you submit the form, you will be advised (on the next screen) of your new FCC

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e-mail: <w5yi@cq-amateur-radio.com>

Registration Number (FRN). Carefully make a note of your FRN and password, since they will be needed later to log in to access your FCC record in ULS and to file applications.

Important: *Do not* register if you have previously received an FRN and *do not* register more than once, since your callsign can be associated with only one FRN. An easy method to determine if you have an FRN is to query ULS License Search at <http://wireless.fcc. gov/uls/>. Enter your station callsign, and select "Search." Your FRN will appear on your license record. If you have an existing callsign and have never been issued an FRN, you must "associate" the callsign with your new FRN.

You may return to the CORES Registration page at any time to update your login and personal information (name, address, phone number, e-mail address, etc.)

Registration by a VEC. We said earlier that most applicants for an amateur radio license do not pre-register. These applicants just appear at a VE examination session and fill out an application (NCVEC Form 605) for a ham license and take the exam.

Successful applicants are automatically registered in CORES by the VEC as part of the VEC-to-FCC "batch" application filing process. All licensees receive a letter from the FCC shortly after their new amateur radio operator license and station callsign are issued listing their CORES FRN and password assigned to them. Carefully retain this letter in your station records.

Universal Licensing System (ULS) Online Filing

The easiest way to file applications in the Amateur Radio Service is to use ULS. It simplifies application and license filing and reduces processing time through secure, worldwide internet access.

You can access the Universal Licensing System (ULS) over the internet using a PC with a Microsoft Windows® 98, NT, 2000, ME, XP, or Vista operating system installed and an Internet Explorer (6 or higher), Firefox 2, or Netscape 8.1 web browser with Java and cookies enabled.

To file applications online, go to the ULS home page at <http://wireless.fcc.gov/uls/>, choose the "Online Filing" button, and log in using your FRN and password. Once logged in, you will be able to update your name and address, request a duplicate license, request another non-specific callsign, renew your license, or request a vanity (spe-

cific) callsign. Except for a vanity (specific) callsign, there is no fee. Simply select the appropriate link. Click "Continue" on the next (Applicant Questions) screen

A license may only be renewed during the final 90 days before expiration. You can view your FCC license by clicking on the link at the bottom of the page. To finish the application, you must click on the "Continue to Certify" button, sign your name, "Submit Application," and print out the "Confirmation." Finally, click on the "Log Out" link.

You can quickly determine the status of your application through ULS Application Search or the status of your license through ULS License Search. Both search engines can be accessed from the ULS home page. Be aware that applications saved during the current business day will not appear in ULS Application Search until the following business day, since all applications are processed at night.

Vanity Callsigns

There are certain things you should know about filing for a vanity callsign. First of all, there are all sorts of rules that apply to *what* callsigns you can select and *when* you can choose them. You can select up to 25 callsigns that you qualify for, but realistically five or six are usually enough. To apply for a vanity callsign, log in and click on the "Request Vanity Call Sign" link.

Select "Eligibility" and indicate whether you are the former station holder, a close relative or club trustee of a deceased former holder or member, or selecting the callsign from a preference list. You can only select vanity callsigns appropriate for your license class. More on this later. After making your choice, click the "Continue" button.

On the Licensee Information page, review and update all of your licensee information. Make any corrections that are necessary. You must keep your address of record current with the FCC. This address will be used to mail you all official correspondence, including your license and related information. Be aware that undeliverable licenses returned to the FCC can be revoked. When ready, select "Continue."

On the Summary page review the information you have entered. If you wish to make additional changes, click the "Edit" button next to the section of your application you wish to edit. You will be able to return to that page of the application. Make the desired change(s) and select the "Return to Summary" button.

When you are ready to submit your application to the Commission, choose the "Continue to Certify" button. After reading the certification, enter your name in the boxes at the bottom of the page. When you are finished, click on the "Submit Application" button. We recommend that you print a copy of the ULS Confirmation screen.

After submitting the online vanity callsign application form, you will receive a file number and the filing fee will be displayed. It is currently $12.30 ($1.23 a year) for ten years. It will change again in September 2009. Click on "View Form 159," select "Form 159," and then choose to pay by credit card online. (If you are not paying online, print out and mail the Form 159 along with your payment by check or credit card to: FCC Wireless Bureau Applications, P.O. Box 979097, St. Louis, MO 63197-9000.)

You are eligible for a refund of your $12.30 FCC fee if your application is dismissed. Requests must be made in writing to: FCC Amateur Section, 1270 Fairfield Road, Gettysburg, PA 17325-7245. Be sure to provide your FRN, the file number of the application, your Social Security Number, the check or credit card number of the payment, and all other information related to the dismissed vanity callsign filing.

Important Vanity Callsign Guidelines. We have covered this before, but the fact remains that about half of all of the vanity callsign applications filed by the amateur community do not result in a selected callsign being issued to them. It is almost always a case of choosing a wrong callsign at the wrong time, but there are other reasons. For example, an applicant may fail to complete the Form 159 (pay the fee) or enter the credit card information wrong,

Choosing a callsign. A specific (vanity) callsign cannot be your first. You must hold an unexpired amateur station callsign of the proper operator class, as described below, to request a vanity callsign for your primary station. A vanity callsign can only be secured by "trading in" your existing call.

To request a vanity callsign for a club station, you must also hold an unexpired club station license listing you as the license trustee. Vanity club callsigns are based on the class of license held by the trustee. You can only select a club callsign from a Call Sign Group equal to or lower than that of the trustee. (There are four callsign groups: A, B, C, and D. Extra Class licensees qualify for Group A, B, C, or D; Advanced for Group B, C, or D; Technician/General for Group C or D; and Novice for Group D only.

Your name and mailing address as shown on your current license must be correct. If your license has expired you must first renew the license before you can request a vanity callsign; you cannot do both at the same time. The callsign you are requesting may not already be assigned. Unlike regular (sequentially issued) callsigns, the FCC charges an annual fee for a specific callsign which is payable in advance for the entire ten-year license term as explained above.

Every U.S. amateur callsign has a one-letter prefix (K, N, W) or a two-letter prefix (AA–AL, KA–KZ, NA–NZ, WA–WZ) and a one- (A–Z), two- (AA–ZZ), or three-letter (AAA–ZZZ) suffix separated by a numeral (Ø–9) indicating the geographic region. You may *not* select a callsign that does not conform to these formats, and it is amazing to us how many hams try to get a callsign with an invalid format. For example, there is no such thing as a U.S. amateur callsign beginning with the single letter "A" but many amateurs apply for them! This is all simple enough, but who qualifies for what can be confusing.

New radio amateurs normally start at the Technician Class level and are initially issued a 2-by-3 format callsign from an alphabetical list for their callsign area. (A 2-by-3 callsign contains two prefix letters, a geographic numeral, followed by three suffix letters—for example, KJ2ABC.)

A Technician or General Class radio amateur with a mailing address in any of the United States or possessions (including Alaska, Hawaii, the Caribbean and U.S. islands) is eligible to apply for any available (Group C) 1-by-3 format vanity callsign beginning with the single letter K, N, or W (but not A).

An Extra Class licensee is eligible for the shortest callsigns and can choose just about any vacant callsign. The shortest callsigns are (Group A) formats: 1-by-2 and 2-by-1 calls beginning with K, N, or W, or a 2-by-1 or 2-by-2 format callsign beginning with the two prefix letters AA through AK. Novices (there are still some of them around) are eligible for a 2-by-3 format beginning with K or W (but not A or N), and Advanced Class hams may select a 2-by-2 format beginning with K, N, or W (but not A).

U.S. radio amateurs with mailing addresses outside of the 48 mainland states (that is, Alaska, Hawaii, the Caribbean, and certain Pacific Island possessions) are eligible for certain prefixes. These station callsigns have a two-letter prefix, the second prefix letter being an L, P, or H. Stations with mailing addresses in the 48 continental (contiguous) states may not select a two-letter prefix with L, P, or H as the second letter. Before going further, let's discuss mailing address versus home address.

A mailing address is simply where you can receive mail. There is no FCC requirement that a licensee actually live in Alaska, Hawaii, the Caribbean, or the Pacific to get a callsign with the special L, P, or H second prefix letter—only that they can receive mail at that geographic location. We suspect that many holders of these callsigns merely use a friend's remote address. Once the callsign is issued and license forwarded, the amateur changes the address to his/her mainland stateside address. You may, of course, change your address at any time without changing the callsign. This "manipulation" is legal and the FCC database contains many amateurs with seemingly remote "DX" locations but mainland stateside addresses.

AL, KL, NL, or WL-by-1 format callsigns may be selected by Extra Class hams with mailing addresses in Alaska.

KP, NP, or WP-by-1 callsigns are reserved for Extra Class radio amateurs in the Caribbean with the numeral 2 denoting the U.S. Virgin Islands and 3 or 4 for Puerto Rico. AH, KH, NH, and WH-by-1 callsigns are reserved for those Extra Class amateurs with mailing addresses in Hawaii (the numeral must be 6 or 7). Various U.S. Pacific islands use other area numerals (for example, AH2B is a station in Guam and KH8K is in American Samoa).

KL, NL, or WL-by-2 format callsigns may be selected by Technician or General Class hams in Alaska. NP or WP-by-2 (but not KP-by-2) in the Caribbean and KH, NH, or WH-by-2 in Hawaii and various Pacific island possessions may also be chosen by the Tech and General Class. (KP-by-2 go to the Advanced and Extra Class.)

Any radio amateur may select a callsign from a "Group" lower than they qualify for. For example: an Extra Class ham may select not only a short Group A callsign, but also any available Group B (2-by-2), Group C (1-by-3), or Group D (2-by-3.) A Tech or General Class ham (eligible for a 1-by-3) may also choose a 2-by-3 (Group D) call.

To make matters even more confusing, there are several callsign prefixes, suffixes, and combinations that, for one reason or another, are not available for assignment to anyone (example: a callsign with the suffix letters SOS is not assignable). We strongly suggest that you go to <http://wireless.fcc.gov/> and click on the "Amateur" link on the right side menu. That will take you to the FCC's Amateur Radio Service pages. Once there, carefully read the section on sequential and vanity callsigns. You will find the callsign exclusions listed.

When to choose a callsign. A callsign is normally assignable two years following license expiration, surrender, revocation, set aside, cancellation, voiding, or death of the holder. There are some exceptions.

The two-year requirement does not apply to requests for a formerly held callsign even though it has been unassigned for less than two years. You do not have to hold a specific class of operator license when requesting a former call that you held less than two years ago.

You may also request the former callsign of a close relative now deceased even though it has been unassigned for less than two years. The FCC defines a close relative as a spouse, child, grandchild, stepchild, parent, grandparent, stepparent, brother, sister, stepbrother, stepsister, aunt, uncle, niece, nephew, or in-law. The callsign is assignable immediately to a close relative once it has been cancelled from the database. *Important:* You must hold a license from a group equal to or higher than that held by the deceased close relative to get his/her callsign!

A club station trustee may request "in memoriam" the callsign for the club previously held by a deceased person who was a member of the club. The trustee must have a written statement (do not send to the FCC unless requested) from a close relative consenting to the request and the trustee must hold a license from a group equal to or higher than that held by the deceased member.

The FCC will not reassign an active callsign even if the holder has been deceased more than two years. The license of the deceased holder must first be cancelled from the licensee database. This is accomplished by providing evidence that verifies that the licensee is dead—such as a newspaper obituary, a death certificate, or data from the Social Security Death Index that shows the date of death. Send to: FCC, Amateur Section, 1270 Fairfield Road, Gettysburg, PA 17325-7245.

When you file for a specific vanity callsign can be very important, especially in the case of a short 1-by-2 format callsign. The FCC's computer awards vanity callsigns by lottery when more than one vanity application is received for the same callsign on the first day of availability. Therefore, you need to carefully determine when this is and file your vanity callsign application on that day. (It makes no difference whether it is filed just after midnight or just before midnight. All applications filed during the same 24-hour day are lumped together.

A callsign is normally active for 12 years—the ten-year license term plus a two-year grace period during which the callsign may be renewed without having to be re-examined. An expired license is automatically cancelled by the FCC two years plus one day after expiration. Any qualified radio amateur may select this expired callsign on that cancel date.

However, other cancellations by the FCC, such as in the case of the death of the holder, are *not* available on the cancel date. Instead you must add two years plus one day to the cancellation date. This disparity has caused many hams to request a vanity callsign either too early or too late.

We hope this month's tutorial will help you better understand and more easily navigate the FCC's Universal Licensing System. 73, Fred, W5YI

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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 9⅝	4.2
SS-30	25	30	3¼ x 7 x 9⅝	5.0

MODEL SS-25M

DESKTOP SWITCHING POWER SUPPLIES WITH VOLT AND AMP METERS

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

MODEL SRM-30

RACKMOUNT SWITCHING POWER SUPPLIES

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

WITH SEPARATE VOLT & AMP METERS

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

MODEL SRM-30M-2

2 ea SWITCHING POWER SUPPLIES ON ONE RACK PANEL

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

WITH SEPARATE VOLT & AMP METERS

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

MODEL SS-12SM/GTX

MODEL SS-10EFJ-98

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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
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VERTEX — FTL-1011, FT-1011, FT-2011, FT-7011

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

*ICS – Intermittent Communication Service

BY DAVE INGRAM,* K4TWJ

Mobiling 2009, Part II
More Attention-Grabbing Mobiles

Our Mobiling Special 2009 continues this month with more views and details of traveling amateurs—folks you may have heard operating from the high roads, low roads, or no roads at all while using a variety of gear and antennas. Such pursuits also extend well beyond the realm of novelties, incidentally. They generate excitement on the bands (hey, listen to this!) and they are an ideal means of sidestepping those pesky CC&Rs afflicting many home stations. Yes, and these creative-minded amateurs are contacting friends, DXing, and having as much fun, or more, than some of the big guns running multi-kilobuck stations and massive antenna systems. That is the beauty of our great amateur radio world: It fits all lifestyles and budgets and everyone is a winner.

Unique Mobiles

Visualize driving up to a romping little roadhouse near Sweetwater, Texas and spotting a chap in blue jeans, T-shirt, and ball cap zipping across the parking lot on a motorized barstool yapping "QSL, 73 and QRZ—next!" Did you just drive into the twilight zone? No, you just discovered James Smith, KC5LQA, running barstool mobile, and it is real (photo 1). James's 2003 model Barfly barstool is powered by a beefy little Briggs and Stratton engine turning a set of racing slick tires and is capable of running at an impressive 15 mph. James has ridden his barstool in a 4th of July parade, Rattlesnake parade, Global Mobile contest, tooled around hamfests with it, and challenged a half dozen Smart cars to drag races. Look carefully at photo 1 and you can see his ICOM 2800, battery, and low-mounted antenna ready for use. We are unsure if the barstool mobile setup is rated in miles per gallon (of gasoline) or gallons per mile (of Jack Daniels whiskey), but either way, it is a gas!

Looking southeast from Texas, we find Joey Jet, N4ZUW, preparing for another special aeronautical mobile session while flying movie stars and celebrities hither and yon in a classy Lear Jet 35 (photos 2 and 3). The rig is a commercial 100-watt HF transceiver with automatic antenna tuner built into the airplane's cockpit. The antenna is a long-wire routed between one wing and the tail. Joey says the setup can work almost all HF bands, but the tuner is a mite slow and finicky, so he prefers to leave it set for operation on 14.200 MHz. That, plus tidbits of information gleaned from his website (www.joeyjet.com), lead us to assume most of Joey's "hamming in the sky" occurs during daytime hours. Keep an ear tuned for him, especially when you are also mobile—in a car, on a bike, or while "barstooling" down the street.

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Photo 1– Look . . . in the parking lot . . . out in the grass. It's a . . . yes, friends, it's a motorized barstool mobile and proud owner Jim Smith, KC5LQA, has won several awards riding it in parades. Specifically, it is a 2003 model Barfly with 3.5-HP engine, padded steering wheel, ICOM 2800 transceiver, Comet dual-band antenna, and gel-cell battery. Ride on, Jim! Ride on! (Photo courtesy of KC5LQA)

Back home in sunny Florida, Joey also runs another attention-grabbing setup with his cool-going Smart car (photos 4 and 5). This overgrown go cart strikes us as a really fun vehicle for mobiling. I must also apologize here, as I lost Joey's pictures of a tall HF whip on the Smart and a neat little QRP rig inside due to a computer crash. His 70-cm digital setup shown in photo 4 gets plenty of use, however, as Joey is president of the Gold Coast Amateur Radio Association. He is also a Volunteer Examiner, a member of the A-1 operator club, and his XYL is Didi, K4ZUW. Check Joey's website (www.joeyjet.com) for more interesting notes.

Reflections in the Rear-View Mirror

While recently looking through some old "Mobile Special" issues of *CQ*, the cover of the May 1955 issue with Lenore Jensen, W6NAZ's Jaguar mobile caught my attention (photo 6). Naturally, I paused and read the full issue cover to cover.

Lenore and her Jag are, in my opinion, as glamorous now as they were in 1955. Her rig consisted of (how's your memory?) a Morrow receive converter feeding the car radio and a crystal-controlled Babcock DX-Mitter running 35 watts on 80 through 10 meters. The antenna was a tall Master Mobile with changeable coils, and she used a headset for hands-free driving—a big-time setup that would even be a blast of fun to use today. In fact, I saw a Jag just like it except in rough shape for sale a few years ago. I sort of staggered away after hearing the price, however.

Photo 2– Joey Jet, N4ZUW, with his unique mobile setups: a Lear Jet 35 used for whisking superstars and notables between various events and a Smart car used for motoring around his home town in south Florida. Listen around 14.200 MHz from time to time and you may hear Joey aeronautical mobile. (Photos 2, 3, 4, & 5 courtesy of N4ZUW)

Lenore was a real "mover and shaker" on and off the roads. She particularly enjoyed tooling through Mexico while operating outside the American phone bands as XEØNAZ. She was probably safe doing so, as life was totally different in the fabulous '50s; gangs and road rage were relatively unknown, and Jags could outrun almost anything on the North American roads.

Lenore was also an incredible YL. She was an actress and a writer, a co-founder of YLRL, and she appeared in numerous TV shows such as *Petticoat Junction, General Hospital, The Beverly Hillbillies, I Dream of Jeannie, The Danny Thomas Show,* etc. An internet search turned up more interesting details. Lenore's screen name was Kingston; her first married name was Conn and her second married name was Jensen. Her home rig ran a full kilowatt on phone (AM!) and CW. She held a Code Proficiency Certificate at 35 wpm, was very active on the air, and, along with Barry Goldwater, ran extensive phone patches during the Viet Nam

war. She was inducted into the CQ Amateur Radio Hall of Fame in 2008.

Looking further through the pages of May 1955 *CQ* proved fascinating. One article described a home-devised mobile antenna using a motor-driven loading coil (yep, just like today except different), and now 50 years later it is the trendy item of the day.

Photo 3– Joey in the cockpit and operating as N4ZUW/aeronautical mobile. The rig is commercial 100-watt transceiver with automatic antenna tuner, included in the airplane's gear. The antenna is random wire located between a wing and the tail. The high-in-the-sky location helps to radiate an outstanding signal heard near and far.

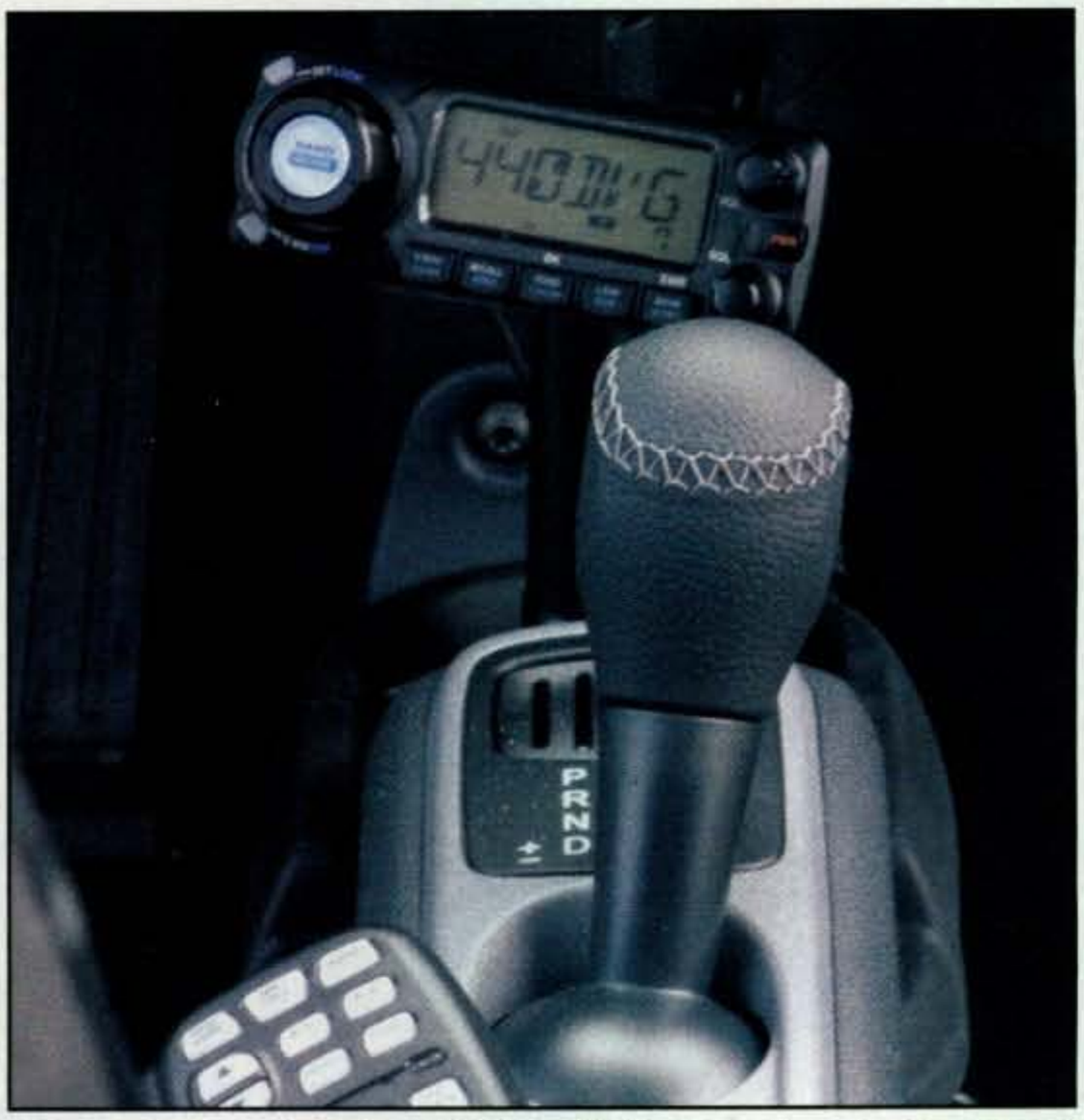

Photo 4– Interior view of N4ZUW's Smart car with ICOM transceiver on the center console. Joey also sent a picture of an HF setup in the Smart, but I lost it in a computer crash (sigh!).

Another article described how to change a trailer hitch to an antenna mount. Hmmm ... I recall seeing a sized-down adapter for that function a year ago. Finally, three articles discussed dynamotors, for powering mobile rigs, and an accompanying article discussed a new form of battery charger or generator called an alternator. Dynamotors typically were around six inches long and two or three inches in diameter. They were a combination DC motor and DC generator with separate windings on a common shaft. When 6 or 12 volts was applied to the motor winding, the dynamotor whirred beautifully and generated between 300 and 400 volts for powering a mobiling transmitter. Cool! A decade or two later, they were replaced by switch-type DC supplies (Heathkit and Collins started the ball rolling), and then 13-volt solid-state rigs captured the limelight.

Browsing through ads in 1955 *CQ*s was also a captivating experience. There were mobile transmitters, receivers, and receive converters by Harvey Wells, Gonset, Pierson Holt, and Morrow; vibrator-type power supplies; mobile T/R relays; and antennas galore (what an era!) for sale. The rig that especially caught my attention was the little Transcon showing in photo 7. If I had only known of this gem when I was young, dumb, and struggling to pay for my first car, I would have put every effort into acquiring one and powering it from two or three series-connected vibrator power supplies scrounged from old car radios (I thought dynamotors were only 28-volt thingies for military radios).

I struggled to mentally return to 2009, and then my good friend Mike Zane, N6ZW, sent me a Mighty Midget Master Mobile antenna from the 1950s. When going past a local flea market last week, I spotted a '50s model Chevrolet in sad shape and begging for a new home. Hmmm ... a new motor, tranny, rear end, some candy-apple-red paint, a bumper mount, and could there still be a dear little Transcon floating around places unknown?

Handy Mobile Aid

Do you occasionally go HF mobile in a rental car and power your transceiver from the vehicle's accessory socket? That is a quick and convenient idea, but be aware there are some potential entanglements. The wiring to accessory sockets in many 2000 and later model newer vehicles is ridiculously thin and may easily overheat when pushed to deliver over 12 or 15 amps. Further, the wiring is often routed under the vehicle's

Photo 5– We could not resist including this picture—the secret to Joey's ultra-high gas mileage with the Smart car. We understand it can travel up to 50 miles on a single winding.

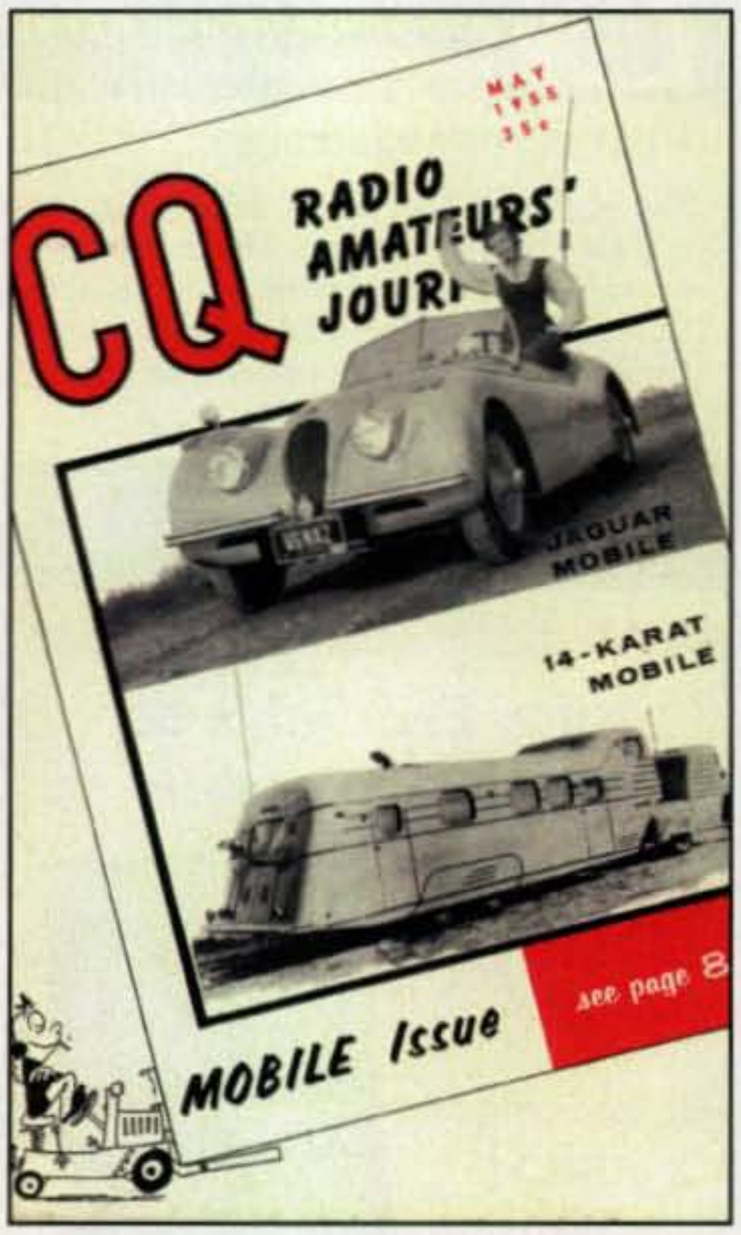

Photo 6– Actress, writer, and radio amateur extraordinaire Lenore Jensen, W6NAZ, graced the cover of CQ magazine in May 1955 with her big-time (vazoom!) Jaguar mobile. Setup ran 35 watts AM to a tall, center-loaded Master Mobile antenna and worked out great. Lenore especially liked operating mobile south of the border as XEØNAZ.

Photo 7– An easy and affordable way to go mobile during the mid-1950s was using a Transcon combination transmitter and receive converter. It was small, available for 10 or 6 meters, included a built-in VFO, a front socket for optional crystals, and delivered 4 to 12 watts output, depending on its power supply. What a doll! →

dry and brittle carpet. Remember the bomb-dropping mechanism in radio-controlled airplanes of eras past? It passed high current through a thin wire that overheated, broke, and dropped the bomb.

A better solution to accessory socket pitfalls is adding an MFJ-4403 transceiver voltage conditioner between the socket and rig (photo 8). This little gem protects your rig from crank-up spikes, excess battery charging voltage, and automotive noise and hash. More importantly, its incredible four Farad capacitors (that's 4-million mFd, friends) charge up while drawing only 10 or 12 amps and deliver 20 amps to your rig for full power at 50-percent duty-cycle operation on SSB or CW. This 4403 Voltage Conditioner is different from the MFJ-4416 Battery Booster highlighted in last month's column, incidentally. The 4416 raised the voltage acquired from a weak battery to sidestep automatic transceiver shutdown at low voltage. The 4403 lets the rig draw 20 amps from a 10- or 12-amp source. Knowing of potential problems and how to avoid them is the key to happy mobiling.

Photo 8– As discussed in the text, powering your mobile transceiver from a modern vehicle's accessory socket can be risky business. This MFJ-4403 Transceiver Voltage Conditioner, however, protects your rig and car from damaging problems. Its massive four Farad capacitors also act like small continuously recharged batteries and let you run 100-watt rigs at full output from the vehicle's wimpy accessory socket. Details at <www.mfjenterprises.com>.

Modern Mobile CW Style

A couple of months ago, I noted Jim Hurley, W5APS, operating CW mobile on 30 meters and was rather impressed by both his signal and operating technique. During the resultant QSO, I learned Jim runs a popular ICOM IC-706 MKIIG and Hamstick antenna setup and had some noteworthy points to share (photos 9, 10, and 11).

First, the transceiver with an LDG-7000 automatic antenna tuner strapped to it is mounted in the (Chevy Malibu's) trunk and the rig's key plus control head are mounted on a homemade wood bracket squeezed between a seat, the

Photo 9– Installing mobile gear in modern automobiles with crowded interiors can prove quite challenging. Jim Hurley, W5APS, sidestepped the dilemma by first visualizing the best spot for his ICOM IC-706's control head and Vibroplex paddle and then making a "push-in" wood mount to hold them in that place. (Photos 9, 10, &11 courtesy of W5APS)

LDG ELECTRONICS

The #1 Line of Autotuners

AT-200Pro

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

Suggested Price $249

NEW! YT-100

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

Suggested Price $199.99

NEW! KT-100

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

NEW! Z-817

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

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

AT-1000Pro

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

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

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

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

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

Now With 2 Year Transferable Warranty!

AT-100Pro

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

radio not included

AT-897 for the Yaesu FT-897

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

radio not included

FT Meter

LDG's new version of its popular FT-Meter presents a lush, highly readable 2.5" meter face with calibrated scales for signal strength and discriminator reading on receive, and power output, SWR, modulation, ALC action and supply voltage on transmit. Each function is selectable from the radio's menu. On/Off switch for the light. ***Still Only $49***

NEW! FTL Meter For Yaesu's popular FT-857(D) and FT-897(D) transceivers, our FTL-Meter presents a lush, highly readable 4.5 inch meter face with calibrated scales for signal strength and discriminator reading on receive, and power output, SWR, modulation, ALC action and supply voltage on transmit. Each function is selectable from the radio's menu. Best of all, it plugs into the meter jack on the bottom of the front panel. ***Suggested Price $79.99***

NEW! M-7700 The LDG M-7700 provides a lavish 4.5" meter for IC-7700. It will display S-meter on receive, or power out, SWR, ALC level or supply voltages, all selectable from the rig's setup menu. What's more, the M-7700 and the virtual meter on your radio can work together; for example, you can display SWR on the radio's meter and power output on the M-7700. ***Suggested Price $79.99***

Z-11Pro

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

NEW! IT-100

Matched in size to the IC-7000 and IC-706, the new IT-100 sports a front panel push-button for either manual or automatic tunes, and status LEDs so you'll know what's going on inside. You can control the IT-100 and its 2000 memories from either its own button or the Tune button on your IC-7000 or other Icom rigs. It's the perfect complement to your Icom radio that is AH3 or AH-4 compatible. ***Suggested Price $179.99***

NEW! Z-100Plus

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

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center console, and a small pocket/ cutout in the dash. Basically, Jim held the paddle and control head in a comfortable-to-use spot and then built the mount to hold the gear in that place. The procedure was a bit fumblesome, but it worked out well.

Jim said he tried using a trunk-lip mount for supporting the Hamstick, but noted the sway and became concerned it would bend or crack the lid unless diligently guyed. Sounds familiar. We, too, have noted many modern cars have thin metal trunk lids and feel apprehensive about using them with an unguyed whip. Jim's solution was simple: He switched to a heavy-duty, triple-footed mag mount, and that brings one additional point into focus:

Avoid relying on capacity coupling for grounding a mag-mount base to an automobile's trunk, roof, or hood. Add a ground strap—preferably short and wide—between the mount's frame and the auto's body, a body bolt, or frame and double check for a solid under 1-ohm connection with your ohmmeter before pronouncing it ready for operation. Then you will find the antenna can be tuned for a nice low SWR, and it will exhibit very good bandwidth and radiate a romping good mobile signal. That's mobiling in style, especially when you operate CW from the rider's seat while the XYL (or OM) drives and dodges loose nuts on wheels.

Conclusion

That overflows allocated space and wraps up this double-feature on mobiling. Again, I encourage you to send photos and tell me about your mobile/portable rig(s) and experiences. Sharing views and notes gives you recognition and helps others seeking ideas for better mobiling. Here's hoping we meet on 30 or 20 meters soon. 73, Dave, K4TWJ

Photo 10– As W5APS suggests, using a wide-based triple-foot mag mount rather than a trunk-lip mount to support a tall HF antenna helps avoid trunk warps or bends by distributing base stress over a wider area. Remember to include a ground strap between the auto body and the antenna mount's base for best signal-radiating results.

Photo 11– In-trunk view of W5APS's setup shows the main body of the IC-706 and LDG-7000 tuner strapped together. The wood base raises the gear off the carpet and helps air circulation so the rig hopefully does not overheat.

The Joy of Kit Building

BY JACK PURDUM, PH.D., W9NMT

Editor's note: This month, instead of a specific project, we decided to offer a basic primer on the tools and techniques needed for basic kit building. Our guest columnist, W9NMT, is a recently retired professor of computer technology at Purdue University and is looking forward to devoting more time to ham radio.—W2VU

I got my Novice ticket over 50 years ago and remember the thrill of my first contact using a Heathkit DX-40 transmitter (photo A) and a Hallicrafters S-40 receiver. I picked up the receiver from a local ham for next to nothing and built the DX-40 kit while I was waiting for my Novice ticket to arrive.

In my mind, there's a huge difference between kit building and "homebrewing" equipment. Homebrewing is where you sit down and design some piece of gear from the ground up. I've always admired and envied such people. Homebrewers are MacGyver-type people who can take an oatmeal box, a razor blade, and a set of box springs from an old mattress into a room and come out a few hours later with a full kilowatt transceiver that fits in a shoebox. Such abilities are far beyond my skill set (and, to me at least, homebrewing involves secret incantations, crushed bat wings, and eye of newt). Kit building, on the other hand, involves taking a bag or two of parts and assembling them in a way that meets someone else's design. With a little help, just about anyone can build a kit.

Photo A– The assembled Heathkit DX-40 kit. (Photo courtesy RigPix.com)

I've always enjoyed kit building. I find the process most enjoyable, and there is an undefined sense of accomplishment when you finish and have something useful that *you* built. The fact that some-

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Photo B– Kit-building tools. (Photos B–E by the author)

one else did the mysterious part of designing the kit and bagging all the components in one convenient place doesn't diminish the inner satisfaction that comes from building a kit—plus it's fun. My recent retirement has given me some time to get back to ham radio and kit building after far too long an absence. This article shares some of my kit-building experience in the hope that both newcomers and old socks alike will try building a kit on their own.

What to Build?

Like most people, I've upgraded my equipment over the years and am pleased with my current transceiver. I considered building a QRP transceiver at first, but backed off that idea, since it made more sense to augment my equipment than duplicate it. I've noticed that my CW "fist" isn't what it used to be. (To be honest, it's lack of practice that's made me sloppy, but my public reason is that arthritis is the culprit. Anyway, that's my story and I'm sticking to it.)

Because I do enjoy CW, I thought I'd buy an electronic keyer for my kit-building project. Before purchasing a kit, I logged onto the internet and started investigating which kit to buy. This turned out to be a fairly daunting task, as there are a ton of good-quality keyer kits available. Eventually, I settled on the WKUSB keyer from K1EL Systems.[1] It has all the features I could ever want in a keyer in an attractive, yet small package at a very reasonable price. Even though it was the Christmas season and I'm sure K1EL Systems was busier than usual, the kit arrived in less than a week.

What Do You Need to Build a Kit?

Regardless of the kit you might choose to build, the tools required are pretty much the same. Photo B shows the tools I use when building a kit. Moving from left to right, you can see a VOM, soldering gun, utility knife, small screwdriver set, toenail clippers, magnifying glass, multi-tip screwdriver, and Vise-Grips. I also printed out a resistor color code chart that I found on the internet to help identify resistor values. You can also see a small piece of white cotton cloth beneath the utility knife that I use to clean off the tip of the soldering iron after each connection is soldered. I prefer to use toenail clippers for trimming leads, as I think it gives me more control than nippers do. (Also, my son borrowed my nippers and seems to have "misplaced" them. Funny how kids never lose anything; they just misplace them. Never did understand the difference.) The Vise-Grips may seem like an H-bomb-to-kill-an-ant as a tool in an electronic kit-building project, but they can be handy when I need to hold a PC board steady while soldering a less than cooperative part to the board.

Qty	Ref. Designator	Value	Description	Package	Check
3	R12, 14, 18	470 ohmS	Resistor	1/8W 5%	/

Fig. 1– Sample line from kit parts list.

Photo C– Fanning out the leads of a component.

Given the small size of the PC board (visible in the upper left corner of photo B), a soldering pencil instead of the iron might seem like a better choice. The soldering pencil probably does make more sense, but not for me. You see, I couldn't find my soldering pencil (lost/misplaced it?) but easily located the soldering iron. Decision made. If you don't have either soldering tool, consider the type of work for which you plan to use it. If experimenting with antennas is your thing, tinning coax braid and soldering on coax plugs with a pencil seems to take forever. In these cases, you'll appreciate the power of an iron. If you plan on just building kits that use PC boards a lot, the pencil is probably a better choice. If you're careful not to apply too much heat to a PC board and its components, the iron can be used for both.

Most electronic components get a little miffed when you apply too much heat to them. Capacitors and resistors seem a little more forgiving to heat than transistors, ICs, and diodes. A friend of mine won't solder a transistor to a PC board unless he uses locking forceps on each lead before he solders it. ICs aren't all that expensive, but IC sockets are cheaper, so I always use IC sockets. They totally remove any heat issues. My experience is that diodes are the least heat-tolerant components on the planet. I *always* check them with the VOM after soldering them in place. The rule is simple: Try to apply most of the heat to the solder pad on the PC board, not the component itself, and then visually check the solder joint (more on this below).

The VOM and magnifying glass probably are not required, but the VOM makes it easy to perform continuity checks and check for solder bridges that might short out components. I picked up the VOM shown in photo B on the internet brand-new for less than $10. Also, more complex kits often provide voltage reference points that require a VOM to check. Since I'm two years younger than dirt, the magnifying glass is a must for me. I use it to check for cold solder joints, solder bridges, and reading the color markings on resistors that aren't much bigger than a grain of rice. (Where was I when they started making 1/8-watt resistors?)

You may or may not need the small screwdriver set shown in photo B. However, when it came time to replac-

ing the 9-volt battery in the VOM, all my other screwdrivers were too large to access the small screws that hold the VOM plastic shell together. Also, some electronic components have adjusting screws that are quite small. Most control knobs have small set screws that require very small screwdrivers. The multi-tip screwdriver, on the other hand, is perfect for all assembly tasks you are likely to encounter (e.g., attaching PC boards to a case) where a normal-size screwdriver is needed.

While you may run into a project where some other tool is needed, the tools shown in photo B should cover most kit-building projects. Don't skimp on the tools, however. If the only tool you have is a hammer, all your problems start looking like a nail, and that usually leads to disappointment. Having the proper tools makes kit building enjoyable and helps to ensure a successful project completion.

Building a Kit

Preparation. Every kit comes with a parts list, so the first order of business is to check the parts received against the parts list. The K1EL System parts list for the WKUSB keyer comes with an empty column on the extreme right that you can use to check off each part as you locate it (see fig. 1). I usually mark these with a simple forward slash (/) as each part is located. When I install a part, I remark the parts list with a backslash (\), which forms an "X" once the part has been *both* located and successfully installed. Obviously, you should end up with nothing but Xs on the parts list when you're done. While this is probably overkill for a simple kit such as the WKUSB keyer, it proved invaluable when I was assembling kit computers (e.g., MITS Altair, Imsai, and SOL-20s) that had hundreds of parts for friends back in the 1970s. It's just a habit I got into and just never bothered to break.

As fate would have it, I was missing a set of four resistors that are particular to the HV version of the keyer kit. I sent an e-mail to the vendor telling the folks about the problem, and they responded *in less than two hours*, offering to mail the resistors in the next day's mail! I was stunned! Since I was able to buy the four resistors for less than a buck at the local RadioShack, I told Steve, the owner, not to worry about it. Still, it's nice to see that customer service is alive and well at K1EL Systems.

The assembly instructions are in the form of an Adobe PDF file that comes on a small CD mailed with the kit. The

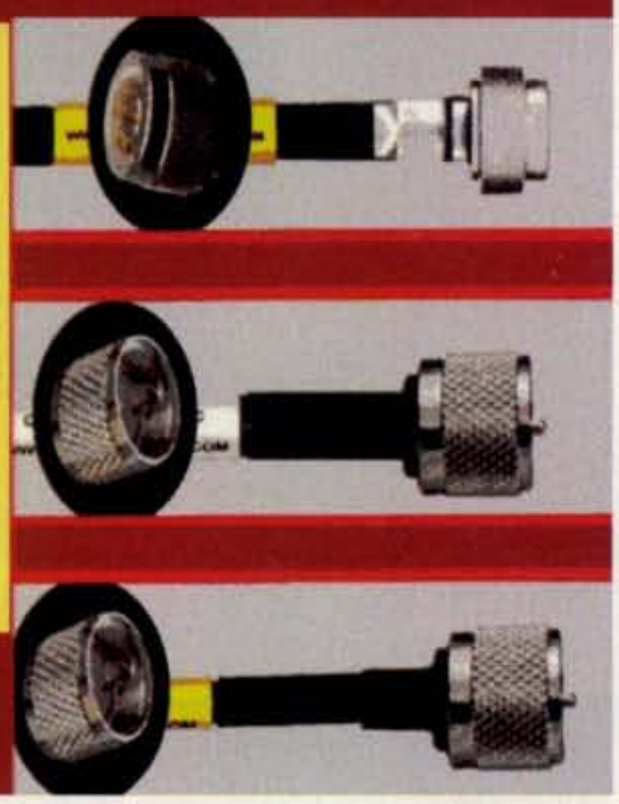

Photo D– The front of the WKUSB keyer. Note the size relative to the utility knife.

