CQ Hall of Fame Inductees, p. 28

Amateur Radio

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

CQ

COMMUNICATIONS & TECHNOLOGY

JULY 2010

1945 Our 65th Anniversary 2010

- A 49-Year Ham Friendship, p. 13
- Over Coffee and Cognac, p. 18
- 2009 Results: CQ WPX RTTY Contest, p. 22
- CQ Reviews: Yaesu VX-8R Handheld, p. 34

MINERAL VA 23117-3425
6196 JEFFERSON HWY
BUCKMASTER PUB 023289
JACK SPEER P120
CQ 50065 XXXX CQR1
**********AUTO**5-DIGIT 23117

On the Cover: Rick Lagerstrom, KN6FR, operates HF portable from Point Lobos, California. Details on page 60.

KENWOOD

Listen to the Future

Kenwood & AvMap

The Ultimate APRS® Combination

TM-D710A

AvMap G5

Two Great Companies...Providing One Outstanding Solution!

KENWOOD U.S.A. CORPORATION
Communications Sector Headquarters
3970 Johns Creek Court, Suite 100, Suwanee, GA 30024
Customer Support/Distribution
P.O. Box 22745, 2201 East Dominguez St., Long Beach, CA 90801-5745
Customer Support: (310) 639-4200 Fax: (310) 537-8235

www.kenwoodusa.com

ISO9001 Registered

AvMap SATELLITE NAVIGATION

Tele Atlas Maps

www.avmap.us • e-mail: info@avmap.us
1.800.363.2627

hy-gain HF BEAMS...

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

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

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

The choice of top DXers.

With 11-elements, excellent gain and 5-bands, the super rugged TH-11DX is *the "Big Daddy" of all HF beams!*

Handles 2000 Watts continuous, 4000 Watts PEP.

Every part is selected for durability and ruggedness for years of trouble-free service.

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

Stainless steel hardware and clamps are used on all electrical connections.

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

7-Elements gives you the *highest average gain* of any Hy-Gain tri-bander!

Dual driven for broadband operation without compromising gain. SWR less than 2:1 on *all* bands.

Uniquely combining monoband and trapped parasitic elements give you an excellent F/B ratio.

Includes *Hy-Gain's* diecast aluminum, rugged boom-to-mast clamp, heavy gauge element-to-boom brackets, BN-86 balun. For high power, upgrade to BN-4000.

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

The broadband *five element* TH5-MK2 gives you outstanding gain.

Separate air dielectric *Hy-Q* traps let you adjust for maximum F/B ratio on each band.

Also standard is *Hy-Gain's* exclusive *BetaMATCH™*, stainless steel hardware and compression clamps and BN-86 balun.

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

The super popular TH-3MK4 gives you the *most gain for your money* in a full-power, full-size durable Hy-Gain tri-bander!

You get an impressive average gain and a whopping average front-to-back ratio. Handles a full 1500 Watts PEP. 95 MPH wind survival.

Fits on average size lot with room to spare -- turning radius is just 15.3 feet. Four piece boom is ideal for DXpeditions. Rotates with CD-45II or HAM-IV rotator.

Features *Hy-Gain BetaMatch™* for DC ground, full power *Hy-Q™* traps, rugged boom-to-mast bracket and mounts on standard 2"O.D. mast. Stainless steel hardware. BN-86 balun recommended.

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

The 2-element TH-2MK3 is Hy-Gain's *most economical* full power (1.5kW PEP) full size tri-bander.

For just $339.95 you can greatly increase your effective radiated power and hear far better!

Ruggedly constructed, top-performing, compact 6 foot boom, tight 14.3 foot turning radius. Installs almost anywhere. Rotate with CD-45II or HAM-IV. BN-86 balun recommened.

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

Revolutionary 4-element compact tri-bander *lets you add 40 or 30 Meters!* Has 14 foot boom and tight 17.25 feet turning radius. Fits on roof tri-pod, mast or medium duty tower.

Hy-Gain's *patented* broadbanding *Para Sleeve* gives you less than 2:1 VSWR. 1.5kW PEP.

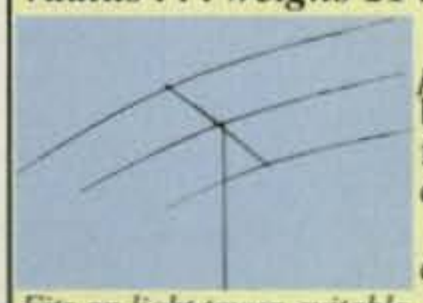
BetaMATCH™ provides DC ground to eliminate static. Includes BN-86 balun. Easily assembled.

***Truly** competitive against giant tri-banders at half the cost!*

QK-710, $179.95. 30/40 Meter option kit for EXP-14.

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

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



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

TH-3JRS, $359.95. Hy-Gain's *most popular* 3-element 10, 15, 20 Meter tri-bander fits on most lots! Same top performance as the full power TH3MK4 in a compact 600 watt PEP design.

Excellent gain and F/B ratio let *you* compete with the "big guns".

Tooled manufacturing gives you *Hy-Gain* durability with 80 MPH wind survival.

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

Tooled Manufacturing . . . Highest Quality Materials

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

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

3. Thick-wall *swaged* aluminum tubing

***Tooled** manufacturing* is the difference between Hy-Gain antennas and the others -- they just don't have it (it's expensive!).

Die-cast aluminum boom-to-mast bracket and element-to-boom compression clamps are made with specially *tooled* machinery.

Hy-Gain antennas feature *tooled* swaged tubing that is easily and securedly clamped in place. All tubing is deburred and cleaned for smooth and easy assembly.

Durable precision injection molded parts.

***Hy-Gain** antennas are stronger, lighter, have less wind surface area, better wind survival, need no adjustments, look professional and last years longer.*

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

hy-gain

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

ham radio news

FCC Proposes Changes to 60 Meters

The FCC has proposed a frequency swap, a power increase, and permission to use CW and certain digital modes on 60 meters, the secondary amateur allocation at 5 MHz. Responding to a petition for rule making filed by the ARRL in 2006, the FCC's Notice of Proposed Rule Making in ET Docket 10-98 proposes substituting 5358.5 kHz for the current channel at 5368 kHz, which often is unusable by hams due to its frequent use by one of the band's primary users (the Fixed Service, in this case). It also proposes permitting the use of Morse code, PSK-31, and PACTOR-III (no other digital modes) on the band, as well as upper sideband voice. It asks for comments on an ARRL proposal to mandate time limits on transmissions using these other modes in order to minimize delays in clearing a frequency if a federal agency (another primary user) needs to make a transmission. It also seeks comments on an ARRL proposal, for the same reason, to mandate the use of VOX (voice-operated switching) on voice communications on the band. Finally, the Commission proposes increasing the maximum power permitted on 60 meters from the current 50 watts ERP (effective radiated power) to 100 watts ERP. At press time, comment deadlines had not yet been set.

Radio Kuwait Vacates 7150, 7190 kHz

All international broadcasters were supposed to have moved their 41-meter operations above 7200 kHz as of last year, but apparently not everyone had gotten the message. When a shortwave station appeared on 7150 and 7190 kHz in April, the International Amateur Radio Union's Intruder Watch monitoring system went to work. According to the *ARRL Letter,* the station was quickly identified as Radio Kuwait. While IARU monitors began filing formal complaints with their countries' telecommunications authorities, Kuwait's IARU Monitoring System coordinator, Faisal al-Ajmi, 9K2RR, contacted Radio Kuwait directly. A few days later, he reported that the station's General Manager of Engineering had informed him that all transmissions on 7150 and 7190 kHz had been suspended.

Mission to Venus Launched Hams' Help Requested

A Japanese-built cubesat is on its way to Venus, and hams are being asked to take part in receiving its signals and in designing related experiments. The UNITEC-1 satellite was launched from Japan on May 20, and it carries an amateur radio telemetry beacon transmitting CW on 5.840 GHz. American ham William Vartorella, KJ4ORX, has been working with the consortium of Japanese universities that designed and built the satellite, and has set up the FlyVenus.com website to try to coordinate ham participation.

One goal is to have hams around the world monitor the very slow CW beacon (1 bps) and combine the received signals to improve the signal-to-noise ratio. Vartorella says the team is also interested in ideas and experiments related to receiving these very weak signals, and is particularly interested in one-page research proposals that he can forward to Japan. For more information, visit <http://www.FlyVenus.com> or contact KJ4ORX via email at <globebiz@juno.com>.

Another Study Fails to Find Cell-phone–Cancer Link

An international study of possible links between cell phone use and brain cancer has, once again, returned inconclusive results. This study, the largest conducted to date, involved 21 doctors in 13 countries and nearly 13,000 participants, and was conducted over a period of 10 years. The International Agency for Research on Cancer, part of the World Health Organization, conducted the research. Its report said there were "suggestions" that using cell phones for more than 30 minutes per day might increase the risk of one type of cancer, glioma, but that "biases and error" prevented researchers from establishing a "causal" link between cell phones and cancer. In one group studied, cancer rates were actually lower than in the general population, but the researchers dismissed those statistics as being based on "implausible values of reported use in this group." While the panel found that "(a)n increased risk of brain cancer is not established from the data," the researchers concluded that further research is needed. *(After all, they need job security—ed.)*

Chinese Hams "Stand Down" From Earthquake Relief

After more than a month of helping to provide relief to earthquake victims in China's Qinhai province, hams working with the Chinese Radio Sports Association (CRSA) have wrapped up their operations, according to the *ARRL Letter.* Unlike the more segmented response to disasters in the United States, each ham radio team traveling to the quake zone transported relief supplies along with its radio gear, and volunteers were involved in more than just providing communications. According to the report from CRSA, one team of hams from Beijing was directly responsible for saving six people. The April 14 quake was the second major earthquake to hit China in two years, and CRSA officials said lessons learned from the 2008 event were put to good use in this response.

Police Blotter: Two Hams in Trouble with the Law

An Ohio ham arrested in North Carolina was due in court on June 10 to respond to misdemeanor charges in connection with potentially threatening behavior toward President Obama. Joseph Sean McVey, K8JSM, of Coshocton, Ohio, was arrested at the Asheville, North Carolina airport in late April just after the president took off aboard Air Force One. According to the Asheville *Citizen-Times* newspaper, McVey was carrying a loaded handgun (for which he had a permit) and his car was equipped with strobe lights and a siren in addition to a variety of scanners and rifle scope formulas. He reportedly told police he wanted to see the president. McVey was charged with the misdemeanor offense of "going armed to the terror of the public," and was released on bail two days after his arrest.

Meanwhile, in southern California, Irene Marie Levy, KJ6CEY, has pleaded not guilty to felony charges relating to transmissions she allegedly made on police and fire frequencies. According to the Southwest Riverside News Network, police allege that Levy transmitted bomb threats, jammed emergency service frequencies and interrupted radio traffic. She was charged with making criminal threats and making a false bomb report, both felonies, as well as misdemeanor counts of maliciously interrupting a communications transmission and obstructing arrest.

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.

TOKYO HY-POWER

HC-1.5KAT

HF 1.5kW Auto Tuner

HL-2.5KFX *Auto Band Set and QSK*

Solid-state HF 1.5kW Linear Amplifier

Photo : From left HC-1.5KAT (HF 1.5kW Tuner with Auto Band Set Feature), HL-2.5KFX (HF 1.5kW MOSFET Linear) and IC-7700 Transceiver

For DXpeditioners

HL-1.1KFX

HF 600W Linear

HL-1.2KFX

HF 750W Linear

HL-1.5KFX

HF / 50MHz 1kW Linear
(650W PEP on 50MHz Band)

TOKYO HY-POWER

Visit Our NEW Website:
www.tokyohypower.com

TOKYO HY-POWER LABS., INC. – USA
6046 FM2920 Rd. Suite 133
Spring, Texas 77379-2542
USA Factory Support Tel: 713-818-4544
USA Factory Email: thpsupport@airmail.net
TOKYO HY-POWER LABS., INC. – JAPAN
1-1 Hatanaka 3chome,
Niiza Saitama 352-0012
Phone: +81 (48) 481-1211
FAX: +81 (48) 479-6949
e-mail: info@thp.co.jp

– Visit Our Tokyo Hy-Power Dealers –

CQ contents

JULY 2010

p. 84

p. 48

features

Vol. 66 No. 7

13 **RADIO FRIENDS FOR 49 YEARS:** The story of DL7JK and W4YO
By Edmun R. Richmond, W4YO

18 **OVER COGNAC AND COFFEE:** Reminiscences on the granddaddy of all solar cycles, a half century ago *By Robert R. Brown, NM7M*

22 **RESULTS OF THE 2010 CQ WPX RTTY CONTEST**
By Ed Muns, WØYK

Trophy Sponsors and Winners....24
Top Scores....25
Club Competition....26
Scores....107

28 **ANNOUNCING:** The 2010 Inductees CQ Amateur Radio, Contest, and DX Halls of Fame

32 **ANNOUNCING:** The 2010 CQ WW RTTY DX Contest

34 ***CQ* REVIEWS:** The Yaesu VX-8R Handheld *By John Wood, WV5J*

34 **MATH'S NOTES:** Electromagnetic interference
By Irwin Math, WA2NDM

56 **MAGIC IN THE SKY:** The treasure trove *By Jeff Reinhardt, AA6JR*

70 **THE HAM NOTEBOOK:** Protecting your equipment—reverse-polarity protection *By Wayne Yoshida, KH6WZ*

105 ***CQ*'s 65TH ANNIVERSARY:** Timeline of ham radio history, 1980–1984

p. 22

p. 56

departments

44 **WASHINGTON READOUT:** "Vanity" callsigns and their mysterious "regulatory fee" *By Frederick O. Maia, W5YI*

48 **PUBLIC SERVICE:** The lull before the storms—WX4NHC puts amateurs in focus at National Hurricane Conference
By Richard Fisher, KI6SN

62 **KIT-BUILDING:** More hints and tips and a look at the MFJ "Cub"
By Joe Eisenberg, KØNEB

66 **LEARNING CURVE:** "Cogito Ergo Sum!" A look at inductors and capacitors, and how they perform as a transmatch, or antenna tuner
By Rich Arland, K7SZ

78 **WHAT'S NEW:** Power to the hams *By John Wood, WV5J*

84 **VHF PLUS:** First CubeSats sub-orbital launch *By Joe Lynch, N6CL*

90 **DX:** Microlite Penguins and more DX *By Carl Smith, N4AA*

92 **AWARDS:** Sponsors needed for county awards, plus awards from Hungary *By Ted Melinosky, K1BV*

98 **CONTESTING:** How to improve your SSB contesting skills
By John Dorr, K1AR

100 **PROPAGATION:** Scorching rain on the sun!
By Tomas Hood, NW7US

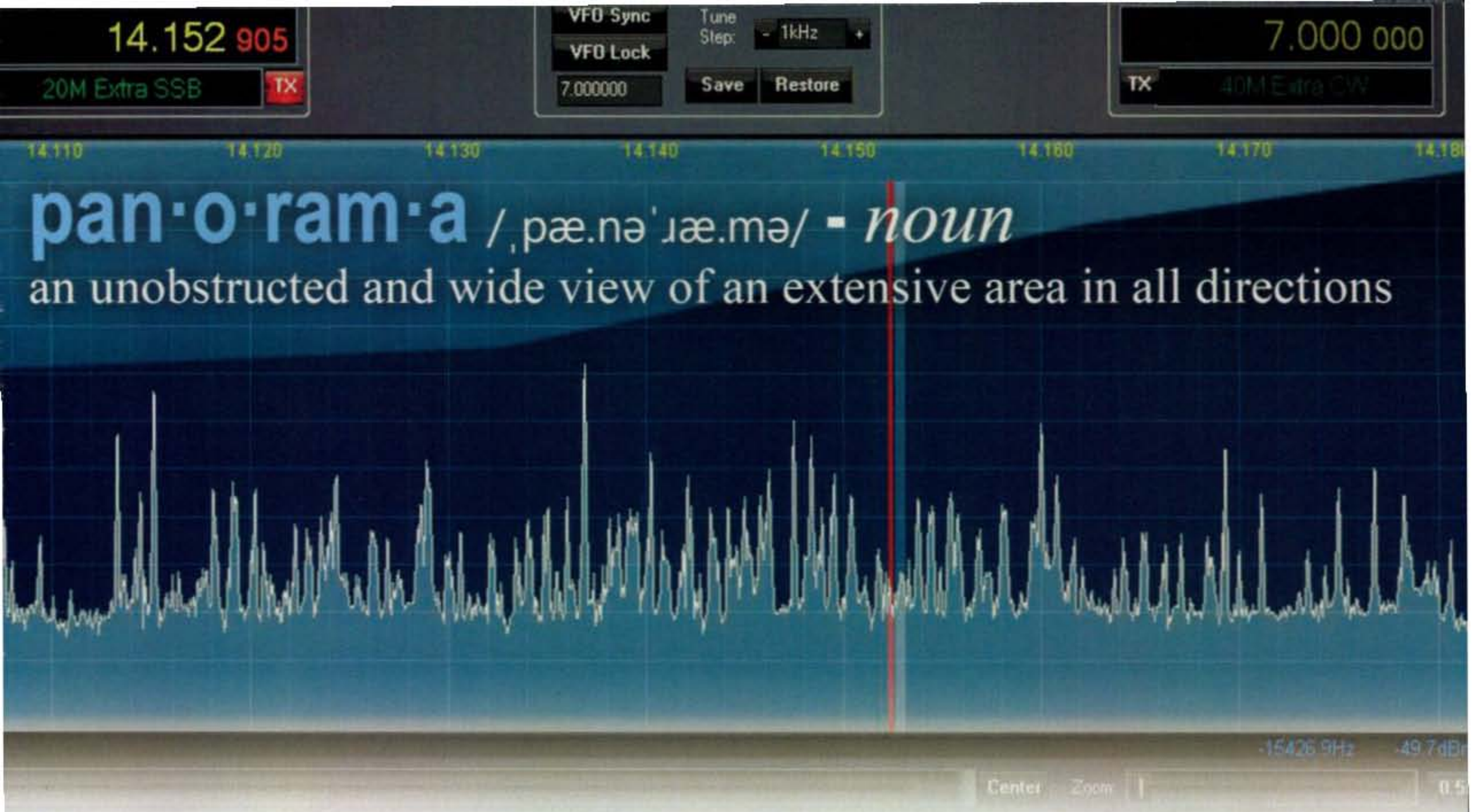
2 **HAM RADIO NEWS**

8 **ZERO BIAS**

10 **ANNOUNCEMENTS**

112 **HAM SHOP**

114 **OUR READERS SAY**



FlexRadio's PowerSDR™ Integrated Panadaptor display

lets you **SEE THE DX** in all directions

FLEX-5000A
HF-6m Transceiver
+2M&70CM

FLEX-3000
HF-6m Transceiver

FLEX-1500
HF-6m Transceiver

Order Now!

www.flex-radio.com
sales@flex-radio.com 512-535-5266

Tune in Excitement.™

FlexRadio Systems®
Software Defined Radios

The Totally New - Advanced Dual Band Mobile Radio
5.2" x 1.6" Large dot matrix (264 x 64 dots) LCD display
GPS / APRS® / Bluetooth® Features

NEW

144/(220)* /430 MHz 50 W
FM Dual Band Transceiver

FTM-350R

*220 MHz 1W (USA Version only)

NEW — Large (5.2" x 1.6"/130 x 40 mm) dot matrix (264 x 64 dots) LCD display for comfortable viewing for night and day. Choose your favorite LCD display from 8 vibrant color options

NEW — The Display Control Head is designed for easy separation from the main RF power unit built by tough aluminum die-cast;10ft control cable included (Optional 20ft control cable available)

NEW — Multi-purpose Global Positioning System display (with optional FGPS-1 GPS Receiver and Antenna. Optional FGPS-2 External GPS Receiver and Antenna is also available)

NEW — Compatible with the worldwide standard data-communications system, APRS®, and SmartBeaconing™ capabilities

NEW — Huge memory channel management capability! 500 Independent Memory channels + 9 Programmable Band Limit Memory Scan channels + 1 Rewritable Preferred channel for each L and R Band

NEW — 3 Speaker System (including Built-in Dual Speakers on the rear of the Control Head for FM Broadcast in Stereo!)

Exclusive — Dual Band AF Monitor for listening to FM/AM broadcast and monitoring ham bands as well

Exclusive — Built-in Barometric Pressure Sensor

Screen Example

Dual Band (Spectrum Scope function)

Navigation (with GPS antenna unit attached)

Mono Band (Spectrum Scope function)

APRS®

Barometer

Timer

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

* APRS® is a registered trademark of Bob Bruninga WB4APR.
* SmartBeaconing™ from HamHUD Nichetronix

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

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

Vertex Standard
US Headquarters
10900 Walker Street
Cypress, CA 90630 (714)827-7600

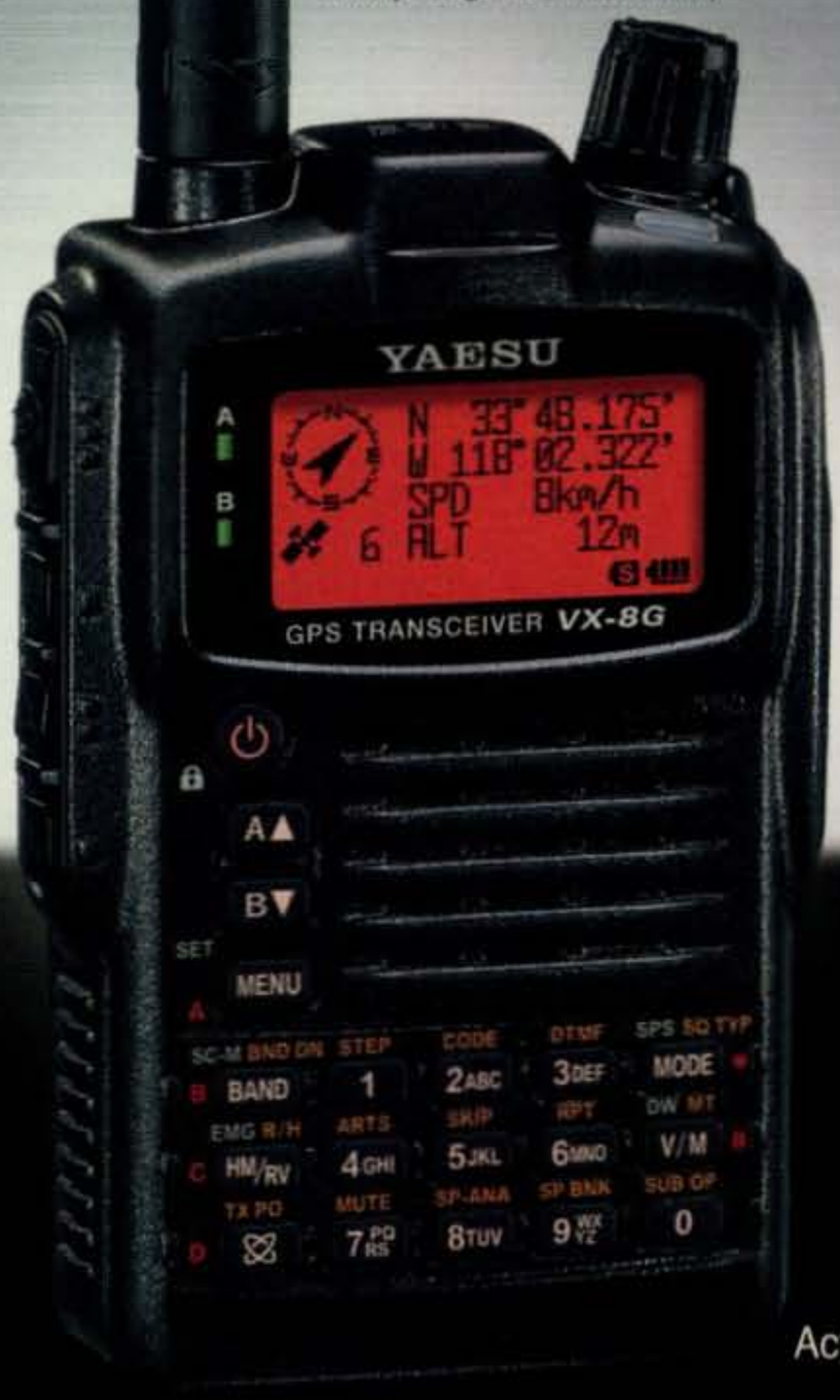
A TECHNOLOGY BREAKTHROUGH

New Advanced VX-8 Series GPS/APRS® Handheld Transceivers
Choose the Yaesu that meets your APRS® operating preferences in the field

50/144/(222)*/430 MHz
FM 5 W/AM 1W (50 MHz) Triple Band Handheld
VX-8DR * 222 MHz/1.5 W (USA version)
(7.4V 1,100 mAh Lithium Ion battery/FNB-101LI and battery charger/NC-86A included)

Actual Size

144/430 MHz
FM 5 W Dual Band Handheld
VX-8GR
(7.4V 1,100 mAh Lithium Ion battery/FNB-101LI and battery charger/NC-86A included)



Actual Size

VX-8DR NEW

All-in-one Prestigious Tri-band Transceiver
Bluetooth® for hands-free Operation with optional accessories
Waterproof/Submersible IPX 7 rated - 3 ft for 30 minutes

Optional GPS and antenna unit for GPS/APRS® operation

The optional GPS Antenna Unit FGPS-2 attached to the optional speaker Microphone MH-74A7A

Bluetooth®

Attached to the radio (microphone input) using the optional GPS Antenna Adapter CT-136

VX-8GR NEW

144/430 MHz Dual Band Transceiver with GPS unit included
Built-in GPS Antenna - Waterproof
Wide Band Receive for 108-999 MHz (Cellular blocked – US Version)

Supports APRS® communication by the Built-in Worldwide Standard AX.25 Data TNC

The VX-8 series radios are compatible with the world wide standard APRS® (Automatic Packet reporting System) using the GPS system to locate and exchange position information.

- SmartBeaconing™ Function
- Memories to list 50 stations
- Memories to store 30 APRS® messages
- DIGI-PATH routing indication function
- 8 DIGI-PATH routing settings
- GPS Compass Display - "Heading Up" or "North Up"
- APRS® Symbol Icon pre-set function
- Clearly displayed APRS® Beacon Messages
- Selective Message Received indicated by Flashing LED

APRS® is a registered trademark of Bob Bruninga WB4APR. SmartBeaconing™ from HamHUD Nichetronix

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

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

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

Vertex Standard US Headquarters
10900 Walker Street Cypress, CA 90630 (714) 827-7600

– a CQ editorial

BY RICH MOSESON,* W2VU

Could RF Be GOOD for Your Health?

Two interesting medical studies crossed my desk in the week after I returned from the Dayton Hamvention®, and both of them got me thinking about something I'd noticed while at Dayton. The first was reported in my local newspaper with the headline, "Study is inconclusive on cell phones, cancer." The second, reported by *Science Daily*, said new evidence suggests that caffeine may slow the progress of Alzheimer's Disease and other types of dementia.

The cell phone study, the largest ever undertaken to date, was conducted by the International Agency for Research on Cancer, a part of the United Nations' World Health Organization. As with every other study on supposed health risks from radio frequency (RF) radiation, this one was unable to establish that cell phones cause cancer. In fact, one part of the study suggested that brain cancer rates were lower among cell phone users than the general population, but the researchers dismissed that finding as being based on "implausible values of reported use."

This brings up two questions: (1) If one set of data is "implausible," then how reliable is the rest? (2) What if that dismissal reflects researcher bias more than an anomaly in the data? In other words, what if the data are actually correct? True, that would go against the widely-held assumption that RF exposure is bad for you, but the purpose of a scientific study is to objectively test such assumptions rather than to try to either confirm or refute them.

Take, for example, the second study. For years, we've heard that caffeine is bad for you and that intake should be limited. Now the *Journal of Alzheimer's Disease* reports on a study conducted in Portugal which suggests that caffeine may actually provide protection against cognitive decline associated with Alzheimer's Disease. Then there's chocolate. Bad for you, right? Well, except that current research is showing that some amount of chocolate, especially dark chocolate, eaten regularly, may actually have health *benefits.*

So … what if the widely-held assumption about the health effects of RF is wrong (like the previously widely-held assumptions about caffeine and chocolate)? What if the researchers are approaching their studies from the wrong angle? I'd like to suggest a study on the potential *positive health effects* of long-term exposure to RF energy!

Look around at your next club meeting or hamfest. How many hams do you see who have had many years of exposure to RF energy and who remain active and involved well into their 80s and even 90s? How many hams do you know with Alzheimer's Disease? There are some, to be sure, but I'm willing to bet that the percentage is significantly lower than in the general population, even though we have a large number of older people in our population.

I started thinking about this at Dayton, where author Walt Maxwell, W2DU, spent several hours at the CQ booth signing copies of his newly-published book, *Reflections III*, in which he completely revised and updated *Reflections II* and added about 100 pages of new text. Walt is 91 years old and sharper mentally than I've ever been.

Walt's fellow *CQ* book author, Jerry Sevick, W2MFI (SK), was likewise fully "with it" and active on the air until just before his passing late last year at age 90. As we went to press, we learned that *CQ* contributor, propagation authority, and University of California at Berkeley Professor Emeritus of Physics Bob Brown, NM7M, who has an article in this issue ("Over Coffee and Cognac," page 18), had also become a Silent Key, on May 23, at age 87. While Bob developed physical limitations, his mind was sharp as a tack until the end. We at *CQ* will miss him and his insatiable curiosity.

Nonagenarian Walt Maxwell, W2DU, autographing books at the 2010 Dayton Hamvention®. Could long-term exposure to RF energy have health-enhancing *effects? (Rachel Moseson photo)*

I'm sure your own club or circle of ham radio acquaintances is similarly populated with a fair number of people who are well on in years and perhaps physically limited, but still mentally sharp and active on the air. Is it possible that decades of RF exposure have somehow given these people *added* longevity and perhaps some sort of protection against ailments such as Alzheimer's Disease?

Of course, the greater likelihood is that the continued mental acuity of so many hams is more closely linked to the fact that so many of us are insatiably curious, never stop learning, and keep our brains active. It is well established that brain health, like physical health, is best maintained and enhanced through regular exercise. But that does not account for the fact that a very large number of hams live well into their 80s and 90s. Is the percentage greater than the general population? If so, what accounts for it? It would make an interesting study.

Dayton Musings

Dayton itself was its usual three days of semi-organized chaos. A couple of us were observing that the Hamvention® is somewhat like ham radio itself—no matter how hectic and disorganized it may appear to the observer, somehow or other it always works. It's not always clear how or why it works, but it does. This year, it seemed that attendance was up a little over last year, which in turn was up a little over the previous year. Most of the vendors we talked to reported higher sales, some significantly so. Without getting overly optimistic, it appears that both the overall economy and the ham radio economy may have turned the corner and begun to recover. We certainly hope it lasts! My thanks to our columnists, award managers, and contest directors who helped out at the CQ booth. And congratulations again to CQ Publisher Dick Ross, K2MGA, who was honored in front of his peers at the CQ industry reception with the Hamvention's 2010 Special Achievement Award in recognition of his 50 years of leadership of the ham radio hobby and industry.

73, W2VU

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

hy-gain® ROTATORS

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

HAM-IV

HAM-IV
$649.95

The most popular rotator in the world! For medium communications arrays up to 15 square feet wind load area. *New* 5-second brake delay! *New* Test/Calibrate function. *New* low temperature grease permits normal operation down to -30 degrees F. *New* alloy ring gear gives extra strength up to 100,000 PSI for maximum reliability. *New* indicator potentiometer. *New* ferrite beads reduce RF susceptibility. *New* Cinch plug plus 8-pin plug at control box. Dual 98 ball bearing race for load bearing strength and electric locking steel wedge brake prevents wind induced antenna movement. North or South center of rotation scale on meter, low voltage control, max mast size of 2 1/16 inches.

HAM IV and HAM V Rotator Specifications	
Wind Load capacity (inside tower)	15 square feet
Wind Load (w/mast adapter)	**7.5 square feet**
Turning Power	800 in.-lbs.
Brake Power	**5000 in.-lbs.**
Brake Construction	Electric Wedge
Bearing Assembly	**dual race/96 ball bearings**
Mounting Hardware	Clamp plate/steel U-bolts
Control Cable Conductors	**8**
Shipping Weight	26 lbs.
Effective Moment (in tower)	**2800 ft.-lbs.**

TAILTWISTER SERIES II

T-2X
$799.95

T-2XD
$1229.95
with DCU-1

For large medium antenna arrays up to 20 sq. ft. wind load. Available with *DCU-1 Pathfinder* digital control (T2XD) or standard analog control box (T2X) with *new* 5-second brake delay and *new* Test/Calibrate function. Low temperature grease, alloy ring gear, indicator potentiometer, ferrite beads on potentiometer wires, *new* weatherproof AMP connectors plus 8-pin plug at control box, triple bearing race with 138 ball bearings for large load bearing strength, electric locking steel wedge brake, North or South center of rotation scale on meter, low voltage control, 2 1/16 inch max. mast.

TAILTWISTER Rotator Specifications	
Wind load capacity (inside tower)	20 square feet
Wind Load (w/ mast adapter)	**10 square feet**
Turning Power	1000 in.-lbs.
Brake Power	**9000** in.-lbs.
Brake Construction	Electric Wedge
Bearing Assembly	**Triple race/138 ball brngs**
Mounting Hardware	Clamp plate/steel U-bolts
Control Cable Conductors	**8**
Shipping Weight	31 lbs.
Effective Moment (in tower)	**3400 ft.-lbs.**

CD-45II

CD-45II
$449.95

For antenna arrays up to 8.5 sq. feet mounted inside tower or 5 sq. ft. with mast adapter. Low temperature grease good to -30 F degrees. *New* Test/Calibrate function. Bell rotator design gives total weather protection, dual 58 ball bearing race gives proven support. Die-cast ring gear, stamped steel gear drive, heavy duty, trouble free gear train, North center scale, lighted directional indicator, 8-pin plug/socket on control unit, snap-action control switches, low voltage control, safe operation, takes maximum mast size to 2 1/16 inches. MSLD light duty lower mast support included.

CD-45II Rotator Specifications	
Wind load capacity (inside tower)	8.5 square feet
Wind Load (w/ mast adapter)	**5.0 square feet**
Turning Power	600 in.-lbs.
Brake Power	**800 in.-lbs.**
Brake Construction	Disc Brake
Bearing Assembly	**Dual race/48 ball brings**
Mounting Hardware	Clamp plate/steel U-bolts
Control Cable Conductors	**8**
Shipping Weight	22 lbs.
Effective Moment (in tower)	**1200 ft.-lbs.**

HAM-V

HAM-V
$1099.95
with DCU-1

For medium antenna arrays up to 15 square feet wind load area. Similar to the HAM IV, but includes *DCU-1 Pathfinder* digital control unit with gas plasma display. Provides automatic operation of brake and rotor, compatible with many logging/contest programs, 6 presets for beam headings, 1 degree accuracy, auto 8-second brake delay, 360 degree choice for center location, *more!*

ROTATOR OPTIONS

MSHD, $109.95. Heavy duty mast support for T2X, HAM-IV and HAM-V.
MSLD, $49.95. Light duty mast support for CD-45II and AR-40.
TSP-1, $34.95. Lower spacer plate for HAM-IV and HAM-V.

AR-40

AR-40
$349.95

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

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

HDR-300A

HDR-300A
$1499.95

King-sized antenna arrays up to 25 sq.ft. wind load area. Control cable connector, *new* hardened stainless steel output shaft, *new* North or South centered calibration, *new* ferrite beads on potentiometer wires reduce RF susceptibility, *new* longer output shaft keyway adds reliability. Heavy-duty self-centering steel clamp and hardware. Display accurate to 1°. Machined steel output.

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

Digital Automatic Controller

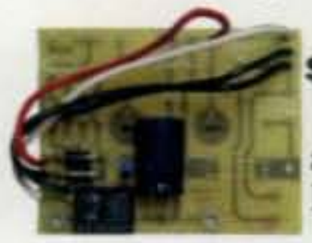
DCU-1
$749.95

Automatically controls T2X, HAM-IV, V rotators. 6 presets for favorite headings, 1° accuracy, 8-sec. brake delay, choice for center of rotation, crisp *plasma* display. Computer controlled with many logging/contest programs.

AR-35 Rotator/Controller

AR-35
$89.95

For UHF, VHF, 6-Meter, TV/FM antennas. Includes automatic controller, rotator, mounting clamps, mounting hardware. 110 VAC. One Year Warranty.



RBD-5
$29.95

NEW! Automatic Rotator Brake Delay

Provides automatic 5-second brake delay -- insures your rotator is fully stopped before brake is engaged. Prevents accidentally engaging brake while rotator is moving. Use with HAM II, III, IV, V, T2Xs. Easy-to-install. Includes pre-assembled PCB, hardware.

http://www.hy-gain.com
Nearest Dealer, Free catalog, To Order . . .
800-973-6572
Voice: 662-323-9538 **Fax:** 662-323-6551

hy-gain®

Antennas, Rotators & Towers
308 Industrial Park Road,Starkville, MS 39759, USA

announcements

• These Special Event stations are scheduled for July:

N1M, operated by the Algonquin ARC in celebration of the 350th anniversary of Marlborough, Massachusetts; 0000Z–2300Z June 25 through July 5 on 7.250, 14.250 MHz, ±QRM. QSL: AARC, P.O. Box 258, Marlborough, MA 01752. Information: <http://www.n1em.org>.

W3ACH, from the 24th annual Chambersfest Festival in Chambersburg, Pennsylvania; 1330–1930Z July 17 on 7.260 or 14.260 MHz SSB ±QRM and on the CVARC 147.120 repeater and other local machines. All stations who work W3ACH will get a certificate following confirmation of your address via on-line callsign databases. Each station sends a paper QSL card (not electronic) to add to our card collection. Send QSL card and contact details to Chambersfest, Cumberland Valley Amateur Radio Club, P.O. Box 121, Chambersburg, PA 17201. Information: <http://www.chambersburg.org> and CVARC: <http://www.w3ach.org>.

W3C, commemorating 100 years of power boat racing in Cambridge, Maryland, 1400Z–2100Z daily July 22–25 on 7.200, 14.250, 21.250, and 28.350 MHz. QSL to E.A.R.S., P.O. Box 311, Easton, MD 21601. Information: <http://www.k3emd.com>.

K4F, from the 39th Annual Smithville Fiddlers' Jamboree & Crafts Festival in Smithville, Tennessee; DeKalb County Amateur Radio Club; 1400–2200Z July 3 on 28.425, 21.335, 14.280, 7.275 MHz. For QSL send SASE to: Wm. Freddy Curtis, KC4GUG, 288 Dogwood Circle, Smithville, TN 37166-2712. Information: <http://www.dcarc.drivehq.com/>.

W9ZL, from EAA Airventure 2010, Oshkosh, Wisconsin; Fox Cities Amateur Radio Club; 1300–2100Z July 28 to August 1 on 14.250, 7.270, 52.550, 146.520 MHz. Certificate: FCARC Airventure 2010, P.O. Box 2346, Appleton, WI 54912. Information: <http://www.FCARC.us>.

• The following hamfests are slated for July and early Aug.:

July 3, **Eastern Pennsylvania ARRL Section Convention & Firecracker Hamfest**, Marysville Lion's Park, Marysville, Pennsylvania. Information: e-mail: <hracw3uu@gmail.com>; phone 717-896-0256; <www.w3uu.org>. Special event station **W3W** in operation at the convention. (Talk-in 146.16/76, PL 100)

July 9–11, **International Hamfest**, CCC Lodge, U.S. side of the International Peace Garden, access from Denseith, North Dakota or south from Boissevain, Manitoba, Canada. Contact: Richard Holder, VE4QK, e-mail: <ve4qk@mts.net>, phone 204-268-1702. (Talk-in 146.52, 146.64 simplex)

July 10, **South Milwaukee Amateur Radio Club's 42nd Annual Swapfest**, American Legion Post No. 434, Oak Creek, Wisconsin. Information and map at: <http://www.qsl.net/wa9txe> and click on SWAPFEST. (Talk-in 146.52 MHz)

July 10, **2010 TARS Hamfest**, Doyle Convention Center, Texas City, Texas; Tidelands Amateur Radio Society. Information and registration: <http://www.tidelands.org>. (Exams)

July 17, **Pike's Peak Radio Amateur Association Ham Radio Megafest**, Lewis-Palmer High School, Monument, Colorado. Information: <http://www.ppraa.org>. (Exams 10 AM)

July 17, **Pioneer Amateur Radio Club's 13th Annual Flea Market**, St. Charles Parish Center, North Bend, Nebraska. Contact Rich Mehaffey, KBØARZ, phone 402-652-3410; e-mail: <4randjme@ futuretk.com>; <http://www.k0jfn.com>.

July 18, **Mid-Atlantic ARC's Valley Forge Hamfest**, Kimberton Fire Co. Fairgrounds, Kimberton, Pennsylvania. Contact Mike Pilotti, KF3CD, e-mail: <kf3cd@arrl.net>; phone 610-696-5040; <http://www.marc-radio.org>. (Talk in 145.13- and 147.06+ CTCSS 131.8)

July 18, **Maryland Hamfest & Computerfest**, Howard County Fairgrounds, off I-70 at Rt. 32. Baltimore Radio Amateur Television Society. Information: e-mail: <brats@bratsatv,org>, phone 410-461-1212, <http://www.bratsatv.org>. (Exams 9 AM, preregistration required)

July 23–24, **35th Annual Ham Holiday 2010**, Biltmore Hotel/Conference Center, Oklahoma City, Oklahoma. Central Oklahoma Radio Amateurs. Information: <www.HamHoliday.org>. (Talk-in 146.85+, PL 141.3; exams)

August 1, **60th Annual Berryville Hamfest**, Clarke County Ruritan Fairgrounds, Berryville, Virginia. Shenandoah Valley ARC. Information: Teresa Orndorff, phone 540-533-0961, <hamfest2010@concast.net>. (Talk-in 146.82–; exams 12 noon)

A publication of

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

CQ Amateur Radio (ISSN 0007-893X) Volume 66, No. 7. Published monthly by CQ Communications, Inc., 25 Newbridge Road., Hicksville, NY 11801, Telephone 516-681-2922. E-mail: cq@cq-amateur-radio.com. Fax 516-681-2926. Web site: www.cq-amateur-radio.com. Periodicals Postage Paid at Hicksville, NY 11801 and at additional mailing offices. Subscription prices (all in U.S. dollars): Domestic-one year $36.95, two years $66.95, three years $96.95; Canada/Mexico-one year $49.95, two years $92.95, three years $135.95: Foreign Air Post-one year $61.95, two years $116.95, three years $171.95. U.S. Government Agencies: Subscriptions to CQ are available to agencies of the United States government including military services, only on a cash with order basis. Requests for quotations, bids, contracts., etc. will be refused and will not be returned or processed. Entire contents copyrighted 2010 by CQ Communications, Inc. CQ does not assume responsibility for unsolicited manuscripts. Allow six weeks for change of address.

Printed in the U.S.A.
POSTMASTER: Send address changes to:
CQ Amateur Radio, 25 Newbridge Rd., Hicksville, NY 11801

Array Solutions Your Source for Outstanding Radio Products

What's New at Array? Check It Out...

New!

OptiBeam OB2-80s
2 Element Yagi

The smallest most efficient 2el 80m Yagi in the world, the OB2-80s (boom length 33 feet, element length 58 feet).

Enjoy band coverage from 3.500 - 3.570 and from 3.680 -3.830 with the high power capable, relay controlled, 4 position OptiBeam 80m multi switch system.

Also available is the **OB1-80s**, rotatable dipole with the same frequency coverage, 58' long.

REX Rig Expert Ukraine

Rig Expert Antenna Analyzers

New!

Hofi® Coaxial Arrestors

Introducing arrestors that meet or exceed all US standards for lightning arrestors. SO239, Type N, 7/16 DIN; bulkhead or standard mount. Mil-Spec units are available. German Engineering from Hofi-Technik, GmbH & Company.

New!

New!

ACOM Model 1011 Linear Amplifier

Uses a pair of economical 4CX250B final tubes and provides 700w output on 160 through 10m. Just granted FCC certification, delivery beginning in July.

Other Quality Products from Array Solutions...

ACOM	Phillystran, Inc.	Tokyo Hy-Power	RigExpert	Prosistel Rotators
Sales and Service for Amplifiers and Accessories	Official Worldwide Phillystran Distributor	Sales and Factory Authorized Service	Analyzers and Interfaces	Strongest Rotators on the Market

www.arraysolutions.com

Phone 214-954-7140
sales@arraysolutions.com
Fax 214-954-7142

Array Solutions' products are in use at top DX and Contest stations worldwide as well as commercial and governmental installations. We provide RF solutions to the DoD, FEMA, Emcomm, UN, WFO, FAA and the State Dept. for products and installation of antennas systems, antenna selection, filtering, switching and grounding. We also offer RF engineering and PE consulting services.

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

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

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

SAN DIEGO, CA
5375 Kearny Villa Rd., 92123
(858) 560-4900
(877) 520-9623
Jose, XE2SJB, Mgr.
Hwy. 163 & Claremont Mesa
sandiego@hamradio.com

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

NEW CASTLE, DE
(Near Philadelphia)
1509 N. Dupont Hwy., 19720
(302) 322-7092
(800) 644-4476
Chuck, N1UC, Mgr.
RT.13 1/4 mi., So. I-295
delaware@hamradio.com

PORTLAND, OR
11705 S.W. Pacific Hwy.
97223
(503) 598-0555
(800) 765-4267
Leon, W7AD, Mgr.
Tigard-99W exit
from Hwy. 5 & 217
portland@hamradio.com

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

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

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

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

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

12 STORE BUYING POWER

HAM RADIO OUTLET

WORLDWIDE DISTRIBUTION

D-STAR EXPERTS!

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

DISCOVER THE POWER OF DSP WITH ICOM!

IC-706MKIIG All Mode Transceiver

• Proven performance • 160-10M*/6M/2M/70CM • All mode w/DSP • HF/6M @ 100W, 2M @ 50W, 440 MHz @ 20W • CTCSS encode/decode w/tone scan • Auto repeater • 107 alphanumeric memories

IC-7000 All Mode Transceiver

• 160-10M/6M/2M/70CM • 2x DSP • Digital IF filters • Digital voice recorder • 2.5" color TFT display

IC-718 HF Transceiver

• 160-10M* @ 100W • 12V operation • Simple to use • CW Keyer Built-in • One touch band switching • Direct frequency input • VOX Built-in • Band stacking register • IF shift • 101 memories

IC-V8000 2M Mobile Transceiver

• 75 watts • Dynamic Memory Scan (DMS) • CTCSS/DCS encode/decode w/tone scan • Weather alert • Weather channel scan • 200 alphanumeric memories

IC-2820H Dual Band FM Transceiver

• D-STAR & GPS upgradeable 2M/70CM • 50/15/5W RF output levels • RX: 118-173.995, 375-549.995, 810-999.99 MHz** • Analog/digital voice with GPS (optional UT-123) • 500 alphanumeric memories

IC-7800 All Mode Transceiver

• 160-6M @ 200W • Four 32 bit IF-DSPs+ 24 bit AD/DA converters • Two completely independent receivers • +40dBm 3rd order intercept point

IC-7600 All Mode Transceiver

• 100W HF/6m Transceiver, gen cov. receiver • Dual DSP 32 bit • Three roofing filters- 3, 6, 15khz • 5.8 in WQVGA TFT display • Hi-res real time spectrum scope

IC-7700 Transceiver. The Contester's Rig

• HF + 6m operation • +40dBm ultra high intercept point • IF DSP, user defined filters • 200W output power full duty cycle • Digital voice recorder

IC-2200H 2M Mobile Transceiver

• 65W Output • Optional D-STAR format digital operation & NEMA compatible GPS interface • CTCSS/DTCS encode/decode w/tone scan • 207 alphanumeric memories • Weather alert

IC-92AD Analog + Digital Dual Bander

• 2M/70CM @ 5W • Wide-band RX 495 kHz - 999.9 MHz** • 1304 alphanumeric memories • Dualwatch capability • IPX7 Submersible*** • Optional GPS speaker Mic HM-175GPS

IC-PW1 HF + 6M Amplifier

• 1.8-24MHz + 6M Amp • 1KW amplifier • 100% duty cycle • Compact body • Detachable controller • Automatic antenna tuner

IC-7200 HF Transceiver

• 160-10M • 100W • Simple & tough with IF DSP • AGC Loop Management • Digital IF Filter • Digital Twin PBT • Digital Noise Reduction • Digital Noise Blanker • USB Port for PC Control

IC-880H 3rd Generation D-STAR Dual Bander

• D-STAR DV mode operation • DR (D-STAR repeator) mode • Free software download • GPS A mode for easy D-PRS operation • One touch reply button (DV mode) • Wideband receiver

IC-V80 2M Handheld Transceiver New!

• 2M @ 5.5W • Loud BTL audio output • Military rugged • Classic 2M operation

IC-80AD 3G D-STAR Dual Bander

• D-STAR DV mode operation • DR (D-STAR repeater) mode • Free software download • GPS A mode for easy D-PRS operation

IC-T70A Dual Band FM Transceiver New!

2M + 70CM • 5/2.5/0.5 Watts Output Power • RX: 136-174, 400-479 MHz** • 302 Alphanumeric Memory Channels • 700mW Loud Audio • Ni-MH 7.2V/1400mAh Battery

ICOM

*Except 60M Band. **Frequency coverage may vary. Refer to owner's manual for exact specs. ***Tested to survive after being under 1m of water for 30 minutes. *AA Alkaline batteries not included, radio comes with a AA alkaline battery tray. *For shock and vibration. ✦Instant winter savings, gift certificates and Icom mail-in rebates expires 6/30/10. Contact HRO for details. CQ JUNE 2010. The Icom logo is a registered trademark of Icom Inc. 50218

CALL TOLL FREE

Phone Hours: 9:30 AM – 5:30 PM
Store Hours: 10:00 AM – 5:30 PM Closed Sun.

Toll free, incl. Hawaii, Alaska, Canada; call routed to nearest store; all HRO 800-lines can assist you; if the first line you call is busy, you may call another.

West.....800-854-6046
Mountain.....800-444-9476
Southeast.....800-444-7927
Mid-Atlantic...800-444-4799
Northeast.....800-644-4476
New England..800-444-0047

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

#1 in Customer Service

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

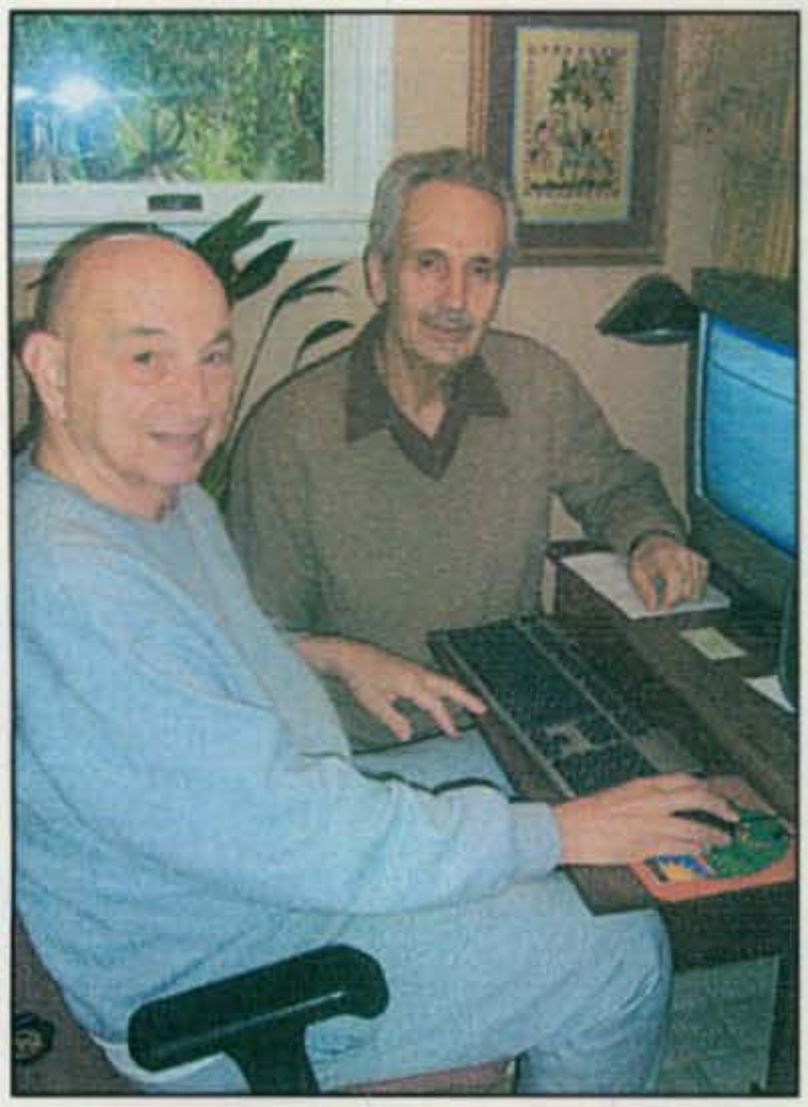


Photo A– Ed, W4YO (left), and Klaus, DL7JK, met on 10 meters in 1961 and have been friends ever since (Photos courtesy of the author)

One of the "talking points" for promoting ham radio is that "it can lead to lifelong friendships with people in faraway places." W4YO's story of his nearly half-century friendship with DL7JK is proof that it's a lot more than just a "talking point."

Radio Friends for 49 Years
The Story of DL7JK and W4YO

BY EDMUN B. RICHMOND,* W4YO

On February 2, 1961, I had my first QSO with Klaus, DL7JK, of Berlin, Germany. After the exchange of the usual first-contact info about signal strength, QTH, name, rig, and weather, I told him of my upcoming trip to his city the following fall to spend an academic year at the Free University of Berlin. Our first contact was on 10 meters phone and lasted for 34 minutes (see QSL card, photo B). The next day, we ran into each other again on 10 meters and picked up where we had left off the day before. Since that time, these contacts have continued in one form or another to the present day, be they QSOs, letters, e-mails, telephone calls, Christmas cards, or in-person visits.