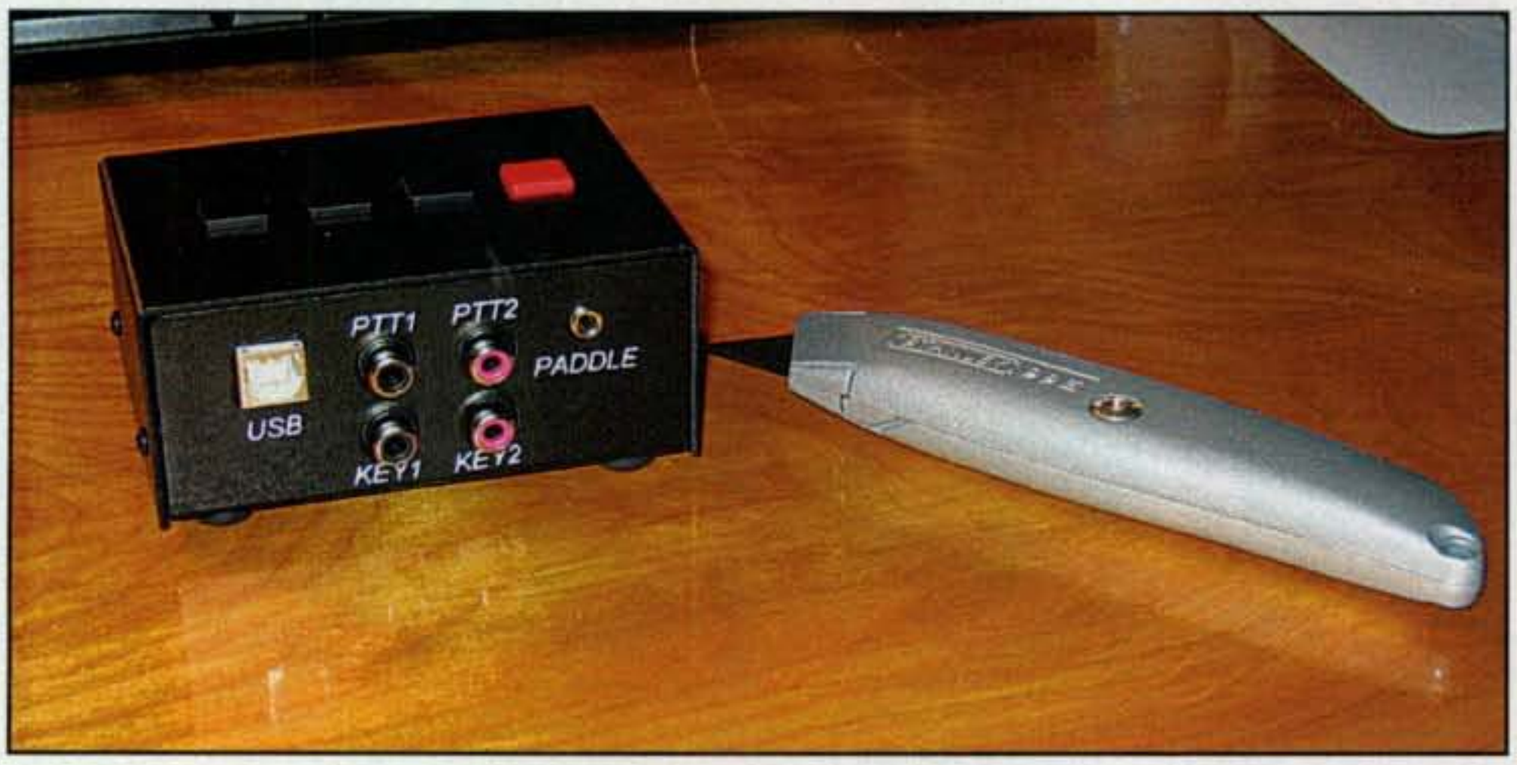

Photo E– The back side of the WKUSB keyer. Note the USB interface socket.

use of PDF files for construction manuals is fairly commonplace for kits. Indeed, most kit vendors have a website where you can download the instruction manual. (I found it useful to read these files before buying, since it gave me some idea of what I'd be running into when building the kit.) Also, by using PDF files rather than printing the manuals, the cost is lower and the vendor can make small tweaks to the directions as necessary.

Another advantage of using PDF files for the instruction manual is the instructions can either be printed out or displayed on a computer. I prefer to display the instructions on the computer, since the Adobe software allows me to expand or shrink photographs that are often included in the instructions. I do, however, always print out the parts list so I can check things off as I proceed.

Installing the Components. The keyer instructions begin by telling you to install and solder all the resistors in place. Since the keyer's PC board is silk screened with all of the component parts identified on the board, this is fairly easy to do. However, it's not the way I like to do things. For example, one line from the parts list is shown in fig. 1.

This is a perfect way to have a parts list, because all of the components with identical values are on a single line. (Note my forward slash in the Chk [Checked] column.) I then locate the three resistors, bend the leads to fit the mounting holes for the part on the PC board, and place the resistors on the board. Unless otherwise told to do so in the instructions, mount each component as close to the board as possible. I like to slightly fan out the component leads after inserting them onto the board to help hold them in place. Photo C shows the back side of the PC board with the resistor leads fanned out prior to soldering.

I think you should resist the temptation to load all of the resistors onto the PC board at one time even if the directions tell you to do so. If you do this, you end up with a forest of component leads sticking out of the back of the board, which can make it difficult to position the tip of the soldering iron onto the pad to be soldered. Instead, I load the identical value components (e.g., R12, 14, and 18) and solder them in place, and then place the backslash on the Chk column, thus forming an X, to show those components have been mounted on the PC board. I make sure the tip of the soldering iron sits on the solder pad on the board while just touching the component lead. By using small-diameter rosin core solder (e.g., .032 inch, available at RadioShack), it takes very little heat to melt the solder and make a good solder joint.

I then check each solder connection with a magnifying glass to make sure it's a good connection and doesn't form a solder bridge with any other component or solder pad. A good solder connection is bright and shiny, while a cold solder joint is grainy and dull. Because most modern PC boards use plated-through holes (i.e., the contact metal of the solder pad extends through to the front side of the PC board), a good connection normally shows a little solder has wicked up into the hole when viewed from the component side of the board. Cold solder joints usually don't flow through to the component side.

I also take my finger nail and "pluck" the soldered leads before I trim them. If I hear a somewhat "musical note," I'm pretty sure the component leads don't have cold solder joints. If the plucking results in a non-musical "thudding" kind of sound, I resolder the joint. While this isn't a bulletproof test, it only takes a second to perform the test, and every once in a while it does discover a bad joint. If you're in doubt about a connection, check it with the VOM.

While not at all necessary, I always mount components in a way that makes it easy to read their values. (Exceptions, of course, are components *such* as diodes, transistors, ICs, etc., where polarity or lead position matters.) For example, if I place a PC board on the table, all of my resistors are mounted in a way that allows their "stripes" to be read from left to right. Those resistors that might be mounted at right angles to the other resistors are mounted in such a way that rotating the board 90 degrees finds all of those resistors aligned for left-to-right reading. I mount capacitors for easy reading, too. If I place the PC board on the table, I should be able to read all of the values from one viewpoint. The only exception is when another, often larger, component obscures the view. In

those cases, I mount the part in whatever fashion makes it easiest to see its value. While you may never take advantage of such easy component viewing, it takes so little effort to do it that there's no reason not to. In the rare case where you did mount the wrong component, this procedure makes it easier to identify the errant component.

Once I'm convinced all of the component connections are good, I use the toenail clippers to trim the leads flush with the board. Because the keyer instructions said to mount all the resistors first, I proceeded to the next line of components on the parts list that had resistors on it. I repeated the process for each line on the parts list until all of the resistors were mounted on the PC board and all resistors were checked off the parts list with an "X."

The keyer directions then said to mount the capacitors on the board. I followed exactly the same procedure as I did with the resistors. The instructions then requested the rest of the components (e.g., connectors, switches, pots, etc.) be mounted on the board. Each of these components was mounted to the PC board using the same techniques described earlier.

Usually, non-PC board components, such as switches, pots, jacks, etc., are connected to the board with hookup wire. If the kit doesn't include the hookup wire, I prefer to use a light (e.g., #20 to #22) stranded copper wire. Solid hookup wire is a little stiff and could make it difficult to snake the wires where they need to go. While some kits may suggest tinning the leads that are formed with hookup wire, I usually don't. My main reason for not tinning is because it sometimes results in wire leads that are a very tight fit in the board's mounting holes. As long as you're convinced a connection is not a cold solder joint, construction should be fine without tinning.

Mounting ICs. *Note: This particular kit recommends conducting certain tests before installing the integrated circuits. If you are using this article as a guide to building this kit, along with the provided instructions, see the section below on testing before installing the ICs. If you are reading it as a general kit-building guide, keep reading.*

Mounting ICs sometimes needs a little extra care. First, many ICs are very sensitive to static discharge. A dead giveaway to a static-sensitive IC is when the IC is delivered in anti-static foam or a separate anti-static bag. This foam is often black in color and looks like a synthetic sponge material. I've seen some people actually wear ground straps connected to their wrists when the static problem is bad. However, my kit construction takes place in my basement, and I could rub two cats together and not get a spark. Still, if you're somewhat concerned, just touch your equipment's ground wire before you start handling the ICs.

If you look at an IC carefully and then look at the IC socket, you'll notice that the IC pins are slightly splayed outward, making the pins wider than the mounting holes in the socket. I really don't know why the IC is manufactured this way, but my made-up reason is that it creates a small amount of pressure between the pins of the IC and the pin connections in the socket. Whatever the reason, you do have to take some care when pushing the IC into its socket. It is very easy to bend an IC pin, making it just that much more difficult to mount the IC. Even worse, it's pretty easy to "fold" a pin under the IC body and not even notice it. Folded pins can be a bear to locate, especially in the old days

when a memory card might have as many as 64 ICs on a single board.

I've found a three-step process that seems to work fairly well: (1) place the pin tips on one side of the IC into their associated socket position; (2) place a slight outward pressure on the IC; and then (3) gently push down on the opposite side of the IC until the IC seats in its socket. For example, looking down on an IC, place the left-side pins into the socket and then lightly push the IC to the left. This pressure doesn't really bend the pins, but simply "flexes" them a little. While maintaining the flex, push the right-side set of pins into the socket. You may have to apply pressure on one side and then the next, but eventually the IC will seat firmly into the socket. Also, make sure you don't put the IC in backwards. Usually, there is a slight dimple in the top of the IC near pin #1.

Testing. After most of the components have been mounted to the PC board, the keyer instructions detailed a series of tests that should be performed before mounting the ICs on the board. The WKUSB keyer can be powered either from a battery pack or from a computer's USB port tied to the keyer. Because you've been so diligent in constructing the keyer, there is a *huge* temptation to skip the testing phase and rush on to complete the kit. Bad idea. The tests are there for a reason, and it's best that you perform the requisite checks before proceeding. While I usually don't stop for directions when I'm driving a car, I do stop construction for testing when the directions say to do so, and you should, too.

The testing procedures are clearly described in the PDF files that come with the kit. Since I wouldn't expect anyone to experience any testing problems, there's no reason to repeat those tests here. Regardless of the kit, run the tests in the sequence suggested and resolve any problems before moving to the next test.

If a test does fail, check the documentation to see if it mentions likely problem areas. If there are no suggestions or they don't solve the problem, visually inspect the placement of all components on the board to make sure you've mounted the right components in the right places. Pay particular attention to diode polarity and lead placement on transistors. Then check for solder bridges (shorts between PC board traces), cold solder joints, and cracked or broken traces. If a voltage reference chart is supplied, use the VOM to verify the values.

It is possible to exhaust all of these possibilities and still have a DOA kit. I've never reached that kind of problem, because the few times I did have a problem, it was a "flat forehead" type mistake (you know, where you slam the heel of your hand into your forehead while mumbling, "How could I be so stupid!"). If you have a ham friend who might have some additional test equipment, that's always a possible solution. Another possibility is a local community college or technical school. Quite often instructors love to have a DOA piece of equipment for their students to diagnose during a lab. Also check to see if you have a local ham club in your area, and, if size makes it feasible, take the piece of equipment, documentation, and your VOM to the meeting. Hams are a helpful group, especially if you're new to kit building. If all of those options fail, contact the kit vendor and ask what you need to do to return it for repair. Make sure you call first so you can follow the return policies to the letter. It will help the vendor fix and return it to you as quickly as possible.

Viola! Eventually, all of the board's components will be mounted and each line of the parts list should end with an X. The keyer instructions then tell you to insert the ICs and mount the speed control to the case. Next, the battery pack is installed, the two halves of the case are assembled, and *viola!* The kit is done. The finished product for the WKUSB keyer can be seen in photos D and E. The buttons on the top of the keyer are used when it is connected to a computer's USB port. This enables the WKUSB keyer to interact with associated software programs.

Satisfaction 101

I can't begin to describe the feeling that results when you use something you built yourself, whether it's something simple such as the WKUSB keyer or a complex 100-watt transceiver kit. Plus, there's an element of fun to be enjoyed in the construction process itself. I encourage you to find some equipment "hole" in your shack and consider filling it with a kit. You'll probably save a few bucks, learn a little about electronics, and have a blast building it along the way!

Note

1. For more information, visit <www.k1el.com>.

SWR Meter Secrets

BY KENT BRITAIN,* WA5VJB

There must be more urban myths and just plain bad information about SWR than any other topic in amateur radio. There are various types of SWR meters as well (see photo A). We start out this month with a reader question from Jerry in California who asks, "Why does the SWR on my vertical change when I change power level?"

Jerry, there are three possible reasons:

First would be that cloud of plasma around your antenna when you transmit. Not a typical problem for most hams (I can think of a few exceptions), but this is an issue with extremely high-power transmitters. Shortwave station HCJB operates high in the Andes Mountains and the ends of its antennas commonly ionize. This plasma conducts electricity and made the antenna resonate on a lower frequency than that for which the antenna was designed. Effectively, the plasma made the antenna longer. The plasma also ate away at the tips of the driven element,s and they had to replace the ends of the elements quite frequently. For years HCJB used loop and/or quad antennas to eliminate high-voltage points and keep down the corona. But again, not too many hams have this problem.

A second way to have SWR changes with different power levels is if you are using a poorly designed or poorly operated amplifier. If the amplifier is poorly biased, mistuned, or is badly overdriven, the amp can generate harmonics. Therefore, the antenna may still have a good SWR at 14 MHz, but not necessarily at 28 MHz, 42 MHz, 56 MHz, etc. The extra SWR is coming from those harmonics. (The extra SWR? I can't believe I just wrote that, but it makes the explanation simple.)

Third is the way most SWR meters work: In photo

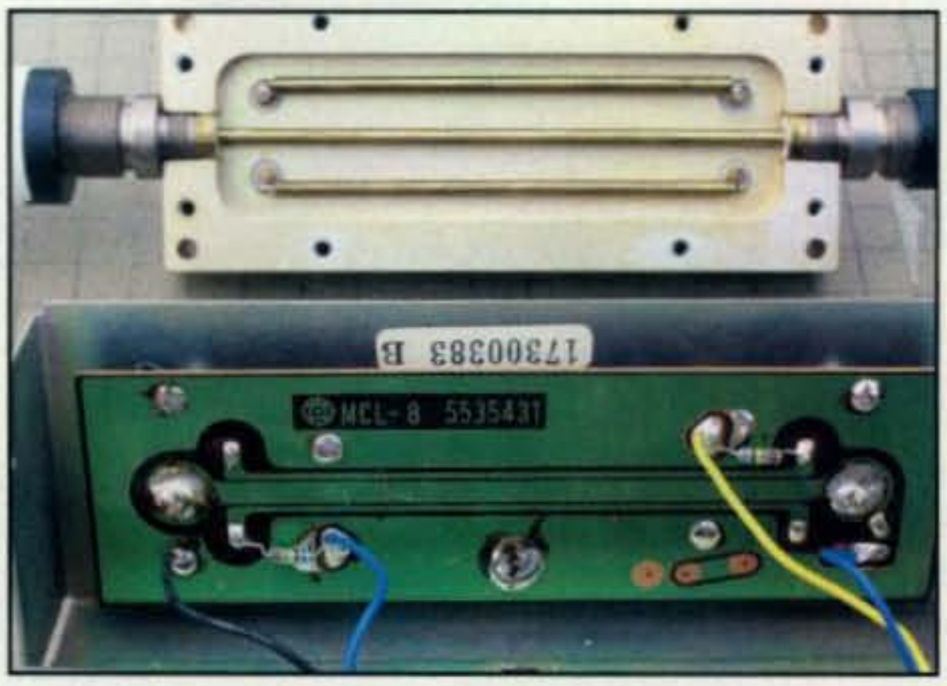

Photo B– Commercial and low-cost directional couplers.

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Photo A– SWR meters vary widely in price, quality, and accuracy. How accurate is yours?

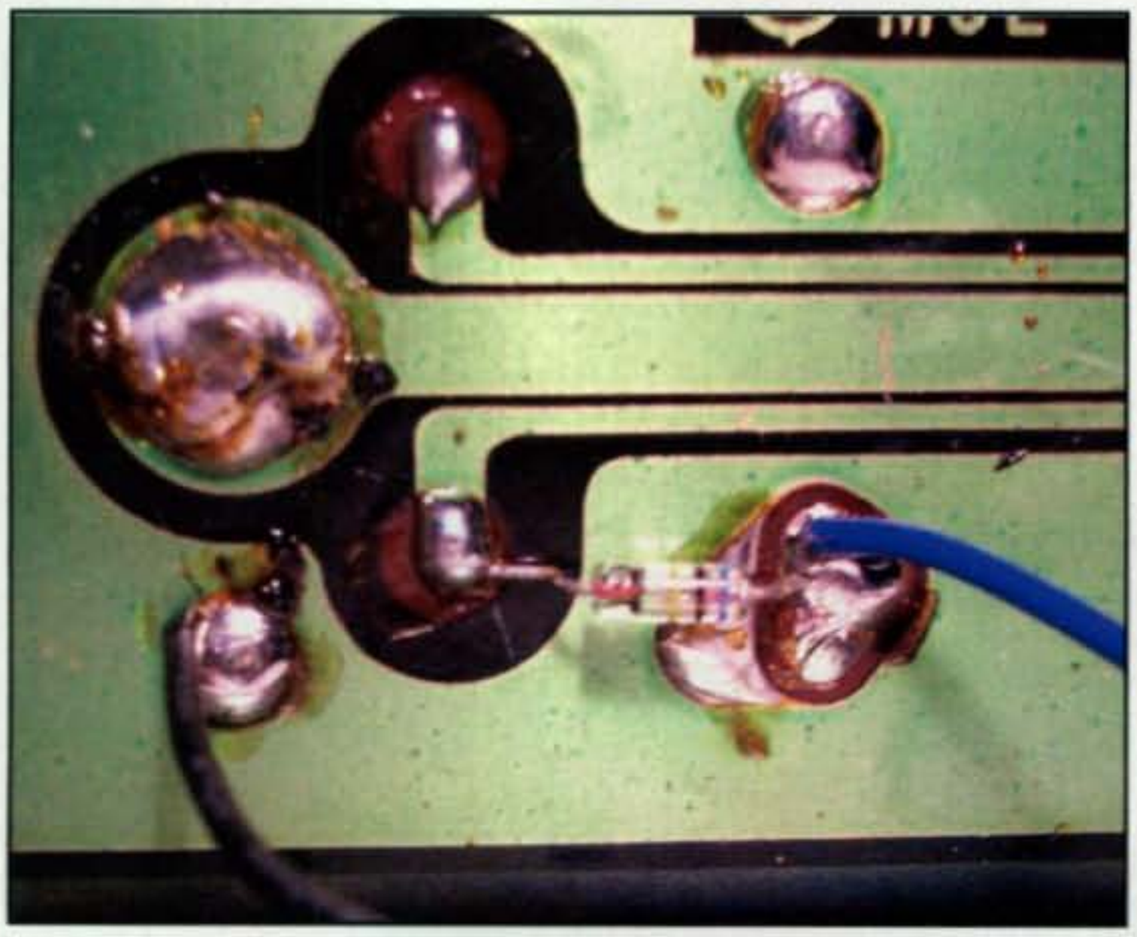

Photo C– The detector diode is at the heart of this SWR meter.

B we have a commercial directional coupler with elements for measuring forward and reflected power. Below the commercial coupler is a simple PC-board directional coupler. While I have a calibration chart for the commercial coupler, just how accurate do you think that PC-board version is? An accurate SWR reading requires the two couplers to have exactly the same amount of coupling, but there is a quick test. Choose an antenna or a frequency where your antenna has an SWR around 2–3:1. Look closely and take a reading. Now flip the meter around. This time FWD is really reflected and REF is really forward. Full-scale calibrate on REF and take your reading on FWD. Few low-cost SWR meters will give you the same SWR reading.

Most SWR meters use a simple detector diode, such as the one shown in photo C, to measure forward and reflected power. These diodes are not linear and are not a precision measuring technique unless individually characterized. In photo D we have a typical RF power meter driven by a detector diode. See how the power scale is non-linear? The diode stretches out the bottom of the scale and then compresses the top of the scale. Also, you have two of these non-linear detectors in that meter. Again, an accurate SWR reading at different power levels requires the FWD and REF diodes to behave identically at the different power levels. The test of your SWR meter by taking an SWR reading and then reversing the meter also tests how well the factory matched the detector diodes if you try it at different power levels.

Bird and Dielectric have a good solution for the directional and detector diode matching. In photo E we have the inside of a Bird® slug. This design uses the same coupling loop and the same diode for both the forward and reverse power readings and just mechanically turns the loop around. It's an excellent way of ensuring consistent readings.

Calibrate your SWR Meter

The best test is to make a calibrated non-50-ohm dummy load. The easiest way is to use a T connector and two 50-ohm loads. You want to keep the coax between the meter and your 25-ohm dummy load as short as possible, like I have in photo F with my high- and low-power test loads. A long cable can move your load around the Smith Chart giving you different readings. This 25-ohm load should read as a flat 50/25 or 2:1 SWR at any power level or frequency—well, up to the power and

Photo D– Typical SWR-meter scale. Note that it is not linear.

Photo E– A Bird® slug uses the same detector diode for both forward and reverse readings.

Photo F– A 25-ohm dummy load for SWR calibration. (See text for details.)

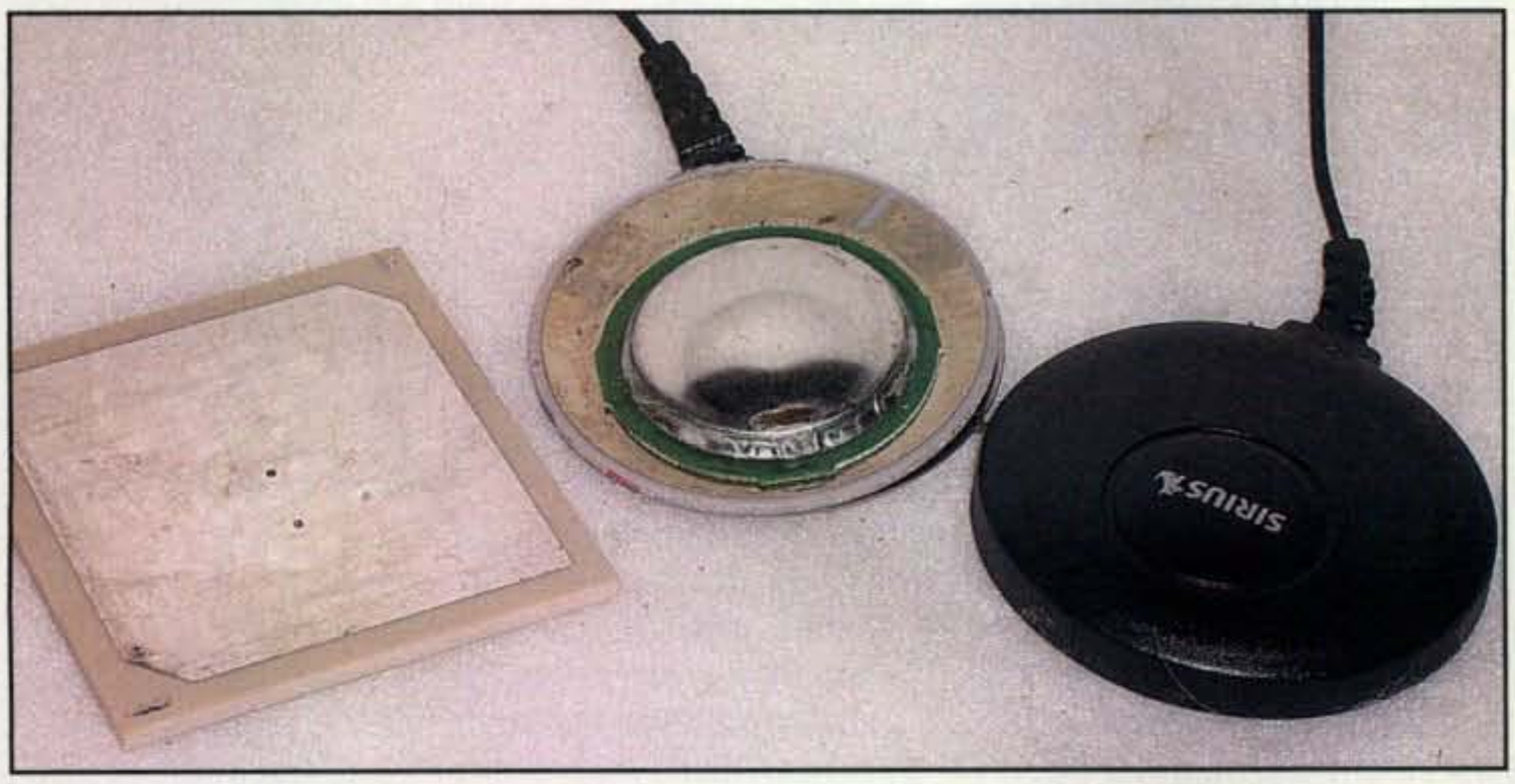

Photo G– Regular (rectangular) and Sirius (circular) patch antennas. Note the thickness of the patch and the slot in the ground plane on the Sirius antenna.

frequency ratings of the loads, of course. If that dummy load appears to change SWR with increases in power, then you know why that SWR meter was such a good deal.

Really Neat Antennas

I am always a sucker for a bunch of unusual antennas I can take apart. In photo G we have the typical patch antenna and two Sirius magnet-mount 2.32-GHz patch antennas. The typical patch antenna on the left is usually square, because that is the easiest shape to work with and it is linearly polarized. In this case, the patch antenna is vertically polarized, so you can imagine my fun when I got a batch of Sirius 2.32-GHz patch antennas to play with. In photo G you can see the patch is round and the ground plane is round with the patch offset to one edge of the ground plane. Two things to note in photo G: First the patch is awfully thick, and second there is a slot in the upper right side of the ground plane. That slot unbalances the current in the patch and makes the antenna circularly polarized. If the slot was cut 45 degrees to the left instead of 45 degrees to the right, then the antenna would have the opposite circular polarization.

The long run of thin coax from the magnet-mount antenna to the Sirius receiver would be too lossy to ever hear the satellite signals, so there had to be an amplifier hiding in there somewhere. In photo H you can see how the Sirius engineers used that thick patch as a shielded housing for a voltage regulator, two stages of GaAs FET amplifiers, and even a ceramic passband filter. In all, 44 surface-mount components were hiding inside the patch element.

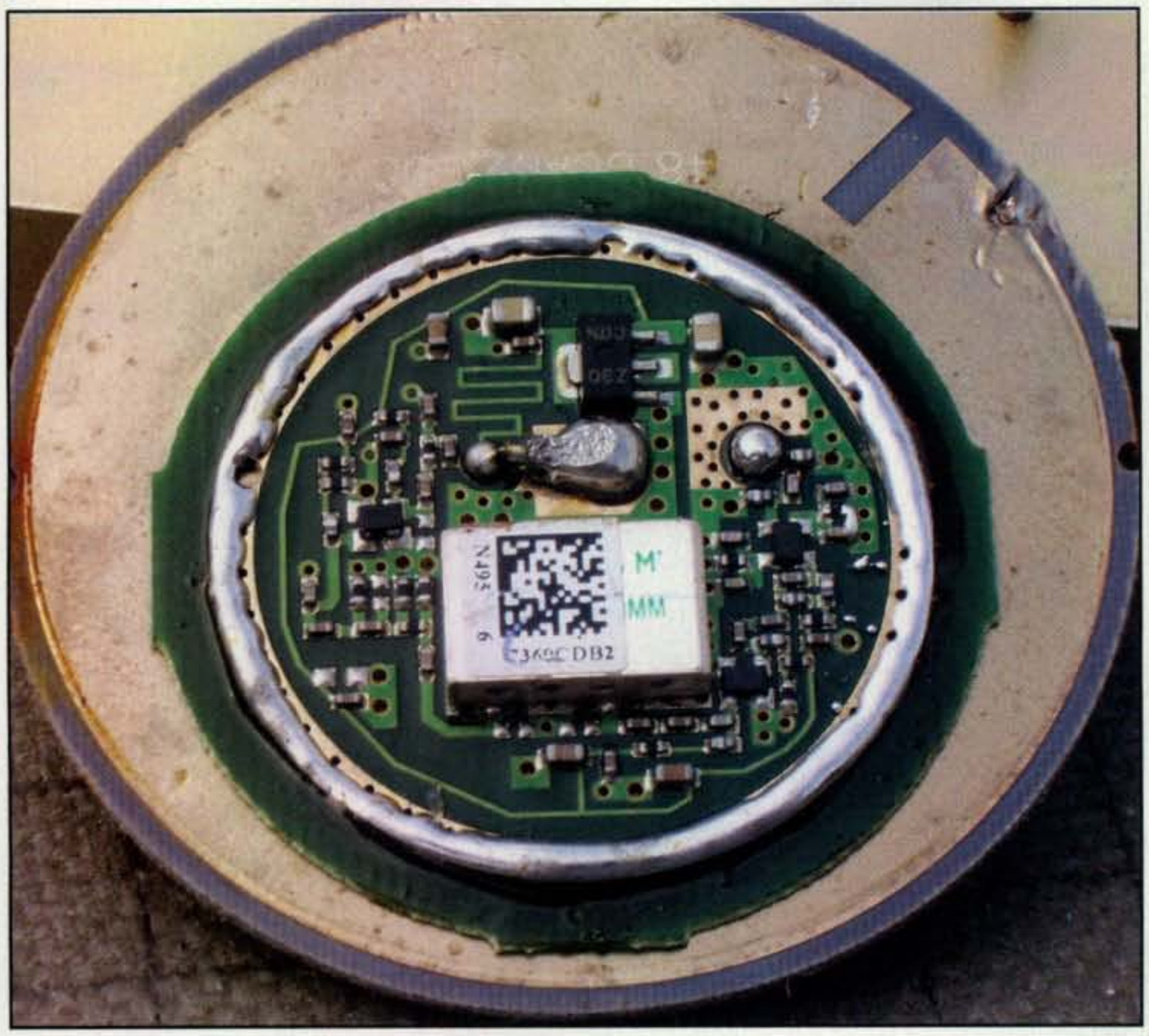

Photo H– There's an amplifier hidden away inside that Sirius patch antenna. That's why the patch is so thick!

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

beginner's corner

BY WAYNE YOSHIDA,* KH6WZ

Stretching the Ham Radio Budget with Used Classic Radios

Hams worldwide generally are a creative and budget-conscious group. It is a ham radio tradition to use previous-generation rigs, converted surplus radio gear, or home-built equipment to get on the air in an economical way. These days the same is true and budget-conscious hams have always figured out how to set up a station and enjoy using the airwaves.

Recently, *CQ* magazine editor Rich Moseson, W2VU, mentioned something about the demand for used rigs must be high due to the slump in the economy. As he wandered through the flea market (swap meet, tag sale, or rally, depending on where you live) at the Orlando, Florida HamCation℠, he noticed many old rigs for sale, including some very classic and once-popular rigs that use vacuum tubes, rather than transistors and integrated circuits. Vacuum tubes are sometimes referred to as "hollow-state" technology, as opposed to transistors, which are "solid-state" technology.

Inspired by Rich's note, recently I went to one of my local ham radio swap meets and noticed the same thing. By the way, the Orlando HamCation is one of the nation's best ham radio conventions. If you are planning a vacation near Orlando, you should arrange it to coincide with this excellent ham radio gathering. It happens every February, so it would also be a great place for a winter vacation! More details are posted on the HamCation website: <http://www.hamcation.com>.

Used ham radio equipment can be found just about anywhere. Sources include your local radio club, ham radio conventions, and the internet auction sites such as eBay and others.

Let's take a look at some of these classic and budget-stretching rigs with an idea of what to look for and things to watch out for when considering a purchase of old, but good, used gear. It would also be a smart idea to bring along an experienced ham friend with good "radio knowledge" so you can ask for his or her opinion. Besides, a good friend might also be a source for a short-term, interest-free loan.

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A Museum Piece or an Every Day Driver?

One of the critical things to keep in mind while looking for bargain station equipment is your goal: You want something you can actually plug in and put

Photo 1– These days it seems like a lot of used mobile and portable VHF and UHF radios are for sale. However, be careful. These radios are radios for the UHF public service band and are not suitable for beginning ham radio use.

Photo 2– Don't know what it is and neither does the seller? It would be best to avoid bargains like this, even if the price seems right.

on the air, and not something that will just sit on a shelf for display. Just like looking for a "reliable transportation car," you are looking for a "reliable communication radio."

In addition, you should look for a fully operational unit without any "improvements" or modifications. An operating manual, either the original or a copy, would be most useful. Sometimes manuals are available to download from the manufacturer's website, or some helpful ham may be willing to provide a copy of the long-discontinued manual for a copying fee or something reasonable. Of course, too, you can use your favorite internet search engine to find a source for an operating manual for that old radio.

While looking at used radios, remember that certain accessories may be needed in order to put the rig on the air, such as a power supply, or a microphone with a strange or non-standard connector, or some other detail like that. Make sure you ask if the set is a complete system so you won't be disappointed later.

When shopping at the swap meet, another good idea is to carry a big 12-volt battery with you, such as an emergency automotive jump-start battery sold in hardware and auto-parts stores. If you spot a radio that requires a 12-volt supply, you should ask the seller if he or she does not mind if you can power up the unit to see if it works. Remember to be sure to ask permission first!

I have seen several serious shoppers who carry (or tow in a cart) a small 110-VAC generator around a swap meet. This is an excellent idea, and it will allow you to check AC mains equipment right there on the spot.

What Are You Looking For and What to Look Out For

Many new hams begin on the VHF and or UHF bands. This is generally true these days due to the increased interest in public service and homeland security organizations such as CERT (Community Emergency Response Team), RACES (Radio Amateur Civil Emergency Service), ARES (Amateur Radio Emergency Service), and others.

The VHF/UHF bands are used extensively for such groups because of the "local" nature of this frequency band, and the radios are portable (hand-held, walkie-talkie units) and compact (in-car rigs), and the antennas are small. Operation on these bands is usually on the FM mode using simplex and repeater channels.

Photo 3– Here is an example of a good, used FM rig. This is a compact 2M/70cm radio in working condition. The original power cord and mounting bracket are missing but can easily be replaced. This rig has all the features of anything brand new, but it comes at a bargain price and it works.

These days there are not too many old tube-type VHF/UHF radios available, although they do exist. However, aside from the unit being a collectors' item or a curiosity piece, a VHF or UHF radio with tubes is not practical for beginners to use.

However, mobile and portable VHF and UHF radios are usually in abundance (see photos 1 and 2). Although some of these units look very nice, you must be certain what frequency or frequencies the units operate on. The HTs in photo 1 and the mobile radios in photo 2 are non-ham, commercial two-way radios in the UHF public service band. The radios are programmable, fixed frequency channel rigs. Although it may be possible to modify and program these rigs to operate in the ham band, it would be best for beginners to ignore radios like this and find something more suitable for ham use, such as an HT that is already modified for ham band use, or an amateur radio specific unit.

It is important to know that some old rigs from about the 1970s are not as desirable these days because of the limited frequency capability and the lack of frequency synthesizers (meaning crystal control or some other fixed, "channelized" frequency scheme such as the use of diode programming).

For example, FM operations on the 2-meter band in the U.S. were once limited to 146 MHz to 148 MHz. While it is true that this frequency range may work perfectly fine in today's 2-meter FM band, a lot of band space is missing from these vintage radios. (The current U.S. allocation for 2-meter FM spans from 144.1 MHz to 148 MHz.)

Take a close look at the frequency display on many 1970s and 1980s era VHF/UHF FM rigs. Back then, mechanical dials and light-emitting diode (LED) displays were used for frequency read-out. If you would like to use your radio outdoors in bright sunlight, the early LED digital displays cannot be seen. Mechanical dials might be off-calibration and may not provide a good and accurate frequency display.

Radios using crystals are okay to purchase, especially if the radio was in use in your local area. Since almost all VHF and UHF FM work is done on simplex and repeater frequencies, chances are pretty good that at least a few crystal channels will be usable without any changes. You might also be able to purchase new crystals for your favorite repeater system.

Photo 4– When shopping for a used rig, look for flaws such as missing knobs and cabinet damage. Remember that you are looking for a good "communications radio."

Another thing that is important is what some manufacturers call a "destination code" on the radio. Especially on the VHF and above bands, frequency allocations may be different from one country to another, even though the model number may be the same. Usually there is a model number suffix that indicates the manufacturer's intended destination for selling the units. In addition to the frequency-coverage issue, repeater access may be different in non-U.S. locations. For example, in Europe, repeater access is initiated by something called *tone burst*, which is a specific audio tone transmitted when you click the PTT (push-to-talk) button. In the U.S. and other locations, a sub-audible tone (CTCSS) is sometimes used for repeater access. The systems are not compatible.

Perhaps the best VHF/UHF radios on the used gear market are like the unit shown in photo 3. This is an example of a very good mid- to late-1990s vintage dual-band (2m/70cm) FM mobile radio that has been discontinued for several years. This unit is very compact, and has a front panel that can be mounted remotely using an accessory cable and bracket. These radios feature frequency synthesizers, so there is no need to buy crystals to get on your favorite frequencies, and the frequency readout is a very readable liquid crystal display.

Here are a few examples of popular vintage 2-meter mobile radios on the used market:

Alinco
- DR-110T, 1980s
- DR-112T, 1990s

ICOM
- IC-208H, 1980s
- IC-2100H, 1990s
- IC-228H, 1980s
- IC-27A, IC-25A (LED display), 1980s

Kenwood
- TM-201 series, 1980s
- TM-211, 1980s
- TM221 series, 1980s
- TR-7730 (LED display), 1980s

Yaesu
- FT-90R, 1990s
- FT-2200, 1980s
- FT-230R, 1980s
- FT-212, 1980s

On the Lower Bands

For the ham looking for adventures in DX (long distance) contacts, the radios to look for are the larger units on "the low bands," or the frequency bands that cover 30 MHz and lower. On the front-panel band switch the rig will usually go from 160 or 80 meters to 10 meters. Some vintage rigs may include 11 meters, which is the CB (Citizen's Band). Don't even think about transmitting there with that old radio.

Many used rigs are available for the low bands, ranging from the vintage and collectable (but also everyday and perfectly usable) "boat anchor" radios (very large units that use tubes), to equipment only a few years old. One of the things I noticed at a recent radio swap meet was the great number of classic radios from the 1960s and 1970s. These units usually, but not always, have built-in power supplies and use hollow-state (tube), rather than solid-state (transistor) technology. Also within this era, the "hybrid" radio became popular and took the form of an all-solid-state receiver and a transmitter with vacuum tubes in the driver and final amplifier section.

Take a look at the modern-looking unit in photo 4 and the vintage unit in photo 5. The modern-looking radio is an all-solid-state rig from the 1980s or so. However, it is missing some knobs on the front panel and has other defects. It is always best to pass on deals like this and look for better units in working condition.

Photo 5– Remember, a stand-alone receiver is only good for listening, and a transmitter is only good for transmitting. In order to talk to someone you must have both!

Photo 6– Here are some beautiful Heathkit transceivers,in working condition. This setup from the 1960s is a great example of a classic radio that will make a fine station today. Even the manual is included.

Photo 7– Who said tubes are hard to find?

The unit in photo 5 is a vintage receiver. Years ago, ham stations had separate receivers and transmitters. Therefore, if you want to have a complete station, make sure you get the receiver and matching transmitter and any external necessary accessory such as the power supply. While you might think about getting the receiver now and looking for the matching transmitter later, this may not happen in a reasonable time, and the goal should be to come home with a complete station rather than a big door stop or paperweight.

Now take a look at photo 6. A vintage Heathkit radio in working condition may be considered a "collectors' item," but can also be a perfectly suitable everyday radio and would be fine for use on today's HF bands. The seller even included the manual for the rig, which is a very nice bonus.

HF rigs from the 1960s to the 1980s may be good bargains, if they are in working condition and include the manual or a copy. Rigs from this era range from all-tube units, with separate receiver and transmitter, to tube-transistor hybrid radios and all-solid-state "single box" transceivers.

Check for the online product reviews of these classic units. Generally speaking, these rigs were, and still are, very reliable and will make a fine station at a great price.

Some examples of great used vintage low-band rigs include:

Collins

KWM-2 transceiver, 516F-2 power

supply, 80–10 meters, 1960s

32S series transmitters, 516F-2 power supply, 80–10 meters, with matching 75S series receivers, 1960s

Drake

R-4B receiver, T4XB transmitter, AC-4 power supply, 80–10 meters, 1970s

TR-4 transceiver, AC-3 or AC-4 power supply, 80–10 meters, 1970s

TR-7 transceiver, PS-7 power supply, general-coverage receiver, 160–10 meters, 1970s

ICOM

IC-730 transceiver, all solid state, 160–10 meters, 1980s

IC-740 transceiver, all solid state, 160–10 meters, 1980s

Swan

Swan 260 Cygnet transceiver, 80–10 meter, 1960s

Trio-Kenwood

R-599 receiver, all solid state,160–10 meters; T-599 transmitter, solid state plus tube finals, 80–10 meters, 1970s

TS-930 transceiver, all solid state, 160–10 meters, 1980s

TS-820 series transceivers, hybrid solid-state receiver, tube finals, 80–10 meters, 1980s

TS-520 series transceivers, hybrid solid-state receiver, tube finals, 80–10 meters,1980s

Yaesu

FT-101 series transceivers, many variations, 80–10 meters, later 160–10 meters, solid-state receiver, tube finals, 1970s

Speaking of Tubes. . .

Recently, someone told me that tubes are hard to find. I am not sure why my friend said this, since there is a very large ham radio swap meet every month in the area. Take a look at photo 7. Although some are tested and some are not, the price is right, about a dollar each. If you decide to invest in radio gear that uses tubes, it is a very good idea to find a good tube tester, or make a friend of who owns one.

Buying a used radio is a great way to stretch the ham radio budget, and putting an old classic radio on the air is a tried-and-true ham radio tradition. In fact, I was so inspired by this idea that I bought a pair of vintage Heathkit transceivers. I will be restoring these units and hope to get at least one of them on the air soon.

73, Wayne, KH6WZ

how it works

More Fun with Metric Conversions

BY DAVE INGRAM,* K4TWJ

Our previous "How It Works" column (May 2009) overviewed the metric system and explained the relation of numbers greater than one, such as kilo, meg, Giga, Tera, etc. This month we follow with a look at numbers or quantities less than one, such as milli, micro, nano, and pico. We will consider how these quantities are used in specifying inductance, capacitance, and current. As a "hands-on" example of daily use, we will describe a quick and easy battery monitor you can home-assemble for your FM handheld transceiver. Let's begin with a flash review of whole numbers and the metric system as shown in fig. 1.

Multiples of One

Starting in the middle of fig. 1, unity is considered one whole amount of the factor under consideration, such as 1 Hz, 1 volt, 1 ampere, etc., while kilo describes thousands of Hz, volts, etc. Similarly, meg describes millions of Hz, volts, etc., and Giga describes billions of Hz or volts, etc. Converting between quantities—both multiples of one and less than one—is relatively easy if we remember three decimal places are associated with each level of measurement.

Two examples of that fact are included in fig. 1. First, 500 volts is written with the decimal at unity and 500 to the left of unity to indicate 500 whole volts. You can then convert that to kilovolts by moving the decimal to kilo and reading .5 kilovolt (sometimes written as 0.5 KV, which is the same amount). The "zero" is not required or mandatory here, but it is often included because it draws attention to the decimal and the fact that the stated quantity is less than one—which, in this case, is less than 1 KV.

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Next consider 7.0 MHz (example B in fig. 1). If the number/frequency is exactly 7 (MHz), the three zeroes after the decimal may be dropped. If the number/frequency is 7.005 MHz, the 5 is a portion of the whole number 7 and must be included. How do you convert that to kHz? Move the decimal to kHz and read 7005. kHz.

Portions of One

Now let's look to the right of unity and consider parts of whole amounts, such as 1 milliwatt, 2.5 milliHenrys, and 500 microFarads (fig. 2). As a convenient starting point, place the decimal at milli and then write 1 to the left to indicate one whole milliwatt (example A). You convert that to watts by moving the decimal to unity (watts) and filling the two vacant spaces with zeroes, so the resultant quantity is .001 watt. Finally, you can convert the quantity to microwatts by moving the decimal to micro and filling in the three empty spaces (between milli and micro) with zeroes and read 1000 microwatts (or 1000 µW). Now notice a milliwatt is a tiny amount of a watt and a thousand times more than a microwatt. Where are milliwatts and microwatts used? They are popular levels of QRPp or ultra-low power hamming, and they are also the amounts of electrical energy used in small items such as keyfob remote controls, wristwatches, basic cell phones, etc.