Back in the 1960s, my call was K4HNA.[1] Klaus has kept his same callsign throughout his amateur life. Between the two of us, we have over a hundred years of amateur activity and experience. Klaus was first licensed in 1960, and I received my license in 1956. After our initial QSOs, many letters and photos traveled across the Atlantic between us for several months. (In those days, an airmail letter from here cost 25 cents and took only four days to reach its destination.) I learned that Klaus (photo C) lived with his parents in an area of West Berlin called Heiligensee, in the northern reaches of that divided city. I, also, lived at home with my parents in Lakeland, Florida (photo D). Klaus was an electronics engineer at Siemens Company, and I was attending Florida Southern College, finishing up a degree in foreign languages, including German. It followed, then, that all our communications were in that language.


German Amateur Radio Station

DL7JK DOK: D 04

To Radio: K4HNA

Confirming our CW/ Phone QSO of 2.2.61 at 16[15] MEZ

QRG: 28 Mc Your sigs RST: 58

My rig is: Tx: Eco-PA inpt: 40 watts

Rx: 1 v 2 Ant: Dipol

Remarks: Besten Dank für das nette QSO, lieber Ed

Vy 73 es cuagn

pse tnx QSL

Op: Klaus

Op: Klaus-Dieter Schitthelm QTH: Berlin-Heiligensee Gambiner Weg 9

Photo B– QSL card from Ed's collection from his first QSO with Klaus, 49 years ago.

A Hot Flash in the Cold War

All through that year of 1961, Berlin was in the news as a hotbed of international intrigue and Cold War tensions. It was rumored that Berlin counted more spies and secret agents than any other city in the world. My parents questioned whether my stay in Berlin might better be postponed indefinitely, under the circumstances of the times. Construction of the infamous Berlin Wall was begun on August 13th, and the Cold War started to heat up when Russian tanks and American tanks amassed at the East-West border crossing at Checkpoint Charlie and faced off, eyeball to eyeball, gun to gun.[2] An extremely tense situation was developing. Luckily, no one got nervous and nobody's trigger finger got itchy. Undaunted, I arrived at Berlin's Tempelhof Airport in late October. Klaus was there to meet me, and after our many radio contacts and letters in the months that had passed, we finally shook hands and greeted each other, face to face.

Since Klaus was a native of this mega-city, he accompanied me to my future home in the Free University's Student Village, located in the southwest of the city, and went to help me register with the local police. He also extended an invi-

**11 Ocean Marsh Lane, Harbor Island, SC 29920*
e-mail: <w4yo@arrl.net>

Photo C– Klaus at his station in his parents' home in West Berlin in 1961.

Photo D– Ed, then K4HNA, in the early '60s at his station in his parents' home in Florida.

tation from his family to spend the upcoming weekend with them at their home in Heiligensee. Over the next few weeks, he introduced me to several other Berliner hams, both on the air and in person. I soon made application for a German ham license with the *Oberpostdirektion* (Berlin licensing authority). Based on my American ticket, I was granted a license and received the call, DJØGB, but I had no radio equipment. If I wanted to operate, I could go to Klaus's station, but that was an arduous hour-and-a-half trip by multiple transfers on bus and subway lines. Berlin sure is a whoppingly huge place!

A few of my new-found ham friends got together and lent me some equipment to get on the air from my room in the dormitory. Klaus supplied a surplus WW II German Panzer tank transmitter that ran 10 watts on 28 megs. A fellow American and commercial pilot living in Berlin DJØFY (I don't remember his name) lent me a National receiver, and I was ready to go with my German call. We mounted a groundplane on top of my building (photo E) and fed the coax through the window frame. At first, I was on 10 meters, and worked mostly groundwave into all areas of Berlin and environs, but conditions were poor with little skip, so Klaus realigned the transmitter to 15 meters.

I kept the knowledge of my ham activity rather limited to a few people. However, the word somehow got out in the Student Village that I had a radio station in my room. One day a pretty German girl approached me and started a conversation which soon led to questions about my station, and would I invite her over to see it. I had been forewarned about such things, and I managed to fend off any further queries. Later in the day, after I had told one of my German student-friends about the encounter, he told me that this particular girl was well known to have "contacts" in East Berlin.[3] Klaus and I talked throughout my year in Berlin, either on the air or by telephone, and I went to visit him and his family several times.

Back to the States...

I returned to Lakeland in the fall of 1962, and in early 1963 was offered a teaching position at Miami Beach Senior High School, where I taught German and Spanish until 1967. During that period, I returned to Berlin in 1965 and visited Klaus and his new wife, Uta, along with Klaus's family. I was also in West Germany for a teachers' conference in 1967 and went back to Berlin for a weekend, but Klaus had been transferred to Siemens in Munich, to where he and Uta had moved the year before. Although I had missed them while I was in Berlin, Klaus and I managed several QSOs over that period.

In 1968 and beyond, Klaus' professional activities at Siemens took him overseas to some far-flung outposts. He traveled to, and was able to obtain callsigns in, Trucial States[4] (MP4TCP), in 1968; in Dahomey, now Benin (TY7ABM) in 1972 and 1975; Sri Lanka (4S7JK) in 1976; and Mongolia (JT1FCQ) from 1999–2002 for short visits each time. I didn't work him or hear him in any of those locations due to a combination of poor conditions and heavy workloads.

In the meantime, I had studied for and received my master's degree and was teaching German at West Liberty State College, in West Virginia. I also changed my call to W8KGR. Although I worked many of the hams I knew in Berlin, I never worked Klaus with my W8 call. I left that job in 1972 and went back to graduate school to work on my doctorate, and for the next three years had only limited time for hamming. In 1975, I received my doctorate, obtained a position at Georgia Institute of Technology in Atlanta, and was issued a new callsign, W4MGN.[5] I spent five summers between 1979 and 1983 doing linguistic research in Africa, and heard from my friend only once during that period.

Klaus shows up in my log on September 27, 1980, from his home in Grafing, near Munich. We QSY'd way up above 29 megahertz, where no one would bother us, and spent the next three hours catching up! We met like that for several weeks, until our professional responsibilities curtailed those contacts. Klaus and Uta now had two teenage daughters, the elder of whom asked me to send her a "Kiss" album, which, of course, I did.

Let Ten-Tec show you "the light".

It's right here!

OMNI VII

...and over here!

ORION II

...here too!

ALL NEW JUPITER

Ham radio doesn't have to be complicated.

Confused setting up your rig for transmitting on SSB or digital modes?
You need "the light". The ALC light on a Ten-Tec radio tells you when you've adjusted the rig for the correct output. To learn how easy "the light" is, visit us on the web.

www.tentec.com/thelight ←

BUY FACTORY DIRECT

TEN-TEC

The SSB Company

1185 Dolly Parton Pkwy., Sevierville, TN 37862. Sales: (800) 833-7373, sales@tentec.com. Office: (865) 453-7172. FAX: (865) 428-4483.
Service: (865) 428-0364, service@tentec.com M-F 8 AM -5 PM (Eastern Time). We accept Visa, MC, American Express and Discover.

Photo E– Klaus and Ed install a groundplane antenna at the Berlin Free University's student housing complex in late 1961.

Photo F– Ed (left), his dog, Amigo, and Klaus seated at Ed's station on February 2, 2010, the 49th anniversary of their first QSO.

Our next meeting was of the eyeball variety, because I had gotten married in December 1992. In the summer of 1993, we took a belated honeymoon to Europe. Among other places, we went to see Klaus and Uta, and spent an afternoon at their home. Klaus was not on the air very much because of a "passive phase" in his radio interest.

Klaus worked at Siemens for 40 years, the last ten years of which were in the field of *industrial metrology,* the science of calibration of weights and measures, and retired in 1996. Although Klaus is "officially" retired, one year later he started to freelance in the field of metrology, and traveled far and wide for the *Physikalisch-Technische Bundesanstalt* (German National Institute for Metrology). He is still active in this area. During this time, we stayed in contact by e-mail. The next time we met on the air was on December 22, 2000 on 10 meters after Klaus had returned from Mongolia. In the interim, I had changed my call again, this time to W4YO. Conditions were not very good, but nevertheless we were able to talk for about a half-hour.

Fast-Forward: 2010

Most of our contacts since that time have been either e-mails or letters. Even if we didn't write during the year, we always sent each other Christmas cards. However, one day in early January of this year, I received an email from Klaus informing me that he was flying to Los Angeles to lead a metrology workshop at the end of the month. He wondered if we would be available if he were to detour to Harbor Island on his way back to Germany and spend some time with us. We wholeheartedly agreed and invited him to visit us.

I picked up Klaus at the Savannah Airport on Sunday, January 31st, and he stayed until he flew home on February 3rd. This meant that, by chance, we were together on February 2nd, the date of our initial QSO way back in 1961.[6] We spent our time by touring some local sights, visiting, and operating my station (photo F). Klaus even made some contacts as W4/DL7JK. We reminisced while enjoying a few 807s[7] and viewed some of my old photographs from Berlin in 1961–62, which Klaus had never seen.

Unfortunately, the weather on February 2nd was not the best. Although it rained the whole day and the temperature was only in the upper forties, our spirits were sky-high. My wife, Toni, who incidentally is WA4XYL, prepared a super menu while Klaus was here. What a fantastic way for two old friends to spend the 49th anniversary of a friendship that began with an amateur radio contact ... absolutely magic!

Notes

1. Also see my article, "Recollections of a DXer: 50 Years in the Pile-ups and Still Counting," *CQ* magazine, Vol. 62, No.1 (January 2006), pp. 13–17.

2. For a description of this confrontation, see *Battle Ground Berlin: CIA vs. KGB in the Cold War,* David E. Murphy, Sergei A. Kondrashev, and George Bailey, New Haven: Yale University Press, 1997, pp. 391 ff.

3. I'm sure it wasn't the radio that really interested her. She probably wanted my passport. She was known to approach unwitting foreign students and ask them to lend her their passports which ostensibly would be used to bring escaping East Berliners across the border into West Berlin. She would promise that the passports would then be returned. The truth was that those passports were never returned; they were doctored and used by East German agents to cross into the West.

4. Now called the United Arab Emirates and prefixed as A6.

5. My above article explains the changes and dates of my callsigns over the years.

6. For the preparation of this article, I went back and researched my logs and QSLs in order to line up the proper sequence of our QSO dates and personal events. It was in this process that I rediscovered the date of our first QSO, and noticed the similarity of the date of Klaus's intended visit over the 2nd of February, 2010. It was, indeed, an unbelievable coincidence.

7. For you newcomers, 807s are transmitting tubes and, in this usage, ham slang for bottles of beer.

TIMEWAVE TECHNOLOGY INC.

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

HamLinkBT-BTH+™

Wireless Headset Adapter & USB Rig Control

- Audio, VOX & PTT!
- Bluetooth® wireless technology
- USB Rig Control
- Fixed & Mobile operation
- Use your favorite rig control program
- Great for field day
- Operate from your easy chair
- Use any cell phone headset

Use a standard cellphone Bluetooth® headset to keep your hands free for driving and operating.

Kill the Noise with the ANC-4 and DSP-599zx!

■ **DSP-599zx Audio Signal Processor***
Noise Reduction & filtering for Audio, CW & data

■ **ANC-4 Antenna Noise Canceller**
Kill noise before it gets to your receiver!

Optimize Your Antenna with the Field-Proven AntennaSmith™

Patented - portable - battery powered
Check Antennas and Transmission Lines

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

TZ-900 AntennaSmith™

Antenna Impedance Analyzer -

- Graphic display - full color in bright sunlight!
- Stand-alone operation - no computer required
- Before & After color graphic overlays - instant comparison
- Handheld - take it to the antenna - measure where it counts!
- Store complete sweeps in permanent memory - download to your PC via USB when it's convenient
- Hours of portable operation, fast recharging
- Complete with software, charger, coax adapters and more!

25th Aniversary Edition of the Legendary PK-232/USB!

■ **PK-232/USB Multimode Data Controller***
Sound card interface, USB, Pactor, RTTY, Packet & more!
100,000 sold - All-time top selling data controller!

■ **DSP-232+ Multimode Data Controller***
Sound card interface, USB, Pactor, 1200/9600 Packet

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

HamLink™ USB Remote Control & Audio

■ **HamLinkUSB™ Rig Control Plus**
Logic Level plus PTT

■ **U232™ RS-232-to-USB Adapter**
Universal Conversion Module
Replaces PCB-mount DB-9 & DB-25

■ **HLUSB-RS232x2 USB to RS-232 Dual Port**
Adapter Cable with 1 USB to 2 RS-232 DB9

■ **HamLinkUSB™ Audio Adapter**
USB Sound Card Interface
No software drivers! Just plug it in.

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

Timewave Technology Inc.
1025 Selby Ave., Suite 101
St. Paul, MN 55104 USA

www.timewave.com
sales@timewave.com

651-489-5080
Fax 651-489-5066

As solar Cycle 24 finally begins its climb, contributor Bob Brown, NM7M, reminisces on the granddaddy of all solar cycles (so far), a half century ago, and how it helped shape his career and his contributions to our hobby.

Over Coffee and Cognac

BY ROBERT R. BROWN,* NM7M

It was nice of you to come by today. It gets sort of lonely with only a TV for company. I'm lucky it doesn't talk back. Anyway, being bed-ridden 24/7, I really miss being on the air.[1] However, I gather it's been pretty dull with solar minimum. Fifty years ago it was wild and crazy, "working the world with 5 watts and a wet noodle!" That's when we learned how "radio really works."...

Looking Back to 1956

I was teaching in New Mexico when it all began, with the solar flare of February 23 in 1956. We learned about it on TV from no less a person than the Royal Astronomer of Great Britain, Sir Thomas Gold. All his reports of weird atmospheric phenomena and radio events told me that it was a "Big Deal." I knew enough physics to know the real "action" had to be at high altitudes in polar latitudes. However, I was stuck at mountain altitudes and low latitude, clearly a change in employment was called for if I was going to get in the game.

Therefore, I prepared a research proposal as well as my resumé and made the rounds in circles with deeper pockets than where I was at the time. It didn't take long. My alma mater, UC Berkeley, had a position open because of an impending retirement and offered it to me. The pay was better, but I had to pay for moving. They offered to support my research, so with my wife and year-old twins, I headed for Berkeley and research in the high latitudes.

The first year was spent teaching a course on atomic physics, gathering a small group (a programmer and good technician), and I started building payloads for July 1959 in Alaska. We built a cosmic-ray detector with a counter telescope for vertical cosmic rays, a gamma-ray counter, and an omni-directional detector. All that had to be under 12 pounds to keep the FAA happy. We hoped that such a small scheme would give a good sample of what was up there, whether quiet or active. When done, we flew Pan Am to Fairbanks, descended on the Geophysical Institute at College, and set up shop on an open field between it and the USGS (United States Geological Survey) magnetic observatory. We needed "running room" to launch balloon trains over 100 ft. long. It was a perfect setup, in every direction.

Ballooning in Alaska

No sooner had we checked out a couple of payloads and had the telemetry station in good order that word came from the Geographical Institute: "Fly now; the sun is flaring." We took a quick look at the data, were convinced, and got a payload in the air ASAP. Listening to the bloops and bleeps of the telemetry, we knew our rig was in a big radiation event. It was much higher in intensity than the earlier '56 event, because our rig was only a few mlllibars below the top of the atmosphere, sampling primary flare particles.

The sun kept flaring, and we had a balloon in the air continuously. We were there to collect data; serious analysis could wait until things calmed down. However, we did take a peek at each of the channels to see how they were working. All seemed OK, but the gamma channel looked odd. A couple of flights were exactly the same. We then concluded we were seeing nuclear gamma rays at low altitudes due to excited states from (p, n) reactions induced by the abundant flare radiation, just as Professor S. F. Singer had predicted earlier in a preprint widely circulated.

Not wanting the folks at Berkeley to think we'd be coming home empty-handed, I sent word home about the gamma rays for local consumption. A week later, I got a news clipping from the *San Francisco Chronicle* saying, "UC Prof Finds Dangerous Rays Over Alaska." That wasn't the end of it, as I got a letter from a Swiss Air pilot, enclosing a $5 bill and asking for more information about gamma rays at aircraft altitudes. All I could do was send him back his money and say there were more gamma rays where those came from. The aerospace industry got the idea, though, and installed, even used, radiation detectors on the Concordes.

We launched our last flight just when the sun flared for the third and final time. The ascent data yielded the counting rate versus atmospheric depth, easily converted to energy with a range-energy curve for air. With a modest correction for time variation, Bob Weir, my programmer, had all the makings for his dissertation when he got back. He had use the ionization profile from the balloon ascent to predict the ionospheric absorption of cosmic radio noise due to the solar protons.

After the February 23 event in 1956, the 1959 event would be "news." The same would be true of the gamma ray data, Ray d'Arcy's topic for analysis.

All in all, we did very well in our first effort. I hoped we could be half as lucky next time. We had to start new payloads while getting our results ready for publication. While my budget would be drained paying for new payloads, our work drew attention in Europe, and I was invited to present our results at the Swedish Academy's Symposium in September of 1960. Happily, the academy would publish the papers given at the symposium, sparing my budget of page charges.

*1105 27th St., Anacortes, WA 98221
e-mail: <nm7m@aol.com>

Universal Radio — Quality equipment since 1942.

ICOM

IC-718

The Icom IC-718 covers 160-10 meters. This radio is very easy to operate with one touch band switching, direct frequency input via keypad and auto tuning steps (senses the rate at which the tuning knob is turned). The receiver section features IF Shift, Adjustable Noise Blanker, RIT and formerly optional UT-106 DSP Automatic Notch/ Noise Reduction. These big rig features give you the necessary tools to fight interference. You get 99 regular memories and 2 scan edge memories. You can scan memories or scan between two specific frequencies. The transmit section features up to 100 watts of RF output and AF speech compression to increase average audio output. A Morse keyer is built-in. The meter shows output power, ALC and VSWR. The layout and basic operation of this rig is simple, but through a menu system you can adjust many operational parameters such as: peak-hold on the meter, mode lock out, RF/SQL knob behavior, key type, etc. The TS function allows you to vary the tuning increment to your liking. The easy-to-read, large LCD and front firing speaker make this rig ideal for either mobile or base installations. The IC-718 comes with the HM-36 hand mic and DC power cable. The IC-718 requires 12 VDC at 20 amps. 9.7 x 3.8 x 9.5 inches 8 Lbs 6 oz. The IC-718 is a great value, providing reliability and DSP at a 'used rig' price. With **free carry case** for a limited time. *Order #0718* **PLEASE CALL**

ICOM

ICOM IC-RX7 SUPER SPECIAL

IC-RX7

This is the best deal you will find on a wideband portable receiver!

Buy the Icom IC-RX7 at our special sale price of $199.95 *and* we will also include:

✔ ***FREE Race Scanning book***

This book will help you to be properly equipped and informed to enjoy the race from a new perspective.

✔ ***FREE* Go Bag**

Plenty of room for your IC-RX7, batteries, accessories, directories and more. With carry strap and open front pocket.

The **Icom IC-RX7-05** is a slim and smart wideband receiver that tunes from 150 kHz to 1300 MHz (less cellular and gaps) in these modes: AM, FM Narrow and FM wide. This allows you to hear regular AM and FM radio, longwave, international shortwave transmissions from around the world as well as local VHF/UHF communications. It features a large, backlit LCD plus a nice keypad. It is splash resistant to equivalent IPX4 standard. CTCSS and DTSC decode is built in. Other features include: keypad, RF Gain, Attenuator, Auto Power save and voice squelch control. A built-in ferrite rod antenna provides good medium wave reception. A total of 1650 scannable alphanumeric memories are available. Many sophisticated forms of scanning and searching are supported. Comes with: BP-244 Li-Ion battery, MB-112G belt clip and BC-149A charger. Regular price $299.95.

Icom IC-RX7, Go Bag & *Race Scanning* *Order #5007* **$199.95**

Price shown is after promotional discounts.

✔ ***FREE Carry Case***

The Tenba Leica carry case is a great way to safely transport your IC-718 or IC-R75 (shown). This case has a carry handle and is padded on all sides and has a zippered top. Included **FREE** with your IC-718 purchase from Universal Radio for a limited time!

✔ ***FREE Radio Go Bag***

This blue insulated bag is great for creating an HT ***Emergency Go Bag***. There is plenty of room for your radio, batteries, accessories, *Repeater Directory* and more. The top is zippered and it has a carry strap and open pocket on the front panel. Included **FREE** with ***any*** Icom HT purchase from Universal Radio for a limited time!

www.universal-radio.com

- **Visit our website or request our free 124 page catalog for other exciting Icom products.**

Universal Radio, Inc.
6830 Americana Pkwy.
Reynoldsburg, Ohio
43068-4113 U.S.A.

800 431-3939 Orders & Prices
614 866-4267 Information
614 866-2339 FAX Line
dx@universal-radio.com

universal radio inc.

Universal Radio is pleased to carry the complete Icom **amateur radio** and **receiver** equipment lines. The **IC-R9500** professional receiver is shown above. Visit the Universal website for full details on this state-of-the-art instrument.

- Visa
- MasterCard
- Discover
- JCB

- Prices and specs. are subject to change.
- Special offers are subject to change.
- Returns subject to a 15% restocking fee.
- Prices shown are after mfg. coupons.

The summer of 1960 went very well in Alaska, with a new, startling result—the observation of an intense burst of X-rays at the sudden commencement (SC) of a magnetic storm. This happened shortly after noon, and the first reaction was to attribute it to trapped electrons in the Van Allen Belt being "jiggled out" by a blast of plasma from the sun. Simple enough?

A complication developed, though. Hans Ortner of the Kiruna Observatory was in Alaska, and seeing the data, he fired off a Telex, asking what was observed across the polar cap at the same time. Back came the answer; the riometer showed the same thing. Now how does one explain that, 12 hours away in local time? Too tough. It could wait, and it was only one example, anyway.

Coffee and Cognac in Kiruna

My trip to the Swedish Symposium went well enough. As my first trip to Europe, a good part of the anxiety of going via a commercial airline wasn't there, as I went via MATS (Military Air Transport Service) both ways and had good sessions with GIs along the way—like I had never left home. The SAS flight north to Kiruna seemed cold and austere by comparison, but after a couple of hours, I was there, 100 km above the Arctic Circle.

There were about 40 people attending the symposium, with every ionospheric interest represented. The first day was spent getting acquainted, and then the symposium got under way. All in all, I made three brief presentations: summaries of Bob Weir's PCA (polar cap absorption) work, Ray d'Arcy's nuclear gamma rays during a PCA event, and my X-rays at an SC and similar activity across the polar cap. Bob Weir's topic drew the greatest interest, mine the least.

It took two days for all the papers to be given, and each night they had a banquet for the attendees. Being very "junior" in the field, I made the second round. I was lucky, as the persons to my right and left spoke perfect English. The one to my left was Dr. Alv Egeland, the Deputy Director of the Observatory, and when the meal was over, he rose and made the rounds, socializing with the guests.

To my right was Dr. John B. Gregory, a thin, lean English type often seen in New Zealand. John was an *F*-region specialist with close to 20 years in the field. To hear him talk, he'd seen about all the *F*-region had to offer. Anyway, he chose to pick on me and my presentation while we enjoyed a cup of coffee and a snifter of good French cognac.

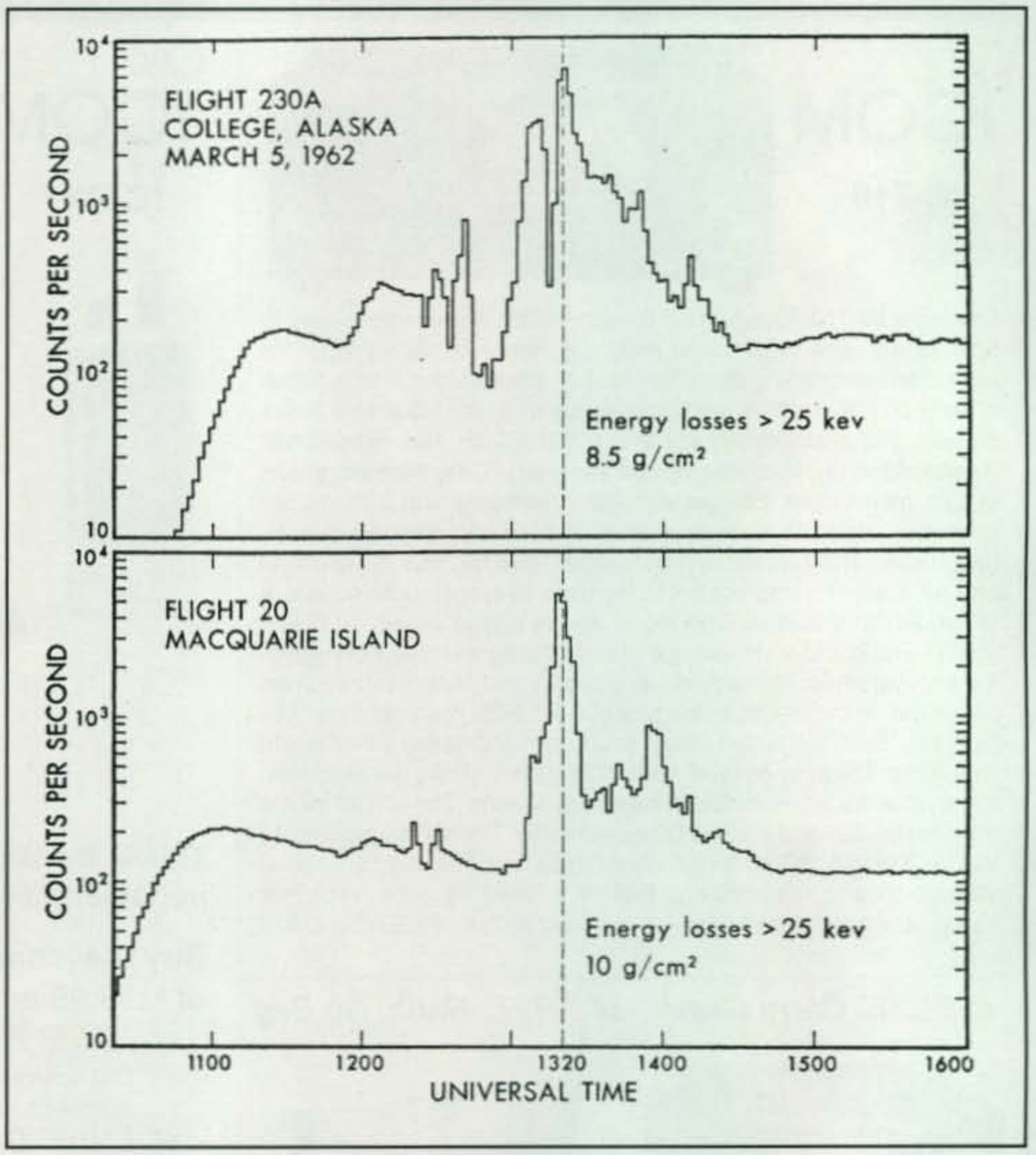


Fig. 1– What would we see when it came to the plot of X-rays from auroral electron fluxes sliding down the two ends of the field line? Would we see equal or unequal X-ray events over Alaska and Macquarie? These are the the two sets of data.

He didn't waste any time, saying my event was quite clear and spectacular, but told me not to have any high hopes of a repeat anytime soon. His argument was statistical, saying that SCs and sudden impulses are just too rare in the scheme of things. I had to agree, but he went on, suggesting a better approach would be looking for large auroral events between conjugate points.

I remembered something about the conjugate points of a lens from geometrical optics in my student days, but finding them in the ionosphere had me stumped until John explained it; they were points connected by magnetic-field lines. He said Harry Vestine of the Rand Corporation had published an extensive calculation in the JGR (*Journal of Geophysical Research*), mapping field lines. John even rattled off a number of conjugate pairs from Vestine's paper: Syowa in Antarctica and Reykjavik, Iceland; Byrd Station, Antarctica, and Quebec; Campbell Island, New Zealand and interior Alaska; and Macquarie Island, Australia, and Kotzebue, Alaska.

His argument was that flying balloons from conjugate points near auroral latitudes had a better chance of success, since aurora are so common and intense auroral events are not infrequent. I think his arguments are supported by "old wives tales" from history about aurora simultaneously appearing in both hemispheres; they had to be big events to attract that much attention.

Next Stop: Macquarie Island

I don't think it was the cognac, but I came away from that conversation with Macquarie Island and Alaska foremost in my mind. It would take a grant, someone to handle the Alaska end, and some

good activity to pull it off, but I was optimistic we could do it. When I got back to California, I learned that Kinsey Anderson, a veteran ballooner from Minnesota, would join us at Berkeley; that solved the problem of the Alaska end while my group would be on Macquarie Island.

There were troubling reports of the weather; talking to a veteran of Macquarie and Alaska, the weather on Macquarie was said to be "Aleutian"—wet and windy, hovering around freezing. Wind was the worry; it would require a good number of payloads to learn how to deal with the wind. If anyone could handle such problems, it was my tech, Wayne Hughes. He knew all the tricks of ballooning.

Thus, we were in "full court press" mode, building payloads for Macquarie, 20 of our usual 12-pound packages. Of those, 14 would be test flights for learning to deal with winds; any good X-ray data would be a bonus. The last six flights in March were for research, the best time for auroral activity according to statistics, and just before our ship returned to Melbourne, Australia.

I built, tested, and packed each payload, wrapping them in plastic for protection against moisture and surrounding them with 2 inches of "pig hair" as shock-absorbing material. They were put in individual crates for shipping south. The bad news was they got to Melbourne OK, but were stranded on the dock due to a stevedore strike. All were loaded by the time our party arrived, and we headed south on the *Thala Dan*, a round-bottomed polar vessel that would roll 30 degrees on a calm day.

We made it to Macquarie with ease and were greeted by 13 Aussies, about 100 huge elephant seals, and 1000 penguins. We were supposed to run a flight program in those surroundings? We set up quickly and launched a test balloon, just to show the Aussies it could be done, that we were not completely crazy.

We spent a week unpacking and making ready for the flights. That done, I climbed the Jacob's Ladder of the *Thala Dan* for the last time and headed back to Melbourne and Berkeley. There, I would have to "sweat it out" until March and the final push, when Kinsey Anderson's people would be flying detectors at their end of the field line and my troops flying at the other end.

Word from Macquarie was promising at first: Close to 90% of the launches were successful, with useful data obtained. Come March, it was another story. We were down to the last pair of flights. News reached me that both of the last flights got off OK. Then both flights reported X-ray activity in progress, and finally the news that both flights recorded high counting rates, peaking at about the same time. That spelled *success*, but we would have to get data in hand to realize the degree. I celebrated with a snifter of cognac and a quiet toast to John Gregory.

What would we see when it came to the plot of X-rays from auroral electron fluxes sliding down the two ends of the field line? Equal or unequal X-ray events over Alaska and Macquarie? If equal, the source had to be out there at 6 Re, at the mid-point of the field line, or farther back in the magnetotail. Look at the two sets of data in fig. 1.

By way of interpretation of the X-ray data, Vestine's calculations deal with the average configuration of the geomagnetic field. Actually, it has to be considered a dynamic, ever-changing system that varies with the pressure and spatial distribution of solar-wind impact. Thus, the ends of field lines will move and the connection between balloon sites will be imperfect, except at fleeting moments when the X-ray fluxes are essentially equal. This interpretation is supported by later conjugate flights between Iceland and Antarctica which show the time-coincidence of the Alaskan-Macquarie X-ray peaks to be the exception, not the rule.

This shows "how radio really works," particle fluxes giving the ionization that makes SSB on polar paths "flutter" or be heavily absorbed. This type of event has its origin in "an accelerator in the magnetotail," not any shock-driven process such as the SC event that started this.

Note

1. After this article was written, the author decided to do what he could to get back on the air and ordered a new station.

Roger, N4RR, racked up another decisive SOLP world win, this time from Bonaire as PJ4R.

Kari, OH2BP, escaping the frigid Finnish winter in his cozy SO2R RTTY shack.

Results of the 2010 CQ WPX RTTY Contest

BY ED MUNS,* WØYK

The 16th annual CQ WPX RTTY Contest once again broke the participation record with 2404 submitted logs, up 16% from last year's record number, which was up 11% from 2007. The number of different callsigns logged was similar to last year's number, around 16,000. However, there were over one-million QSOs, 27% more than in 2009 (compared to an 8% increase from 2007 to 2008) partially due to relatively good propagation conditions across 80–15 meters with a bit more activity on 10 meters than we've seen in recent years. The money band for QSO points was 40 meters. 170 countries appeared across all logs.

65% of the QSOs in the submitted logs were made by stations who made a total of less than 500 QSOs. 23% of the QSOs in the submitted logs were made with stations who did not submit a log and averaged less than 18 QSOs. There were 13,600 participants not listed in the line scores because they didn't submit logs, but who are always important to the success of the contest.

Participants interested in maximizing contacts, and perhaps new mults for various awards, were most rewarded on 20 and 15 meters. Those who sought to maximize their score made sure they got everything they could out of 40 meters where half the QSO rate nets the same points as on the high bands. Single ops, limited to 30 hours, had to strategically apply their time as one of their operating skills in this contest. For most, it was beneficial to be on 40 meters whenever it was open, supplementing with 80 meters, depending on rate and station capability. As the solar flux rises, the high bands will become more effective, despite their half-point value, and conversely the low bands will become less effective.

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

All of this resulted in **11** new world records and **35** new continental records. What a wonderful tribute to the continued growth of RTTY contesting with increasing numbers of both new and veteran contesters embracing the RTTY mode.

Single-Operator

Single-Operator, Low Power (SOL). PJ4R (N4RR) handily took top honors once again with 5.4M, but Roger did so from Bonaire this time, sticking to the obvious advantages of a northern South America location. Wanderley, PY2MNL, a very familiar LP RTTY competitor also in South America, activated ZX2B for second place worldwide with 4.6M. Third and fourth was a photo finish (4.31M each!) with Fabi, VA2UP, moving past Filipe, CT1ILT, based on a lower error rate. Fabi broke the North America record and Filipe broke the Europe record. Mark, WE4M, broke the USA record. Steve, ZC4LI, won Asia, approaching close to the Asia record. Heijo, DJ1JO, operating EA8OM won Africa, and Felimon, DV1JM, came out on top in Oceania.

Single-Operator, High Power (SOH). This category set a new world record and five new continental records. Thanks to above normal conditions from Aruba, P49X (WØYK) broke the world record for the fourth year running by 19% with a score of 13.3M. Serge, 5B/UTØU (UT5UDX), was second worldwide and blasted the Asia record by 46% with 9.1M. Mike, K4GMH, took third by raising the North America record 15% to 7.9M. Boyan, LZ8E (LZ2BE), was fourth and broke the European record by 39% with 7.5M, a record previously held by Serge, G6PZ (UT5UDX). Fifth was the top Africa entry, Mohamed, CN2R (CN8KD), a very familiar RTTY contester with 6.5M. Massimo, KH6ZM, lifted the Oceania record 21% to 3.3M.

Single-Operator, Single Band 3.5 MHz. Salvatore, IV3YIM, took first place in Low Power and set a new world record with 1.1M points. The next 19 places were in Europe! Dai, JF2IWL, raised the Asia record he set last year.

In the High Power category Sasa, 9A1CCY, broke the world record with 2.5M and the next 12 finishes were from Europe. The first Africa record was established by Jose, CT3BD, with 158K.

Single-Operator, Single Band 7 MHz. The first nine places in Low Power were from Europe, with Ari, IQ3UD (IW3SQY), breaking the world record with 2.2M points. Pasquale, YW5RY (YV5KAJ), broke the South America record with 799K, while Jim, KC4HW, broke the North America record with 692K. In Asia, Toshi, JE2UFF, more than doubled his own record to 524K. Fadly, YB8FL, raised the Oceania record more than four times to 194K. There were no Africa entries this year.

Miha, S53M (S51FB), raised the High Power world record by 19% to 4.7M, with Europe taking the first four places in 2010. Earl, AE5AA (N5ZM), broke the North America record with 2.7M and Gennadiy, UN1L, shattered the Asia record by 107% with 2.1M.

Single-Operator, Single Band 14 MHz. Joel, VX6WQ (VE6WQ), took first place Low Power and set a new Canada record with 1.1M points. Second place with a new USA record was Bill, AKØA, with 1.0M. Third (first in Europe) was Sally, G2YL, with 620K.

Antonio, CT3EN, broke the High Power world record by 18% with 3.4M points. Krzysztof, SN7Q, was second, topping Europe with 2.1M and Don, WW4R (N4ZZ), was fourth, setting a new USA record with 1.8M.

Single-Operator, Single Band 21 MHz. Jose, CT3KY, set a new Low Power world (and, Africa) record with 1.4M points. Peter, 6W2SC (HA3AUI), was second with 1.2M (and a very

THE NEW DB 11...
If it fits here, it will fit anywhere!
Truly small size with truly big performance.

StepIR™

INTRODUCING THE NEW DREAM BEAM 11
INTRODUCTORY PRICE - $2195.00

WEIGHT - 63 lbs (28.57kg)
WIND LOAD - 5.9 sqft (0.54sqm)
TURNING RADIUS - 10.5ft (3.20m)
FREQUENCY COVERAGE - 13.9Mhz - 54 Mhz
BOOM LENGTH - 11 ft (3.35m)
LONGEST ELEMENT - 19 ft (5.79m)
POWER RATING - 3KW continuous

BAND	ACTIVE ELEMENTS
20m	2
17m	3
15m	3
12m	3
10m	3
6m	3

Refer to our website for more technical specs and gain figures as they are released. The DB 11 will be available in the Fall of 2010. Get your name on the order list now.

BS7H
W6RGG on Scarborough reef DXpedition.

2112 116TH AVE NE SUITE 1-5, BELLEVUE WA, 98004 **WWW.STEPPIR.COM** TEL: (425) 453-1910 FAX: (425) 462-4415

Picture is an artistic rendition to show scale and portability of antenna.

low error rate), also breaking the prior world and Africa records. Third, with a new South America record, was Francesco, YV1FM, with 1M. Yuri, UP6P (UN6P), took fourth, setting a new Asia record with 797K. A new Europe record was set by Francisco, EA7ISH, with 659K, a new North America record was set by Gonzalo, XE3N, with 505K, and a new Oceania record was set by Nur, YB8EL, with 221K.

Ezequiel, LP2F (LU1FDU), broke the world and South America records in High Power with 2.2M points. Luis, CX4AAJ, took second with 1.7M. Nikola, 9A5W, took third with 1.5M, just short of his Europe record. Charles, KK5OQ, was fifth, with 1.1M, narrowly missing the North America record.

Single-Operator, Single Band 28 MHz. Masa, JF1RYU, set a new Low Power world and Asia record. Alisson, PU5AAD, took third with a new South America record, and Miro, YU2A, took fourth with a new Europe record.

Alexander, UAØSW, was first in High Power and Alex, RU6CQ, was second.

Multi-Operator

Multi-Operator Single-Transmitter (MS). The EE8E team (Juan, EA8CAC, Olli, EA4BQ [OHØXX], and Pekka, EA8AH [OH1RY]) operated the EA8AH station to smash the world record by 64% with 14.2M points. In second place was E73M (Boris, E73M, E73Y, E74A, and E74KC) with 8M. Sue, P41YL (AI6YL), took third with 7.9M and broke the South America record by 44% with hubby Carl, P49V (AI6V), who enjoyed sending "88" when she let him operate! In fourth, and breaking the Asia record by 34% with 7.4M points, was the RK9CWA team of Serge, UA9CGA, Mikhail, RW9CF, and Alex, RA9DF.

Multi-Operator Two-Transmitter (M2). 2009's winner and Europe record holder Z37M (Z31MM, Z32ID, Z35T, Z35X, Z36N, Z36W, and Roberto) broke that record by 31% with 12.0M points. *However,* 4O3A (Ranko, 4O3A, Dragon, 4O4A, Bore, 4O6Z, Acim, YU1YV, Simon, S51D, and Zlatko, Z30A) broke the Europe record by *57%* with 14.5M points and took first place this year. Third was captured by the RWØA team (RAØAM, RAØALM, RVØAU, RVØAUI, RWØAR, RVØAX, RUØAM, RUØAKB, RXØAE, RZØAT, and Daniil) with 9.3M and a new Asia record. OH6R (OH3CV, OH3FM, OH3MFP, OH3LQK, OH6MLC, OH6NMY, and KØSSU) was fourth with 8.9M. and EA8URL (EA8URL, EA8AXB, EA8AZM, EA8BEX, EA8BQM, EA8DP, EA8GL, EA8NL, EA8RY, EA8AKN) was fifth with 8.4M.

Multi-Operator Multi-Transmitter (MM). HG1S (HA1TJ, HA1DAC, HA1DAI, and HA1DAE) broke their own Europe record from last year by 38% with 14.5M points. LZ9W (LZ1ANA, LZ1FG, LZ1ZD, LZ2HM, LZ2UZ, LZ3FM, and YL Nesi) took second with 8.7M, and KA4RRU (KA4RRU, K3UI, N4DXS, and KI4ZKJ) was third with 6.7M. VE7UF (VA7FC,

2010 CQ WPX RTTY CONTEST TROPHY SPONSORS AND WINNERS

Single Operator High Power

World: Sponsored by ContestRank.com (in memory of SP9ERV). **Winner: P49X (Op: Ed Muns, WØYK)**
Africa: Sponsored by Andrei Stchislenok, EW1AR-NP3D (in Memory of EU1MM). **Winner: CN2R (Op: Mohamed Kharbouche, CN8KD)**
Asia: Sponsored by Tyler Stewart, K3MM. **Winner: 5B/UTØU (Op: Sergey Rebrov, UT5UDX)**
Europe: Sponsored by DL-DX RTTY Contest Group. **Winner: LZ8E (Op: Boyan Petkov, LZ2BE)**
N.A.: Jeff Demers, N1SNB. **Winner: Mike Sims, K4GMH**
Canada: Fabi Bertolotto, VA2UP. **Winner: VC2E (Op: Daniel Richer, VE2SB)**
USA: Sponsored by Glenn Vinson, W6OTC. **Winner: Tyler Stewart, K3MM**
7th Call Area (USA): Sponsored by Hank Lonberg, KR7X (in memory of Bob Wruble, W7GG). **Winner: Hank Lonberg, KR7X**

Single Operator Low Power

World: Sponsored by Mike Sims, K4GMH. **Winner: PJ4R (Op: Roger Hoffman, N4RR)**
Europe: Sponsored by Trey Garlough, N5KO. **Winner: Filipe Monteiro Lopes, CT1ILT**
N.A.: Sponsored by Wayne King, N2WK. **Winner: Fabi Bertolotto, VA2UP**
South America: Sponsored by Francisco "Siso" Hennessey, Jr, HK3W. **Winner: ZX2B (Op: Wanderley Ferreira Gomes, PY2MNL)**
Canada: Claude Duberger, VE2FK. **Winner: Robert Loranger, VE2AXO**
Japan: GOMAGARA Contest Club, JA6ZPR. **Winner: Masaki Okano, JH4UYB**
USA: Sponsored by Jim Reisert, AD1C. **Winner: Mark Sihlanick, WE4M**

Single Operator Single Band

3.5 MHz World High Power: Sponsored by Sue Cook, AI6YL/P40YL. **Winner: 9A1CCY (Op: Sasa Pokorni, 9A3NM)**
7 MHz World High Power: Sponsored by ContestRank.com (in memory of SP9EWO). **Winner: S53M (Op: Miha Habic, S51FB)**
7 MHz World Low Power: Sponsored by Don Reed, K2OGD. **Winner: IQ3UD (Op: Ari Udine, IW3SQY)**
14 MHz World High Power: Sponsored by Steve "Sid" Caesar, NH7C. **Winner: Antonio Duarte Costa Gomes, CT3EN**
14 MHz World Low Power: Sponsored by Kenny Young, AB4GG. **Winner: VX6WQ (Op: Joel Weiner, VE6WQ)**
21 MHz World High Power: Sponsored by Steve Jarrett, K4FJ. **Winner: LP2F (Op: Ezequiel Reinaldi, LU1FDU)**
21 MHz World Low Power: Sponsored by Doug Faunt, N6TQS. **Winner: Jose Duarte Sousa Goncalves, CT3KY**
28 MHz World High Power: Sponsored by Steve Hodgson, ZC4LI. **Winner: Alexander Ilyin, UAØSW**

Multi-Op Single Transmitter

World: Sponsored by Steve Merchant, K6AW. **Winner: EE8E (Ops: EA4QB [OHØXX], EA8AH [OH1RY], EA8CAC)**
Asia: Sponsored by CT3 Madeira Contest Team/CQ9K/CT9M. **Winner: RK9CWA (Ops: UA9CGA, RW9CF, RA9DF)**
Europe: Sponsored by Toomas Soomets, ES5RY. **Winner: E73M (Ops: E73M, E73Y, E74A, E74KC)**
N.A.: Sponsored by Whatcom Amateur Radio Society. **Winner: WW4LL (Ops: WW4LL, K4ZJ, K9MUG, NP3D)**

Multi-Op Two Transmitter

World: Sponsored by Nick Smith, W4GKM. Winner: 4O3A (Ops: 4O3A, 4O4A, 4O6Z, YU1YV, S51D, Z30A)
N.A.: Sponsored by Ed Muns, WØYK. **Winner: KF4QQY (Ops: KF4QQY, W4MYA)**
U.S.A.: Sponsored by CTRI Contest Group. **Winner: N2BJ/9 (Ops: N2BJ, K2PAC)**

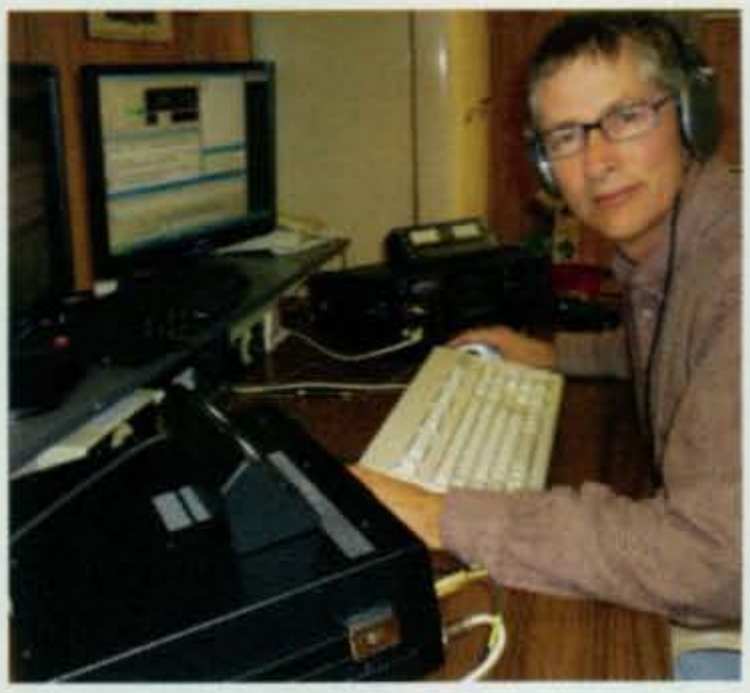
Multi-Op Multi-Transmitter

World: Sponsored by Abroham Neal Software by K3NC. **Winner: HG1S (Ops: HA1TJ, HA1DAC, HA1DAI, HA1DAE)**
N.A.: Sponsored by Fred Dennin, WW4LL. **Winner: KA4RRU (Ops: KA4RRU, K3UI, N4DXS, KI4ZKJ)**
Canada.: Sponsored by KA4RRU Contest Group. **Winner: VE7UF (Ops: VA7FC, VA7RN, VE7AX, VE7FO, VE7UF)**

Club Competition

World: Sponsored by Potomac Valley Radio Club. **Winner: Bavarian Contest Club**
N.A.: Sponsored by Northern California Contest Club. **Winner: Potomac Valley Radio Club**

Sergey, UR2QQ, supplied the only UR9 prefix to many stations with just 5 watts to an inverted-Vee antenna.



Daniel, VE2SB, operating as VC2E, pushed past VA3DX for a narrow win in Canada and is already planning for an even bigger effort in 2011!

VA7RN, VE7AX, VE7FO, and VE7UF) was fourth with 5.2M, and DL3VTA (DL3VTA, DL1DVE, and DF2CK) was fifth with 4.4M.

Club Competition

Once again the Bavarian Contest Club took top honors with over 59M points from 71 logs, which was also the highest number of club participants. Also a repeat, second place went to the Ukrainian Contest Club with 41M points and 38 logs. Third place was captured by the Potomac Valley Radio Club with 36M and 39 logs. The Rhein Ruhr DX Association was fourth with 34.0M and the Northern California Contest Club was fifth with 33.8M. Club competition is a fun way for clubs to get more stations on the air and increase participation in the contest.

When submitting a log for any CQ contest, be sure that the club name is exactly, character by character, the same as listed on the club name list at <www.cqww.com/clubnames.htm>. Do not abbreviate, add periods, include other information in parentheses, etc. A computer program

TOP SCORES

WORLD

SINGLE OPERATOR HIGH POWER ALL BAND

P49X (WØYK)	13,300,632
5B/UTØU (UT5UDX)	9,105,744
K4GMH	7,876,920
LZ8E (LZ2BE)	7,547,400
CN2R (CN8KD)	6,469,920
S5ØA (S5ØXX)	6,294,750
K3MM	6,158,748
RD3AF	5,348,200
EO5M (URØMC)	5,198,842
AA3B	5,167,272

28 MHZ

UAØSW	13,860
RU6CQ	12,012
IK3ASM	420

21 MHZ

LP2F (LU1FDU)	2,222,207
CX4AAJ	1,725,636
9A5W	1,515,220
UXØFF	1,208,832
KK5OQ	1,146,036
UW1M (UR5MW)	1,066,418
K4FJ	977,040
OH7MJU	821,328
WQ6O (N6ML)	763,758
RA3SI	608,300

14 MHZ

CT3EN	3,447,686
SN7Q	2,079,004
9A7R	1,987,925
WW4R (N4ZZ)	1,810,284
KK9A	1,696,442
US5I (US5IQ)	1,546,360
S59AKR (S52X)	1,538,537
WV6I (N6WM)	1,496,302
LN9Z (LB1G)	1,465,568
DR1ØTCC (DK3DM)	1,463,924

7 MHZ

S53M (S51FB)	4,715,540
I4IKW	4,258,738
HF4K (SP4K)	3,831,264
GM3SEK	2,763,834
AE5AA (N5ZM)	2,675,616
YT1VP	2,648,268
RL4R (RW4PL)	2,351,076
UN1L	2,133,330
K9OM/4	1,986,600
ES5RY	1,752,184

3.5 MHZ

9A1CCY (9A3NM)	2,486,304
I4AVG	2,007,880
EMØX (UT2XQ)	1,762,992
DL4MCF	1,530,780
OY3JE	1,269,884
IZØKBR	1,239,840
YU7AU	1,028,700
ES5GP	899,640
DJ3IW	800,808
SP6AXW	469,780

SINGLE OPERATOR LOW POWER ALL BAND

*PJ4R (N4RR)	5,412,550
*ZX2B (PY2MNL)	4,569,532
*VA2UP	4,134,200
*CT1ILT	4,130,634
*WE4M	3,325,880
*PJ2T (W8AV)	3,119,020
*E76C	2,848,230
*ZC4LI	2,758,800
*K9NR	2,288,387
*YT2T	2,245,698

28 MHZ

*JF1RYU	3,939
*JH6WHN	2,370
*PU5AAD	1,160
*YU2A	510
*F6IRG	72
*JI3FLA	33

21 MHZ

*CT3KY	1,372,624
*6W2SC	1,235,433
*YV1FM	1,037,848
*UP6P (UN6P)	797,406
*UN9GD	723,151
*EA7ISH	658,530
*RNØSS	652,632
*RVØAL	597,276
*XE3N	504,738
*RUØANW	504,612

14 MHZ

*VX6WQ (VE6WQ)	1,087,788
*AKØA	989,280
*G2YL	619,887
*HA7TM	586,592
*RV9CP	570,741
*W4LC	542,841
*WM5DX	471,090
*CT1EEK	413,118
*YU8NU	404,044
*EA4DB	377,865

7 MHZ

*IQ3UD (IW3SQY)	2,231,138
*E79D	1,571,570
*UR7TZ	1,303,736
*OK2RU	1,168,172
*EC5CSW	1,114,876
*IK5AMB	944,680
*EU1AZ	836,944
*MØVAA	818,244
*SP3VSE	806,474
*YW5RY (YV5KAJ)	798,984

3.5 MHZ

*IV3YIM	1,085,466
*EU8RZ	915,496
*IQ8RB/1 (IK1DFH)	644,328
*YU7YZ	617,382
*OM5TX	610,000
*SP4ØEIY	549,626
*UT5KO	502,680
*UZ2HZ	472,610
*YL2GQG	405,594
*USØGH	388,096

MULTI-OPERATOR SINGLE TRANSMITTER ALL BAND

EE8E	14,208,960
E73M	8,044,411
P41YL	7,904,256
RK9CWA	7,431,585
IZ1LBG	6,678,000
TM4P	5,973,708
DD1LD	5,712,470
YTØA	5,692,866
9A5D	5,396,653
SX1L	5,254,535

MULTI-OPERATOR TWO TRANSMITTER ALL BAND

4O3A	14,493,792
Z37M	12,047,140
RWØA	9,293,220
OH6R	8,923,150
EA8URL	8,419,428
DLØCS	7,709,998
LY2W	6,204,716
EF7R	5,907,094
KF4QQY	2,718,232
JA6ZPR	2,225,862

MULTI-OPERATOR MULTI-TRANSMITTER ALL BAND

HG1S	14,452,038
LZ9W	8,702,370
KA4RRU	6,617,322
VE7UF	5,221,755
DL3VTA	4,398,732
J38XX	142,428

UNITED STATES

SINGLE OPERATOR HIGH POWER ALL BAND

K4GMH	7,876,920
K3MM	6,158,748
AA3B	5,167,272
K1SFA (@K1TTT)	4,749,976
N2WK	4,412,529
K4RO	3,766,375
W3FV	3,617,046
W3MF	3,570,750
WB9Z	3,562,221
W4PK	3,474,838

21 MHZ

KK5OQ	1,146,036
K4FJ	977,040
WQ6O (N6ML)	763,758
W7ZR	376,336
KE9I	270,884
KK8X	218,290
N7BV	196,980
W8WEJ	27,040
W7MRC (NG7Z)	17,353
WK4Y	5,712

14 MHZ

WW4R (N4ZZ)	1,810,284
KK9A	1,696,442
WV6I (N6WM)	1,496,302
AA5AU	1,438,686
WO4O	1,160,460
KK7OO (KL7OO)	1,043,385
KZ7X	985,395
N7NM	730,800
NG6S (W4UAT)	574,892
K4SKB	151,840

7 MHZ

AE5AA (N5ZM)	2,675,616
K9OM/4	1,986,600
W1TY/2	1,343,626
K7WP	765,706
NM6K (K6AW)	627,216
AE1P	425,896
W4CU	390,724
AA4VV	313,196
WØBR/3	136,416
AI6O	62,040

3.5 MHZ

KØPK	146,610
K4WW	81,972
W6AEA/7	77,832
W7PP/8	72,628
N2EIK	33,276
N6MA/7	2,752

SINGLE OPERATOR LOW POWER ALL BAND

*WE4M	3,325,880
*K9NR	2,288,387
*N9CK	1,620,729
*NTØF	1,331,408
*NV2G (N2ZN)	1,162,974
*N4IG	1,135,464
*K8AJS	1,035,120
*N2FF	839,375
*K2DSL	817,430
*K7RE/Ø	813,093

21 MHZ

*K8IA/7	144,957
*NW1C	40,796
*KC8ZTJ	24,823
*KX7L	5,994
*N5UWY	5,700
*KFØIQ	3,680

14 MHZ

*AKØA	989,280
*W4LC	542,841
*WM5DX	471,090
*W1ZD/7	211,104
*KM6Z	199,584
*W9ILY	167,760
*N7DB	104,854
*N2ZAK	100,200
*KC1UX	74,909
*K4FPF	42,182

7 MHZ

*KC4HW	692,040
*AB1J	415,872
*KK1X	334,536
*K2PO/7 (K2PO/7)	275,850
*NN7SS (K6UFO)	177,408
*K2PAL	134,460
*N3TG/4	61,500
*KEØL	45,540
*WA7BME	8,000
*KM6I	6,160

3.5 MHZ

*W1CSM	2,916
*K7MH	1,998

MULTI-OPERATOR SINGLE TRANSMITTER ALL BAND

WW4LL	4,941,016
NAØCW	4,414,410
NC4CS	3,507,400
N4CW	2,654,334
KT1I	1,935,744
WY7SS	1,137,955
NR5M	1,005,648
WX5S/6	914,081
WX7P	776,662
KUØK	658,026

MULTI-OPERATOR TWO TRANSMITTER ALL BAND

KF4QQY	2,718,232
N2BJ/9	2,118,714
WØIW	1,820,880
NK7U	554,382

MULTI-OPERATOR MULTI-TRANSMITTER ALL BAND

KA4RRU	6,617,322

EUROPE

SINGLE OPERATOR HIGH POWER ALL BAND

LZ8E (LZ2BE)	7,547,400
S5ØA (S5ØXX)	6,294,750
RD3AF	5,348,200
EO5M (URØMC)	5,198,842
RA3CM	5,093,424
SQ8ØUM (SQ9UM)	4,793,256
UW8I (UT2IZ)	4,729,140
RG3K (UA3QDX)	4,035,339
YO9HP	3,979,212
LY9Y	3,925,884

28 MHZ

RU6CQ	12,012
IK3ASM	420

21 MHZ

9A5W	1,515,220
UXØFF	1,208,832
UW1M (UR5MW)	1,066,418
OH7MJU	821,328
RA3SI	608,300
UA6CE	592,074
YO2RR	380,952
EA1ACP	351,553
CT4NH	266,532
DL3BQA	247,234

14 MHZ

SN7Q	2,079,004
9A7R	1,987,925
US5I (US5IQ)	1,546,360
S59AKR (S52X)	1,538,537
LN9Z (LB1G)	1,465,568
DR1ØTCC (DK3DM)	1,463,924
IK6VXO	1,352,754
OK8YD	1,264,304
DF9ZP	1,246,278
OK3C (OK2ZC)	1,155,544

7 MHZ

S53M (S51FB)	4,715,540
I4IKW	4,258,738
HF4K (SP4K)	3,831,264
GM3SEK	2,763,834
YT1VP	2,648,268
RL4R (RW4PL)	2,351,076
ES5RY	1,752,184
AN1A (EA1AST)	1,691,670
IW1PNJ	1,445,598
DL6JZ	1,435,980

3.5 MHZ

9A1CCY (9A3NM)	2,486,304
I4AVG	2,007,880
EMØX (UT2XQ)	1,762,992
DL4MCF	1,530,780
OY3JE	1,269,884
IZØKBR	1,239,840
YU7AU	1,028,700
ES5GP	899,640
DJ3IW	800,808
SP6AXW	469,780

SINGLE OPERATOR LOW POWER ALL BAND

*CT1ILT	4,130,634
*E76C	2,848,230
*YT2T	2,245,698
*LZ9R (LZ3YY)	2,118,202
*SN2I (SP2EWQ)	2,103,232
*HA8BE	2,093,364
*IZ2FOS	2,025,540
*OE2GEN	2,021,760
*S56A	1,829,016
*GØMTN	1,794,121

28 MHZ

*YU2A	510
*F6IRG	72

21 MHZ

*EA7ISH	658,530
*UZ7HO	320,910
*YO3JF	315,792
*IKØEIE	256,794
*RA4WC	226,950
*YT2B	199,808
*MWØCRI	194,400
*G4ZOB	179,738
*DO6HMA	169,433
*DL1DTL	168,960

14 MHZ

*G2YL	619,887
*HA7TM	586,592
*CT1EEK	413,118
*YU8NU	404,044
*EA4DB	377,865
*G3YBY	356,697
*LZ2JA	350,910
*S51OE	337,900
*RN6HDX	316,316
*UA6BJY	308,660

7 MHZ

*IQ3UD (IW3SQY)	2,231,138
*E79D	1,571,570
*UR7TZ	1,303,736
*OK2RU	1,168,172
*EC5CSW	1,114,876
*IK5AMB	944,680
*EU1AZ	836,944
*MØVAA	818,244
*SP3VSE	806,474
*USØMM	768,812

3.5 MHZ

*IV3YIM	1,085,466
*EU8RZ	915,496
*IQ8RB/1 (IK1DFH)	644,328
*YU7YZ	617,382
*OM5TX	610,000
*SP4ØEIY	549,626
*UT5KO	502,680
*UZ2HZ	472,610
*YL2GQG	405,594
*USØGH	388,096

MULTI-OPERATOR SINGLE TRANSMITTER ALL BAND

E73M	8,044,411
IZ1LBG	6,678,000
TM4P	5,973,708
DD1LD	5,712,470
YTØA	5,692,866
9A5D	5,396,653
SX1L	5,254,535
DKØEE	5,039,615
OF5ØRR	4,673,378
OH3I	3,874,360

MULTI-OPERATOR TWO TRANSMITTER ALL BAND

4O3A	14,493,792
Z37M	12,047,140
OH6R	8,923,150
DLØCS	7,709,998
LY2W	6,204,716
EF7R	5,907,094
IK1TWC	1,842,880
IQ8MD	1,214,400
RF3T	1,034,990

MULTI-OPERATOR MULTI-TRANSMITTER ALL BAND

HG1S	14,452,038
LZ9W	8,702,370
DL3VTA	4,398,732

*Low power

CLUB COMPETITION

UNITED STATES

Club	# Entrants	Score
POTOMAC VALLEY RADIO CLUB	39	35,718,790
NORTHERN CALIFORNIA CONTEST CLUB	43	33,803,738
SOCIETY OF MIDWEST CONTESTERS	26	26,432,326
FRANKFORD RADIO CLUB	11	17,404,367
TENNESSEE CONTEST GROUP	24	16,290,745
YANKEE CLIPPER CONTEST CLUB	23	15,490,833
ALABAMA CONTEST GROUP	10	9,292,398
GRAND MESA CONTESTERS OF COLORADO	10	8,881,396
ROCHESTER (NY) DX ASSN	7	7,575,128
FLORIDA CONTEST GROUP	11	7,374,597
MINNESOTA WIRELESS ASSN	20	6,027,121
WILLAMETTE VALLEY DX CLUB	9	5,285,361
CENTRAL TEXAS DX AND CONTEST CLUB	7	4,692,494
CTRI CONTEST GROUP	7	4,482,227
MAD RIVER RADIO CLUB	8	3,877,614
ORDER OF BOILED OWLS OF NEW YORK	6	3,646,360
ARIZONA OUTLAWS CONTEST CLUB	17	3,637,528
SOUTH EAST CONTEST CLUB	8	3,377,246
BERGEN ARA	3	3,070,516
SOUTHERN CALIFORNIA CONTEST CLUB	8	2,192,372
LOUISIANA CONTEST CLUB	3	1,675,391
UTAH DX ASSOCIATION	5	1,597,762
WESTERN NEW YORK DX ASSOCIATION	3	1,499,401
WESTERN WASHINGTON DX CLUB	10	1,386,285
KANSAS CITY DX CLUB	4	1,140,540
SKYVIEW RADIO SOCIETY	3	1,057,531
SPOKANE DX ASSOCIATION	5	1,055,271
KENTUCKY CONTEST GROUP	5	829,220
HUDSON VALLEY CONTESTERS AND DXERS	3	637,091
DELAWARE LEHIGH AMATEUR RADIO CLUB	4	632,255
METRO DX CLUB	5	601,429
NORTH COAST CONTESTERS	3	561,520
PADUCAH AMATEUR RADIO ASSOCIATION	3	419,528
CAROLINA DX ASSOCIATION	3	151,356

DX

BAVARIAN CONTEST CLUB	71	59,021,480
UKRAINIAN CONTEST CLUB	38	41,277,364
RHEIN RUHR DX ASSOCIATION	55	34,017,983
SLOVENIA CONTEST CLUB	10	18,770,755
CONTEST CLUB FINLAND	8	15,703,811
URAL CONTEST GROUP	10	13,551,638
BLACK SEA CONTEST CLUB	27	12,600,778
CROATIAN CONTEST CLUB	9	12,162,763
BOSNIA AND HERZEGOVINA CONTEST CLUB	5	11,697,421
CONTEST CLUB ONTARIO	18	10,568,671
YU CONTEST CLUB	7	10,363,751
CONTEST GROUP DU QUEBEC	7	9,932,123
RUSSIAN CONTEST CLUB	7	9,766,394
LU CONTEST GROUP	11	8,714,837
YO DX CLUB	16	8,175,063
BRITISH COLUMBIA DX CLUB	6	7,776,871
KAUNAS UNIVERSITY OF TECHNOLOGY RADIO CLUB	4	7,534,508
GMDX GROUP	5	7,289,616
LATVIAN CONTEST CLUB	8	6,870,601
SOUTH URAL CONTEST CLUB	5	6,811,379
VYTAUTAS MAGNUS UNIVERSITY RADIO CLUB	3	6,676,759
DL-DX RTTY CONTEST GROUP	13	6,637,615
NONE	20	6,585,010
ARAUCARIA DX GROUP	7	6,205,430
CT3 MADEIRA CONTEST TEAM	3	4,978,292
YAROSLAVL CONTEST CLUB	3	4,518,853
BRITISH AMATEUR RADIO TELEDATA GROUP	3	4,394,807
599 CONTEST CLUB	6	4,362,543
WORLD WIDE YOUNG CONTESTERS	9	4,103,575
SP DX CLUB	14	3,745,558
RTTY CONTESTERS OF JAPAN	7	3,567,600
LA CONTEST CLUB	3	2,862,876
CHILTERN DX CLUB	4	2,619,745
BELARUS CONTEST CLUB	4	2,314,813
KKKK CONTEST CLUB KRASNODARSKOGO KRAYA	5	1,994,274
CSM BAIA MARE	4	1,719,399
CENTRAL SIBERIA DX CLUB	3	1,434,889
VU CONTEST GROUP	4	1,413,160
TEMIRTAU CONTEST CLUB	5	1,355,450
VK CONTEST CLUB	4	1,303,096
TULA RADIO CLUB	3	1,185,213
RIO DX GROUP	6	958,661
TOP OF EUROPE CONTESTERS	3	877,685
PLIS PLAI CONTEST TEAM	3	855,872
RU-QRP CLUB	3	695,595
HAROS RADIO CLUB	4	361,481
NORFOLK AMATEUR RADIO CLUB	4	347,594
CANTAREIRA DX GROUP	4	202,432
ALRS ST PETERSBURG	3	116,237
BEIJING SUNNY HAM CLUB	4	17,360

compares the club name in your log to the *CQ* contest club name list and ignores any that do not match exactly. It is easy to add a club name to the list following the instructions on the club names web page.

Log Checking

Besides being a lot of fun, contesting improves operating skills. Today's log-checking technology provides insightful analysis. Log Check Reports (LCRs) are available on request from <w0yk@cqwpxrtty.com> and describe the detail of all the errors found in your log. A theoretical but unrealistic goal is zero errors. For one thing, the other station can make a mistake, such as inadvertently erasing your QSO from his log, or sending a different serial number than what he recorded in his log. These errors *by the other station* will cause you to lose the QSO credit and perhaps incur a NIL (Not In Log) penalty. Another consideration is operat*ing* very slowly and meticulously to avoid errors, but actually decreasing the potential score by working less stations. With the current state of log checking, an error rate less than 4% is good, and if it is less than 2%, one might wonder if too much time is being spent on accuracy—e.g., long exchanges, repeats, etc. As a reference, this set of logs had an average of 1.5% NILs, 1.2% busted (incorrect) callsigns, and 1.8% busted serial numbers.

Some single operator logs had a seemingly high error rate in their LCR, but it was largely due to operating beyond the 30-hour limit. Some operated 36 hours, perhaps going by the CW/SSB WPX rules, while others just wanted to operate more. There is no penalty for this at all and it adds to contest activity. Any QSOs beyond 30 hours of operating (with breaks less than 60 minutes included as operating time) are used, actually needed, in the log checking, but not included in the score.

Results and Records

Thanks to Don, AA5AU, and Randy, K5ZD, there is now a searchable database (www.cqwpxrtty.com/score_db.htm) of all results in the history of CQ WPX RTTY, as well as CW and SSB. It is easy to initiate a quick search for all the operations by a given callsign, or see the historical results of a country or region. This, in turn, provides a very rich and accurate set of records (www.cqwpxrtty.com/records.htm) for all categories and any geographical area. The Statistics link brings up a graph of submitted logs since the beginning of CQ WPX, 16 years ago.

Also, for expanded QRM and a list of ops of multi stations for the 2010 contest, see the *CQ* website: <www.cq-amateur-radio.com>.

Acknowlegements

In addition to Don and Randy, there are many who work to support WPX RTTY. Mark, K6UFO, assists wherever help is needed, such as fixing logs for Cabrillo compliance, entering paper logs (there were three this year!), proofing rules and website edits, printing one-off certificates, etc. Gail, K2RED, at *CQ* edits and takes care of the details for this article. Mike, K4GMH, manages the sponsored plaque program, finding sponsors, collecting funds, producing the artwork, checking it twice (or more!), and ordering plaques all in a timely manner as soon as results are completed. Barry, W5GN, tackles the monumental job of producing hundreds of certificates and deciphering addresses in the Cabrillo headers to mail out all of them.

(Continued on page 106)

Announcing:

2010 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 tenth 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. 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 2010 "class" of the CQ Amateur Radio Hall of Fame:

Buchanan, Chester W3DZZ (SK). Developer of the W3DZZ triband trap beam, very popular with hams in the 1950s and '60s.

Cotner, Calvin K4JSI. Retired Director of Operations for Comsat World Systems, awarded the 2009 Aerospace Communications Award from the American Institute of Aeronautics and Astronautics for "technical and strategic leadership" in international cooperation in satellite communications from the earliest days to the present.

Dana, Forrest, 4AGR. Early Army Amateur Radio System member who (with Ralph Hollis, 4AFC) provided critical communications after the Caribbean hurricane of 1928, maintaining a link with the War Department and providing information that brought help from the Army and the Red Cross (2010 is the 85th anniversary of AARS, the predecessor of MARS).

Harlan, Gene WB9MMM (SK). Amateur radio magazine publisher. Editor/Publisher, *ATV Quarterly*; founder, *Cyberham* magazine.

Hart, George W1NJM. Former ARRL Communications Manager; chief developer of the National Traffic System.

Hollis, Ralph 4AFC. See entry above for Forrest Dana, 4AGR.

Ingram, Dave K4TWJ (SK). Prolific ham radio author; Contributing Editor, *CQ* magazine, 1982–2010, covering a wide variety of topics and transmitting through the printed word his unquenchable enthusiasm for ham radio.

Kangas, Paul W4LAA. Business news anchor on PBS for 30 years; known as the "Walter Cronkite of business news."

Patz, Dr. Arnall ex-WA3EVC. Ophthalmologist who discovered and eliminated a major cause of blindness in premature babies.

Schmidt, Howard W7HAS. First White House Cyber-security Coordinator. Previously served in Bush administration as Vice Chairman of the Critical Infrastructure Protection Board and a special adviser to the president for cyberspace security.

Schneider, Bill K2TT. Chairman, Defense Science Board, a federal advisory committee providing independent advice on scientific matters to the Secretary of Defense; Under Secretary of State for Security Assistance, Science, and Technology during the Reagan administration.

Smith Jim, VK9NS (SK). Noted DXer and DXpeditioner, author; longtime member of the CQ DX Hall of Fame.

CQ Contest Hall of Fame honoree Don Hill, AA5AU, is a major promoter of RTTY contesting and is known among contesters as "the RTTY Elmer."

Smith, George AA2EJ. Inventor of the CCD (charge-coupled device) sensor, which revolutionized digital imaging; co-recipient of the 2009 Nobel Prize in Physics

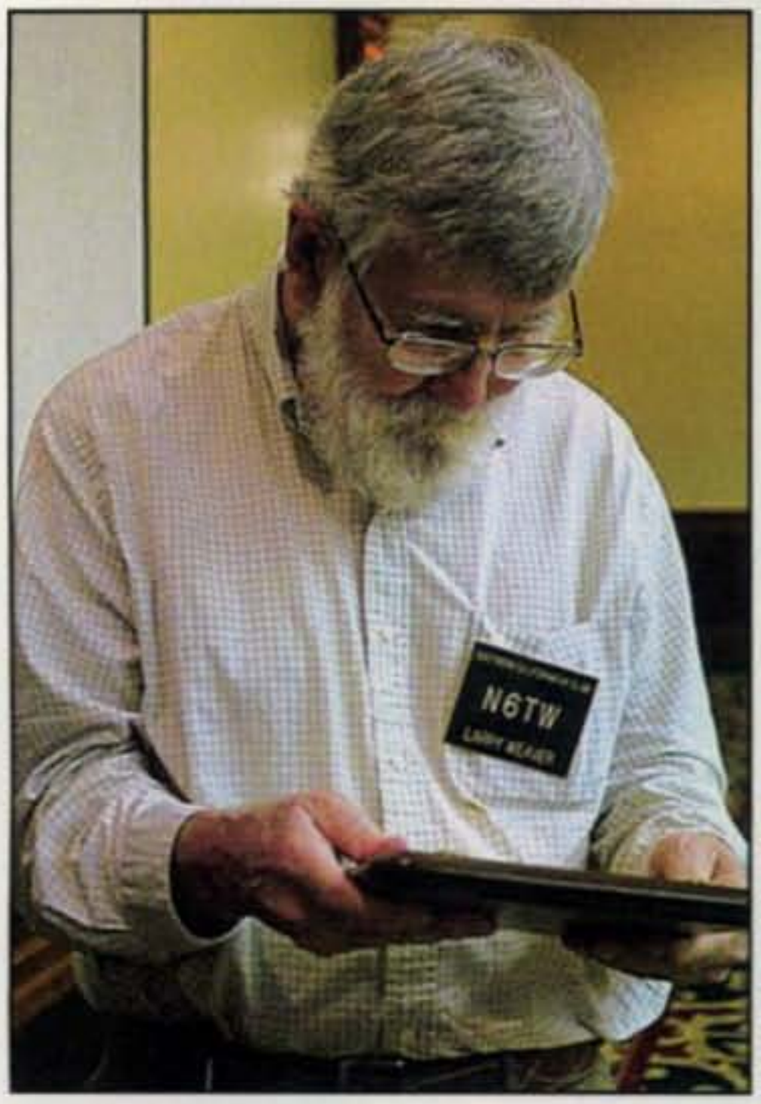
Stenning, Mark AA1AC. CEO, International Tennis Hall of Fame, Newport, Rhode Island

Wilson, George W4OYI (SK). ARRL President Emeritus; ARRL President 1992–95; led ARRL portion of effort to create vanity callsign program.

CQ Contest Hall of Fame

This year, we are inducting two new members into the CQ Contest Hall of Fame:

Don Hill, AA5AU. Don is a major promoter of RTTY (radioteletype) contesting, and is known among contesters as "the RTTY Elmer." His websites, <www.aa5au.com/rtty> and <www.rttycontesting.com>, provide tutorials on RTTY contesting as well as information on equipment, sound-card interfaces, and outstanding suggestions for contest macros. Don is a regular participant on contesting reflectors and presenter at hamfest RTTY forums, and is a regular contributor on RTTY contesting to the *National Contest Journal.*



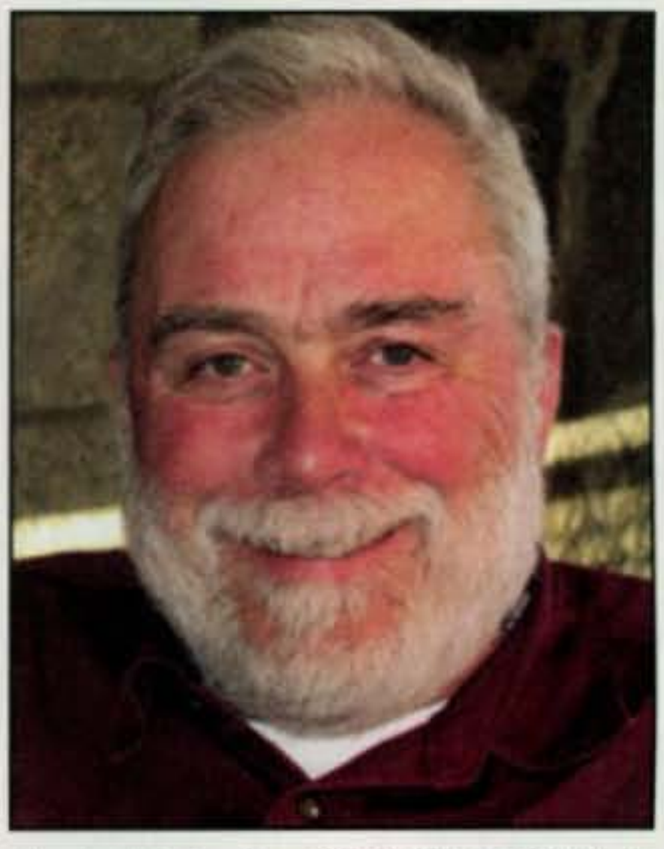
Larry Weaver, N6TW, also inducted in the CQ Contest Hall of Fame this year, has been a member of the CQ World-Wide Contest Committee since 1974, specializing in log-checking.

Larry Weaver, N6TW. Larry is one of those behind-the-scenes people who helps contests run smoothly. A member of the CQ World-Wide Contest Committee since 1974, Larry has specialized in log-checking, starting with paper logs in the '70s and developing some of the log-checking software used today in scoring the CQWW and other contests. Larry is also a past president of the Southern California DX Club and a past Chairman of the International DX Convention held each year in Visalia, California.

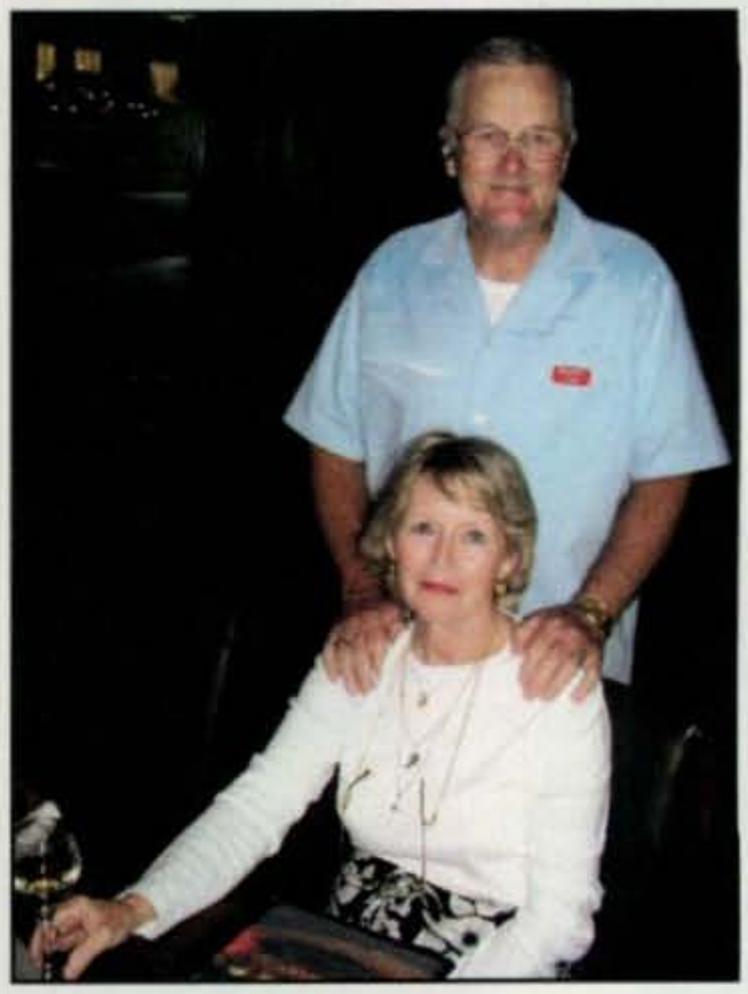
CQ DX Hall of Fame

We also welcome the two newest members of the CQ DX Hall of Fame:

Robert Locher, W9KNI. Bob is an accomplished DXer, with the highest total on the annual listing of CW entities on the DXCC Honor Roll, and has all DXCC entities on Mixed Mode, but he is best known as an author and mentor on effective DXing. His book *The Complete DXer* is the best-selling DX book ever published; and his newest book, *A Year of DX*, chronicles his effort to win the 2008 CQ DX Marathon, a year-long operating activity for which Bob provided the principal inspiration. (He placed second in 2008, but won his category in 2009.) Bob was also a member of the ARRL's DX Advisory Committee for six years and served as chairman for three years.



Inducted into the 2010 CQ DX Hall of Fame is Bob Locher, W9KNI, an accomplished DXer and well-known author and mentor on effective DXing.



Among the many accomplishments leading to Lynn Lamb, W4NL's induction in this year's CQ DX Hall of Fame is his being a leading proponent of improved DXing etiquette. He is shown here with his wife, Rosie, KA4S.

Lynn Lamb, W4NL. Lynn is a co-founder of SEDCO, the Southeastern DX and Contesting Organization, which sponsors an annual convention featuring well-known speakers on DXing and contesting. He also holds the A1 Operator award, is at the Top of the DXCC Honor Roll and is a board member of INDEXA. Lynn also writes regularly for *The DX Magazine* and has had articles published in a variety of amateur radio journals. He is a leading proponent of improved DXing etiquette.

Congratulations to our new inductees on their outstanding accomplishments!

WORLD CLASS PRODUCTS

THE NEW 10-30LP12 LOG PERIODIC

The 10-30LP12 removes the concern many share regarding the complexity and cost of other multiband antennas. This Higher Performance log periodic covers every frequency..instantly, from 10 to 30 MHz ! Just one feedline is all you need to access this flawless feature. From moments after it was installed at the M2 test facility on the West Coast, U.S.A., stations in Europe were contacted using just 100W on 17M, 15M and yes, 12M. This antenna is definitely a band opener.

M2 has done everything possible to keep cost down and performance up. This standard version is built for 80 plus MPH winds and years of no maintenance, trouble free performance. For those who don't need 30M, we designed it without the rear element and boom section. It becomes the 13-30LP11 with the same specifications, less 30M on a 37 ft. boom. An optional kit will add the boom and rear element if you need the full coverage.

THE NEW 6M-1000 SOLID STATE AMP

The 6M-1000 represents the culmination of many years of solid state amplifiers designed by Ken Holladay, K6HCP (KLM, Mirage and RF Concepts). Physical size and weight are the smallest ever for this kW amp. When combined with a lightweight switching power supply at 7-10 lbs, the 6M-1000 is perfect for DXpeditions and field day operations. It will make a great addition to any home station as well. EME and Meteor scatter usage are capable with either CW or the very popular JT6M & JT65A. Full power output of 1 kW for 50 seconds using JT65A should be possible for hours. Two temperature controlled whisper fans cool the finned heat sink and will cycle on and off as needed. If external preamp and relays are used, the amp supplies 12VDC and also sequences a N.O. key line.

COMING SOON 2 METER 1KW AMPLIFIER !

M2 Antenna Systems, Inc.
4402 N. Selland Ave.
Fresno, CA 93722
Phone (559) 432-8873 Fax (559) 432-3059
www.m2inc.com

M2 Offers many HF Logs, Monobanders and Multiband products.
Not to mention our full line of VHF, UHF and Microwave antennas.
We are your one stop shop for all of your High Quality Antenna needs.
Check us out on the web at www.m2inc.com

Announcing:

The 2010 CQ WW RTTY DX Contest

September 25–26, 2010

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, US 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 will 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., 599 14). US and VE stations also send US state or VE area (e.g., 599 05 MA, see V. 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 US "lower-48" 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 US 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:* Alaska (KL7) and Hawaii (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 US state/VE area multipliers. *Example:* 1000 QSO points × 100 multipliers (20 Zones + 40 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.

4. **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,** and **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 DX RTTY Contest may be sent to the Contest Director, Ed Muns, WØYK, PO 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 DX RTTY 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 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, 2010**. Logs received after the deadline may be listed in the results but will be ineligible for any award.

Yaesu's newest handheld represents a breakthrough in HT technology, with 4-band operation, hands-free Bluetooth® capability, and options for APRS and GPS—built in.

CQ Reviews:

The Yaesu VX-8R Handheld

BY JOHN WOOD,* WV5J

Are you always attracted to the latest and greatest in amateur radio HT technology? Then you've probably noticed the Yaesu VX-8R handheld and its variations, such as the VX-8DR and the VX-8GR.

Focusing on the base model, this new, heavy-duty handheld from Vertex Standard is the first ham portable that can transmit on the four most active VHF/UHF bands in the U.S. with 5 watts out on 6 meters, 2 meters, and 70 centimeters, and 1.5 watts on 222–225 MHz.

It also offers extensive APRS® (Automatic Packet Reporting System) and Bluetooth® capabilities with the appropriate and optional accessories, plus a plethora of additional features. In other words, as an HT, it's a handful.

With its GPS antenna and dedicated support bracket attached, the VX-8DR literally equates to a stand-alone handful of APRS technology. (Photos by the author)

First Impressions

I had seen the VX-8R in ads and at the Huntsville Hamfest, so I was visually familiar and favorably impressed with the HT before I took it out of the box. That in no way diminished the fun of being the first person I knew of to open the box and take this high-tech unit out of its clear plastic wrapper. In this particular case, the Yaesu unit I pulled out of the box to review for *CQ* was a VX-8DR which is enhanced with some APRS capabilities not available on the stock VX-8R but can be added. The VX-8GR has a built-in GPS antenna and APRS capabilities but it is only a dual-band (2m and 440 MHz) HT. All three versions receive from 108 MHz to 999 MHz (cell blocked). The 8R and the 8DR also receive the AM and FM broadcast bands.

Following the manufacturer's precautions about not using the radio until the Lithium Ion (LiIon) batteries are given a chance to fully charge, I grabbed the optional AA battery-holder case and filled it with three fresh alkalines, attached it to the radio, mounted the supplied antenna, and pushed the power button. Sure enough, the orange backlight came on and the Vertex Standard logo popped up just before I was presented with the main operating screen. That's the high-res display that shows a wealth of information for both VFOs, including the operating frequencies, mode, volume level, receive signal strength, squelch type, memory mode, power output levels, and more. In addition, the bottom row of the display shows status icons for the function key, WiRES feature, DTMF autodialer, Emergency Auto I.D. (EAI), Automatic Power Off (APO), Bluetooth, key lock, mute, VOX, battery saver, and battery status.

Now at this point, I managed to squelch my urge to just start pushing buttons to discover their functions and instead took a break in my exploring and

**CQ New Products Editor, 1870 Alder Branch Lane, Germantown, TN 38139-4405*
e-mail: <wv5j@cq-amateur-radio.com>

RIGblaster radio to computer interfaces

A RIGblaster is the easiest way to properly connect your radio to a computer to operate using over 150 Amateur Radio programs. You get over thirty old and new operating modes, and if equipped, CAT/CI-V rig control for your radio.

Five models to choose from – One for every station and budget

duo **A complete station integration console for two radios that allows you to conveniently control everything almost any way you wish. Allows you to use your best microphone, speakers and headphones on almost any two radios and a PC.**

Sound Card - Real PTT Control - Rig Control - CW Keying - FSK Keying - Auto Switching

pro **All you can possibly do with a computer and radio. Our top of the line single radio interface that is without compromise, no matter what type of operation you do, or would ever wish to do. Duplex HF digital voice operation.**

Sound Card - Real PTT Control - Rig Control - CW Keying - FSK Keying - Auto Switching - Speech Processing

plus **The standard for an automatic switching interface. Fully automatic operation; your mic. always works, your computer always works, no manual switching, no plugging or unplugging, no radio menu buttons to push.**

Sound Card - Real PTT Control - Rig Control - CW or FSK Keying - Auto Switching

plug & play **Data jack interface that works with specific radios* that have a compatible data/aux jack. Built in USB to serial PTT, CW and CAT/CI-V control system. Automatic operation if your radio's data jack provides this switching.**

Sound Card - Real PTT Control - Rig Control - CW Keying

nomic **Small, simple, rugged and inexpensive. Perfect for portable or temporary setups. No external power supply needed. A inexpensive choice for a dedicated Internet link with the EchoLink System®.**

Sound Card - Real PTT Control

All models ***USB*** with Windows 98SE through 7 and Mac OSX; Linux too.

Easy step by step instructions, our very complete CD, and all the cables you need to get on the air with 2000 different radios (P & P radio specific)!

Readily available web, telephone and e-mail support that is always above and beyond the competition! If you can't find the answers to your questions on our web page please call, we are always willing to help our fellow hams.

SOUNDCARD & RIG CONTROL

DX4WIN
HamScope
MixW
WriteLog

SOUNDCARD

AGW Packet
ChromaPix
CW Get
CW Skimmer
CW Type
DigiPan
DM 780
EchoLink
EchoStation
FLdigi
IZ8BLY CHIP64
IZ8BLY STREAM
IZ8BLY HELL
IZ8BLY MT63
MMSSTV
MMTTY
PSK31 Deluxe
PSK31 Windows
RCK RTTY
SSTV32s
TR LOG
TrueTTY
VKExpress
W1SQLPSK
WinPIX32
WinPSK
WinPSKse
WSJT

RIG CONTROL

AALog
Beacon See
ComCAT
DigTRX
Ham Radio Deluxe
N1MM Logger
N3FJP Log
VQLOG
LOGic 6
Super Control
Swisslog
TRX Manager
Win-EQF

SPEECH PROCESSING

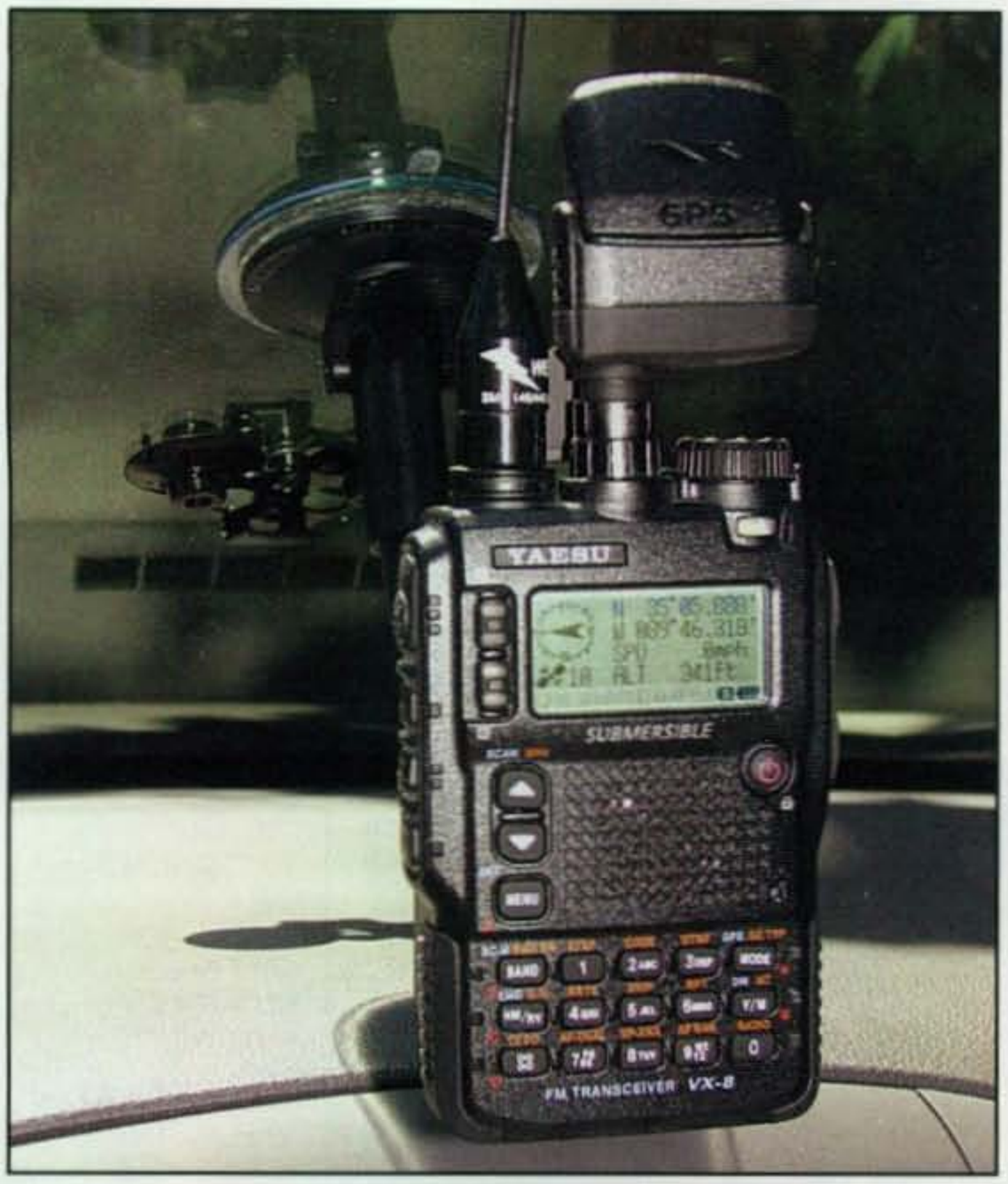
Voice Shaper

Starter Kit $10.95 **POSTAGE INCLUDED!** CD, receive cable and instructions. Money back towards the purchase of a RIGblaster

Free shipping on all orders over $100 - UPS Ground, in the US. AK & HI - US mail. **Money back guarantee**

West Mountain Radio www.westmountainradio.com

ORDER ON-LINE OR CALL TOLL FREE (888) 937-8686, (888) WESTMTN



The VX-8DR can be suction-cupped to your windshield like a GPS receiver (which it is, to an extent) or a cell-phone holder. With Bluetooth®, you can operate it hands-free while driving.

put the LiIon battery in the optional quick-charge cradle. That way I could avoid exhausting the AA batteries and look forward to learning more about the rig when it could be powered by the rechargeable battery.

Operating on the 1100-mAh LiIon battery a few hours later (an 1800-mAh battery is also available), I grabbed the manual and the VX-8DR and started learning the functions of the HT's 25 buttons and one easy-to-grab control knob.

After the power on/off button, the next prominent button is the one labeled MENU, which gives you access to the radio's 111-position operating menu, its 25-item APRS menu, and four primary screens—the main/opening screen, a display of the GPS location information, an APRS stations-received list, and a received APRS messages list. Two buttons mounted above MENU let you scan up and down through these MENU displays, which leaves 21 buttons to define. A total of 10 of the 15 keypad buttons cover the Touchtone® capabilities (when PTT is pressed), while the other five let you pick your operating band, mode selection, home and reverse frequencies function, emergency function activation, and VFO or memory select. However, keep in mind these 15 keypad buttons are also used for direct frequency entry and, after the F key is pressed, have secondary functions that let you select frequency steps, squelch type and sub-audible tones, DTMF function, CTCSS or DCS operation, change to the home frequency, activate the ARTS (Automatic Range Transponder System) function, activate the memory scan "skip" channel selection mode, set the repeater offset, activate memory tune mode, select the power output level, activate the spectrum analyzer mode, enter the special memory mode, and access the AM/FM radio mode.

Also accessed through the keypad "7" button when preceded by the F button is a feature unique to this radio – its AF dual watch function, which allows you to listen to a commercial AM or FM broadcast station while the radio silently monitors up to two selected frequencies, either from your memories or from the two independent VFOs. Should a signal come over either of the selected frequencies, the radio automatically mutes the broadcast signal until the other signal ends. This makes for non-boring/entertaining monitoring of ham frequencies with the commercial signals filling in any lulls. It even lets you set your memory to scan so that any incoming signal it snags will break in and come through. Also, if you decide you just want to listen to the morning drive time on your favorite local FM station, it's easy to configure the VX-8R for commercial FM receive only with the push of just a few buttons. This signature feature is one that we may well see being added to future HTs from other manufacturers.

Speaking of buttons, we haven't defined all of this HT's buttons just yet, have we? Of the remaining six buttons, two allow you to select the VFO for transmit while four others grace the left side of the radio—the F (or function) key, PTT, monitor, and volume adjustment.

The lone control knob positioned on the top of the radio lets you step through the options presented by the display screens and make menu selections as well as adjust the speaker volume and receive frequencies. This knob is rubberized so it is easy to grip and turn from the front and rear even with gloves on, but not easy to bump and accidentally change its position, since it has multiple detent settings and plastic guards on its left and right sides.

APRS Capabilities

Since APRS functioning was one of the design goals of the VX-8DR, it's no surprise that this radio does APRS very, very well. When connected to its optional GPS antenna through the speaker microphone or dedicated bracket, this is one solid APRS package that is completely self-contained with no wires to snag or detract from its appearance. Connected to an uninterrupted power source and tuned to the correct APRS frequency, the VX-8R package can beacon your APRS messages and location day and night from your dashboard, your desk, or your belt. Opt for the VX-8DR, and you get advanced features such as SmartBeaconing, an expanded memories list, memories to store 30 APRS messages, DIGI-PATH routing indication function, eight DIGI-PATH routing selections, GPS compass display "heading up" or "north up," APRS symbol icon pre-set function, clearly displayed APRS beacon messages, and selective message received indicated by a flashing LED. For amateur radio APRS enthusiasts, this is today's state-of-the-art.

Bluetooth Capabilities

In addition to their APRS features, the VX-8R and VX-8DR also offer Bluetooth headset capabilities, a low-power, wireless microphone/earphone feature that previously has been seen primarily as a cell phone add-on. In addition to its convenience, this technology also offers owners the opportunity to operate their HT up to 8–10 feet away from their RF-absorbing bodies. Safer? Probably. Reducing the body's exposure to RF is thought by many to be a good thing (even though there is no proven link between RF exposure and any sort of illness). Yaesu's promotional photos show an "outdoorsy" ham using the radio through a Bluetooth headset while the rig is attached to his belt, just one of the many options Bluetooth makes available to you.

Bluetooth also allows hams who are using this HT to communicate through repeaters to position the VX-8R in repeater "sweet spots" commonly found in homes and other buildings, away from their bodies and near windows or positioned in a

One way to use Bluetooth® at home with the VX-8DR is to position the radio near a window for better reception or access to the local repeater while you monitor and catch up on your research.

second-floor room. Bluetooth makes it possible for the ham to "push" the HT's PTT button (by pressing a PTT button located on the headset) without having to be physically close to the radio, which helps the radio "get into" the repeater. Find the sweet spot in your home, position the HT there, and operate reliably a short distance from the radio through the Bluetooth headset. That's a benefit of particular interest to us in the mid-south, where mountains are scarce and skyscrapers are non-existent. Around here, repeaters typically are installed in compromise locations—the tallest buildings or towers available—so we need every advantage we can get to be consistent into a local machine. While maybe it was not the designers' intent, this Bluetooth option, nevertheless, can help to increase the effective range of an HT, particularly when we operate on flat or rolling terrain. Plus, of course, it permits "hands-free" operation while driving. This is an important capability as more jurisdictions clamp down on the use of handheld devices while driving.

One small problem I encountered in testing the VX-8DR was in trying to get the Bluetooth headset to pair to the HT. The steps shown in the manual, which I followed precisely, simply would not persuade the HT to recognize the Yaesu BH-1A Bluetooth headset I was attempting to use. A call to Yaesu tech support fixed the glitch quickly; all I needed to do was reset the radio by simultaneously holding down the left three buttons on the keypad and then powering up the rig. That did the trick and made it possible for me to pair the headset to the HT on my next attempt at following the directions in the manual. It also launched me on a personal mission, one of exploring and discovering the many advantages of hands-free operations made possible by Bluetooth. Thank you, Yaesu tech support, for your assistance.

On-Air Performance

The rig received good to excellent signal reports on all bands, and that includes working through the local 224.78-MHz repeater, both with and without the Bluetooth headset. The 1100-mAh battery can monitor for 5 to 6 hours without APRS transmit. With APRS transmit, count on about 3 to 3.5 hours. With the 1800-mAh battery, you can monitor with APRS transmit on (at 30-minute intervals) and last about 8 hours. Therefore, if you're planning to regularly use the APRS beacon feature, it probably would be worthwhile to go for the higher-capacity battery pack. All of these are real-world results and closely coincide with Yaesu's published battery-life estimates for Lilon rechargeable batteries.

Personal Observations

Obviously, there's not enough room in this article to delve into all of the features and capabilities of this radio, but suffice it to say that this first four-band HT sets the high-water mark for all other HT makers to aspire to. With its dual receive (U+V, V+V, V+U), wideband receiver, interlaced AM/FM/FM Stereo commercial-band receiver, GPS receive, Bluetooth, and APRS capabilities, this portable is a remarkable unit. Add to that its ability to resist harsh weather and to be submersed in three feet of water for up to 30 minutes, its built-in barometric and ambient temperature sensors, its compact size and easy-to-read, large back-lit display, and you are looking at the state-of-the-art in HT technology. With the VX-8R, hams can now hold that advanced technology in the palms of their hands.

The manufacturer's suggested retail price (MSRP, or list price) for the original four-band VX-8R and for the VX-8GR (two bands, plus GPS) is $540; MSRP for the VX-8DR (four bands plus GPS and APRS) is $566. Dealer prices generally are lower. For full specs and additional information, visit <www.yaesu.com>. To order, visit your favorite Yaesu dealer.

math's notes

BY IRWIN MATH,* WA2NDM

Electromagnetic Interference

Many of us have been faced with unpleasant amounts of interference from time to time when tuning across the various bands. As a result, we thought it would be a good idea this month to take a brief look at some of the more common sources of the type of interference one might encounter and perhaps offer a few hints as to how to possibly reduce their effect. Note that this column is intended to look at "real" interference, not amateurs with bad manners who deliberately cause another type of interference, which can be just as annoying.

All electronic equipment, whether it is amateur radio related or not, usually is capable of generating some sort of interference. Often it is of a very low level or not confined to a band we are interested in, but nevertheless it is there. Remember that as long as there is current flowing there is a magnetic field being produced, and if it is an alternating or momentary current flow there is also some electromagnetic radiation produced. Some of the more common culprits are motors (particularly brush types), fluorescent lamps (even some of the newer CFL lamps), relay-driven devices, light dimmers, and of course, direct RF radiators such as microwave ovens, cell phones, cordless phones, computers, Bluetooth® devices, WiFi units, and the list goes on.

These sources can sound like momentary static bursts, continuous buzzing or crackling, whistles and hums, or just unusually high ambient noise levels. In addition, the various interfering signals can reach your radio by direct radiation or by actual conduction through the power wiring at your location. Identifying the particular source that is plaguing you is sometimes relatively easy to do if you know how.

Operators on the lower bands can often track down interfering sources by means of a small portable AM radio. Simply tune the radio to a point between stations, preferably near the high end of the band, and then use the radio itself as a probe. You will note that the ferrite antenna coil used in most such radios makes them somewhat directional, so that should help. If you need more sensitivity you can add a 12-inch "antenna" extension from one side of the coil, or possibly wind a few turns of wire around the actual coil (or radio) itself for use as an antenna. As you move around your immediate location with this setup, often you can actually locate the interfering source fairly quickly. We used this exact technique to find a defective light dimmer in one bedroom of our house that was almost totally wiping out the 20-meter band at random times. The dimmer dimmed the light in the ceiling fixture properly, but something was wrong with the internal suppression. Interference disappeared, by the way when the light was either full on or off. In this case replacing the dimmer switch (with an exact replacement, by the way) immediately solved the problem.

Motors, as we have mentioned, are another potential source of interfering signals. Older appliances may contain so-called "universal" motors that were designed for AC or DC operation, and as a result contain carbon brushes which make contact with copper pads on the rotating armature. These brushes usually produce sparks which could cause interference to almost all of the lower bands. A solution for this type of interference is to connect a small-value ceramic capacitor, around 0.001 to 0.1 µF, either across the brushes themselves (within the appliance) or at least across the AC plug of the appliance. For safety, this capacitor should have a voltage rating of at least four times the line voltage. This means 600 volts for the 115-volt line or 1000 volts for the 220-volt line.

This same technique can also work for devices that use relays to switch heavy loads. Again use capacitors appropriate for the voltages present. A vintage hand-held mixer that my wife used had this problem. Whenever she was mixing anything, I could not operate. A 0.01-µF 600-volt disc ceramic capacitor soldered across the power plug of the mixer neatly solved the problem. Fortunately, the plug had a small hollow space between the pins that allowed the capacitor to be neatly tucked in and not short against the outlet's metal wall plate. If you do try to connect a capacitor externally in this manner be aware of the fact that the outlet plate may be made of metal. If you plan to connect a capacitor inside any appliance, be extremely careful. When you reassemble the appliance, you certainly do not want to create a hazard!

To determine if the interference is coming by direct radiation or by conduction, simply disconnect the antenna of the radio. If it goes away, it is almost always by radiation. If it does not, then it is usually by conduction. In the case of conducted interference the same solution of a small capacitor across the AC input, or from each side of the AC line to ground (but this time at the actual radio), might work. Again, be careful!

Another very common source of interference is the computer. High-speed digital signals with very fast rise and fall times produce all sorts of interference that can easily reach your radio by means of conduction as well as radiation. That is why you will see ferrite filters on the connection cables of monitors or other peripheral devices. These are usually simple ferrite cores which produce high impedances to these signals and prevent (or at least lower) the potential for producing interference. If this sort of interference is your problem, rerouting leads away from your radio or shielding them further with aluminum foil might help. Some companies actually provide split ferrite chokes designed to clamp around a power cable.

Making sure that your radio is properly grounded can also go a long way toward reducing interference. Some of the older "boat anchors" used a two-wire plug instead of the modern three-wire variety. My Kenwood TS-830s is one of them. When I simply grounded the chassis (by means of the rear-panel ground stud provided for the purpose) to a nearby cold-water pipe (with a length of common #14 house wire), the background noise

*c/o CQ magazine

level fell by almost a full S unit. If you do not have a convenient water pipe, consider using the screw holding the wall plate, as it is usually connected to a separate ground wire in the house wiring. A small crimp lug can make this a very easy task.

Please keep in mind that the purpose of this column is not to cure all of the forms of interference you might encounter. It is simply to make you aware of where interfering signals may come from and what you might do as a "first pass" to try to solve the problems yourself. If it turns out that outside power lines or some sort of broadband system in your neighborhood is the culprit, be absolutely sure to contact the proper utility. Often if you can prove to them that they are causing a problem, they will try to help. Our local utility company has been very helpful on numerous occasions both at my QTH and those of a couple of other amateurs who have had power-line problems. Never attempt to solve this sort of problem yourself, and if you do try some of the measures mentioned in this column *be ultra careful when you are in the vicinity of the AC power line.* The voltages are deadly, and if you are careless, interference will be the least of your problems.

73, Irwin, WA2NDM

What You've Told Us...

Our April survey asked about antenna restrictions you may face. The majority of this month's respondents (56%) reports having no legal restrictions on their antennas. However, 19% say they're subject to municipal rules requiring permits and/or regulating antenna height and setback. Only 1% reported having a municipal permit request denied. Nearly one in three readers are subject to homeowner association (HOA) rules, with 10% reporting they may put up outdoor antennas with permission, 9% saying all outdoor antennas are prohibited, 5% saying all antennas are prohibited, and 4% reporting that outdoor antennas are limited to the rear yard.