Next let's convert the value of an inductor listed at 2.5 milliHenrys to microHenrys (fig. 2, example B). First write 2.5 with the decimal centered on milli. Then move the decimal to micro, fill in the two empty spaces, and read 2500 microHenrys. A couple of special notes warrant mention here. First, medium-large values of inductance (such as 1 to 5 or 6 mHy) are typically used in RF choke-related applications, and smaller values of inductance (such as 5 to 700 or 800 microHenry/µHy) are used

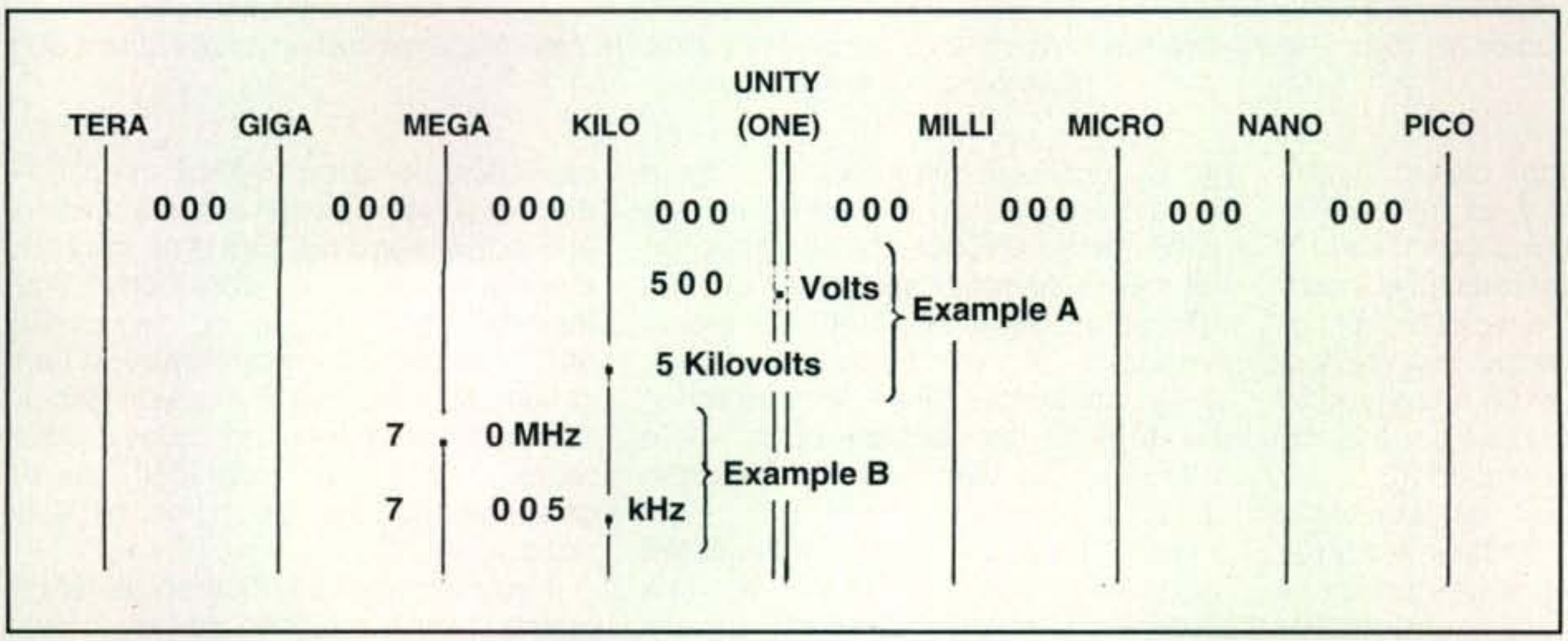

Fig. 1– Conversion chart for the metric system with emphasis on whole numbers or multiples of one. Details plus explanation of examples are in the text.

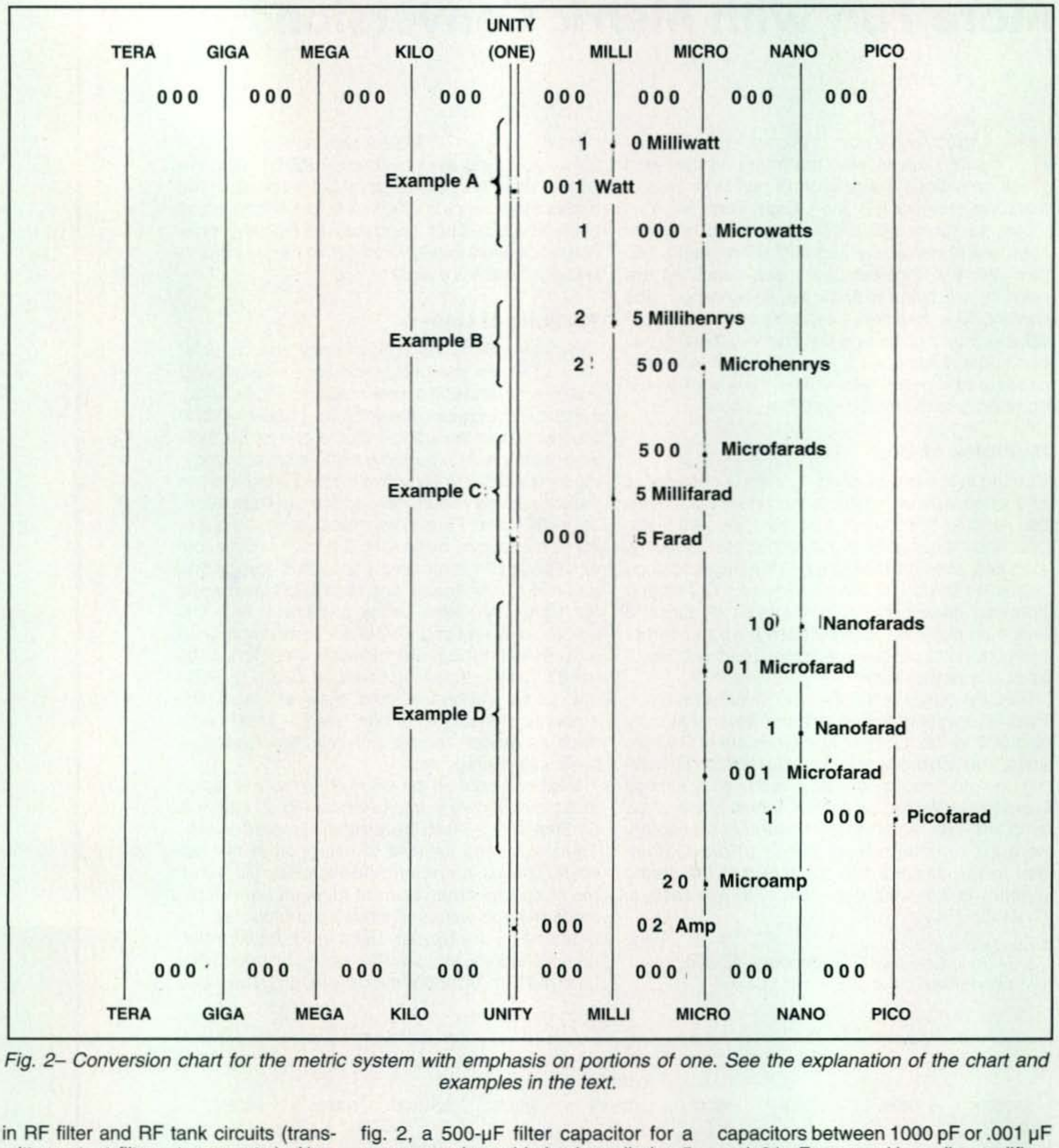

Fig. 2– Conversion chart for the metric system with emphasis on portions of one. See the explanation of the chart and examples in the text.

in RF filter and RF tank circuits (transmitter output filters, tuners, etc.). Also, you usually find "mHy inductors" used at lower frequencies, whereas "µHy inductors" are usually employed at higher frequencies. Thinking large equals slow and low frequency, while small equals fast and high frequency, is a general "fits all" analogy worth remembering.

Capacitors are usually categorized in fractions of Farads—traditionally large microFarads for low frequencies/audio /power-supply applications and smaller picoFarads for higher frequencies/RF applications. Referring to example C in fig. 2, a 500-µF filter capacitor for a power supply could also be called a .5 milliFarad or a .0005 Farad capacitor, but milli is seldom used in conjunction with Farad. Also, and until the recent evolution of small-size/low-voltage "super capacitors," Farads were much too large to be considered in whole numbers, so we usually describe capacitors in µFs or pFs.

With respect to RF-associated capacitors, values from a few picoFarads (pF) to 800 or 900 pF are typically used in VHF and HF transceivers, and linear amplifiers and capacitors between 1000 pF or .001 µF and .01 µF are used in audio amplifiers and power supplies. Old pros may say there is more to the story here, citing feed-through capacitors, bypasses, etc., and that is correct. However, I am striving to keep this discussion simple and easy to understand by new amateurs. Too much "technical" scares good operators out of our great amateur radio world.

If you occasionally homebrew small amateur radio projects, you may have noticed capacitors recently being marked with a new term called

Photo A– Size comparison of a 10-µF capacitor (left) and .01-µF/10-nF capacitor (right). Think low frequencies (50 Hz to 50 kHz, typical) for large capacitors and high frequencies (500 kHz to 500 MHz) for small capacitors as a keep-it-simple guideline and you are right on track.

nanoFarad (nF) rather than the more familiar terms of microFarad (µF) or picoFarad (pF). You may also have noted capacitors from eras past marked in micromicroFarad (µµF) and would like assistance in clarifying exact values. Try the following idea.

Let's start by converting a 10 nF capacitor such as found in various kit rigs (example D in fig. 2). Write 10 in two spaces left of nano and place a decimal at nano to indicate ten whole nanoFarads. You can then move the decimal to micro and read .01 µF. Similarly, a 1 nF is done this way: Place a 1 to the left of nano, move the decimal to micro, fill the two empty slots with zeroes and read .001 µF. Converting to pF is also a snap: Move the decimal to pico, fill in the three empty slots with zeroes, and read 1000 pF. Micro-microFarad was a previous term for picoFarad, incidentally, so 1000 pF is also 1000 µµF.

Milliamps and microamps follow a similar conversion process. That is, first place a decimal at the considered level (such as microamps), and then write the whole number of microamps to the left of the decimal with any parts of whole microamps to the right of the decimal. Then move the decimal to the newly considered value (such as amps), fill in spaces with zeroes, and read the equivalent value. As a quick final example, 20 microamps equals .00002 amp. Now let's have some fun with milliamp calculations.

Easy-Brew Battery Checker

Do you have a VHF/UHF FM handheld transceiver or a portable QRP rig with a rechargeable (NiCad) battery pack and an unreliable battery-level indicator? Does the transceiver's battery seem to always "run out of juice" at the least opportune time? Quickly assemble our mini monitor, and it will alert you to an approaching dead battery condition while there is still time to sign off gracefully rather than "fall into the noise."

Operation of our super-simple battery monitor is based on the fact that there is a slight drop (600 to 700 millivolts) in a rechargeable/NiCad battery pack's output voltage as it approaches full discharge condition, and that drop can be detected by a Zener diode. That change (from full charge to approaching full discharge) can also be displayed on a regular (not high intensity, etc.) LED. You can then reduce power or opt for shorter transmissions as necessary to complete a QSO (with some energy left for emergency use). This technique works because a rechargeable/NiCad battery pack's output voltage remains high until

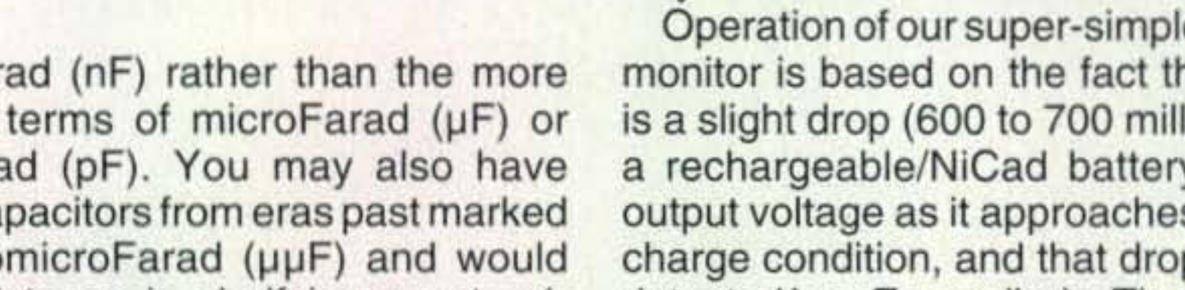

Fig. 3– Circuit diagram of an easy-to-assemble battery checker useful on everything from handheld transceivers to automobile batteries. See text for discussion of circuit and precise value of components.

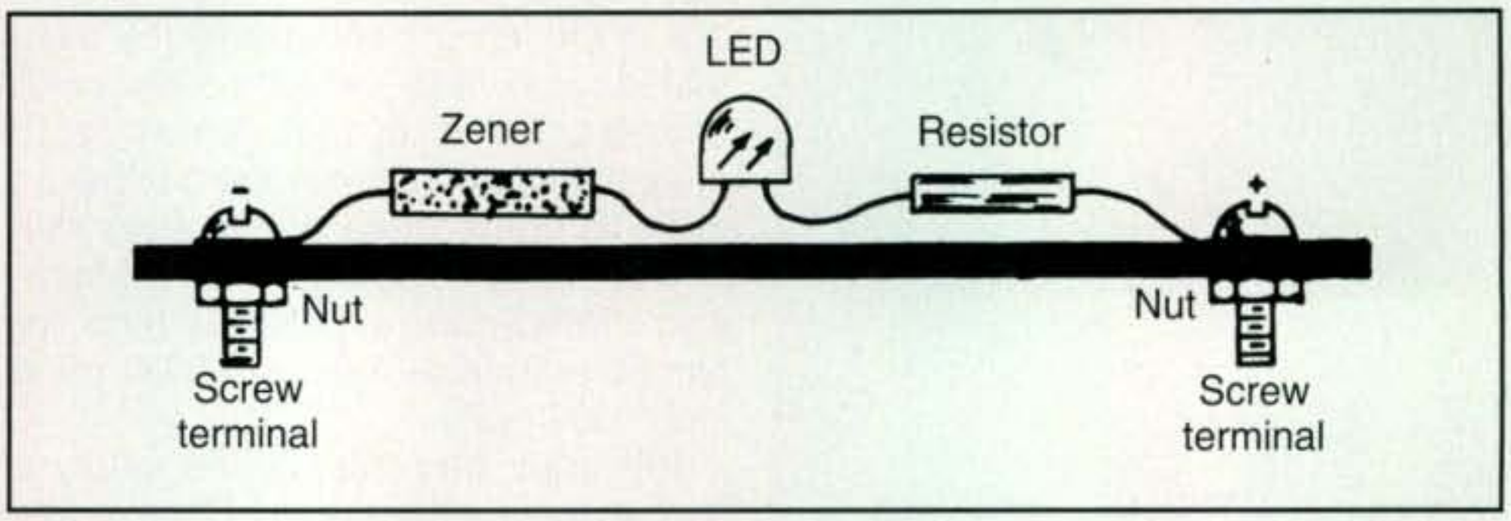

Fig. 4– Assembly outline for homebrewing your own handheld transceiver battery checker as discussed in the text. Regular coaxial sockets often include diodes that isolate battery connections, so mounting the parts on a small piece of perf-board with screws to mate with the bottom/rapid-charge terminals on the battery pack is often necessary.

it begins to approach the "knee" of its discharge curve, and a select-value Zener diode detects or conducts in its reverse/avalanche direction until reaching that point. The series-connected LED shines brightly while the Zener is conducting, and then extinguishes when the Zener reaches its "knee point" and stops conducting.

Precise values for the Zener and its associated "knee detection point tweaking resistor" will depend on your battery pack's "full charge" voltage, and a bit of experimenting may be helpful here. Typically, you combine a Zener in the 10.8- to 11.5-volt range with a resistor of 240 to 300 ohms and an LED of your choice to check a 12.0- or 12.5-volt battery pack. If your rig uses a 7.2- to 7.6-volt battery pack, combine a Zener rated between 6.5 and 7.0 volts with a 240- to 270-ohm resistor and LED of your preference. Tweak resistor value for your desired LED brightness/dimming with discharge.

Now let's add some helpful tips. Checking battery voltage while in a rig (and mating a checker with a battery's charging terminals) can be tricky. Start by using your trusty VOM to measure battery voltage (full, half, and fully discharged) at the transceiver's usual plug-in charge terminals. Some handhelds use a wall charger with AC output and rely on a diode in the transceiver for rectification to DC and some include a second diode for reverse-polarity protection. In such cases, you must change and use the battery pack's bottom "rapid charge" or "drop-in" charger terminals. At that point, you will also know if your charge checker can be home-assembled by soldering series-connected components to a rig's mating plug or if those components should be mounted on a piece of perfboard with contact screws spaced/positioned to mate with rapid-charge terminals on the bottom of your rig's battery pack (see fig. 3 for circuit diagram; fig. 4 for assembly tips).

You can calibrate the assembled battery monitor by first rechecking the voltage of a fully charged battery pack (the LED should light at full intensity) and then tweaking the resistor's value so the LED extinguishes precisely at the knee of the battery pack's discharge curve. That knee usually occurs within 100 millivolts of 11.7 volts for a 12- or 12.6-volt battery pack or within 100 millivolts of 6.9 volts for a 7.2- or 7.6-volt battery pack.

Using the battery monitor is a snap: Just hold it to your transceiver's battery-charging terminals or socket, transmit at full power, and note the LED remains fully lit until the battery charge begins dropping. You then have the option of transmitting at lower power or reducing transmit times to make best use of remaining energy. One final note: A battery checker as previously described also works well for keeping tabs on an automobile's battery, and you can build it into an accessory socket plug so it can be easily moved between vehicles. Dink, enjoy, and have fun!

Conclusion

Understanding the metric system and knowing how to convert between its different quantities of measurement are assets every radio amateur will find beneficial on almost a daily basis. It is seldom explained "full picture style," however, so this month's column addressed that void. We also included several examples of conversions to help you feel comfortable applying metric figures in radio electronics. I have also noted this knowledge is seemingly acquired by magic when becoming licensed, but ask how you can learn it without a keep-it-simple exposure, like through this column.

73, Dave, K4TWJ

magic in the sky

BY JEFF REINHARDT,* AA6JR

Putting Electrons in Motion

So you've been talking on the radio, or working some CW. Maybe even doing some PSK or ATV. The joy of what we do as ham radio operators comes from conveying information that rides electromagnetic waves across the great open spaces. So far, so good.

In past columns we've explored many different facets of "magic"—some historical, some personal, but always tied to the wonder that makes radio communications one of the true miracles arising from the discoveries and creativity found in the human mind.

What makes it all possible is the lowly, abundant, tiny particle we know as the electron, too numerous to count, still not fully understood, yet willing to serve us on a moment's notice. Each day we send torrents of electrons on missions that range from life-saving to frivolous—lighting our homes, sparking our engines, racing through microchips, or just sitting in wait for our next command. We take electrons for granted, yet think of what our lives would be like without the ability to exert our authority over these humble servants. When electrons move, well . . . stuff happens.

Have you considered where and how we set those electrons in motion? Sure there's some natural movement, but we're talking *serious* energy here. Recently, your humble correspondent had the privilege of taking a "behind the scenes" tour at one of the prime electron-shipping sites to be found anywhere—Hoover Dam at the Arizona-Nevada border on the Colorado River.

Off Limits

Since that horrible day in September 2001, the generating galleries of Hoover Dam have been a restricted access area. Having obtained advance permission, we set off on a journey into controlled-access areas. A lengthy elevator ride from the top of the dam brought us down into the concrete and rock netherworld now sadly seen by few. Exiting the elevator, we were guided to a bin where the required hard hats lay in wait. Finding one and sizing it, we were ready to proceed through a rock tunnel carved out by sweat-driven hammers, hardened steel, and powerful blasts. Long after man is

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A rare look at Hoover Dam from its base, holding back the contents of Lake Mead through its sheer mass and providing a home to 17 powerful generators. (All photos by the author)

The first generator viewed by the author at Hoover Dam—a "small" 3500 hp water-wheel-driven unit that provides power for dam operations.

The generator gallery looks as though it was constructed last year, not some seven decades ago. The generators churn out their power without a fuss, practically vibration free.

extinct, these caverns will remain as a tribute to the dedicated workers who came from across America to work in oppressive conditions, people willing to lay it all on the line yet glad to have a job in the depths of the Great Depression.

Our guide told us of the bypass tunnels that were cut and blasted from the canyon walls that allowed the untamed Colorado River to pass around the dam's construction site. A cofferdam upstream forced the water into the tunnels, allowing workers to first dig down to bedrock and then begin pouring concrete.

Far above, "high scalers" cleared boulders and other hazards from the canyon walls. Dangling from ropes and cables, they were a heartbeat away from eternity every moment they were on the job.

Think for a moment of the many technological tools we have at our disposal. Through computer programs and calculators, we can land spacecraft on Mars. Hoover Dam was designed and built in an analog age, where "high tech" was delivered through a slide rule.

Where It Began

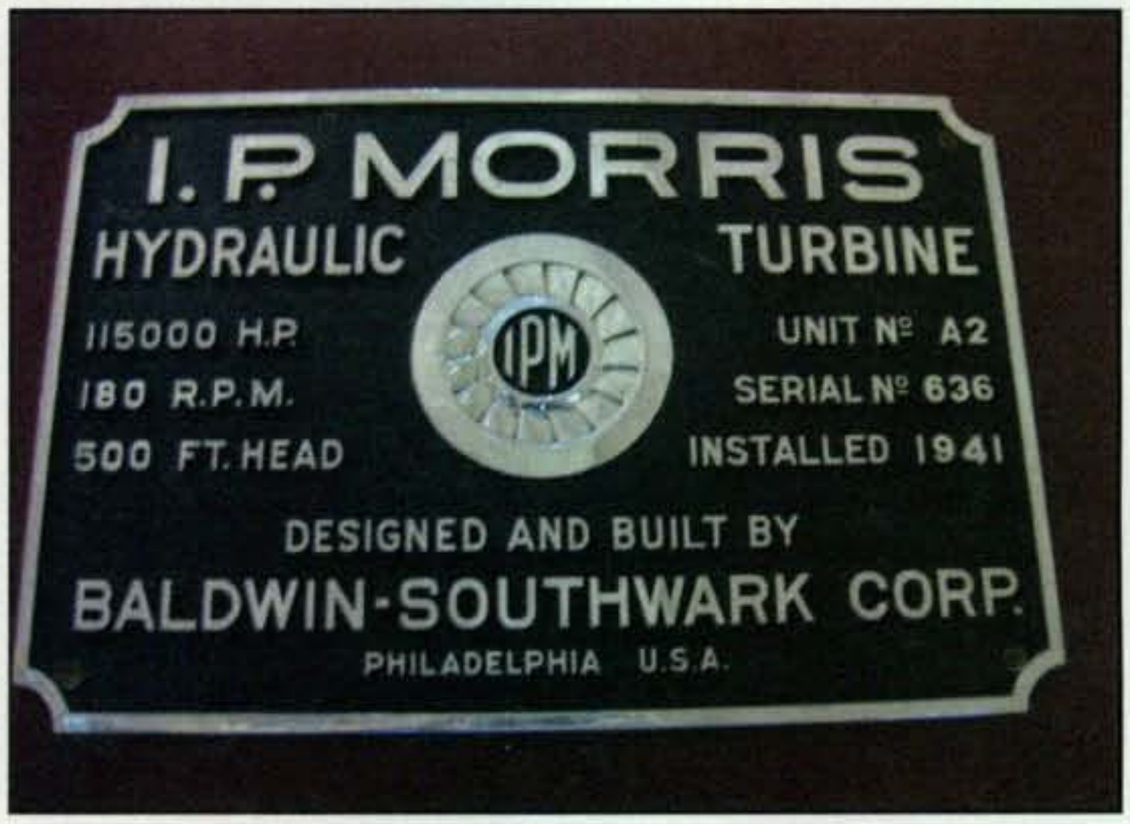
Further into our journey we burst from the tunnel into an amazing open area—the generator gallery on the Nevada side of the dam. The beautiful and durable terrazzo floor looks like it was installed last week. I wanted to linger and explore, but we were escorted farther and challenged to keep up with our guide. We soon emerged outdoors, walking across the lower face of the dam.

I stared up at the imposing height of the structure, wondering how many hundreds of billions of gallons of water were exerting their weight against the concrete above me. Walking a little farther, we came to the state line painted in the walkway at the center of the dam.

With just a few moments to take some photos, we resumed walking and entered the Arizona side of the dam and into the generator gallery. An unexpected "first stop" was at a mini-generator, a water- wheel device that provides power for the dam complex itself. However, nearby lurk the giants, the huge enclosed rotors driven by mighty turbines taking the full force of voluminous water driven by some 500 feet of "head," delivering incredible pressure to spin the turbine's blades. I stopped to admire the beauty and simplicity of the basic design; a gallon of water weighs 8.345 pounds. Its force can be channeled and amplified by dropping it, and I was reminded of an engineer friend's mantra—"gravity always works."

Despite my amazement, the generators quietly went about their work, revolving at 180 rpm, delivering 60 cycle current perfectly synchronized with the other units to locations throughout the west. Las Vegas? Los Angeles? Phoenix? Tucson? It was easy to speak in conversational tones. The balanced units churn out their energy without a fuss. A single unit generates energy at a rate of 115,000 horsepower, or 133 megawatts, and I was standing among a row of similar machines. My mind swung to imagine some of the uses for that power, that moment, from light bulbs to a person impatiently selecting the floor of an elevator button, to a life-sustaining device at a hospital; maybe even a ham radio operator about to key-down. It was incredible to think that I was standing next to the source of that power.

Additional stops on the tour took us to a room where we stood above a 30-foot diameter pipe that delivers torrents of



The nameplate complete with ratings for generator A2 at Hoover Dam.

water to each generator. The low rumble is just a hint of the forces in motion. Another trip through the generator gallery and down some stairs took us to a very rare look at the links between the turbines and the generators. It's a noisy room that conveys the serious work being done. Once again, we ascended to daylight, where we looked up at the dam and at the water exiting the turbines to resume its trip down the Colorado River pathway.

It's quite likely the lamp you may be using to read this story is driven by a generator—electromechanical motion being used to send electrons on their many diverse missions. I hope you've enjoyed this glimpse into the origins of how some of that power begins its journey, awaiting your command to key down and create some "Magic In the Sky."

73, Jeff, AA6JR

Sturdy driveshafts link the turbines to the generators.

A visit to Hoover Dam is an unforgettable experience, even without a tour of its inner workings. Traffic across the top of the dam will cease after a new bridge across the canyon is completed.

what's new

BY ANTHONY A. LUSCRE,* K8ZT

USB Interface, Grab-and-Go EmComm Center, Voice/CW Memory Keyer & Mics

This month, we take a look at a USB interface to take care of your interfacing rig and operating the "soundcard modes." Next, is a Grab-and-Go Emergency Communications Center, a combination Voice and CW memory keyer, and two new microphones. Finally, we visit The Amateur Radio Website of the Month.

microHAM USB Interface III

microHAM's new USB Interface III (photo A) provides a solution to the lack of available serial (com) ports on laptop and newer desktop computers for controlling your radio. The USB interface III includes full optical isolation of all control signals (radio control, CW, PTT, and squelch) and built-in USB soundcard with front-panel level controls for transmit via your transceiver's accessory audio input and the constant level (pre-volume control) audio output.

microHAM USB interfaces have built-in hardware support for your radio; you no longer need additional level converters such as CT-62, IF-232, FIF-232, and CT-17. The USB Interface III includes support for CW keying (DTR) and PTT (RTS), as well as a detector/driver for pseudo-FSK and QSK CW on the soundcard's right audio channel for use with FLDIGI on any platform.

Unlike many common mass-market computer USB to serial adapters, microHAM's "USB interfaces are carefully designed for maximum immunity from strong RFI and at the same time are RF quiet." Each data line is low-pass filtered for minimum interference.

Package includes: micro USB Interface III™, CD ROM with Windows® drivers, control software and manual, USB A-B cable, and one radio cable (you get to specify your radio). Suggested price is $229, but with an introductory price of $199. For more information or to order visit <www.microham-usa.com/Products/USB3.html>.

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MFJ Grab-and-Go Emergency Communications Center

The MFJ-706 (photo B) is an Emergency Communications (EmComm) box that turns your ICOM IC-706 into an instant and foolproof emergency communications center. It covers all HF, VHF, and UHF amateur radio frequencies available on the IC-706.

It is literally a complete "grab-and-go" communications center that can provide a full 100-watt SSB/CW signal simply by plugging into any available vehicle cigarette-lighter socket or light-duty 10- to 15-amp 12-VDC power supply. An MFJ exclusive PeakPowerBoost™ circuit delivers instantaneous SSB/CW power peaks using several Farads of super capacitance.

A built-in, full-range automatic antenna tuner turns any random wire or other antenna into a highly effective HF antenna. Simple foolproof automatic tuning is done with a single push of a button. An optional antenna mount gives you the ability to screw on a loaded whip (such as a Hamstick) for long-range HF communication or use a high-gain VHF/UHF antenna for local communications.

The IC-706 control head can easily be removed and placed in a convenient location while the larger MFJ EmComm box can be placed in the trunk, on the floor, or on the back seat of your vehicle. It is a compact $6\frac{3}{4}$"W × $4\frac{1}{2}$"H × $13\frac{1}{2}$"D inches. When you're ready to move on, just grab the handle and go. The handle is positioned so the MFJ EmComm box is balanced for easier carrying. Tough front and back covers secure and fully protect all of the enclosed electronic gear. A convenient compartment stows your microphone and other small accessories so you are always ready for emergencies.

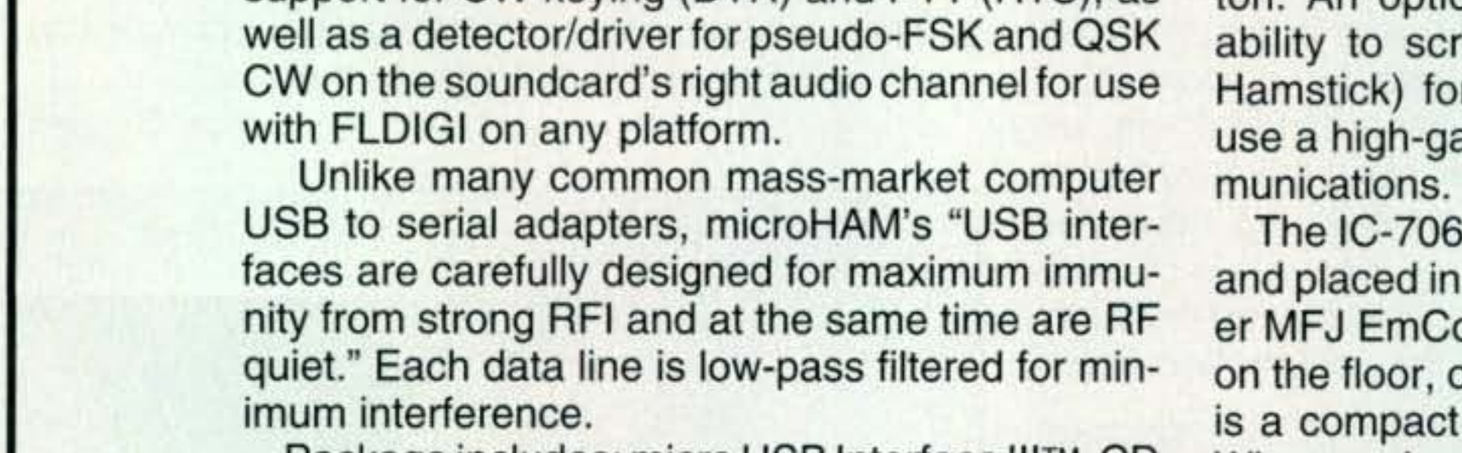


Photo A– microHAM's new USB Interface III provides both rig control with USB cable and a built-in soundcard interface for digital communications. (Photo courtesy microHAM)

Photo B– The MFJ-706 is a Grab-and-Go Emergency Communications Center that requires you only provide an ICOM 706 and antenna. (Photo courtesy MFJ Enterprises)

The IC-706 speaker is fully exposed, so speech audio is always loud and clear. The transceiver is well ventilated to prevent overheating, so you can provide continuous high-power communications. The MFJ-706 can be used horizontally, vertically, or at any other angle.

When a sudden emergency arises you literally can grab an entire communications center, rush to the site, and be in instant HF/VHF/UHF communication! Suggested retail price is $399.95. For more details or to order visit <www.mfjenterprises. com>.

Unified Microsystems VK-64 Voice and CW Memory Keyer

The Unified Microsystems model VK-64 (photo C) is a combination voice keyer and CW memory keyer in the same package. You can operate the VK-64 manually with the front-panel controls, or under program control through your PC or laptop's printer port, or with the new UVK-200 USB interface.

The voice keyer section has four 15-second messages. Recording is simple. Press the record button followed by a message number button and start talking. Press the stop button when you are finished. Messages are stored in non-volatile memory, remaining stored until recorded over with a new message.

The CW portion is an iambic memory keyer with four programmable messages, each one capable of storing over 300 Morse characters. A front-panel knob adjusts speed from 8–45 wpm. Selectable keyer configurations include: Mode A or B keying, adjustable weighting, adjustable side-tone frequency, side-tone On/Off, right- or left-handed paddle, and tune function. The VK-64 also includes a built in LPT CW interface. Most contest logging programs support sending CW through the printer port, and VK-64 is compatible with the major contest logging programs, including N1MM, NA, WriteLog, TRLog, CT, and LogEQF. The computer keying works in parallel with the internal CW keyer.

Installing the VK-64 is easy. Unplug the microphone and plug the VK-64's transmitter audio/PTT cable into your radio. Plug the microphone into the VK-64's microphone input cable. The VK-64 automatically switches the microphone for recording and play back. The rest of the time your microphone audio and PTT signals pass through the VK-64 and connect directly to the transmitter, even when the VK-64 is powered off.

CW setup is as simple as plugging your paddle into the VK-64. CW out connects to the CW jack of your transceiver. Adding computer control only needs a standard 25-pin shielded computer cable between the laptop or PC and the VK-64. Cables are not included, but can easily be made according to directions in the manual or purchased from Unified Microsystems.

Unit size is 6.25" × 6.25" × 2.5" with a weight of 1.25 lb. Required power is 12 VDC at 500 ma. A 12V wall transformer is included with the VK-64. The VK-64 is priced at $249.95. Available VK-64 accessories include: VKC-4/8 Audio Cable, which provides the connection between the VK-64 and your rig and microphones. The wires to these connectors come pre-stripped and tinned for quick final assembly to match the pinout requirements for your particular equipment. Instructions are included. Specify 4 (VKC-4) or 8 (VKC-8) pin microphone connectors. E-mail Unified Microsystems for pricing information on completely assembled and custom-length cables.

The UVK-200 USB Interface can control the VK-64 voice messages and send CW through the USB ports. The UVK-200 is priced at $49.95. KC-4 and KC-8 CW Cable Sets include cables to the paddle and transmitter. The paddle cable has a connector to the VK-64 on one end and stripped and tinned wires on the other. Model KC-4 has the transmitter cable terminated with a 1/4-inch-stereo phone plug. Model KC-8 is ter-

Photo C– The Unified Microsystems VK-64 is a voice keyer and CW memory keyer in the same package. (Photo courtesy Unified Microsystems)

Photo D– The Ten-Tec model 702 microphone. (Photo courtesy Ten-Tec)

minated with a 1/8-inch plug. The KC-4 & KC-8 CW Cable Sets are $9.95. For more information or to order visit <www.unifiedmicro.com/vk64.htm>.

Ten-Tec Microphones

Ten-Tec is introducing two new hand microphones. Both are omni-directional with a dynamic element, 500-ohm impedance, and coiled connection cable. The model 702 (photo D) is wired with an 8-pin connector for the Ten-Tec Omni-VII and Orion-II HF transceivers, plus 8-pin equipped Yaesu transceivers. The model 703 is wired with a 4-pin connector for the Jupiter and older Ten-Tec HF transceivers. Price is $39.95. For more information or to order visit <http://radio.tentec.com>.

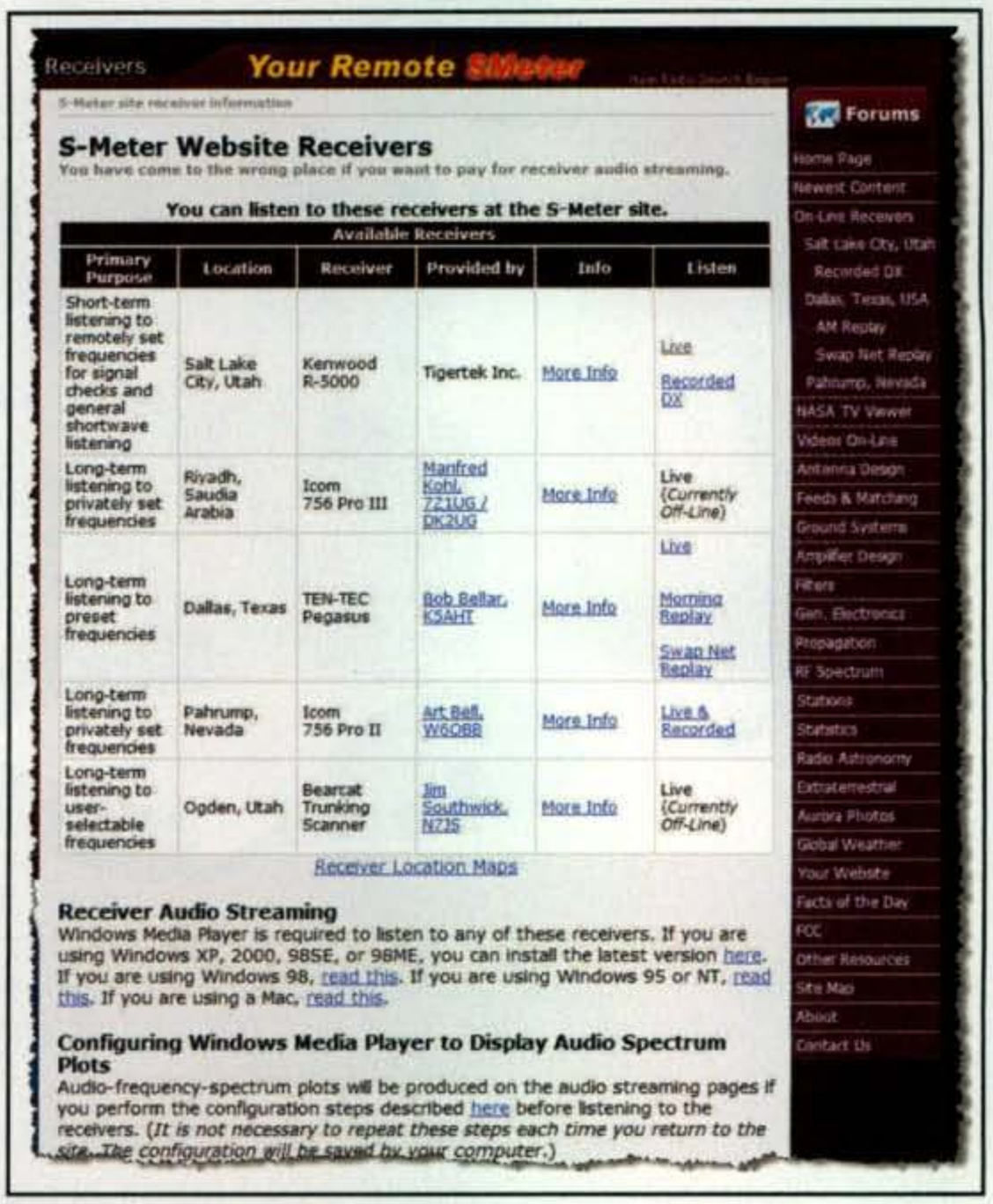


Fig. 1– Screen-shot of this month's Amateur Radio Website, Your Remote S-Meter.

The Amateur Radio Website of the Month

This month's site is the Your Remote S-Meter Website (fig. 1). "Check your signal and listen to others on remote receivers. Read thousands of pages of ham radio information. Download virus-free radio-related design programs. There is no charge for receiver usage, any of the information, or any downloaded computer programs."

Menus take you to major content sections. Thousands of other pages are buried within. Search from the bottom of any page to find what you are looking for if you don't see it in a menu. This site is updated frequently, so be sure to bookmark or add it to your Favorites so you can return easily.

Wrap-up

That is all for this month's column. If this issue reaches you before ARRL Field Day, listen for me as K8ZT/7 1B from East Glacier, Montana. Remember, I welcome your feedback, questions, and/or comments. If you are a producer of a new product for amateur radio, please feel free to e-mail me or snail mail me at the addresses on the first page of this column.

Until next month . . .73, Anthony K8ZT

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

BY JOE LYNCH,* N6CL

Maritime VHF Beacon Network for Tropo Ducting Monitoring

Dave Pedersen, N7BHC, has been working tirelessly to find tropo links where no amateur radio signal has seemingly gone before. His latest effort is in locating a ready-made VHF beacon network that should help us know when propagation exists. The following information is from him:

As you know, I'm a firm believer in using VHF beacons to indicate the presence of tropospheric ducts across the ocean. The beacon networks we typically use are land based, either amateur VHF and UHF band, or commercial transmitters such as FM and TV stations, air traffic control from airports, and other VHF users.

They all fall short in that they are land based, and for our interests, located far across the ocean on a far distant shore. They give us no indication of tropospheric ducts that may extend part of the way across the oceans. What would be ideal is a huge network of beacons scattered across the oceans of the world that we can listen for. Very fortunately, such a beacon network already exists.

The maritime Automatic Identification System (AIS) is a system used by ships to communicate their positions to each other as part of the global maritime safety system. AIS provides identification, position, course, and speed, with other nearby ships and VTS stations. This information can be displayed on a PC using simple receivers and PC software, or dedicated receivers with internal modems can also be used. While intended for directly exchanging data between vessels, and between vessels and shore-based Vessel Tracking Services, it is also monitored by many private individuals, operating on two channels at 161.975 and 162.025 MHz, Marine channels 87B and 88B. Several of the software packages also link the data onto Internet position servers. It is reminiscent of a maritime APRS system, except that ships to do not relay each others' positions.

Regulation 19 of SOLAS Chapter V requires AIS to be fitted aboard all ships of 300 gross tonnage and upwards engaged on international voyages, cargo ships of 500 gross tonnage and upwards not engaged on international voyages, and all passenger ships regardless of size.

I added a section to my web page today at the link below with lots of information and links. I focus a lot on implementing your own AIS monitoring station to watch for tropospheric ducted signals being received from distant vessels. See: <http://sites.google.com/site/n7bhcvhf/trans-oceantic-ducting/beacon-project/non-amateur-beacons/marine-band-beacons.

Massive Collaboration of Meteor Showers

The following posting from the TV FM DX e-mail reflector (TVFMDX) is from Jim Thomas of the Worldwide TV DX Association (WTFDA, <http://www.wtfda.org>). It was cross posted to the wsjt group e-mail reflector by Les Rayburn, N1LF:

Mark your calendars for July 12th. You may want to stay home. It will be a Sunday. Five average meteor showers in their own right are collaborating on July 12th for the summer show-stopper performance. This is truly a rare event. Get your tickets now.

Here's the act to follow: The *Kappa Aurigids*, averaging 20 pings per hour on the 10th, which will be winding down with 15 per hour on the 12th; the *Alpha Orionids*, peaking on the 12th and featuring 50 pings per hour; the *Nu Geminids*, also peaking, with 60 pings per hour on the 12th; the *Lambda Geminids*, peaking with 30 pings per hour on the 12th; and the *Beta Cancrids* with 20 pings per hour, also peaking on the 12th. And the meteor scatter hits just keep on coming.

July 12th could potentially peak at 230 pings per hour at times. Not all of these showers will be at the same time, so the day will be busy, not to mention if sporadic-*E* and tropo are doing their things also. It will be at least worthwhile keeping the recorders running. Grab a brew, grab a brat, and grab that FM radio dial!

VHF Plus Calendar

July 7	Moon apogee
July 7	Full Moon
July 7	Lunar eclipse
July 15	Moon last quarter
July 17–19	Great Plains Super Launch (See text for details)
July 18–19	CQ WW VHF Contest (See text for details)
July 21	Moon perigee
July 22	New Moon
July 22	Solar eclipse
July 24–25	Central States VHF Society Conference (See text for details)
July 28	*Southern Delta Aquarids* meteor shower
July 28	Moon first quarter

—EME conditions courtesy W5LUU.

Analog Nightlight Program Keeps TV Stations on the Air

The FCC's Analog Nightlight program will allow certain analog TV stations across the country to continue transmitting until July 12. For a list of the stations allowed to participate in this program, download this Adobe Acrobat file: <http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-09-2A2.pdf>.