Among those readers living with antenna restrictions, two-thirds (66%) have not tried to get permission to put up an antenna, while 20% have sought and received a municipal permit, 14% have received permission from their HOA, 9% have had requests to their HOA denied.

None of this seems to keep you from getting on the air, as 80% of you report having an HF and VHF station at home, 12% have only an HF station, and 4% have only a VHF station. In addition, 2% operate mobile only, 1% use the internet (e.g., Echolink) to talk with fellow hams, and 2% are not on the air at all. The numbers are similar regarding antennas, as 71% of you say you have full-view outdoor antennas, 18% have low-profile outdoor antennas, and 9% each have indoor antennas or hidden/stealth antennas. In addition, 2% have only mobile antennas, 1% have only internet connections, and 2% have no antennas and are not active on the air.

Finally, we asked those whose home station options were limited whether they had tried any of several alternatives, and 38% report operating VHF/UHF mobile, 31% operate HF mobile, 15% have been guest ops at another station, 13% have tried operating via Echolink or similar networks, and 4% have made use of the internet to remotely access a ham station located elsewhere.

This month's free subscription winner is Art Lewis, WA8VSJ, of Delray Beach, Florida.

Reader Survey
July 2010

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, since 89% of you who responded to April's survey say you have outdoor antennas, we'd like to follow up with more antenna questions.

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

1. Do you have an outdoor antenna at home?
- Yes 1
- No 2

2. Do you have a tower at home?
- Yes, ground-mounted 3
- Yes, roof-mounted 4
- Yes, more than one 5
- No 6

3. What sort of antenna(s) do you use on HF at home? (circle all that apply)
- Dipole/wire antenna 7
- Yagi 8
- Quad 9
- Vertical 10
- Log-periodic 11
- Other 12
- None 13

4. What sort of antenna(s) do you use at home on VHF/UHF (circle all that apply)
- Dipole/Wire Antenna 14
- Single Yagi 15
- Yagi Array 16
- Quad 17
- Vertical/Ground Plane 18
- Log-periodic 19
- Dish 20
- Other 21
- None 22

5. How high above ground is your highest antenna (at its highest point)?
- Above 100 feet 23
- 70–100 feet 24
- 35–70 feet 25
- 15–35 feet 26
- Less than 15 feet 27
- No outside antenna(s) 28

6. For what band(s) do you have antennas on your vehicle(s)?
- HF 29
- VHF (6m, 2m, 1.35m) 30
- UHF (70cm & up) 31
- No mobile antennas 32

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

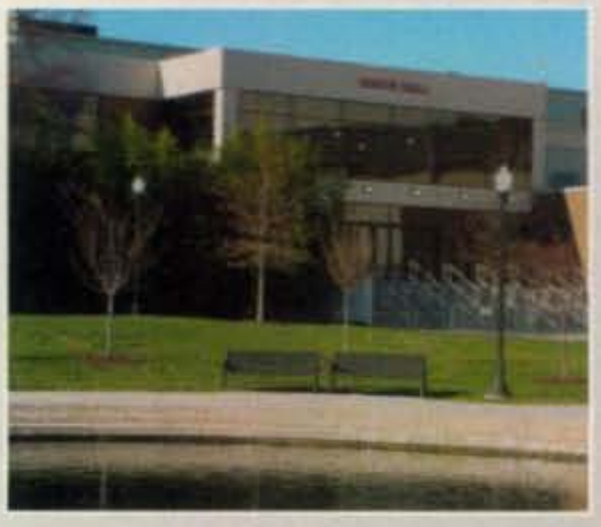
www.hamfest.org www.hamfest.org www.hamfest.org

Huntsville Hamfest and ARRL SE Division Convention

August 21-22, 2010
At the Von Braun Center in Huntsville, Alabama

Program Highlights

- **Huntsville Hamfest -** Featuring a huge new equipment dealer show, many major manufacturers, giant flea market, and more!
- **International DX, contest, technical, and public service forums.**
- **HAYLARC YL Breakfast** Huntsville Young Ladies Amateur Radio Club invites all YLs attending the Huntsville Hamfest to join them for a Dutch breakfast Sunday, 7am at Shoney's.
- **DXCC Card Checking**
- **DX Banquet** - Saturday evening sponsored by the North Alabama DX Club, featuring Tom Harrell, N4XP speaking on the K4M DXpedition to Midway Island. The DX Banquet is held at the Holiday Inn across from the Von Braun Center.
- **Hospitality Suites -** Huntsville Hamfest will host hospitality rooms at the Holiday Inn across from the Von Braun Center on Friday and Saturday evenings.
- **ARRL Program Representatives**
- **Youth Activities**
- **2010 YHOTY** (Young Ham of the Year) Award Presentation.



Hotels

Holiday Inn
Group/Convention code: SHA
Reservation: **1-800-238-4985** or **1-256-553-1400**
www.holidayinn.com/huntsvilleal

Embassy Suites Hotels
Group/Convention code: HMF
Reservations: **1-800-362-2779** or **1-256-539-7373** or
visit www.embassysuiteshuntsville.com

Nearby Points of Interest

- ✓ U.S. Space & Rocket Center and U.S. Space Camp
- ✓ 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

ARRL The national association for AMATEUR RADIO

Huntsville Hamfest Association
The World's Friendliest Hamfest
www.hamfest.org

See you in Huntsville for the World's Friendliest Hamfest

BY FREDERICK O. MAIA,* W5YI

"Vanity" Callsigns and their Mysterious "Regulatory Fee"

There is a lot of confusion in the amateur radio community about the costs associated with obtaining and renewing a vanity callsign. W5YI sorts it out.

The FCC has proposed to lower the cost to get or renew a vanity callsign. Beginning in September, the fee will be $13.30 instead of $13.40 and we have been asked, "Why a 10¢ reduction?"

Another frequent question we get is "Why does an amateur with a vanity callsign have to pay another fee when the callsign is renewed since there is nothing that the FCC has to do except change the expiration date?"

This month let's talk about vanity callsign "fees"—what they are, how they came about, how the cost is determined, and why are they assessed only on vanity callsigns.

A vanity station callsign is one that is selected by the user rather than by being computer-assigned by the FCC from an alphabetized block of callsigns. A radio amateur is eligible to apply for specific callsign formats depending upon a very complex set of rules (which we have covered in detail in past columns).

Briefly, Extra Class hams can choose the shortest (1-by-2, 2-by-1, and AA to AL-by-2) callsigns; Advanced Class can select the remaining 2-by-2 format; Technicians and General Class operators may obtain 1-by-3 callsigns; and Novices may only hold a 2-by-3 format callsign.

Vanity callsigns have only been available since 1996. Ham operators have always wanted to be able to get a specific callsign. However, before the mid-1990s, every request made to the FCC was routinely denied.

Ham Radio Callsigns of Choice

The history of "vanity" callsigns in the amateur service is long ... and interesting! It actually goes back to June 1990 when Jim Wills, N5HCT—a retired Extra Class amateur from Tyler, Texas—wanted to reclaim his long-expired WA5EHQ callsign. That's when Jim filed a Petition for Rule Making in response to an April 19, 1990, FCC Public Notice concerning the assignment of amateur radio station callsigns. I knew Jim (now a Silent Key), since Tyler is local to the Dallas-Ft. Worth area where I live. I told him, based on many previous FCC decisions, that he had no chance of getting a specific callsign. I eventually was proved wrong.

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

Wills' petition suggested that amateurs be allowed to specify three callsign choices in order of preference and attach a $30.00 fee to the FCC requesting a callsign change. "The Federal Budget and the amateur community all gain from this proposal," he said. That petition, like others before it, was denied because radio amateurs are statutorily exempted from paying fees. And besides, the FCC did not have the manpower and data processing capability to administer such a program even if it could legally do so. However, Jim did not give up.

In 1991, Jim contacted his Congressman, Ralph M. Hall (D-TX) who shared the idea with the staff of the House Telecommunications Subcommittee, which was already working on a way to make the FCC self-supporting. Congress's goal was for the FCC to collect enough user fees to pay for itself. These were to be called "regulatory fees," an assessment to pay for being regulated by the government.

Wills convinced Hall that amateur radio operators would be willing to pay a fee to the FCC to get what came to known as a "vanity" station callsign, one that is similar to a "vanity" automobile license plate. Hall told Jim Wills that Congress might be able to make the necessary legislative changes to put a vanity callsign fee into effect. Jim called me and told me about the plan. I continued to be very skeptical.

On June 12, 1992, a letter jointly signed by Representatives Hall and Edward J. Markey (D-MA) was sent to then FCC Chairman Alfred Sikes. It said: "We are writing to you on behalf of several amateur radio operators who are interested in the establishment of an FCC system for allotting distinctive callsigns. Such callsigns would be available at a fee to radio operators, in order to recover the total cost associated with the program." The addition of Markey's signature to the letter added new importance! Markey and the House Commerce Committee controlled the FCC budget.

On January 13, 1993, Congressman Hall again wrote to Jim Wills about a self-funding program of granting special callsigns to ham radio enthusiasts that would not place additional demands on FCC resources as long as the FCC set fees at an appropriate level. He also noted that the FCC was already reprogramming its amateur data processing system and that this would be a good time to implement a specialized callsign program.

A major problem was that the FCC still didn't have permission to collect fees associated with ham radio. Hall again discussed the issue with the staff of the Telecommunications Subcommittee and gained Chairman Ed Markey's support for a legislative amendment that would allow the FCC

MFJ TUNERS

MFJ *IntelliTuner*™ Automatic Tuners

The MFJ-993B *IntelliTuner*™ lets you tune any antenna *automatically -- ultra fast.*

It's a comprehensive automatic *antenna tuning center* complete with SWR/Wattmeter, antenna switch for two antennas and 4:1 current balun for balanced lines.

MFJ's exclusive *IntelliTuner*™, *Adaptive Search*™ and *Instant Recall*™ algorithms give you *ultra fast* automatic tuning with over 20,000 *VirtualAntenna*™ Memories.

You get a highly efficient L-network, 6-1600 ohm matching at 300 Watts SSB/CW or *extra-wide* 6-3200 Ohm matching at 150 Watts SSB/CW, 1.8-30 MHz coverage, Cross-Needle *and* digital meters, audio SWR meter, *backlit* LCD, remote control port, radio interface, heavy-duty 16 amp/1000V relays.

MFJ-993B **$259.95**

The MFJ-993B automatically tunes for minimum SWR and remembers your frequency and tuner settings. The next time you operate on that frequency and antenna, these tuner settings are instantly restored and *you're ready to operate in milliseconds!* 10W x2¾ Hx9D". Use 12-15 VDC/1 amp or 110 VAC with **MFJ-1316, $21.95**. Radio interface cables, remote control available. See ***www.mfjenterprises.com***

600 Watt MFJ Automatic Tuner

MFJ-994B **$359.95**

Like MFJ-993B but handles 600 Watts SSB /CW, matches 12-800 Ohms. 10,000 memories. Does not have LCD display, antenna switch, 4:1 current balun, audio SWR meter/feedback. 10Wx2¾Hx9D in.

No Matter What™ Warranty

Every MFJ tuner is protected by MFJ's famous one year *No Matter What*™ limited warranty. We will repair or replace your MFJ tuner (at our option) for a full year.

More hams use MFJ tuners than all other tuners in the world!

MFJ-9982 *2500 Watt* Tuner

MFJ-9982 **$699.95**

The MFJ-9982 *ContinuousCarrier*™ antenna tuner handles 2500 Watts *continuous carrier* output on all modes and all HF bands into most unbalanced antennas -- even 160 Meters. 6-position antenna switch, 4-core balun, 1.5kW dummy load, true *peak/average* SWR/Wattmeter, 13¾Wx7Hx6¼D".

MFJ-989D *Legal Limit* Tuner

MFJ-989D **$389.95**

New, improved MFJ-989D *legal limit* antenna tuner gives you better efficiency, lower losses and a new *true* peak reading meter. Easily handles *full* 1500 Watts SSB/CW, 1.8-30 MHz, including MARS/WARC bands. Six position antenna switch, dummy load. *New* 500 pF air variable capacitors. *New* improved *AirCore*™ Roller Inductor. *New* high voltage current balun. *New* crank knob. 12⅞Wx6Hx11⅝D".

MFJ-962D *compact* kW Tuner

MFJ-962D **$299.95**

A few more dollars steps you up to a KW tuner for an amp later. Handles 1.5 KW PEP SSB amplifier input power (800W output). Ideal for Ameritron's AL-811H! *AirCore*™ roller inductor, gear-driven turns counter, pk/avg lighted Cross-Needle SWR/Wattmeter, antenna switch, balun, Lexan front, 1.8-30MHz. 10¾Wx4½H x10⅞D in.

MFJ-969 300W *Roller Inductor* Tuner

Superb *AirCore*™ Roller Inductor tuning. Covers *6 Meters* thru 160 Meters! 300 Watts PEP SSB. *Active* true peak reading lighted Cross-Needle SWR Wattmeter, *QRM-Free PreTune*™, antenna switch, dummy load, 4:1 balun, Lexan front panel. 10½Wx3½Hx9½D inches.

MFJ-969 **$219.95**

MFJ-949E *deluxe* 300 Watt Tuner

***More** hams use MFJ-949s than any other antenna tuner in the world!*

MFJ-949E **$179.95**

Handles 300 Watts. Full 1.8 to 30 MHz coverage, custom inductor switch, 1000 Volt tuning capacitors, *full size* peak/average lighted Cross-Needle SWR/ Wattmeter, 8 position antenna switch, dummy load, *QRM-Free PreTune*™, scratch proof Lexan front panel. 10⅝Wx3½Hx7D inches.

MFJ-948, $159.95. Economy version of MFJ-949E, less dummy load, Lexan front panel.

MFJ-941E *super value* Tuner

***The** most for your money!*

MFJ-941E **$139.95**

Handles 300 Watts PEP, covers 1.8-30 MHz, *lighted* Cross-Needle SWR/ Wattmeter, 8 position antenna switch, 4:1 balun, 1000 volt capacitors, Lexan front panel. Sleek 10½Wx2½Hx7D".

MFJ-945E HF/6M *mobile* Tuner

MFJ-945E **$129.95**

Extends your mobile antenna bandwidth so you don't have to stop, go outside and adjust your antenna. Tiny 8Wx2Hx6D in. *Lighted* Cross-Needle SWR/Wattmeter. Lamp and bypass switches. Covers 1.8-30 MHz *and* 6 Meters. 300 Watts PEP. **MFJ-20, $6.95,** mobile mount.

MFJ-974HB *Balanced Line* Tuner

The MFJ-974HB *true* fully balanced antenna tuner tunes any balanced lines. Matches 12-2000 Ohms. Covers 1.8-54 MHz *continuously* including all WARC bands. 300 Watts SSB/150 Watts CW. Lighted Cross-Needle SWR/Wattmeter. 7½Wx6Hx8D in.

MFJ-974HB **$209.95**

MFJ-976, $499.95. 1500 Watt *fully balanced* antenna tuner. 1-30 MHz.

MFJ-971 *portable/QRP* Tuner

Tunes coax, balanced lines, random wire 1.8-30 MHz. Cross-Needle Meter. SWR, 30/300 or 6 Watt QRP ranges. Matches popular MFJ transceivers. 6Wx6½Hx2½D in.

MFJ-971 **$119.95**

MFJ-902 *Tiny Travel* Tuner

Tiny 4½Wx2¼Hx3D", full 150 Watts, 80-10 Meters, has tuner bypass switch, for coax/random wire.

MFJ-902 **$99.95**

MFJ-904H, $149.95. Same but adds Cross-needle SWR/Wattmeter and 4:1 balun for balanced lines. 7¼Wx2¼Hx2¾D in.

MFJ-16010 *random wire* Tuner

Operate all bands anywhere with MFJ's reversible L-network. Turns random wire into powerful transmitting antenna. 1.8-30 MHz. 200 Watts PEP. Tiny 2Wx3Hx4D inches.

MFJ-16010 **$69.95**

Dealer/Catalog/Manuals

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

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

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

to collect fees for specialized callsigns in the Amateur Service. Jim kept updating me on the progress of his "ham calls of choice" effort, and I began thinking that maybe the program might have a chance of being enacted.

Budget Reconciliation Act of 1993

That was the official name of the Clinton Administration's Deficit Reduction Plan. In the budget bill was a provision for collecting regulatory fees from various FCC licensees. Through Congressional action, Amateur Service "vanity" callsigns were among the many line items included to help offset the cost of the FCC's budget.

"Vanity" callsigns in the Amateur Service were initially proposed at a cost of $7.00 a year over ten years ($70.00) as part of the Budget Reconciliation Act of 1993.Neither the FCC nor the ARRL knew vanity callsigns were coming! The provision for "ham callsigns of choice" was enacted into law totally without FCC action. This stunning development caught everyone flat-footed.

By working directly with Congress, Jim Wills by-passed the FCC's Private Radio Bureau. The League even tried to take credit for initiating the program, which it did not. Once the law provided for ham vanity callsigns, the FCC got involved to come up with an equitable system for vanity callsign assignment.

The wording that applied to the Amateur Service, inserted in the Schedule of Regulatory Fees at the last minute, was only four words long. It read: "Amateur vanity callsigns: $7." The FCC was authorized "...to assess and collect the payment in advance for a number of years not to exceed the term of the license held by the payer."

Actually, President Clinton's Deficit Reduction Plan (and vanity callsigns) almost didn't get approved at all! It passed the House by only 2 votes (218 to 216) and Vice President Al Gore had to break a 50-50 tie in the Senate. The measure was signed into law on August 10, 1993.

Ironically, even though Congressman Hall was primarily responsible for getting the amateur callsign amendment tied to that bill, he was opposed to the overall Clinton budget package and voted against it!

The FCC's new computer system was programmed to provide personalized amateur callsigns in 1994. The special callsign program still had to go through FCC rulemaking before it could be implemented. The Commission issued a Notice of Proposed Rulemaking on December 13, 1993 and approved the final "Vanity" callsign rules almost exactly a year later (on December 23, 1994).

While the ARRL played no part in getting the vanity callsign program through Congress and enacted into law, it was instrumental in originating the guidelines under which amateurs would be able to obtain a station callsign of their choice. In the end, the FCC basically followed the League's suggestions, but there were exceptions.

For example, the ARRL wanted a one-time $150.00 application fee rather than a regulatory fee, with the callsign only being chosen from the amateur's own region. However, the enabling legislation only provided for "Regulatory" and not "Application" fees. A system of opening gates and a FCC Form 610-V vanity callsign application was developed.

Section 9 Regulatory Fees

There are actually two kinds of licensee fees authorized by the Communications Act that the FCC assesses and collects. "Application fees" authorized by Section 8 of the Act were already on the books. Application fees are to reimburse the government for the administrative costs involved in issuing licenses and permits. But radio amateurs are statutorily exempt from paying them, and a vanity callsign is not a license.

Section 9 (Regulatory) fees are collected to recover the regulatory costs of four broad categories of Commission activity including enforcement, rulemaking, user-information, and international activities. That covers just about all the FCC does.

Each year, as part of the passage of the federal budget, Congress establishes an amount that the FCC must collect in regulatory fees. The Fiscal Year 2010 FCC Regulatory Fee Schedule is based on the FCC's budget needs for FY-2011.

This schedule indicates the amount each benefactor of FCC services must reimburse the government. Every U.S. citizen contributes toward covering the FCC budget in one way or another. For example, telephone, cellular, radio, television, and cable TV providers are assessed a fee which is passed on to their customers. Some 280-million cellphone users each are assessed 17¢ a year. That doesn't seem like much, but it totals nearly $48 million. Also, 64.5-million cable TV subscribers pay another $55 million. Interstate telephone companies chip in another $150 million.

The regulatory fee section of the law does not specifically exempt any group from paying this fee, although it does allow the Commission to waive, reduce, or defer payment of a fee "for good cause shown, where such action would promote the public interest." The FCC has interpreted this to mean that regulatory fees will not be applied to state and local governments, amateur radio operator licensees (other than amateur vanity callsigns), and non-profit organizations.

Regulatory fees are adjusted up or down percentage-wise annually based on fluctuations in the FCC's budget. If the FCC's upcoming Fiscal Year approved appropriation increases over last year, so do the user regulatory fees.

The U.S. government's fiscal year begins on October 1 of the previous calendar year and ends on September 30 of the year with which it is numbered. A fiscal year (financial year, or sometimes budget year) is a period used for calculating annual financial statements in businesses and other organizations. Therefore, fiscal year 2011 begins on October 1, 2010.

Last year, the FCC had to collect nearly $342 million in regulatory fees. This year's revenue requirement is slightly less—$335 million. This reduction is universally reflected in the amount each benefactor pays. In the case of vanity callsigns, the amount was reduced 10¢ from $13.40 to $13.30. (The year before that, the fee was $12.30 for ten years.) This is the only FCC fee that can legally be assessed on ham operators.

The ultimate objective of the Section 9 regulatory fee system is for the FCC to collect its budgetary costs from the same public who obtains the benefit of its services. The amount that must be recovered is set by Congress. In a nutshell, regulatory fees paid to the FCC basically go to reimburse the U.S. Government for the amount of money it costs to fund the agency.

Congress and the Communications Act initially authorized a vanity callsign cost of $7 annually over a ten-year term ($70). On June 14, 1995, and with the 1995 fiscal year nearly over, the FCC's Office of Managing Director reduced that cost to $3.00, or $30.00 for the 1995 fiscal year. I believe it is no coincidence that this is the same cost that Jim Wills had suggested in his 1990 petition.

The Managing Director's office came up with the $3 annual figure by estimating that 2,000 amateur vanity callsigns would be issued which would reimburse $60,000 of the FCC's budget. However, no amateur vanity callsigns were issued in FY-1995.

The first vanity callsigns were not issued until June 1996, and even then it was only for previously held callsigns. The FCC did not open the program to Amateur Extra Class amateurs until September 23, 1996. It soon became apparent that the number of vanity callsigns wanted would be much higher than first thought.

Fiscal Year 1997

For fiscal year 1997 (which started October 1, 1996) Congress required the FCC to collect $152.5 million in regulatory fees, a substantial increase over the prior year. On March 3, 1997, the FCC released a proposed fee schedule in order to collect the increased amount required by Congress.

The FCC said it believed it would issue some 10,000 vanity callsigns in FY-1997, a substantial increase over its first estimate, and a regulatory fee of $5.00 annually, or $50 for a ten-year term, was recommended for FY-1997.

By the way, Jim Wills, N5HCT, who got the vanity callsign program off and running, never did get his old WA5EHQ callsign back. He requested and received W5JIM. Jim died in March of 2008 and his W5JIM callsign went to a family member.

FY-2010 Fees Collected Oct. 2010 to Sept. 2011

Over the years, the vanity callsign fee (and all regulatory fees) have been adjusted up or down depending only on percentage changes in the FCC's appropriation (i.e., the upcoming fiscal year budget.) *By law, this fee is not related to the cost of issuing and renewing vanity callsigns.*

Last April, the FCC released its annual proposal seeking to implement a new regulatory fee schedule for Fiscal Year 2011 (Oct. 1, 2010 to Sept. 30, 2011). The Commission proposed to lower the regulatory fee for amateur radio vanity callsigns from $1.34 a year ($13.40 for the ten-year term) to $1.33 or $13.30 for ten years—a decrease of 10 cents. All newly adjusted regulatory fees usually start in mid-September of each year.

Next year's total FCC budget slightly exceeds $350 million. It includes funding "...to implement the National Broadband Plan; managing the nation's spectrum; overhauling the Commission's data systems and processes; updating the FCC's operations using improved technology; supporting the Commission's public safety and cybersecurity role; strengthening the Commission's consumer information programs; and enhancing the FCC's role as a strong advocate for U.S. interests internationally." A complete copy of the Commission's FY 2011 budget is available on the FCC's website at: <www.fcc.gov>.

Nearly $336 million of the $350 million will be returned to fund the FCC in the form of regulatory fees paid by the beneficiaries of its services. To reach the amount required by Congress, the FCC adjusted the FY 2009 total amount downward by 1.8 percent. Radio amateurs who obtain or renew vanity callsigns will be paying nearly $200,000 of the $336 million. That is based on an anticipated 14,800 "payment units"—amateurs each paying $13.30 from Oct. 2010 to Sept. 2011 for the ten-year use of their vanity callsigns.

The vanity callsign fee has varied over the years from a low of $11.70 in 2007 to a high of $70 as first proposed in the *1993* Budget Reconciliation Act. Again, it fluctuates based on the amount of funding Congress tells the FCC it must recover. Also, the vanity regulatory fee is not based (and cannot be based) on the cost to provide or renew the callsign. 73, Fred, W5YI

public service

BY RICHARD FISHER,* KI6SN

The Lull Before the Storms:

WX4NHC puts Amateurs in Focus at National Hurricane Conference

With a heightened awareness of the critical need for disaster communications preparedness in the wake of the Haiti earthquake, an unprecedented crowd of more than 100 gathered for the Amateur Radio Forum hosted by the National Hurricane Center's WX4NHC during the 2010 National Hurricane Conference in Orlando, Florida. Attendance for the main session on March 30 "was the largest in the history of the Amateur Radio Forum," according to Julio Ripoll, WD4R, a volunteer operator at WX4NHC for 30 years and its assistant coordinator.

During the lull before the 2010 Atlantic Hurricane Season, which runs from June 1 to November 30, representatives of the station presented "Amateur Radio—Disaster Communications Before, During and After Hurricanes" and opened the forum to all radio amateurs free of charge. "The majority in attendance were ham operators involved in, or interested in, emergency communications," Ripoll said. Emergency managers, meteorologists, and government officials participated in the session as well.

"This was the first time that this forum was attended simultaneously by previous National Hurricane Center Director Max Mayfield and current NHC Director Bill Read, KB5FYA," WD4R said.

The agenda included:

• The History and Operations of WX4NHC, which was presented by WD4R, the station's assistant coordinator.

• WX4NHC Weather Initiatives (Data Collection Modes and Methods), by John McHugh, K4AG, WX4NHC coordinator.

• The WX4NHC/HH2 University of Miami Field Hospital Mission (International Deployment and Interoperability) by WD4R, coordinator/UM Medical Haiti Hams.

• VoIP Hurricane Net Operations, presented by Rob Macedo, KD1CY, director of operations of the VoIP Hurricane Net and the Assistant Emergency Coordinator for Eastern Massachusetts.

• The International Radio Emergency Support Coalition (IRESC), by KD1CY.

• American Radio Relay League Update, presented by Greg Sarratt, W4OZK, ARRL Southeastern Division director.

"These multi-media presentations were specifically tailored to inform (participants of) the many modes and methods of communications used to collect weather and damage assessments," Ripoll said, "as well as (how) to disseminate the hurricane advisories to the affected areas when they lose other conventional means of receiving this vital information."

The modes span from the high-frequency Hurricane Watch Net to the hybrid EchoLink/IRLP VoIP Hurricane Net and beyond—including "APRS, Winlink, CWOP, ON-NHC, e-mail, and even fax," he said. The information collected "is used by the hurricane specialist to augment data from other sources and many times has proven to make a difference in the final forecast."

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

Former National Hurricane Center Director Max Mayfield, left, joins other participants in the Amateur Radio Forum during the 2010 National Hurricane Conference in Orlando. (Conference photos courtesy of WD4R)

Julio Ripoll, WD4R, talks about the National Hurricane Center's amateur station WX4NHC during the National Hurricane Conference earlier this year.

R&L Electronics

1315 Maple Ave HAMilton, Oh 45011
http://randl.com sales@randl.com
Local/Tech 513-868-6399
Fax 513-868-6574
(800)221-7735

ICOM

IC7600

The latest DSP technologies developed for the IC-7800/7700 plus over 45 years of analog circuit expertise give the IC-7600 the performance advantage. The flagship's lineage: dual DSP units, 3kHz 1st (roofing) filter, double-conversion superheterodyne, all direct descendents of the IC-7800/7700.

AH4 Auto Tuner 299.95
CT17 Level Converter 142.95
ICPW1 Modular 1kW Linear Amp ..... Call
ICSP23 Ext Speaker 189.95
SM20 Desk Mic 209.95
SM50 Dynamic Desk Mic 289.95

IC7200

IF DSP, AGC Loop Management, Digital IF filter, Manual notch filter, Digital Twin PBT, Digital noise reduction, Digital noise blanker, High stability transmitter, USB port for PC control, RF speech compressor, CW mode operation, Tough construction against water intrusion, Rugged design for outdoor use. Rear bumper

AH4 Auto Tuner 299.95
CT17 Level Converter 142.95
ICPW1 Modular 1kW Linear Amp ..... Call
ICSP23 Ext Speaker 189.95
SM20 Desk Mic 209.95
SM50 Dynamic Desk Mic 289.95

IC718

The HF bands allow you to communicate over long distances covering many km even to the other side of the world. With the superior performance found in the IC-718 such as wide dynamic range, high C/N ratio, and full duty operation you will find making these contacts easy. Experience the combination of the latest RF and digital technology, along with the size and simplified operation. You will see the IC-718 will be the most practical rig you will ever own.

AH4 Auto Tuner 299.95
CT17 Level Converter 142.95
FL52A 500Hz CW filter 204.95
MB23 Carrying Handle 16.95
UT102 Voice Synthesizer 67.95

IC7000

IF DSP, AGC Loop Management, Digital IF filter, 2 point manual notch filter, Digital noise reduction, Digital noise blanker, 35W output on 70cm band, High stability crystal unit, Direct digital synthesizer circuit, Compact, all in one package, User friendly key allocation, Digital voice recorder, Built-in RTTY demodulator, 2.5 inch color TFT display.

AT180 Auto Tuner 444.95
CT17 Level Converter 142.95
OPC589 Modular 8 pin mic adapter 36.95
RMK7000 Remote Kit 74.95
SM20 Desk Mic 209.95

IC92AD

Rugged submersible protection, Optional GPS speaker microphone, Wideband receiver with dualwatch capability, 5 watt output, Simple bandscope, Built in voice recorder, Large dot matix display, One touch reply button, Keypad navigation, Optional PC remote control capability,

BC177 Rapid Charger 68.95
BP256 7.4V @ 1620mAh Li-Ion 86.95
BP257 AA Battery Case 34.95
CP19R Cigarette Lighter Adapter 42.95
HM174 Waterproof Speaker Mic 119.95
HM175GPS Wtrprf spkr mc w/GPS 229.95
HM75A Speaker Mic w/Remote 63.95
HS85 Headset w/VOX, PTT 93.95
LC168 Carrying Case 27.95
RS92 Remote control software 82.95

IC80AD

Switchable VHF/UHF dual bander, Wideband receiver, Free downloadable software, 1052 Memory Channels, Multiple Scan Function, CTCSS Built-in, 5 Watt Output

BC139 Rapid Charger 89.95
BP216 AA Battery Case 39.95
BP217 7.4V @ 1500mAh Li-Ion 86.95
CP19R Cigarette Lighter Adapter 42.95
HM189GPS GPS Speaker Mic 229.95
HM75A Speaker Mic w/Remote 63.95
HS85 Headset w/VOX, PTT 93.95
LC163 Carrying Case 36.95

IC2820H

Wideband receiver with simultaneous receive capability, Diversity receive capability, 50W on VHF and UHF, Separate controller from main unit, 522 memory channels, Band scope function, Optional D-Star operation.

CS2820 Programming Software 38.95
MB65 Mounting Base 35.95
OPC478UC USB Cloning Cable 52.95
OPC589 8 pin modular adapter 36.95
OPC1663 Separation Cable 11.2ft 15.95
UT123 Digital/GPS Unit 289.95

ICID880H

Switchable VHF/UHF dual band, Wideband receiver, Free download cloning software, 1052 memory channels, Multiple scan function, Built in CTCSS/DTCS enc/dec, Keypad navigation.

MB120 Mounting Bracket 52.95
JTPS14M Power Supply 49.95
OPC478 Cloning Cable 39.95
OPC478UC Cloning Cable 52.95
OPC589 Mic adapter 36.95

ICV8000

Switchable VHF/UHF dual band, Wideband receiver, Free download cloning software, 1052 memory channels, Multiple scan function, Built in CTCSS/DTCS enc/dec, Keypad navigation.

CSV8000 Cloning Software 34.95
JTPS14M Power Supply 49.95
OPC478 Cloning Cable 39.95
UT108 DTMF Decoder Unit 31.95

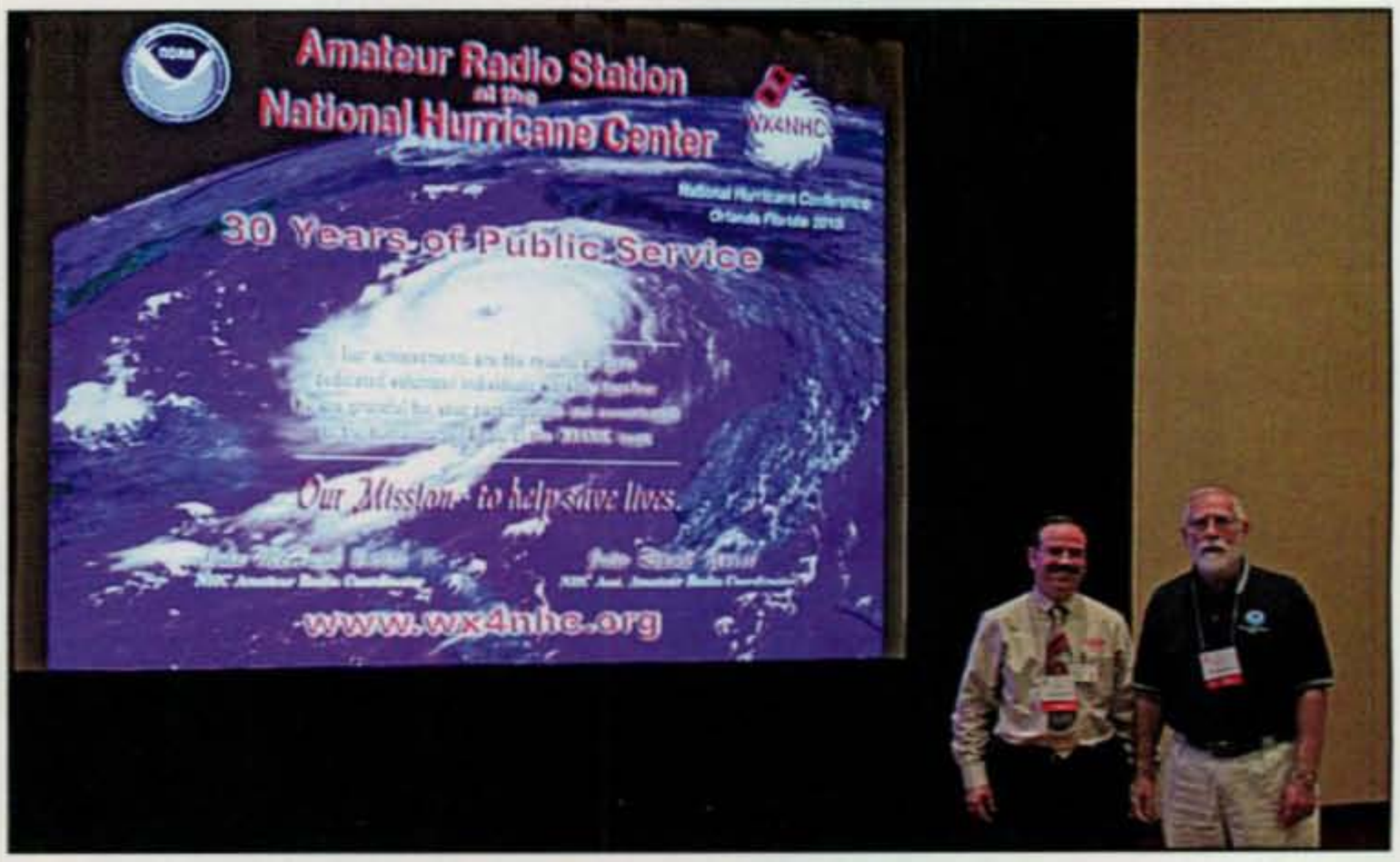
ICT70A

Rugged 2m/70cm HT, 700mW loud audio, Long Lasting Battery Life, External DC Power Jack, 302 Memory Channels, CTCSS Built-in, Internal VOX function, PC Programmable with Optional CST70

BC193 Rapid Charger 50.95
BP263 AA Battery Case 25.95
BP265 7.4V @ 1900mAh Li-Ion 46.95
CP19R Cigarette Lighter Adapter 42.95
CST70 Programming Software 37.95
HM131 Speaker Mic 37.95
HS95 Behind the head headset 149.95
OPC478UC USB Programming Cable 52.95

From left, Greg Sarratt, W4OZK; Rob Macedo, KD1CY; John McHugh, K4AG; Julio Ripoll, WD4R; and NHC Director Bill Read, KB5FYA, at the 2010 National Hurricane Conference.

A record-breaking crowd attended the amateur radio forum at this year's National Hurricane Conference in Orlando.



WX4NHC's Julio Ripoll, WD4R, left, and John McHugh, K4AG, took part in the conference's multimedia presentations.

"Surface reports" sent by radio amateurs also give the weather data a human element that allows the public to easily understand the intensity of a storm and help governmental agencies to plan their response, Ripoll said.

Saba Island Lieutenant Gov. Jonathan Johnson was one of the conference attendees. "We had a very nice conversation after the presentation about his concerns that Saba Island is without a resident ham radio operator since Don McGehee, PJ6DM, now K4SAB, moved to Florida a few years ago," Ripoll said.

The lieutenant governor pointed out that "a natural disaster could cause a communications blackout and (the island's) only backup system is a few portable satellite phones," WD4R said. "Remember, Saba Island (smallest island of the Netherlands Antilles) is actually a dormant volcano."

The forum's special presentation on the recent HH2/WX4NHC amateur radio international EmComm deployment in response to Haiti's devastating earthquake reflected on the amateurs' quick action following a request by the University of Miami Miller School of Medicine/Project Medishare.

Operators were called to support UM's field hospital in Port-au-Prince, "the largest and most sophisticated medical hospital in Haiti with over 120 doctors and medical staff and a 240-bed hospital," said Ripoll, who is an architect at the UM Medical School and was appointed by the UM Vice President of Medical Facilities Ron Bogue as amateur radio coordinator for this mission.

Ripoll described how "the initial planned operation was to create a backup communications link between UM-Miami and UM-Haiti and that quickly evolved into a very complex local communications center in Haiti that exemplified the best of versatility, improvisation, and interoperability by both amateur radio and MARS (Military Auxiliary Radio System) operators on the ground."

He gave an emotional overview of how communications links "were quickly established and maintained between the UM Field Hospital, USNS Comfort hospital ship, other medical centers, military security units, helicopter and speed boat critical patient transfers, airport and cargo terminal logistics, and even help with dispatch and relay of doctors' GMRS (General Mobile Radio Service) handhelds. The ham radio operations clearly assisted in the saving of many lives for the five weeks of weekly rotating deployments, until other conventional communications were repaired and installed."

Ripoll said, "There wasn't a dry eye in the room, and that included the presenter."

Another forum was held March 31 "specifically for the benefit of emergency managers and entitled 'Amateur Radio: The Emergency Manager's Hidden Resource,'" WD4R said. It was an informal discussion attended by about 40 people and moderated by KD1CY and W4OZK.

Professional videographer Jim Palmer, KB1KQW, Eastern Massachusetts Assistant Emergency Coordinator, assisted with the audio/visual setup and documented the forums. To see the videos, visit: <http://video.nsradio.org>.

Ripoll said WX4NHC, celebrating its 30th year of volunteer public service at the National Hurricane Center, "passed out QSL cards and an information handout that included this message from NHC Director Bill Read:

"In an era with increasing reliance on high-speed technology, we still need the capability to relay critical information to and receive critical information from those communities in their time of greatest need—in times of disaster when most technology has failed. Frequently the only viable forms of

communication are the dedicated ham radio operators in or near the disaster area. We at NHC are grateful for the support of the team of radio operators staffing WX4NHC during tropical cyclone events and assisting in potentially life-saving communications."

"We hope for a quiet (2010) hurricane season," Ripoll said while looking ahead to the 2011 NHC Conference in Atlanta.

For more information about WX4NHC, visit: <http://www.wx4nhc.org>.

WX4NHC Takes to the Air for Hurricane Pre-Season Station Test

Operators at the NHC's WX4NHC chose Saturday, May 29 for this year's annual shakedown of its Miami-based amateur radio station.

Held from 9 AM to 5 PM Eastern time (1300 to 2100Z), it is planned each year to "test all of our radio equipment, computers, and antennas using as many modes and frequencies as possible," said veteran WX4NHC operator Julio Ripoll, WD4R.

The event was not designed as "a contest or simulated hurricane exercise. New equipment and software (is) tested," he said, and multiple frequencies and modes can be tested at any give time." The annual event is also used for operator training. NHC Director Bill Read, KB5FYA, was among those listed to take part in the on-air activities.

Several HF, VHF, and UHF frequencies were chosen, as well as 2- and 30-meter APRS. Allowing for QRM, the HF spots included: 3.950, 7.268, 14.325, 21.325, 28.425 MHz. The team tried to stay on 14.325 MHz most of the time and announced when they'd QSY, Ripoll said. South Florida VHF and UHF repeaters were included in the mix. The VoIP Hurricane Net (IRLP node 9219/ EchoLink WX-TALK Conference node 7203) was activated during a portion of the daylong test.

Stations taking part were urged to QSL (with SASE) to WD4R. For more details, visit: <http://www.wx4nhc.org>.

Part of the LCARES group that used 2-meter FM simplex during the March of Dimes Walkathon included (from left): Irv Butler, KB1E; Paul Branch, K3NON; John Walton, WB4HV; Eli Blanco, N4ELI; Al Richter, W4ALR, LCARES-EC; Bill Wornham, NZ1D; and Carl DePoy, K8BBT. (March of Dimes Walkathon photos by K1AYZ)

Lesson Learned: When VHF Conditions Get Goofy, Go Simplex

Members of the Lake County (Florida) Amateur Radio Emergency Service thought they were going to use their

Irv Butler, KB1E, holds down the net control position during the March of Dimes Walkathon in Taveres, FL.

standard repeater frequency during a March of Dimes Walkathon in late April, "but we knew we were in trouble early that morning when we could hear repeaters from all over the state of Florida breaking the squelch."

Ted Luebbers, K1AYZ, Lake County ARES public information officer, recalled how "unusual propagation and ducting (prompted) a shift from our 2-meter repeater to the use of a simplex frequency in order to deliver special event communications," scrapping previous plans.

"Here in Central Florida it was unusual to hear stations from Miami and Fort

Lake County ARES' new emergency communications trailer.

Al Richter, W4ALR, Lake County ARES Emergency Coordinator, left, stands with Rob Richardson, KI4NNU, who did a lot of work on the new trailer.

Myers reading full scale on our S-meters," K1AYZ said. "This propagation . . . would raise havoc," so the team went simplex, which "worked out surprisingly well, considering the distances we had to cover. The only problem we had was with a couple of handheld units."

That problem was solved "by going back to regular mobile rigs which ran anywhere from 10 to 50 watts," he said. "The other thing that helped was to put the 2-meter antenna at the top of the crank-up tower attached to our new emergency communications trailer."

The Lake County ARES group positioned its trailer at Wooton Park in Tavares, FL, where net control communicated with 13 rest stops that offered water, juice, fruit, and cookies to the Walkathon participants.

"Each rest stop had a ham operator to coordinate with the net control station," Luebbers said, "reporting on needed supplies, people passing through these checkpoints, and with Walkathon personnel at Wooton Park.

"In addition, we provided a van with a 2-meter mobile rig to transport walkers back to the park who found the seven mile trek too demanding or had a minor injury" that prevented them from finishing.

The Walkathon "is an annual event in Tavares which is always a great success and raises a lot of money for medical research and programs that help babies begin healthy lives," K1AYZ said. "This year the weather was great with plenty of sunshine and a comfortable temperature, so our Lake and Sumter County EMS people didn't have to deal with dehydration problems.

"The Lake County ARES hams always enjoy the opportunity to provide VHF radio communications . . . and it provides an excellent chance to train our members by helping them improve their communication skills and fine-tune our portable equipment."

Luebbers added that the operators "are well aware of the seriousness of these opportunities to practice their special skills, as many of them were deployed about three years ago in the aftermath of the Ground Hog Day Tornado that blew through this area."

For more details about Lake County ARES, visit: <http://www.n4fla.org>.

German Skywarn Team Schedules Visit to Oklahoma's "Tornado Alley"

Members of the German Skywarn team organized a visit to the United States in May "as part of their training in storm spotting," according to Andreas Kollmohr, DG8SBR, team co-coordinator.

A tour of Oklahoma's "Tornado Alley" was scheduled through the month, under plans coordinated by Germany Skywarn Vice Chairman Ansgar Berling and Sven Lueke, chairman. The Oklahoma Emergency Management Radio Club granted permission to the licensed operators on the German team to use WX5EM, the club callsign while in the United States.

This would "help identify the team quickly," reducing the chance for confusion, said Lloyd Colston, KC5FM, club trustee. Arrangements were also made for a tour of the National Weather Center in Norman, OK.

For more information about German Skywarn, see: <http://www.skywarn.de>. The web home of the Oklahoma Emergency Management Radio Club is: <http://wx5em.us/>.

Wanted: Your Stories of Amateur Radio Public Service

How have you, or has your EmComm group, contributed to the ever-expanding portfolio of amateur radio public service? We'd like to hear about it.

Whether it's been in a real-life emergency, disaster preparedness training, recruiting in the EmComm ranks, or in support of community activities, many of us have stories to tell. Sharing those experiences not only credits those who step forward to become involved, but also gives other responders perspective on how they might do things better or differently in the future. We welcome stories focusing on new equipment, initiatives, and procedures, as well.

As much as we're interested in hearing about the "now," there's a lot to be learned from the "then," as well, looking back on radio amateurs' long and distinguished EmComm history.

Please take a moment to drop us a line about your emergency communications activities—present, past or future. Via e-mail write to <ki6sn@cq-amateur-radio.com>, or through the U.S. Postal Service: 1940 Wetherly Way, Riverside, CA 92506. We'll take it from there. 73, Richard, KI6SN

MORE DEALS THAN YOU CAN SHAKE A STICK AT!

Call or email for our new Ham Radio Catalog!

TEXAS TOWERS

Savings As Big As Texas!

Alpha-Delta • Ameritron • ARRL • Astron • Bencher • Butternut • Cal-Av • Comet • Cushcraft • Daiwa • Diamond • Force 12 • Gap • Glen Martin • Hustler • Hygain • Icom • Kenwood • Lakeview • Larsen • LDG Electronics • M2 • MFJ • Polyphaser • Phillystran • Rohn • Tex-Com • Times Microwave • Universal Tower • US Tower • Vibroplex • Yaesu

KENWOOD

KENWOOD TS-2000

Huge Band Coverage, All Mode HF/6m/2m/70cm, Auto Tuner, CW Memory Keyer, Dual RX, Dual DSP, Built-In 1200/9600 bps TNC, TCXO, and Much More!

$250 KENWOOD COUPON!

KENWOOD TS-480SAT

Mobile Performance, All Mode HF/6m, Auto Tuner, Separate Front Control Panel, 16-Bit DSP, CTCSS Encode/Decode, More!

$300 KENWOOD COUPON!

KENWOOD TM-D710A

Mobile 2m/70cm FM XCVR With Built-In TNC, Separate Front Control Panel, CTCSS Encode/Decode, 1000 Memory Channels, and Much More!

CALL FOR YOUR LOW PRICE!

TIMES LMR COAX

High performance coax cable. Offers lower loss than RG-213/U without the water displacement problems common to 9913 and 9086 types.

HUGE LMR STOCK, CALL!

cushcraft

CUSHCRAFT A3S

Three element triband beam with optional 30/40m kit. Compact yet rugged design with all stainless steel hardware. Perfect for limited space application.

CALL FOR MORE CUSHCRAFT!

ALUMINUM TUBING

O.D.	WALL	COST/FT.
6063-T832 DRAWN ALUMINUM TUBING		
.375"	.058"	$1.00
.500"	.058"	$1.10
.625"	.058"	$1.20
.750"	.058"	$1.30
.875"	.058"	$1.40
1.000"	.058"	$1.50
1.125"	.058"	$1.65
1.250"	.058"	$1.85
1.375"	.058"	$2.05
1.500"	.058"	$2.25
1.625"	.058"	$2.55
1.750"	.058"	$2.80
1.875"	.058"	$3.05
2.000"	.058"	$3.30
2.125"	.058"	$3.80

M2

M2 KT-34M2

Four element, short boom triband beam is long on performance! Rugged design with all stainless steel hardware offers broad gain, high F/B ratio, and flat match. Supplied with broadband ferrite balun rated at 3000 Watts.

CALL FOR M2 ANTENNAS!

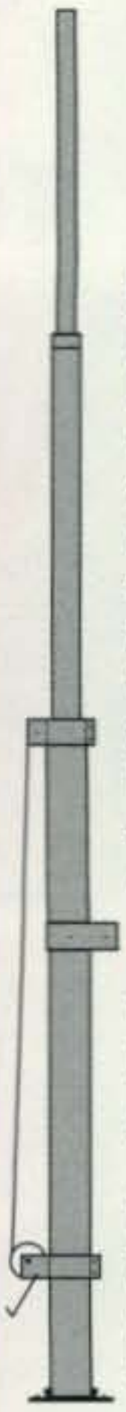
Yaesu G-1000DXA

ANTENNA ROTATORS

Hygain, CD-45II	$399
Hygain, Ham-IV	$589
Hygain, Ham-V	$989
Hygain, T2X	$699
Hygain, T2X Digital	$1099
Hygain, HDR-300A	$1349
M2, OR-2800PX	$1329
Yaesu, G-450A	$259
Yaesu G-550	$329
Yaesu, G-800SA	$369
Yaesu, G-800DXA	$429
Yaesu, G-1000DXA	$509
Yaesu, G-2800DXA	$1129
Yaesu G-5500	$589

ROTOR CABLE IN STOCK, CALL!

US TOWER CORPORATION



MA SERIES

Neighbor Friendly Design offers a flag-pole-like appearance, while supporting antenna loads up to 22 square feet. Models range from 40–85 feet in height and come with a hand winch and house bracket. Optional self supporting bases are also available.

TOWER EXPERTS

We Ain't Braggin'...

But we've helped so many Hams order US Towers over the years that we've become the US Tower experts. Please call for help selecting the perfect US Tower for your QTH!

Universal

B-18 SERIES

Light Duty Aluminum Self Supporting Towers. Five models range from 30–50 feet in height, and support up to 12 sq. ft. of antenna load.

CALL FOR MORE INFO!

B-26 SERIES

Medium Duty Aluminum Self Supporting Towers. Thirteen models range from 30–90 feet and support up to 34.5 sq. ft. of antenna wind load.

CALL FOR MORE INFO!

B-30 SERIES

Heavy Duty Aluminum SelfSupportingTowers. Nineteen models range from 40–100 feet, and support up to 34.5 sq. ft. of antenna wind load.

CALL FOR MORE INFO!

TEXAS TOWERS

1108 Summit Avenue, #4 • Plano, TX 75074
Hours: M-F 9 AM–5 PM Central Time
Email: sales@texastowers.com

MASTERCARD
VISA • DISCOVER

TOLL FREE **(800) 272-3467**

Proudly Serving Ham Operators Since 1978!
Visit Our Website for More Great Deals:
http://www.texastowers.com

magic in the sky

BY JEFF REINHARDT,* AA6JR

The Treasure Trove

We've all heard that "beauty is in the eye of the beholder." Fair enough, and one person's trash may well be another's treasure. Platitudes aside, we humans show a propensity to become attached to inanimate objects for reasons that are inexplicable; they have no basis in rationality. Very often, the attachment is emotional.

As cable and satellite TV channels continue their fragmentation into serving narrower interest groups, we now see programs and entire channels devoted to activities such as cooking, home improvement, fashion design, antiques and classic cars, fitness, and more. Wouldn't it be great to someday see a "CQ" TV channel that brings us 24-hour programming on the multiple different aspects of ham radio and the many ways to enjoy our favorite hobby?

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

Until that time, here at the "Magic Channel" of *CQ* we'll explore the sometimes amazing world of ham radio collectibles. During my adventures of traveling the world, I've had the pleasure of seeing a number of fascinating and diverse collections, from viewing the masterpieces of well-known art galleries, to an obscure and eclectic collection of bottles and roadside castaways on an abandoned section of Route 66 (near Barstow, California, if you're really curious). Collections may include items from Hummel figurines to Lionel train sets, glassware from beer bottles to delicate hand-blown flowers that appear real, butterflies, coins, baseball cards and stamps, rubber bands, and balls of string. We gather "stuff" but are hard-pressed to explain why we do it or explain how it may even become obsessive behavior.

One of the newer TV shows is found on the History channel. It features two guys who drive around the country picking through people's "trash and treasure" collections looking for "nuggets." The few

Believe it or not, this is just part of a private collection of radio gear owned by a friend who will remain anonymous. (All photos by the author)

A Dayton treasure, complete with manual. Perhaps someday it will be a valued antique, but today it's a functional amplifier.

episodes I've seen have not featured radio gear, but one can hope, right?

What's in Your Radio Collection?

As a ham, what's in your radio collection? Many *CQ* cover photos showcase impressive shacks that are the pride of their owners and the envy of the rest of us. You probably remember your first ham radio very well. Is it still in your shack? Let's dig a little deeper and see what we find and which items hams have in their possession.

Go to any ham swap meet and you'll find an array of items, some expected, some surprises. The recently concluded Dayton Hamvention® gathering is probably the mother of all such events, with a swap fest that offers endless variety. Collectors often descend looking for bargains on the classics, which offer the enjoyment of owning a piece of history that also has function. Names such as Collins, Hallicrafters, Gonset, Clegg, National, Galaxy, and even the venerable Heathkit offer a connection with ham radio's past. More "recent classics" include some of the early offerings of Kenwood (aka Trio), Yaesu (Vertex Standard), and ICOM.

Ham radio collecting doesn't start and end with transmitting and receiving gear, however. I've seen splendid collections of peripherals such as microphones, speakers, and perhaps one of the most diverse areas of collecting includes the keys that have formed the dots and dashes for going on 150 years of communications. Headphones, antenna matching boxes, vacuum tubes, crystals, and would you believe even catalogs from many now-defunct suppliers can offer collectors a connection with the past that brings a pleasurable smile to those who recall those "thrilling days of yesteryear," especially the postwar era of inexpensive surplus gear that was a bargain-hunter's dream.

One of the more difficult items to collect would be antennas, although there is an endless variety, from hand-held duckies to various verticals, Yagis, quads, dishes, arrays, and dipoles. And that's before we even begin to consider towers!

Locating "The Vault"

You probably know a ham who has a collection that dominates a basement or garage. I do, but I will not name the names or the locations. I admire not only their devotion to their respective collections, but the broad knowledge they have of almost every item. I also admire the patience and tolerance of their long-suffering spouses.

For some of us, our personal collection constitutes a "museum" of sorts. For others it's a gathering of items that need repair to become functional, or perhaps suitable for sale at a higher price. For a few, it's simply an investment in an antique item. Let's face it; they're just not making some of that special gear anymore. It will only get more rare as time passes by. Sadly, many items considered "collectible" really don't appreciate all that much. The only sound investment advice I can pass along is a quote from Will Rogers: "Buy land—they ain't makin' any more of the stuff." Anything else carries a higher risk.

Therefore, the conventional wisdom I have come to value is to collect items that simply bring you pleasure in owning them. What's funny is the stuff I like

LDG ELECTRONICS

NEW! AT-600Pro

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

radio not included

Z-817

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

KT-100

LDG's first dedicated autotuner for Kenwood Amateur transceivers. Easy to use - just right for an AT-300 compatible Kenwood transceiver (except TS-480HX). The KT-100 actually allows you to use the Tune button on the radio. The LEDs on the front panel indicate tuning status, and will show a match in seconds, or even less of you've tuned on or near that frequency before. Has 2,000 memories for instant recall of the tuning parameters for your favorite bands and frequencies. If you have an AT-300 compatible Kenwood radio, you can simply plug the KT-100 into your transceiver with the provided cable; the interface powers the tuner, and the Tune button on the radio begins a tuning cycle. The supplied interface cable makes the KT-100 a dedicated tuner for most modern Kenwood transceivers. ***Suggested Price $199.99***

AT-200Pro

The AT-200Pro 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. Includes Icom interface cable, DC power cable and coax jumper. ***Suggested Price $249***

NEW! Z-11Proll

Meet the Z-11Proll, 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-11Proll uses LDG's state-of-the-art processor-controlled Switched-L tuning network. It will match dipoles, verticals, inverted-Vs or virtually any coax-fed antenna. With an optional LDG balun, it will also match longwires or antennas fed with ladder-line. Includes Icom interface cable, DC power cable and coax jumper. ***Suggested Price $179.99***

Our customers have always known we're #1

But did you know that LDG was the first company with a "no questions asked" two-year transferable warranty on ALL our products and the first company to include all cables with our autotuners? LDG autotuners also have the highest resale value of any autotuner on the market today. Our customers feel good about owning LDG products and so will you! Call us or log-on today!

Join the LDG Yahoo Group at > http://groups.yahoo.com/group/LDG-auto-tuners/

The #1 Line of Autotuners!

NEW! AT-100ProII

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

radio not included

AT-897Plus for the Yaesu FT-897

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

radio not included

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

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

NEW! M-7600 For IC-7600. It will display S-meter on receive, or power out, SWR, ALC level or supply voltages, all selectable from the radio's menu. What's more, the M-7700 and the virtual meter on your radio can work together. ***Suggested Price $79.99***

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

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

AT-1000Pro

The AT-1000Pro has an Automode that automatically starts a tuning cycle when the SWR exceeds a limit you set. Operates at any power level between 5 and 1,000 watts peak. RF Relay protection software prevents tuning at greater than 125 watts. Tunes from 1.8 to 54.0 MHz (inc. 6 meters), with tuning time usually under 4 seconds, transmitting near a frequency with stored tuning parameters, under 0.2 seconds. 2000 memories. 2 Antenna connections. Includes Icom interface cable, DC power cable and coax jumper. ***Suggested Price $599***

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***

Z-100Plus

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

IT-100

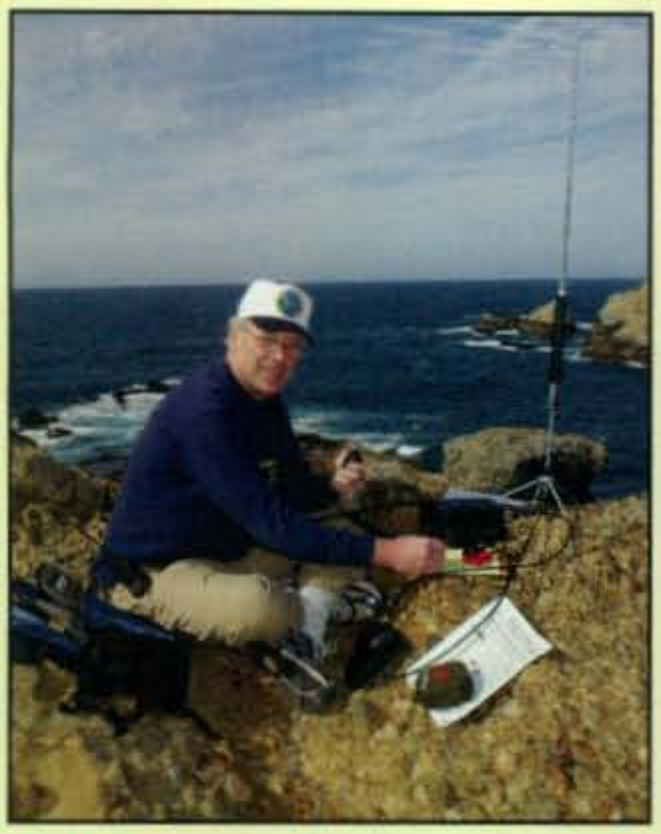
Matched in size to the IC-7000 and IC-706, the new IT-100 sports a front panel push-button for either manual or automatic tunes, and status LEDs so you'll know what's going on inside. You can control the IT-100 and its 2000 memories from either its own button or the Tune button on your IC-7000 or other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

To order today, call or visit your favorite dealer!

Visit www.ldgelectronics.com for a complete dealer list.

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

LDG



On the Cover

Eric J. "Rick" Lagerstrom, KN6FR, of Seaside, California, operates HF from a hilltop overlooking the Pacific Ocean at Point Lobos—the location that according to local lore inspired Robert Louis Stevenson to write his classic novel, *Treasure Island.* It inspires Rick to get on the air and make ham contacts using his Yaesu FT-817 transceiver and a portable MP3 backpack antenna. Rick says he has long enjoyed hiking and has included ham radio as part of his treks since the mid-1990s.

A tireless promoter of amateur radio, Rick is involved in a variety of organizations that help encourage people to get licensed and on the air, and was the ARRL Instructor of the Year in 1996/97. He has been an event leader at a wide variety of activities, including area Multiple Sclerosis Society walks, the California International Air Show and the Big Sur International Marathon.

Rick is a professor at Golden Gate University in San Francisco, teaching business and technology courses, into which he often integrates amateur radio (in his RF and Wireless course, students who get a ham license don't have to write a term paper!). He is also in the process of completing his own Doctor of Business Administration degree at Golden Gate, specializing in organizational behavior and development. Amateur radio has been a central underpinning of his work so far, serving as the topic for five major papers and his forthcoming dissertation.

Five years ago, Rick's two sons, James (KE6VNN) and Robert (KE6VNG), were on our cover. Rick says that James has used his amateur radio knowledge and experience to qualify for the U.S. Army's "25-Bravo" program and is currently serving as an information systems operator/analyst with the Army's 10th Mountain Division, an assignment that has taken him several times to Iraq and Afghanistan. *(Cover photo by Larry Mulvehill, WB2ZPI)*

You have to see it to believe it. Roadside debris becomes an art collection on an abandoned stretch of old US Route 66 near Barstow, CA.

is either really expensive (as in unaffordable) or really ordinary, as in functional but not really worth a lot to someone else, so I have a lot of ordinary stuff that works well, and that's OK.

The other thing that should reside in the back of any beginning collector's mind is the realization that it's easy to get burned by paying too much for an item. It's better to read up on a subject and pick the brains of experienced collectors for their very valuable knowledge—and even they get burned now and then. Passing along a tip I learned, you're more likely to find bargains on radio gear at neighborhood estate and garage sales than at dedicated radio swap gatherings.

Places to Visit

With the summer travel season upon us, a visit to museums is a great way to enjoy time away from home and gain some perspective on the things we enjoy. If you love antiques, there are many corridors in the USA that offer such pleasures, such as the area near Cooperstown, NY, or the event known as "world's biggest garage sale" found along US 40 (the old Lincoln Highway) in the Midwest. Somewhat to the west of Cooperstown along New York's historic Route 5 and 20 corridor is one of the first radio museums, in the rustic hamlet of Bloomfield. Not far away in Rochester, NY, the Antique Wireless Association will be holding its annual convention August 17–21. See <www.antiquewireless.org for details>.

Of course, ARRL HQ in Newington, CT has an impressive collection of items to seeThe Smithsonian in Washington, DC has recently redone its American History museum, and I'm told you can easily spend a day there. The beauty of mixing our hobby with touring can be found in the many resources offered by the internet and newer mobile phones that offer detailed information access from just about anywhere.

"X" Marks The Spot

So, if you're an experienced collector or a fan of all things associated with radio, you don't have to travel the world in search of treasures. Unlike the fabled pirate maps that showed the location of buried treasure, the "X" that marks the spot to begin the fun of collecting is right under your feet. Sometimes all it takes to find a treasure is letting others know of your interest, which is good old-fashioned networking. That can lead to a phone call from a friend that starts with, "Hey, I just stopped by this garage sale and there's this funny-looking radio that says 'Collins' on the front...."

The pleasures, treasures, and ad ventures you may find in the pursuit are just one more way to enjoy the "Magic In The Sky."

73, Jeff, AA6JR

MFJ *Pocket size* Morse Code Reader™

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

Is your CW rusty?

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

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

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

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

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

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

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

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

MFJ-461
$89.95

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

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

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

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

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

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

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

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

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

MFJ Morse Code *Reader and Keyer* Combination

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

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

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

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

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

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

MFJ Iambic Paddles

MFJ-564 Chrome
MFJ-564B Black
$69.95

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

***Miniature* Travel Iambic Paddle**

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

MFJ Code Oscillator

MFJ-557
$39.95

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

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

MFJ Deluxe CW Keyer

Deluxe MFJ Keyer has all controls on front panel for easy access -- speed, weight, MFJ-407D tone, volume knobs, and tune, semi/ **$79.95** auto, on/off push-buttons. You get all keyer modes, dot-dash memories, self completing dots/dashes, jam- proof spacing, sidetone, built-in speaker, type A /B keying. RF proof. Solid state keying. 7x2x6 inches.

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

Keyer/Paddle Combo

MFJ-422D
$189.95

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

MFJ-422DX, $99.95.

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

MFJ*Pocket* Morse Tutor

Learn Morse code anywhere with this tiny *MFJ Pocket-sized Morse Code Tutor*™! Practice copying letters, numbers, prosigns, punctuations MFJ-418 or any combination or words or **$89.95** QSOs. Follows ARRL/VEC format. Start at zero code speed and end up as a high speed *CW Pro!* LCD, built-in speaker.

MFJ *ClearTone*™ Speaker

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

MFJ 24/12 Hour Station Clock

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

Free MFJ Catalog

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

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

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

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

kit-building

BY JOE EISENBERG,* KØNEB

More Hints and Tips and a Look at the MFJ "Cub"

I have found a lot of tips lately having to do with surface-mount components. Some kit manufacturers have gone to the step of pre-mounting surface-mount components to the board, as in the popular MFJ "Cub" series of CW transceiver kits as well as the Hendricks PFR-3 and the Elecraft KX-1. The new "Retro-75" 75M AM transceiver kit by Small Wonder Labs has only one surface-mount part, and it also comes pre-mounted. Using a tiny drop of super glue to hold a component in place is a tip I often see, but unless the part is big enough, you run the risk of melting the glue and causing connection issues. Remember to go slowly and be careful when mounting surface-mount parts and always double-check their ID.

With the warm summer months here, a nice afternoon or evening project for a builder is the MFJ Cub series of kits. These are available for all bands from 80 to 15 meters. These single-band transceivers cover the CW portion of the band and have variable tuning to allow you to transmit and receive over a wide range. The receiver has crystal filtering for better selectivity. These kits are also unique in that when you sort out the parts, there are no resistors! Usually resistors are the most common parts in a kit, followed by common value capacitors, such as .1 µf and .01 µf, as well as electrolytic capacitors. In these kits, neither those capacitors nor any resistors are in the bag of parts. The reason is that a majority of these components are pre-mounted surface-mount parts, so the builder does not have to deal with surface-mount (see photo A). It also removes some of the tedium of placing all of those parts on the board if they were standard components. This also has the advantage of making the finished product a lot smaller than would have otherwise been possible, making for a CW transceiver that is compact enough for easy backpacking and travel.

Also, there are only two polarized parts, the varicap and the LED, so there is a lot less chance for error when building a Cub. Assembly takes about 3 1/2 to 4 hours, and there are only two identical toroids to wind, a topic I covered this past January. A case and knobs are supplied as well, making these kits complete and ready to use on the air when finished. I will use the MFJ-9340K 40-meter band version for my example.

*7133 Yosemite Drive, Lincoln, NE 68507
e-mail: <k0neb@cq-amateur-radio.com>

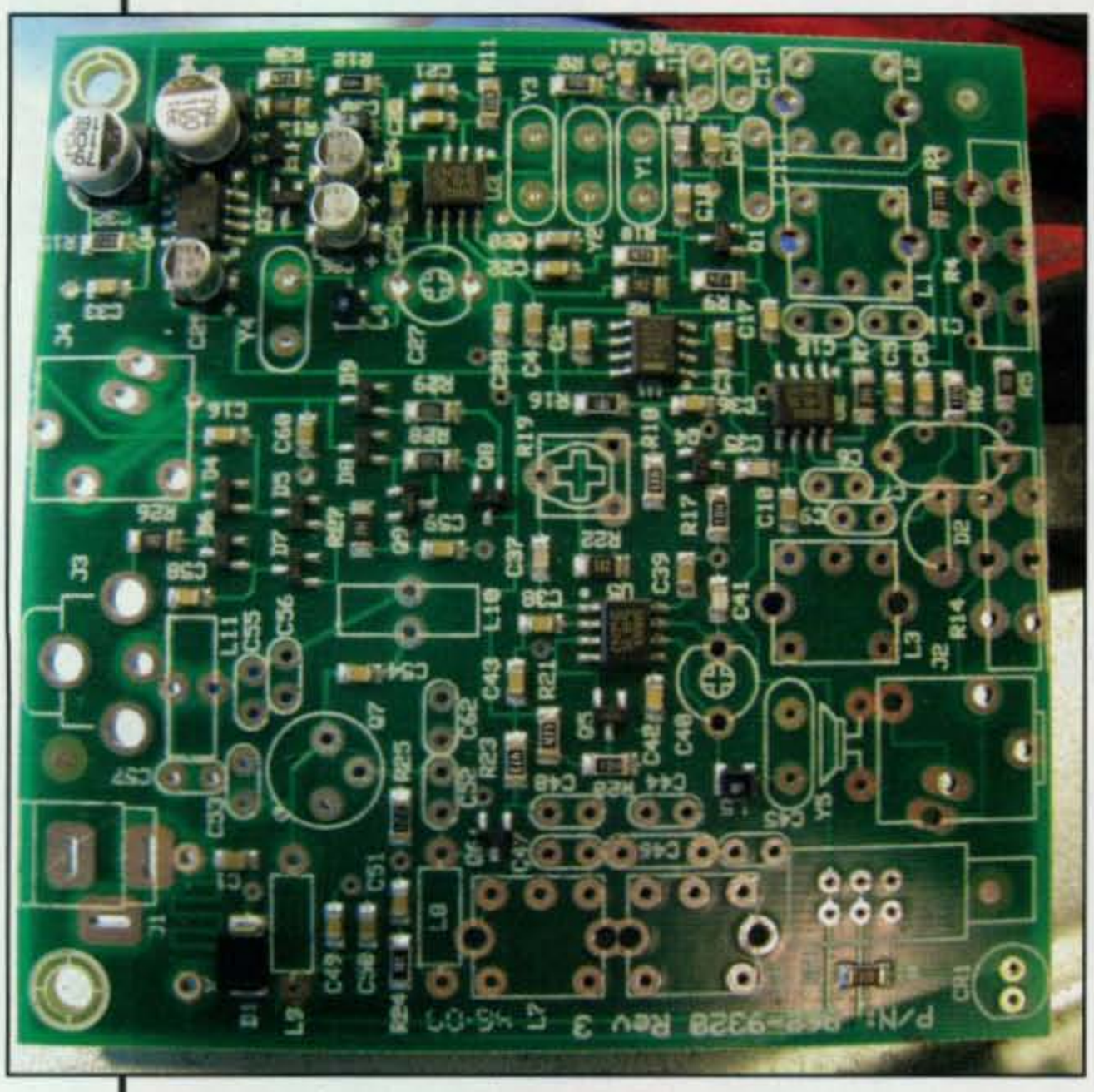


Photo A– MFJ Cub board before assembly. Note the large number of surface-mount components already pre-mounted by the factory.

Starting Large

The instructions begin with placing the large components on the board that are not specific to the band your kit covers. These larger parts are pretty easy, as they only go in one way and fit well (photo B). After you have placed the pots, jacks, and switch on the board, the process continues with the parts that are specific to your chosen band.

Usually when building a kit, I try to place the resistors in one direction with the color stripes going from left to right or top to bottom. This helps me to check my parts placement before connecting power to my kit. I usually place the non-polarized capacitors with the printing facing the same direction of the printing on the board below it (photo C). However, when placing capacitors next to a larger part that might block my view, I usually make the printing on the capacitor face outward so that it can easily be viewed in case of troubleshooting. When trying to figure out if you misplaced a capacitor, it is helpful to be able to easily read its value instead of having to possibly damage the part by pulling it away from a larger adjacent part. You should be able to look at the board from the side and see most of the part values unless they are unavoidably hidden by another part.

It is also a good idea to mount all parts as close to the board as possible, still allowing for enough space for bending the leads properly and not damaging the part. In this kit, the output transistor and the five crystals are specified to be mounted with space above the board for insulation purpos-

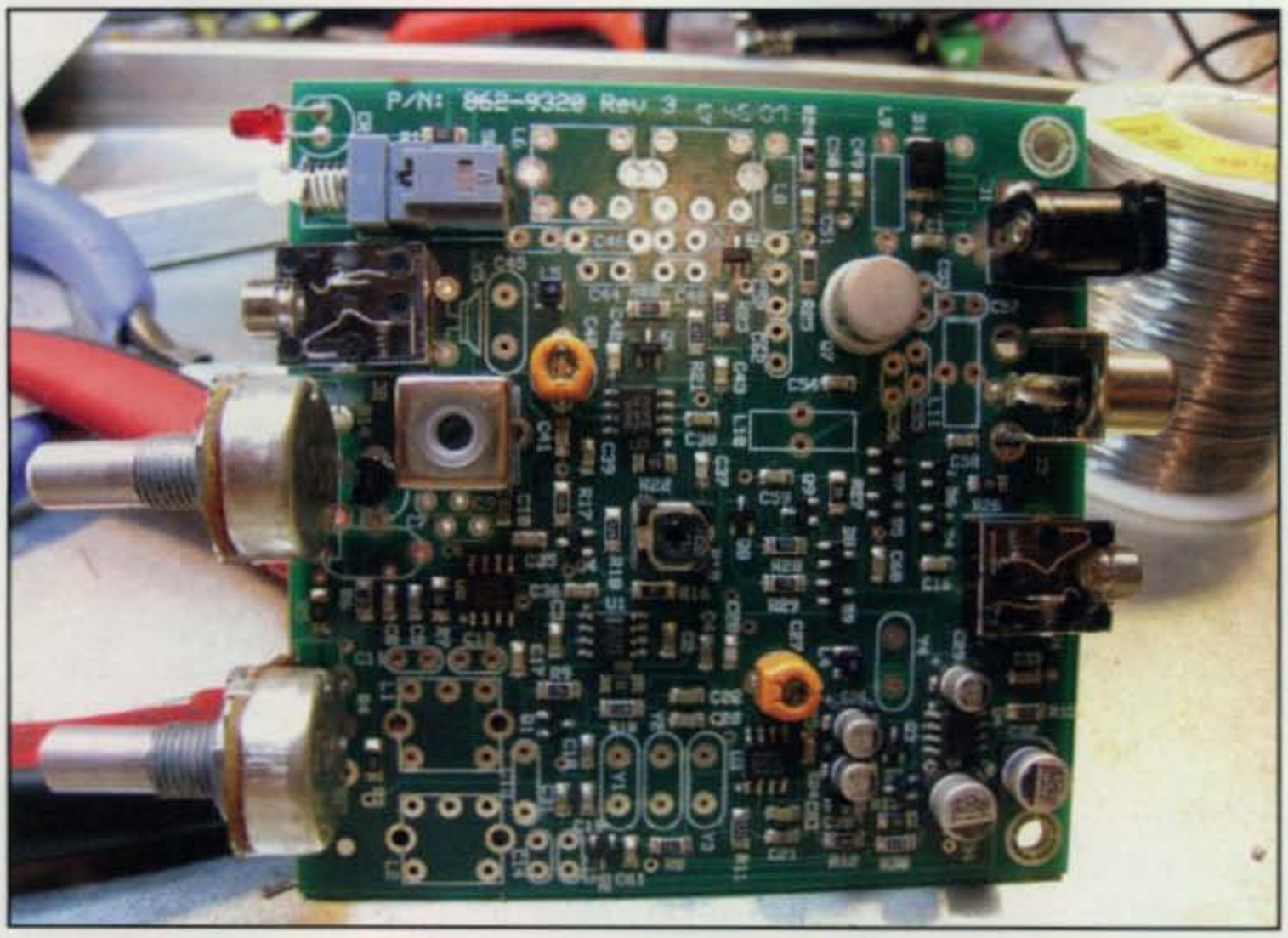


Photo B– Major controls and some large parts added to the board during assem-bly. Note the small number of components needed to complete this kit.

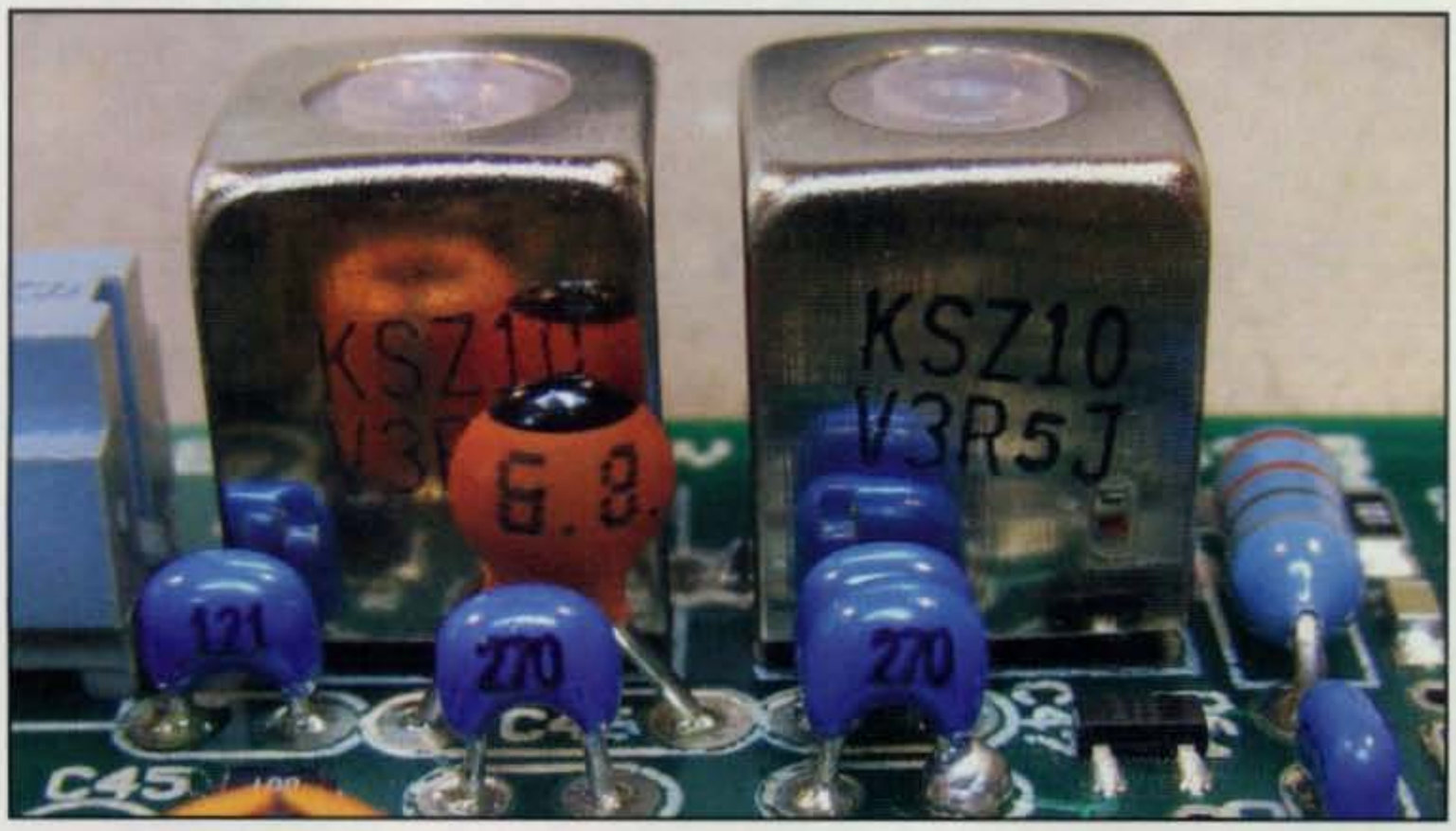


Photo C– Capacitors placed facing outward from nearby larger parts for easy identification

es, as they have metal cases that could short out.

The two toroids have exactly the same number of turns and are not a large number, so they are easy to count and wind, although the wire is quite stiff. Be sure to clean their leads well and tin them before placing them on the board to be sure of making a good connection. When mounting the square tunable coils, bending the two side tabs under the board helps to hold them in place.

Getting Aligned

This kit does not come with the proper tuning tools, so be sure you have access to non-metallic tuning tools to be able to align the kit (photo D). Using metal tools could cause the coil slugs to break as well as make it difficult to properly tune and peak the transceiver. When mounting it into the case, you will find an extra hole in the rear above the RCA jack used for the RF output. This hole is specially cut to fit a panel-mounted BNC jack (photo E). I have found these panel-mount BNC jacks at many flea markets for very low cost. I recommend using a BNC connector, as RCA

Photo D– Completed kit in case with the required tuning tools on the top.

plugs have a tendency to fall out but BNC connectors lock in. The manual calls for using a piece of scrap wire leads left over from making the kit to connect the center lead of the BNC jack to the center lead of the adjacent RCA jack below it. That way you can use either one.

Using a good general-coverage receiver and/or a frequency counter will help in the alignment process as well. If you have any doubts about alignment, take your kit to a friend who has the tools to do a good job. It will be a great learning experience and you will find out what you need to do when building future kits, or the other Cub kits for different bands. The good thing is that once aligned, there are no other internal adjustments to be made. After alignment, I was able to get 1.5 watts output from my 40-meter Cub.

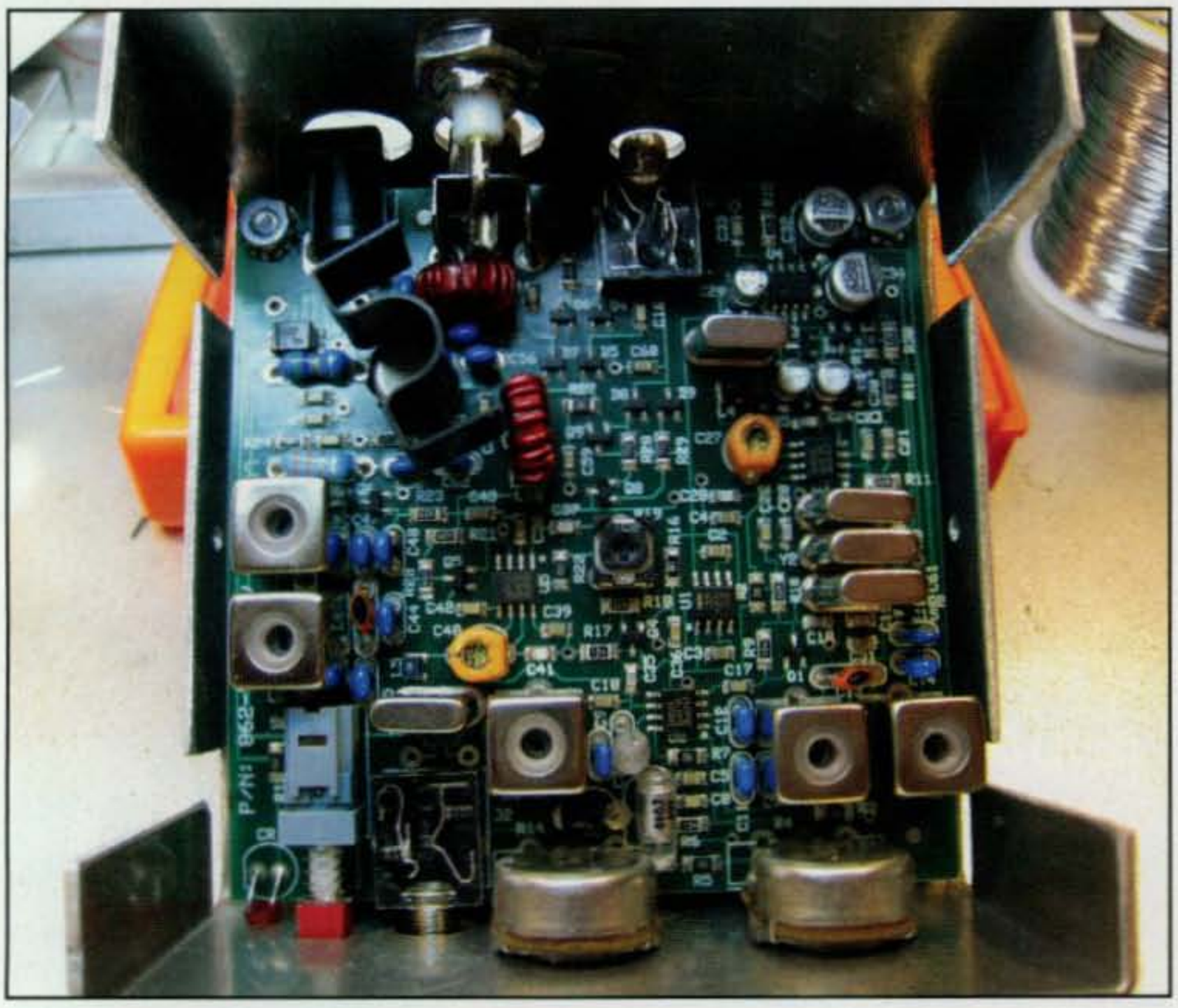


Photo E– Completed board mounted in the case. Note the added BNC connector placed above the RCA connector.

There have been a number of modifications to this kit published online. Simply Googling "MFJ Cub mods" will give you links to most of them. There are mods to improve the keying envelope, increase power output, add RIT (receiver incremental tuning), and reduce drift. The manual also includes a list of compatible transistors to substitute for the supplied power output transistor for higher output and suggestions on how to mount the most common ones. Download the manual from MFJ at <http://www.mfjenterprises.com> to get a better idea of the inner workings of this series of kits.

The Cubs are available directly from MFJ or from any of a number of MFJ distributors. The ARRL also sells this kit along with a very helpful book called *Low Power Communication* by *CQ* "Learning Curve" editor Rich Arland, K7SZ.

If building this kit as a group project, be sure to have a test bench ready with the proper alignment tools and equipment for best results, including a test antenna or dummy load. Think of the fun of making contacts while connected to the dummy load with others in your group once the kits are all completed! Be sure to also have an adequate 12-volt power supply on hand.

For better narrow CW filtering when using the Cub, consider the NESCAF audio filter. This audio filter kit gives a wide range of bandwidths and filter peaking to bring out those harder to copy CW signals. You can get the NESCAF at <http://newenglandqrp.org/store>.

Update...

An update to my March column where I pictured a surface-mount low-power dummy-load kit: Hendricks Kits (<http://www.qrpkits.com>) has begun selling a new version of that kit which comes with both surface-mount and conventional through-hole components. It comes with both sets of parts, but the builder chooses only one type to complete the kit. Thus, you have a choice if you wish to tackle surface-mount or if you want to stick with conventional through-hole components! It sells for $15, and is a great kit for group building as well. It is also an excellent companion to the MFJ Cub for testing and adjustment, as the predecessor to this kit was used when I aligned my Cub.

Until next time . . . 73 de KØNEB

CQ Books & CDs

VHF Propagation

by Neubeck, WB2AMU & West WB6NOA

A comprehensive source-book on VHF propagation by two great authors. Includes: Tropo ducting, Aurora,Meteor Scatter, TEP, Sporadic-E, Combo Modes and more!

Order VHF PROP $15.95

2010 World Radio TV Handbook

Up-to-date info on medium-wave, shortwave, and FM broadcasts and broadcasters. Includes articles of interest to both listeners and DXers, reviews of the latest equipment, maps with SW transmitter sites and much more!

Order WRTH $35.00

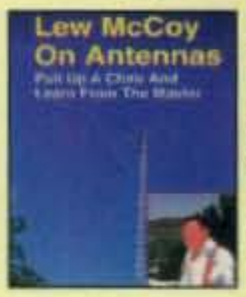
The NEW Shortwave Propagation Handbook

by W3ASK, N4XX & K6GKU

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

Order SWP $19.95

McCoy on Antennas



by Lew McCoy, W1ICP

Unlike many technical publications, Lew presents his invaluable antenna information in a casual, non-intimidating way for anyone!

Order MCCOY $19.95

33 Simple Weekend Projects

by Dave Ingram, K4TWJ

Do-it-yourself electronics projects from the most basic to the fairly sophisticated. You'll find: station accessories for VHF FMing, working OSCAR satellites, fun on HF, trying CW, building simple antennas, even a complete working HF station you can build for $100.

Order 33PROJ $17.95

W6SAI HF Antenna Handbook

by Bill Orr, W6SAI

One of ham radio's most respected authors, W6SAI was known for his easy-to-understand, down-to-Earth, writing style. In keeping with this tradition, this book is a thoroughly readable text for any antenna enthusiast, jam-packed with dozens of inexpensive, practical antenna projects that work!

Order HFANT $19.95

NEW!

Reflections III

by Walter Maxwell, W2DU

Fully revised and updated, this 424-page, third edition is a must have!

Here's a sampling of what you'll find inside:
Too Low an SWR Can Kill You
The View Into the Conjugate Mirror
Using the Smith Chart
The Line Match Problem
Computer Programs for Impedance Matching
and much, much more!.

Order REFLEC $39.95

The Quad Antenna

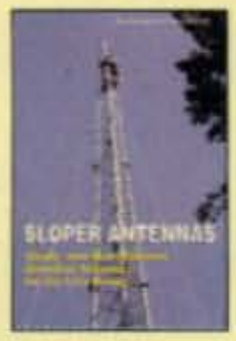
by Bob Haviland, W4MB

A comprehensive guide to the construction, design and performance of Quad Antennas.

Order QUAD $19.95

Sloper Antennas

By Weigl, OE5CWL



Single- and Multi-Element Directive Antennas for the Low Bands
With calculations and practical experience, this book shows which basic concepts have to be considered for sloper antennas for the low bands. You'll find all the information needed for successful home building of the antennas.

Order SLOPER $24.95

cds Ham Radio Magazine on CD

Enjoy quick and easy access to every issue of this popular magazine, broken down by years!

SPECIAL! Save $5 on each CD set

ON SALE - only $54.95 ea.

Three sets, each containing 4 CDs

1968-1976 Order HRCD1 ~~$59.95~~

1977-1983 Order HRCD2 ~~$59.95~~

1984-1990 Order HRCD3 ~~$59.95~~

Buy All 3 Sets and Save $49.90!

Order HRCD Set

$129.95 (Reg. $149.95)

The Short Vertical Antenna and Ground Radial

by Sevick, W2FMI

Small but solid guide walks you through the design and installation of inexpensive, yet effective short HF vertical antennas. With antenna restrictions becoming a problem, it could keep you on the air!

Order SVERT $10.00

Understanding, Building & Using Baluns & Ununs

by Sevick, W2FMI

Successor to the popular and authoritative Baluns and Ununs. Great deal of new tutorial material, and designs not in previous book, with crystal clear explanations of how and why they work.

Order 2BU $19.95

Shipping & Handling: U.S. & Possessions-add $7 for the first item, $3.50 for the second and $2 for each additional item. FREE shipping on orders over $100 to one U.S. address. Foreign-calculated by order weight and destination and added to your credit card.

CQ Communications, Inc. • 25 Newbridge Road, Hicksville, NY 11801
Call: 1-800-853-9797 • Fax: 516-681-2926 • website: www.cq-amateur-radio.com

learning curve

BY RICH ARLAND,* K7SZ

"Cogito Ergo Sum!"

Seventeenth century philosopher, physicist, mathematician, and one of the prime movers behind the Western Philosophy movement, Rene Descartes summed it all up very succinctly with those three words—"Cogito Ergo Sum!"—I think, therefore, I am!

Had Rene lived in our age, undoubtedly he would have come up with "Cogito Ergo CQ!"—I think, therefore I Ham! (Sorry, Rene, but really it was just *too* tempting not to do that!)

Actually, that butchered Latin phrase is quite appropriate. Amateur radio is a thinking man's (or woman's) hobby. It is very technical in nature and it requires a certain level of technical competence in electronics, shortwave propagation, antenna theory, international radio law, and RF radiation hazards in order to obtain an FCC license to utilize the amateur bands. Had ham radio been around in Rene's time, undoubtedly he would have had a callsign!

This month we are going to exercise our gray matter a bit, in homage to Rene. In this column we are going to explore the mystifying nether world of inductors, capacitors, and how they perform as a "transmatch," or more commonly (and improperly) called an "antenna tuner" or "antenna tuning unit" (ATU).

The transmatch connects between the output of the transmitter or transceiver and the antenna. In essence it is nothing more than a device that matches the output of the transmitter to the coaxial cable or balanced feedline that carries the radio frequency (RF) energy to the antenna. In reality, it *does not* "tune" the antenna; it only matches the impedance between the transmitter output and the input of the transmission line.

What's impedance? Glad you asked. Impedance is alternating current (AC) resistance. Impedance is to AC what resistance is to DC. Both are measured in ohms. However, we are talking about radio frequency (RF) energy, right? Right! Think of RF as really, really fast AC. The higher the frequency, the faster the RF moves.

OK, we've discovered that RF energy is really rapidly alternating current. One of my college professors summed it up rather nicely: RF is AC that leaves the wire. Well, that's how we communicate. We radiate RF energy from our wire (antenna) and it travels through space to the receiving station. Pretty simple, but I am still amazed at the contacts I make using radio. That is what keeps this hobby interesting for me and hundreds of thousands of other ham radio operators.

Now getting that signal from the transmitter to the antenna can be kind of tricky at times. Ideally, we need a method that will allow us to transfer the maximum power from the transmitter to the antenna with as little loss as possible.

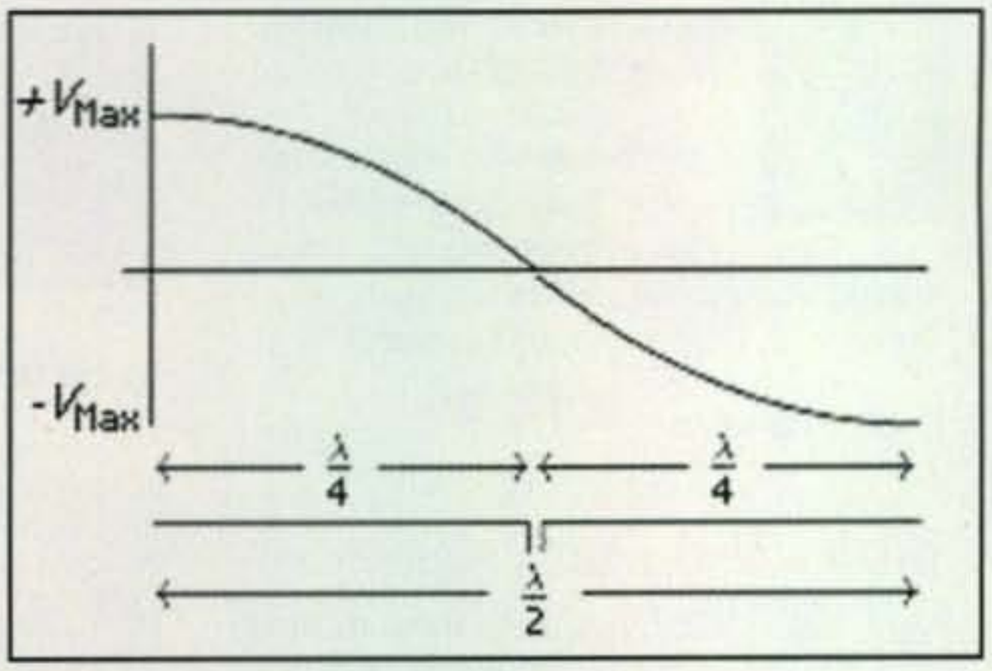


Fig. 1A– RF voltage distribution across a half-wavelength dipole. Note that the maximum RF voltages are developed at the ends of the elements where the impedance is highest.

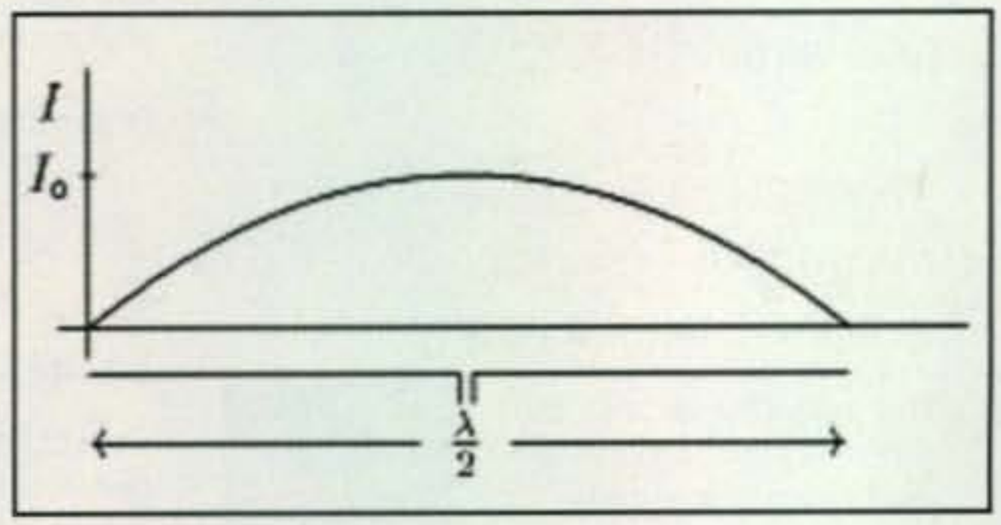


Fig. 1B– RF current distribution across a half-wavelength dipole. Here we see maximum RF current at the feedpoint of the dipole, which is the low-impedance point on this antenna.

OK, so we have this transmitter with a 50-ohm output and a wire dipole antenna about 55 feet away from our shack. How do we get the RF from point "A" to point "B"? The most common method used today is 50-ohm coaxial cable. You can connect one end of the coax to the transmitter and run it out to the antenna, hooking it up directly to the feed point and start transmitting. It will work. Maybe not well, but most likely it will work, provided that the antenna is resonant on the band you have your transmitter tuned to and the length of the coaxial cable is around 1/2 wavelength long at your operating frequency. If any one of these three factors changes, there will be an impedance mismatch on the feedline.

This mismatched condition can cause several things to happen. First, your transmitter power output will start to decrease as your rig senses this mismatch. This takes place so the rig's final amplifier circuit won't be damaged. Second, there will be an increase in standing wave ratio (SWR) which can actually be measured using an in-line SWR

*770 William St. SE, Dacula, GA 30019
e-mail: <k7sz@arrl.net>

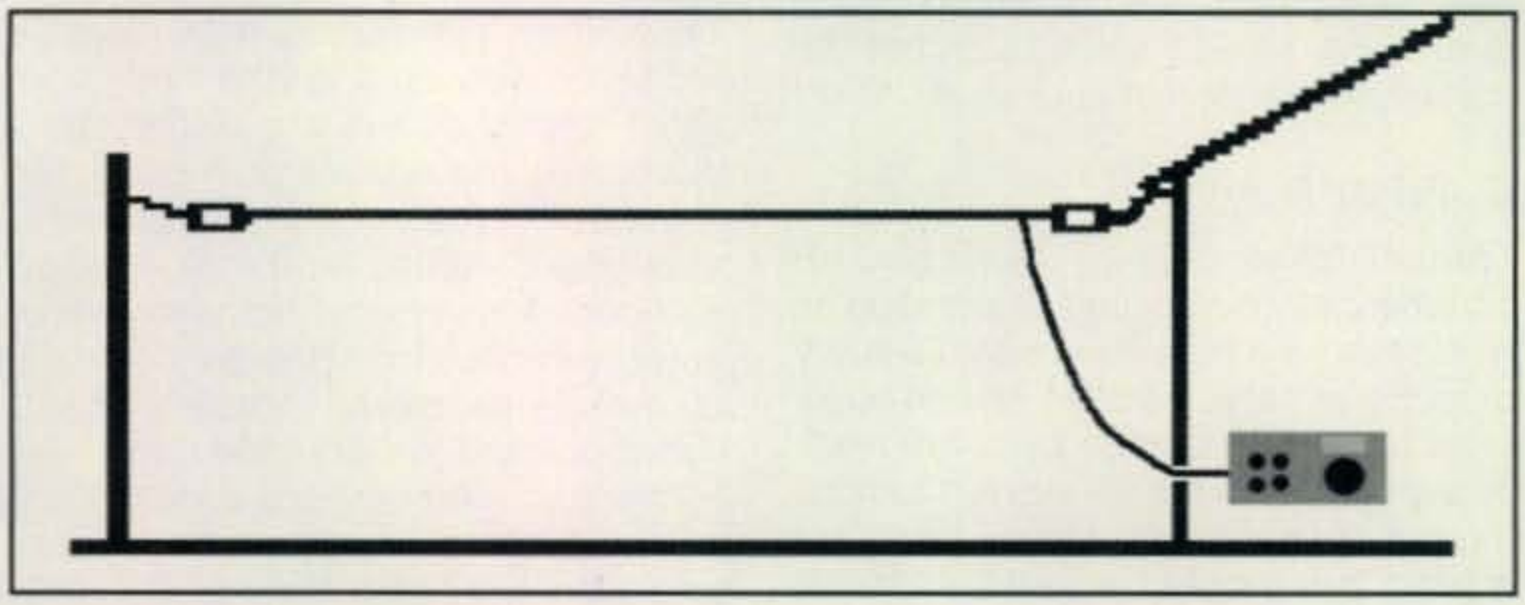


Fig. 2– The "classic" end-fed antenna. This can be a random length of wire coupled to your rig. Of course, you'd want some form of transmatch between the wire and the radio to tame the impedance excursions on various bands.

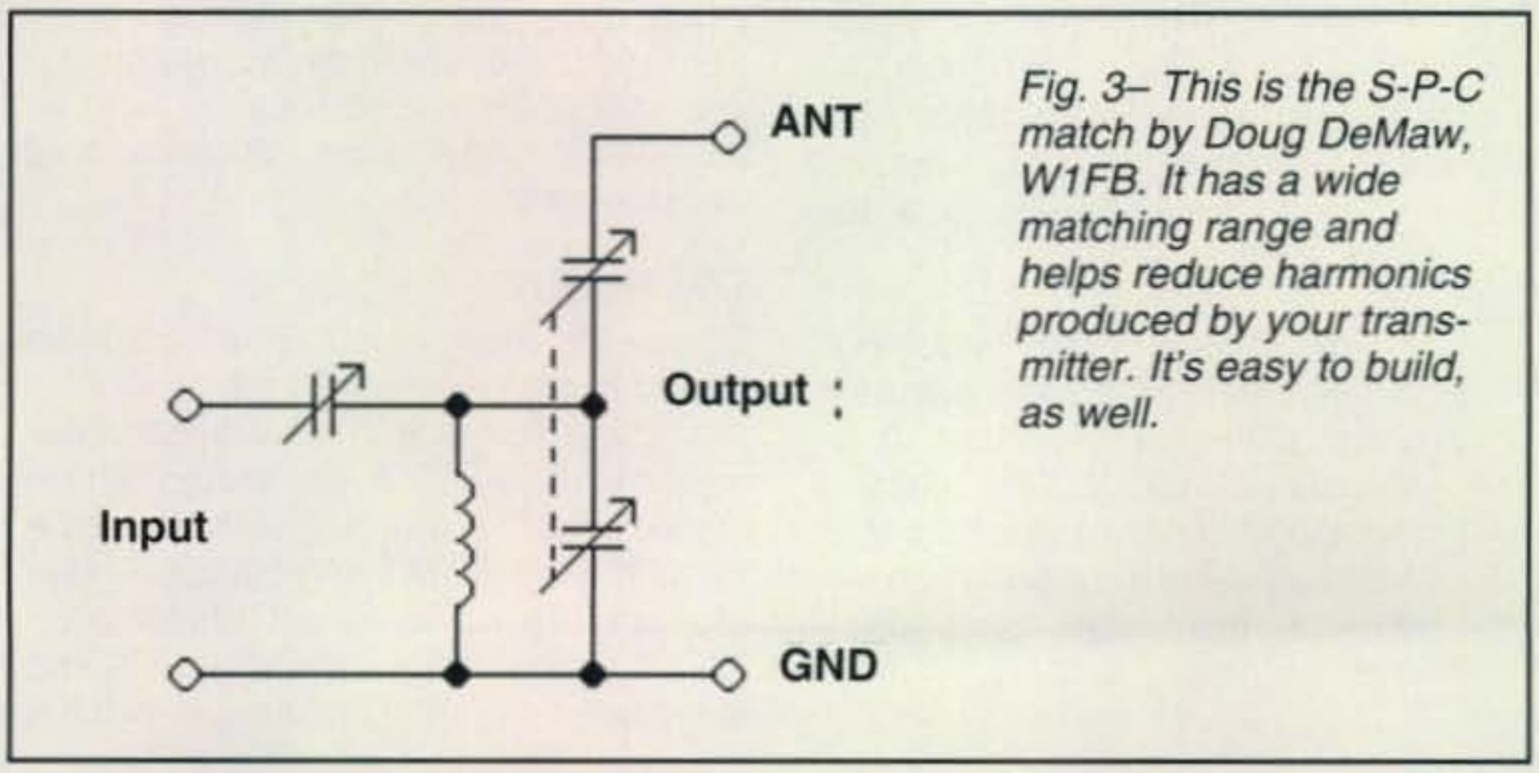


Fig. 3– This is the S-P-C match by Doug DeMaw, W1FB. It has a wide matching range and helps reduce harmonics produced by your transmitter. It's easy to build, as well.

meter, called a bridge. SWR is a topic all by itself best left for another time. However, it is safe to say that your radio gear will operate well with a less than optimal match, resulting in a SWR of 2:1.

If you look closely at our HF ham bands, you will notice a relationship among them. Many are harmonically related: 160, 80, 40, 20, and 10 meters (60, 30, and 15 meters are also harmonically related to one another, but not to the other five HF bands, and 17 meters is the odd-ball.)

Therefore, you might logically assume that an antenna cut for 160 meters will also work on 80, 40, 20, and 10 meters. Wrong! Without going into a lot of math, let's say that the RF current and voltage points along the length of the antenna won't really let you do that. If you remember our discussion a couple of columns ago, if we cut an antenna for 80 meters, it will be roughly 167 feet end-to-end ($468/F_o$ = Length in feet).