Chuck Houghton, WB6IGP, SK

The following is from Ed Munn, W6OYJ:

The Microwave Group of San Diego is sorry to report the passing of one of our most active colleagues and a co-founder, Charles (Chuck) Houghton, WB6IGP. Chuck, 68, had been suffering from advanced effects of Parkinson's disease and died at home, in his sleep, on April 29, 2009. Chuck retired a few years ago after a career of over 40 years with the Pacific Bell telephone company as a communications toll technician in the

e-mail: <n6cl@sbcglobal.net>

Chuck Houghton, WB6IGP (SK), operating his lasercom system. (Photo courtesy The Mighty Ohm: <http://mightyohm.com/>)

broadcast services department handling all types of media services.

His impact on amateur radio VHF/UHF and microwave communications dates from the late 1960s when he was a ham radio mentor to a high-school-age new ham operator named Kerry Banke, now N6IZW. Chuck, at that time, was also very active in the Military/Amateur Radio MARS' communications system. He set up and maintained an important component bank to support the local MARS program.

Chuck worked with Kerry on using surplus burglar-alarm units containing Gunn diode oscillators, and converting them to usable two-way FM voice transceivers for the amateur 10-GHz band. He made and distributed printed circuit boards and parts kits, putting many of us on the air on that frequency band in the late 1980s. That was the first of many parts kits he produced for ham use.

His major impact on our hobby was through his extensive documentation of many projects in his monthly columns in *73* magazine for many years, and later a quarterly column in *CQ VHF* magazine. Through these articles, hams and experimenters across and beyond the U.S. borders were exposed to the work being done locally by him, Kerry Banke, and others. In particular, he documented techniques to modify scrap RF assemblies donated for amateur use by Qualcomm. He took the major role in distributing these units. This more modern modified gear has provided multitudes of ham operators worldwide with high-performance capabilities. In recent years his articles also expanded to techniques for using laser diodes for long-range optical communications.

He will most certainly be missed by all of us who knew him and benefited from his knowledge and writings. Those who wish to send condolence cards can mail them to the Houghton family at 6345 Badger Lake Avenue, San Diego, California 92119. E-mail condolence notes can be sent via Kerry Banke at: <kbanke@sbcglobal.com>.

The following is from Tony Long, KC6QHP:

Chuck Houghton, WB6IGP, and Kerry Banke, N6IZW, started the San Diego Microwave Group back in the 1980s. What they started was an informal group that still meets in the garage at Kerry's house in La Mesa, California once a month to talk about and work on microwave ham radio projects. This group has been highly influential in the interests and careers of Jeff Keyzer, KF6PBP, and me. We both went to college in San Diego and attended these meetings, and just as importantly, had a great source of parts and articles from Chuck.

Chuck and Kerry started out on the microwave bands by using surplus microwave burglar-alarm systems and modifying them for amateur radio use. Chuck was in some ways an early version of many DIY electronics bloggers of today. He not only did experiments and built interesting projects, he also wrote about them, told others how to do it, and supplied printed circuit boards, kits of parts, and so on. His reach was worldwide and no doubt has enabled the microwave amateur radio hobby to flourish. So, to Chuck I bid a farewell and 73. You will be missed but you will be remembered well!

Commenting on Chuck, Bill Brown, WB8ELK, his former *73* magazine editor, wrote: "Chuck was quite an enterprising fellow who could find amazing goldmines in piles of electronic surplus. He had quite a knack for that."

As Chuck's last editor (for *CQ VHF* magazine), I always enjoyed working with Chuck. As was his creativity with junk, so was his creativity with the English language. Gail, K2RED, my Managing Editor, learned how to edit and understand his unique style of writing.

Via his QTH, Chuck maintained a relationship for me with my hometown of San Diego. It was via his writings that I would vicariously connect with the guys who were the movers and shakers in the microwave niche of our hobby. With his passing into the ranks of Silent Keys he joins two of my best friends in microwaves, Bert Adams, K6BTO, and his son and my high school buddy, Frank, AE6L.

First BOREALIS Launch of the Year

The following is from Bill Hiscock, AD7SW:

We had our first BOREALIS high-altitude balloon flight of 2009 this Saturday, with guest Dr. Greg Guzik of LaSpace attending. The weather was dubious up to the last minute. It snowed all Thursday and until noon Friday, depositing about a foot os snow on the ground. Then it cleared up and warmed up to the lower '60s on flight day. The official flight report, actual and predicted ground tracks, and altitude profile are attached. Pictures will be posted on the BOREALIS website after they are organized.

The BOREALIS balloon launch series uses amateur radio extensively, both in APRS and ATV tracking. More information on the BOREALIS program can be found on the website: <http://spacegrant.montana.edu/borealis/>. For detailed technical information, see the handbook located at: <http://spacegrant.montana.edu/borealis/Resources_2/handbook/index.php>.

Bill Hiscock, AD7SW, SK

Bill posted the above e-mail on the SGSatellites emailing list on Sunday, April 19, 2009. On the following Tuesday evening Bill succumbed to the effects of light-chain deposition disease (LCDD). According to his wife Barbara Oyster, Bill was diagnosed in 1991 with LCDD and given three months to five years to live. He was 39 years old, about the 500th person and the youngest person in the world to be diagnosed with the disease. LCDD is a blood cancer, sometimes known as smoldering multiple myeloma. The disease causes

excess protein to be circulated in the blood and attacks different organs in different people at different times. He underwent periodic rounds of chemotherapy during the past 18 years. During his lengthy survival of the disease, Bill attributed his longevity to his activity as director of the Montana Space Grant Consortium.

The following is from Bill's colleague, a fellow professor, Dave Klumpar, KD7MFJ:

Bill was the founding Director of the Montana Space Grant Consortium (MSGC) and served as its only Director since 1991. Bill wrote the grant proposal to NASA that started MSGC. It is told that Bill, who succumbed to a rare blood disease on April 21st, had recounted how winning the Montana Consortium proposal had "saved his life." As a result of receiving the grant award, Bill decided to pursue a lifelong dream of obtaining his private pilot's license. It was an outcome of taking his flight physical examination in 1991 that he was diagnosed with Light-Chain Deposition Disease (LCDD). Owing to that early diagnosis, and early medical treatment, Bill lived for an additional 17 years, pursuing his passion for everything NASA.

As Director of MSGC, Bill was an ardent supporter and sponsor of the MSU Space Science and Engineering Laboratory's (SSEL) hands-on student spaceflight hardware-development projects. The SSEL has built two nanosatellites, commonly known as CubeSats, for MSGC. Both satellites utilize UHF and VHF communications in the ham bands and operate in the Amateur Satellite Service under frequency coordination by the IARU. Both miniature scientific satellites carry radiation-detector payloads built upon Geiger counters provided to SSEL by the late James A. Van Allen, discoverer of the Earth's radiation belts. The Montana Earth Orbiting Pico Explorer (MEROPE) was built for MSGC by Montana university students in the SSEL between 2001 and 2006. It was launched on a DNEPR launch vehicle in July 2006. The DNEPR experienced a premature engine shutdown during the first stage ascent, resulting in the loss of MEROPE and 22 other satellites intended for orbit. A new CubeSat satellite, known as "Explorer-1 Prime" (E1P), is in final stages of integration and testing in the SSEL in preparation for a domestic launch in early 2010. *(More information on the E1P satellite will be forthcoming in a future feature article in* CQ VHF *magazine. The announcement of the launch date will be published in this column when it is known.—ed.)*

Bill will be missed. Scholarships are being established in Bill's memory under the William A. Hiscock Space Grant Scholarship Fund. For more information see: <http://spacegrant.org/hiscock/>.

Former Montana State University professor and Montana Space Grant Consortium Director Bill Hiscock, AD7SW (SK). (Photo courtesy Montana State University)

FFMA Rare Grids Activation

Lynn Burlingame, N7CFO, reports that he will be headed out in the second week of July (likely the 14th) and intends to be on the road for at least two months. The first major stop will be East Glacier, Montana for the Glacier Waterton HF. From there he will travel through the Dakotas, Iowa, Wisconsin, and then a quick dash across the country to Maine. He plans a couple of weeks in Maine and then down the East Coast, through the Gulf States, and then west. The exact route will be chosen on the fly, but he will do his best to bring up rare grids along the way. He will have HF Airmail on board and can make his presence known by e-mail even when in the boonies. He will be running an IC-7K with a KB6KQ loop while mobile and the same rig with a three-element Yagi when portable.

Ric Porter, AA4SC, reports that he and his son are planning a one-month trip to the upper western states. Their objective is to have fun and to activate some needed western grids. They plan to visit Yellowstone and other scenic attractions. They tentatively plan to operate from a few rare grids in Montana and perhaps in other places. Plans are to take an M^2 three-element beam and two stacked loops. They will take two 100-watt capable rigs and perhaps a 400-watt brick. Digi modes are a possibility, but their primary focus will be working sporadic-*E*.

Henry Ingwersen, KT1J, will activate the following grids: FN56, FN57, FN66, and FN67 around the dates of the CQ WW VHF Contest (July 18–19).

Sean Kutzko, KX9X, will be in FN45

for the CQ WW VHF Contest. He will arrive at his rental cabin on Friday, July 1 and leave early Monday, July 20. He will have an ICOM 746-Pro with 100 watts on 6 and 2 meters. Antennas will be a Cushcraft A50-3S and a 13B2 at about 25 feet. Activity will be mainly CW/SSB. It's been several years since he has been on WSJT. If he can get up to speed on it, he will bring it, but don't expect it.

Thomas Carney, K6EU, will activate CM86 some time this month.

Operating Reports

The following reports are from Chip Margelli, K7JA: "I got the first opening of the 'season' last night (April 27, 2009, PDT). Curiously, it started out very short, with N7YGU in DM42 at 0145 UTC (28 April), followed by K5LA in DM61 at 0203, K7ICW in DM62 at 0204, and XE2OR in DL98 at 0225. Heard others but decided not to add to the chaos on 125."

On May 6, 2009 Chip had a QSO with JL8GFB. Audio from the JA side can be heard at: <http://jl8gfb.com-sys.jp/recording/090507.k7ja.html>.

DXpedition to Mali

The following is from Arliss Thompson, W7XU:

Instead of a 6m DXpedition to the Caribbean, this year WØSD and I (and perhaps some others) will be operating from Bamako, Mali. Our call is TZ6EI. Planned dates of operation are 26 June through 5 July.

As usual, the operation will focus on 6m. To the best of my knowledge, Mali has not been worked from the U.S. on 6, so we're hoping for a first despite the long distances involved. More details will be given as they become available.

Current Contest

CQ WW VHF Contest: This year's CQ WW VHF Contest will be held fromn 1800 UTC July 18 to 2100 UTC July 19. Rules are posted online at: <http://www.cq-amateur-radio.com/World%20Wide%20VHF%20Contest.html>.

Current Conferences

This year's **Great Plains Super Launch (GPSL)** will be held at the Kaw Area Technical School in Topeka, Kansas July 17–19. A special screening of the movie *Blast!* will be shown Thursday afternoon. The showing is sponsored by *CQ VHF* magazine. For more information on GPSL, see the website: <http://nearspaceventures.com/gpsl2009/>. To view a trailer of the movie, see: <http://www.blastthemovie.com>.

This year's **Central States VHF Society Conference** will be held in Elk Grove, Illinois, on July 23-25, at the Elk Grove Village Holiday Inn Hotel. For more information, please see the URL: <http://www.csvhfs.org/>.

Southeast VHF Society Conference Design Winners

This year's Southeast VHF Society conference produced the following winners of the design contest: First place, Michael Stipick, KC4RI: A 9-band VHF/UHF Transverter Switcher. Second place, Steve Hicks, N5AC: A Digital Dish Pointer for Automatic Dish Pointing. Third place, John Logsdon, K2STO: A Five Band Rover Mixer Module and switcher using the ApolLo-32 frequency Synthesizer. Stipick's prizes include: $2500 Mini Circuits gift certificate (Mini Circuits is a major underwriter for the prize), as well as a year's subscription to *CQ VHF* magazine. Hicks' prize was $500 gift certificate, and Logsdon's prize was a $200 gift certificate.

Calls for Papers

Calls for papers are issued in advance of forthcoming conferences either for presenters to be speakers, or for papers to be published in the conferences' *Proceedings*, or both. For more information, questions about format, media, hardcopy, e-mail, etc., please contact the person listed with the announcement. The following organizations or conference organizers have announced a call for papers:

Technical papers are solicited for presentation at the **28th Annual ARRL and TAPR Digital Communications Conference** to be held September 25–27 in Chicago, Illinois and publication in the conference *Proceedings.* Presentation at the conference is not required for publication. Submission of papers is due by July 31 and should be submitted to: Maty Weinberg, KB1EIB, ARRL, 225 Main Street, Newington, CT 06111, or via the internet to <maty@arrl.org>. For suitable topics and submission guidelines also contact Maty via e-mail, and check <http://www.arrl.org>.

This year's **Microwave Update** conference will be held in Irving, Texas near the DFW airport the weekend of October 23–25. This is a call for papers and talks. They are looking for presentations on all aspects of microwave equipment and antenna construction, theory, propagation, operating, and design modes, just to name a few. Frequency range is 900 MHz through LASER. They have already had quite a few early volunteers, which they always appreciate, but are looking for more presenters. If you are interested in presenting please drop Al Ward, W5LUA, an e-mail at <w5lua@sbcglobal.net>.

They are also looking for papers for the *Proceedings*. You do not have to be a presenter to have your paper included in the *Proceedings*. Papers for the *Proceedings* can also just be short topics on any topic microwave related. The *Proceedings* will again be published by the American Radio Relay League. While the authors retain the basic copyright, by submission they consent to publication in the *Proceedings* and possible publication of the proceedings in CD/DVD format. If you are interested in making a contribution to the *Proceedings*, please contact Kent Britain, WA5VJB, at <wa5vjb@flash.net>. The deadline for papers is Monday, August 31, 2009. The ARRL asks that you refer to the *Proceedings* Style Guideline on the conference website at: <http://www.microwaveupdate.org/> .

Additional information on Microwave Update can also be found at: <http://www.ntms.org/>. Just click on the "Microwave Update" link on the left-hand side. The 2009 MUD Conference chair is Steve Hicks, N5AC, and he can be reached at <n5ac@n5ac.com>.

Meteor Showers

This month there are a number of minor showers. Please see the opening piece in this column for more information on the collaborating meteor showers on July 12. Among the other showers this month are the following: The *Piscis Austrinids* is expected to peak July 28. The *δ-Aquariids*, is a southern latitude shower. It has produced in excess of 20 meteors per hour in the past. Its predicted peak is around July 27. The *Piscis Austrinids* is expected to peak around July 28. The *α-Capricornids* is expected to peak on July 30.

For more information on the above meteor shower predictions see Tomas Hood, NW7US's propagation column. Also visit the International Meteor Organization's website: <http://www.imo.net/calendar/2009>.

And Finally . . .

This month's column is a compilation of information related to the VHF-plus frequencies. I hope the information is useful to you for your operating pleasure. If you have information to share, please e-mail me at: <n6cl@sbcglobal.net>.

Until next month... 73 de Joe, N6CL

BY CARL SMITH,* N4AA

C6AAA DXpedition and More DX News

As I write this in almost mid-May, I am in the process of preparing for the Dayton Hamvention®. Some folks don't know that the copy for *CQ* magazine must be submitted about two months before the publication date. This year I will be sharing my time between the CQ booth and the ICOM booth. At the ICOM booth there will be various short DXpedition presentations on both Friday and Saturday. I hope I will have seen many of you there this year.

N4AA on from The Bahamas

I was on the air as C6AAA from Governors Harbor in the Bahamas from April 18 to 23. I had quite a week, and I want to thank all of you who dropped by to say hello to C6AAA. I have to publicly thank my hosts, Joe, W8GEX, and Janet, W8CAA, Pater, and Joe, AA4NN, and Margarett Blackwell. These experienced DXpeditioners paved the way for this newcomer to experience the joy of being "on the other end" of a pile-up. They changed bands/modes when asked so I could get on the band/mode that was working for me with my modest setup. Propagation was pretty bad for us, so we were able to just take off and act "touristy" on a few days.

All in all, it was an experience I not only enjoyed but it was also a learning experience I'll not soon forget. I also have to thank Dave Anderson, K4SV. Dave is one of those guys you just have to be around to really appreciate him. He loaned me his ICOM IC-7000 radio, power supply, Tarheel II motorized mobile antenna with a 12-foot whip, coax, control cable for the antenna, and a MicroHAM USB II interface. Folks, that is about all one needs to go on a mini-DXpedition. I had to furnish radials for the antenna, a keyer/paddle, headset, laptop (loaned to me by Joe, AA4NN), and a few hand tools. I have to admit, with friends like K4SV, W8GEX, and AA4NN I felt very comfortable going to a strange place and setting up shop for a week. I won't get into the specific location we stayed at or the fantastic meals that were generated by Margarett, the wife of AA4NN, and Janet, W8CAA, the wife of W8GEX, but I'll never know why I didn't gain 20 pounds that week.

I made a reasonable number of contacts on 80 through 17 meters, mostly CW, as I indicated I

The CQ DX Field Award Program

Mixed

97 .....RW4NH

CW

56.....GØDEZ

Mixed Endorsements

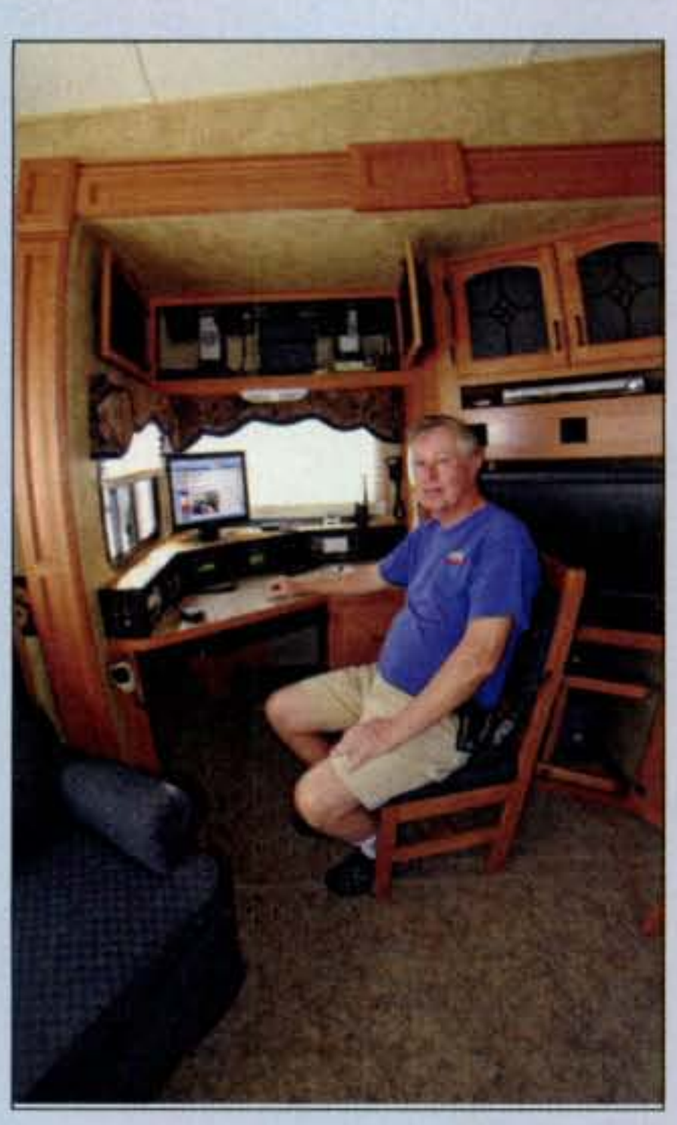
200.....HA1RW/220
200.....N8PR/217
200.....W6OAT/205
175 .....K8OOK/189
175 .....RW4NH/187

The basic award fee for subscribers to *CQ* is $6. For non-subscribers, it is $12. In order to qualify for the reduced subscriber rate, please enclose your latest *CQ* mailing label with your application. Endorsement stickers are $1.00 each plus SASE. Updates not involving the issuance of a sticker are free. All updates and correspondence must include an SASE. Rules and application forms for the CQ DX Awards may be found on the <www.cq-amateur-radio. com> website, or may be obtained by sending a business-size, self-addressed, stamped envelope to CQ DX Awards Manager, Billy Williams, N4UF, Box 9673, Jacksonville, FL 32208 U.S.A. Please make all checks payable to the award manager.

*P.O. Box DX, Leicester, NC 28748-0249
e-mail: <n4aa@cq-amateur-radio.com>

Carl, N4AA, operating as C6AAA in April. The smile says it all..."Man, listen to that pile-up! " (Photo courtesy of Margarett, XYL of AA4NN)

The C6 group (left to right): Janet, W8CAA/C6AYL; Joe, W8GEX/C6DX; Joe, AA4NN; Margarett (wife of AA4NN); and Carl, N4AA/C6AAA. (Photo courtesy of Margarett)



On the Cover

Jim Briggs, WA9TIR, can operate from wherever he happens to be with his HF/VHF/UHF ham station built into his 5th-wheel camper, a 38-foot Montana with three slideouts. The mast on the back is bolted to the frame and is a combination of PVC and aluminum. It extends to between 25 and 30 feet and collapses into the long piece of PVC tubing at the bottom. On top of the mast are two 20-meter Hamsticks and two 40-meter Hamsticks, arranged as dipoles. Inside the camper, Jim and his wife, Carole, WB9EGQ, share a station consisting of an ICOM IC-706 for HF work, along with an IC-208H and a *Motorola Spectra* for VHF and UHF operating. The console in the rear slideout of the camper also includes a Drake SWR meter and voltage/current meters to keep tabs on the camper's battery system, which also powers all of his ham gear.

Jim built the console himself (along with another one at their home station) using skills from his job building RF, microwave, and phone systems for his local 911 center. Jim likes to build electronic gear as well; in fact, he says he's more of a builder than an operator, although he's operated while on the road from Orlando, Florida to Sault Ste. Marie, Michigan, and many places in between. He's a regular check-in on the Spiderweb Net (www.spiderwebnet.net) on 40 meters. He's been operating camper-mobile for about 10 years, using the current camper for about the past three years.

(Photos by Larry Mulvehill, WB2ZPI)

would. I tried RTTY and did manage a fair number of contacts. The only SSB I did was on 75, where I ran into a group of friends from Tennessee and South Carolina. In addition to Dayton, I'll be talking more about the trip at the SEDCO gathering at Pigeon Forge, Tennessee the last weekend of September. Perhaps you will get a chance to see/hear about it at one of those places.

Joe, W8GEX/C6DX, is a fan of 60 meters and he had a good time passing out QSOs on that band. Janet also worked 60 meters and spent some time on 40 SSB, too, as C6AYL. Joe, AA4NN, worked 160–15 meters all CW, his favorite mode, also signing C6DX.

When I returned from my trip on April 25, I logged onto my e-mail program. I was astonished to find 3119 e-mails in my basket. After spending a very long time screening them, using the subject as a "key," I eliminated over 3000 of those e-mails. Barely 100 of them had anything of interest to me at all. If you should happen to send an e-mail to me, *please* put your *callsign* in the subject line of the message. With the problem of junk/SPAM, I have been forced to screen the stuff by using the subject and just deleting it if I cannot readily recognize the subject as something I might want/need.

CQ DX Awards Program

SSB

2525 .....JA7XBG
2526.....W6MAC
2527 .....W1DF

SSB Endorsements

330 .....AA4S/338
330.....N7WR/335
330 .....JA7XBG/335
320 .....W1DF/325
275 .....W9ACE/294
275.....W6MAC/292
275 .....N3RC/280
28 MHz N3RC
3.5/7 MHz N3RC
3.5/7 MHz.....W1PX

CW Endorsements

330 .....N7WO/330
320.....W1DF/328
320.....EA3ALV/319
300 .....KØKG/302
275.....4Z5SG/279
1.8 MHz 4Z5SG

The basic award fee for subscribers to *CQ* is $6. For non-subscribers, it is $12. In order to qualify for the reduced subscriber rate, please enclose your latest *CQ* mailing label with your application. Endorsement stickers are $1.00 each plus SASE. Updates not involving the issuance of a sticker are free. All updates and correspondence must include an SASE. Rules and application forms for the CQ DX Awards may be found on the <www.cq-amateur-radio.com> website, or may be obtained by sending a business-size, self-addressed, stamped envelope to CQ DX Awards Manager, Billy Williams, N4UF, Box 9673, Jacksonville, FL 32208 U.S.A. Currently we recognize 338 active countries. Please make all checks payable to the award manager.

The WPX Program

CW

3219 .....DL4CF
3220 .....EA3GHZ
3221 .....LY2MM
3222 .....N3RC
3223 .....K4PBY

SSB

3040 .....N3ALN
3041 .....LY2MM
3042 .....N3RC

Mixed

2049 .....EA3GHZ
2050 .....AG5Z
2051 .....VK7ZE
2052 .....LY2MM
2053.....IK1RKN

Digital

28 .....RW6CR
29.....YO6HSU
30.....WT6X
31 .....IV3PGQ

CW: 500 K4PBY. 750 N3RC. 850 EA3GHZ. 2400 DL4CF, W9IL. 2000 LY2MM. 2150 N8BJQ. 3250 WA5VGI.
SSB: 350 VK7ZE, YO6HSU. 550 WA5UA. 700 LY2MM. 850 7N1NXF. 1100 N3RC. 1300 IV3VCG. 1650 N8BJQ. 2350 W9IL. 2600 EA3GHZ.
Mixed: 700 K7EG. 750 YO6HSU. 850 AG5Z. 1400 N3RC. 2250 LY2MM. 2600 WZ4P. 2750 EA3GHZ, N8BJQ. 2900 K1BV. 3250 W9IL. 3750 WA5VGI. 4000 WB2YQH.
Digital: 350 RW6CR, WT6X. 550 YO6HSU. 900 N8BJQ.

160 Meters: LY2MM, N3RC
80 Meters: LY2MM, N3RC
40 Meters: EA3GHZ, LY2MM, N3RC
20 Meters: EA3GHZ, LY2MM, N3RC
15 Meters: EA3GHZ, LY2MM, N3RC
10 Meters: EA3GHZ, LY2MM, N3RC

Asia: LY2MM, N3RC
Africa: LY2MM, N3RC
Europe: LY2MM, N3RC
Oceania: LY2MM, N3RC, AA1VX
North America: LY2MM, N3RC
South America: LY2MM, N3RC

Award of Excellence: LY2MM, N3RC
160 Meter Bar: N3RC

Award of Excellence Holders: N4MM, W4CRW, K5UR, K2VV, VE3XN, DL1MDD, DJ7CX, DL3RK, WB4SIJ, DL7AA, ON4QX, 9A2AA, OK3EA, OK1MP, N4NO, ZL3GO, W4BQY, IØJX, WA1JMP, KØJN, W4VQ, KF2O, WB8CNL, W1JR, F9RM, W5UR, CT1FL, WA4QMQ, W8ILC, VE7DP, K9BG, W1CU, G4BUE, N3ED, LU3YL/W4, NN4Q, KA3A, VE7WJ, VE7IG, N2AC, W9NUF, N4NX, SMØDJZ, DK5AD, WD9IIC, W3ARK, LA7JO, VK4SS, I8YRK, SMØAJU, N5TV, W6OUL, WB8ZRL, WA8YTM, SM6DHU, N4KE, I2UIY, I4EAT, VK9NS, DEØDXM, DK4SY, UR2QD, AB9O, FM5WD, I2DMK, SM6CST, VE1NG, I1JQJ, PY2DBU, HI8LC, KA5W, K3UA, HA8UB, HA8XX, K7LJ, SM3EVR, K2SHZ, UP1BZZ, EA7OH, K2POA, N6JV, W2HG, ONL-4003, W5AWT, KBØG, HB9CSA, F6BVB, YU7SF, DF1SD, K7CU, I1POR, K9LJN, YBØTK, K9QFR, 9A2NA, W4UW, NXØI, WB4RUA, I6DQE, I1EEW, I8RFD, I3CRW, VE3MS, NE4F, KC8PG, F1HWB, ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, KC7EM, YU1AB, IK2ILH, DEØDAQ, I1WXY, LU1DOW, N1IR, IK4GME, VE9RJ, WX3N, HB9AUT, KC6X, N6IBF, W5ODD, IØRIZ, I2MQP, F6HMJ, HB9DDZ, WØULU, K9XR, JAØSU, I5ZJK, I2EOW, IK2MRZ, KS4S, KA1CLV, WZ1R, CT4UW, KØIFL, WT3W, IN3NJB, S50A, IK1GPG, AA6WJ, W3AP, OE1EMN, W9IL, I7PXV, S53EO, DF7GK, S57J, EA5BM, DL1EY, DJ1YH, KUØA, VE2UW, 9A9R, UAØFZ, DJ3JSW, OE6CLE, HB9BIN, N1KC, SM5DAC, RW9SG, WA3GNW, S51U, W4MS, I2EAY, RAØFU, CT4NH, EA7TV, W9IAL, LY3BA, K1NU, W1TE, UA3AP, EA5AT, OK1DWC, KX1A, IZ5BAM, K4LQ, KØKG, DL6ATM, VE9FX, DL2CHN, W2OO, AI6Z, RU3DX, WB9IHH, CT1EEN, G4PWA, OK1FED, EU1TT, S53MJ, DL2KQ, RA1AOB, KT2C, UA9CGL, AE5B, KØDEQ, DKØPM, SV1EOS, UAØFAI, N4GG, UA4RZ, 7K3QPL, EW1CQ., UA4LY, RZ3DX, UA3AIO, UA4RC, N8BJQ, UA3BS, UA9FGR, UT3UY, WA5VGI, UT9FJ, UT4EK, K9UQN, UR5FEO.

160 Meter Endorsements: N4MM, W4CRW, K5UR, VE3XN, DL3RK, OK1MP, N4NO, W4BQY, W4VQ, KF2O, W8CNL, W1JR, W5UR, W8ILC, K9BG, W1CU, G4BUE, LU3YL/W4, NN4Q, VE7WJ, VE7IG, W9NUF, N4NX, SMØDJZ, DK5AD, W3ARK, LA7JO, SMØAJU, N5TV, W6OUL, N4KE, I2UIY, I4EAT, VK9NS, DEØDXM, UR2QD, AB9O, FM5WD, SM6CST, I1JQJ, PY2DBU, HI8LC, KA5W, K3UA, K7LJ, SM3EVR, UP1BZZ, K2POF, IT9TQH, N6JV, ONL-4003, W5AWT, KBØG, F6BVB, YU7SF, DF1SD, K7CU, I1POR, K9LJN, YBØTK, K9QFR, W4UW, NXØI, WB4RUA, I1EEW, ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, YU1AB, IK4GME, WX3N, W5ODD, IØRIZ, I2MQP, F6HMJ, HB9DDZ, K9XR, JAØSU, I5ZJK, I2EOW, KS4S, KA1CLV, KØIFL, WT3W, IN3NJB, S50A, IK1GPG, AA6WJ, W3AP, S53EO, S57J, DL1EY, DJ1YH, KUØA, VR2UW, UAØFZ, DJ3JSW, OE6CLD, HB9BIN, N1KC, SM5DAC, S51U, RAØFU, CT4NH, EA7TV, LY3BA, K1NU, W1TE, UA3AP, OK1DWC, KX1A, IZ5BAM, DL6ATM, W2OO, RU3DX, WB9IHH, G4PWA, OK1FED, EU1TT, S53MJ, DL2KQ, RA1AOB, UA9CGL, SM6DHU, KØDEQ, DKØPM, SV1EOS, N4GG, UA4RZ, 7K3QPL, EW1CQ, UA4LY, RZ3DX, UA3AIO, UA4RC, N8BJQ, UA3BS, UA9FGR, UT3UY, WA5VGI, UR5FEO.

Complete rules and application forms may be obtained by sending a business-size, self-addressed, stamped envelope (foreign stations send extra postage for airmail) to "CQ WPX Awards," P.O. Box 355, New Carlisle, OH 45344 USA. Note: WPX will now accept prefixes/calls which have been confirmed by eQSL.cc. Other electronic QSL confirmation means are not accepted.

*Please Note: The price of the 160, 30, 17, 12, 6, and Digital bars for the Award of Excellence are $6.50 each.

5 Band WAZ

As of May 1, 2009, 778 stations have attained the 200 zone level and 1631 stations have attained the 150 zone level.

New recipients of 5 Band WAZ with all 200 zones confirmed:

None

The top contenders for 5 Band WAZ (zones needed, 80 or 40 meters):

S51U, 199 (27)
N4WW, 199 (26)
W4LI, 199 (26)
K7UR, 199 (34)
W2YY, 199 (26)
IK8BQE, 199 (31)
JA2IVK, 199 (34 on 40m)
IK1AOD, 199 (1)
WØCP, 199 (18)
GM3YOR, 199 (31)
VO1FB, 199 (19)
KZ4V, 199 (26)
W6DN, 199 (17)
W3NO, 199 (26)
RU3FM, 199 (1)
N3UN, 199 (18)
W1JZ, 199 (24)
W1FZ, 199 (26)
SM7BIP, 199 (31)
N4NX, 199 (26)
N4MM, 199 (26)
EA7GF, 199 (1)
N6HR/7, 199 (37)
JA5IU, 199 (2)
RU3DX, 199 (6)
N4XR, 199 (27)
HA5AGS, 199 (1)
VE3XN, 199 (26)
YU7GMN, 199 (10)
K7LJ, 199 (37)
RA6AX, 199 (6 on 10m)
RX4HZ, 199 (13)
KØGM, 199 (17)
S58Q, 199 (31)
KQØB, 199 (2 on 10)
K9OW, 199 (34 on 10)
N5AW, 199 (17)
EA5BCX, 198 (27, 39)
G3KDB, 198 (1, 12)
JA1DM, 198 (2, 40)
9A5I, 198 (1, 16)
K4CN, 198 (23, 26)
G3KMQ, 198 (1, 27)
N2QT, 198 (23, 24)
OK1DWC, 198 (6, 31)
W4UM, 198 (18, 23)
US7MM,198 (2, 6)
K2TK, 198 (23, 24)
K3JGJ, 198 (24, 26)
W4DC, 198 (24, 26)
F5NBU, 198 (19, 31)
OE2LCM, 198 (1, 31)
WK3N, 198 (23, 24)
W9XY, 198 (22, 26)
KZ2I, 198 (24, 26)
W7VJ, 198 (34, 37)
K9MIE, 198 (18, 21)
W9RN, 198 (26, 19on40)
W5CWQ,198 (17, 18)
I5KKW, 198 (31&23 on 20)
JT1BV, 198 (4, 11)
IV3MUC, 198 (1&31 on 40)

The following have qualified for the basic 5 Band WAZ Award:

N5PG (170 zones)

5 Band WAZ updates:

K7LJ (200 zones)
RA4CC (200 zones)
HA1RW (200 zones)
G3WW (170 zones)
K2CL (200 zones)
K6FG (196 zones)
S51DX (200 zones)

***Please note: Cost of the 5 Band WAZ Plaque is $100 shipped within the U.S.; $120 all foreign (sent airmail).**

Rules and applications for the WAZ program may be obtained by sending a large SAE with two units of postage or an address label and $1.00 to: WAZ Award Manager, Floyd Gerald, N5FG, 17 Green Hollow Rd., Wiggins, MS 39577. The processing fee for the 5BWAZ award is $10.00 for subscribers (please include your most recent *CQ* mailing label or a copy) and $15.00 for nonsubscribers. An endorsement fee of $2.00 for subscribers and $5.00 for nonsubscribers is charged for each additional 10 zones confirmed. Please make all checks payable to Floyd Gerald. Applicants sending QSL cards to a *CQ* checkpoint or the Award Manager must include return postage. N5FG may also be reached via e-mail: <n5fg@cq-amateur-radio.com>.

The WAZ Program

12 Meter SSB

40 .....UA3AKO

17 Meter SSB

47 .....UA3AKO

30 Meter CW

90 .....UA3AKO

80 Meter CW

76.....N7XM

160 Meters

304 .....JA8ISU (39 zones)
305.....HA1RW (40 zones)
306 ...OH3WD (40 zones)
307 ..UA3AKO (40 zones)

All Band WAZ

Mixed

8569 .....DL4CF
8570.....IW1QN
8571 .....UR7EU
8572.....UY5LQ
8573.....W6KGP
8574.....UT5UA
8575 .....W6RLL
8576.....VU2NKS
8577.....N2YBB

SSB

5101 .....DK6HD
5102.....IZ4DPV

CW

567 .....DL4CF
568 .....JA7OXR

RTTY

198.....N5PHT
199 .....JA1EOD

Rules and applications for the WAZ program may be obtained by sending a large SAE with two units of postage or an address label and $1.00 to: WAZ Award Manager, Floyd Gerald, N5FG, 17 Green Hollow Rd., Wiggins, MS 39577. The processing fee for all *CQ* awards is $6.00 for subscribers (please include your most recent *CQ* mailing label or a copy) and $12.00 for nonsubscribers. Please make all checks payable to Floyd Gerald. Applicants sending QSL cards to a *CQ* checkpoint or the Award Manager must include return postage. N5FG may also be reached via e-mail: <n5fg@cq-amateur-radio.com>.

DX Activity

VK9LA was on the air from Lord Howe March 23 to April 3. The team ended with a total of over 30,000 Q's. They reported 149 countries with 125 on SSB, 119 on CW, and 60 on RTTY. They worked all 40 CQ zones and reported 62% of the QSOs on CW; 31% on SSB, and 7% on RTTY. An interesting statistic was the highest band total they had was on 40 meters with 6000 CW and 3100 SSB. Next was 20 meters with 3100 on CW, 2400 on SSB, and nearly 1200 on RTTY.

VK9GMW was on the air from Mellish Reef March 28 until April 13. This was a low-key, simple DXpedition by AA7JV and HA7RY. The operation was intended to have a strong low-band focus, although over 50% of the 20,000 QSOs were on the higher frequency bands, 30 to 10 meters. It's interesting to note that they made over 2000 QSOs on 160 meters. The DXpedition was timed to fall between when 160-meter conditions are still good (i.e., the end of March) and when the cyclone season in Australia has started to decline. As it turned out, they had to wait on Marion Reef for the season's last cyclone, Tropical Cyclone Jasper, to move out of the area. Marion Reef lies halfway between the Australian mainland and Mellish Reef. The two-man team was fortunate enough to be able to make up for the delay in starting operation by staying on Mellish longer than originally planned. Reports indicated that their newly designed all-band antennas worked well. This was, no doubt, largely due to their being above salt water most of the time. Still, they were especially pleased with the 80-meter performance of the new antenna. The description of the antenna system is available as a downloadable PDF at <http://vk9gmw.com/documents/VK9GMW_ANTENNA.pdf>.

THE WPX HONOR ROLL

The WPX Honor Roll is based on the current confirmed prefixes which are submitted by separate application in strict conformance with the CQ Master Prefix list. Scores are based on the current prefix total, regardless of an operator's all-time count. Honor Roll must be updated annually by addition to, or confirmation of, present total. If no up-date, files will be made inactive.

MIXED

6139 .....9A2AA	4150 .....I2PJA	3684.....IK2ILH	3150 .....W9IL	2675 .....N8BJQ	2116 .....AE5B	1705.....W2EZ	1322 .....AA4FU	680 .....IWØHOU
5468 .....K2VV	4147 .....VE3XN	3681 ..WB2YQH	3091 .....9A4W	2673 ....JN3SAC	2192 .....N2SS	1662.....SV1DPI	1269 .....K5WAF	650 .....N3YZ
5214 .....W1CU	4088.....N6JV	3652....WA5VGI	3007 .....W2WC	2475 .....W6OUL	1951 .....KØKG	1651 ...KC9ARR	1016 ...RA1AOB	644 .....KWØH
5031 .....W2FXA	3980 .....N9AF	3609 ...YU7BCD	2998 .....K9UQN	2410 .....K5UR	1891 .....W2FKF	1643 .....N1KC	976 .....KM6HB	636 .....ZS2DL
4669 .....EA2IA	3947 .....I2MQP	3522...ON4CAS	2965 ...OZ1ACB	2397 .....VE6BF	1891 .....VE9FX	1446 .....DF3JO	964 .....K8ZEE	
4592 .....9A2NA	3937 .....S53EO	3494 .....W9OP	2873.....W2ME	2358 .....I2EAY	1858 .....W7CB	1362 ..WD9DZV	815 .....KL7FAP	
4490.....N4NO	3866 .....KØDEQ	3325 ..SM6DHU	2752 .....K1BV	2353.....W2OO	1820 .....KX1A	1359.....N3RC	726.....K5IC	
4430.....YU1AB	3821 .....KF2O	3227 .....K9BG	2704.....K2XF	2162 .....W3LL	1741 .....AB5C	1330 .....K6UXO	682.....AI8P	

SSB

4955.....IØZV	3616 .....EA2IA	2857 .....4X6DK	2431 .....G4UOL	2094 .....I8LEL	1915 .....W2OO	1678.....K9UQN	1386 ....IK4HPU	1031.....IK8OZP
4505.....VE1YX	3441 .....N4NO	2726 .....IN3QCI	2326.....CX6BZ	2093 .....W2WC	1879 .....K3IXD	1649.....N8BJQ	1385.....AE9DX	978.....EA7HY
4290.....F6DZU	3186 ...CT1AHU	2711 ...LU8ESU	2300 ..SM6DHU	2076 .....K2XF	1877....DL8AAV	1623.....VE9FX	1377.....EA3NP	951.....KU4BP
4213 .....K2VV	3149 ...OE2EGL	2709.....KF7RU	2297 .....W9IL	2071 .....N6FX	1891 .....W2FKF	1611.....W2ME	1258.....N1KC	924.....VE6BF
4116.....I2PJA	3133 .....KF2O	2642...YU7BCD	2250 .....I3ZSX	2046.....K5UR	1795.....KQ8D	1591....JN3SAC	1232.....AG4W	875 .....K7SAM
3978.....OZ5EV	3108 .....I4CSP	2595.....EA1JG	2209 ....IK2QPR	1946 .....W3LL	1756.....KI7AO	1480 .....AB5C	1145 ...EA3EQT	637 .....K5WAF
3715 .....I2MQP	2871 .....KØDEQ	2451 ...EA3GHZ	2201.....NQ3A	1935 ...SV1EOS	1729.....W6OUL	1464...VE7SMP	1083 .....KX1A	
3669 .....9A2NA	2860 .....I8KCI	2440 ...WA5VGI	2099...SV3AQR	1927 .....AE5B	1714.....IK2DZN	1463 .....I2EAY	1042 ....IZØBNR	

CW

5110 ..WA2HZR	3607 .....EA2IA	2723....EA7AZA	2425 .....W8IQ	2227.....IØNNY	1848 .....I2EAY	1334 .....RUØLL	1030 .....AA5JG
5085 .....K9QVB	3223 .....9A2NA	2632.....W2ME	2415 .....W2WC	2223 .....VE6BF	1804 ..EA7AAW	1310 .....K6UXO	915.....N1KC
4874 .....K2VV	3175 .....KØDEQ	2623 ..SM6DHU	2373 .....W9IL	2142 .....N8BJQ	1643 .....W2OO	1299 ..WA2VQV	842 ....WD9DZV
4102.....N6JV	3160 ...WA5VGI	2618 .....K9UQN	2324 .....OZ5UR	2089 .....K2XF	1497 .....AC5K	1223 .....KX1A	824 .....VE9FX
4051 .....N4NO	2837 .....KF2O	2727...YU7BCD	2309....JN3SAC	2040 .....I2MQP	1445 ....EA2CIN	1220 .....AA4FU	749 .....AE5B
3682.....VE7DP	2731 .....I7PXV	2621 .....KA7T	2308 .....N6FX	1945 .....K5UR	1395 .....W9HR	1109 .....VE1YX	740 .....F5PBL
3672.....LZ1XL	2727...YU7BCD	2502 ...JA9CWJ	2244 ....IK3GER	1927 .....W6OUL	1364 .....WO3Z	1053 .....K5WAF	608 .....IK2SGV

DIGITAL

1107 .....W3LL	1009 ..GUØSUP	909.....N8BJQ	607 .....KØDEQ

S04R from Western Sahara was available April 12 to 17. The eight-man team consisted of Agustin, EA1KY; Roberto, EA2RYL; Antonio, EA5RM; Manuel, EA7AJR; Alain, F6ENO; Bernard, F9IE; Fabrizio, IN3ZNR; and Valery, UT7CR. They conducted an on-line survey prior to the operation to try to determine what bands/modes were most needed. They must have been surprised, as I was, that the survey showed almost identical need on every band and every mode. The numbers ranged from a low of 2623 for 17 meters to a high of 2738 for CW. All other responses were between those two "extremes." The statistics for the operation are on the website: <http://www.dxfriends.com/s04r/>. They show over 37,000 total Q's, with 20,000 on CW, 14,000 on SSB, and 2400 on RTTY.

Midway in October: There have been no further press releases on this announced DXpedition. I have been told that plans are ongoing and there is simply nothing "new" to say at this time. When there is something newsworthy, it will be released through the usual DX news sources.