If we plot RF current and RF voltage along this antenna, we will see that the maximum current occurs at the feed point of the antenna. The maximum RF voltages are present on each end of the dipole antenna. We choose to feed the antenna at the high RF current point because it is a *low* impedance point

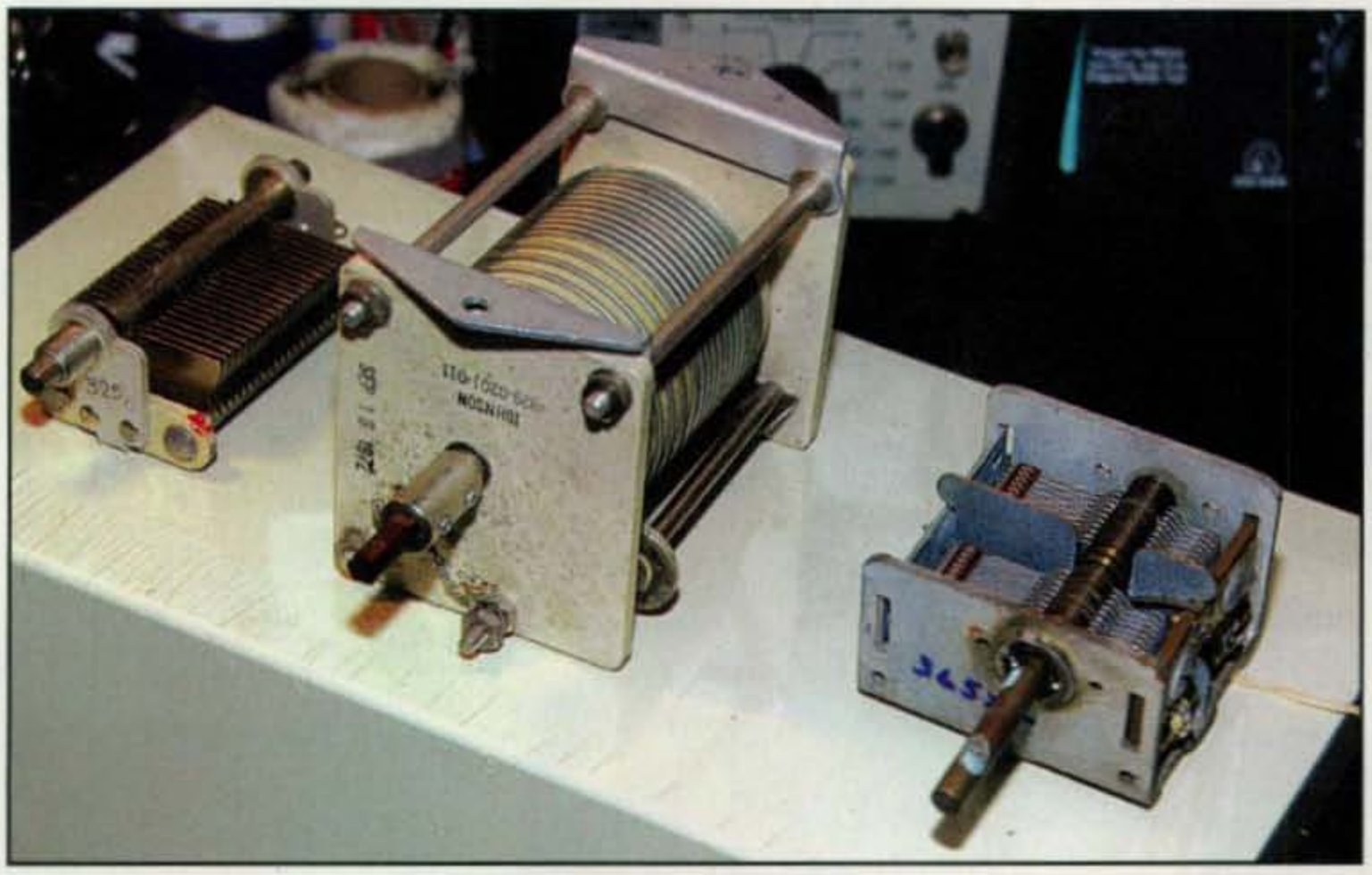


Fig. 4– These are the raw components for my S-P-C Transmatch. The small rotary inductor is in the center and should provide enough inductance to match at least 80–10 meters.

(*high* current = *low* resistance or impedance) and roughly matches the impedance of our transmitter output. This also means that the ends of the antenna are at very high resistance, which is where huge RF voltages are developed. (See figs. 1A & 1B.)

Now if we move our transmitter from 80 to 40 meters and use the same antenna, the impedance points shift so the feed point is no longer at a low impedance and therefore does not "match" the output of the transmitter. We can, in fact, use a configuration of inductors (coils of wire) and capacitors to disguise this mismatch of impedance and force the transmitter to deliver RF energy to the antenna. However, it won't work as well as if we had erected another antenna cut specifically for 40 meters.

How we doin' so far? Still with me? Good. OK, so we know that to be efficient and radiate properly, we need to have our antenna resonant at the operating frequency. What happens when we can't erect eight or nine dipoles? Welcome to the world of multiband antennas!

To be sure, there are a multitude of antennas specifically designed to perform on more than one HF band, including end-fed wires, trapped dipoles, off-center fed dipoles, and loops, just to mention a few. Probably the simplest is an end-fed wire antenna (fig. 2). You could couple the output of your rig directly to the end-fed wire and radiate a signal. Whether or not anyone will hear you is a bit "iffy." End-fed wires usually require some form of transmatch to disguise the impedance of the end of the wire to something that the transmitter section of your rig will like.

Build or Buy?

Transmatches can be fabricated or commercially purchased, depending on how deep your pockets are in this economy. Personally, I like the idea of building a transmatch, since parts are readily available and it's always fun to build a piece of gear for the shack. If you are a good "scrounger," a well-built transmatch may cost you zero! How's that for economical?

Some Background

In 1970, Lew McCoy, W1ICP (SK), came up with a design he called "The Ultimate Transmatch." This was *the* transmatch to have for quite a few years. In the early 1980s, Doug DeMaw, W1FB (SK), improved upon the ultimate design with what he called "The S-P-C" for Series-Parallel-Capacitor Transmatch. The DeMaw design proved to be superior due to its ability to provide additional harmonic suppression to the transmitted RF signal and expanded tuning range.

Let's take a quick look at the S-P-C Transmatch circuit (fig. 3). This unit has a great tuning range from 160 through 10 meters and can control mismatches in excess of 15:1. This means that the device will match impedances between roughly 4 ohms to 750 ohms. Conventional automatic transmatches will handle about a 4:1 tuning range, which works out to 12.5 ohms to 200 ohms.

So exactly how do you find parts for a transmatch? Flea markets. That's right, the good old flea markets and garage sales. You never can tell what will turn up at a flea market or yard sale. Dual-section capacitors are the centerpiece of old vacuum-tube radios of the 1950s–60s. An old "all American five tube" receiver goes for a couple of dollars. Inside is one of the main components!

You can either make or buy tunable inductors. Ham radio flea markets are a great place to find roller inductors, but they are normally rather large and can be expensive, so it might be better to "roll your own" using a toroidal inductor and some wire, adding taps every couple of turns. Look at any of the many antenna-tuning articles on the internet or in back issues of *CQ* magazine for component values and construction methods. A number of homebrew projects are included in ARRL publications, as well as its annual *Amateur Radio Handbook* and the *Antenna Book.*

The parts for my transmatch are shown in fig. 4. The dual-section variable capacitor came from an old Hallicrafters SW receiver, and the roller inductor and the single variable cap followed me home from a hamfest many years ago. The container is an older Ten-Tec enclosure that matches my 35-year-old Argonaut 509. Once I get all the holes drilled and the unit operational we'll revisit this topic.

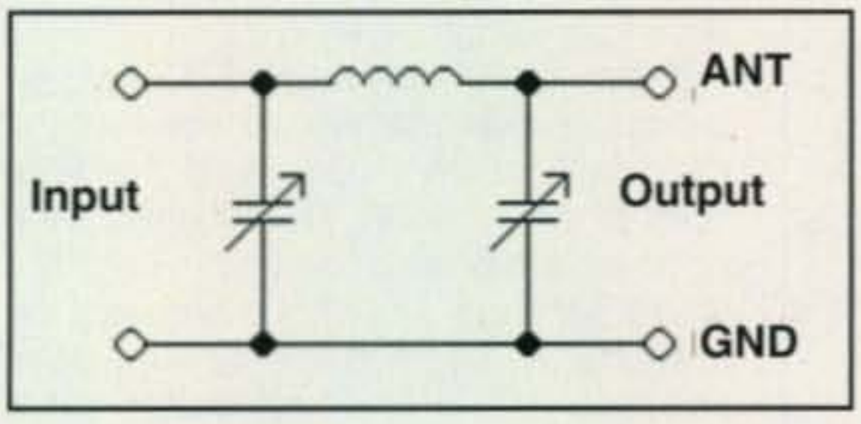


Fig. 5– This is a "PI" matching circuit that I have used several times with great success. It is very easy to use, but the matching range is not as good as the S-P-C. It will reduce second harmonics from the transmitter really well.

CW Redux

One of the really nice things about this hobby is the people with whom I get a chance to interact. When I asked Dick Bentley, K2UFT, if he would share some of his CW learning techniques he came through with flying colors. First of all, Dick is a world-class CW operator. He works both high-power (QRO) and low-power (QRP) CW and is on the

DXCC Honor Roll. He is also a member of the prestigious First Class Operators Club (FOC). Here's Dick's input:

"You learn to become proficient in Morse code the same way you would get to play Carnegie Hall—Practice, Practice, and more Practice!"

Step # 1 is you *actually desire* to learn the code; you don't *have* to know it any longer per FCC fiat.

Step #2 is to use whatever learning aids you can find; the internet is full of them. Since I am basically cheap, I would recommend Googling DJ1YFK or lcwo.net. (Learn CW Online) Fabian is a world-champion CW guru He's won CW copying contests at over 100 wpm, so it stands to reason he knows what he is doing. If you have a receiver that will decode CW, the ARRL has code practice sessions on the air, so check the ARRL website (www.arrl.org) for times and frequencies .

Step #2A: Whatever learning aid you select, I recommend the Farnsworth method of generating code practice where the characters are sent at a relatively high rate of speed but the spacing between the characters is varied. This method helps your copying ability, as you increase the effective speed by shortening the gap between characters without having to relearn each individual character as the speed increases.

Step #3: When you feel confident that you are decoding complete abbreviations and words and you have an amateur license, it's time to take the plunge. One of the options here in the Atlanta area is to check into the Georgia Training Net, held nightly on 3.549 MHz. There are no doubt similar Slow Speed CW nets available throughout the U.S. and Canada. You will also find fellow hams who are willing to send at slow speeds around the QRP ARCI (http://qrparci.org/) and the Straight Key Century Club (http://www.skccgroup.com) frequencies.

Step #4: You'll need to have a decent straight key to send decent code. If you can find a World War II Surplus J-38 key (they trade frequently on eBay), that would be a great starting point. Once you are up to about 15 words per minute and feel you want to invest in the "musical mode," as some call it, it's time to consider an electronic keyer and a solid paddle set such as the Bencher BY-1. Learn to use it left-handed (or right-handed if you are a southpaw). I suggest this for two reasons: (1) If you ever want to try a semi-automatic key or "bug" you will need the manual dexterity of the hand that you favor. (2) You can write on your logs or enter data on your keyboard with your favored hand while you are sending CW with the other (yes, with practice, this can be done successfully.).

Step #5: Don't be discouraged by those you contact who won't slow down for you. Thank them for the contact, saying something like "I'll look forward to a longer contact with you once I have increased my code speed." That would be a friendly way to get your point across.

Step #6: Learn the lingo. CW is chock full of abbreviations. Using complete words in a contact is rarely necessary, especially at slow speeds (you'll bore the guy to death). Learn the Q Signals; they'll save you a lot of time. The first one you'll need is QRS— "Please reduce your sending speed"—and there are plenty more! Please don't ever send the characters for a "period" during a casual CW conversation. A short pause between statements works just as well and you don't need to send it! Whatever you do, don't use the Q Signals during a phone conversation; its much easier to vocalize what you mean and be understood.

General Observation: The reasons to become proficient with CW include the technical challenge, being able to communicate when voice circuits aren't cutting it, the ability to cover great distances with minimum power output, and being able to work DX, or distant stations, with simple equipment. I'm sure the list could be expanded tenfold but enough for this round.

Why do I like CW? Anyone can talk into a microphone, there's no particular skill involved there! CW involves skill!

My thanks to Dick, K2UFT, for his CW offerings. If you get a chance to work Dick on the bands, and that is a very good possibility, he will definitely slow down (QRS) for you!

That's a wrap for this time, gang. 73 Rich, K7SZ

the ham notebook

BY WAYNE YOSHIDA,* KH6WZ

Protecting Your Equipment: Reverse-Polarity Protection

I know what you're thinking: How is it possible to connect the plus, (or red) wire and the minus (or black) wire incorrectly? All radio people should know red means plus and black means minus, and the minus is ground.

However, there are some circumstances when details like this are blanked out of one's memory. There's even a photo capturing the expression of a station owner's face when he blew up an entire line-up of equipment by connecting power backwards. I will not include the photo in this column. Needless to say, the infamous operator has corrected his power wiring to prevent this catastrophe from ever happening again. I can say that I have never done this to any of my commercially made equipment. Homebrew or modified commercial radios are different story, though.

Reverse-polarity protection is needed if you remove and re-install your radio or radios in different locations, such as at radio club demonstrations, or if you lend your gear to friends. Reverse-polarity protection is probably a good way to preserve friendships!

There are about 189,000 results from a Google search for reverse-polarity protection. After spending a few hours looking at various sites and postings, here is an attempt to summarize some of the better ideas for you to consider.

*28181 Rubicon Court, Laguna Niguel, CA 92677
e-mail: <kh6wz@cq-amateur-radio.com>

Three Kinds of Protection

Sort of like the *Close Encounters* movie, I have classified reverse-polarity protection into three goof-proof levels:

The **first level** of protection is mechanical. This is the simplest form of protection, implemented with specific connectors that can never be reversed. Several years ago, many hams used Jones plugs, a plug with one wide blade and one narrow blade. However, they can be bulky, and they just do not look cool.

A newer connector that is gaining popularity with ham radio public-service and other organizations is the Anderson PowerPole®. A compatible connector is available from AMP, a Tyco Electronics company, called the Power Lock connector. They can actually mate with each other. See photos A and B.

I use the 30A (PP30) PowerPole housing, Anderson part number 1327, for red, and 1330G6 for black, and the compatible silver-plated contacts, part number 1331. The corresponding AMP products are 1445957-5 for the red housing and 1445957-2 for the black housing. The contacts are available in silver finish, part number 1604112-1, or tin, part number 1604112-1. These connectors are available from many online sources as well as popular distributors such as Digi-Key and Richardson Electronics.

In the **second level** of protection, simple electronics is used to prevent the major goof. The "idiot diode" has several configurations. In all cases, it might be a good idea to make sure there are fuses on both sides of the reverse-polarity protection circuit.

The diodes used here can be just about any silicon rectifier diode, with peak reverse voltage (PRV) higher than 50 or so volts. Current ratings should be higher than the entire anticipated load. If space is a problem or you need to build a compact assembly, then the 1N4001 diode (50V, 1A) can work. However, a small diode is likely to blow when the circuit works. Diodes are cheap, so you can get some very rugged devices for a few dollars or so each. You may want to ask your builder friends to see if they have any spare diodes for you. Stud-mount rectifiers, such as the devices shown in photo C, have hefty ratings and are very reasonably priced at the places in the "Sources of Supply" list in this column.

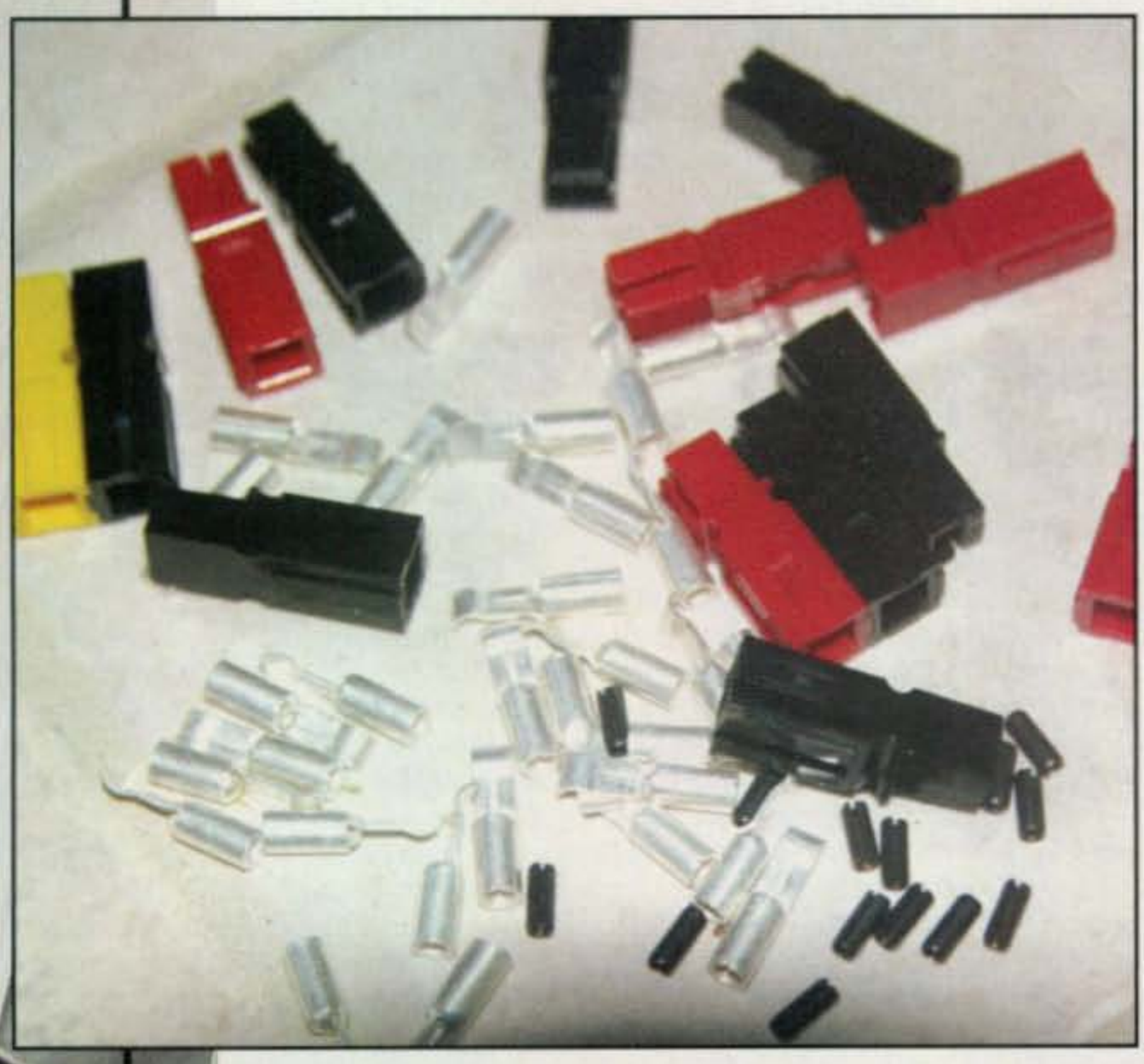


Photo A– The 30A Anderson PowerPole® is becoming popular with ham radio public-service groups. It is a genderless, plastic connector that comes in several configurations and current ratings. A compatible substitute is available from AMP.

AMERITRON . . . 800 Watts . . . $899!

More hams use Ameritron AL-811/H amplifiers than any other amplifier in the world!

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

AL-811H
$899
Suggested Retail
4-Tubes, 800 Watts

AL-811
$749
Suggested Retail
3-Tubes, 600 Watts

You get a quiet desktop linear that's so compact it'll slide right into your operating position -- you'll hardly know it's there . . . until QRM sets in. And you can conveniently plug it into your nearest 120 VAC outlet -- no special wiring needed.

You get all HF band coverage (with license) -- including WARC and most MARS bands at 100% rated output. Ameritron's *Adapt-A-Volt*™ hi-silicon core power transformer has a special buck-boost winding that lets you compensate for high/low power line voltages.

You also get efficient full size heavy duty tank coils, slug tuned input coils, operate/standby switch, transmit LED, ALC, dual illuminated meters, QSK with optional QSK-5, pressurized cooling that you can hardly hear, full height computer grade filter capacitors and more. 13¾Wx8Hx16D inches.

AL-811, $749. Like AL-811H, but has three 811A tubes and 600 Watts output.

AMERITRON *no tune* Solid State Amplifiers

ALS-500M 500 Watt Mobile Amp

ALS-500M
$849
Suggested Retail

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

ALS-600 Station 600 Watt FET Amp

ALS-600
$1499
Suggested Retail

***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. switching power supply.

AL-80B . . . *Desktop Kilowatt* 3-500G Amp

AL-80B
$1495
Suggested Retail

AL-80B kilowatt output *desktop* linear amplifier doubles your average SSB power output with high level RF processing using our exclusive *Dynamic ALC*™!

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

You get a full kilowatt PEP output from a whisper quiet desktop linear. Compact 15½Wx8½Hx14D inches. Plugs into your nearest 120 VAC outlet. Covers 160 to 15 Meters, including WARC and MARS (user modified for 10/12 Meters w/license).

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

Near Legal Limit ™ Amplifier

AL-572
$1795
Suggested Retail

New class of *Near Legal Limit*™ amplifier gives you 1300 Watt PEP SSB power output for *60%* of price of a full legal limit amp! 4 rugged 572B tubes. Instant 3-second warm-up, plugs into 120 VAC. Compact 14½Wx 8½Hx15½D inches fits on desktop. 160-15 Meters. 1000 Watt CW output. Tuned input, instantaneous RF Bias, dynamic ALC, parasitic killer, inrush protection, two lighted cross-needle meters, multi-voltage transformer.

HF Amps with Eimac *3CX800A7*

Suggested Retail

AL-800
$2595
1 *Eimac*® tube, 1250 W

AL-800H
$3895
2 *Eimac*® tubes, 1.5 kW *Plus*
With Imported Tube
AL-800F, $1995
AL-800HF, $2745

These *compact* desktop amplifiers with 3CX800A7 tubes cover 160-15 Meters including WARC bands. Adjustable slug tuned input circuit, grid protection, front panel ALC control, vernier reduction drives, heavy duty 32 lb. silicone steel core transformer, high capacitance computer grade filter capacitors. Multi-voltage operation, dual lighted cross-needle meters. 14¼Wx8½Hx16½D in.

AMERITRON *full legal limit* amplifiers

AMERITRON legal limit amps use a super heavy duty Peter Dahl Hypersil® power transformer capable of 2.5 kW!

Most powerful -- *3CX1500/8877*

AL-1500
$3795
Eimac® Tube

AL-1500F
$3195
Imported tube

Suggested Retail

Ameritron's *most powerful* amplifier uses the herculean 3CX1500/8877 ceramic tube. 65 watts drive gives you full legal output -- it's just loafing with a 2500 Watts power supply.

Toughest -- *3CX1200A7*

AL-1200
$3459
Suggested Retail

Get ham radio's *toughest* tube with the Ameritron AL-1200 -- the *Eimac*® 3CX1200A7. It has a 50 Watt control grid dissipation. What makes the Ameritron AL-1200 stand out from other legal limit amplifiers? The answer: A super heavy duty power supply that loafs at full legal power -- it can deliver the power of more than 2500 Watts PEP two tone output for a half hour.

Classic -- *Dual 3-500Gs*

AL-82
$2745
Suggested Retail

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

Call your dealer for your best price!

Free Catalog: 800-713-3550

Ameritron brings you the finest high power accessories!

ARB-704 amp-to-rig interface. . . $59.95

Protects rig from damage by keying line transients and makes hook-up to your rig easy!

ADL-1500 Dummy Load with oil. . . $74.95

Oil-cooled. 50 Ohms. 1500 Watts/5 minutes. SWR< 1.2 to 30 MHz. Low SWR to 400 MHz.

ADL-2500 fan-cooled Dry Dummy Load, $209.95

Whisper quiet fan, 2.5kW/1 minute on, ten off. 300W continuous. SWR< 1.25 to 30 MHz.<1.4 to 60 MHz.

ATP-100 Tuning Pulser . . . $69.95

Safely tune up for full power, best linearity. Prevents overheating, tube damage, power supply stress, component failure.

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

AMERITRON . . . the world's high power leader!

Photo B– You can go crazy with different connector configurations for your gear. Here is a small sample of the creations I made for my radio-gear bag. All of my 12V things, including many non-ham radio items, use this connector.

Fig. 1 requires a diode with a high current rating, and sacrifices some voltage going to the rig due to the loss in the diode. This loss takes the form of heat. When power is connected backwards, the fuse blows and sometimes the diode does, too. However, it is cheaper to replace one fuse and one diode rather than to repair and replace many parts in a fried radio.

In the circuit shown in fig. 2, a lighter or smaller-rated diode can be used and pops a fuse immediately when reverse polarity is applied. This is my personal favorite, because there is no loss through the diode. A small 1N4001 diode can be used here. Similar to the above configuration, sometimes both the fuse and the diode will blow if power is applied backwards.

A fancier circuit is shown in fig. 3. Two diodes and a relay with a 12V coil are made into an "automatic switch"; the relay only kicks closed (turns on) when power is applied properly. When power is applied backwards, the relay does not close, and no power is applied to the rig. An automotive headlight relay works well in this circuit, since the coil takes 12V to actuate and the contacts are usually rated at 20A or 30A continuous duty. Perhaps the only drawback is the need to have some spare fuses on hand and

Photo C– Stud-mount rectifiers work great for these protector circuits and have hefty ratings.

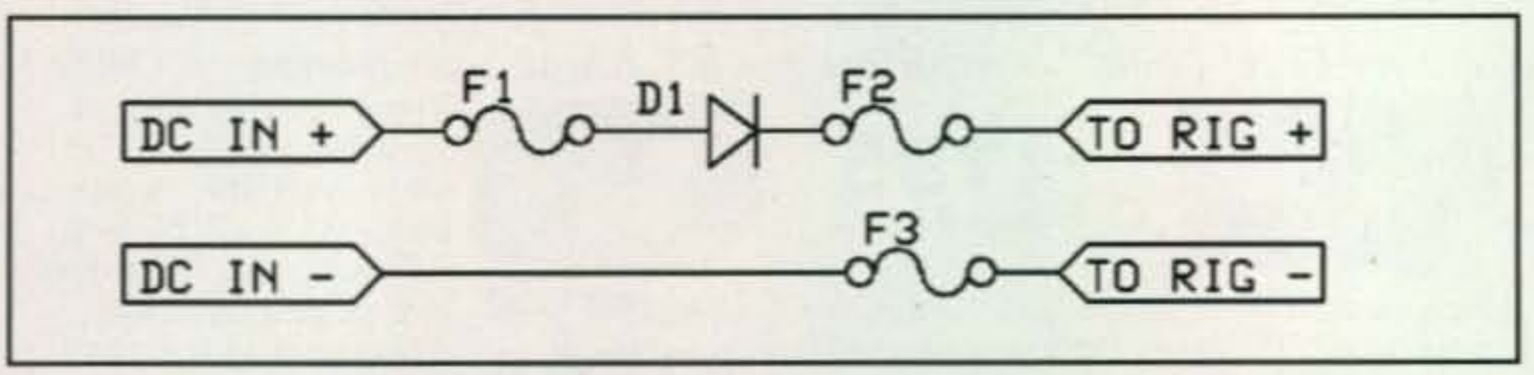


Fig. 1– A single, high-current silicon rectifier can be used for reverse-polarity protection, but there are better ways to do this.

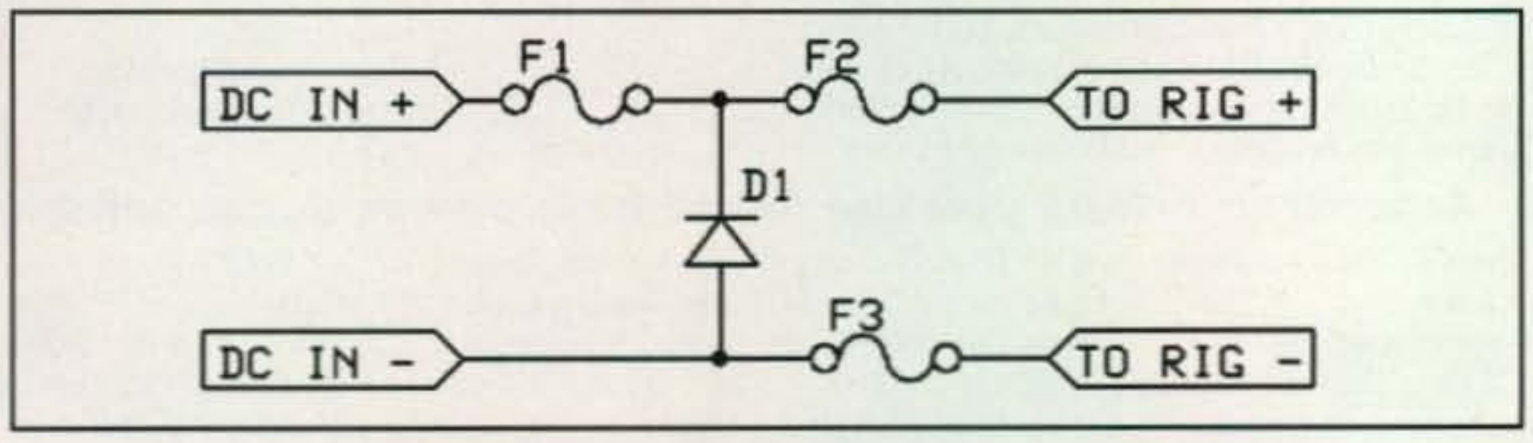


Fig. 2– Another one-diode approach uses a smaller diode and does not have any loss through the diode. This is the circuit I prefer.

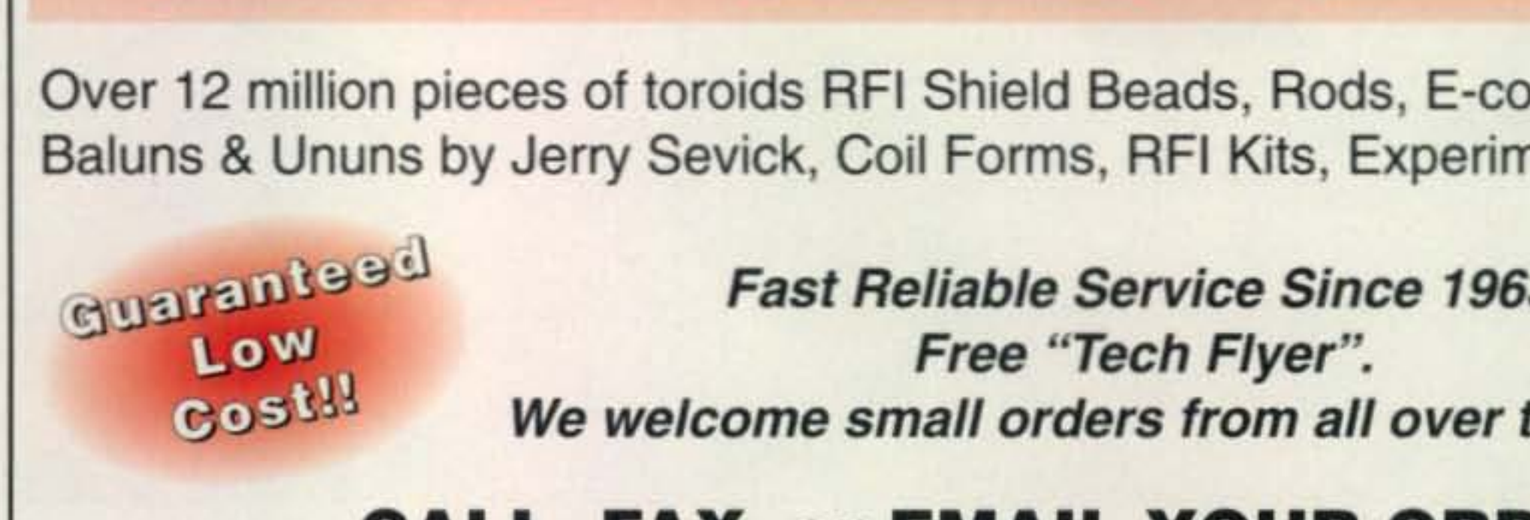


Fig. 3– A fancier circuit uses two diodes and a relay with a 12V coil.

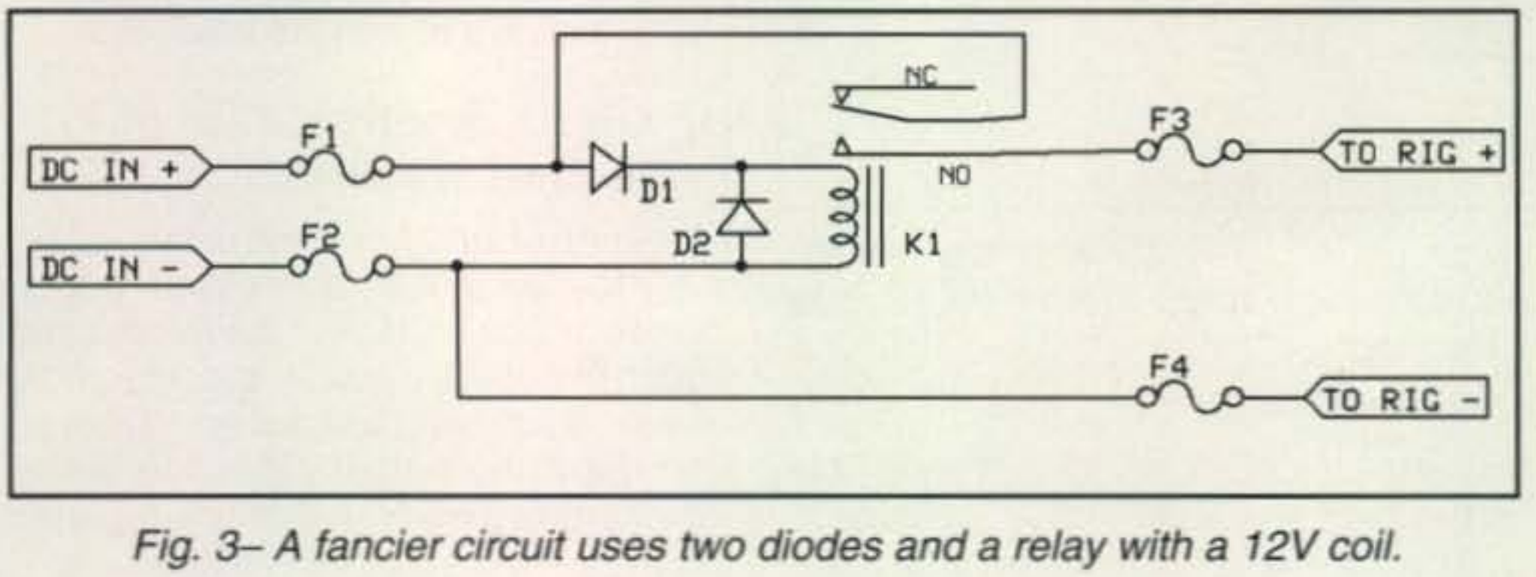


Fig. 4– This "magic circuit" takes any polarity input and always makes the proper polarity come out. Use high-current diodes in this application and mount them on a heatsink.

maybe a replacement diode to restore operation. On the other hand, this is certainly better than something blowing up in your radio.

After you implement these precautions in your radio installation, and one day you make a wiring mistake and a fuse blows, you have to stop and think about why a fuse would blow in the first place. You should not simply remove the bad fuse and plug in a new one. This can be wasteful, and if you are not careful, you can run out of fuses before the rig can go back on the air. You should stop and check the wiring, the fuse or fuses, and the diode, too. Confirm what is wrong and make corrections. A diode that blows up in these applications is usually easy to see, since it is usually broken, cracked, or charred.

The first and second kind of protection work only on the "radio side" of the wire and not the source (battery or power supply) side of the power wiring. In other words, although the connection going to the radio is okay, it is still possible to connect the other end of the wire to the battery or the power supply backwards. This can happen when you are in a hurry or if you are setting up your

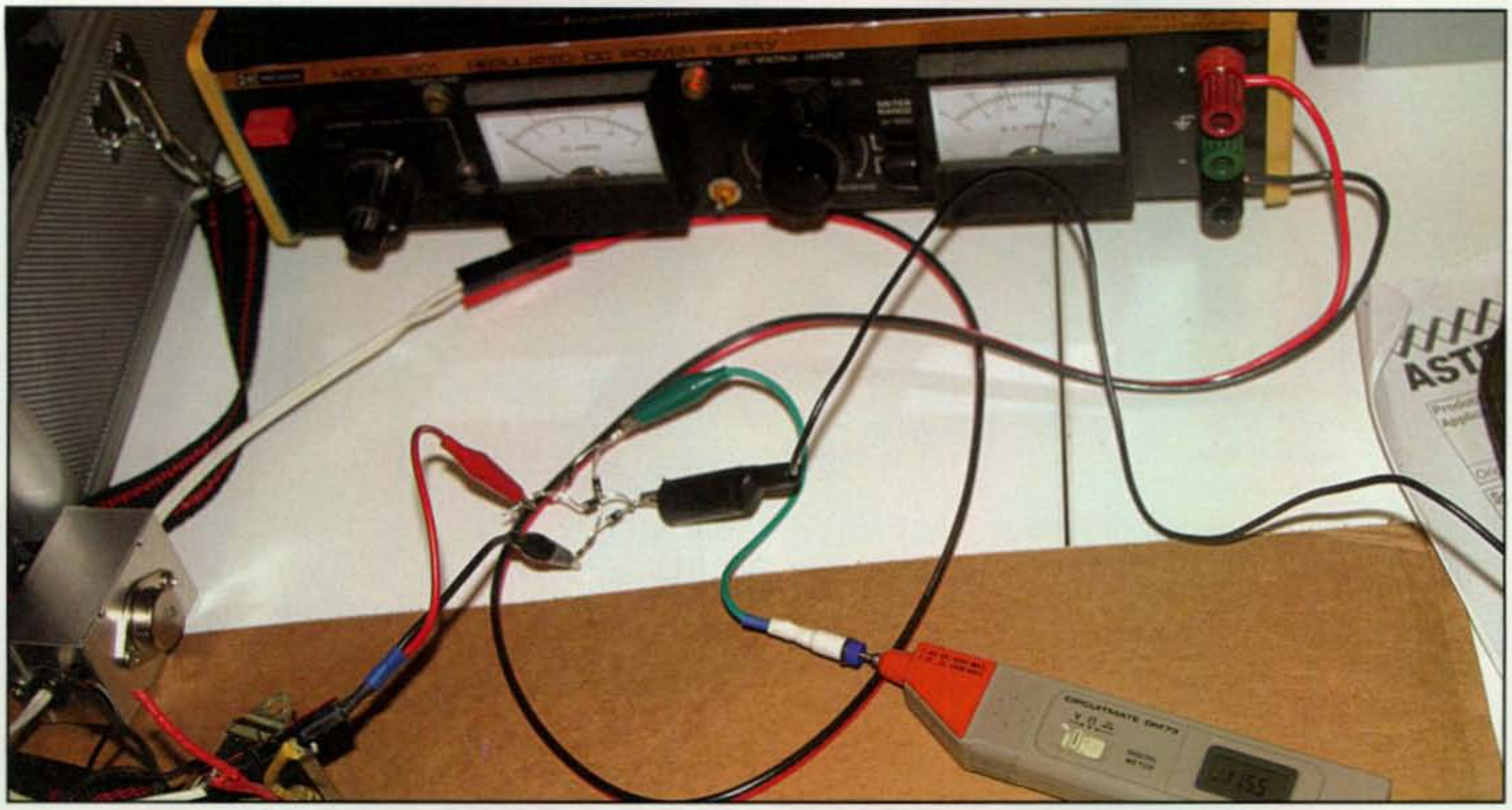


Photo D– The "polarity corrector" circuit in the prototype stage, using small diodes. Any polarity goes in, but plus is always plus and minus is always minus at the output.

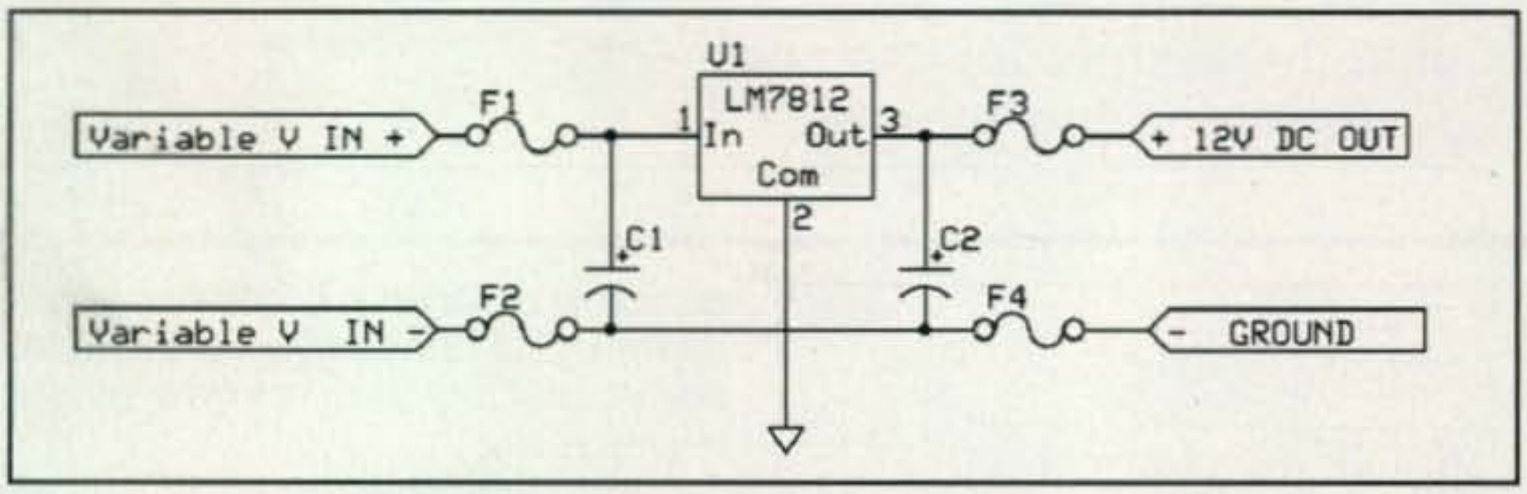


Fig. 5– This is the over-voltage prevention circuit. An LM7812CK, a 12V regulator in a TO-3 package, forces the output to 12V even when more than 12 volts is applied to the input.

equipment in the dark. A red wire and a black wire look exactly the same in the dark, or under dim lighting conditions!

Therefore, the **third kind** of protection is to totally and completely prevent hooking up power backwards no matter what. This includes goofs at the power supply (or battery) side as well as the equipment side of the power cable. This is the "belt and suspenders" solution.

The "belt part" is the use of a goof-proof connector such as the Anderson PowerPole or the AMP Power Lock connector. The "suspenders part" is a diode circuit that corrects polarity from the input no matter how you hook up the battery or power supply. The plus and minus always come out correctly at the output (see fig. 4). Photo D is a picture of the circuit in the prototype stage, using small 1N4004 diodes. The final circuit will use high-current diodes and will be housed in a metal box.

Uh Oh . . . Another Kind of Protection is Needed

I thought of another destructive event that may need to be addressed: applying too much voltage. I never thought about this until I saw a friend's radio upside down, with the covers removed and the radio partially disassembled. When I asked my friend what happened to his rig, he said that he loaned it to a friend, and it blew up because 48 volts was applied to the rig.

This can happen if you have a variable voltage power supply, such as the one I have on my test bench. These

Photo E– This is the over-voltage prevention box. I use this on my work bench when I want to be absolutely sure my 48V variable power supply is adjusted to 12V maximum.

units are very convenient, since one unit can supply many different voltages with the twist of a knob. However, after seeing the radio after feeding it with too much voltage, I decided to make a simple box to help prevent this accident from happening to any of my 12V radios when connected to a 48V power supply. See fig. 5 and photo E.

A three-terminal voltage regulator (7812) and two electrolytic capacitors will do the trick. The values are not critical. C1 can be any electrolytic capacitor from 1000 µF to 2200 µF at 50V or higher, and C2 can be an electrolytic from 10 µF to 50 µF at 50V or higher. This box is installed between the power supply output and the 12V unit to be powered. The regulator forces 12V to come out, even if the variable power supply control is cranked all the way to the right. I can also connect a small DC meter to the output of the regulator box for further reassurance. I have another regulator box for 5V, which is used for my 5V and 6V gadgets.

Summary

Although most current ham radio equipment includes built-in reverse-polarity protection, these circuits may be buried deep inside the rig, or the components used to implement these protection schemes may be very tiny and difficult to access for repair. Hopefully, the ideas presented here will move any damage away from the radio and into these easy-to-build and inexpensive protectors.

73, Wayne, KH6WZ

Sources of Supply

Here are some of my favorite places to buy small electronic parts. You probably have a store near you, or you can check with your radio club friends for diodes and relays used for the simple protection circuits featured in this column.

All Electronics Corp
14928 Oxnard St.
Van Nuys, CA 91411 USA
Phone: 818-997-1806
<http://www.allelectronics.com>

Digi-Key Corporation
701 Brooks Ave. South
Thief River Falls, MN 56701 USA
Phone: 218-681-6674
<http://www.digikey.com>

JK Electronics
6395 Westminster Blvd.
Westminster, CA 92683 USA
Phone: 714-890-4001
<http://www.jkelectronics.com>

Richardson Electronics
40W267 Keslinger Rd.
P.O. Box 393
LaFox, IL 60147 USA
Phone: 630-208-2200
<http://www.rell.com>

Surplus Sales of Nebraska
1218 Nicholas St.
Omaha, NE 68102 USA
Phone: 402-346-4750
<http://www.surplussales.com>

Power to the Hams

BY JOHN WOOD,* WV5J

They say that absolute power corrupts absolutely—except in amateur radio, where power makes communications possible, absolutely. Therefore, this month in What's New, let's take a look at power in just a few of its different roles—rechargeable power, radio power, and the power of information.

Portable Solar Chargers

Typically, hams love their power, and in many instances they like it to be portable. That's why portable solar chargers have such an appeal to power-hungry hams and their portable gear, including HTs and QRP rigs. After all, recharging batteries from the power of the sun is like getting something for almost nothing; just connect the radio to the charger and leave it in the sunlight for a few hours.

Many of these chargers are actually developed for today's consumers who love their portable electronic devices almost as much as hams value their HTs. However, with batteries being batteries, if these portable solar chargers marketed by the folks at CableOrganizer.com work for cell phones,

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

Photos A through D– CableOrganizer.com is introducing four new portable solar battery chargers to give electronic consumers and amateur radio operators a variety of ways to tap into the power of the sun. Top left is the JuiceBar, top right the PowerMonkey-eXplorer, bottom left the Universal charger, and bottom right the X Power™. For more information, visit CableOrganizer.com.

PDAs, iPods®, gaming systems, cameras, and laptops, possibly they can perform the same task for today's hams who operate portable and who are no strangers to the word "modification."

"There are many budget-friendly portable charging devices on the market that harness the power of the sun—a free and totally clean energy source," notes Paul Holstein of CableOrganizer.com, an eTailer offering a myriad of eco-friendly electronics. "These mobile solar chargers also reduce the need for multiple chargers or adapters for each piece of equipment requiring power."

Here are a few representative portable solar charging devices CableOrganizer.com offers to help consumers and amateurs to go green, without having to spend a lot of green.

JuiceBar Solar Charger. The JuiceBar Solar Charger (photo A), priced at $40.21, enables the owner to charge several different devices using light without having to tote around a variety of AC adapters and cords. This compact device is equipped with solar cells that begin to charge immediately upon contact with light. The package includes 12 of the most commonly used adapters for cell phones, iPods, MP3 players, portable gaming systems, and more.

PowerMonkey-eXplorer AC/Solar Charger. Recharge an iPod player, GPS unit, cell phone, or PDA any of three ways with the PowerMonkey-eXplorer (photo B) which sells for $149.21. It includes a solar cell that can completely charge a cell phone with only six hours of sunlight, or it can be plugged into the wall in any of 150 countries thanks to the four AC adapter tips that come with it. It can also be charged from a computer with the included USB adapter. The PowerMonkey holds enough power for 40 hours of iPod time or 96 hours of cell phone talk time. The package includes 10 device adapter tips, an AC adapter, four AC adapter tips, and carry pouch.

Universal Solar Battery Charger. Many "green" hams already use rechargeable batteries to help reduce battery waste in landfills, so here's an opportunity for them to go even greener. Try recharging batteries with the sun using the Universal Solar Battery Charger (photo C). Priced at $22.43, the Universal Solar Battery Charger accepts D, C, AA, and AAA size batteries in pairs. Its needle meter displays the strength of the sunlight hitting the solar cell and gives an estimate of the charging time for different battery types based on that measurement. This charger also accepts Gum (Prismatic) batteries, but be forewarned, batteries are not included.

X Power™ Solar Portable Power Pack. Perfect for camping trips, road trips, tailgating, or power-outage emergencies, this XPower Solar Portable Power Pack (photo D), which sells for $193.49, is lighter, quieter, and most importantly, greener than any generator out there. A removable solar panel soaks up the sun's energy and provides up to 400 watts of power for everything from laptops and cell-phone chargers to blenders and small TVs.

For more information about any of these four power providers from CableOrganizer.com, on the web visit <http://cableorganizer.com>.

The Caguairan—An Interesting Kit

Hams in Cuba are getting extremely creative in their communication efforts, as evidenced by the introduction of a kit radio designed to operate on the 160-meter band. However, a caveat to U.S. hams: Don't get your hopes up about acquiring one; current U.S. trade embargoes prohibit that.

Photo E–This new radio kit from Cuba, the Caguairan, may be tantilizing to kit builders but is currently unavailable to U.S. hams due to trade embargoes in place with Cuba.

Tagged the Caguairan (photo E), *CQ* magazine's contact in Cuba, Arnie Coro, CO2KK, explains that the radio is currently a prototype that has an output power of 10 watts so that it complies with Cuban rules for those just getting started there in amateur radio. He adds that the linear amplifier stage of the Caguairan has broadband circuitry that is capable of transmitting up to 30 watts by changing the output transistors.

By design, it's a single-band rig, but it has the capability of operating CW and double sideband, and it can function on two or three bands with added bandswitching.

"The idea is to sell the kit at a very low cost in order to encourage home construction by radio amateurs," Coro explains. "At the same time, the DSB rig on 40 meters with 20 to 30 watts of power will make it an ideal transceiver to be used during the hurricane season because it can work for many hours using a car battery."

CO2KK adds that he is working on another radio he calls the Super Islander 4.0 which uses tubes recycled from old TVs, which are plentiful on the island.

Podcast Power

The Practical Amateur Radio Podcast <http://www.myamateurradio.com/> from Jerry Taylor, KDØBIK, has become the first amateur-radio-focused podcast to be added to the available content list on the popular Roku set top box and soon to be launched Boxee device, thus allowing the opportunity for over 1-million subscribers and counting to gain exposure to amateur radio.

The Practical Amateur Radio Podcast has partnered with RawVoice to make all this happen. RawVoice currently supports more than 5000 content creators on its family of sites powered by its RawVoice Generator media network platform—TechPodcasts.com, Blubrry.com, TravelCastNetwork.com, and ProMedNetwork.com.

"We're offering 'branded distribution' for content creators on these two devices and more to come this year, providing an all-inclusive pipeline to their content that was not possible before, "said Todd Cochran, CEO of RawVoice.

The Practical Amateur Radio Podcast, a proud member of the Tech Podcast Network, has an extraordinary opportunity to introduce the hobby of amateur radio to this large audience.

The Practical Amateur Radio Podcast (PARP) was created by Taylor in May 2008 as a way to give back to the hobby he loves so much. Produced in Taylor's basement ham

shack, PARP helps introduce amateur radio to those interested in the hobby and helps encourage all to share their knowledge with others.

During each episode, Taylor picks a topic and breaks it down in practical fashion to make it easy for all to understand. In the podcast's featured amateur segment, he also showcases the extremely hard work other amateurs are doing to make the hobby better.

In addition to having a large U.S. audience, listeners from all over the world download or stream PARP on a regular basis. Hams in Canada, Australia, the United Kingdom, Germany, and Switzerland make up the top five countries outside of the U.S. that download PARP.

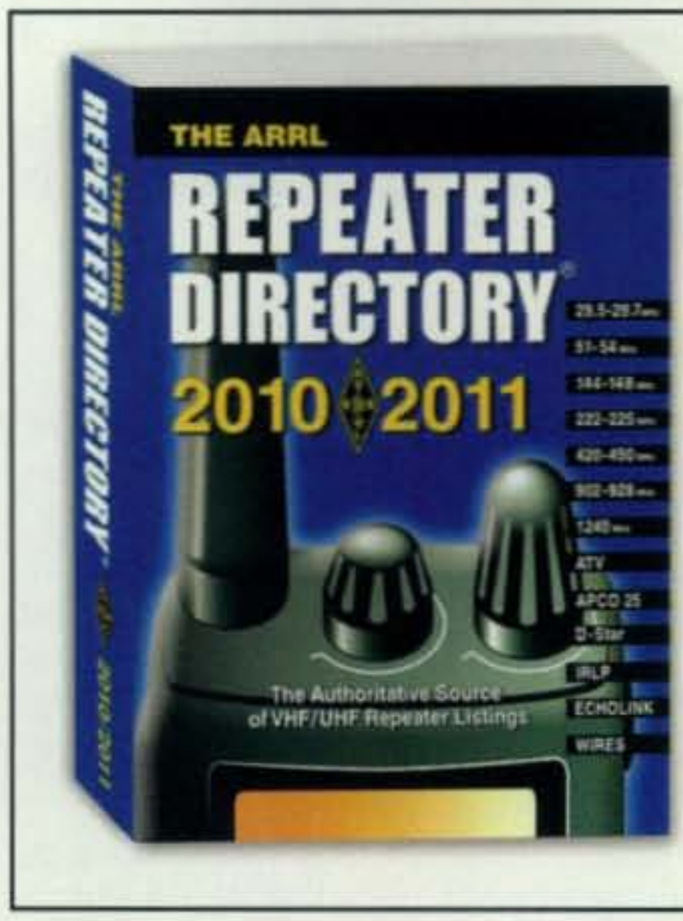
Visit <http://www.myamateurradio.com/> to learn more about The Practical Amateur Radio Podcast and its slogan: "The Practical Amateur Radio Podcast, Creating Elmers one Podcast at a time."

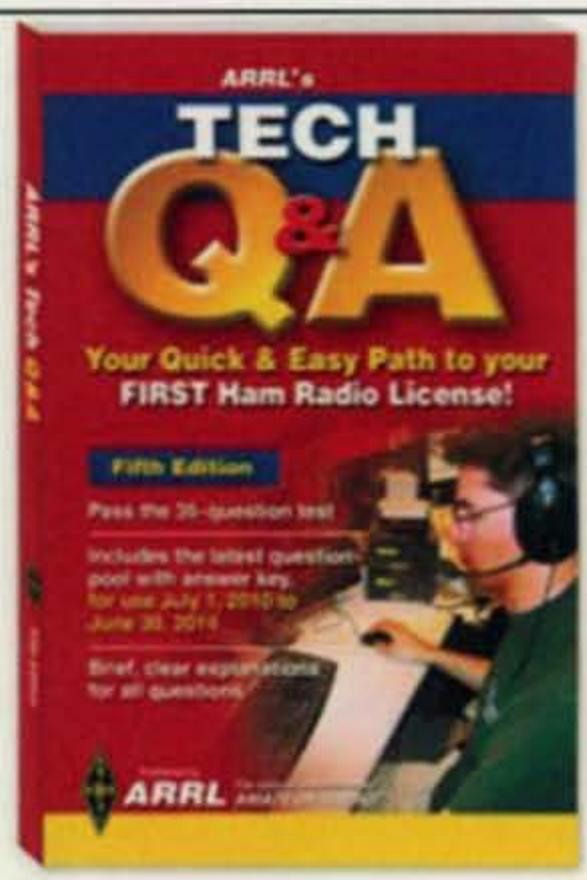
ARRL Publications

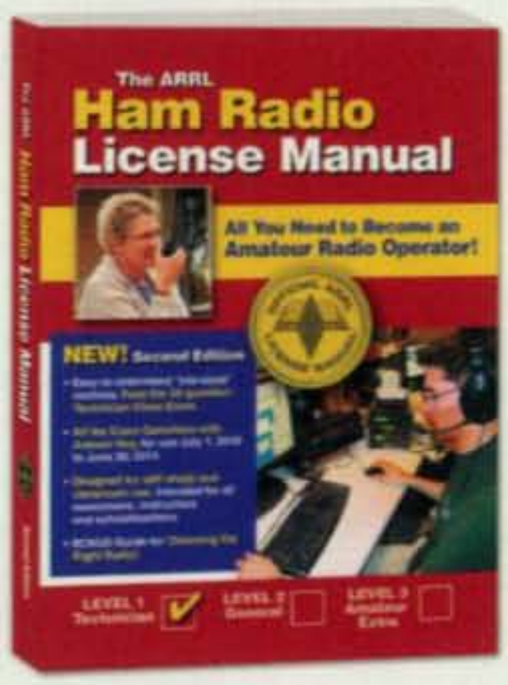
The ARRL has recently published four new editions of books that traditionally enhance the hobby for most active amateurs (photos F, G, H, I): its *2010–2011 Repeater Directory* (both pocket and desktop sizes; photo F), the *Ham Radio License Manual* and its partner publication, the *Tech Q&A Manual*, and *Understanding Basic Electronics*.

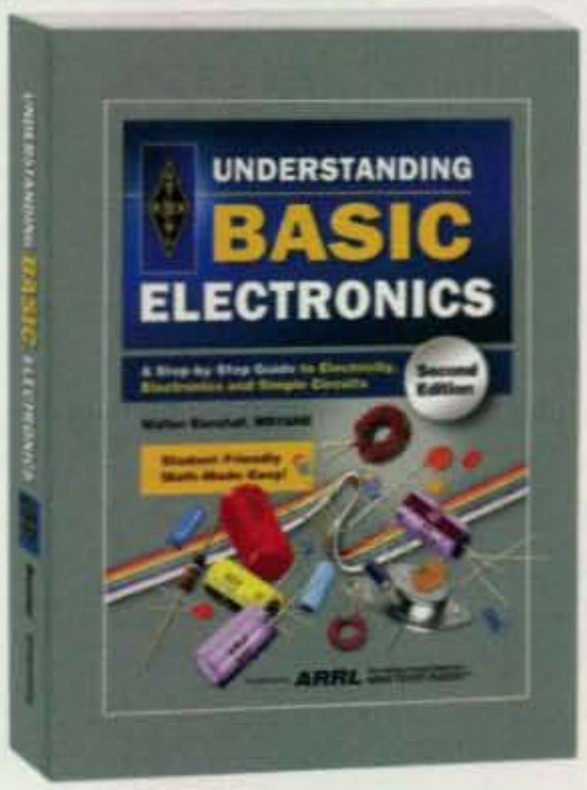
If you're like me and have been a ham for awhile, you're probably familiar with the *ARRL Repeater Directory* and pick up a copy every year to keep up with the changing repeater scene. And if you're new to the hobby, it might be wise to pick up a copy of this latest edition because there is a lot you can learn from it. The *2010-2011 Repeater Directory* lists operating information for repeaters on the 10-meter, 6-meter and 2-meter bands along with machines operating on 222–225 MHz, 420–450 MHz, 902–928 MHz, and 1240 MHz. It also lists many other types of repeaters, such as ATV, APCO 25, D-Star, IRLP, Echolink, and Wires. In addition, it's easy to use with its intuitive layout. The pocket version of the *2010-2011 Repeater Directory* sells for $10.95, while the desktop edition goes for $15.95.

The next two books recently released by the ARRL are a big help to those wanting to become amateur radio operators. The *Ham Radio License Manual* has everything and more that neophytes need to learn to become Technician class licensed amateurs, while the *Tech Q&A Manual* helps those who already possess the essential knowledge needed to practice and prepare for the Technician license test.









Photos F through I– The 2010–2011 Repeater Directories, *the* Ham Radio License Manual, Tech Q&A Manual, *and* Understanding Basic Electronics *are all new editions now available from the ARRL to help enhance the ham-radio experience.*

Priced at $24.95, the *ARRL Ham Radio License Manual* emphasizes the fun of the hobby while giving readers the information about licensing and operating regulations, radio and signal fundamentals, radio safety, electricity, components and circuits, propagation, antenna and feed lines, and communication practices they need to become licensed amateurs and sharing additional knowledge about amateur radio equipment and how to select your first ham radio. This book also contains the entire Technician question pool with answer key for use from July 1, 2010 to June 30, 2014.

For those who have already absorbed the necessary information to pass the test and just need to review the question pool, there's the *Tech Q&A Manual* priced at $17.95.

As for the fourth ARRL publication, *Understanding Basic Electronics*, this 26-chapter book provides a solid, step-by-step guide to electricity, electronics, and simple circuits that can be useful to the student, radio amateur, and radio experimenter. Priced at $32.95, *Understanding Basic Electronics* covers transformers, power supplies, analog and digital electronic circuits, resonant circuits, impedance, alternating current, and the basics such as Ohm's Law, capacitors, inductors, diodes, resistors, insulators, conductors, transistors, integrated circuits, semiconductors, and much more.

For more information about all four of these ARRL publications and to purchases one or more of the books online, go to <www.arrl.org> on the web or call 1-888-277-5289.

Ploughshares Into Swords

Amateur radio operator and active author Thomas S. Fiske, AA6TF, recently released his ninth book, *Ploughshares into Swords*. This small history, written with information partly supplied by Lannea G. Melzian and the California Institute of Technology itself, tells of the secret projects pursued by Caltech during World War II.

Through the eyes of a young couple, the author brings back the World War II era and the ways they coped as civilians. They increased the speed of aircraft assembly lines, saved grease and tinfoil, and became swept up in a rocket (aircraft ordnance) program at Caltech almost no one today knows about.

The husband goes on to build the China Lake facility in the desert and makes a sudden trip to battle zones in Germany as an army colonel, where he very secretly investigates German rocket-launch sites while his friends, the physicists back home, go to work on the atomic bomb project. The intensity of the war escalates until suddenly, it's over and the many big shots and VIPs of the war become ordinary guys out of

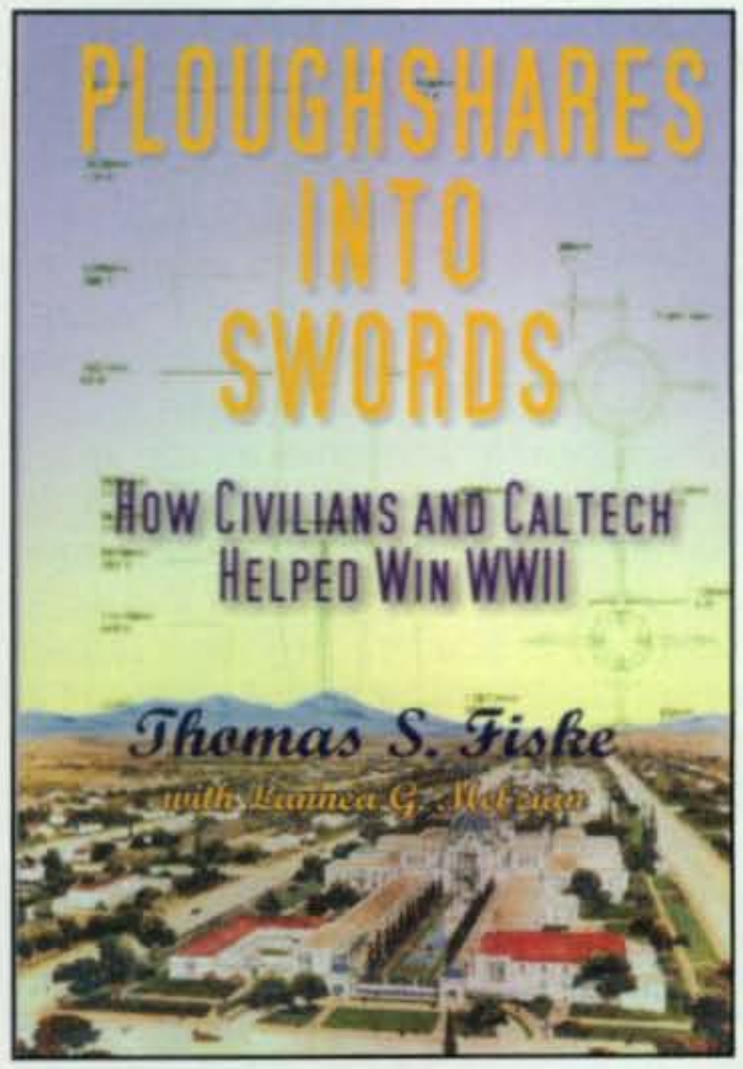


Photo J– Fans of author Thomas S. Fiske, AA6TF, who have been waiting for his next work will be happy to know that Fiske's ninth book, Ploughshares Into Swords, *is now available.*

work. Caltech goes back to teaching and new companies are started, just as though nothing has happened. However, the dust has not settled, and this story does not end with the war.

Published by Star Publish LLC., *Ploughshares Into Swords* is a very readable 330 pages long. For more information, contact Tom at <fiskets@msn.com> or visit his website at <http://www.fiskefamily.com/fiskacetics> where he lists and describes his other books.

Website of the Month

If you're a ham who likes to help other hams, you'll find W5GI.com a most comfortable place to visit, because that's the primary aim of the website.

As Webmaster John P. Basilotto, W5GI, explains in the welcome section, W5GI.com is a place to share amateur radio techniques and lessons learned with special emphasis on high performance wire antennas. Why not stop by?

73, John, WV5J

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.*

Finding *WorldRadio Online*

To access the current issue of ***WorldRadio Online*** as well as past online issues, downloading tips and other info, you'll need to go to the *WRO Welcome Page* on the *CQ* magazine website.

Here's how to do it:

(1) Go to the CQ homepage at: **<www.cq-amateur-radio.com>.**

(2) Find the ***WorldRadio Online*** logo to the left of the *CQ* magazine covers. Click on it. This will take you to the WRO Welcome Page. At this point, you have several options. There are links to a variety of informational pages. We recommend that you read the "Viewing and Downloading Tips" before doing anything else. The Back Issues link will take you to previous issues (beginning January 2010) to download and view. **Enjoy!**

RSGB Books from CQ

View more RSGB books on our web site!

Guide to VHF/UHF Amateur Radio

By Ian Poole, G3YWX

RSGB 2000 Ed.,112 pgs.
Everything you will need to help you enjoy VHF/UHF to the fullest. Choosing the right transmitter, receiver, antenna,utilizing the correct part of each band and more!

Order No. RSGVUAR $16.00

HF Antenna Collection

RSGB, 2nd Ed., 2002. 252 pages.

A collection of outstanding articles and short pieces which were published in *Radio Communication* magazine. Includes single- and multi-element, horizontal and vertical antennas, extremely small transceiving and receiving antennas, feeders, tuners and much much more!

Order: RSHFAC $33.00

IOTA Directory

Edited by Roger Balister, G3KMA
RSGB, 2007 Ed..

Fully updated, lists all islands that qualify for IOTA, grouped by continent, and indexed by prefix. Award rules and includes application forms.

Order: RSIOTA $18.00

Backyard Antennas

RSGB, 1st Ed., 2000, 208 pgs.

Whether you have a house, bungalow or apartment, Backyard Antennas will help you find the solution to radiating a good signal on your favorite band.

Order: RSBYA $33.00

QRP Basics

By Rev. George Dobbs, G3RJV
RSGB, 2003 Edition, 208 pages
How to get the best results from a QRP station whether from home or outdoors. Explains how to construct your own station, including complete transmitters, receivers and some accessories. Other sections include toroidal coils, constuction techniques and equipping a workshop. You'll also find a listing of QRP contests and awards.

Order: RSQRPB $28.50

The Antenna Experimenter's Guide

RSGB, 2nd Ed., 1996. 160 pages.

Takes the guesswork out of adjusting any home-made or commercial antenna, and makes sure that it is working with maximum efficiency. Describes RF measuring equipment and its use, constructing your own antenna test range, computer modeling antennas. An invaluable companion for all those who wish to get the best results from antennas!

Order: RSTAEG $33.00

Practical Wire Antennas 2

By Ian Poole, G3YWX
RSGB, 2005 Edition, 176 pages
This significantly expanded and fully revised edition includes designs for a wide range of practical wire antennas. You'll find just about every type of wire antenna you could possible imagine with complete and easy to understand designs.

Order: RSPWA2 $23.50

World at Their Fingertips

by John Clarricoats, G6CL

RSGB,1st Ed., 1993, 307 pages

The story of amateur radio in the U.K. and a history of the Radio Society of Great Britain. Its pages and illustrations give a account of the development of a hobby that has provided technical knowledge and service to the community.

Order: RSWTF $16.00

HF Amateur Radio

RSGB, 2007 Second Ed.

HF or shortwave bands are one of the most interesting areas of amateur radio. Guides you through setting up an efficient amateur radio station, equipment to choose, installation, the best antenna for your location and MUCH more.

Order: RSHFAR $23.00

Technical Topics Scrapbook 1985-1989

by Pat Hawker, G3VA
RSGB, 1st Ed., 1993, 346 pages
A collection of popular 'Technical Topics' published in RadCom. Info, ideas, mods and tips for amateurs.

Order: RSTTC89 $18.00

Packet Radio Primer

By Dave Coomber, G8UYZ & Martin Croft, G8NZU

RSGB, 2nd Ed., 1995, 266 pages
Detailed practical advise for beginners. Completely revised and greatly expanded to cover developments in this field and beyond bare basics into advanced areas such as satellite operations.

Order: RSPRP $16.00

Microwave Projects 2

By Andy Barter, G8ATD
216 pages

If you're interested in building equipment for the amateur radio microwave bands, the designs in this book are sure to please! Projects have been selected from international authors and all projects use modern techniques and up-to-date components. Details on how to obtain ready-made boards are included with most projects.

Order: RSMP2 $28.50

Power Supply Handbook

By John Fielding, ZS5JF
RSGB, 2006 Edition, 288 pages
How power supplies work, selecting components, building and modifying supplies, measuring the finished supply, batteries, chargers, test equipment - it's all here!

Order: RSPSH $28.50

VHF/UHF Handbook

Edited by Andy Barter, G8ATD

RSGB, 2nd Ed., 320 pages.
This second edition guides you through the theory and practice of VHF/UHF operating and transmission lines. Includes info on getting started, antennas, constructing your own equipment, satellite ops, local nets and specialized modes.

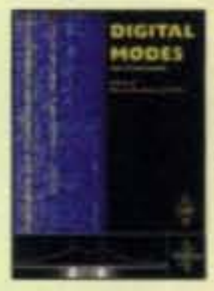
Order: RXVUH $29.50

Technical Topics Scrapbook 1995-1999

By Pat Hawker, G3VA
RSGB, 2000 Ed., 314 pages.
This third compilation of 'Tech Topic' articles is a fascinating collection of circuit ideas, antenna lore, component news and more!

Order: RSTTC99 $27.50

Digital Modes for All Occasion



By Murray Greenman, ZL1PBPU
RSGB, 2002 Ed., 208 pgs. Simply the most "complete" book on Digital Modes available.Over 100 illustrations!

Order: RSDMFAC $28.50

Shipping & Handling: U.S. & Possessions-add $7 for the first item, $3.50 for the second and $2 for each additional item. FREE shipping on orders over $100 shipping to one domestic address.
All Foreign Shipping & Handling - calculated by order weight and destination and added to your credit card charge.

CQ Communications, Inc., 25 Newbridge Rd., Hicksville, NY 11801
Call 800-853-9797 - Fax 516-681-2926 - www.cq-amateur-radio.com

vhf plus

BY JOE LYNCH,* N6CL

First CubeSats Sub-orbital Launch

On March 27, 2010 at 10:09:56 EDT, NASA launched the maiden flight of its Terrier-improved Malemute sounding rocket from Wallops Island, in Virginia. The purpose of the launch was vehicle diagnostics. The secondary payload contained two CubeSats that were ejected approximately 72 seconds after the launch. These two cubesats made history as being the first to be launched on a sub-orbital trajectory.

The CubeSats were designed and built by university students from Kentucky and California. Named ADAMASat and Cal Poly 1U (one-unit), respectively, the following is a description of their components:

The ADAMASat was a 2U (two-unit) payload that tested the KySat-1 antenna deployment mechanism and actuator circuit. The antenna deployment mechanism consisted of a mono-filament wire wrapped around the satellite to hold down its antennas, and a Nichrome cutter that burned the mono-filament line to release the antennas. The design worked flawlessly. The onboard beacon was designed to involve amateur radio operators in tracking the CubeSat during its eight minutes of life. Amateur radio operators from around the Midwest and East Coast copied the transmissions of both satellites. Among them were students at the U.S. Naval Academy and students in Kentucky. See the comments below for more information on the Kentucky students' involvement.

The Cal Poly 1U was a 1U payload that tested an attitude determination system. More information on both satellites and their successful launches can be found at: <http://ssl.engr.uky.edu/suborbital/socem>.

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

VHF Plus Calendar

June 29 – July 2	Activation of DL88/DL89. (See text for details.)
July 1	Moon apogee.
July 4	Last quarter Moon. Moderate EME conditions.
July 11	New Moon. Moderate EME conditions. Total eclipse of the sun.
July 13	Moon perigee.
July 17–18	CQ WW VHF Contest. (See text for details.)
July 18	First quarter Moon. Moderate EME conditions.
July 22–24	Central States VHF Society Conference. (See text for details.)
July 25	Very poor EME conditions.
July 26	Full Moon.
July 28	Moon apogee.
July 28	*Southern Delta Aquarids* meteor shower.

—EME conditions courtesy W5LUU

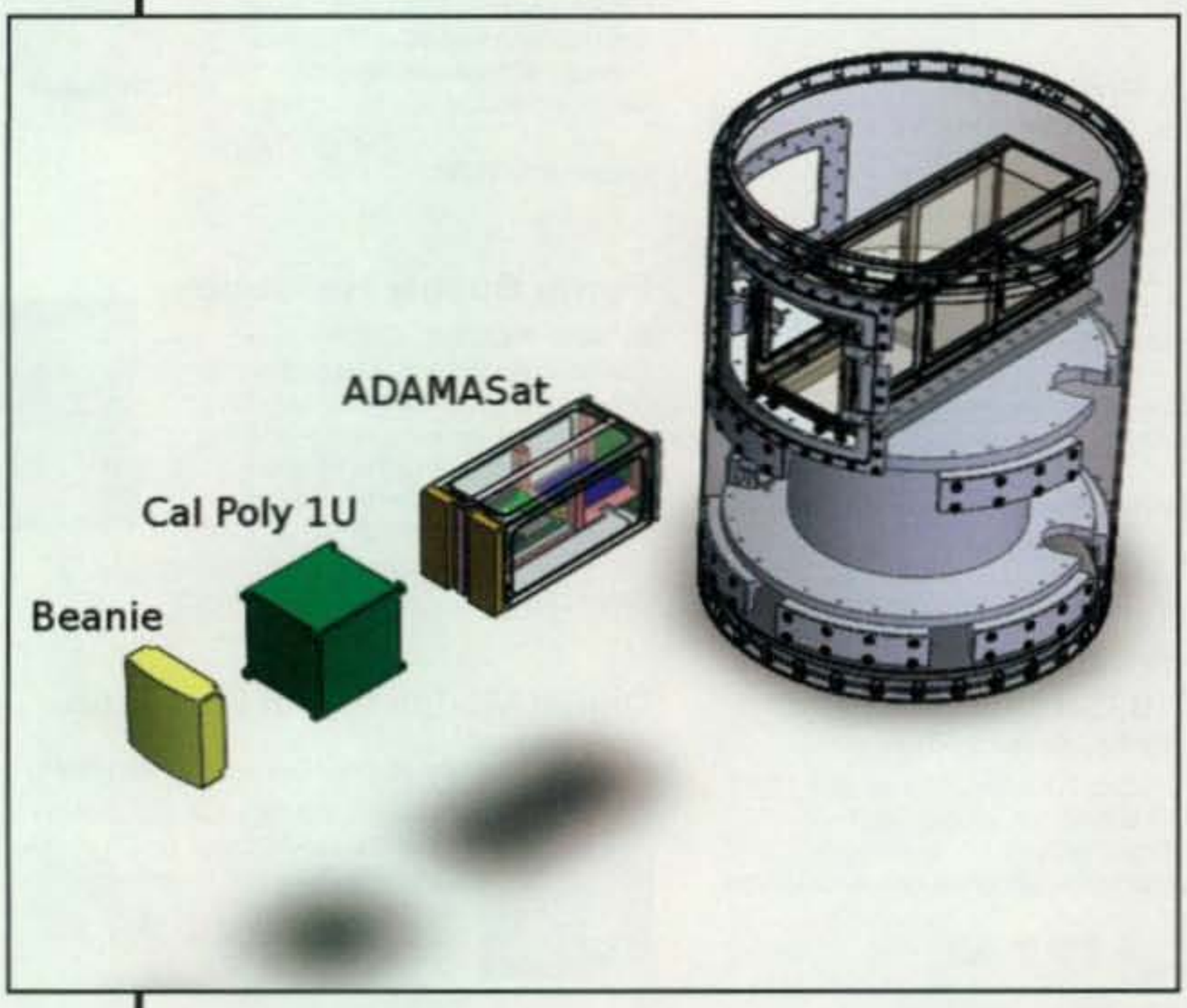


Diagram of the cubesats and how they were ejected from the rocket. Note: (Unless otherwise indicated, all photos are courtesy of Space Systems Lab, University of Kentucky)

I invited Anthony Karam, KJ4HVK, the student manager of the project to comment on the project, along with his faculty advisor, Dr. Jim Lumpp, KG4YLI, both from the University of Kentucky.

Anthony stated that initially NASA Wallops approached Kentucky Space (a consortium of the following: University of Kentucky, Morehead State University, the University of Louisville, Western Kentucky University, Murray State University, the Kentucky Community and Technical College System, the Kentucky Space Grant Consortium, and Belcan) with the flight opportunity.

Concerning the NASA contact, Jim clarified:

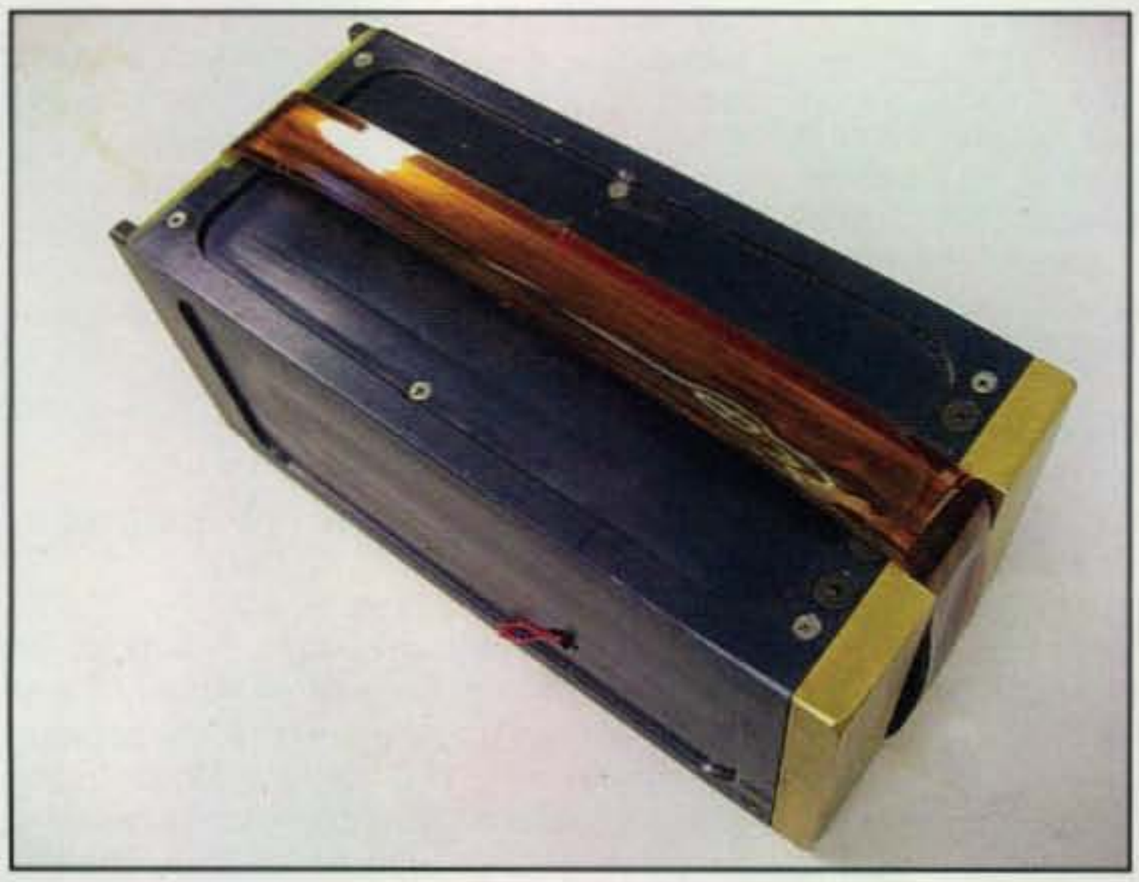
> We actually initiated mission with Wallops, but that was before Anthony started working on the project. We have worked with Wallops for several years on high-altitude balloons (using amateur radio operator telemetry and video) and then UAVs. We started doing CubeSats several years ago (also using amateur radio operator frequencies) and had a failed attempt at a sub-orbital mission in 2007. This contact led to the Sub-Orbital CubeSat Experimental Mission (SOCEM) mission and the ADAMASat satellite.

Anthony continues:

> For SOCEM we had:
>
> Three minimum success criteria: Integration of the polycubesat launcher (PCL) in Hall 12.067 payload section; Delivery and integration of CubeSats into PCL; Acceptance testing of complete payload.
>
> Three comprehensive success criteria: Successful ejection of CubeSats; Reception of telemetry data from CubeSats on portable ground stations at Wallops and in Kentucky; Successful reception of experiment results from the monofilament cutter system.
>
> SOCEM satisfied all six minimum and comprehensive success criteria.
>
> The ADAMASat design also flight verified our Payload Interface Module (PIM), which is a core component of the KySat-1 bus. On the mechanical side, we had to

design a system which would hold the payloads tightly during launch (if the payloads had been held loosely their footswitches could have opened during launch vibrations, resulting in premature startup sequences), would thermally protect the payloads during launch, would be centered about the spin axis of the rocket, and would successfully deploy some of the payload mass against rotational inertia (as the rocket was not spun down for payload deployment). There were certainly also systems-engineering related lessons learned by the whole team, and circuit-design related lessons learned by the EEs which I can provide more information on if necessary.

The SOCEM hardware was specifically designed for NASA's 17"-diameter sounding rockets but could be extended to larger-diameter sounding rockets without a great deal of redesign work. Compatibility with smaller diameter sounding rockets would require more redesign work due to space constraints we were already getting close to with the 17" diameter. In orbital launches the rocket is typically de-spun prior to payload deployment, so for those cases I'm not sure the system we developed would have any advantage over standard CubeSat deployment through a device such as Cal Poly's PPOD. Redesigning the SOCEM hardware to support parachute-based payload recovery may be possible in the future and is an interesting idea! My first big concern is the space requirement for a parachute, but it may be possible to store a parachute in 1U (10 cm) of a 3U (30 cm) CubeSat in a SOCEM-esque mission.



ADAMASat with tape-measure antennas wrapped around the satellite.

Cal Poly's cubesat.

We met with Dr. Bob Bruninga, WB4APR, the designer of APRS, at SmallSat in Logan, Utah last summer and he was a huge help to us. He posted information about our mission on the AMSAT-NA site and helped get the word out to amateur radio operators interested in helping us with our mission. After the mission we received packets from several amateur radio operators who had tracked ADAMASat and decoded the data. Working with the amateur radio community was a great experience and we look forward to doing it again when we launch KySat-1.

The Kentucky Space advisors, most specifically Dr. Jim Lumpp of the University of Kentucky and Dr. Ben Malphrus of Morehead State University, really got the project started on the Kentucky Space end. They handled all the initial conversations with NASA Wallops and with Cal Poly. Overall the advisers provide the necessary leadership backbone of the educational side of Kentucky Space.

Most of the students who work in Kentucky Space complete graduate school and many go on to careers in the space industry.

SOCEM discussions began in Spring 2009 with a potential launch in the Summer of 2009. Delays pushed the launch but allowed Kentucky Space to focus on tweaking, testing, and verifying designs. It also gave the team time to complete the ADAMASat free GUI (see below), write a paper on the project for an AIAA conference, and test and improve ground stations. The launch actually happened 27 March 2010.

The GUI was a free software program that was downloaded from the University of Kentucky website for the launch. It was designed so that amateur radio operators with a Windows® computer, a radio, and TNC that can receive on 144.390 MHz, a serial or USB cable, and a suitable location could pick up and decode the data. The GUI parses the APRS packets as they are received, graphing temperatures on-board the payload and reporting status of the mission in real time. It also included instructions on e-mailing the packet log to Kentucky Space to aid in post-processing, and a built-in aggregator for the official ADAMASat.

More information on the forthcoming KYSat-1 will be published in this column and in *CQ VHF* magazine. Additionally, current announcements will be posted on Facebook.

Student Involvement in SOCEM

The following is from Charlie Cantrill, KI4RDT, Information Technology Instructor, Nelson County Area Technology Center:

Getting students involved in amateur radio can be challenging, especially when competing against other technologies such as smart phones, media players, and game consoles. I teach Information Technology at Nelson County Area Technology Center in Bardstown, Kentucky, where many students are already tech-savvy.

When I first looked at how to get these students involved in amateur radio, they didn't display much interest in HF or terrestrial VHF work. I overlooked the possibilities of using satellite technology as a way of engaging students, as I didn't have much experience in working satellites before attending the ARRL's Teachers Institute.

After completing the workshop, I became intrigued with the idea of incorporating space technologies into exiting Information Technology curriculum. A former Nelson County student, Tyler Burba, KJ4HVF, who is attending Morehead State University and enrolled in its space program, approached me and we discussed the Kentucky Space outreach program. This program is intended to get students involved in space technologies and STEM areas (science, technology, engineering, and math).

That is when the light went on and we started pursuing our involvement in LEO (Low Earth Orbit) satellites. If the amateur community wants to get students involved in amateur radio, satellite work is the way to do it.

We won a grant from the ARRL Education Technology Program for equipment and started using it in February. I knew students would love to be a part of missions such as SOCEM (Sub-Orbital CubeSat

Enthusiastic Kentucky students receiving data from both CubeSats.

Experimental Mission) and other satellite activities, motivating them to become involved and engaged in communications. Before the date of the launch, we practiced using our equipment on LEO satellites and learned how to use our Kantronics KPC3+ TNC (Terminal Node Controller). As many who have used this TNC can affirm, it is rather complicated, but a workhorse.

The launch dates kept getting rescheduled and coordinating with my licensed students to have them present for the launch was getting complicated. The decision was made that I would record the audio and we would wait until Monday when the students would decode the packets.

I found a nice quiet spot and recorded the audio using a 146/437-10 Arrow antenna and Yaesu FT-857D. I didn't quite know what to expect and was a little frustrated, as a local APRS (Automatic Packet Reporting System) station was beaconing at the time of the launch and was coming in at a solid S7 to S8 signal level.

In the background was a very faint sound of the satellite, or so I guessed, as the audio was different from the other APRS packets from the local stations. I rotated the antenna to cope with fading as best as I could and I did not I need to compensate any for Doppler shift.

I couldn't be sure what was recorded until the student amateur radio operators showed up on Monday to decode the packets. On Monday the students rigged up a cable to go from our voice recorder to the TNC, and they start playing the audio I recorded. At first we were all a little disappointed, as we were only decoding the APRS packets from the local stations.

Then we got to the part of the recording with the SOCEM packets and started getting some partial packets decoded. The students were elated as the first couple of packets were decoded. As it turns out, the audio recording contains many more packets than we were able to decode, as there was a fair amount of fading in the signal. In the end we were able to decode five complete packets and several partial packets.

Being so far west, we didn't make a big deal out of what we decoded, as the signal was very low on the horizon and we were certain our contribution would be a drop in the bucket.

We sent the e-mail with our packets to Kentucky Space so we could show our support and involvement. We didn't know how successful we were until I received an e-mail from Samir Rawashdeh, KI4KXM, confirming our packets were helpful, and we were able to fill in some gaps.

As it turned out, the propagation, noise levels, and conditions were in our favor, and the packets we sent helped contribute to the effort more than we initially thought. The moral to this story is that anyone can contribute to a mission's success regardless of his or her location, even if he or she can only confirm receiving the signal.

Our effort demonstrates that with a three-element Yagi and a little perseverance, you can contribute and make a big impact with basic equipment. More of this type of effort needs to occur to get the students involved in science, technology, and communications.

I applaud the Kentucky Space Corporation, universities, and NASA in keeping up the good work to keep space accessible to our youth.

Arecibo and Echoes of Apollo 2010

The following is from Pat Barthelow, AA6EG:

Thanks to all who worked with us at Arecibo for the Echoes of Apollo/World Moon Bounce Day event, with a rare appearance by the KP4AO Arecibo Observatory Radio Club, and guest operators who did a fantastic job. We worked for three straight days, 2.5-hour sessions off the moon on 432 MHz, using SSB, CW, and JT65.

In actuality the three straight days capped about three months of intensive preparation and planning, beginning with phone calls to Arecibo Management at Cornell University,

Trajectory of sounding rocket.

Kentucky school students who participated in tracking the SOCEM launch. From left to right: Charlie Cantrill, KI4RDT; Bryan Petsy; Zach Plowe, KJ4LIY; Cody Ferguson, KJ4TNQ. Not pictured: Chandler Young, KJ4TNT. (Photo courtesy of KI4RDT)

and to Mike Nolan, Angel Vazquez, and other senior management and technical crew at NAIC Arecibo. The stories are being written now from multiple perspectives for *CQ VHF* magazine as well as other amateur radio publications. You can anticipate full stories published in the coming months.

The Arecibo EME event included technical trials and tribulations, and ultimately, overall triumph with more than 250 two-way QSOs completed over the three days of 2.5-hour operating windows. After the post analysis is completed, many, many more will be acknowledged as heard, and probably the audio files will be available online for all participants to possibly hear their own signals, as they were heard by the SDR broadband recordings.

We estimate that we only worked 10 percent of those who called. The pile-ups were astonishing, and a key study was accomplished—that of engaging in participation young people and Nobel Prize winning scientists alike. The event made SWL EME copy possible with a variety of antennas with boom lengths of less than one meter, and in some cases and some modes, *dipoles* heard signals off the moon.

The best news of all is that it may be possible for future Arecibo EME events to be scheduled. Additionally, leaders in NASA were impressed and could very well become active supporters of EME as a source of science outreach and educational activities.

Stay tuned . . . *73, de Pat, AA6EG, and the EME team at KP4AO, Arecibo Radio Observatory, PR.*

XV9AA Makes First EME QSO

The following is from Thu, XV9AA: "For your information, the last month I and my team mates have been busy preparing for our moonbounce (aka EME communication) experiment with Dave's kind support. And after some initial unsuccessful attempts finally I made the first successful EME QSO with Gary, KB8RQ, using JT65B/WSJT on VHF last Wednesday, April 21, 2010, thanks to his gigantic array of 24 Yagis and 1.5 kW output (I only have a single 11-element Yagi and 100W output). In the coming days, I'll continue improving my station to be able to work EME with other (smaller) stations."

K5N to Activate DL88/DL89

Some of the guys who previously activated EL58 are planning on activating DL88/DL89 between June 29 and July 2, 2010. Here is a link to their website:

Operators at Arecibo, KP4AO. From left to right: Dr. Mario Ierkic, Professor at the University of Puerto Rico, and former Aericbo staff member; Dr. Joe Taylor, K1JT (Nobel Laureate, relating to Pulsars), Princeton U Inventor of JT-xx digital modes; Pat Barthelow, AA6EG , Echoes of Apollo, Founder; Angel Vazquez, WP3R, Chief Op, Tech staff lead for EME at Arecibo Observatory Radio Club; Dr. Jim Breakall, WA3FET, EE Professor, Penn State; Israel Cabrera, KP4LCL, Operations Technician/Telescope Operator; person kneeling is unknown. (Photo courtesy of AA6EG)

<http://www.kcvhfgridbandits.com/kc_vhf_grid_bandits_037.htm>.

Current Contest

CQ WW VHF Contest: This year's CQ WW VHF Contest will be held from 1800 UTC July 17 to 2100 UTC July 18. Complete rules can be found in the June issue of *CQ* and a condensed version in the Spring 2010 issue of *CQ VHF*.

Current Conference

This year's **Central States VHF Society Conference** will be held July 22–24, in Bridgeton, Missouri, at the Doubletree Hotel. For more information, go to: <http://www.csvhfs.org/>.

Calls for Papers

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

Technical papers are solicited for presentation at the **29th Annual ARRL and TAPR Digital Communications Conference** to be held September 24–26 in Portland, Oregon and publication in the conference *Proceedings*. Presentation at the conference is not required for publication. Submission of papers is due by July 31, 2010 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>.

Meteor Showers

This month there are a number of minor showers. The *Piscis Austrinids* is expected to peak July 28. The *δ-Aquarids* is a southern latitude shower. It has produced in excess of 20 meteors per hour in the past. Its predicted peak is also 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 elsewhere in this issue. Also visit the International Meteor Organization's

The 432 linear phased array antenna at Arecibo, which efficiently illuminated the 1000-ft. spherical dish surface and collected the linearly aligned received signal images from the dish off the moon. (Photo courtesy of AA6EG)

website: <http://www.imo.net/calendar/2010>. A pdf document of the year's meteor showers is available from the IMO at: <http://www.imo.net/docs/cal2010.pdf>.

And Finally . . .

My exposure to the SOCEM project was during the Southeastern VHF Society banquet speech given by Dr. Ben Malphrus, KJ4HVE, who is the Director of Earth and Space Science academic program at Morehead State University. Ben gave a terrific presentation of what Kentucky colleges and the State of Kentucky are doing in space. Previously considered a joke among serious contenders for aerospace development, these Kentuckians have established themselves as meaning business. Most important for us amateur radio operators, they have fully integrated amateur radio into their programs. You will be hearing more about them in the coming months and years. In particular, Ben is planning at least one article in *CQ VHF* magazine sometime this year.

If you have some exciting news for us to publish, then please let me know by sending me an e-mail at <n6cl@sbcglobal.net> or finding me on Facebook or Twitter. Until next month...

73 de Joe, N6CL

dx

BY CARL SMITH,* N4AA

Microlite Penguins and More DX

The solar flux has started rising. Although slowly, it is still an improvement. Signals have started appearing on 12 and 10 meters, and 10 meters is proving to be quite interesting in the late evenings (East Coast time). There have been real signals from VK and ZL—not loud, but there. Cycle 24 is certainly turning out to be one for the books. Nothing makes much sense, as the historical guidelines don't seem to apply. Well, it's like the weather; there's nothing we can do about that either. We just have to take what we get. If we turn on the radio and hear signals, good; if not, oh well.

Microlite Penguins DXpedition

The Microlite Penguins DXpedition Team announced they would be heading south again. This time, they will be activating the South Orkney Islands, VP8O, January 27 to February 8, 2011. Here's the news release:

> Safe and reliable Antarctic transportation has been secured by the experienced *RV Braveheart*, and activity will be on all HF bands 160–10 meters using SSB, CW, and RTTY.
>
> Operators will be K9ZO, ND2T, 9V1YC, KØIR, N1DG, NØAX, W3WL, N6MZ, I8NHJ, N4GRN, WB9Z, W7EW, and VE3EJ. This will be the team's fourth time activating an entity in the Antarctic region and fifth DXpedition overall. You may recognize most of the callsigns from the group's past operations, but we've also added several new members to the team, all of whom have been on DXpeditions to some of the world's rarest entities.
>
> Those who have enjoyed our operations over the last eight years may recall that our methods and philosophy are somewhat different from other DXpeditions. Although our overall goal is still to provide a new DXCC entity on as many bands and modes as possible, we also strive to increase the fun factor by focusing on operational simplicity and radio skill.
>
> In the past we kept the Microlite Penguins DXpeditions noncommercial and confined the financial burden to ourselves and a single sponsor, the NCDXF. But today, with the astronomical cost of Antarctic travel and a budget approaching US$300,000, this single-sponsor approach is no longer a possibility. To make this DXpedition happen, we must break our tradition and ask for the support of the entire amateur radio community. All financial support, no matter what the amount, will be welcome. We have even set up a website where DXers, clubs, and foundations can donate online: <http://www.vp8o.com>.
>
> It is the support and encouragement of the DX community that will make this exciting Antarctic adventure a success. We hope that you, personally, can be a part of this adventure, share the excitement with us, and help bring the Microlite Penguins to the airwaves once again.
>
> 73 and see you on the bands.—*The Microlite Penguins DXpedition Team*

This group can always be depended upon to provide an outstanding operation. I heartily endorse them.

DX Activity

Last month I commented on the **YI9PSE** operation from Iraq. I "guessed" that they were on track to hit 50,000 Q's. Well, that was a good guess, as they reported 50,847 with 19,408 unique callsigns at the end of the activity. They accomplished this in spite of having to wait two or three days to get their equipment through customs. George, N6NKT, will be handling the QSL chores, and the logs will be uploaded to LoTW in late 2010, if you don't mind waiting for your confirmation.

3W6C (Côn Cỏ Island, Vietnam) got off to a good start and then ran into some difficulties. The original plans for separate operating locations had to be abandoned, as they were "requested" to con-

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

The logo of the Microlite Penguins DXpedition Team headed for South Orkney as VP8O early next year. (Courtesy of James, 9V1YC)

Pierre, ZS1HF, stands next to the ship that took him to Marion Island in April, where he expected to be on the air as ZS8M starting in mid-May. (Photo courtesy of Dennis, ZS1AU)

solidate their operating into a smaller space. Thus, they didn't do quite as well as they had hoped, but still gave it their best in spite of the situation.

As of this writing in early May, **E4X** from Palestine is scheduled to give us another opportunity to add that one to our worked list in late May, early June. Hopefully we'll be able to have a wrap-up on that one next month.

CYØ – Sable Island. Randy, NØTG, says the team is on track to make the trip in mid-October. They had to postpone it for a family medical situation that has now been resolved. An interesting note is Randy tells me the team made a "wet-run" to an island off the coast of North Carolina to test their plans. Everything apparently worked fine, although they did "tweak" a few things to make things easier when they head to Sable Island.

It's a bit early to tell, but many are looking forward to Pierre, ZS1HF, coming on the air from Marion Island, **ZS8M**. He was getting settled in mid- to late April and expected to be on the air by mid-May. Remember that Pierre doesn't work CW, so it will be SSB to work him. Most of us will take any mode and/or band.

Hopefully, next time we'll have a final report on the **Pacific Odyssey DXpedition** by the Ukrainian group that was going to Samoa (5WØOX), Central Kiribati (T31X), and Tokelau ((ZK3X) in May and June.

WWROF

An interesting item came out of the

The WPX Program

CW

3247	K8ZT	3248	KE5K

SSB

3071	JY5CC	3074	KE5K
3072	K8ZT	3075	VK2CA
3073	RA1CW		

Mixed

2101	KC5GB	2107	KE5K
2102	K8ZT	2108	VK2CA
2103	DF8UO	2109	KD5YUK
2104	N4ST	2110	D2EB
2105	WB1EDI	2111	KB9OWD
2106	KEØN		

Digital

42 ..... KE5K

CW: 600 JH6JMM. 700 KE5K. 950 W4UCZ. 1150 WD9DZV, IØWOK. 1300 K8ZT. 2350 N8BJQ. 2450 W9IL. 2550 IØNNY. 2800 K9UQN. 2950 W8IQ. 5600 K2VV.
SSB: 400 RA1CW. 850 WA5UA. 1300 PT7ZT. 1350 K8ZT. 1750 K9UQN. 1800 N8BJQ. 2100 KWØU. 2200 DL8AAV. 2250 SV3AQR. 2350 KE5K. 2400 W9IL. 4850 K2VV.
Mixed: 500 N4ST. 600 D2EB, KB9OWD. 650 WB1EDI. 1850 K8ZT. 2700 KE5K. 3000 N8BJQ. 3200 K9UQN. 3340 W9IL. 6400 K2VV.
Digital: 850 KE5K. 1000 N8BJQ.

160 Meters: K8ZT, W4UCZ, KE5K
80 Meters: K8ZT, W4UCZ, KE5K
40 Meters: K8ZT, W4UCZ, K8ZEE
30 Meters: W4UCZ
20 Meters: K8ZT, KE5K, VK2CA
17 Meters: KE5K
15 Meters: K8ZT, KE5K, VK2CA
12 Meters: KE5K
10 Meters: K8ZT, VK2CA

Asia: K8ZT, KE5K
Africa: K8ZT, KE5K, K8ZEE
Europe: K8ZT, KE5K
Oceania: K8ZT, KE5K
N. America: K8ZT, KE5K
S. America: K8ZT, KE5K

Award of Excellence: K8ZT, KE5K, JH8BOE
160 Meter Bar: K8ZT, KE5K, JH8BOE
17 Meter Bar: KE5K
Digital Bar: KE5K

Award of Excellence Holders: N4MM, W4CRW, K5UR, K2VV, VE3XN, DL1MDD, DJ7CX, DL3RK, WB4SIJ, DL7AA, ON4QX, 9A2AA, OK3EA, OK1MP, N4NO, ZL3GO, W4BQY, IØJX, WA1JMP, KØJN, W4VQ, KF2O, WB8CNL, W1JR, F9RM, W5UR, CT1FL, WA4QMQ, W8ILC, VE7DP, K9BG, W1CU, G4BUE, N3ED, LU3YL/W4, NN4Q, KA3A, VE7WJ, VE7IG, N2AC, W9NUF, N4NX, SMØDJZ, DK5AD, WD9IIC, W3ARK, LA7JO, VK4SS, I8YRK, SMØAJU, N5TV, W6OUL, WB8ZRL, WA8YTM, SM6DHU, N4KE, I2UIY, I4EAT, VK9NS, DEØDXM, DK4SY, UR2QD, AB9O, FM5WD, I2DMK, SM6CST, VE1NG, I1JQJ, PY2DBU, HI8LC, KA5W, K3UA, HA8UB, HA8XX, K7LJ, SM3EVR, K2SHZ, UP1BZZ, EA7OH, K2POA, N6JV, W2HG, ONL-4003, W5AWT, N3XX, HB9CSA, F6BVB, YU7SF, DF1SD, K7CU, I1POR, K9LJN, YBØTK, K9QFR, 9A2NA, W4UW, NXØI, WB4RUA, I6DQE, I1EEW, I8RFD, I3CRW, VE3MS, NE4F, KC8PG, F1HWB, ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, KC7EM, YU1AB, IK2ILH, DEØDAQ, I1WXY, LU1DOW, N1IR, IK4GME, VE9RJ, NN1N, HB9AUT, KC6X, N6IBF, W5ODD, IØRIZ, I2MQP, F6HMJ, HB9DDZ, WØULU, K9XR, JAØSU, I5ZJK, I2EOW, IK2MRZ, KS4S, KA1CLV, WZ1R, CT4UW, KØIFL, WT3W, IN3NJB, S50A, IK1GPG, AA6WJ, W3AP, OE1EMN, W9IL, I7PXV, S53EO, DF7GK, S57J, EA5BM, DL1EY, DJ1YH, KUØA, VE2UW, 9A9R, UAØFZ, DJ3JSW, OE6CLE, HB9BIN, N1KC, SM5DAC, RW9SG, WA3GNW, S51U, W4MS, I2EAY, RAØFU, CT4NH, EA7TV, W9IAL, LY3BA, K1NU, W1TE, UA3AP, EA5AT, OK1DWC, KX1A, IZ5BAM, K4LQ, KØKG, DL6ATM, VE9FX, DL2CHN, W2OO, AI6Z, RU3DX, WB9IHH, CT1EEN, G4PWA, OK1FED, EU1TT, S53MJ, DL2KQ, RA1AOB, KT2C, UA9CGL, AE5B, KØDEQ, DKØPM, SV1EOS, UAØFAI, N4GG, UA4RZ, 7K3QPL, EW1CQ., UA4LY, RZ3DX, UA3AIO, UA4RC, N8BJQ, UA3BS, UA9FGR, UT3UY, WA5VGI, UT9FJ, UT4EK, K9UQN, UR5FEO, LY2MM, N3RC, OH3MKH, RA3CQ, UT3IZ, S55SL, RU3ZX, YO9HP, RA3DNC.

160 Meter Endorsements: N4MM, W4CRW, K5UR, VE3XN, DL3RK, OK1MP, N4NO, W4BQY, W4VQ, KF2O, W8CNL, W1JR, W5UR, W8ILC, K9BG, W1CU, G4BUE, LU3YL/W4, NN4Q, VE7WJ, VE7IG, W9NUF, N4NX, SMØDJZ, DK5AD, W3ARK, LA7JO, SMØAJU, N5TV, W6OUL, N4KE, I2UIY, I4EAT, VK9NS, DEØDXM, UR2QD, AB9O, FM5WD, SM6CST, I1JQJ, PY2DBU, HI8LC, KA5W, K3UA, K7LJ, SM3EVR, UP1BZZ, K2POF, IT9TQH, N6JV, ONL-4003, W5AWT, N3XX, F6BVB, YU7SF, DF1SD, K7CU, I1POR, K9LJN, YBØTK, K9QFR, W4UW, NXØI, WB4RUA, I1EEW, ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, YU1AB, IK4GME, NN1N, W5ODD, IØRIZ, I2MQP, F6HMJ, HB9DDZ, K9XR, JAØSU, I5ZJK, I2EOW, KS4S, KA1CLV, KØIFL, WT3W, IN3NJB, S50A, IK1GPG, AA6WJ, W3AP, S53EO, S57J, DL1EY, DJ1YH, KUØA, VR2UW, UAØFZ, DJ3JSW, OE6CLD, HB9BIN, N1KC, SM5DAC, S51U, RAØFU, CT4NH, EA7TV, LY3BA, K1NU, W1TE, UA3AP, OK1DWC, KX1A, IZ5BAM, DL6ATM, W2OO, RU3DX, WB9IHH, G4PWA, OK1FED, EU1TT, S53MJ, DL2KQ, RA1AOB, UA9CGL, SM6DHU, KØDEQ, DKØPM, SV1EOS, N4GG, UA4RZ, 7K3QPL, EW1CQ, UA4LY, RZ3DX, UA3AIO, UA4RC, N8BJQ, UA3BS, UA9FGR, UT3UY, WA5VGI, UR5FEO, N3RC, UT3IZ RU3ZX, YO9HP, RA3DNC.

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, 2010, 816 stations have attained the 200 zone level and 1681 stations have attained the 150 zone level.