IRCs

IRCs are being "replaced" again. Yes, another "new" version, called the Nairobi Model, goes on sale July 1, 2009, and they are expected to be valid through December 31, 2013. Whatever you have, you had better check and see if they

Tom, N4XP, visits with the YV ops (left to right): YV5EED, N4XP, YV5EU, YV5ZV, YV5ANT, and YV5CUZ. (Photo courtesy of Ramon, YV5EED)

CQ DX Field Award Honor Roll

The CQ DX Field Award Honor Roll recognizes those DXers who have submitted proof of confirmation with 175 or more grid fields. Honor Roll lisiting is automatic upon approval of an application for 175 or more grid fields. To remain on the CQ DX Field Award Honor Roll, annual updates are required. Updates must be accompanied by an SASE if confirmation is desired. The fee for endorsement stickers is $1.00 each plus SASE. Please make all checks payable to the Award Manager, Billy F. Williams. Mail all updates to P.O. Box 9673, Jacksonville, FL 32208.

Mixed

K2TQC.....265	F6HMJ.....201	K8OOK.....184
HAØDU.....228	VE3ZZ.....201	K2SHZ.....182
W1CU.....228	JN3SAC.....200	K2AU.....182
HA1RW.....220	W4UM.....198	KØCA.....181
VE3XN.....217	OK1AOV.....195	K1NU.....180
N8PR.....217	W6OAT.....194	ON4CAS.....180
KØDEQ.....216	N4NX.....192	W5ODD.....177
HA5WA.....206	HA9PP.....190	NØFW.....176
KF8UN.....205	BA4DW.....188	
N4MM.....201	9A5CY.....187	

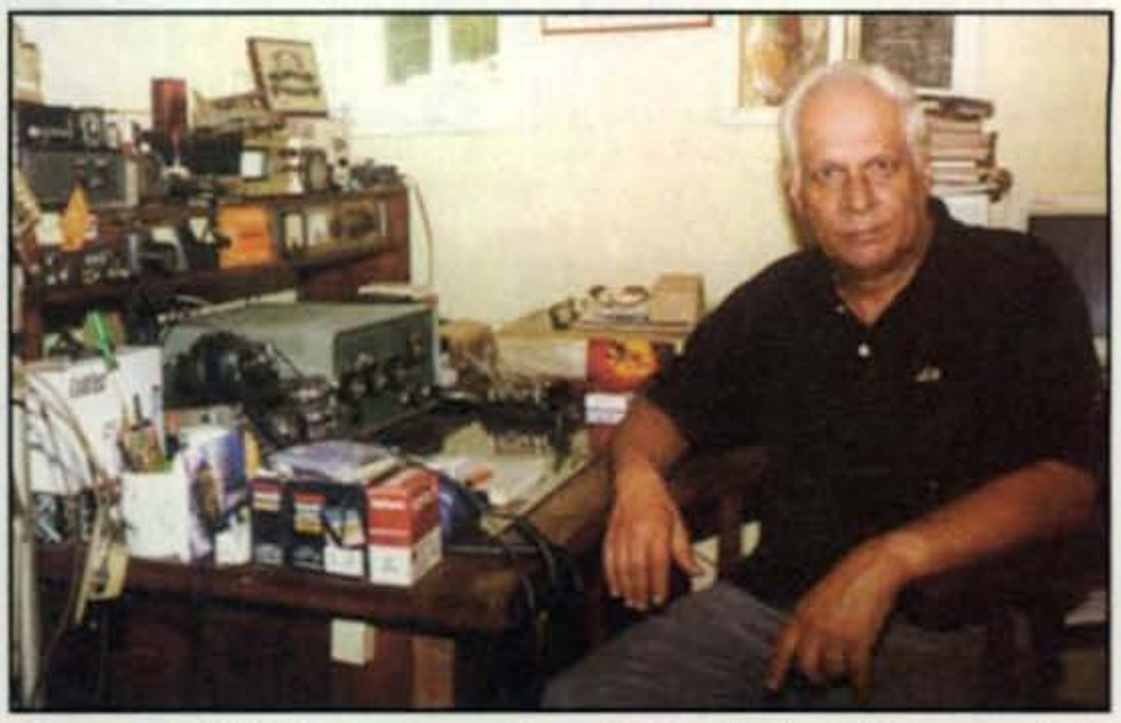
SSB

W1CU.....209	VE7SMP.....190	NØFW.....176
W4ABW.....199	N4MM.....184	DL3DXX.....175
KØDEQ.....192	W4UM.....182	

CW

DL6KVA.....220	JN3SAC.....194	N4MM.....179
W1CU.....220	W4UM.....191	N4NX.....177
KØDEQ.....207	OK1AOV.....186	KØCA.....175
DL3DXX.....203	OK2PO.....184	

Felix, DL5XL, is active from the Antarctic research station Neumayer III as DP1OPL until early 2010. He works CW on 20 and 40 meters, but also 17 and 30. DL1ZBO handles the QSL chores for Felix. (Photo courtesy of Bill, N2WB)



Denver, 4S7DA—many of us have that call in our logs. Denver hasn't been active in recent years but he says, "I had almost given up on amateur radio, except for the push I got from my QSL Manager, W3HNK, and my very old friend VE3ILG/4S7RN, so I am making a comeback." (Photo courtesy of Floyd, N5FG)

expire December 2009 and redeem them prior to that date.

Youth in Amateur Radio

In the month of April there were a number of notices on Silent Keys. Many of these were elderly folks, and I won't try to name all of them here. I will simply send our condolences to all who lost a loved one in recent months.

These notices just bring to mind the fact that we are an aging group. Oh sure, we see a young person from time to time, but nothing like we can recall from back in the 1960s and 1970s. There are some efforts being made to try to interest young people in amateur radio, but are we doing enough? I don't think so. It isn't enough to help youngsters get a license. We need to bring them along and show them what ham radio can do, what it should do. Cell phones, computers, twitter (whatever that is), and other means of communicating are bombarding young folks. What can we do to demonstrate ham radio, what it can be used for, and how it can be used it for the benefit of not only ourselves, but also our fellow man? Remember Hurricane Katrina and New Orleans and the loss of communications capability. Who came to their rescue? You know who … We Did! Come on, folks; put on your thinking caps and come up with some ideas. Try them, and if they work, tell others about it.

Well, by this time I hope I will have run into many of you at Dayton. Maybe next month we'll have more revealing DX to talk about. Until then, enjoy the chase and always remember to Have Fun!

73, Carl, N4AA

QSL Information

8Q7TB via PF4T
9A/OE3ZK via OE3WGC
9AØCI via DEØMST
9A48IFATCA via 9A4WW
9A8ØØVZ via 9A7A
9H3GA via DL5GA
9J2YO via YO4ATW
9M2TI via EA4ATI
9M8Z via MØURX
AA4VK/CYØ via AA4VK
AHØF/KH2 via JA2NQG
AHØS/KH2 via JH1DVG
AM7M via EC7ANC
AN9CNP via EA9CE
AO1K via EA1GVG
AP2ASHF via DL7UPN
AT9RS via W3HNK
AT9RS via DL4KQ
AXØBP via VK2CA
BY4RRR via DL2JRM
C21TI via EA4ATI
C56ETF via GWØETF
C6AAA via N4AA
C6AKU via K5WW
C6AMS via NA6M
C6AYL via W8GEX
C6DX via W8GEX
C91FC via ON4CJK
C91TX via W5PF
CE9XX via F5PFP
CN2BC via DL7BC
CN8VO via EA7FTR
CQ3T via CT3KN
CS9L via DJ6QT
CT7FFC via CT1GFK

(The table of QSL Managers is courtesy of John Shelton, K1XN, editor of "The Go List," 106 Dogwood Dr., Paris, TN 38242; phone 731-641-4354; e-mail: <golist@golist.net>; <http://golist.net/>.)

awards

BY TED MELINOSKY,* K1BV

CQ Awards Checkpoints and Postal Code Awards

Jonas Bjarnason, TF2JB, the new CQ awards checkpoint for Iceland.

Many stations around the world are working toward the different awards offered by *CQ* magazine. USA-CA is just one of them (there also are WAZ, WPX, and CQ DX Award programs, plus the Field Award). When it comes time to apply for an award, or for an endorsement, many of us may have a hard time finding a local volunteer to check cards and sign a certification that you actually qualify for the award. Enter the *CQ* awards checkpoints. These are volunteers who save the applicant postal costs and risk of the loss of irreplacable QSLs in the mail.

Recently, the checkpoint position in Iceland was assumed by Jonas Bjarnason, TF2JB. His credentials include serving as an elected officer of the Iceland Radioamateur Association (IRA), acting as editor of *CQ TF* for eight years, and earning DXCC, WPX, WAS, and many other awards. Jonas holds a graduate degree in economics and serves as a director in an Icelandic governmental institution.

We have checkpoint volunteers in 40 states of the U.S., Puerto Rico, three Canadian provinces, and 56 countries. This list is maintained by Floyd Gerald, N5FG <n5fg@cq-amateur-radio.com>. The complete and current list of these volunteers can be found at: <http://www.cq-amateur-radio.com/WAZCheckpoint110704.pdf>.

eQSL Update

Five applications for USA-CA were received in April. Of these five, two were 100-percent eQSL (N8MNI and NT2A), and the one from K7GT was a hybrid, containing both traditional confirmations and eQSL. So far, so good. I suggest that you check eQSL.cc to see how many new counties you can add to your USA-CA totals. I followed my own advice by checking under the WPX award, and was delighted to pick up 161 new prefixes for that *CQ* sponsored award.

*12 Wells Woods Rd., Columbia, CT 06237
e-mail: <k1bv@cq-amateur-radio.com>

USA-CA Special Honor Roll

Fred Groce, KØFG
USA-CA All Counties #1183
April 6, 2009

USA-CA Honor Roll

500

N8MNI	3464
NT2A	3465
KØFG	3466
N4PJ	3467
K7GT	3468

1000

KØFG	1774
N4PJ	1775
K7GT	1776

1500

KØFG	1491
N4PJ	1492

2000

KØFG	1380

2500

KØFG	1299

3000

KØFG	1209

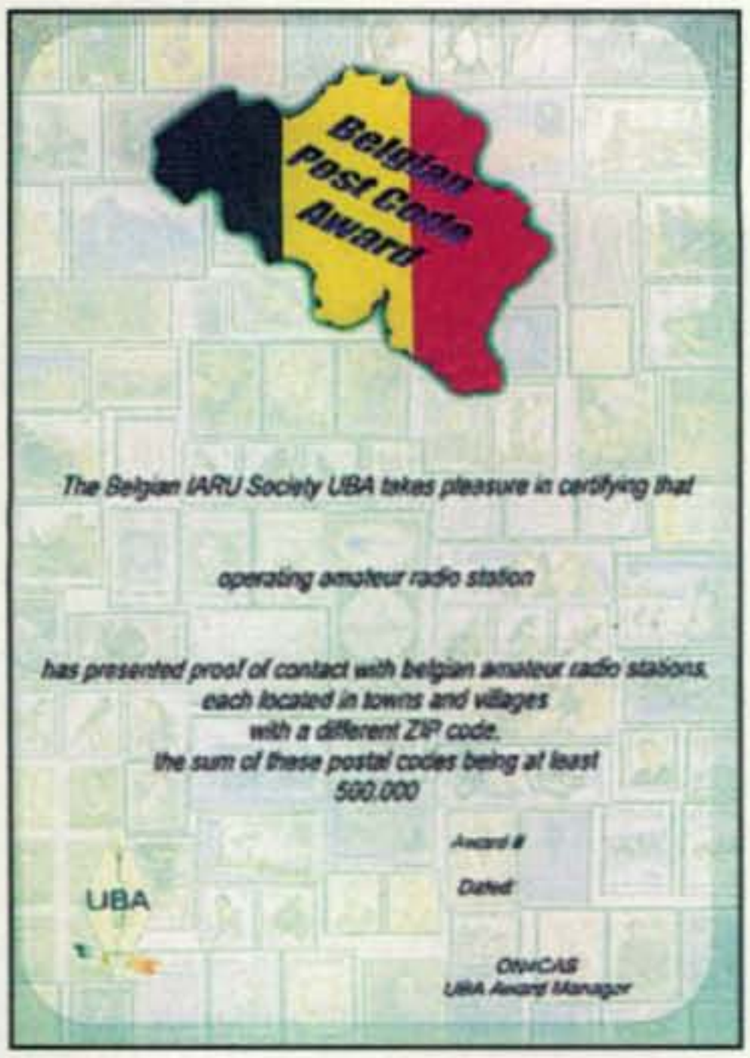
The total number of counties for credit for the United States of America Counties Award is 3077. The basic award fee for subscribers is $6.00. For nonsubscribers it is $12.00. To qualify for the special subscriber rate, please send a recent CQ mailing label with your application. Initial application may be submitted in the USA-CA Record Book, which may be obtained from CQ Magazine, 25 Newbridge Road, Hicksville, NY 11801 USA for $2.50, or by a PC-printed computer listing which is in alphabetical order by state and county within the state. To be eligible for the USA-CA Award, applicants must comply with the rules of the program as set forth in the revised USA-CA Rules and Program dated June 1, 2000. A complete copy of the rules may be obtained by sending an SASE to Ted Melinosky, K1BV, 12 Wells Woods Road, Columbia, CT 06237 USA. DX stations must include extra postage for airmail reply.

DX Awards

I really don't know what the fascination with postal codes/Zip codes might be, but I can only guess that award hunters are on a first-name basis with their postman or postal clerk. You really need a pretty good QSL collection to be able to start applying for most awards, and up to now that has meant reliance on the postal service. (How many of your friends and relatives have even heard of an International Reply Coupon, or have had to look up the airmail rate to Tajikistan?)

Part of addresses for about 40 years has been a postal code, which permits enhanced sorting by people or machines and helps to keep the fees for postage at least somewhat under control. The code varies among countries. Belgium uses four digits; the USA, Italy, Poland, and France five digits; Russia 6 digits; and Japan varies from 3 to 7 digits. Some of these codes are composed of two parts, a province code and a locality code within that province. France and Poland fall into that category. Each of the five countries listed below is fairly common, and you should have a nice pile of QSL cards to check for their awards.

Belgium's Post Code Award. The UBA Post Code Award is available for contacting Belgian stations in towns and villages each having a different post code. SWL okay. No date limits. All bands and modes are allowed, but no use of packet or



The UBA Post Code Award is available for contacting stations in towns and villages in Belgium each having a different post code.

repeaters. Each post code should be contacted only once, regardless of bands or modes used. The postal code is a 4-digit number shown immediately before the city or town. Your score is the *sum* of all different Belgian post codes confirmed by QSL cards.

The basic award requires 500,000 points. The first endorsement sticker requires 750,000 points with 8 different provinces. A second endorsement sticker requires 1,000,000 points with 9 different provinces. A trophy is available for a score of 1,500,000 points with all 10 provinces.

A special Excel worksheet has been created to facilitate application and score calculation. Applicants are encouraged to use this worksheet when applying for the award. This file on diskette will be accepted as an application form. The file can be downloaded from the UBA Award Mailing list webpage at the "files" section. Anyone not wishing to use this file may send his/her application in the form of a GCR list. Besides the usual QSL data, this list must contain the postal code of each contacted station. Every GCR list should be sorted by ascending postal codes. The award fee is 5 Euros. Endorsements are free if applied for at the same time as the initial award. If not, an SAE + 1 Euro should be provided. The cost of the trophy is 30 Euros. Apply to the UBA Award Manager: Egbert Hertsen, ON4CAS, Postbus 85, Mechelen 2, B-2800 Mechelen, Belgium.

In 2008, a PDF version of this award was made available *at no cost*. Print the award in your own shack. When you apply for the award, request that the PDF file version be e-mailed to the address you supply. (The PDF is widely used for document distribution, and the software is available for no cost at: <http://www.adobe.com/>.) Internet: <http://www.uba.be/en.html> (found under link to UBA)

Diplôme 10 Millions. Contact stations in towns in France with different French postal codes. For example, the value of the code in the sponsor's address shown below is 77270. The number produced by adding all of the contacts must equal at least 10,000,000 for the basic award. A trophy is offered for accumulating a total of 50,000,000. Each postal code may be used only one time. The number of zip codes is limited to 25 by the French department. Postal codes from French SWLs may also be used. Postal codes of French Overseas Departments, such as FG, FM, FR, etc., may be used as well. SWL okay. All bands and modes. No time limitations. For the award send GCR list

Contact stations in towns in France with different French postal codes to earn the Diplôme 10 Millions.

and fee of 10 Euros, 10 IRCs, or $US10; the fee for the trophy is 35 Euros. Apply to: Jean-Pierre Lehembre, F6FNA, 8 rue de Verdun, F-77270 Villeparisis, France. The sponsor has created an Excel spreadsheet program to manage this award. Write to <f6fna@ref-union.org> for a copy. Internet: <http://f6fna.club.fr/dixmregle.html>.

Worked All Italian ZIP Codes Award. Section ARI Pescara sponsors this award for working different Italian zip (postal) codes after January 1, 1965. The code consists of a 5-digit number, sometimes preceded by the letter "I-". There are about 4900 different such codes. In the case of contacts without the zip code number shown on the card, you may use the code shown in a callbook or refer to the internet site: <http://www.ik6cac.com/en_dataCAP.asp>.

The award versions available are:

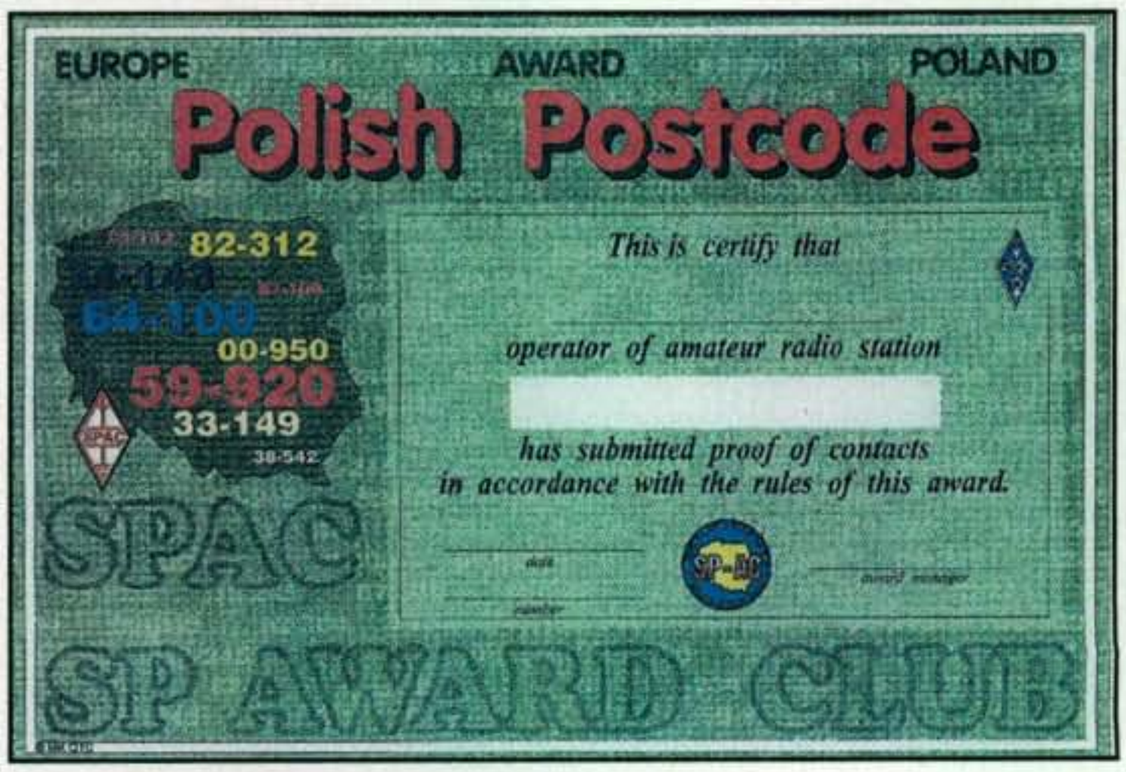
1. Mixed—all bands and modes.
2. HF—on HF using all modes.
3. Over 30 MHz—for 50 MHz, VHF, UHF, and higher using all modes.
4. Phone—all bands using phone mode.
5. CW—all bands using CW mode.
6. RTTY—all bands using digital modes.

Section ARI Pescara sponsors the Worked All Italian ZIP Codes Award for working different Italian zip (postal) codes after January 1, 1965.

The basic award is available for 250 such codes, and there are endorsements for each additional 250. No use of repeaters allowed. Send GCR list and fee of 6 Euros or $US10 to: Carlo Delle Monache, IK6CAC, Via S. Eligio 22, I-66100 Chieti, Italy. E-mail: <ik6cac@amsat.org>; Internet: <http://www.ik6cac.com/it_waiz.asp>

Japan Postal Code Award. This is one of the awards sponsored by the Japan Awards Hunter Group. SWL okay. Confirm contacts with JA stations whose postal codes total exactly 100,000. Of the 100,000, 50,000 shall consist only of 3-digit postal codes (example 170). Another 50,000 shall consist of 5-digit postal codes with the last 2 digits counted as decimal points (example 760-24 = 760.24). For the new 7-digit codes, only the first 5 digits shall be used. If the fourth and fifth digit of a new 7-digit code consist of "00," the code will be counted as a 3-digit code (example: 154-0023 = 154. 144-0056 = 144). If the fourth and fifth digits of a new 7-digit code consist of numbers other than "00", the code will be counted as a 5-digit code (example: 350-1106 = 350.11, 245-8856 = 245.88).

Contacts must be made on three or more bands. The list shall include JCC/G or Prefecture numbers. All stations must be different. The list must be sorted by postal codes. Postal codes must be shown on the QSL cards. P.O. Box number addresses do not count. No endorsements. Send application form and fee of Y500 to Chikaraishi Tomiji, JA1BUQ, 2-56-5 Nishirokugo, Ota, Tokyo 144-0056, Japan. E-mail: <ja1buq@jarl.com>; Internet: <http://www.jarl.com/jag/awards_eng.html>.



The Polish Postcodes Award is one of the interesting awards promoted by the SP-AC Club.

Polish Postcodes Award. This is one of the large and interesting series of awards promoted by the SP-AC Club. On HF, Polish stations need 70 different postcodes from Poland, and on frequencies higher than 30 MHz 30 are needed. All others need 30, and on frequencies higher than 30 MHz, just 15. The first two numbers of the 5 digits are the ones to count—e.g., **82**-300, **59**-922, **00**-950.

Contacts after January 1,1970 count for the award. SWL okay. All bands and modes accepted. GCR list okay. Fee for the award is $US7, 10 IRCs, or 5 Euros. Fee for endorsement stickers is 2 IRCs or $US2. Apply to: Arkadiusz Szczyglewski, P.O. Box 6, 59-920 Bogatynia, Poland. Internet: <http://www.spac.com.pl/>.

We're always interested in hearing from club, special interest group or individuals who sponsor an award. Contact me at the e-mail address shown on the first page of this column.

73, Ted, K1BV

Contesting, Kid Style

BY JOHN DORR,* K1AR

July's Contest Tip

There is often a cadence, or rhythm, that exists in many contest QSOs. For example, some weak stations will send "BK" at the end of their exchange or a full 599 (without abbreviated numbers). Completion of a contest QSO can often be enhanced by sensing that rhythm and mirroring it on your end. For example, if the sending station sends "QSL?" or "BK," it can be helpful to send the same text back to the station so that he/she can more easily verify your confirmation of the contest exchange. Ironic as it sounds, slowing down and paying particular attention to "the other guy" can result in a rare multiplier ending up in your log versus a busted QSO. Of course, the same can be said for DX contacts. Practice the technique outside of contests and you may be surprised how well it works!

Calendar of Events

All year	**CQ DX Marathon**
June 27–28	King of Spain SSB Contest
June 27–28	ARRL Field Day
June 27-28	Marconi Memorial HF Contest
July 1	RAC Canada Day Contest
July 4–5	DL-DX RTTY Contest
July 4–5	Venezuela Independence Day Contest
July 11-12	IARU HF World Championship
July 18–19	**CQ WW VHF Contest**
July 18–19	North American RTTY QSO Party
July 25–26	RSGB IOTA Contest
Aug. 1-2	North American CW QSO Party
Aug. 1–2	August UHF Contest

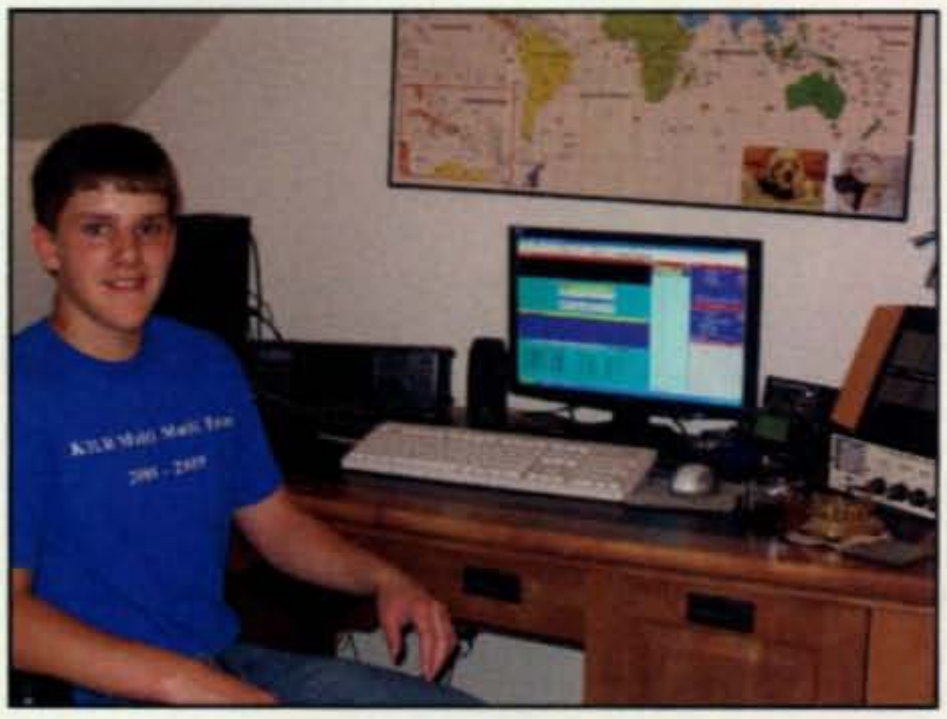
We all were kids once. There may even be a few of you reading these words who can make that claim today! For the many of us, we began our ham radio journeys as kids. In my case, I was 13 years old and completely captivated by this wireless thing we call ham radio, and contesting in particular.

As has often been discussed, however, the ranks of youthful hams have dwindled. We are fortunate, however, to have enthusiastic young hams such as Cal Darula, KØDXC, who is a tremendous representative of the youth movement in ham radio. This month, his words will provide you with insight and hope that there is a place in contesting for young people. For that reason, I've invited him to tell us, in his own words, what it means to be a young ham and how we can better attract more like him.

From the Keyboard of KØDXC

Hello! I am Cal, KØDXC, a 14-year-old ham residing in Jackson, Ohio. I've been licensed for about four years and I have been contesting for about half of that time. My grandpa, K9MMS, got me interested in the hobby when I was 8 years old. At that time, I lived a few miles away from him in Illinois. Unfortunately, before I could get my license, my family moved to Minnesota. After the move, I didn't see my grandpa very often and amateur radio fell into the back of my mind as I adjusted to my new school and made new friends.

While visiting my grandparents' house for Thanksgiving a few years later, I completely surprised my grandpa by asking him if I could still get my ham radio license. It had been two years since we had last discussed ham radio, and when you're 10 years old that's a long time! Soon thereafter, my grandpa gave me the ARRL's Technician class study guide. Two weeks later I went to the local ham club's VE testing and passed the exam on my first try, getting only three questions wrong. My license soon arrived in the mail and at age 10, I became KCØUSZ!



Here is Cal, KØDXC, proudly showing off his home station in Jackson, OH. (Photos courtesy of KØDXC)

I had a lot of fun with ham radio right after I was licensed. My grandpa came to Minnesota and we set up a station on the desk in my bedroom. It consisted of an IC-706MKIIG, MFJ tuner, power supply, and a few other shack accessories. For antennas we put up an HF6V vertical, a 2-meter ground-plane, and a 6-meter dipole. I was very excited to have my own station and be able to get on the air and operate almost whenever I wanted

Cal, KØDXC, could hardly believe it—manning the 10-meter position at K3LR!

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e-mail: <K1AR@contesting.com>

to (of course, certain things came before ham radio, such as family, school, friends, etc.)!

I soon became bored with the limitations of my operating privileges. Six meters rarely opened, and 2 meters didn't have a lot of activity. I wanted more; I wanted to get on HF and work the world. Unfortunately, at the time, this would mean passing the 5-wpm CW test to upgrade.

My grandpa taught me CW when I was eight, but during the two years I was away from amateur radio I forgot the Morse code. I tried using programs to "relearn" CW, but I always lost interest before I made any progress. However, in 2007 the FCC dropped Morse code as a licensing requirement and I immediately took and passed the General exam.

SSB on HF was fun for a while, but it frustrated me because there wasn't much DX to work. Then one day I tuned across the CW portion of the 20 meters. I was amazed at all the signals I heard! Right then I made the decision to learn CW again and get in on the action myself!

Once again I went back to listening to code-training CDs, but made little progress with them. Finally, out of frustration I decided that I was going to start operating CW whether I knew the code or not! I wrote down all the code characters on a sheet of paper and called CQ. During my first few QSOs I didn't copy very much of what the other person sent, but after about a month I had my code speed up to about 15 wpm. I had successfully learned Morse code, and CW became my favorite mode overnight!

In those days, my primary joy in amateur radio was making lots of QSOs. Before my voice started changing I could get on SSB and log 100+ Q's in an hour by casually calling CQ. I used to get home from school and run pileups on 20 meters until it closed down. When my grandpa heard about this, he suggested I try contesting.

My first contest was the IARU HF Championships in July of 2007. At the time I was still fairly new to CW, so I entered the SSB-only category. During the contest I made 73 Q's in about 6 hours. I ran my IC-706 and a 6BTV trapped vertical. My results were terrible and I didn't have much fun. However, I never once thought about quitting this radio sport. During the contest I was bitten by the contesting bug. It amazed me to hear the big guns running stations. I marvel that some of the operators seemed to greet everyone who called them by name. It was absolutely thrilling to have a few stations answer my CQs. I had discovered contesting!

In this day and age there are many things out there to distract teens: cell phones, the internet, Comedy Central, video games—the list goes on. Even I will admit to sending thousands of text messages a month and getting on Myspace™/Facebook™ every so often. Most kids I know have never even heard of ham radio. When they want to talk to someone, they pick up a cell phone.

I was drawn into radio mainly because of contesting. My grandpa has always been a contester, and I really like the competitive side of our hobby, too. My first radio experience was the Kid's Day contest in 2003. I enjoyed working stations all around the world and the best part about it was that I was talking to other kids!

Contesting opens up many doors in amateur radio. I wouldn't be writing this if it wasn't for contesting. I have met many new people through contesting that will result in long-lasting friendships. Contesting has also helped me build my operating skills, and it has improved my knowledge of propagation.

My most memorable radio sport experience was being part of the K3LR multi-multi team for the 2008 CQ WW DX CW Contest. It was my first M/M experience and I was thrilled to be invited. Tim has a station that most only dream about, and propagation in PA compared to MN is absolutely fantastic! I was one of the 10-meter operators, but during the contest I had a few opportunities to make QSOs on the other bands. During that weekend I learned a lot, and I consider K3LR and his team to be some of my contesting Elmers.

Another great experience was when I able to use NU1AW/Ø on 20 meters SSB in the 2008 IARU HF Championships. It was exactly one year after my first contest, but this time I made over 1,000 QSOs in about 7 hours! I operated with Mark, WAØMHJ, at his station. Thanks again for hosting me, Mark!

My favorite contest (as of this writing) is the NAQP CW. My antennas aren't very good for DX contesting, but I think that I have a decent signal on most bands in the domestic contests. The January NAQP CW in 2008 was my first CW contest (as a single operator). In that contest, my total score ended up being about 25,000 points. A year later in the NAQP CW January 2009, my score was about 103,000 points. Only a year later and I more than quadrupled my score. In August this year I am hoping to break 150,000!

The average age of a ham continues to get older and older. Few young people are finding their way into amateur radio and some of the old timers are worried. Should they be worried? Not in my opinion! Amateur radio is a truly spectacular pastime. It has hosted people of all ages from various backgrounds. Back in the 1950s, '60s, and '70s ham radio experienced some of its greatest popularity. Teenagers would get home from school, turn on the radio, and "ragchew" with all of their friends and maybe even a few of the teachers. Amateur radio back then was almost as popular as *texting* is now!

I believe that to lower the average age of a ham we need to *spread the word*. Most kids have *never* heard of amateur radio. When I lived in Minnesota I tried to start a radio club at my middle school. At a student council meeting I brought up the topic by asking, "How many of you have ever heard of amateur radio?" Not one person knew what it was. However, after I finished my presentation everyone in the room said they thought a radio club would be a cool idea and that they wanted to get a ham radio license. Unfortunately, the school board did not approve a radio club and only one of the student council members ended up getting licensed.

Private recruiting also works well. If you have any kids who live in your neighborhood invite them over and talk about ham radio. If you don't want to be very formal, just say hello and approach them when you're taking a walk through the neighborhood and you see them outside. If they seem interested, invite them over to make a few QSOs, or see if they want to experience a non-serious contest. *Everyone* can make a difference.

Well, that's about it for this article, and I hope you enjoyed it! Amateur radio is a truly wonderful hobby, and I am honored to be a part of it. I think that the competitive side of the hobby will attract more and more young people as time goes by. Radio sport is my favorite part of this hobby. I hope to see you in the next contest, whether you're young or an Old Timer!

Another Great Book by G3SXW

Well, Roger Western, G3SXW, has done it again with his new book, *DX Delights – Tales of Travels with my Radio.* Speaking from personal experience, anything that Roger writes is a great read, and *DX Delights* is no exception. This time around, Roger recounts the human side of DXpeditioning, with over sixty anecdotes—some amusing, some dramatic, some bizarre . . . blatant bribery, airport stupidities, heat stroke, near suffocation, cabin fever, culture shock, and much more.

This 130+ page illustrated and signed book provides DXpeditioning entertainment and reading pleasure for all. To purchase a copy, send cash or sterling check to: Roger Western, G3SXW, 7 Field Close, Chessington, Surrey, KT9 2QD, England. Bank transfers are also accepted to: sort-code 20-90-69, A/c 80953636, IBAN GB06 BARC 2090 6980 9536 36, SWIFTBIC: BARCGB22. Mention *DX Delights* and your callsign for reference. Price: GBP £12, USD $20, Euros 15. Lastly, you can also use PayPal at: <g3sxw@btinternet.com>. Order yours today. You won't regret it!

Final Comments

I don't know about you, but I found this month's contribution by Cal, KØDXC, to be very motivating and encouraging. We need more "Cals" in our ranks, and it's up to us "old fogies" to find them and get them involved. Make it your belated New Year's resolution for 2009 (yes, I know it's July).

See you in the next contest!

73, John, K1AR

BY TOMAS HOOD,* NW7US

Gaining the Competitive Edge

A Quick Look at Current Solar Cycle Conditions

(Data rounded to nearest whole number)

Sunspots
Observed Monthly, April 2009: 1
Twelve-month smoothed, October 2008: 2

10.7 cm Flux
Observed Monthly, April 2009: 70
Twelve-month smoothed, October 2008: 68

***Ap* Index**
Observed Monthly, April 2009: 4
Twelve-month smoothed, October 2008: 5

One Year Ago: A Quick Look at Cycle 23 Conditions

(Data rounded to nearest whole number)

Sunspots
Observed Monthly, April 2008: 3
Twelve-month smoothed, October 2007: 6

10.7 cm Flux
Observed Monthly, April 2008: 70
Twelve-month smoothed, October 2007: 72

***Ap* Index**
Observed Monthly, April 2008: 9
Twelve-month smoothed, October 2007: 8

LAST-MINUTE FORECAST

Day-to-Day Conditions Expected for July 2009

	Expected Signal Quality			
Propagation Index.....	(4)	(3)	(2)	(1)
Above Normal:6, 14, 19-21, 26	A	A	B	C
High Normal: 3-5, 7-8, 10-13, 15-18, 22-25, 27, 30-31	A	B	C	C-D
Low Normal: 1-2, 9, 28-29	B	C-B	C-D	D-E
Below Normal: N/A	C	C-D	D-E	E
Disturbed: N/A	C-D	D	E	E

Where expected signal quality is:
A—Excellent opening, exceptionally strong, steady signals greater than S9.
B—Good opening, moderately strong signals varying between S6 and S9, with little fading or noise.
C—Fair opening, signals between moderately strong and weak, varying between S3 and S6, with some fading and noise.
D—Poor opening, with weak signals varying between S1 and S3, with considerable fading and noise.
E—No opening expected.

HOW TO USE THIS FORECAST

1. Find the *propagation index* associated with the particular path opening from the Propagation Charts appearing in *The New Shortwave Propagation Handbook* by George Jacobs, W3ASK; Theodore J. Cohen, N4XX; and Robert B. Rose, K6GKU.

2. With the *propagation index*, use the above table to find the expected signal quality associated with the path opening for any given day of the month. For example, an opening shown in the Propagation Charts with a *propagation index* of 2 will be fair to poor (C–D) on July 1st and 2nd, fair (C) on the 3rd through the 5th, gppd (B) on the 6th, etc.

3. As an alternative, the Last-Minute Forecast may be used as a general guide to space weather and geomagnetic conditions through the month. When conditions are Above Normal, for example, the geomagnetic field should be quiet and space weather should be mild. On the other hand, days marked as Disturbed will be riddled with geomagnetic storms. Propagation of radio signals in the HF spectrum will be affected by these conditions. In general, when conditions are High Normal to Above Normal, signals will be more reliable on a given path, when the path is ionospherically supported.

Over the course of the last few years, the excitement has been growing. An ever-growing crowd of amateur radio operators is discovering, or in some cases rediscovering, a way to beat the odds during solar cycle minimums. What is heartening during these troubled economic times and during these dismal days of very low sunspot activity is that this trend involves foundational technology that is affordable—technically attainable by the average amateur radio hobbyist—and they are having fun, too!

*P.O. Box 9, Stevensville, Montana 59870-0009
e-mail: <nw7us@arrl.net>

Fig. 1– The selected radio circuit between Iceland and Florida. (For figs. 1–7, source: NW7US using ACE-HF Pro, v2.05)

What technology does it take to overcome the challenges created by a very quiet sun? The common answer might be to pump as much power into an antenna designed to have the highest gain possible. That is not typically an economical solution, however. What if you are limited to constructing only a simple dipole antenna and you have less than $200 to assemble a fully-working amateur radio station?

The answer is elegant: Use a home-built, low-power (QRP) continuous-wave (CW) International Morse code transceiver. Low power? During the solar cycle minimum? Yes.

This combination of low-cost, low-power technology and Morse code operation has become one of the more highly popular activities in the amateur radio landscape. If it were not successful in getting your signal from your station to the far end of the radio circuit, this mode of operation probably would not be so popular. Let's explore why it is.

One of the many driving goals when getting on the radio is to communicate with a distant station. If you cannot hear the distant station, or if your signal is not heard by the distant station, then radio is

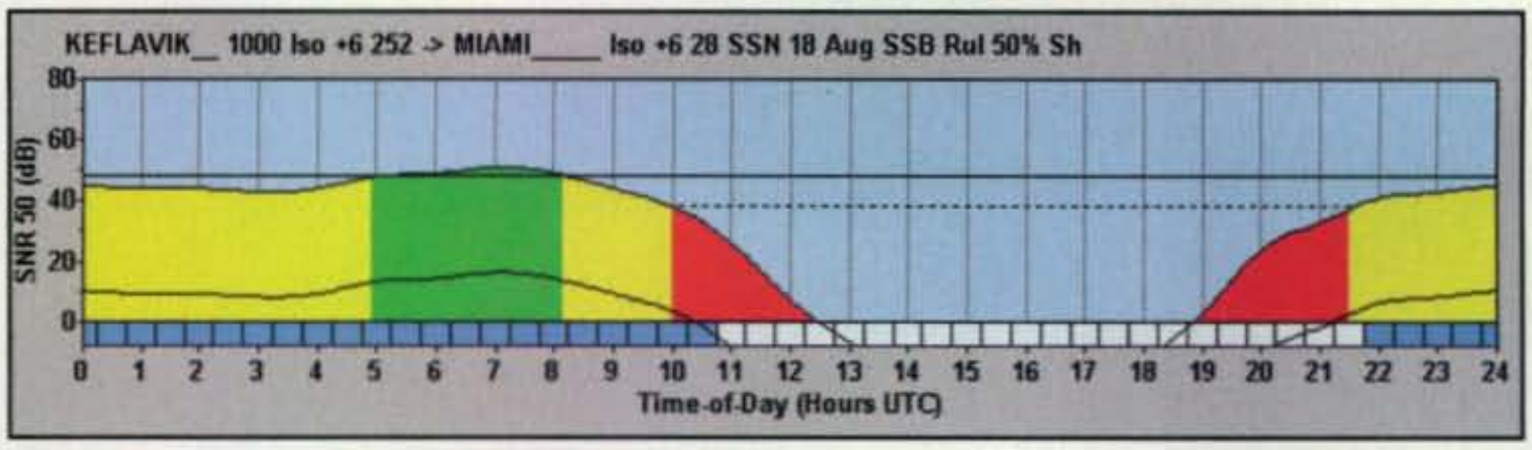

Fig. 2– A chart of the radio path between Keflavik, Iceland and Miami, Florida. the receiving station in Florida has a higher noise level due to nearby thunderstorms and other noise generation.

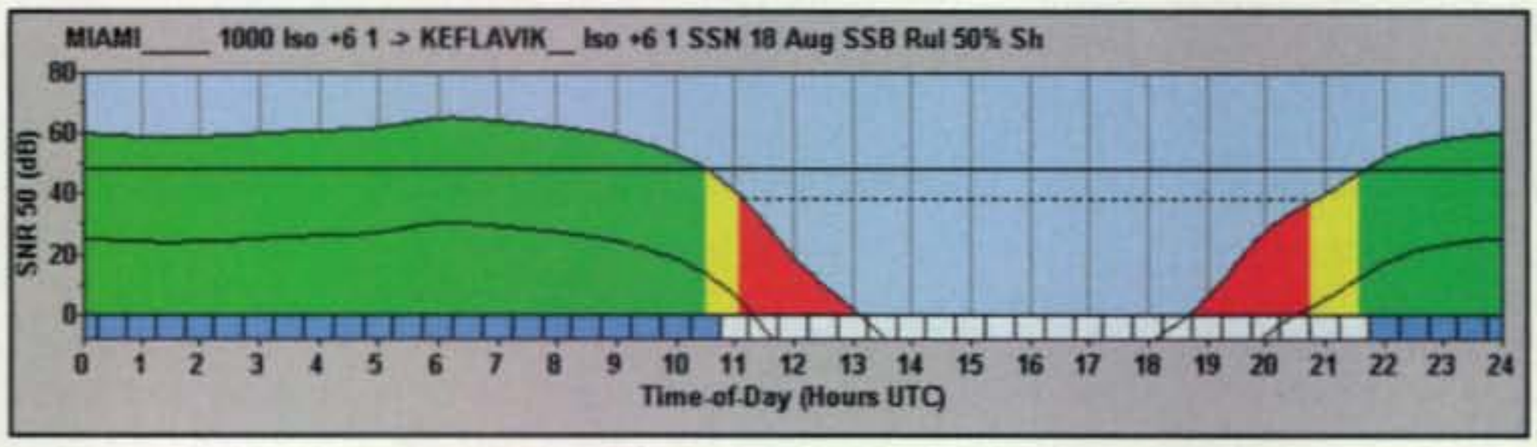

Fig. 3– A chart of the radio path between Miami, Florida and Keflavik, Iceland. The receiving station in Iceland now has a lower noise level than the one in Florida. The received signal has a much better SNR than the signal received in Florida, showing their reciprocity of identically powered and modulated signals is theoretical only.

useless. The science of radio signal propagation is in part the search for efficient communications between two stations.

Often when people talk about radio reception, signal strength is touted as the most useful factor in the effort of getting a signal from the transmitter to the receiver. However, since the problem of reception is more complex than a simple power issue (just pump more watts into the antenna), the better way to get a handle on the problem is to use the signal-to-noise ratio (SNR) measurement of a radio circuit. (The radio circuit is the path between, and including, the transmitter and receiver). The SNR is a real measure of effectiveness. With it, we can better understand how effectively a signal can get from point A to point B.

Think of it this way: Imagine sitting in a crowded hall waiting for a concert to start. You can easily hear a conversation between people a few rows behind you and you can speak to your neighbor in a whisper. The ambient noise in the hall is very low. However, now the curtain rises, the conductor appears, and the audience begins to applaud. The noise level has risen considerably. You must raise your voice—raise your signal level—to be heard by your neighbor. The noise part of the SNR equation has gone up, so your signal level must also be higher.

The same thing happens when we listen to our radio. A distant signal that we heard at S7 yesterday can't be heard today even though we had scheduled a QSO, because now we are in the middle of a thunder and lightning storm. The noise has risen—but not the distant signal—so the SNR has gone down. In radio communications, SNR is the name of the game, not signal alone.

Unless you are in the middle of an industrial area where high man-made noise levels exist, the principal limitation on received SNR is atmospheric noise that comes from lightning flashes. When you are very near a thunderstorm, your receiver may be almost blocked by interference from lightning. To illustrate this, take a look at fig. 1, a simulated circuit created by ACE-HF Pro, version 2.05 (http://hfradio.org/ace-hf/). This time, I specified a circuit from a ham in Keflavik, Iceland to a station in Miami, Florida.

I chose this circuit purposely because summer thunderstorms concentrate in the Caribbean and in central North and South America. Thus, as one approaches the polar regions, atmospheric noise levels diminish and noise at Keflavik should be lower than at Miami.

Let's see what ACE-HF has to say about reciprocal SNR predictions. Figs. 2 and 3 show comparative SNR vs. time-of-day charts for this circuit. The first is for the transmitter at Keflavik and the second reverses the circuit. Reception at Miami is marginal, but when the circuit is reversed, a significant SNR increase is predicted. The only thing we have changed is the receiver's location. The better SNR is due to the lower atmospheric noise level at Keflavik.

On an abstract numerical basis, the signal-to-noise ratio is inversely pro-

From the Space Weather Prediction Center/NOAA:

Solar Cycle 24 Prediction Update Released May 8, 2009

May 8, 2009: The Solar Cycle 24 Prediction Panel has reached a consensus decision on the prediction of the next solar cycle (Cycle 24). First, the panel has agreed that solar minimum occurred in December 2008. This still qualifies as a prediction, since the smoothed sunspot number is only valid through September 2008. The panel has decided that the next solar cycle will be below average in intensity, with a maximum sunspot number of 90. Given the predicted date of solar minimum and the predicted maximum intensity, solar maximum is now expected to occur in May 2013. Note, this is a consensus opinion, not a unanimous decision. A supermajority of the panel did agree to this prediction.

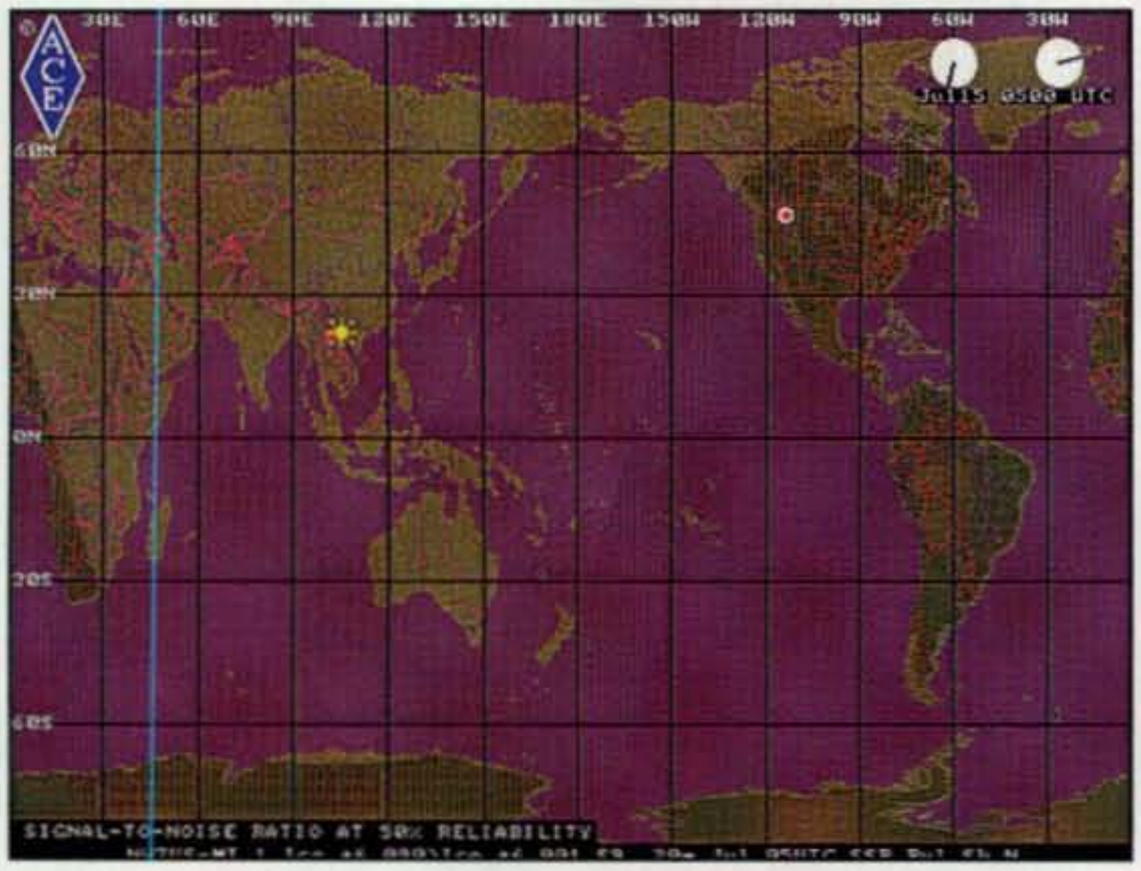

Fig. 4– The nonexistent signal footprint on the 14-MHz amateur radio band using 1 watt single-sideband voice. This indicates that it is pretty hopeless to expect a 1-watt SSB signal from Montana to reach anywhere using a no-gain isotropic antenna during July 2009.

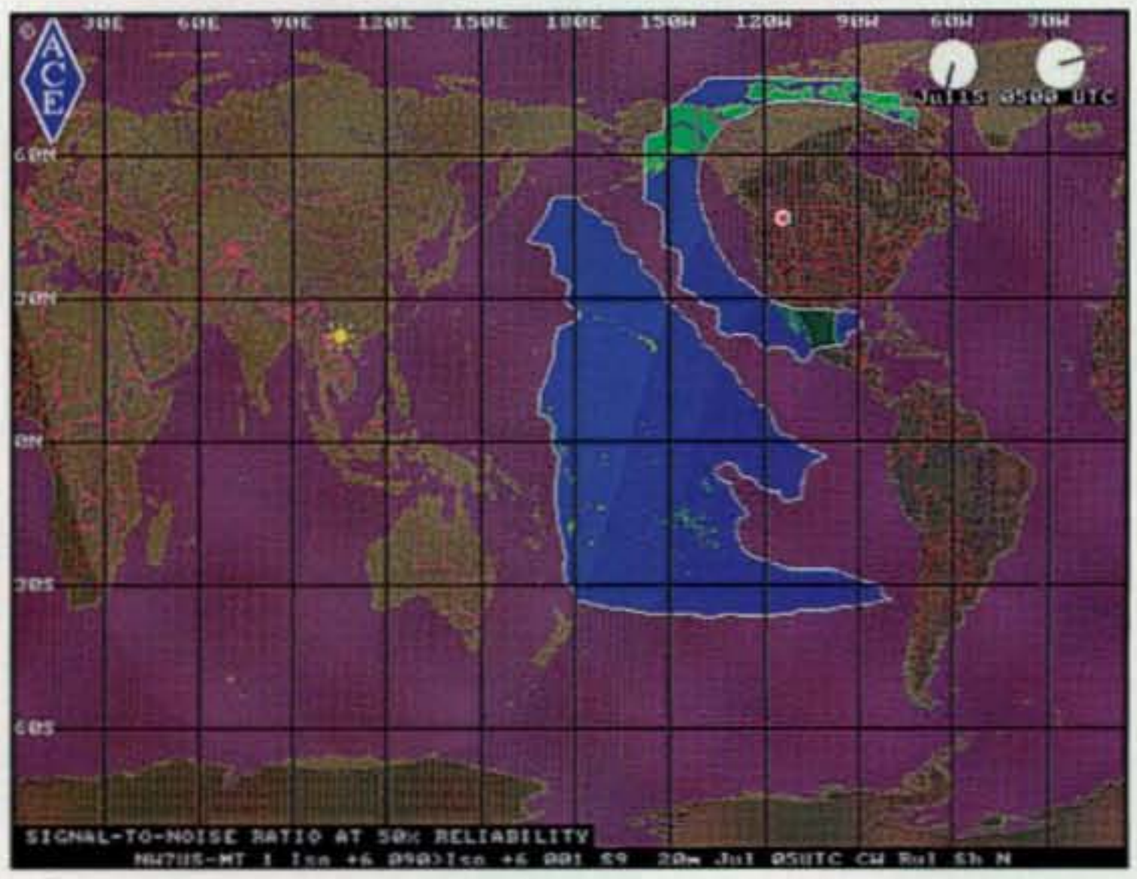

Fig. 5– The useful signal footprint on the 14-MHz amateur radio band using 1 watt CW. This indicates that a 1-watt CW signal from Montana can be used to communicate over a good part of the Pacific region using a no-gain isotropic antenna during July 2009.

portional to the width of the slice of frequencies in which we are detecting our signal. This slice is also known as the bandwidth that we are receiving, and that bandwidth contains the intelligence we're trying to detect. A slice that is 10 Hz wide (we can also call this a 10-Hz channel) would give a signal-to-noise power advantage of 23 dB, or is 210 times greater in strength than the level of inherent noise in a 2100-Hz channel (a typical bandwidth for single-sideband [SSB] voice communication).

In simplified terms, this means that a signal that is transmitted with 1 watt in a very narrow 10-Hz-wide channel is 210 times more efficient than a 1-watt (fully-modulated) SSB signal. Fig. 4, created by ACE-HF, illustrates the "footprint" of a SSB signal that originates at my home QTH in Montana State, during one hour of a day in July. Notice how there is no expected signal footprint anywhere beyond my location. A 1-watt SSB signal, during the solar cycle minimum, is pretty hopeless.

Fig. 5 illustrates the "footprint" of a CW signal with the same output power level, the same antenna, and during the same month of analysis. Notice how I can reach much of the Pacific region if I switch from SSB to CW using the same power level and antenna.

Fig. 6 shows a 100-watt SSB signal, which results in about the same coverage as the 1-watt CW signal. However, notice a drastic improvement in area coverage if I use a 100-watt CW signal (fig. 7)!

These four example area coverage maps were based on using a no-gain isotropic antenna (a theoretical antenna that radiates equally in all directions) at both ends of the circuit. Imagine the improvement you would get on your signal between your radio and a distant radio if you change your antenna so that you would have a gain of 23 dB (the same gain realized by switching from SSB to CW). That's like going from 5 watts to just over one kilowatt! The same effect is possible simply by changing the bandwidth of your communications mode.

When we talk about using modes such as CW, we are interested in how effective that mode is compared with other modes. We want to find the most efficient modes possible and concentrate our signal propagation efforts on those modes.

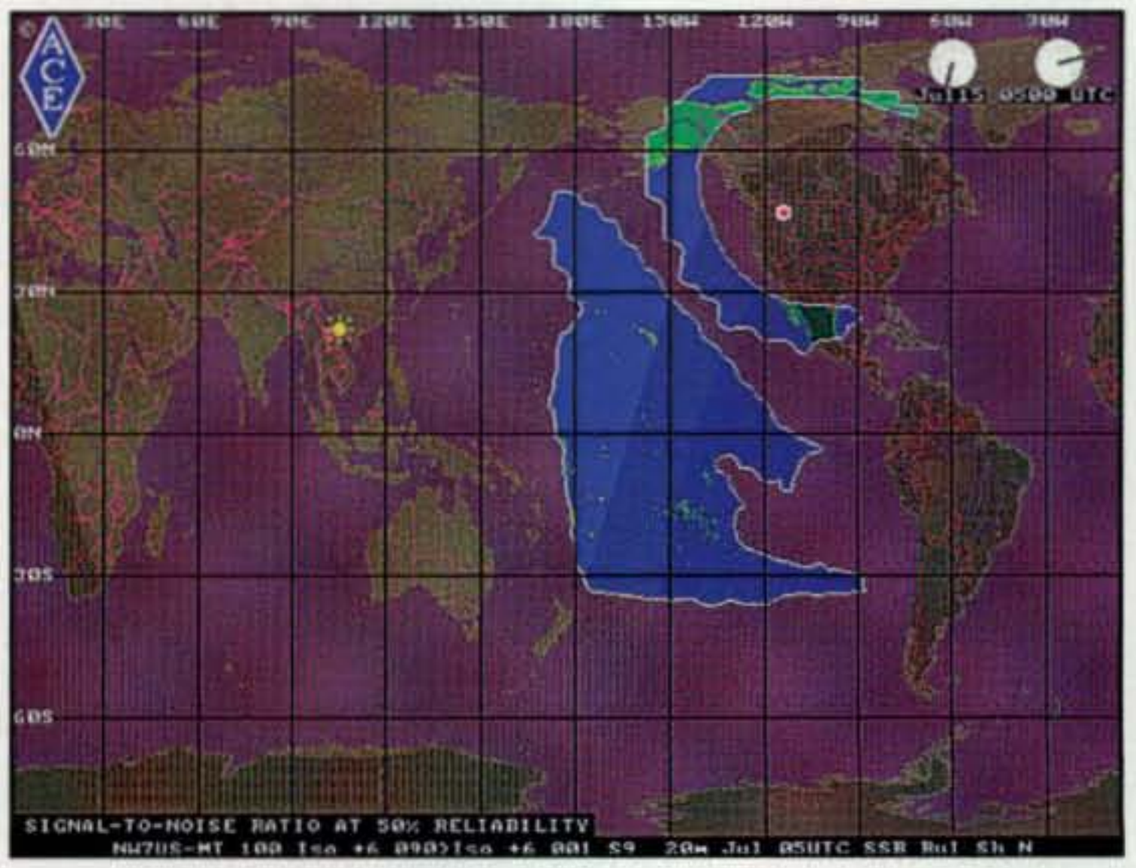

Fig. 6– The useful signal footprint on the 14-MHz amateur radio band using 100 watts on SSB. This indicates that a 100-watt SSB signal is about the same as using a 1-watt CW signal from Montana given the same parameters during July 2009.

Over great distances, the signal will experience loss. The more "power" it has, the more chance we'll "hear" it on the receive side of that long journey.

There's another advantage of using CW over other modes. The typical amateur radio operator utilizing the CW mode manually copies Morse code "by ear." The bandwidths commonly employed in receivers for CW operation are between 250 Hz and 500 Hz. It has been postulated by research that the human brain acts like a special DSP filter, giving a weak signal detected in a 250-Hz bandwidth an even better SNR than what is purely available at the speaker.

That is why Morse code as a mode of operation will continue to be one of the viable options for weak-signal communications. In addition to the ability for us operators to DSP a CW signal and succeed more efficiently than using a mode such

as SSB on that same path with the same power and other operating parameters, there are modes based on CW that utilize the power of computer processing technology and other hardware advances. There is Coherent CW, High Speed CW, and other narrow-bandwidth digital modes that are proving to greatly increase the signal-to-noise ration of an already weak-signal transmission.

Morse code CW operation is not limited to QRP, however. Because of the advantage of using a narrow-band carrier wave over the less-efficient single-sideband transmission, CW appears to have become the mode of choice during contests. This fact came to light during the 2008 CQ World-Wide DX Contest. CQ headquarters reported that the number of CW logs submitted for the 2008 CQ World-Wide DX contest has exceeded the number of phone logs for the first time in more than 20 years. There were a total of 5013 SSB logs and 5272 CW logs submitted for the 2008 running of the event, for a total of 10,285 logs. It is the first time since 1986 that more CW logs have been submitted than SSB logs. The logs contained the callsigns of more than 50,000 different amateur stations making at least one contest contact. This is indicative of the current trend to use CW to overcome the poor conditions experienced during these years of very low sunspot activity.

If you are interested in overcoming the odds inherent in the propagation of your communications, consider learning Morse code and increasing your skill in using CW. How? I strongly recommend using the Koch method, a method of CW training developed by German psychologist Ludwig Koch back in the 1930s. The Koch method is not only useful for learning code if you have not yet done so, but, it is very effective in improving your speed and skill if you are already using CW. Visit my International Morse code / CW Resource Page on the internet at <http://cw.hfradio.org/> for a lot of helpful information and tools for the CW operator.

There is a relatively new group of CW operators who formed a club and are dedicated to using only manually operated keys. This club, also known as SKCC, Straight Key Century Club, is the fastest growing group of straight key Morse code operators in the world. First organized in January of 2006, the SKCC membership has rapidly grown to include many thousands of members from all corners of the globe. The club offers a great number of fun events, from short "sprints" (in which you try to work as many other SKCC stations as possible during a time period, often several hours in length), to weekend events that promote "ragchew" QSOs in which you have conversations beyond the short exchange of the SKCC number and name, location, and signal report. There are plenty of incentives, too. What is so unique and fun about this is that the SKCC rules ensure that everyone is on a level playing field. Only manual keys are allowed, no electronic or computer-driven CW. Only straight key operation is allowed. (See my portable CW amateur station in fig. 8).

Back to the QRP strategy in beating the current economic challenges.: Check out some of these QRP groups: The QRP Amateur Radio Club International at <http://www.qrparci.org/>, and the North American QRP CW Club at <http://www.arm-tek.net/~yoel/>. This is an exciting activity. Using a whisper of power, you can still work the world.

July Propagation

Many DX hunters view July as the least exciting month of the year. With generally lower daytime Maximum Usable Frequencies (MUFs), the highest of the amateur HF bands are mostly unusable for stable long-distance *F*-layer propagation during the summer. Added to this seasonal change is the lower solar activity of this solar cycle minimum. With the 10.7-cm flux levels hovering right around 70, rarely will the highest amateur HF bands wake up.

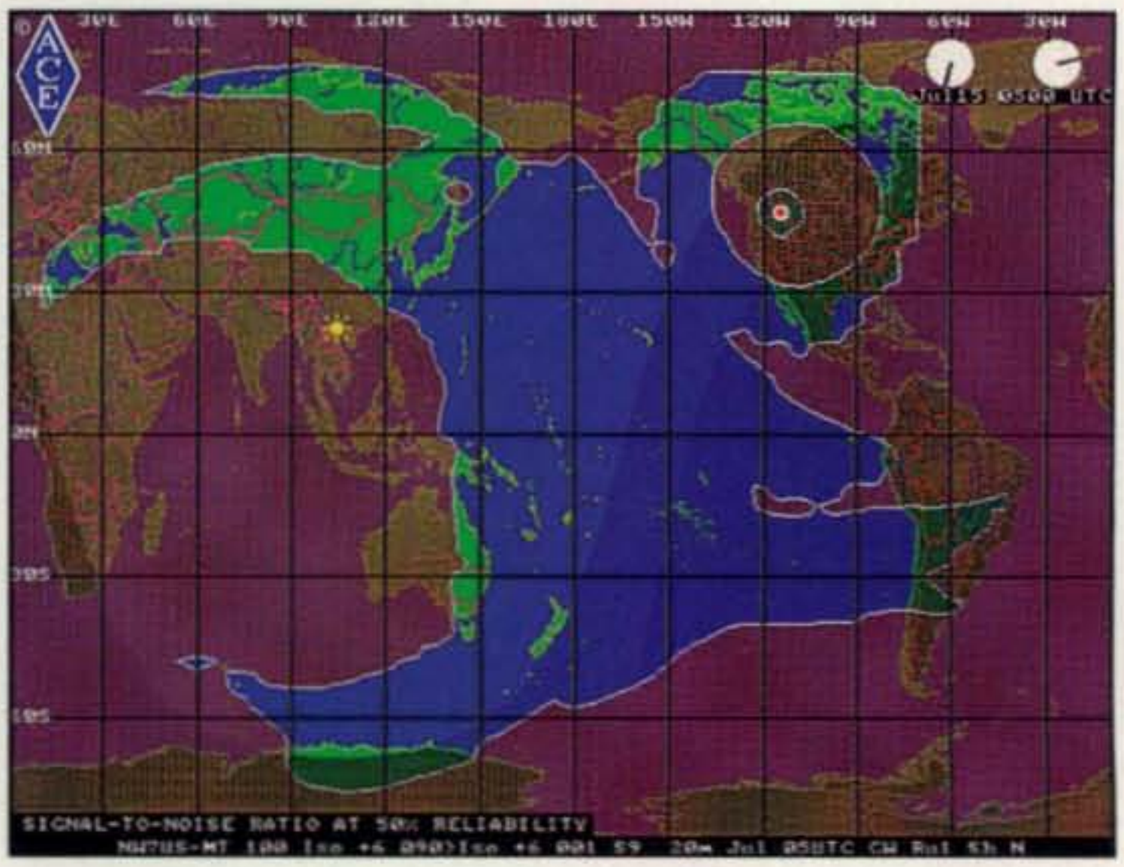

Fig. 7– The useful signal footprint on the 14-MHz amateur radio band using 100 watts on CW. Notice the much greater area of coverage of this CW signal over that of a 100-watt signal given the same parameters during July 2009. Clearly, in all cases CW is much more effective for communications during this solar cycle minimum.

While *F*-layer propagation of the highest HF frequencies will be poor, radio signals near the Best Usable Frequency (BUF) will be stable over paths that could remain open for longer periods than during the winter and early spring season. In addition, July's sporadic-*E* (*Es*) ionization is near the year's seasonal peak. This should result in a considerable increase in short-skip openings on almost all of the high-frequency amateur bands and on 6 and 2 meters as well.

Twenty meters should continue to be the best band for DX propagation during the month. When conditions are at least Low Normal (refer the Last-Minute Forecast) the band is expected to open to one area of the world or another between sunrise and the early evening. Peak conditions on 20 meters are expected for a few hours after local sunrise and again during the late afternoon and early evening. When conditions are at least Low Normal, expect 20-meter openings towards South America, the South Pacific, and Oceania until as late as midnight. When conditions are High Normal or better, the band should also remain open to most other areas of the world until as late as midnight.

Look for some short-skip openings into the Caribbean area and Central America as early as 10 AM, with a peak expected to all areas of Latin America between 3 and 5 PM local daylight time, on 17 and 15 meters. When conditions are High Normal or better, these bands may also open to Africa during the late afternoon from the eastern half of the country, and to Australasia and the South Pacific area during the late afternoon and early evening from the western half of the country. Seventeen meters will act somewhat the same as 15, but openings will be tend to be longer, and signals perhaps stronger and more stable.

Expect short-skip openings on 10 and 12 meters during July towards the Caribbean and possibly Central America as a result of sporadic-*E* ionization. When conditions are High Normal or better, an occasional opening deeper into South

America may be possible, especially during the afternoon hours.

Overall, look for frequent short-skip openings on 10, 12, 15, and 17 meters between distances of 500 and 1300 miles. During the afternoon hours skip may extend to beyond 2300 miles as a result of *F*-layer reflection. Short-skip openings should range between 250 and 2300 miles on 20 meters. Peak conditions are most likely to occur during the late morning and again during the late afternoon and early evening hours. Daytime openings on 40 and 30 meters should range between 100 and 600 miles, increasing to between 250 and 2300 miles after sunset. Look for openings up to about 300 miles on 80 meters during the day, extending out to the maximum short-skip (one-hop *F*-layer reflection) of 2300 miles during the hours of darkness.

Nighttime openings into many areas of the world are possible on 20, 30, and 40 meters. However, seasonally high static levels may often make DX reception difficult on both 30 and 40 meters. High static levels are also expected to result in somewhat poorer DX conditions on 80 meters, although some long-distance openings are forecast during the hours of darkness. One-sixty meters is virtually shut down due to the high static levels of summer. The best bet for 40-, 80-, and 160-meter DX openings is an hour or two before midnight for openings towards the north and east, and just before local sunrise for openings towards the south and west. Expect some 160-meter openings between sunset and sunrise for distances up to approximately 1300 miles, if the seasonally-high static levels permit.

Fig. 8– NW7US portable station in Tomas's travel trailer. The use of CW over other modes such as SSB offers quite an advantage during the very low solar cycle activity of this period of solar cycle minimum. (Source: NW7US)

Peak Sporadic-*E* Propagation

Optimum short-skip propagation conditions are expected during July as a result of a seasonal peak in sporadic-*E* ionization. Expect an increase in the number of short-skip openings on HF, and often on 6 and 2 meters. During the daylight hours, considerable short-skip openings are forecast for 10 and 15 meters over distances ranging between approximately 400 and 1300 miles, with openings occasionally extending out to beyond 2000 miles. Around-the-clock short-skip openings should be possible on most days on 20 meters, with the skip often as short as 300 miles and as long as 2300 miles. Short-skip conditions on 20 meters should peak during the late afternoon and the early evening.

Good daytime openings on 40 and 30 meters should range between 100 and 750 miles, increasing to between 250 and 2300 miles after sunset. Look for openings up to about 300 miles on 80 meters during the day, extending out to the one-hop limit of 2300 miles during the hours of darkness. However, these bands could be quite noisy.

While no short-skip openings are likely on 160 meters during the daylight hours of July, expect some openings between sunset and sunrise for distances up to approximately 1300 miles, if the static levels are low.

VHF Conditions

Statistical studies show that a sharp increase in sporadic-*E* propagation takes place at mid-latitudes during the late spring and summer months. During July and August short-skip propagation over distances ranging between approximately 600 and 1300 miles should be possible on 6 meters. Openings may also be possible on 2 meters during periods of intense sporadic-*E* ionization with stations up to 1300 miles away. While sporadic-*E* short-skip openings can take place at just about any time of the day or night, statistics indicate that conditions should peak for a few hours before noon and again during the late afternoon and early evening. During July you can expect 6-meter sporadic-*E* on at least three out of every four days. Openings may last from a few minutes up to hours.

Current Solar Cycle Progress

The Dominion Radio Astrophysical Observatory at Penticton, BC, Canada, reports a 10.7-cm observed monthly mean solar flux of 69.7 for April 2009. The 12-month smoothed 10.7-cm flux centered on October 2008 is 68.2. The predicted smoothed 10.7-cm solar flux for July 2009 is 72.

The Royal Observatory of Belgium reports that the monthly mean observed sunspot number for April 2009 is 1.2, up from March's 0.7. Notice that the lowest monthly number during this current solar cycle minimum occurred in July and August of 2008, when the mean observed sunspot number for each month was 0.5. Solar cycle scientists are placing the end of solar Cycle 23 statistically at December 2008 as a result. The lowest daily sunspot value of zero (0) was recorded on April 1–5, 7–20, and 23–28. The highest daily sunspot count was 8 April 29 and 30. The 12-month running smoothed sunspot number centered on October 2008 is 1.8. The forecast for July 2009 calls for a smoothed sunspot count of 8 to 14.

The observed monthly mean planetary *A*-index (*Ap*) for April 2009 is 4. The 12-month smoothed *Ap* index centered on October 2008 is 5.4. Expect the overall geomagnetic activity to vary greatly between quiet to minor storm levels during July.

I welcome your thoughts, questions, and experiences regarding this fascinating science of propagation. You may e-mail me, write me a letter, or catch me on the HF amateur bands. Please come and visit my radio resources at <http://hfradio.org/>. See you on the air!

73, Tomas, NW7US

Number groups after call letters denote following: Band (A = all), Final Score, Number of QSOs, and Prefixes. An asterisk (*) before a call indicates low power. Certificate winners are listed in boldface. (Note that the country names and groupings reflect the DXCC list at the time of the contest.)

2009 RTTY WPX RESULTS
SINGLE OPERATOR
NORTH AMERICA

United States

AJ1I	**A**	**4,577,664**	**2057**	**728**
			(OP:	W1UE)
K1SFA	*	2,026,752	1154	546
K5ZD/1	*	1,743,843	1036	527
W1ZK	*	745,710	728	402
NG1G	*	490,335	582	337
N1SV	*	473,340	620	322
W1KQ	*	403,265	540	295
AE1T	*	399,324	535	321
W1BYH	*	325,689	414	273
WE1H	*	172,430	314	215
W1UJ	*	157,023	316	219
W1HBR	*	103,600	251	175
N5VU/1	*	78,588	238	148
W1TO	*	65,569	175	133
W1YRC	*	59,909	188	139
NA1QP	*	24,930	120	90
WN1OTV	*	3,570	37	34
AD1L	**14**	**285,360**	**429**	**290**
AK1W	*	12,403	99	79
***KS1Y**	**A**	**3,101,805**	**1636**	**687**
			(OP:	N1BAA)
*KA1C	*	392,805	484	301
*W1CCE	*	257,629	403	241
*KK1X	*	194,253	395	219
*AB1J	*	186,042	342	202
*K1SEZ	*	176,596	351	212
*KB1CJ	*	103,455	242	171
*YO7ARY/W1	*	100,806	281	159
			(OP:	YO7ARY)
*WB1EDI	*	96,446	251	166
*NJ1H	*	87,016	226	149
*KF1D	*	86,193	194	157
*N1SNB	*	79,577	221	151
*AD1DX	*	66,265	210	145
*WA1ZYX	*	63,000	182	140
*KJ4DHB/1	*	58,928	180	127
*NE1F	*	41,800	145	110
*N4QX/1	*	32,340	126	105
*W2JU/1	*	17,100	100	75
*W1MJ	*	15,688	83	74
*KB1NRB	*	15,663	81	69
*N1MEO	*	7,056	61	56
*N7FYO/1	*	6,450	53	50
*KX9X/1	*	2,550	37	34
***KC1UX**	**14**	**19,437**	**102**	**93**
*K1UO	*	4,560	43	40
***KA1CQR**	**3.5**	**2,538**	**29**	**27**
N02T	**A**	**1,058,574**	**899**	**473**
NX2X	*	375,550	504	290
AA2NA	*	220,069	377	229
NA2M	*	183,609	330	207
WA2ETU	*	157,080	308	204
NJ1F/2	*	153,069	268	197
WS9M/2	*	127,270	287	178
W2LE	*	98,952	230	186
K2TV	*	94,214	225	163
KC2KZJ	*	12,978	76	63
W2IUC	*	3,655	49	43
N2CU	**14**	**66,882**	**189**	**157**
***N2FF**	**A**	**416,416**	**517**	**308**
*K2DSL	*	323,868	514	274
*WA2LXE	*	220,752	411	219
*K2ZC	*	219,968	315	224
*WA2MCR	*	170,060	358	220
*KB2NB	*	152,277	265	193
*WB2RIS	*	126,420	260	196
*K2YG	*	124,914	273	191
*K2SI	*	98,505	255	165
*N2MH	*	80,483	239	151
*KB2VMG	*	78,960	209	140
*KD2MX	*	59,400	193	132
*WC2L	*	39,760	143	112
*WB2SIH	*	36,630	143	111
*KR2D	*	28,440	124	90
*N2TEW	*	28,152	121	92
*KC2OGR	*	27,090	116	90
*WB2TPS	*	21,070	103	86
*WA2CAM	*	16,400	106	82
*K3QE/2	*	12,160	76	64
*WV2ZOW	*	348	12	12
*N2AKT	*	12	3	3
*WX2U	*	1	1	1
***K2PAL**	**7**	**9,464**	**61**	**52**
K3MM	**A**	**5,386,178**	**2327**	**742**
W3FV	*	2,280,564	1275	572
AA3B	*	1,932,537	1060	543
K3RWN	*	471,968	650	301
K3WW	*	445,160	483	310
W3ZZ	*	438,957	573	323
KJ3X	*	380,190	610	285
			(OP:	K1DOV)
N3AM	*	257,250	357	245
W3DAD	*	225,504	384	216
W3MF	*	99,969	180	141
WI2E/3	*	87,669	201	153
W3TNU	*	86,080	207	160
K3RMB	*	66,816	205	128
N3QW	*	61,020	145	113
WA3AAN	*	25,676	111	98
K3MD	*	11,122	80	67
AJ3M	*	7,248	57	48
AI3Q	**14**	**19,691**	**121**	**97**
***W3DQN**	**A**	**345,330**	**468**	**270**
*KB3LIX	*	302,575	419	247
*WW3S	*	212,940	362	252
*KW3W	*	200,640	398	220
*WØBR/3	*	198,644	322	212
*N3CHX	*	155,856	330	191
*W3BUI	*	96,084	257	153
*N3NZ	*	62,720	201	140
*KB3KXX	*	19,028	89	71
*W3ZF	*	11,648	76	64
*N3NR	*	11,616	72	66
*N3WZR	*	7,728	55	46
*W3ZGD	*	3,136	37	32
*N3RDV	*	2,494	34	29
*N3AFT	*	1,920	33	32
*N3JNX	*	1,458	30	27
***NY3B**	**14**	**12,375**	**87**	**75**
***K3NK**	**7**	**121,360**	**221**	**164**
*K3SV	*	67,626	133	117
K4GMH	**A**	**5,241,488**	**2214**	**742**
N6AR/4	*	2,456,720	1468	574
W4PK	*	2,213,340	1346	555
W4GKM	*	1,148,210	1107	470
K4FX	*	1,101,600	904	459
AD4EB	*	871,125	978	375
W2YE/4	*	674,064	689	372
KR4F	*	632,333	661	383
N4LV	*	620,238	655	334
WB4ROA	*	507,647	523	329
KR4U	*	480,095	703	301
K4HMB	*	440,118	507	294
W6IHG/4	*	439,240	522	316
NQ1W/4	*	340,392	491	312
			(OP:	K1KO)
K4HAL	*	321,183	523	281
W4BCG	*	320,040	520	254
N4BCB	*	257,948	449	236
W9WI/4	*	238,760	405	235
KC4SAW	*	185,812	334	206
K3KO/4	*	177,639	285	231
N3JT/4	*	174,744	292	216
K7CS/4	*	174,468	316	201
KN4LF	*	156,672	278	192
KM1C/4	*	151,578	317	189
WC2Z/4	*	145,343	288	181
AI4WW	*	130,835	286	191
W4LWW	*	118,413	250	177
K3IXD/4	*	103,777	248	157
K4GM	*	90,405	229	147
W4EEH	*	87,480	245	162
N4VV	*	83,782	244	163
K1ZW/4	*	82,544	205	154
K4XD	*	71,775	171	145
AD4YO	*	61,364	174	116
W4RRE	*	52,093	152	113
WD8RYC/4	*	40,320	133	105
NTØV/4	*	38,533	152	113
K4ZTL	*	35,308	124	97
W2OO/4	*	25,840	107	85
W3YY/4	*	21,156	87	82
N3BM/4	*	19,250	83	77
W4OJC	*	13,398	67	58
K4EDI	*	2,610	31	30
WA4GLH	*	1,342	28	22
NA4W	**28**	**627**	**21**	**19**
			(OP:	K4WI)
NJ4U	**21**	**74,816**	**248**	**167**
K4FJ	*	52,734	208	141
K4WW	**14**	**408,680**	**498**	**340**
N4ZZ	*	105,840	238	180
WW4LL	**7**	**2,170,276**	**1075**	**526**
K4CZ	**3.5**	**146,544**	**315**	**172**
WF4W	*	64,740	202	130
***N2QT/4**	**A**	**2,090,808**	**1302**	**568**
*WF4M	*	1,265,660	988	484
			(OP:	AA4U)
*AB4GG	*	964,920	976	408
*W4UEF	*	624,429	727	351
*WB2RHM/4	*	605,166	607	349
*KE4KWE	*	525,008	717	314
*AB4SF	*	461,360	540	316
*WF7T/4	*	404,125	605	265
*N4IG	*	399,848	536	302
*K4MIL	*	366,359	493	263
*K4CX	*	293,248	477	232
*K1GU/4	*	289,920	435	240
*KS4S	*	253,105	474	223
*KD4HXT	*	126,368	364	176
*NB4M	*	118,193	261	181
*WB5NMZ/4	*	112,401	304	181
*W4VIC	*	112,041	252	177
*K4REB	*	109,650	272	170
*K4JJQ	*	88,060	241	148
*NA4C	*	85,164	229	151
*N4AU	*	80,661	227	161
*WD4PDZ	*	79,328	189	134
*K2OGD/4	*	77,928	185	136
*KU4A	*	70,448	211	148
*KM4JA	*	69,174	209	126
*KN4Q	*	52,890	191	123
*WØQQG/4	*	51,480	169	117
*N4LF	*	46,464	139	121
*W4BK	*	46,065	166	111
*AI4G	*	41,470	167	110
*KE4S	*	40,071	141	111
*W4DDR	*	35,182	132	98
*N4PJ	*	32,635	125	107
*WC4CC	*	29,545	111	95
			(OP:	K4CC)
*WN4DX	*	27,371	128	101
*AA4NU	*	23,584	116	88
*KD4N	*	22,968	119	87
*WA8OJR/4	*	20,025	110	89
*AE4O	*	18,224	92	68
*KU4PY	*	15,375	91	75
*KM4RK	*	13,080	77	60
*W4OTN	*	12,993	87	71
*W4GHD	*	9,882	72	61
*KI3O/4	*	9,664	78	64
*N3TG/4	*	9,499	71	59
*W4MLD	*	5,700	59	50
*KR1ST/4	*	4,012	42	34
*AA1AR/4	*	2,442	40	33
*W3NR/4	*	170	10	10
***W4LC**	**14**	**284,820**	**411**	**303**
*N1ADY/4	*	150	10	10
***N3UA/4**	**3.5**	**6,364**	**58**	**43**
K5DU	**A**	**1,919,212**	**1601**	**529**
WA5ZUP	*	1,074,400	1336	400
K7IA/5	*	458,965	757	307
W5KI	*	391,980	532	282
W5PF	*	195,688	412	244
KD5JAA	*	124,560	312	173
NA5RC	*	100,440	233	162
N5RMS	*	64,024	275	151
			(OP:	K5NZ)
NK5G	*	47,790	200	118
KK5OQ	**14**	**1,212,729**	**1148**	**553**
AE5AA	**7**	**1,657,920**	**1042**	**480**
			(OP:	N5ZM)
AA5AU	*	335,580	425	255
N5RN	*	206,752	397	208
***AD5XD**	**A**	**660,476**	**982**	**326**
*KD5LNO	*	417,360	664	282
*WB5TUF	*	331,695	559	273
*W5KDJ	*	326,452	579	262
*K5WW	*	303,282	643	249
*WM5DX	*	178,808	429	217
*W5APS	*	151,620	384	210
*K5HDU	*	118,125	315	189
*W5QLF	*	95,680	287	160
*N5UWY	*	73,206	269	147
*KØGEO/5	*	70,200	263	135
*WØVX/5	*	52,496	199	136
*WA9AFM/5	*	39,165	174	105
*NJ5DX	*	28,536	148	87
			(OP:	W5OV)
*AA5VU	*	22,525	103	85
*AE5MM	*	19,320	110	84
*K5DHY	*	15,604	101	83
*N5PU	*	10,584	79	54
*WS5K	*	8,906	79	61
*KE5LQ	*	7,650	61	51
*W5JE	*	5,610	69	55
*K5DKH	*	2,352	34	28
*KK5JY	*	2,100	30	28
*AA5AM	*	1,794	24	23
***K5PAX**	**21**	**4,455**	**45**	**45**
***WD5K**	**14**	**207,418**	**431**	**274**
*K5NAA	*	18,928	133	104
*AA5JG	*	522	18	18
***W5GHZ**	**7**	**3,264**	**42**	**34**
N6ML	**A**	**1,918,202**	**1692**	**494**
K9YC/6	*	795,760	1003	343
N6IE	*	769,792	1067	388
NG6S	*	664,796	798	319
			(OP:	W4UAT)
N6QQ	*	574,368	693	372
KT6YL	*	494,158	856	329
WX6V	*	488,422	702	298
NZ6K	*	458,640	718	294
			(OP:	K6RB)
WA6BOB	*	352,836	574	243
W6LED	*	331,936	576	253
K6EU	*	236,840	495	248
NW6H	*	234,596	418	223
			(OP:	W6EU)
AF6T	*	193,752	391	207
			(OP:	K6TD)
W6SX	*	187,910	430	190
W6OQI	*	176,384	409	208
K9JM/6	*	174,858	392	193
KE1B/6	*	173,310	442	218
K6DGW	*	162,919	405	197
KI6VC	*	156,366	490	219
WF6C	*	127,617	302	177
			(OP:	N6XI)
W6TQG	*	103,108	287	173
K6TA	*	96,960	251	160
NM6G	*	93,696	382	183
			(OP:	W6CZ)
K6HGF	*	86,520	311	168
KG6ZHC	*	82,938	262	138
WB6JJJ	*	81,732	226	139
N6WG	*	64,480	255	124
N6CK	*	48,608	163	112
W6RKC	*	22,568	122	91
NW6P	*	15,075	109	75
K6SRZ	*	13,272	106	79
NI6T	*	11,224	76	61
K6MI	*	574	14	14
***W6FFH**	**A**	**313,730**	**616**	**274**
*KM6Z	*	275,868	608	237
*K6GEP	*	112,338	328	158
*N6VH	*	102,008	294	164
*W6WRT	*	86,086	254	154
*KE6SHL	*	58,801	236	127
*K6MM	*	58,800	189	140
*NQ6L	*	57,912	225	127
*KØXB/6	*	56,100	217	132
*K6UUW	*	49,818	192	138
*K6GFJ	*	45,840	193	120
*K6AAB	*	42,432	168	104
*K6VUG	*	32,536	128	98
*KA6NGR	*	30,015	130	87
*K6BIR	*	29,779	153	97
*N6TQS	*	25,830	117	90
*N6EF	*	25,389	136	93
*N6FD	*	21,280	123	95
*K6XV	*	19,998	146	99
*NA6G	*	17,933	111	79
*KM6I	*	16,650	111	75
*K6RM	*	14,348	104	68
*N6GEO	*	13,690	97	74
*K6LE	*	12,561	105	79
*KA6GDT	*	11,403	74	63
*N6QEK	*	11,328	79	59
*K6ST	*	7,250	63	50
*KI6BEN	*	3,696	49	42
*KD6FIL	*	1,829	37	31
*N3RC/6	*	1,170	27	26
*N3FAW/6	*	522	30	29
*W6OAT	*	216	8	8
***N6HE**	**14**	**3,960**	**59**	**45**
*N6NU	*	2	1	1
KR7X	**A**	**1,440,410**	**1380**	**458**
W7ZR	*	1,096,591	1371	389
K7EG	*	498,888	666	328
KV7DX	*	490,406	801	322
			(OP:	KN5H)
K7SFN	*	372,887	684	281
WA7LNW	*	275,766	489	246
KD7MSC	*	216,354	512	214
NC7J	*	178,068	399	209
			(OP:	W7CT)
W7UG	*	161,544	326	212
N7TR	*	156,981	403	201
K7OX	*	148,304	345	184
W9PL/7	*	121,830	259	155
W7YES	*	119,579	293	197
N6KW/7	*	109,548	324	179
WX7P	*	96,416	298	184
W7VXS	*	90,216	327	179
K7LV	*	55,800	204	124
NI7R	*	35,880	165	115
N7DB	*	16,064	85	64
W7WHY	*	4,816	52	43
W7CT	*	1,632	43	32
KZ7X	**14**	**384,540**	**723**	**340**
N7BV	*	284,675	566	295
WA1PMA/7	*	4,488	51	51
AD7XV	*	3,312	63	46
N6MA/7	**7**	**391,072**	**476**	**242**
K7WP	*	55,876	184	122
K7ZO	*	17,780	83	70
***NN7SS**	**A**	**550,620**	**768**	**342**
			(OP:	K6UFO)
*KW7N	*	210,330	474	205
*N7ESU	*	167,856	376	208
*NQ7R	*	153,504	430	208
*K7VIT	*	137,520	317	191
*WAØWWW/7	*	131,008	303	184
*W7EWG	*	125,312	367	178
*NF7T	*	107,091	296	163
*KC7V	*	90,644	267	172
*AD7MQ	*	46,800	201	120
*WY7SS	*	42,560	252	133
*K7EIQ	*	42,120	172	130
*KE7FBY	*	34,344	171	108
*K7RFW	*	34,216	152	94
*W6SA/7	*	29,792	150	98
*WA7SHP	*	16,425	102	75
*KD7RUS	*	16,133	106	73
*WA7BME	*	14,136	81	62
*KO9G/7	*	13,041	96	69
*W7TYN	*	8,100	67	54
*N7WA	*	7,672	71	56
*W7NNN	*	5,616	58	48
*WA7U	*	5,016	83	57
*KX7L	*	3,956	49	43
*AD7OG	*	3,649	46	41
*K7QMM	*	2,964	47	39
*KE7VZW	*	2,356	44	38
*WY7LL	*	2,280	55	40
***K7AR**	**14**	**103,917**	**309**	**201**
*W1ZD/7	*	63,733	243	163
*NG7Z	*	1,134	30	27
*W7JAZ	*	544	19	17
***N7ZG**	**3.5**	**23,652**	**118**	**81**
W9KB/8	**A**	**390,511**	**619**	**271**
K8UT	*	346,884	493	274
K8SM	*	264,196	450	257
K8CC	*	212,848	423	212
N8TR	*	196,581	336	231
K1LT/8	*	138,942	328	186
AA8LL	*	107,262	218	177
WT8C	*	86,032	210	152
W8KEN	*	32,040	123	90
N8NOE	*	18,942	111	82
K8AO	*	7,991	73	61
WA8RPK	**14**	**89,208**	**239**	**177**
NF8M	*	570	20	19
***K8ZZ**	**A**	**403,656**	**656**	**278**
*WB8JUI	*	291,635	516	235
*KK8MM	*	247,912	396	233
*K8OT	*	180,198	327	213

*N2OPW/8	*	167,776	364	196
*N9AUG/8	*	49,173	181	111
*K8TJM	*	17,390	94	74
*KG8DH	*	13,334	77	59
*NA8W	*	10,660	76	65
*N8IE	*	10,584	70	63
*KC8ZTJ	*	7,656	86	66
*W8IDM	*	2,432	39	32
W9IU	**A**	**1,420,020**	**1123**	**490**
AI9T	*	1,338,057	1130	469
K9IUQ	*	435,552	542	312
W9IL	*	198,094	341	247
W9HLY	*	189,000	421	189
WA9IVH	*	179,316	372	204
ND9E	*	144,364	293	193
N9WKW	*	137,228	297	182
K9BJM	*	80,064	207	144
KA6SGT/9	*	33,578	138	103
AI9L	*	5,828	55	47
W9SE	**14**	**29,103**	**146**	**109**
***N9CK**	**A**	**427,800**	**579**	**310**
*N9LF	*	97,174	268	154
*WR9Y	*	97,032	279	156
*N9DD	*	83,433	265	137
*K9JWI	*	71,672	214	136
*W9PDS	*	68,370	243	129
*K9PY	*	54,692	157	121
*K9QH	*	47,560	175	116
*W9OA	*	34,736	116	104
*N9LYE	*	30,492	160	99
*N9UY	*	29,106	129	98
*KA9O	*	26,820	113	90
*W9CPI	*	18,648	108	74
*KA9VHG	*	14,925	90	75
*W9VQ	*	12,060	74	67
*W9WE	*	3,486	49	42
ABØRX	**A**	**1,974,753**	**1464**	**549**
KØFX	*	930,600	930	396
KØALT	*	455,642	693	278
ABØUK	*	363,888	707	266
WØHT	*	294,577	473	271
KØTG	*	240,448	510	208
KØBX	*	166,044	317	202
KSØAA	*	157,325	420	203
KØPIR	*	154,365	463	205
WVØT	*	118,064	353	157
W4RK/Ø	*	111,222	295	167
WØTY	*	97,352	248	172
KØJJR	*	73,904	234	149
WØBH	*	72,352	298	152
WØMU	*	67,860	245	145
NØRN	*	30,603	133	101
WB5MFI/Ø	*	28,796	125	92
KV6O/Ø	*	22,050	130	90
WAØMHJ	*	12,180	81	70
KBØL	*	8,614	72	59
N6BXO/Ø	*	1,274	26	26
***NTØF**	**A**	**601,692**	**706**	**348**
*K7RE/Ø	*	408,613	701	317
*KI6DY/Ø	*	395,872	667	278
*WØSM	*	210,909	526	229
*KIØF	*	197,550	374	225
*NØYO	*	189,772	435	227
*ABØS	*	184,338	460	198
*KØWHV	*	163,615	351	215
*WSØZ	*	161,448	389	186
*WBØN	*	142,740	391	180
*KØRC	*	138,570	322	186
*WAØLPV	*	122,285	312	185
*KSØM	*	113,668	268	181
*NFØN	*	104,748	278	172
*WNØL	*	100,224	281	192
*KØAD	*	91,260	312	156
*NØEOP	*	89,516	319	161
*KØVM	*	87,731	273	151
*WØRAA	*	77,280	288	160
*KOØZ	*	74,784	223	152
*ABØYM	*	71,514	255	137
*WBØQLU	*	65,631	221	131
*WØPC	*	50,622	192	118
*ACØE	*	43,625	199	125
*KBØNHW	*	33,156	164	108
*WØTUP	*	32,552	175	104
*AD1C/Ø	*	31,000	125	100
*AAØAW	*	27,262	129	86
*NØLEF	*	19,092	107	74
*WØPSS	*	12,351	101	69
*KSØT	*	3,230	37	34
*KCØNFB	*	1,488	32	31
*KCØZHF	*	384	19	16
*N1WQ/Ø	*	120	8	8
***AKØA**	**14**	**98,303**	**343**	**197**
*NRØL	*	1,058	24	23

Alaska

KL7RA	**A**	**559,988**	**707**	**286**
KL7IWC	*	174,303	384	181
KL8DX	**14**	**421,600**	**585**	**310**
NL7V	*	141,440	268	208
***AL1G**	**A**	**48,336**	**199**	**114**
*KL2R	*	38,690	147	106
			(OP: N1TX)	
*KL7R	*	7,216	58	41
***KL1SF**	**14**	**5,324**	**55**	**44**

Belize

V31YN	**A**	**536,038**	**605**	**271**
			(OP: DJ4KW)	

Canada

VE1MC	**A**	**1,199,061**	**892**	**461**
VO1TA	*	502,128	493	317
VO1KVT	**14**	**150,147**	**315**	**201**
***VE1DHD**	**A**	**80,360**	**191**	**140**
*VO1NM	*	37,875	154	101
*VO1OR	*	3,993	39	33
VE2FK	**A**	**1,278,368**	**885**	**439**
VC2E	*	1,020,448	776	416
			(OP: VE2SB)	
VY2LI	*	397,393	491	263
VA2WDQ	*	57,466	159	118
CF2SG	*	24,552	105	88
			(OP: VA2SG)	
CG2DWA	**3.5**	**32,448**	**107**	**78**
***VA2UP**	**A**	**1,894,692**	**1109**	**492**
*CG2AXO	*	197,985	308	197
			(OP: VE2AXO)	
*VE2FFE	*	7,803	58	51
VE3KF	**A**	**1,079,028**	**859**	**388**
CG3RZ	*	784,566	694	334
			(OP: VE3RZ)	
VE3NZ	*	642,190	623	298
CF3DX	*	601,026	538	327
VE3SS	*	172,800	278	192
CF3XH	**7**	**431,262**	**429**	**247**
			(OP: VA3XH)	
***VE3DZ**	**A**	**1,328,210**	**949**	**442**
*VE3GSI	*	976,887	799	373
*VE3JI	*	767,650	698	325
*CG3FH	*	295,218	387	231
			(OP: VE3FH)	
*VA3PL	*	254,504	346	232
*VE3BDN	*	140,760	273	180
*VE3RCN	*	67,328	165	128
*VE3MGY	*	60,165	183	105
*VE3XAT	*	33,277	123	107
*VE3AJ	*	8,642	73	58
***VE3FJ**	**14**	**36,410**	**143**	**110**
***VE3IAE**	**7**	**153,306**	**241**	**153**
***VE3FRX**	**3.5**	**222,250**	**335**	**175**
***VE4EAR**	**A**	**459,420**	**564**	**260**
***VA5LF**	**A**	**23,552**	**128**	**92**
VE6YR	**A**	**216,354**	**423**	**214**
***VE6MO**	**A**	**33,528**	**146**	**88**
CG7CC	**A**	**1,548,740**	**1221**	**422**
			(OP: VE7CC)	
VA7ST	*	891,780	838	334
CF7RN	*	706,585	807	319
VE7CF	*	126,080	282	160
***VA7KO**	**A**	**591,030**	**682**	**297**
*VE7BSM	*	203,322	389	206
*VE7FCO	*	27,451	114	97
*CF7BS	*	18,400	111	80
*VA7ND	*	13,505	83	73
*VA7HZ	*	6,222	54	51
*VA7ALK	*	4,292	41	37
VE9MY	**A**	**163,625**	**248**	**187**
***CG9NC**	**14**	**181,152**	**307**	**222**
			(OP: VE9NC)	

Costa Rica

***TE2M**	**A**	**341,553**	**458**	**257**

Cuba

***CO2EL**	**A**	**244,530**	**348**	**209**

Dominica

J7N	**A**	**2,353,992**	**1528**	**516**

Dominican Republic

***HI3TEJ**	**A**	**3,102,870**	**1657**	**586**

Grenada

***J39BS**	**A**	**1,341,774**	**979**	**414**

Guadeloupe

***FG1PP**	**A**	**77,520**	**205**	**152**

Guatemala

TG9SM	**14**	**236,574**	**488**	**234**
TG9ADQ	*	49,266	179	126
***TG9ANF**	**14**	**590,733**	**759**	**351**

Honduras

***HR2/LU1DY**	**7**	**51,798**	**127**	**97**
			(OP: LU1DY)	

Martinique

***FM1HN**	**14**	**360,848**	**507**	**304**

Mexico

XE2YBG	**A**	**453,530**	**636**	**266**
XE1EE	*	299,145	498	245
XE1V	*	267,860	479	236
XE3RR	*	116,112	324	177
***XE2FGC**	**A**	**471,766**	**630**	**278**
*XE2AUB	*	412,896	616	276
*XE1GRR	*	153,300	314	175
***XE1CT**	**14**	**0**	**0**	**0**
***XE3N**	**7**	**263,816**	**313**	**196**

Nicaragua

YN2S	**A**	**3,760,350**	**1712**	**645**
			(OP: NP3D)	
***H7/NP3D**	**14**	**102,068**	**317**	**158**
			(OP: EW1AR)	

Puerto Rico

***KP4ED**	**A**	**107,146**	**285**	**169**
*WP3GW	*	7,315	57	55
***WP4I**	**3.5**	**43,674**	**120**	**87**
			(OP: WP3C)	

St. Vincent

***J88DR**	**14**	**1,457,875**	**1139**	**535**

Virgin Islands

***KP2BH**	**A**	**433,742**	**511**	**274**

AFRICA

Canary Islands

EC8ABQ	**14**	**21,294**	**97**	**78**
EA8ANE	**3.5**	**65,280**	**116**	**102**
***EA8BEX**	**A**	**1,344,717**	**734**	**423**
*EA8OM	*	925,370	614	370
*EA8/DL3KVR	*	835,034	649	359
			(OP: DL3KVR)	
*EA8BQM	*	157,776	288	173
***EC8ADW**	**14**	**718,891**	**643**	**383**
*EA8AJO	*	93,576	195	168

Cape Verde

***D4C**	**A**	**5,352,382**	**2037**	**731**
			(OP: YL2KL)	

Chagos Islands

VQ9X	**A**	**567,015**	**581**	**309**
			(OP: VQ9RD)	

Djibouti

***J28OO**	**14**	**918**	**19**	**18**
			(OP: E7BA)	

Madeira Islands

CT3FQ	**14**	**2,925,220**	**1470**	**670**
CT3EN	*	1,545,276	1034	524

Morocco

***5C5W**	**A**	**3,741,444**	**1413**	**606**
			(OP: CN8KD)	

Senegal

***6W7RV**	**A**	**45,475**	**129**	**107**

South Africa

ZS2EZ	**A**	**678,980**	**570**	**340**
***ZS1JY**	**A**	**17,829**	**69**	**63**

ASIA

Asiatic Russia

UA9CLB	**A**	**6,237,504**	**2465**	**637**
RG9A	*	3,416,931	1588	537
			(OP: UA9AM)	
RA9CB	*	1,841,924	1005	419
RW9WA	*	1,316,700	859	418
UA9BS	*	725,114	608	334
UA9TF	*	635,050	579	325
RX9SA	*	505,707	538	303
UA9OZ	*	226,904	325	226
RV9MA	*	217,473	294	213
UA9JSN	*	157,850	263	154
RA9FEU	*	25,074	69	63
RA9JR	**14**	**1,021,395**	**829**	**457**
RA9RR	*	592,401	587	361
RV9XM	*	132,246	258	186
RT9S	**3.5**	**464,360**	**338**	**247**
			(OP: UA9SP)	
***RA9SC**	**A**	**1,625,778**	**1017**	**462**
*RA9MJ	*	786,828	696	357
*RM9RZ	*	759,850	630	350
*UA9AFS	*	755,067	642	353
*RX9FG	*	681,030	581	315
*UA9WIK	*	288,512	323	224
*UA9SUX	*	288,000	321	225
*UA9FFV	*	245,488	308	229
*RX9DJ	*	240,227	338	221
*RZ9HA	*	218,988	347	231
*UA9OLO	*	209,520	300	194
*UA9SJR	*	208,980	303	215
*RA9SAS	*	168,084	244	161
*RU9AZ/9	*	130,400	238	163
*RA9DZ	*	96,222	234	174
*RK9FBE	*	95,906	205	158
*RA9CCO	*	94,608	195	144
*UA9OV	*	42,534	133	102
*UA9AX	*	40,934	113	97
*RV9UB	*	26,712	111	84
*UA9XBJ	*	13,600	61	50
*RA9FHL	*	3,060	32	30
***RV9JD**	**21**	**74,798**	**180**	**149**
*RW9RA	*	65,037	173	133
*UA9QF	*	8	2	2
***RA9SN**	**14**	**393,546**	**447**	**321**
*RA9FN	*	249,080	352	260
*UA9UNG	*	200,970	352	231
*RW9MZ	*	121,536	253	192
*RA9AFZ	*	97,983	209	171
*UA9WOB	*	66,528	170	144
*RW9SZ	*	42,665	139	115
*UA9FEG	*	5,612	46	46
***RW9WW**	**7**	**210**	**7**	**7**
UAØCA	**A**	**1,438,864**	**984**	**443**
RXØAW	*	1,175,346	890	414
UAØYAY	*	505,520	565	284
UAØFAI	*	454,740	558	286
UAØZAM	*	39,000	134	104
RKØSP	*	17,222	98	79
RUØLL	*	15,936	81	64
RWØSR	**14**	**401,450**	**531**	**310**
UAØAGI	**7**	**5,824**	**43**	**32**
***RAØACM**	**A**	**648,768**	**640**	**327**
*UAØLKD	*	295,200	448	240
*UAØQBR	*	77,268	224	141
*UAØZEO	*	10,080	65	42
*RAØAY	*	4,352	42	34
*RAØANO	*	252	9	9
***RVØAL**	**14**	**623,960**	**627**	**380**
*UAØSR	*	289,560	411	285
***RAØWHE**	**7**	**11,904**	**62**	**48**
*RXØAT	*	10,856	51	46

Azerbaijan

***4K9W**	**A**	**58,016**	**132**	**112**

China

BA4DL	**A**	**219,248**	**397**	**193**
B4TB	*	37,856	138	91
			(OP: BA4TB)	
BA3RJ	**14**	**264,439**	**421**	**259**
***BD1DQD**	**A**	**618,144**	**682**	**282**
*BD4CZX	*	83,981	206	137
*BD5CDI	*	1,140	22	20
*BG6JEQ	*	299	13	13
***BA4SI**	**21**	**12,540**	**75**	**66**
***BA4SD**	**14**	**228,950**	**387**	**241**
*BG4AHF	*	67,067	210	143
*BD1TCC	*	62,652	199	138
*BD5CEC	*	4,320	52	40
***BG3DCI**	**7**	**1,330**	**21**	**19**

Cyprus

***5B/G4MKP**	**A**	**53,568**	**112**	**96**
			(OP: G4MKP)	

Georgia

***4L1FP**	**A**	**1,339,376**	**829**	**388**
***4L1BR**	**14**	**115,248**	**252**	**168**

Hong Kong

VR2XLN	**A**	**574,476**	**597**	**294**
VR2XMT	*	234,600	460	184
VR2PX	*	69,930	169	126
***VR2XLL**	**A**	**57,420**	**143**	**110**
*VR2YYW	*	19,512	114	72

India

VU2LBW	**A**	**291,695**	**404**	**257**
***VU2NKS**	**A**	**408,408**	**406**	**264**
***VU2PTT**	**14**	**12,350**	**73**	**65**

Israel

4Z8BB	**A**	**2,422,168**	**1272**	**518**
***4Z5CP**	**A**	**1,727,397**	**944**	**441**

Japan

JM1XCW	**A**	**261,668**	**364**	**209**
7L4IOU	*	203,613	365	201
JN1ROV	*	101,355	210	145
JR1NHD	*	68,324	168	124
JA1BWA	*	61,206	205	101
JA1HGY	*	46,410	133	102
JA1IE	*	33,019	152	89
JI1ALP	*	31,680	123	99
JR1BAS	*	4,692	38	34
JA1WSK	*	4,681	38	31
7N4WPY	**21**	**1,485**	**29**	**27**
JE1LFX	**14**	**285,560**	**442**	**242**
JA1SJV	**7**	**29,850**	**105**	**75**
***JA1OVD**	**A**	**820,440**	**726**	**344**
*JP1QDH	*	466,949	580	287
*7N2UQC	*	289,068	476	221
*JA1XRH	*	238,924	359	212
*JA1MVK	*	194,020	275	218
*JA1BJI	*	154,208	267	158
*JA1BNW	*	125,132	271	164
*JA1FRQ	*	120,276	247	156
*JI1LET	*	89,933	198	139
*JA1IZ	*	75,628	193	146
*JH8KYU/1	*	60,140	195	124
*JA1RRA	*	51,678	187	99
*JK1NSR	*	47,082	157	118
*JA1BFN	*	45,453	142	109
*JA1EMQ	*	37,450	135	107
*JF1HJX	*	13,629	93	59
*JO1VRV	*	13,440	71	56
*JA1OHP	*	13,167	78	57
*JA1CPZ	*	13,065	72	65
*JA1BHK	*	9,971	76	59
*JK1TCV	*	7,708	52	41
*JQ1YWK	*	4,794	38	34
*JA1MZM	*	3,600	40	36
*JA5INF/1	*	630	17	14
*JA1RMT	*	546	18	14
*7K3OZQ	*	250	11	10
*JH1GUO	*	18	3	3
***JI1BBN**	**21**	**0**	**0**	**0**
***JP1JFG**	**14**	**192,560**	**328**	**232**
*JG1GGU	*	142,164	303	198
*JG1IEF	*	124,729	257	187
*JK1LUY	*	5,544	47	44
*7L3DGP	*	4,719	49	39
*JI1UDD	*	310	11	10
***JS1PWV**	**7**	**8,856**	**41**	**41**
JA2XYO	**A**	**721,732**	**662**	**349**
JA2FSM	*	439,008	534	272
JR2PMT	*	40,255	125	97
JF2FIU	*	21,336	116	84
JM2RUV	*	8,272	51	47
JH2FXK	**14**	**18,815**	**96**	**71**
JN2AMD	*	1,298	24	22
JE2LPC	**7**	**540**	**10**	**10**
***JA2AXB**	**A**	**200,232**	**315**	**206**
*JA2GHP	*	80,041	200	131
*JA2KCY	*	64,239	175	133
*JL2CZY	*	27,473	140	83
*JA2VHG	*	19,875	91	75
*JJ2DWL	*	9,996	60	51
***JR2AAN**	**21**	**36**	**5**	**4**
***JE2UFF**	**7**	**221,920**	**274**	**190**
*JJ2PUG	*	7,566	47	39
***JF2IWL**	**3.5**	**1,480**	**30**	**20**
JA3IKG	**A**	**251,450**	**381**	**235**
JS3CTQ	*	220,248	325	228
JN3SAC	*	175,110	289	195
JL3SBE	**7**	**36,182**	**102**	**79**
***JA3JM**	**A**	**165,620**	**311**	**182**
*JH3CUL	*	151,360	300	176
*JH3PTC	*	141,240	300	165
*JG3SVP	*	140,476	277	173
*JJ3OFL	*	108,120	233	159
*JF3SAD	*	79,074	201	138
*JH3EQP	*	35,250	126	94
*JR3PKO	*	21,692	100	68
*JR3SZZ/3	*	2,772	41	33
*JI3OGI	*	690	15	15
***JR3RIY**	**21**	**35,392**	**142**	**112**
*JK3GWT	*	34,632	135	104
***JA3ETD**	**14**	**83,820**	**205**	**165**
JH4UTP	**A**	**788,522**	**736**	**373**
JH4BTI	*	236,728	395	233
***JH4UYB**	**A**	**1,232,478**	**873**	**414**
*JR4DHK	*	28,269	149	81
*JI4JGD	*	4,422	48	33
***JA5SUD**	**A**	**328,308**	**448**	**251**
*JG5DHX	*	20,304	103	72
*JA5FNX	*	8,085	72	49
JA6FGC	**14**	**19,624**	**105**	**88**
***JQ1AHZ/6**	**14**	**1,701**	**31**	**27**
JH7QXJ	**A**	**681,264**	**661**	**332**
JA7COI	*	616,200	658	312
JA7IC	*	520,858	551	299
JA7ZP	*	143,370	262	177
JA7BME	*	68,019	153	123
JA7KY	*	76	4	4
***JH7RTQ**	**21**	**49,609**	**175**	**133**
JA8TR	**A**	**564,900**	**603**	**300**
JA8MXC	**14**	**30,200**	**142**	**100**
***JA8EIU**	**A**	**240,219**	**409**	**217**
***JH8SIT**	**14**	**79,278**	**200**	**146**
*JH8FIH	*	40,793	138	113
*JA8UON	*	33,790	131	109
*JE8CLT	*	19,923	99	87
JA9CWJ	**14**	**232,624**	**355**	**248**
***JA9LX**	**A**	**83,430**	**209**	**135**
*JF9KVT	*	71,264	197	131
*JI2TNT/9	*	4,191	38	33
***JHØNEC**	**A**	**32,085**	**146**	**93**

Kazakhstan

UO6P	**A**	**1,746,306**	**1003**	**438**
			(OP: UN7PBY)	
UN9L	*	1,189,632	816	384
***UN9GD**	**A**	**318,080**	**404**	**224**
*UN7CN	*	83,850	193	129
***UN3M**	**21**	**333,064**	**468**	**248**
***UN4PG**	**14**	**255,277**	**367**	**253**
*UN7JX	*	98,090	212	170

Laos

XW1B	**A**	**1,465,908**	**969**	**453**

Qatar

***A71CV**	**A**	**1,236,684**	**845**	**401**

Saudi Arabia

***HZ1PS**	**A**	**632,247**	**533**	**357**
***7Z1SJ**	**14**	**558,258**	**549**	**354**

South Korea

HL2FDW	**A**	**320,572**	**531**	**214**
DS1JFY	*	237,200	336	200
HL5JCB	*	130,662	284	153
DS5QLJ	*	53,950	174	130
HL9A	**21**	**98**	**8**	**7**
				(OP: WX8C)
***DS5DNO**	**A**	**64,872**	**179**	**102**
*HL5YI	*	56,592	155	108
*DS4GEX	*	32,376	91	76

Taiwan

***BV4VR**	**7**	**34,650**	**105**	**75**

Thailand

HSØEHF	**A**	**454,510**	**582**	**301**
***E21YDP**	**A**	**349,752**	**516**	**247**
***E21EIC/8**	**14**	**3,605**	**43**	**35**

Turkey

TA1EE	**A**	**81,144**	**171**	**126**
TA1BM	**14**	**29,164**	**118**	**92**
***TC1DX**	**A**	**670,320**	**515**	**294**
*TA2EY	*	263,610	260	202
*TA1TR	*	230,346	298	191
*TA1AT	*	34,320	105	88
***TA1CX**	**14**	**306,032**	**436**	**248**
***TA1EQ**	**7**	**248,040**	**246**	**180**

UK Bases on Cyprus

***ZC4LI**	**A**	**2,294,320**	**1156**	**476**

Uzbekistan

***UK7AZ**	**21**	**124,956**	**247**	**178**

West Malaysia

9M2/WQ2C	**A**	**351,655**	**558**	**265**
			(OP: WQ2C)	
9M2DRL	*	121,500	342	150
***9M4DXX**	**A**	**55,372**	**166**	**109**

EUROPE

Aland Islands

***OHØ/OH2LRE**	**A**	**7,224**	**62**	**56**
			(OP: OH2LRE)	

Austria

OE1MCU	**A**	**2,471,049**	**1158**	**549**
OE9GHV	**14**	**966,018**	**822**	**466**
***OE5PEN**	**A**	**359,000**	**439**	**250**
*OE5JKL	*	178,410	277	190
*OE9HGV	*	66,660	168	132
*OE1TKW	*	8,162	56	53

Belarus

EU1AZ	**A**	**2,000,431**	**1219**	**503**
***EV8D**	**A**	**749,592**	**645**	**348**
			(OP: EW8CY)	
*EU1DX	*	604,366	544	343
*EW7EW	*	474,900	479	300
*EW1NM	*	277,980	397	246
*EW1NA	*	216,890	298	205
*EW7LE	*	181,412	276	217
*EW7KF	*	146,832	236	168
*EU2MM	*	75,761	160	137
***EW8OF**	**14**	**61,204**	**204**	**143**

Belgium

OQ4B	**A**	**741,844**	**658**	**382**
			(OP: ON4BHQ)	
ON4KGL	**14**	**61,633**	**181**	**143**
ON6LEO	*	26,058	119	101
OQ5M	*	540	19	15
			(OP: ON5ZO)	
***ON4CT**	**A**	**1,572,142**	**962**	**478**
*OQ5A	*	493,536	487	291
*OP4A	*	166,945	261	193
*ON9CSV	*	162,288	267	196
*ON6FC	*	123,195	241	191
*OO5D	*	95,616	235	166
			(OP: ON5SD)	
*OSØS	*	74,750	169	125
*ON3AD	*	50,830	143	115
*ON4LDP	*	49,173	134	111
*ON3ED	*	47,124	120	119
*ON4CAS	*	24,570	103	91
*ON8NT	*	990	22	22
***ON4ABL**	**7**	**155,644**	**239**	**167**

Bosnia-Herzegovina

E76C	**14**	**2,211,120**	**1324**	**664**
***E71S**	**A**	**835,205**	**634**	**343**

Bulgaria

LZ2BE	**A**	**3,196,756**	**1521**	**652**
LZ2PI	*	1,595,560	1069	452
LZ2ZG	*	326,568	383	264
LZ5ZI	**7**	**39,376**	**104**	**92**
LZ7X	**3.5**	**397,320**	**390**	**258**
***LZ9R**	**A**	**554,265**	**555**	**327**
			(OP: LZ3YY)	
***LZ1QV**	**7**	**172,440**	**234**	**180**
***LZ2JA**	**3.5**	**289,198**	**318**	**227**
*LZ2DF	*	49,504	118	104

Corsica

TK5EP	**A**	**532,396**	**564**	**334**

Crete

***SV9COL**	**A**	**557,326**	**594**	**329**

Croatia

9A7V	**A**	**170,874**	**252**	**198**
9A2DQ	**21**	**303,520**	**433**	**280**

9A5W	**14**	**2,290,934**	**1371**	**641**
9A7R	**7**	**3,842,256**	**1292**	**627**
9A1CCY	**3.5**	**2,326,032**	**1032**	**522**
				(OP: 9A3NM)
***9AØW**	**A**	**179,550**	**286**	**210**
*9A1CMS	"	155,144	250	172
				(OP: 9A6KZH)
*9A2BW	"	27,864	106	86
Czech Republic				
OK2PZ	**A**	**1,169,103**	**792**	**403**
OK2PF	"	858,585	673	357
OK3KK	"	235,961	304	209
OK1AZK	"	129,978	227	166
OL6W	"	94,168	193	149
OK2SWD	"	50,022	155	126
OK1ULE	"	39,699	118	99
OK2RW	"	30,732	93	78
OK1FPS	**21**	**84,810**	**223**	**165**
OK2PMS	"	3,888	42	36
OK2FB	"	2,449	32	31
OL8M	**14**	**905,316**	**796**	**444**
				(OP: OK1DRQ)
OK4RQ	**7**	**172,454**	**211**	**163**
				(OP: OK1DRQ)
OL6X	**3.5**	**2,344,086**	**1040**	**523**
				(OP: OK1DIG)
OK2SFP	"	640,660	505	311
***OK1HEH**	**A**	**604,584**	**557**	**311**
*OK1ZE	"	407,808	432	288
*OK2DW	"	357,236	397	253
*OK1UDJ	"	280,998	338	233
*OK1LO	"	125,662	215	166
*OK6MA	"	114,408	224	168
*OK2UHP	"	103,500	217	150
*OK2VX	"	99,012	211	148
*OK2BJI	"	27,234	100	89
***OK2CLW**	**21**	**27,857**	**119**	**89**
***OK1HGM**	**14**	**22,908**	**105**	**92**
Denmark				
OZ1ADL	**A**	**1,118,572**	**824**	**439**
OV1A	"	1,027,984	799	376
OZ2TF	"	709,302	609	363
OU4O	"	156,884	245	182
OZ/DJ8ES	**3.5**	**193,772**	**255**	**193**
***5P9X**	**A**	**295,427**	**403**	**251**
				(OP: OZ9GA)
*OZ4VW	"	155,036	247	196
*5P2A	"	56,500	158	125
				(OP: OZ1HX)
*OZ1DGQ	"	19,516	95	82
***OZ1JVX**	**7**	**91,356**	**168**	**138**
*OZ7AEI	"	14,560	65	56
England				
G6PZ	**A**	**5,440,128**	**2137**	**744**
				(OP: UT5UDX)
G3TXF	"	563,584	475	296
GØHDV	"	525,480	548	290
G3YYD	"	260,712	333	204
2EØZWW	"	167,757	266	199
MØBPQ	"	40,376	126	103
M2X	**14**	**278,256**	**433**	**272**
				(OP: G4RCG)
MØUNI	"	43,940	146	130
***G4DBW**	**A**	**834,605**	**670**	**355**
*GØHVQ	"	635,964	583	339
*G4WGE	"	519,356	492	314
*G1XKZ	"	479,568	473	291
*M9W	"	318,602	417	241
				(OP: G1VDP)
*G8MIA	"	294,424	382	247
*GØCER	"	289,800	364	230
*G4SGI	"	280,422	392	243
*G3KNU	"	209,660	303	220
*GØRPM	"	165,628	253	188
*G3RSD	"	158,792	262	184
*G1DJI	"	138,227	252	173
*G3RWL	"	118,248	233	156
*MØSDX	"	111,034	211	154
*G3VAO	"	93,687	203	167
*GØSNG	"	81,675	197	165
*2EØBPP	"	68,805	179	139
*G3SNU	"	57,908	148	124
*G6CSY	"	53,820	128	117
*G3VQO	"	30,360	108	92
*2E1OKT	"	28,500	128	95
				(OP: MØOKT)
*G3KMQ	"	24,857	97	67
*G7RTI	"	15,028	75	68
*2EØTQR	"	9,513	70	63
*MØAEJ	"	8,208	57	54
***M3UZL**	**21**	**11,651**	**84**	**61**
***G2YL**	**14**	**248,040**	**395**	**265**
*G4ZOB	"	117,564	252	202
Estonia				
ES2DJ	**A**	**798,840**	**680**	**360**
***ES2DX**	**A**	**6,292**	**46**	**44**
***ES4MM**	**7**	**156,252**	**220**	**174**
European Russia				
RG3K	**A**	**2,721,605**	**1591**	**565**
				(OP: UA3QDX)
UA4HOX	"	2,631,070	1743	547
RD4WA	"	2,084,996	1351	524
UA3SAQ	"	2,061,006	1299	537
UA4WAU	"	1,812,517	1268	511
RN3ZC	"	1,761,200	1191	476
UA6CE	"	1,708,364	1169	518
RA3ANI	"	1,545,764	1152	473
RW4WZ	"	1,083,965	945	431
RU4WD	"	981,795	929	435
UA3LEO	"	904,800	713	400
RW6CR	"	885,069	748	387
RW6BN	"	814,000	746	400
RV3WD	"	793,940	692	371
RZ4HZW	"	619,686	642	346
				(OP: RX4HJ)
RX3AEX	"	529,635	594	335
RW3LB	"	476,771	503	307
RZ6HF	"	445,780	540	310
RL3AB	"	413,130	513	282
RA3BT	"	380,970	448	306
UA4PN	"	373,324	456	268
RW4HBG	"	302,484	452	273
RA3BB	"	266,181	373	249
UA1NFA	"	224,406	350	234
RK3ZZ	"	213,075	323	225
RD3DS	"	209,898	312	207
RN1NU	"	191,648	359	226
RU6YJ	"	183,529	287	223
RV3IC	"	159,348	296	196
UA3TCJ	"	109,704	228	168
RZ6AK	"	104,700	201	150
RA3CM	"	91,584	201	159
UA4RZ	"	79,092	211	156
UA3DPM	"	60,480	171	144
RV1CC	"	49,848	145	124
RK6CM	"	36,848	129	112
UA4NC	"	28,248	107	88
RA3TT	"	27,063	118	97
UA3AGW	"	6,578	54	46
RZ3TZZ	**14**	**572,871**	**673**	**397**
				(OP: RA3TE)
RA4ST	"	278,677	454	287
RK3DZB	**7**	**1,603,040**	**841**	**466**
				(OP: RU3DNN)
RW6CF	"	620,052	479	326
UA6AKD	"	188,708	237	191
RZ3DX	"	4,032	34	32
***UA3PAB**	**A**	**1,719,094**	**1241**	**481**
*RV3FF	"	1,462,238	1008	493
*RA4HL	"	1,356,080	1025	460
*UA4HJ	"	1,154,256	917	417
*RV3QX	"	1,011,465	833	399
*RW6AH	"	976,726	860	394
*RK6CK	"	947,359	886	419
*RX6LD	"	842,107	797	413
*UA3QJJ	"	794,005	738	379
*RL3WL	"	760,032	711	336
*UA4ALI	"	707,082	699	382
*RA3QH	"	684,981	600	333
*RA4FUN	"	586,278	577	329
*RA3YAO	"	584,877	600	331
*RA6XE	"	565,290	604	330
*RV3ZN	"	527,653	545	301
*RZ6BU	"	511,755	523	313
*RZ3ATE	"	494,424	546	324
*UA3QGT	"	454,145	516	305
*RX3ZX	"	449,652	504	303
*RD3DT	"	393,960	465	294
*RL3AW	"	360,594	460	299
*RN6MA	"	349,920	437	243
*RD1AW	"	312,708	393	253
*RW3XB	"	300,105	390	247
*RW3PF	"	297,073	404	259
*RU3PU	"	294,735	389	245
*RA6FUZ	"	273,375	326	243
*RU3XB	"	265,050	344	225
*RU3WR	"	225,789	324	219
*RA6HSM	"	224,315	332	203
*UA3PT	"	220,160	326	215
*RA3UAG	"	219,291	295	201
*RW3WX	"	183,402	292	207
*RW3TA	"	180,180	316	210
*RA3MB	"	179,850	297	218
*RV3DCZ	"	169,065	287	195
*UA3TN	"	152,514	294	222
*RV3YR	"	133,224	234	182
*RZ3DC	"	129,720	224	184
*RD3AL	"	118,505	242	173
*RW3QF	"	105,408	184	144
*RF3P	"	103,530	219	170
*RV4HL	"	95,403	224	177
*RK6AQM	"	94,860	167	153
*RV6HEO	"	92,845	205	155
*RV6ACC	"	82,436	205	148
*RN4ABD	"	81,840	206	155
*UA3UHZ	"	77,322	187	147
*UA3RW	"	77,280	181	140
*UA3WHK	"	75,943	155	133
*UA3AMZ	"	61,250	171	125
*RK4PB	"	56,394	161	117
*UA3AGU	"	55,320	153	120
*UA3UBT	"	49,800	163	120
*UA4UT	"	49,362	137	114
*RA3VR	"	43,733	134	101
*RA3TYL	"	40,018	128	107
*UA3FX	"	39,289	120	101
*RU6BR	"	38,160	124	106
*RX3AT	"	37,323	125	99
*RX3MX	"	36,663	129	101
*UA3MOC	"	35,720	99	94
*RN6DR	"	33,858	118	99
*RV3DBK	"	33,200	130	100
*RA6FZ	"	28,392	107	91
*RX3MM	"	23,268	97	84
*UA4FUW	"	19,584	77	64
*UA4SKW	"	18,957	94	89
*RV4LC	"	16,730	81	70
*UA3MON	"	16,660	84	70
*UA4FX	"	13,281	65	57
*RN3ZIC	"	8,140	57	55
*RN3REY	"	5,896	50	44
*RK3DMN	"	5,453	44	41
*RW4LQ	"	4,983	43	33
*RV4LS	"	4,329	40	37
*RA6AAW	"	2,625	29	25
*UA6AGK	"	1,496	23	22
*UA3QIX	"	702	14	13
*UA3YQL	"	455	13	13
***RV3APM**	**21**	**3,420**	**41**	**38**
***RU3SE**	**14**	**166,362**	**322**	**238**
*RV6BO	"	110,760	272	195
*UA6BJY	"	101,167	258	187
*UA6ARR	"	76,773	211	163
*UA3QUO	"	39,237	139	123
*RA4LK	"	14,025	81	75
*RA3OW	"	8,319	69	59
*RW3AI	"	8,004	64	58
*UA3PNO	"	2,176	34	32
*UA3YAA	"	27	4	3
***RU4SS**	**7**	**334,068**	**337**	**246**
***RD4HD**	**3.5**	**186,240**	**255**	**194**
*RU4HU	"	75,594	154	129
Faroe Islands				
OY3JE	**3.5**	**1,067,396**	**710**	**374**
Finland				
OH2HAN	**A**	**1,489,104**	**953**	**486**
OH2BBT	"	1,069,810	887	406
OG4X	"	303,408	409	252
OH7JJT	"	83,468	186	154
OH7MJU	**14**	**1,030,688**	**904**	**496**
OH7MN	**7**	**948,004**	**664**	**347**
OG6R	"	741,480	551	334
				(OP: OH6XY)
OH6M	"	588,016	509	286
				(OP: OH6LBW)
OH1TN	**3.5**	**426,920**	**408**	**260**
***OH2NT**	**A**	**295,960**	**404**	**245**
*OH8TV	"	171,841	305	239
*OH6GAZ	"	97,352	222	172
*OH8FAL	"	90,180	234	180
*OH2LZI	"	75,360	203	157
*OH8GZQ	"	27,451	119	97
*OH5HBA	"	15,525	69	69
*OH2NFN	"	8,586	54	53
*OH2JLN	"	7,750	54	50
*OH8GVQ	"	70	7	7
***OH1FFN**	**7**	**34,944**	**95**	**91**
France				
F5VKT	**A**	**1,971,582**	**1082**	**498**
F5IHP	"	782,640	669	360
F5CQ	"	154,840	262	196
F5UMP	"	128,925	225	191
F4FDR	"	45,980	122	95
F8DZU	"	12,200	68	61
F1AGU	"	4,326	48	42
TM9FL	**14**	**987,116**	**850**	**463**
				(OP: F5KFL)
F4DVX	**7**	**3,903,702**	**1349**	**627**
***F5VBT**	**A**	**801,780**	**670**	**332**
*F6FTB	"	529,368	490	322
*F6CBL	"	288,960	366	258
*F4CWZ	"	192,708	281	212
*F5LCU	"	106,110	206	162
*F5INJ	"	100,624	204	152
*F5LMJ	"	93,024	194	153
*F1LPT	"	88,350	200	150
*F4CUI	"	61,695	145	135
*F1TRE	"	40,596	118	102
*F5PHW	"	19,912	91	76
*F4FFZ	"	15,387	78	69
*F1TIM	"	14,626	81	71
*F1IWH	"	11,772	62	54
*F1LLS	"	10,602	63	57
***F5TMJ**	**21**	**704**	**16**	**16**
***F8PMO**	**7**	**98,890**	**174**	**145**
***F5BEG**	**3.5**	**367,026**	**363**	**249**
Germany				
DJ6QT	**A**	**1,775,104**	**1026**	**512**
DL5YYM	"	1,511,619	962	461
DK1KC	"	1,115,200	826	400
DL8SCG	"	988,400	716	400
DL9GWD	"	928,602	757	414
DK6CQ	"	896,220	725	383
DC3RJ	"	686,832	616	349
DF6QV	"	556,500	525	318
DK1QH	"	440,896	469	332
DJ9MH	"	394,850	433	298
DL1IAO	"	380,586	390	274
DJ6TK	"	377,718	457	291
DL5YM	"	354,900	411	273
DK1BX	"	354,051	418	279
DL5MEV	"	344,861	412	293
DK8EY	"	336,150	424	270
DP4N	"	314,096	368	268
				(OP: DL4NER)
DK3GI	"	306,246	361	258
DK7MD	"	302,652	413	252
DJ4EY	"	296,559	349	249
DL1RYD	"	269,250	387	250
DL4MDO	"	254,024	307	226
DL4CF	"	247,866	314	218
DL4PY	"	231,693	341	231
DM3VL	"	224,870	292	226
DHØGHU	"	183,106	291	203
DK5IR	"	178,080	287	212
DJ2YE	"	158,976	267	184
DAØR	"	154,645	271	197
				(OP: DK3KN)
DJ9RR	"	148,341	251	197
DD7ZT	"	141,510	220	178
DK7ZT	"	93,000	175	150
DJ6TB	"	84,666	176	137
DL6MWG	"	78,813	171	139
DJ5IW	"	46,626	126	114
DL5ST	"	45,820	132	116
DR5X	"	43,152	133	116
				(OP: DL8LAS)
DL4RDJ	"	30,702	128	102
DL9NDV	"	26,696	116	94
DL1YFF	"	24,904	105	88
DG1RTV	"	8,880	54	48
DL1JB	"	8,190	53	45
DL5MX	"	6,586	45	37
DL1EJA	"	6,164	52	46
DL4ZM	"	5,292	51	49
DN4NER	"	720	17	16
				(OP: DL4NER)
DK1FW	"	24	3	3
DP9Z	**21**	**130,790**	**281**	**205**
				(OP: DF9ZP)
DM5TI	"	518	14	14
DL3BQA	**7**	**1,152,580**	**724**	**403**
DR2W	"	549,880	452	295
				(OP: DJ2HD)
DK4WA	"	1,848	22	21
DJ3IW	**3.5**	**507,680**	**447**	**304**
***DF4WC**	**A**	**1,691,361**	**975**	**513**
*DLØMB	"	1,348,138	827	466
				(OP: DK9IP)
*DD5M	"	1,289,484	861	441
				(OP: DJØZY)
*DFØBV	"	1,094,770	776	415
				(OP: DL1MAJ)
*DJ8EW	"	1,002,400	757	400
*DH6BH	"	852,768	684	378
*DL1ZBO	"	835,855	695	349
*DK5MB	"	822,906	648	378
*DL4ME	"	788,792	690	344
*DD1LI	"	648,404	586	346
*DR2Q	"	618,510	585	318
				(OP: DL8MBS)
*DL2AL	"	489,042	488	303
*DL1DXF	"	441,881	473	289
*DH1JG	"	413,478	474	279
*DF8XC	"	400,384	436	272
*DM3HZN	"	399,456	455	288
*DM5JBN	"	371,355	471	285
*DK1AX	"	359,268	427	273
*DL1EAL	"	332,640	384	252
*DL1HTY	"	331,520	386	256
*DC8SG	"	322,308	393	252
*DL1APX	"	318,330	387	243
*DL1DWR	"	249,711	334	231
*DJ5QV	"	248,160	311	220
*DJ6JH	"	238,260	314	228
*DL9MRF	"	231,474	322	223
*DM2BPG	"	231,061	317	229
*DL1THB	"	214,620	310	219
*DL9NO	"	212,995	313	205
*DJ5TT	"	207,207	317	207
*DL2RUG	"	206,824	268	206
*DJ5MY	"	203,734	288	206
*DM6DL	"	201,600	331	225
*DK1AUP	"	195,288	303	206
*DL7BW	"	195,108	281	213
*DL6SFR	"	194,028	342	222
*DP5X	"	189,678	288	202
				(OP: DL3EBX)
*DL3WKG	"	188,739	300	201
*DL6UMF	"	180,200	290	200
*DL1KUR	"	172,845	276	207
*DL3DRN	"	168,438	270	201
*DL6ØCHILD	"	164,260	272	191
*DL5BCF	"	160,631	262	191
*DC1HPS	"	155,210	272	187
*DL5JBW	"	154,348	258	188
*DO6SR	"	151,698	246	193
*DL9FB	"	151,122	259	178
*DF8JK	"	149,530	262	190
*DO9ST	"	145,544	242	184
*DL4TL	"	142,008	258	194
*DL1HSI	"	137,472	243	179
*DL9GTB	"	126,326	240	166
*DO3UWE	"	113,344	206	161
*DJ6UP	"	113,208	250	178
*DM5JL	"	113,190	230	165
*DL6DCD	"	113,176	228	172
*DK6ITM	"	110,205	220	155
*DGØKS	"	108,836	216	169
*DK1LRS	"	106,124	227	172
*DL6EAQ	"	103,108	222	173
*DQ6E	"	100,800	216	175
				(OP: DL3BBY)
*DK7FP	"	90,522	171	141
*DL8ZAJ	"	79,242	173	141
*DL8ZVG	"	75,600	183	135
*DL7FA	"	67,268	183	134
*DL6UAM	"	64,350	156	117
*DL6ABB	"	58,292	150	118
*DO3ME	"	58,240	150	128
*DL1CW	"	57,480	149	120
*DL5OCD	"	56,810	147	115
*DO3PKE	"	54,320	133	112
*DF6RI	"	51,884	140	119
*DL9MKN	"	40,874	123	107
*DG4YGW	"	40,660	129	107
*DL9NEI	"	39,382	119	97
*DK3PM	"	36,461	109	101
*DL1EJD	"	36,158	121	101
*DK7MCX	"	35,175	124	105
*DL5RBR	"	33,600	112	96
*DL7UXG	"	32,942	104	91
*DL1NEO	"	32,215	97	85
*DC6CX	"	30,576	104	91
*DA9L	"	30,084	109	92
				(OP: DO1BEN)
*DJ4MZ	"	29,920	108	88
*DF2AP	"	29,406	101	87
*DJ3EF	"	29,068	99	86
*DL2MJ	"	25,420	96	82
*DL1LQL	"	24,682	98	86
*DF6WE	"	23,229	99	87
*DH2PL	"	20,664	82	72
*DK9MH	"	19,304	93	76
*DF6ZY	"	17,347	99	83
*DL1DBR	"	17,040	88	71
*DL9SEV	"	14,400	90	72
*DF1HF	"	11,895	69	61
*DJ3GE	"	11,623	70	59
*DL4RCK	"	10,561	62	59
*DL5MAT	"	10,400	61	52
*DL6RBH	"	8,736	58	52
*DH1OK	"	5,986	49	41
*DL4DG	"	5,814	52	51
*DL9YAJ	"	4,699	41	37
*DO8YX	"	4,636	39	38
*DJ2IA	"	3,850	36	35
*DL5KUR	"	2,976	33	31
*DL7ED	"	2,880	36	32
*DJ1GK	"	2,408	28	28
*DL8DXF	"	720	16	16
***DO6GZ**	**21**	**5,934**	**55**	**46**
***DL8RCL**	**14**	**90,480**	**218**	**174**
*DH3RB	"	68,101	203	151
*DL9XAW	"	29,848	133	104
*DL1DWL	"	24,252	117	94
*DL1DTL	"	1,875	28	25
*DJ2GMS	"	442	13	13
***DL5KUD**	**7**	**327,840**	**355**	**240**
*DGØDG	"	130,400	189	163
*DL2ZA	"	123,702	207	159
*DL4KW	"	55,154	116	109
*DQ4Q	"	6,640	40	40
				(OP: DF9ZP)
***DD9WG**	**3.5**	**237,184**	**289**	**218**
*DL3VZL	"	31,476	101	86
*DO4DXA	"	2,250	25	25
Greece				
SX1L	**A**	**1,992,996**	**1239**	**522**
				(OP: SV1GYG)
SV1DPI	"	1,250,798	925	458
SY2V	"	1,178,670	943	389
				(OP: SV2GJV)
SV2FLQ	"	656,674	649	313
SV8CS	**21**	**112,558**	**280**	**167**
SZ1A	**14**	**393,881**	**605**	**307**
				(OP: SV1CIB)
SV2BFN	"	391,549	563	311
***SV8RX**	**A**	**1,035,596**	**774**	**398**
*SV1JMO	"	884,643	771	393
*SV1OZ	"	78,228	187	164
Guernsey				
***GUØSUP**	**A**	**673,870**	**552**	**395**
Hungary				
HG8R	**A**	**2,405,200**	**1263**	**560**
HA6NL	"	969,400	697	370
HA9PP	"	251,564	429	244
HA7LW	"	80,784	172	136
HA5PT	"	34,542	119	101
HA7TM	**14**	**603,328**	**676**	**352**
HG3DX	**3.5**	**2,031,160**	**973**	**493**
				(OP: HA3MY)
HA3LI	"	895,448	654	346
HA1YI	"	814,756	583	347
***HA8BE**	**A**	**2,172,564**	**1218**	**522**
*HA5LZ	"	854,484	663	372
*HA5NB	"	447,300	480	284
*HA8BQ	"	205,551	308	207
*HG8C	"	62,744	161	124
				(OP: HA8EK)
*HA5OMM	"	50,930	128	110
***HG3IPA**	**21**	**26,448**	**113**	**87**
				(OP: HA3JB)
***HAØGK**	**7**	**93,624**	**164**	**141**
*HA3OU	"	46,662	116	101
Iceland				
TF1AM	**A**	**815,502**	**797**	**398**
				(OP: TF3AM)
Ireland				
***EI9ES**	**A**	**15,680**	**76**	**70**
Italy				
II2CV	**A**	**3,223,163**	**1459**	**601**
				(OP: IK2NCJ)
IV3JCC	"	1,736,086	1009	506
IK2SAI	"	974,264	767	386
I1OQI	"	564,136	525	302
IK2SND	"	530,564	495	292
IZØGYP	"	317,328	390	264
IK1MEG	"	309,419	365	253
I7CSB	"	284,050	351	247
IZ3KSO	"	151,512	232	177
IK1PMR	"	148,333	254	211
I5JFG	"	144,400	253	190
I2DJX	"	118,638	211	169
IT9BLB	"	59,869	189	137
IZ1OQB	"	33,672	111	92
I1BAY	"	23,100	88	77
IK2DPP	"	14,396	60	59
IK2GZU	"	14,283	72	69
IT9SMU	"	12,261	61	61
IK6VXO	**14**	**639,602**	**655**	**386**
IØQM	"	368,368	481	322
IK2YXP	"	32,550	132	105
IZ1GLO	"	16,720	87	76
				(OP: K2LEO)
I4IKW	**7**	**3,962,680**	**1293**	**628**
IZØKBR	"	2,357,936	994	518
IW1PNJ	"	1,415,256	750	436
IK8UND	"	629,350	493	307
I4AVG	**3.5**	**2,003,280**	**964**	**491**
***IZ2FOS**	**A**	**1,847,662**	**1069**	**527**
*IV3PGQ	"	706,153	601	359
*IW1AYD	"	384,506	399	263
*IW4EGX	"	354,960	406	272
*IZ2EWM	"	348,890	412	278
*IK5FKF	"	345,462	389	258
*I2XLF	"	328,394	409	253
*IW9BCW	"	300,045	379	241
*IK3STG	"	254,203	314	233
*IK2YSJ	"	249,760	339	224
*IZ2JPN	"	246,624	340	224
*I2TFJ	"	188,292	293	204
*IZ3GOG	"	175,071	305	201
*IW5ALG	"	172,081	276	217
*IV3ARJ	"	149,408	239	184
*IN3XUG	"	137,020	211	170
*IN3FHE	"	136,048	208	176
*IZ3EOU	"	135,992	222	178
*IW8PQ	"	131,768	246	182
*IV3XZG	"	123,804	206	171
*IK5ZUB	"	108,576	205	174
*IQ3ME	"	107,417	206	163
				(OP: I3VAD)
*IK5PVX	"	89,388	188	156
*IKØMIB	"	87,318	195	154
*IZ8MBW	"	73,304	204	154
*IV3KSE	"	41,584	136	113
*IZ5HQB	"	40,700	123	100
*IK2WYI	"	33,681	133	103
*IK2NCF	"	32,214	109	91
*IK2WFN	"	31,584	109	94
*IK2AOO	"	29,484	99	84
*IW6PWC	"	29,316	99	84
*IK7RVY	"	25,935	112	95
*I2BZN	"	25,029	99	81
*IZ7EUB	"	22,344	94	76
*IK1WEG	"	21,930	107	86
*IZ1DXS	"	20,713	96	77
*IK3CST	"	19,152	85	72
*IK2EBP	"	19,053	87	73
*IZ3JDL	"	14,184	81	72
*IK2AUK	"	11,252	67	58
*I1YGQ	"	9,861	64	57
*IZ1MHY	"	8,536	50	44
*IZ1AOD	"	4,970	37	35
*IZØFVD	"	4,107	38	37
*IK2REA	"	2,369	26	23
*IK7WPD	"	2,240	33	32
***IZ8IYL**	**21**	**73,788**	**215**	**143**
***IW1QN**	**14**	**436,022**	**546**	**311**
*IN3OWY	"	76,153	206	161
*IZ1PKV	"	72,542	214	166
*I3PXN	"	58,739	189	151
*IZ8FTW	"	31,312	126	103
***IO3UD**	**7**	**1,858,520**	**852**	**485**
				(OP: IV3DSH)
*IW9FDD	"	334,644	347	237
*IK3QAR	"	308,154	329	231
*I2WIJ	"	194,776	240	194
*I4HRH	"	98,384	167	143
*IKØLNN	"	94,640	170	140
*IV3KAS	"	33,930	112	87
***IK1DFH**	**3.5**	**763,680**	**563**	**344**
*IK3SSJ	"	118,272	205	154
*IKØTUM	"	94,900	166	146
Kaliningrad				
RA2FB	**14**	**114,048**	**260**	**192**
***UA2FFW**	**A**	**650,424**	**596**	**328**
*RA2FG	"	174,472	313	193
Latvia				
YL7A	**A**	**2,335,800**	**1315**	**600**
YL2CI	"	1,892,440	1172	506
YL2NN	"	1,162,596	812	417
YL9T	"	621,984	589	341
				(OP: YL2TW)
***YL3FP**	**A**	**749,830**	**646**	**334**
*YL3CU	"	655,270	600	322
*YL2TB	"	20,838	75	69

*YL4U	*	468	12	12
			(OP: YL2KF)	
*YL8M	*	297	9	9
			(OP: YL7A)	
***YL2CV**	**21**	**11,940**	**77**	**60**
***YL2JZ**	**7**	**551,000**	**463**	**290**
***YL2GQG**	**3.5**	**170,050**	**236**	**179**
Lithuania				
LY8O	**A**	**3,662,480**	**1678**	**680**
LY6A	*	3,118,800	1522	600
LY1R	*	3,046,810	1440	598
LY9Y	*	2,650,116	1338	588
LY2VA	*	764,596	656	332
LY3UV	*	101,080	179	140
LY4OO	**14**	**465,124**	**579**	**341**
LY4G	**3.5**	**107,604**	**183**	**147**
LY2IJ	*	3,304	29	28
***LY2FN**	**A**	**829,356**	**675**	**366**
*LY2BUU	*	250,941	335	233
*LY4K	*	225,540	316	210
*LY1ØØØWN	*	176,512	285	197
***LY2SA**	**3.5**	**21,114**	**76**	**69**
Luxembourg				
LX1ER	**A**	**703,290**	**599**	**357**
LX1NO	**14**	**44,516**	**148**	**124**
Macedonia				
***Z35T**	**A**	**423**	**9**	**9**
***Z32XU**	**3.5**	**240**	**8**	**8**
Moldova				
ER3AU	**A**	**171,124**	**239**	**179**
***ER3DX**	**A**	**997,128**	**731**	**396**
*ER1DAC	*	16,260	63	60
***ER2RM**	**3.5**	**195,840**	**253**	**192**
Montenegro				
***4O7A**	**A**	**2,500**	**28**	**25**
Netherlands				
PA5KT	**A**	**732,864**	**587**	**352**
PA2MRT	*	718,968	617	348
PAØVHA	*	541,368	533	309
PAØLSK	*	227,227	339	227
PA9DD	*	209,699	300	203
PAØJNH	*	116,688	199	156
PA3EBP	*	92,157	210	139
PA1TX	*	76,145	197	157
PA5O	*	71,029	159	139
PA2ALF	*	51,362	144	122
PE2KP	**14**	**4,620**	**46**	**44**
***PA3DBS**	**A**	**612,864**	**591**	**336**
*PA2CVD	*	231,840	349	230
*PD1KSA	*	202,878	347	234
*PA3HCF	*	114,240	223	170
*PD7BZ	*	78,374	186	149
*PA3EWG	*	60,375	148	115
*PA3HGF	*	25,026	109	86
*PE1MMZ	*	22,550	100	82
*PAØLOU	*	21,627	97	81
*PA1DV	*	15,416	93	82
*PB7XYL	*	12,954	55	51
***PAØMIR**	**3.5**	**27,208**	**88**	**76**
Northern Ireland				
***MIØM**	**A**	**565,348**	**550**	**331**
			(OP: MIØSAI)	
*GI4JTF	*	77,965	203	155
Norway				
LA8AJA	**A**	**59,212**	**148**	**113**
LA9TY	*	16,036	88	76
LA5HPA	**14**	**753,900**	**719**	**420**
***LA1PHA**	**A**	**20,910**	**104**	**85**
*LA6BNA	*	799	17	17
***LA1QDA**	**14**	**29,898**	**138**	**99**
Poland				
SP9LJD	**A**	**3,549,636**	**1565**	**621**
SP4TXI	*	1,931,868	1092	521
SP4Z	*	1,256,235	784	445
SQ7B	*	415,172	448	271
SP2FTL	*	313,650	386	255
SP9JZT	*	82,550	160	130
SP5NVX	*	51,393	135	111
SP5GMM	*	17,272	72	68
SP3GTS	*	1,580	21	20
SP4GDC	*	162	6	6
SP3GXH	**7**	**891,968**	**575**	**362**
SN4L	**3.5**	**94,242**	**172**	**139**
			(OP: SP4JCP)	
***SP2EWQ**	**A**	**1,278,825**	**878**	**425**
*SP3GAX	*	670,456	626	344
*SQ8JX	*	603,564	558	318
*SP8EEX	*	509,712	473	296
*SP9AUV	*	495,756	477	293
*SP3BJK	*	481,399	503	293
*SP7QJB	*	459,408	487	272
*SP9CTS	*	370,188	415	252
*SP6EKS	*	343,827	367	253
*SP3DSC	*	334,800	390	270
*SP1DMD	*	296,608	377	248
*SP2GJI	*	288,176	364	248
*SP9JQA	*	283,656	332	223
*SP3HC	*	268,096	349	236
*SP3RBG	*	224,424	293	216
*SQ8LEC	*	189,399	299	203
*SN1A	*	166,004	279	188
			(OP: SP1EG)	
*SP6QKP	*	158,478	292	183
*SP9CXN	*	149,068	242	166
*SQ9CND	*	140,112	234	168
*SP6BEN	*	138,210	241	170
*SN5E	*	131,672	235	151
			(OP: SP5NHK)	
*SP6JZP	*	128,100	220	183
*SP3MGM	*	107,568	201	162
*SP7FBQ	*	106,400	216	152
*SP3VSE	*	106,002	183	151
*SP8NR	*	75,020	148	121
*SP5CQI	*	56,571	140	109
*SP3DOF	*	26,869	114	97
*SP6NVK	*	19,295	108	85
*SP6TRX	*	17,732	74	62
*SP9NWN	*	16,352	92	73
*SP9MZH	*	15,872	79	64
*SP3XR	*	7,849	52	47
*SP7EXJ	*	5,328	41	36
*SP5OXJ	*	504	13	12
***SP3IK**	**21**	**5,000**	**45**	**40**
*SP4NKJ	*	1,160	20	20
***SP2MKZ**	**14**	**101,722**	**244**	**181**
*SP9FT	*	88,032	222	168
*SP2IU	*	87,019	222	173
*SP4PBI	*	65,860	184	148
*SN2M	*	10,380	71	60
			(OP: SP2XF)	
*SP6BBE	*	8,874	72	58
*SP4ZJC	*	1,113	23	21
***SP8TJU**	**7**	**590,668**	**474**	**307**
*SQ2RGB	*	344,500	339	250
*SP6EIY	*	253,804	293	214
*SP2IW	*	224,048	271	209
*SP4BPH	*	198,352	247	196
*SP2HXY	*	110,834	182	151
***SP6IHE**	**3.5**	**481,012**	**428**	**287**
*SP6DMI	*	355,632	368	248
*SP4GL	*	253,000	295	220
*SP9BNM	*	56,808	145	108
*SP1MWN	*	49,396	117	106
*SP5UAF	*	15,240	65	60
*SN9I	*	11,766	55	53
			(OP: SP9EMI)	
Portugal				
CT1ILT	**A**	**523,224**	**529**	**338**
CT1EAT	*	404,004	396	262
CT1EHK	*	80,033	247	163
***CT1BXE**	**A**	**770,952**	**782**	**353**
*CT1HZU	*	840	16	15
***CT2JMR**	**7**	**55,660**	**118**	**110**
Romania				
YR9P	**A**	**3,688,020**	**1704**	**630**
			(OP: YO9HP)	
YO6DBL	*	298,376	362	247
YO5CUQ	*	143,460	248	180
YO3RU	**14**	**308,448**	**482**	**288**
YO5CBX	*	170,912	315	224
YO4DFT	**7**	**595,378**	**474**	**301**
***YO5OHY**	**A**	**530,244**	**515**	**309**
*YO5BBO	*	523,439	538	301
*YO9CWY	*	498,036	527	294
*YO3APJ	*	463,232	459	308
*YO8DDP	*	461,376	492	288
*YO8WW	*	430,321	438	289
*YO6HSU	*	423,423	455	273
*YO6HVQ	*	394,212	445	273
*YO5BYV	*	305,488	341	244
*YO2RLC	*	194,880	304	203
*YO4RST	*	77,980	180	140
*YO7LGI	*	53,536	147	112
*YO7LFV	*	39,083	160	121
*YO2MCK	*	14,592	73	64
***YRØWL**	**21**	**12,462**	**75**	**62**
			(OP: YO9BXC)	
*YO3JW	*	6,120	54	45
***YO5TP**	**14**	**26,166**	**121**	**98**
*YO3JF	*	0	0	0
***YO6A**	**7**	**58,320**	**131**	**108**
			(OP: YO6BHN)	
*YO3GW	*	29,600	86	80
***YO3III**	**3.5**	**8,360**	**45**	**44**
Sardinia				
ISØYEK	**A**	**4,255**	**41**	**37**
***ISØ/IT9VDQ**	**A**	**2,144**	**33**	**32**
			(OP: IT9VDQ)	
Scotland				
GM5A	**A**	**2,634,876**	**1494**	**558**
GM8S8H	*	999,792	804	393
			(OP: GMØFGI)	
GM3MZX	*	87,058	206	158
***GMØNBM**	**A**	**508,614**	**564**	**309**
*MMØRKT	*	139,120	268	188
***GM4KLN**	**14**	**54,708**	**172**	**141**
Serbia				
YT2U	**A**	**1,526,623**	**958**	**467**
YT2T	**14**	**1,746,486**	**1224**	**581**
YT5W	*	1,191,561	1009	483
			(OP: YU5RY)	
YU7U	**7**	**1,872,702**	**888**	**477**
***YU8NU**	**A**	**835,516**	**762**	**374**
*YU1RP	*	209,248	299	208
*YU7D	*	151,434	253	179
			(OP: YU7DP)	
*YU3A	*	103,050	180	150
*YU1IV	*	41,580	128	105
***YU2DX**	**14**	**135,864**	**289**	**204**
***YU7YZ**	**7**	**489,440**	**410**	**280**
***YU2A**	**3.5**	**738,340**	**541**	**335**
*YT1V	*	10,200	51	51
			(OP: YU2DX)	
Slovakia				
OM3ZBG	**A**	**53,703**	**143**	**117**
***OM6RK**	**A**	**704,330**	**608**	**337**
*OM7AG	*	552,050	534	305
*OM1VA	*	496,540	496	305
*OM7DX	*	388,094	424	266
*OM7YC	*	319,545	415	263
*OM3TLE	*	138,672	234	162
*OM4TW	*	105,865	194	155
*OM7YL	*	78,372	157	126
***OM5TX**	**7**	**904,308**	**599**	**358**
Slovenia				
S56A	**A**	**797,524**	**580**	**364**
S51FB	**21**	**224**	**11**	**8**
S53M	**7**	**3,510,730**	**1202**	**617**
			(OP: S51FB)	
S54E	**3.5**	**2,294,136**	**1025**	**513**
***S51OE**	**A**	**813,170**	**680**	**349**
*S56WPF	*	337,595	379	269
*S59D	*	292,560	389	230
*S54O	*	227,900	293	212
*S55O	*	198,450	256	189
*S57NTR	*	180,200	231	212
*S57NCP	*	123,975	192	171
***S57AJ**	**3.5**	**238,980**	**300**	**210**
*S54A	*	160,950	220	185
Spain				
EA1AKS	**A**	**2,757,600**	**1361**	**600**
EA1KY	*	1,163,130	815	411
EC1KR	*	741,151	622	373
EA1AP	*	356,256	447	288
EA1WX	*	32,396	101	89

Andy, K2TJ, and Ken, N2ZN, at the controls of the N2WK Multi-Two, taking first place USA and 6th in the world.

EA1JW	*	1,357	23	23
AN1A	**7**	**1,599,066**	**825**	**441**
			(OP: EA1AST)	
***EA1DR**	**A**	**2,891,562**	**1383**	**587**
*EA1DZM	*	83,790	167	133
*EE1K	*	28,674	92	81
*EA1DFP	*	2,759	36	31
EA5EM/2	**A**	**984,147**	**774**	**391**
AN2K	*	583,100	559	350
EA2AZ	*	36,160	146	113
***EA2VE**	**A**	**1,635,426**	**1082**	**482**
*EA2BNU	*	336,708	417	282
***EA2CJ**	**7**	**513,928**	**439**	**283**
EE3R	**A**	**1,295,775**	**864**	**443**
EB3JT	*	107,876	186	149
***AM3A**	**A**	**245,410**	**365**	**230**
			(OP: EA3FHP)	
*EB3CML	*	122,400	214	160
*EA3ALV	*	119,405	224	167
*EA3HCJ	*	71,672	174	136
*EA3ANE	*	39,746	148	119
*EA3GUG	*	31,500	114	90
*EA3GYK	*	29,400	122	100
			(OP: DK7TM)	
*AM3EGB	*	19,888	105	88
***EB3FLY**	**7**	**135,090**	**195**	**171**
EA4BT	**A**	**304,291**	**397**	**263**
EA4EJR	*	15,936	76	64
***EA4MA**	**A**	**7,644**	**54**	**52**
*EA4BNQ	*	540	15	15
***EA4TD**	**14**	**654,434**	**722**	**394**
*EG4M	*	45,694	148	134
			(OP: EA4EQD)	
EA5DKU	**A**	**1,561,056**	**994**	**483**
EE5J	*	779,025	735	425
			(OP: EA5YJ)	
EC5KB	*	278,861	398	251
			(OP: EA5DWS)	
EA5IY	*	112,632	196	156
EB5DET	*	3,219	30	29
EA5HAB	**14**	**457,443**	**566**	**371**
EH5J	*	28,455	128	105
			(OP: EA5DM)	
***EB5GMH**	**A**	**622,404**	**636**	**339**
*EB5CNK	*	477,325	464	305
*EB5ARP	*	337,937	411	271
*EB5RR	*	107,400	213	150
***EA5ET**	**14**	**123,627**	**251**	**203**
***EC5BKI**	**7**	**9,792**	**51**	**51**
EA7ZY	**21**	**72,822**	**213**	**159**
***EH7H**	**A**	**1,463,475**	**983**	**475**
			(OP: EA7ELY)	
*EB7ABJ	*	467,675	561	325
*EA7AZA	*	65,898	159	126
*EA7TG	*	48,552	138	119
*EA7MT	*	25,120	96	80
*EA7CWA	*	23,035	99	85
*EA7VJ	*	11,648	71	64
***EA7HEG**	**14**	**341,734**	**504**	**323**
Sweden				
SI4G	**A**	**453,005**	**501**	**301**
			(OP: SM4RGD)	
SM3LBP	*	37,044	124	108
SM5QU	**14**	**21,714**	**107**	**94**
***SF6DX**	**A**	**248,744**	**344**	**236**
*SM7BJW	*	148,598	262	191
*SM3ETC	*	92,720	225	152
*SM7BHM	*	45,650	138	110
*7S5S	*	25,112	96	86
			(OP: SM5CSS)	
*SM7N	*	19,750	85	79
			(OP: SM7NDX)	
*SM6WET	*	14,616	82	72
*SM7CWI	*	9,129	55	51
*SM4RLD	*	5,332	51	43
***SM7CIL**	**14**	**116,160**	**273**	**192**
*SM2JUR	*	45,240	162	130
***SM7U**	**7**	**64,130**	**134**	**121**
			(OP: SM7PAF)	
Switzerland				
HE8AAA	**A**	**676,696**	**522**	**337**
HB9CAL	*	272,209	414	259
***HB9SVT**	**A**	**516,681**	**495**	**307**
*HE8AWS	*	127,466	229	163
			(OP: HB9AWS)	
*HE8FBG	*	46,866	125	107
			(OP: HB9FBG)	
*HB9BGF	*	5,781	44	41
*HB9ARK	*	3,255	36	31
*HB9HQX	*	2,664	36	36
*HB9BNK	*	476	14	14
***HB9DHG**	**7**	**519,652**	**437**	**277**
Ukraine				
EO5M	**A**	**3,859,840**	**1807**	**652**
			(OP: URØMC)	
UW8I	*	3,528,090	1760	657
			(OP: UT2IZ)	
UW5U	*	1,806,752	1156	524
UT4ZG	*	1,521,024	1066	466
UT6IS	*	885,654	800	378
UX6IR	*	562,122	490	334
UR5FEL	*	382,925	415	265
UR4IOR	*	315,456	418	248
UXØFF	*	258,264	318	204
UR4EI	*	195,415	309	209
UX8ZA	*	181,425	316	205
UY1LS	*	161,280	262	192
UR7EW	*	139,018	238	178
UW7LL	*	124,292	199	161
UT8EU	*	101,623	194	151
UT7UJ	*	38,192	133	112
UR5ZVP	*	30,175	104	85
UU2JQ	*	2,112	25	24
UV8M	**14**	**1,532,678**	**1165**	**581**
			(OP: UX3MR)	
US5IQ	*	1,390,158	1153	531
UR7R	*	335,960	524	296
			(OP: UX1RX)	
US3QW	*	15,920	86	80
UU7JM	*	27	3	3
EO3Q	**7**	**2,291,750**	**1030**	**515**
			(OP: UW5Q)	
UT7MA	*	1,689,888	824	464
UT3N	*	613,056	490	309
			(OP: UT3NK)	
UT5ECZ	*	140,712	218	156
UW2Q	*	125,292	188	159
UX2X	**3.5**	**1,316,014**	**747**	**427**
			(OP: UT2XQ)	
UY3MW	*	229,320	279	210
UY1HY	*	193,200	256	200
UT5EO	*	109,652	207	158
US2IR	*	46,144	118	103
UT1XX	*	40,546	115	97
UU2JG	*	32,256	91	84
UT5DJ	*	32,220	101	90
EO5I	*	400	10	10
			(OP: UT2II)	
***UT5EPP**	**A**	**1,769,229**	**1152**	**483**
*UT8EL	*	1,165,855	901	431
*UR4U	*	1,157,952	854	444
			(OP: UR4UDI)	
*USØHZ	*	970,139	779	383
*UX1UX	*	922,131	736	369
*UR8QR	*	757,891	660	353
*US6CQ	*	683,098	620	338
*UU6JF	*	629,625	635	345
*UX6IB	*	604,122	534	321
*US2YW	*	484,770	474	286
*UY8LM	*	464,012	494	311
*UR5MBA	*	443,688	492	278
*UX2MF	*	425,040	481	276
*UT2IO	*	399,168	486	288
*UY5TE	*	322,152	428	248
*UR5LAK	*	297,075	396	233
*UT3RS	*	288,473	380	239
*UX7QV	*	280,770	385	245
*UT4XU	*	233,914	300	218
*UU9JQ	*	215,160	341	220
*UT5UKY	*	172,710	272	202
*UR3AC	*	171,072	281	192
*UY2ZA	*	146,880	230	180
*UT7ZB	*	127,967	247	181
*US8UA	*	94,224	203	151
*UT5ERP	*	82,327	170	133
*UTØRM	*	68,832	213	144
*UU7JN	*	61,360	167	130
*US5EEK	*	38,400	118	100
*US6EX	*	23,406	96	83
*UX3IW	*	22,464	91	78
*UR7QM	*	16,728	91	82
*UR5EIT	*	7,708	51	47
*UT2AB	*	5,282	41	38
*UT2QQ	*	5,280	53	48
*UR2MO	*	5,120	44	40
*UZ7U	*	4,699	40	37
			(OP: UT3UA)	
*UR7TZ	*	1,340	21	20
*USØYA	*	1,098	19	18
***UXØUW**	**21**	**8,008**	**64**	**52**
***EO1I**	**14**	**764,784**	**829**	**423**
			(OP: UT1IA)	
*UZ7HO	*	580,160	669	392
*UT4UQ	*	78,566	212	163
*UT7MR	*	64,170	188	155
*US7IQZ	*	42,837	152	131
*UT5PQ	*	34,608	146	112
***UTØEA**	**7**	**1,038,306**	**636**	**393**
*UY7C	*	760,572	530	333
			(OP: UR3CMA)	
*UT5KL	*	319,924	349	242
*UTØET	*	163,080	217	180
*UT/UA3XAL	*	35,512	108	92
*UR8IDX	*	414	9	9
***USØGH**	**3.5**	**388,608**	**380**	**264**
*UT5KO	*	382,802	386	259
*UX5IO	*	159,506	231	173
*UR8MH	*	133,132	219	166
*UT5PH	*	123,836	201	166
*UR5UBR	*	117,624	197	169
*US8ICM	*	18,876	78	66
Wales				
GW4BLE	**A**	**86,597**	**217**	**139**
GW4SKA	**7**	**2,134,504**	**947**	**502**
***MWØCRI**	**A**	**1,381,800**	**1006**	**470**
*GW3YVC	*	12,744	67	59

OCEANIA

Australia				
***VK2KDP**	**A**	**3,422**	**29**	**29**
***VK3FM**	**A**	**29,750**	**104**	**85**
*VK3TDX	*	2,046	24	22
***VK7AD**	**A**	**14,006**	**57**	**47**
East Malaysia				
***9M6YBG**	**A**	**2,496**	**36**	**24**
Guam				
KG6DX	**A**	**341,649**	**464**	**231**
Hawaii				
KH6FI	**A**	**1,262,070**	**1024**	**333**
KH6GMP	*	331,193	479	227
KH7X	**14**	**1,857,082**	**1222**	**514**
			(OP: KH6ND)	
NH7C	**7**	**1,960,704**	**906**	**368**
***KH6CO**	**A**	**36,880**	**124**	**80**
			(OP: KH6OO)	
*KH6/AA4V	*	35,670	128	87
			(OP: AA4V)	
Indonesia				
YB4IR	**A**	**378,213**	**428**	**219**
YBØPAH	**14**	**320,551**	**439**	**253**
YC8FEF	**7**	**199,056**	**227**	**156**
***YB3MM**	**A**	**49,532**	**148**	**116**
***YC8EXL**	**21**	**10,547**	**69**	**53**
***YBØJIV**	**14**	**104,044**	**252**	**148**
*YB2ECG	*	35,604	140	92
*YBØEIN	*	13,847	81	61
*YBØECT	*	8,507	65	47
*YB8EL	*	6,846	58	42
*YB1MBA	*	3,978	43	39
***YB1ALL**	**7**	**11,782**	**48**	**43**
New Zealand				
ZM2B	**A**	**448,818**	**383**	**254**
			(OP: ZL2BR)	
***ZL3TE**	**7**	**44,370**	**97**	**87**
			(OP: W3SE)	
Philippines				
***DV1JM**	**A**	**554,667**	**576**	**263**

SOUTH AMERICA

Argentina

LV5V	**A**	**3,325,816**	**1599**	**566**
				(OP: LU5VV)
LTØH	*	2,092,856	1159	524
				(OP: LU3HY)
LU1BJW	*	289,695	399	217
AY8A	**28**	**72**	**6**	**6**
				(OP: LU8ADX)
***LW1HR**	**A**	**116,586**	**263**	**153**
*LW7HE	*	48,970	153	118
*LU6QI	*	1,940	20	20
***LU3HS**	**28**	**8**	**2**	**2**
***LT2F**	**14**	**268,862**	**385**	**242**
				(OP: LU7FNI)
***LQ8F**	**7**	**266**	**7**	**7**
				(OP: LU5FF)

Aruba

P49X	**A**	**11,177,154**	**3193**	**801**
				(OP: WØYK)
P4ØYL	**14**	**2,307,084**	**1313**	**598**
***P4ØR**	**A**	**5,632,140**	**2106**	**645**
				(OP: N4RR)

Brazil

PY1KN	**A**	**377,533**	**417**	**257**
PY2KP	*	92,400	182	140
PY7ZY	*	40,992	127	84
PY1SAN	*	7,138	47	43
***ZX2B**	**A**	**3,516,130**	**1500**	**587**
				(OP: PY2MNL)
*ZX7A	*	990,500	715	350
				(OP: PS7TKS)
*PX2T	*	333,720	434	270
				(OP: PY2DN)
*PW2P	*	165,767	257	199
				(OP: PY2XAT)
*PY2SEX	*	45,980	144	110
*PY2IQ	*	25,956	99	84
*ZV2K	*	23,800	102	85
*PY2BRZ	*	1,440	25	24
***ZV2C**	**28**	**44**	**4**	**4**
***PY2MTV**	**21**	**130,474**	**255**	**178**
*PT9PA	*	91,560	199	168
*PY2UN	*	48,875	153	125
*PU2MJU	*	792	20	18
***PY2NY**	**14**	**156,812**	**272**	**197**
*PY1ZV	*	68,808	176	141
*PR7AR	*	30,030	121	91
*PY4XX	*	3,069	35	33
***PY2OC**	**7**	**90**	**5**	**5**

Chile

XR3P	**A**	**234,491**	**362**	**227**
***CE3SNA**	**A**	**462**	**15**	**14**

Colombia

***HK6P**	**A**	**519,468**	**489**	**292**

Ecuador

***HC1JQ**	**A**	**1,008**	**19**	**18**

Suriname

PZ5RA	**A**	**2,754,272**	**1308**	**544**

Uruguay

CW7T	**A**	**1,038,562**	**799**	**434**
				(OP: CX7TT)
CX5TR	*	304,843	392	259
CX4AAJ	**21**	**652,845**	**634**	**355**

Venezuela

YW5RY	**3.5**	**16,992**	**64**	**59**
				(OP: YV5KAJ)
***YV1FM**	**A**	**396,048**	**372**	**222**
*YW5T	*	365,958	434	251
				(OP: YV5JBI)
*YY6JAG	*	21,980	75	70
***YY5LI**	**7**	**734,638**	**445**	**289**
*YV1JGT	*	157,388	186	154

MULTI-OPERATOR SINGLE TRANSMITTER NORTH AMERICA

United States

AF4Z	**2,699,398**	**1744**	**611**
NA8CW	**2,614,354**	**1756**	**566**
AK4K	2,306,798	1729	614
WQ2N	**1,636,386**	**1180**	**525**
KT1I	**1,512,312**	**1309**	**488**
NZ1U	783,510	707	390
N2BJ/9	**581,160**	**747**	**348**
W6OTC	**540,981**	**711**	**279**
NJ4F	251,175	388	255
WB8SKP/4	185,924	385	212
W4HOD	149,952	356	192
KDØS	142,690	388	190
K7ABL	**89,534**	**308**	**178**
N2NGW	66,816	202	144

Canada

VE3FJB	**1,029,618**	**773**	**414**

ASIA

Asiatic Russia

RK9CWA	**3,634,176**	**1640**	**546**
RK9SWF	8,364	57	51

China

BD2IMS	**123,868**	**323**	**173**

Kazakhstan

UN1L	**3,551,671**	**1680**	**547**
UN8LF	1,932,336	1206	486

South Korea

D9K	**114,816**	**293**	**138**

EUROPE

Bosnia-Herzegovina

E77DX	**1,473,759**	**761**	**447**

Croatia

9A5D	**4,395,352**	**1900**	**676**

Czech Republic

OK1KSL	**2,443,422**	**1264**	**566**

England

G6BOX	**530,784**	**519**	**384**

Estonia

ES5Q	**4,183,488**	**2014**	**648**

European Russia

RZ1AWT	**4,763,520**	**2059**	**720**
RK4WWQ	1,448,727	1147	447
RK3PWJ	47,412	122	108
RZ3DZI	18,720	88	78
RK3DXZ	405	15	15

Finland

OH3I	**3,133,260**	**1580**	**618**
OH2ET	1,248,904	988	428
OH8F	1,118,776	948	436
OH4AB	106,176	223	158

France

F2FZ	**3,877,368**	**1768**	**627**

Germany

DP4P	**3,605,616**	**1579**	**657**
DP4D	6,210	45	45

Iceland

TF3W	**1,018,416**	**999**	**433**

Italy

IW1ARB	**4,836,186**	**1879**	**729**
IQ3TN	1,041,654	787	381

Montenegro

4O3A	**8,670,269**	**2763**	**857**

Poland

SN5Z	**596,808**	**537**	**324**

Romania

YR8BHCS	**1,236,026**	**853**	**418**

Serbia

YTØA	**5,112,420**	**1915**	**695**

Slovakia

OM3KWZ	**2,028,755**	**1151**	**485**
OM3RRC	551,714	482	311

Slovenia

S52X	**6,236,336**	**2189**	**752**

Spain

EE2K	**1,615,182**	**997**	**482**

Ukraine

UZ4E	**3,622,164**	**1796**	**642**
UU4JXI	870,320	727	368

OCEANIA

Hawaii

KH6MB	**671,000**	**585**	**244**

New Zealand

ZL4A	**389,136**	**463**	**268**

SOUTH AMERICA

Argentina

LV6O	**354,234**	**409**	**258**
LU3DY	79,940	191	140
LT5X	15,975	84	71

Brazil

PU5ATX	**2,336**	**38**	**32**

Uruguay

CV5K	**1,248,618**	**908**	**411**

Venezuela

YW5RTTY	**748,780**	**598**	**290**

MULTI-OPERATOR TWO TRANSMITTER NORTH AMERICA

United States

N2WK	**4,914,945**	**2379**	**743**
WX5S/6	**3,270,652**	**2385**	**574**

Belize

V31TB	**2,292,345**	**1474**	**495**

Canada

VE7UF	**2,909,810**	**1785**	**505**
CG7SZ	2,476,684	1688	449
VE6AO	**669,300**	**843**	**276**

Puerto Rico

NP3U	**9,895,184**	**3523**	**842**

ASIA

Japan

JA6ZPR	**4,442,225**	**1991**	**685**

EUROPE

Germany

DQ4W	**7,190,819**	**2497**	**787**
DLØCS	5,924,583	2335	729
DA3X	3,119,364	1581	612

Italy

IQ5AE	**1,417,680**	**892**	**440**

Macedonia

Z37M	**9,211,774**	**3079**	**806**

Norway

LA1K	**547,760**	**625**	**334**

Ukraine

UZ2I	**5,167,950**	**2430**	**655**

MULTI-OPERATOR MULTI-TRANSMITTER NORTH AMERICA

United States

KA4RRU	**3,854,176**	**2185**	**688**

Canada

VE5PV	**488,289**	**690**	**249**

AFRICA

Canary Islands

EF8M	**25,237,996**	**5690**	**1036**

ASIA

Asiatic Russia

RWØA	**8,129,497**	**3063**	**701**
RA9A	**4,854,762**	**2089**	**594**

EUROPE

Bulgaria

LZ9W	**9,976,426**	**3224**	**859**

Finland

OH6R	**6,996,482**	**2857**	**747**

Germany

DM3W	**1,098,197**	**755**	**443**

Hungary

HG1S	**10,470,520**	**3285**	**874**

CHECK LOGS

The following submitted check logs. Thank you: EM5ØKFF, DM5GI, DC9ZP, SN9Y, SQ9I, WB2COY, HA1SN, RWØAQ, UX1IL, K2QD, RA6YDX, DL1DTC, EX8AB, DF9KF, IZ4MJP, DM3BJ, RA9AAA, DL7VEE, DL3TC, K0IDT, DU1EG, SQ5WAA, IQ5FI, OK2SG, SP3QYQ, IW2GRA, E72U, AB1FY, EA7LS, YL5T, AH6NF, SP7HOV, SJØWPX, RA3FF, UR4EYA, GWØETF, RU3EJ, SP9IHP, RD3ABN, AF6DD, LZ2NKM, KE5LYW, SE6C, DG7LAE, DL6RAI, RU6YY, CT1AGF, OK1DMP, EA3GTJ, VA3PC, SP9CQ, DL5MG, DL2DXD, RA9AMO, UA1WBV, IWØHOU, DL5JWL

Looking Ahead in CQ

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

- SSB Results, 2008 CQ World Wide DX Contest
- Hot Stuff at Hamvention® by Anthony Luscre, K8ZT
- Your Next Mobile Rig May Be Your Cell Phone! by Bill Kearns, WB6JAR
- The GB2CW Project, by Roger Cooke, G3LDI
- CQ Interviews: Nobel Laureate Joe Taylor, K1JT, by Rich Moseson, W2VU

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our readers say

More Callsign History

The following letter was addressed to "Washington Readout" editor Fred Maia, W5YI:

Hi Fred,

I just finished reading your very interesting article "The Story Behind 'Group' Callsign System" in the May 2009 issue of *CQ*. You mentioned in the third from last paragraph that "The 'X' group—RACES, club, military recreation, repeaters and temporary station licenses—were never implemented.... The special call WC, WK, WM, WR, and WT-by-3 letter suffix callsigns were allocated and reserved by the FCC, but never have been issued."

I must disagree. Our club, the San Diego Repeater Association, had the call WR6ACF. There were *many* WR repeater calls issued. Looking through my 1980 Callbook I find WC calls. WC6AAJ through WC6AAV were a few in San Diego County. I sorta wish we had the old WR repeater calls back again.

Ken Decker, WA6OSB

Editor, *CQ*:

I enjoyed reading Fred Maia's article about callsign history and such in the May issue.

In his history, he didn't mention one very odd bit of callsign history ... the 1×4 callsigns. My dear friend W2GFF (90 years old) knew about it first-hand and has shared the story with me. Also, another good friend, W3HF, has researched this with me using his massive Callbook collection. If you would be interested, I can prepare (maybe with W3HF as well) a brief "rest of the story" for *CQ*. I have talked about this oddity at several club meetings and found folks enjoyed learning about these special callsigns.

Barry, W4WB

W2VU responds: Wow, Barry! I've never heard of them either. Please do put something together for us!

Antenna Cloaking Devices

Editor, *CQ*:

Living in a restrictive CC&R area, I was extremely interested in Professor Heisseluft's article in the April edition of *CQ*. I did not see any mention of the continued operation of the DX contest operations after installation of the cloaking system. Did it also hide the RF electromagnetic as well as visible light waves?

Having spent a career in military communications, I worked on occasion with Faraday screens and screen rooms to provide an electromagnetic shield for equipment. Both the plasmonic silver and the nanosize gold film layers appear to essentially provide the antenna farm with Faraday shield for the RF region of the electromagnetic spectrum as well as the visible light region.

If I may, I would suggest that the good Professor not concentrate his efforts on the "Large Antenna Farms" shown in the article. These guys are not in CC&R-restricted areas! Concentrate on the urban CC&R areas. Use close-to-the-ground HF NVIS antennas. The concentric rings of the shield would only have to be high enough to shield nosy neighbors in a two-story house from seeing the antenna. Considering the present cost of gold, this would be a tremendous savings in material. In this way, the antenna would be shielded from view, the neighbors would be protected from RFI, and the good neighbor ham could use the open top of the concentric rings of the invisibility cloak to get a good NVIS signal on the air!

John Malo, N6IMV

Professor Heisseluft responds: Mr. Malo indeed raises a valid point. And given that the price of gold now is well over $900 per ounce, it indeed would make sense to focus on NVIS applications. The Lauton Institute's studies of NVIS date back several decades to work performed in collaboration with the U.S. Army's Communications and Electronics Command. Perhaps it is time to revisit that work with an eye towards assisting those in CC&R restricted areas! —*Emil*

Out of Their OWN Pockets?

Editor, *CQ:*

Regarding "Washington Readout," *CQ*, April 2009, pp. 50–54, in the closing sentence Fred says "...perhaps Congress itself should just fund the public safety network."

I'd like to remind you that Congress doesn't have any money. That is why they use taxpayer money. And since "[n]o one bid on the $1.3 billion price" for the sale of the "D block," it implies that it's a fiscally bad idea (otherwise business would be all over it). If it's a bad idea, I don't want my tax money paying for it.

Maybe you are right, though. If the members of Congress think it's a really, really good idea, they should pay for it with their own personal funds. This would cost them less than two-and-a-half million dollars apiece—that is, for 435 congressmen and 100 senators each paying $2,429,906.00, the total would be $1.3 billion. I'm sure they can afford it, and they really should "spread it around." Heck, they could even share in the profit that this idea promises for such an investment.

It might also help them understand how much a billion is.

Dave Bushong, KZ1O

"Talk is Cheap!"

Editor, *CQ*:

Re: "Talk is Cheap!" by Dick Genaille, W4UW (November 2008 *CQ*): I tried it with my IC-208 and people were amazed at my transmit audio quality. I just connected the telephone earpiece directly to the mic input of the transceiver and it works very well. What a great article!

Henry, K2BFY

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