New recipients of 5 Band WAZ with all 200 zones confirmed:
W9OP

The top contenders for 5 Band WAZ (zones needed, 80 or 40 meters):

N4WW, 199 (26)
W4LI, 199 (26)
K7UR, 199 (34)
IK8BQE, 199 (31)
JA2IVK, 199 (34 on 40)
IK1AOD, 199 (1)
GM3YOR, 199 (31)
VO1FB, 199 (19)
KZ4V, 199 (26)
W6DN, 199 (17)
W3NO, 199 (26)
RU3FM, 199 (1)
N3UN, 199 (18)
W1JZ, 199 (24)
W1FZ, 199 (26)
SM7BIP, 199 (31)
N4NX, 199 (26)
N4MM, 199 (26)
EA7GF, 199 (1)
N6HR/7, 199 (37)
JA5IU, 199 (2)
RU3DX, 199 (6)
N4XR, 199 (27)
HA5AGS, 199 (1)
VE3XN, 199 (26)
N5AW, 199 (17)
JH7CFX, 199 (2)
K7LJ, 199 (37)
RA6AX, 199 (6 on 10m)
RX4HZ, 199 (13)
KØGM, 199 (17)
S58Q, 199 (31)
KQØB, 199 (2 on 10)
K9OW, 199 (34 on 10)
KØKG, 199 (26)
IN3ZNR, 199 (1)
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)
W9XY, 198 (22, 26)
KZ2I, 198 (24, 26)
W7VJ, 198 (34, 37)
W9RN, 198 (26, 19 on 40)
W5CWQ,198 (17, 18)
I5KKW, 198 (31&23 on 20)
IV3MUC, 198 (1&31 on 40)
UA4LY, 198 (6&2 on 10)
IK4CIE, 198 (1, 31)
JA7XBG, 198 (2 on 80&10)
K8PT, 198 (18, 26)
HB9ALO, 198 (1, 31)

The following have qualified for the basic 5 Band WAZ Award:

S55SL (191 zones)

5 Band WAZ updates:

HB9ALO (198 zones)
KØKG (199 zones)
K4HB (196 zones)
W9MU (193 zones)
K9UP (199 zones)
K4CN (200 zones)
WK3N (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, P.O. Box 449, Wiggins, MS 39577-0449. The processing fee for the 5BWAZ award is $10.00 for subscribers (please include your most recent *CQ* mailing label or a copy) and $15.00 for nonsubscribers. An endorsement fee of $2.00 for subscribers and $5.00 for nonsubscribers is charged for each additional 10 zones confirmed. Please make all checks payable to Floyd Gerald. Applicants sending QSL cards to a *CQ* checkpoint or the Award Manager must include return postage. N5FG may also be reached via e-mail: <n5fg@cq-amateur-radio.com>.

Visalia DX Convention in April. The World Wide Radio Operators Foundation was created in 2009 by a group of radio operators who saw a need for an independent organization devoted to the skill and art of radio operating.

The website (http://www.wwrof.org) tells us the WWROF is: "Dedicated to improving the skills of amateur radio operators around the world, utilizing education, competition, advancement of technology and scientific research, promoting international friendship and goodwill, and preparing them to better serve society in times of communication need."

The directors and officers of the World Wide Radio Operators Foundation all are well-known and highly respected radio operators. In addition, each brings a specific skill set and proven track record in his professional career to the management of the organization. For more information check the website: <http://www.wwrof.org>.

WRTC 2010

The 2010 World Radio Team Championship will be running in mid-July, in conjunction with the IARU (International Amateur Radio Union) HF Championship. This time the WRTC will be hosted by the Russians in Moscow. As you may already know, this event is the "Olympics of Amateur Radio," and about 50 teams from all over the world will compete for Gold, Silver, and Bronze in the fields near Moscow.

This time teams will be set up in tents with generators supplying the power, and special new rules will allow both operators to make contacts in a modified form of SO2R (Single Operator, Two Radios) with interlocked radios—meaning only one signal at a time is permitted on the air.

Our Russian friends have planned what sounds like a wonderful week of amateur competition for competitors and spectators alike! There will be some side trips for visitors, and, of course, WRTC week always provides wonderful opportunities for socializing and just "hanging out" with some of the very best amateur radio contest operators in the world. This will be "the place to be this July"—no doubt about it!

It should be a fun time for all and I personally look forward to working as many of the teams as possible.

DXpedition Funding

Funding DXpeditions is always a problem. Many of the DXpeditioners come up with the bulk of the funds from their own pockets. Some DXpeditions are just too expensive to be funded that way. The group has to go looking for donations. There are many organizations that exist for the sole purpose of providing funds for DXpeditions. Some of these are Northern California DX Foundation (NCDXF); International DX Association (INDEXA); German DX Foundation (GDXF); and Oceania DX Group (ODXG). I apologize for not being able to name every one of them.

These organizations accept donations from individuals, clubs, etc., for the

The WAZ Program

6 Meters

97.....UY1HY (25 zones)

20 Meter SSB

1192.....VK3PA

40 Meter SSB

109.....VK3PA

80 Meter CW

83.....W9OP

160 Meters

338.....G4PWA (40 zones)
339....SM3NRY (40 zones)
340.....SP8AJK (40 zones)
341.....KD9SV (40 zones)
342.....TF4M (36 zones)
343.....UA3LAR (38 zones)
344.....VE3EJ (40 zones)
345.....N6SS (40 zones)
346....EY8MM (40 zones)
347.....UT4EO (34 zones)
348.....UY1HY (36 zones)
349.....VO1FB (32 zones)

All Band WAZ Diamond Jubilee

038.....ZS2EZ
039.....K7CMR
040.....VE3MMQ
041.....VE7BV
042.....KØKG
043.....K9MIE
044.....KJ4BK

Mixed

8686.....K8GI
8687.....JR2PMT
8688.....WB9WHQ
8689.....DL8NBW
8690.....NNH7FY
8691.....VO1HP
8692.....OH3NDH
8693.....JA5DBE

SSB

5130.....DL9LF

Rules and applications for the WAZ program may be obtained by sending a large SAE with two units of postage or an address label and $1.00 to: WAZ Award Manager, Floyd Gerald, N5FG, P.O. Box 449, Wiggins, MS 39577-0449. The processing fee for all *CQ* awards is $6.00 for subscribers (please include your most recent *CQ* mailing label or a copy) and $12.00 for nonsubscribers. Please make all checks payable to Floyd Gerald. Applicants sending QSL cards to a *CQ* checkpoint or the Award Manager must include return postage. N5FG may also be reached via e-mail: <n5fg@cq-amateur-radio.com>.

CQ DX Awards Program

SSB

2545.....UAØMF
2546.....JF1GYX
2547.....KW3W
2548.....CE1TT
2549.....WM3L
2550.....KE5ZWD

CW

1101.....JN1RQV
1103.....ZL1CDX
1104.....UAØMF
1105.....KW3W
1106.....K4EQ

RTTY

48.....UAØMF

SSB Endorsements

330.....N7RO/339
330.....UAØMF/339
330.....W9IL/334
320.....KW3W/324
275.....AD7J/299
275.....AE9DX/294
150.....CE1TT/190
Mobile.....WM3L

CW Endorsements

330.....N7RO/338
330.....UAØMF/338
320.....W9IL/321
310.....KØKG/310
275.....K4EQ/277
150.....ZL1CDX/150

RTTY Endorsements

320.....UAØMF/320

The basic award fee for subscribers to *CQ* is $6. For nonsubscribers, it is $12. In order to qualify for the reduced subscriber rate, please enclose your latest *CQ* mailing label with your application. Endorsement stickers are $1.00 each plus SASE. Updates not involving the issuance of a sticker are free. All updates and correspondence must include an SASE. Rules and application forms for the CQ DX Awards may be found on the <www.cq-amateur-radio.com> website, or may be obtained by sending a business-size, self-addressed, stamped envelope to CQ DX Awards Manager, Billy Williams, N4UF, Box 9673, Jacksonville, FL 32208 U.S.A. Currently we recognize 339 active countries. Please make all checks payable to the award manager.

Photocopies of documentation issued by recognized national Amateur Radio associations that sponsor international awards may be acceptable for CQ DX award credit in lieu of having QSL cards checked. Documentation must list (itemize) countries that have been credited to an applicant. Screen printouts from eQSL.cc that list countries confirmed through their system are also acceptable. Screen printouts listing countries credited to an applicant through an electronic logging system offered by a national Amateur Radio organization also may be acceptable. Contact the CQ DX Award Manager for specific details.

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

6315 9A2AA	4213 I2PJA	3735 WB2YQH	3091 9A4W	2530 YO9HP	2192 N2SS	1705 W2EZ	1269 K5WAF	680 IWØHOU
5788 K2VV	4146 N6JV	3684 IK2ILH	3007 W2WC	2511 W6OUL	2001 AB1J	1662 SV1DPI	1116 YU7FW	662 JA7OXR
5426 W1CU	4118 S53EO	3616 W9OP	2965 OZ1ACB	2499 KC9ARR	1951 KØKG	1643 N1KC	1016 RA1AOB	653 KK3Q
5031 W2FXA	4082 I2MQP	3522 ON4CAS	2936 N8BJQ	2440 K5UR	1930 W2FKF	1593 S55SL	976 KM6HB	650 N3YZ
4758 EA2IA	4034 N9AF	3474 SM6DHU	2873 W2ME	2428 N6QQ	1905 W7CB	1512 WD9DZV	964 K8ZEE	644 KWØH
4705 9A2NA	4001 KØDEQ	3305 JH8BOE	2845 JN3SAC	2397 VE6BF	1891 VE9FX	1446 DF3JO	815 KL7FAP	636 ZS2DL
4618 N4NO	3908 KF2O	3227 K9BG	2752 K1BV	2378 W3LL	1820 KX1A	1359 N3RC	726 K5IC	600 IK1RKN
4430 YU1AB	3892 WA5VGI	3207 W9IL	2724 W2OO	2358 I2EAY	1761 AG4W	1337 K6UXO	723 KØDAN	600 KB9OWD
4232 VE3XN	3775 YU7BCD	3104 K9UQN	2704 K2XF	2116 AE5B	1741 AB5C	1322 AA4FU	682 AI8P	

SSB

5065 IØZV	3505 N4NO	2734 YU7BCD	2333 W9IL	2093 W2WC	1891 W2FKF	1611 W2ME	1334 PT7ZT	883 WA5UA
4505 VE1YX	3323 OE2EGL	2711 LU8ESU	2326 CX6BZ	2076 K2XF	1844 YO9HP	1505 AG4W	1258 N1KC	875 K7SAM
4419 K2VV	3229 CT1AHU	2709 KF7RU	2210 SV3AQR	2072 K5UR	1795 KQ8D	1480 AB5C	1145 EA3EQT	741 WD9DZV
4371 F6DZU	3196 KF2O	2618 WA5VGI	2209 IK2QPR	1986 DL8AAV	1762 N8BJQ	1464 VE7SMP	1083 KX1A	717 KØDAN
4307 OZ5EV	3108 I4CSP	2595 EA1JG	2201 NQ3A	1945 KI7AO	1758 W6OUL	1463 I2EAY	1042 IZØBNR	637 K5WAF
4171 I2PJA	2957 KØDEQ	2471 I3ZSX	2157 W2OO	1935 SV1EOS	1719 K9UQN	1410 S55SL	1031 IK8OZP	600 WA2BEV
3843 I2MQP	2860 I8KCI	2451 EA3GHZ	2142 W3LL	1927 AE5B	1714 IK2DZN	1386 IK4HPU	978 EA7HY	
3749 9A2NA	2857 4X6DK	2431 G4UOL	2107 N6FX	1889 N6QQ	1643 JN3SAC	1385 AE9DX	951 KU4BP	
3658 EA2IA	2817 IN3QCI	2417 SM6DHU	2094 I8LEL	1879 K3IXD	1623 VE9FX	1377 EA3NP	924 VE6BF	

CW

5353 K9QVB	3687 EA2IA	2838 I7PXV	2483 JN3SAC	2324 OZ5UR	1918 W2OO	1407 WO3Z	1147 WD9DZV	821 HB9DAX
5254 WA2HZR	3366 WA5VGI	2837 W8IQ	2456 IØNNY	2223 VE6BF	1848 I2EAY	1403 AG4W	1125 IØWOK	753 F5PBL
5141 K2VV	3308 KØDEQ	2723 EA7AZA	2434 W9IL	2101 I2MQP	1804 EA7AAW	1334 RUØLL	1109 VE1YX	749 AE5B
4146 N6JV	3293 9A2NA	2721 K9UQN	2419 IK3GER	2089 K2XF	1665 AC5K	1327 WA2VQV	1053 K5WAF	695 S55SL
4128 N4NO	2923 KF2O	2632 W2ME	2415 W2WC	1979 K5UR	1665 YO9HP	1317 K6UXO	1030 AA5JG	615 JH6JMM
3878 LZ1XL	2923 YU7BCD	2647 KA7T	2342 N6FX	1966 W9HR	1445 EA2CIN	1223 KX1A	915 N1KC	608 IK2SGV
3827 VE7DP	2914 SM6DHU	2502 JA9CWJ	2324 N8BJQ	1961 W6OUL	1424 N6QQ	1220 AA4FU	824 VE9FX	600 IT9ELD

DIGITAL

1284 W3LL	1133 N6QQ	1066 YO9HP	1037 N8BJQ	1009 GUØSUP	772 KØDEQ	769 AG4W	692 WD9DZV	629 W2OO

The CQ DX Field Award Program

Mixed

108 HB9DDZ 109 WT6X

SSB

68 WM3L

CW

59 HB9DDZ

Digital

18 WT6X

Mixed Endorsements

175 HB9DDZ/180 175 K8OOK/195
175 W4UM/199

SSB Endorsements

100 NKØS/112 Mobile WM3L

CW Endorsements

175 HB9DDZ/179 175 W4UM/194

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.

purpose of passing along the funds to make it possible to bring rare places on Earth on the air for our enjoyment. We should support these organizations with whatever we are able to provide. Some are membership groups and others operate from just donations. Regardless of the form, we need to support one or more of them if we wish to see DXpeditions to the really rare spots, such as those harsh-climate Antarctic islands (Peter I, Heard, Bouvet, South Sandwich, etc.) or some of the other hard to reach places. I urge all of you to give serious thought to how you can help one or more of these organizations.

Until next time, enjoy the chase and Have Fun!

73, Carl, N4AA

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	VE3ZZ	207	ON4CAS	191
HAØDU	240	HA5WA	206	HA9PP	190
VE3XN	234	F6HMJ	206	K8OOK	189
VE7IG	232	JN3SAC	206	BA4DW	188
W1CU	228	KF8UN	205	RW4NH	187
HA1RW	220	W6OAT	205	K2SHZ	182
N8PR	220	OK1AOV	205	K1NU	180
9A5CY	219	N4MM	202	HB9DDZ	180
HA1AG	218	W4UM	198	W5ODD	177
KØDEQ	216	N4NX	192	NØFW	176

SSB

W1CU	209	VE7SMP	190	NØFW	176
W4ABW	202	N4MM	186	DL3DXX	175
KØDEQ	192	W4UM	182	JN3SAC	175

CW

DL6KVA	225	DL3DXX	203	OK2PO	184
W1CU	220	JN3SAC	200	N4MM	179
DL2DXA	209	OK1AOV	196	HB9DZZ	179
KØDEQ	207	W4UM	192	N4NX	177

QSL Information

A41KJ via NI5DX
A41MX via EB7DX
A41MX/36 via EB7DX
A43ND via A47RS
A45WG via NI5DX
A45WG/P via NI5DX
A45WH via A47RS
A52DA via DL1DA
A52DX via W3HNK
A52FJJ via JA1FJJ
A6/DL3YM via DL3YM
A6/N1DG via N1DG
A6/RV6LNA via UA6MF
A6/VE6LB via VE6LB
A60ISG via IZ8CLM
A60SAB via IZ8CLM
A60WARD via IZ8CLM
A611BN via NI5DX
A61AB via IZ8CLM
A61AQ via N1DG
A61AS via YO3FRI
A61BK via NI5DX
A61BN via NI5DX
A61C via W4JS
A61E via EB7DX
A61I via IZ8CLM
A61KM via NI5DX
A61NA via UA6MF
A61OO via IZ8CLM
A61TT via IZ8CLM
A61TX via W4JS
A62END via IZ8CLM
A62ER via IZ8CLM
A65BB via S57DX
A65BE via G3XHZ
A65BG via PA7FM
A65BI via SM5DJZ
A65BM via W4JS
A65BP via UA6MF
A65CA via RV6AJJ
A65DLH via DO7ZZ
A6XN via DJ9ZB

(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/>.)

BY TED MELINOSKY,* K1BV

Sponsors Needed for County Awards plus Awards from Hungary

I recently checked the status of the individual county awards for all of the states that offer one or more county awards. The results were pretty bad, or to look at it in a positive way, there are a lot of opportunities. Many sponsors didn't bother to answer either e-mail or written inquiries, so I am going to have to assume they no longer sponsor the awards. (Their e-mails did not bounce, nor were the letters returned by the Post Office.)

Thus, here is the opportunity for a new group of individuals or clubs to sponsor a county award for their state. This list includes the states that did not previously sponsor an award, and the newly added states: AK, DE, HI, IA, ID, KS, MN, MS, NE, NH, NM, NV, NY, ND, OH, OR, PA, and TN (18 states).

Individuals lose interest or become Silent Keys, clubs stagnate, and these are just the facts of life. There probably won't be a whole lot of applications, and nobody makes a lot of money sponsoring the county awards, but you will be meeting a need, and perhaps bring some fame to your club or group. If you have any questions, send me an e-mail at <k1bv@cq-amateur-radio.com> and we can "talk."

Awards from Hungary

The theme of this month's awards centers on those issued by the country of Hungary, in Central Europe. I visited Budapest two years ago, and was fascinated by an exciting and vibrant country well on the way to making a transition from a state-controlled economy to a rough-and-tumble private economy.

HA/HG stations are easy to work, especially during contests, and Hungary's licensing authority permits special prefixes for every sort of anniversary or special event—e.g., HA80IARU, HA100RADIO, HA501DAE, HA507SQ, and HA802ERO. When you work one of these exotic prefixes, just check QRZ.com or Buckmaster to see if there is any special short-term award involved. Very often there is, and you may have just contacted 20 or 30% of needed stations in order to qualify.

European Capital of Culture Pécs 2010 Award. The city of Pécs was designated as one of the European Capitals of Culture in 2010. Pécs has a 2000-year-long history of tolerance for many different peoples, languages, and religions, and exhibited this during the Balkan Wars of the 1990s. It is the sixth largest city in Hungary and is located in the extreme south of the country, close to the border of Croatia.

The Mecsek Radio Club offers this award with the following requirements. You must earn at least

*12 Wells Woods Rd., Columbia, CT 06237
e-mail: <k1bv@cq-amateur-radio.com>

USA-CA Special Honor Roll

Duane A. Puro, K8AO
USA-CA All Counties #1197
March 27, 2010

Susan Mason WA6OCV
USA-CA All Counties #1198
April 16, 2010

USA-CA Honor Roll

500		2000	
WA6OCV	3502	K8AO	1395
EI9FBB	3503	WA6OCV	1396
1000		**2500**	
WA6OCV	1796	K8AO	131
		WA6OCV	1313
1500		**3000**	
K8AO	1509	K8AO	1223
WA6OCV	1510	WA6OCV	1224

The total number of counties for credit for the United States of America Counties Award is 3077. The basic award fee for subscribers is $6.00. For nonsubscribers it is $12.00. To qualify for the special subscriber rate, please send a recent CQ mailing label with your application. Initial application may be submitted in the USA-CA Record Book, which may be obtained from CQ Magazine, 25 Newbridge Road, Hicksville, NY 11801 USA for $2.50, or by a PC-printed computer listing which is in alphabetical order by state and county within the state. To be eligible for the USA-CA Award, applicants must comply with the rules of the program as set forth in the revised USA-CA Rules and Program dated June 1, 2000. A complete copy of the rules may be obtained by sending an SASE to Ted Melinosky, K1BV, 12 Wells Woods Road, Columbia, CT 06237 USA. DX stations must include extra postage for airmail reply.

The European Capital of Culture Pécs 2010 Award is offered by the Mecsek Radio Club for earning at least 2010 points during the calendar year 2010.

2010 points during the calendar year 2010. Point values are as follows:

a. HG10P, HG2010P, HG10PECS special call signs = 300 points.

b. Any HA3, HG3 callsigns = 100 points.

c. All other HA, HG callsigns = 50 points.

All valid stations may only be contacted once regardless of band or mode. QSOs via packet, repeater, and internet-based systems (EchoLink, Web TCVR, etc.) are not accepted.

Send log extract and fee of 1000 HUF for Hungarian stations or 10 Euros for foreign stations to <HA3MRK@gmail.com>. The award application deadline is December 31, 2011. The Award Manager is: Hegedüs Norbert, HA3IN, Pécs, Pellérdi u. 66, H-7634 Hungary.

Balaton Diploma (BD). Lake Balaton is the largest lake in Central Europe, located in the western portion of the country, and is a well-known tourist and vacation spot. The northern side of the lake is largely devoted to vineyards started by the Romans over 2000 years ago, where in addition to the common varieties of grapes are other types that only exist in Hungary.

This award is sponsored by the Radioclub Siofok and issued for contacts made after January 1, 1967. SWL OK. Contact stations as specified below:

HAs need 50 points, and at least three contacts must be with Radioclub Siofok members.

DX stations have to obtain 15 points, and at least one contact must be with a member of Radioclub Siofok.

Europeans need 30 points and must make two contacts with club members.

Stations and point values:

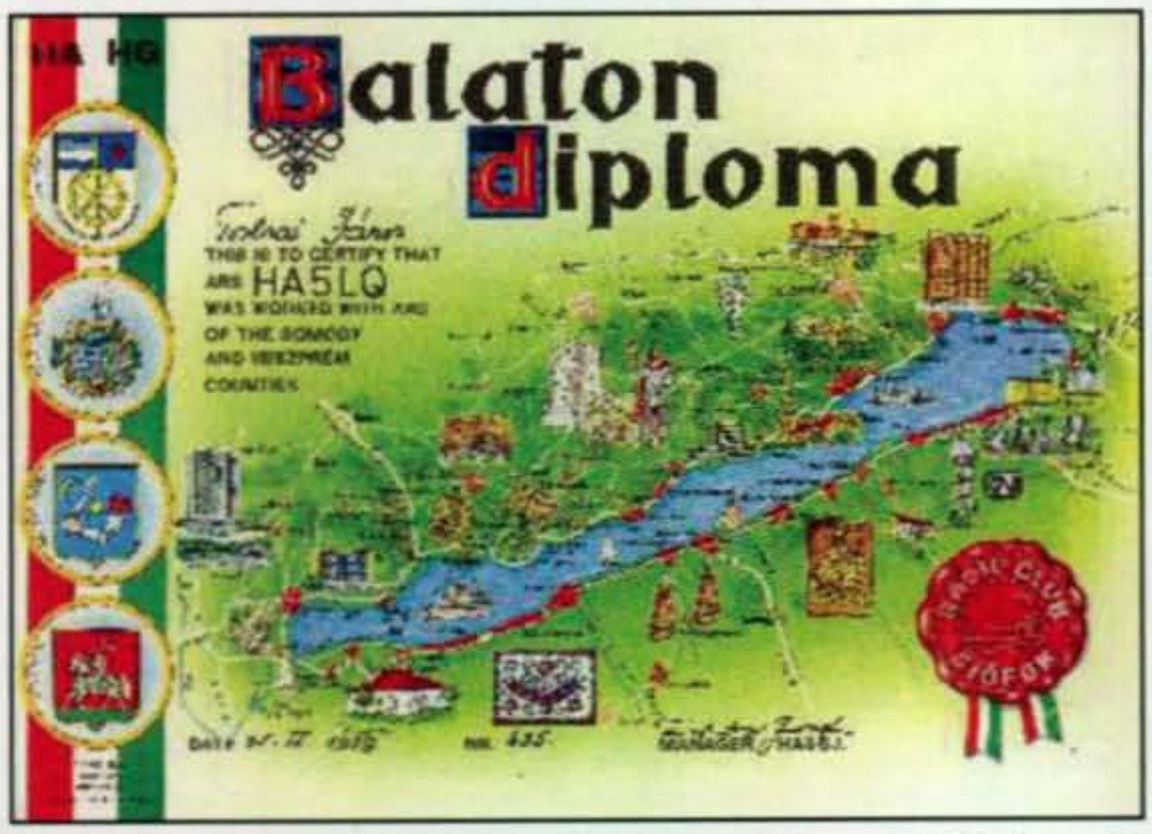
(a) Radioclub Siofok and members count 5 points: HA3KGJ, HA3GJ, HA3GQ, HA3HE, HA3KHL, and HA2RM. Honorary members are HA4XW, HA3NG, HA6NP, and HA8UA.

(b) Stations in the vicinity of Lake Balaton count 3 points—Towns of Keszthely, Balatonfured, Balatonfuzto, Balatonboglar, and Fonyod.

(c) Any other stations in Zala, Veszprem, and Somogy counties = 1 point.

These are stations whose partial callsigns start with: HA2KR*, HA2KS*, HA2YR*, HA2YS*, HA2R**, HA2S**, HA3KG*, HA3KH*, HA3YG*, HA3YH*, HA3G**, HA3H**.

Send GCR list and fee of 8 Euros or $US10 to: Radio Club, P.O. Box 78, H-8601 Siofok, Hungary. E-mail: <ha3gj@teamcomp.hu>.



Sponsored by the Radioclub Siofok, the Balaton Diploma is issued for contacts made after January 1, 1967.

The Radioclub of Kaposvar issues the Big Hunter Award, which commemorates the exploits of Szchenyi Zsigmond, famed big-game hunter and prolific author. The award combines working both European and African countries.

Big Hunter Award. The Radioclub of Kaposvar issues this award, which commemorates the exploits of Szchenyi Zsigmond, famed big-game hunter and prolific author. The award combines working both European and African countries.

The applicant must submit proof of contacts made after April 24, 1967, the date of his death. Confirm contacts with the following countries, where he lived and hunted: 5H Tanzania, 5X Uganda, 5Z Kenya, 9A Croatia, GM Scotland, HA3 + HA4 Hungary, I Italy, KL Alaska, ST Sudan, SU Egypt, VU India, and YO-Romania.

Class I = HA3 + HA4 plus 11 countries.

Class II = HA3 + HA4 plus 7 countries.

SWL OK. Contacts may be on CW, SSB, or mixed modes. No WARC band contacts count for the award.

Send GCR list and fee of 5 IRCs or 5 Euros to the award manager: Borsföldi Ferenc, HA3GE, H-7401 Kaposvár PF. 271, Hungary. Internet: <http://www.mrasz.hu/>.

New Budapest Award. Yes, there was an (Old) Budapest Award, which required contacts made while Hungary was under the old Cold War status, which fell apart in 1990. This New Budapest Award is similar. It is issued by the Radioamateur Society of Budapest (MRASZ BSZ) for contacting Budapest stations on or after January 1, 1990. It can be categorized as a "quantity" award, requiring only lots of contacts with a specific prefix. Since HA5 is the prefix used by Budapest—the largest city and capital of the country—you may have the cards in your collection right now. The award fee is also quite modest. SWL OK.

On HF: HAs need 75 different HA5 stations; other EUs need 50; and all others 25.

On VHF: HA/HGs need 50 different HA5 stations. All others: within 500-km distance of Hungary need 30 different HA/HG stations; those over 500 km from Hungary add QSO distances of contacts totaling at least 5000 km with HA/HG stations.

Via Satellite: Need three HA/HG5 contacts.

The same station may be used only one time. All bands and modes, except no use of repeaters. GCR list and fee of 6 IRCs to: Attila Komantinger HA5JP, MRASZ Budapesti Szovetsege, PO Box 603, H-1374 Budapest, Hungary. Internet: <http://www.mrasz.hu/>

The New Budapest Award is sponsored by the Radioamateur Society of Budapest (MRASZ BSZ) for contacting Budapest stations on or after January 1, 1990.

We're always interested in hearing from clubs, special interest groups or individuals who sponsor an award. You can contact me at the e-mail address shown on the first page of this column.

73, Ted, K1BV

contesting

BY JOHN DORR,* K1AR

How to Improve Your SSB Contesting Skills

July's Contest Tip

With events such as the Dayton Hamvention®, which by the time you read this will be history for this year, and all of the upcoming summer hamfests and radio "get-togethers," a great opportunity exists to share contesting experiences face-to-face and have us all learn from one another. Don't hide in your shack this summer. Get out and talk to your fellow contesters. Learn from their experience and apply it to your situation. Your contests scores can only improve!

It seems that much more has been written over the years about improving one's CW skills than SSB operating. Perhaps this is based on the assumption that CW is a more difficult operating mode. After all, on SSB the skill is simply to talk fast and with clarity, right? As you'll see this month, nothing could be further from the truth.

I believe that more training is possible for a SSB-challenged operator than for one who has problems with CW. One reason is that virtually all of us begin life with an ability to talk and speak a language. CW operating adds the complexity of "learning the code" before you even consider proficiency. While it's clear that some contesters seem to have God-given talents, there's plenty of opportunity to improve anyone's skills. When considering SSB operating proficiency, a few skill categories come to mind: calling CQ, timing, phonetics, and a myriad of miscellaneous topics. With these subjects in mind, let's dive in.

Calling CQ

The act of calling CQ seems simple enough, yet it is a skill in and of itself in the world of contesting. Consider one of the main goals of contesting: to make as many QSOs in as short a period of time as possible. Having said that, does it make sense to call "CQ Contest" like you would if you were DXing on a Tuesday afternoon? Calling an effective "contest" CQ requires several attributes. They include brevity, clarity, emphasis on your callsign, energy, and speed that reflects the conditions at the time. Let's unpack each of these areas in some more detail.

There's rarely, if ever, a scenario in which a long-winded CQ becomes a productive strategy in an SSB contest. Remember, the longer you're transmitting, the longer you're not working someone. Many stations will simply tune right by you, especially if you don't have one of the bigger signals on the band.

Speaking with a clear voice is an important attribute of phone operating. Just like your mother used to say, never mumble your words. While you can only control your signal strength to a certain degree, articulation is entirely up to you.

When calling CQ, what is the one piece of information that the other station doesn't have? You guessed it—your callsign. For that reason, it makes sense to emphasize that in your CQing style. Spending less time saying the words "CQ Contest" and more time saying your callsign will pay dividends.

Energy and speed go hand-in-hand when CQing. A station is much more likely to call you if you show some animation in your voice. Make it sound like you're really into the event when you're transmitting—even when you're exhausted. This approach is infectious and will draw stations to your calls. Speed is part of this equation as well. If you have a "snappy" approach to operating, the favor will be returned by most stations. Dull, uninspiring CQs are not the order of the day with phone contest operating. Also, remember that while speed is essential in most operating contexts, you don't want to sound like a speeding maniac when CQing on a nearly dead band or a QRN-laden low frequency. Also, on rare occasions it does sometimes pay to slow things down a little, especially when you're trying to attract calls from rare/unusual multipliers or geographic areas that may not be operating competitively in the contest.

Timing

Well, they say in life that timing is everything and so it is with contest operating, too. Timing in pile-

Calendar of Events

All year	**CQ DX Marathon**
June 26–27	ARRL Field Day
June 26–27	King of Spain SSB Contest
June 26–27	Marconi Memorial HF Contest
July 1	RAC Canada Day Contest
July 3–4	Venezuelan Ind. Day Contest
July 3–4	DL-DX RTTY Contest
July 10–11	IARU HF Championship
July 10–11	WRTC 2010 Competition
July 17–18	**CQ WW VHF Contest**
July 17–18	North American RTTY QSO Party
July 24–25	RSGB IOTA Contest
Aug. 1	SARL HF Phone Contest
Aug. 7	European HF Championship
Aug. 7–8	ARRL UHF Contest

*2 Mitchell Pond Road, Windham, NH 03087
e-mail: <K1AR@contesting.com>

ups has as much to do with eventually working another station as does your signal strength. My experience in phone pile-ups is that short calls with small breaks in-between is one of the best operating methods you can use to be successful. It's rare that you ever need to sign the other guy's call; after all, he already knows that!

Every pile-up has its own characteristics. There's a kind of ocean-wave effect to most pile-ups that is a timing opportunity for you. The secret to effective calling in phone pile-ups (and CW for that matter) is to call when others are not. If the pile-up is big, delay the start of your call by a second or two. You want to be the person whose callsign hangs out at the end of a series of calls so that the other station can say: "Something Alpha Radio, you're 5934!"

Tailending is another operating technique unto itself. Simply put, it is a calling method whereby you sign your call at the end of another person's QSO. You have to dance a fine line of acceptable calling procedure, with the guideline being that you never eradicate information the other station is trying to copy (e.g., callsign, exchange, etc.). That's one certain way you'll end up not working them!

Tailending begins by trying to get a feel as to whether the other station accepts that kind of operating procedure. Ultimately, there's really only one way to find out and that is to try to see if it works (or if you get yelled at!). Just as with any pile-up situation, the secret is very simple: Get your callsign heard when others are not calling.

Phonetics

The use of phonetics seems so simple, yet many operators are poor at its application. Always remember why we use phonetics on SSB. It's not so that we can sound cute or cool, but so that we can help the other station copy our callsign correctly. For that reason alone, always use common words for phonetics. The standard Alpha, Bravo, Charlie phonetic list was created for just that reason. While using "Kill One Albino Rabbit" may be cute, it'll get "lost in the sauce" during a contest.

Another common error in use of phonetics is that we sometimes get stuck in a rut with our word choices. For example, I tend to be a Kilo One Alpha Radio kind of guy. Never forget to change the phonetics you are using if you're having trouble working someone. Your word choice may be a challenge to a non-English speaking operator, or it just may not break through a pile-up as well as another selection. Consider the trade-offs for phonetics, choices such as "United vs. Union" or "Easy vs. Echo" or "Germany vs. Gulf." Sharp, ear-piercing words are almost always more effective in phone operating.

Miscellany

There is a class of operating techniques that fits into the miscellaneous category. So with that in mind, let me ramble for a bit!

Like most contest operators, I hate QRM. I'm living for the day when 10 meters comes back to life so that I can hide high in the band and run guys for hours and be free of QRM. Unfortunately, in today's 20-meter SSB scenario, we're all left to "duke it out," fighting for precious running real estate on the band along with hundreds of others. One technique I use is to preemptively strike when someone asks if my frequency is in use. By that I mean drop everything and respond. I do this even if the station is slightly off my "zero beat" frequency. Most stations will move immediately if you catch them right at the end of their first CQ. They are just as likely to stay if you don't respond right away! For this reason, I'll react right in the middle of an active QSO, if I have to, to maintain my frequency, even if I end up losing the QSO. In my book, a clear frequency is worth much more than a couple of lost QSOs here and there. I've also noticed that many incomplete QSOs end up being "reworked" later on, so that any loss in score is minimized by the end of the contest.

Another factor to consider is the quality of your transmitter's audio. There is an amazing number of stations on the band that have simply terrible, uninspiring audio. Despite our reputation, contest audio is not generated by turning your processor all the way up. It does mean, however, that you need to evaluate audio settings on your transceiver—especially if it is new or unfamiliar to you. You should also invest in a good, high-quality microphone. Again, there is not a 1:1 VSWR between money spent and desired audio. Do your homework and make extensive tests before the contest. It's a shame to have all the operating pieces in place with the exception of your transmit audio. As an aside, I should mention that the same analysis applies to digital voice recorders. How many stations can you think of that sound just great until they hit the F1 key in their computer logging program?

Finally, let me take the opportunity to point out the perils that come from not signing your entire callsign when calling someone. Not only is this poor contest operating, but it is a terrible practice for any mode of amateur radio activity. Simply put, signing a partial version of your call will almost always slow down the other station, resulting in an extra transmission to "fill in" the missing data. Unfortunately, this technique has grown from the net operations around the bands and has extended itself into contesting as well. Common sense should prevail here. If a station can copy your callsign in its entirety, what advantage comes from just signing part of it?

Final Comments

As you can imagine, I've only scratched the surface of phone operating techniques. Hopefully, you've gained some insight that will improve your next contest score. I'd like to hear about some of the tangible results that you obtained from this discussion.

See you in the next contest!

73, John, K1AR

Propagation

BY TOMAS HOOD,* NW7US

Scorching Rain on the Sun!

A Quick Look at Current Solar Cycle Conditions
(Data rounded to nearest whole number)

Sunspots
Observed Monthly, April 2010: 8
Twelve-month smoothed, October 2009: 7

10.7 cm Flux
Observed Monthly, April 2010: 76
Twelve-month smoothed, October 2009: 74

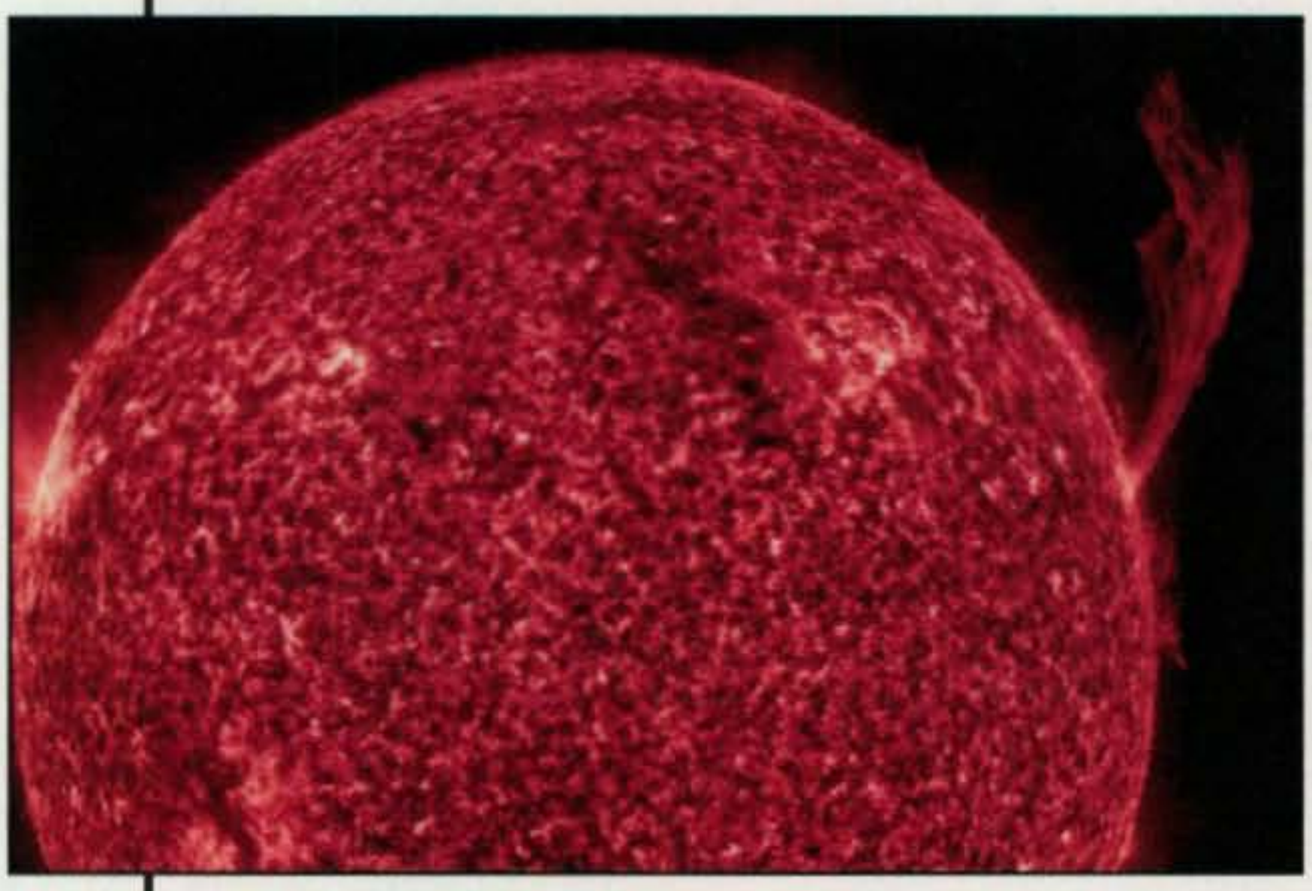
***Ap* Index**
Observed Monthly, April 2010: 10
Twelve-month smoothed, October 2009: 4

On February 11th, the Solar Dynamics Observatory (SDO) lifted off from Cape Canaveral on a five-year mission to study the sun. Researchers have called the advanced spacecraft the "crown jewel" of NASA's heliophysics fleet. SDO is able to transmit back to Earth IMAX-quality images of solar explosions and peer beneath the stellar surface to see the sun's magnetic dynamo in action.

SDO contains a suite of instruments that provide observations that will lead to a more complete understanding of the solar dynamics that drive variability in the Earth's environment. This set of instruments does an amazing number of measurements, including measuring the extreme ultraviolet spectral irradiance of the sun at a rapid cadence, making images of the chromosphere and inner corona at several temperatures at a rapid cadence, and much more. The Science Teams receive the data from SDO and then process, analyze, archive, and serve the data. There are three primary "banks" of instruments.

HMI (Helioseismic and Magnetic Imager). The Helioseismic and Magnetic Imager extends current capabilities of the SOHO (Solar and Heliospheric Observatory) and MDI (Michelson Doppler Imager) spacecraft with continual full-disk coverage at higher spatial resolution and new vector magnetogram capabilities.

*P.O. Box 9, Stevensville, Montana 59870-0009
e-mail: <nw7us@arrl.net>



A magnetic filament erupts on April 19, 2010 (upper right region). At this moment in the SDO high-definition movie that captured the eruption, you can see the plasma begin to 'fall' back to the sun. (Credit: SDO/AIA [Solar Dynamics Observatory/Atmospheric Imaging Assembly])

***One Year Ago:* A Quick Look at 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

LAST-MINUTE FORECAST

Day-to-Day Conditions Expected for July 2010

	Expected Signal Quality			
Propagation Index.....	(4)	(3)	(2)	(1)
Above Normal: 2-4, 7-13, 16-22, 29-31	A	A	B	C
High Normal: 1, 5-6, 15, 25-28	A	B	C	C-D
Low Normal: 14	B	C-B	C-D	D-E
Below Normal: 23-24	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 (C) on July 1st, and good (B) on July 2nd through the 4th. On July 5th conditions should be good (B), 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.

AIA (Atmospheric Imaging Assembly). The Atmospheric Imaging Assembly images the solar atmosphere in multiple wavelengths to link changes in the surface to interior changes. Data include images of the sun in 10 wavelengths every 10 seconds.

EVE (Extreme Ultraviolet Variablity Experiment). The Extreme Ultraviolet Variablity Experiment measures the solar extreme-ultraviolet (EUV) irradiance with unprecedented spectral resolution, temporal cadence, and precision. EVE measures the solar extreme-ultraviolet spectral irradiance to understand variations on the time scales that influence Earth's climate and near-Earth space.

SDO's AIA instrument has twice the image resolution of current STEREO (Solar TErrestrial RElations Observatory) images, and four times greater imaging resolution than SOHO. The image cadence also varies. SDO takes one image every second. At best STEREO takes one image every three minutes and SOHO takes one image every twelve minutes.

Massive Explosion and Solar Rain

In April 2010, scientists working with NASA's new SDO released the most astonishing movies of the sun anyone had ever seen. On April 19, SDO observed one of the biggest eruptions in years. Eruptions of this size were last seen at the end of the last sunspot Cycle, but from 2006 until the last months of 2009, such activity was nearly non-existent.

The SDO captured the eruption in real time, and not only was the resulting video dramatic, but it could solve a long-standing mystery of solar physics. Karel Schrijver of Lockheed Martin's Solar and Astrophysics Lab, and the lead scientist conducting the analysis, said, "We can see a billion tons of magnetized plasma blasting into space while debris from the explosion falls back onto the sun's surface. These may be our best data yet."

The movie, recorded on April 19th, spans four hours of actual time and more than 100,000 km of linear space (to download the movie, visit <http://tinyurl.com/color-coronarain>). The area where they observed the falling plasma rain is so huge that the entire planet Earth could fit between the plasma streamers with room to spare.

Schrijver says his favorite part of the movie is the coronal rain. "Blobs of plasma are falling back to the surface of the

This dramatic image of solar plasma riding magnetic field lines, we can see the plasma "raining" back to the sun. However, until the new SDO views of these events, we did not see the dynamics at work. (Credit: NASA/TRACE [NASA/Transition Region and Coronal Explorer])

sun, making bright splashes where they hit," he explains. "This is a phenomenon I've been studying for years."

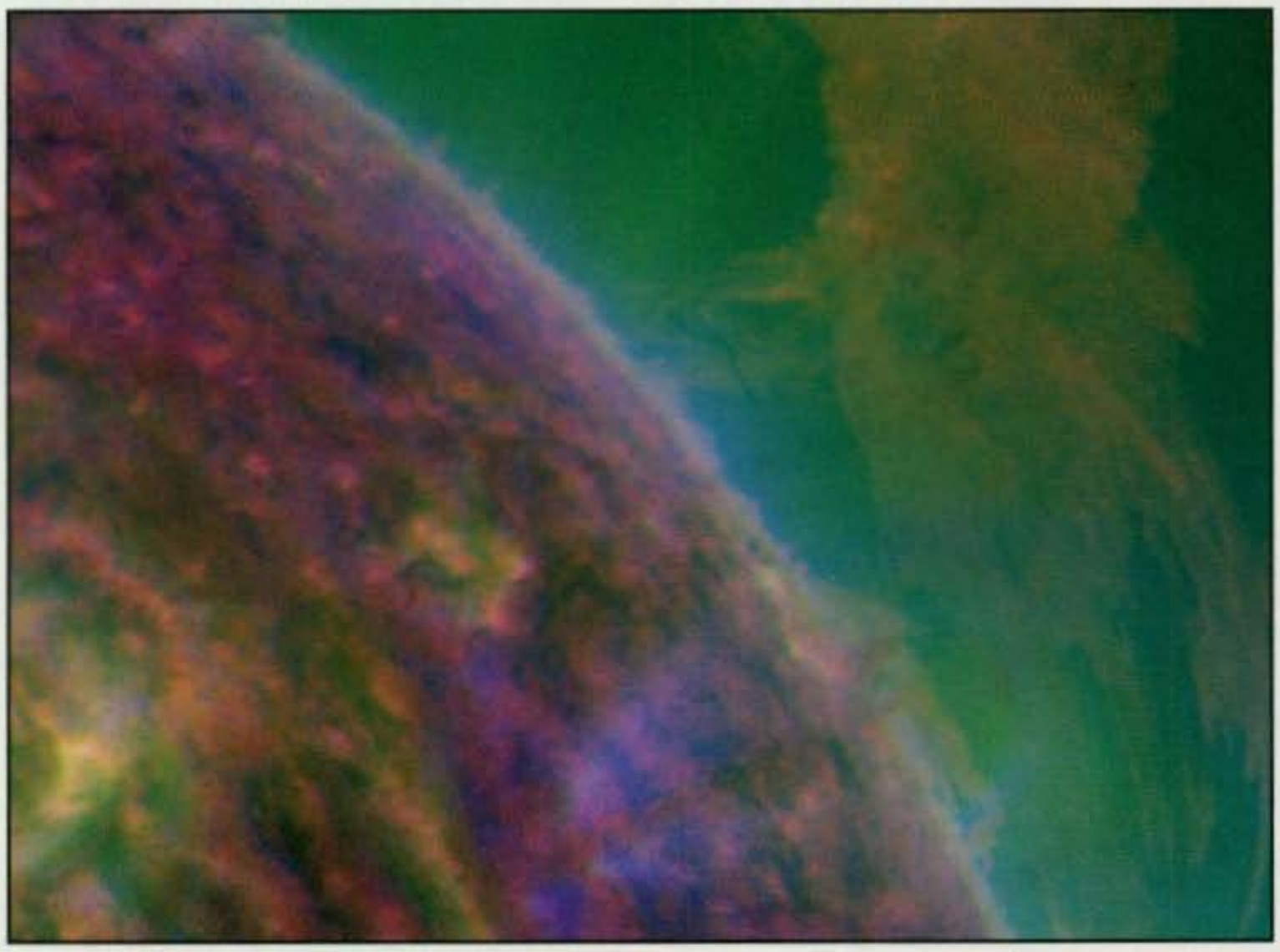
In all of his studies he has seen coronal rain falling back to the sun, and this is to be expected, as the sun's gravity is very powerful. However, as seen in this movie, plasma clouds seem to hover over the sun for extended periods, defying gravity, until finally, the rain streams down. Scientists have been puzzled about this. For the first time, SDO provides an answer:

"The rain appears to be buoyed by a 'cushion' of hot gas," says Schrijver. "Previous observatories couldn't see it, but it is there."

Using the array of ultraviolet telescopes of the AIA, the observatory can remotely measure the temperature of gas in the sun's atmosphere. Coronal rain turns out to be relatively cool—"only" 60,000° K. When the rains falls, the plasma cloud is supported, in part, by an underlying cushion of much hotter material, between 1,000,000 and 2,200,000° K.

"You can see the hot gas in the color-coded temperature movie," says Schrijver. "Cool material is red; hotter material is blue-green. The hot gas effectively slows the descent of the coronal rain."

This is an exciting discovery and one of many yet to come as the SDO mission comes online (May 2010). With image resolution many times greater than any previous spacecraft instruments, we'll discover a lot more about our nearest star. SDO is the "Hubble Telescope" of solar observation.



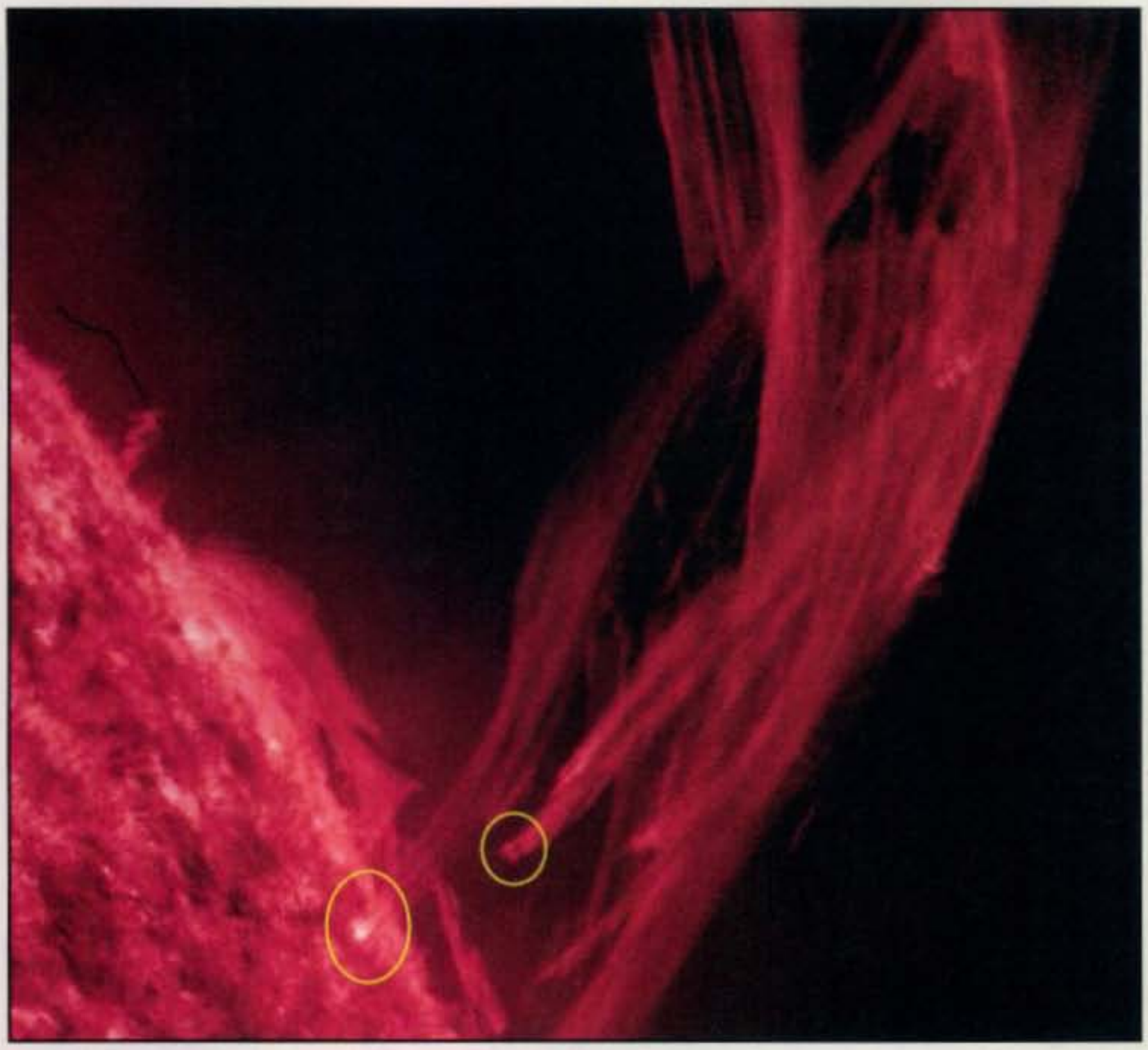
With SDO, we can see the plasma cloud as it hovers over the sun, defying the sun's gravity, before finally raining down. (Credit: NASA/AIA)

July Propagation

Many DX hunters view July as the least exciting month of the year. With generally lower daytime Maximum Usable Frequencies (MUF), 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 that we are still observing as we climb out of the solar cycle minimum. With the 10.7-cm flux levels hovering right around 80, it is rare to see the highest amateur HF bands wake up, except on paths between the Northern and Southern Hemispheres.

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 to the Last-Minute



Coronal rain. Encircled are two plasma streamers, one hitting the sun's surface and another incoming behind it. (Credit: SDO/AIA)

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 toward 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 toward 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 for the hours of darkness. 160 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.

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 76 for April 2010, down from March's 83.3. The 12-month smoothed 10.7-cm flux centered on October 2009 is 74.1, up from September's 73.3. The predicted smoothed 10.7-cm solar flux for July 2010 is about 89, give or take about 7 points.

The Royal Observatory of Belgium reports that the mean monthly observed sunspot number for April 2010 is 7.9, down from March's 15.4. Don't fear, though, because in every sunspot cycle we've recorded it is typical for wide swings from month to month as the activity level increases until solar cycle maximum is reached. The lowest daily sunspot value during April 2010 was zero (0) on April 14–20, 23–24, 26–27, and 29. While that is a longer string of "zero" days, it is not unusual during the ramping up of a new sunspot cycle. The highest daily sunspot count for April was 25 on April 4. The 12-month running smoothed sunspot number centered on October 2009 is 7.0. A smoothed sunspot count of 30 is expected for July 2010, give or take about 8 points.

The observed monthly mean planetary *A*-index (*Ap*) for April 2010 was 10, significantly higher than we've seen in years; the last time the planetary *A*-index was 10 was in December 2005! This is significant as another sign that the new solar cycle is gaining in intensity: As we move closer and closer to the new sunspot cycle maximum, we're going to see a lot of geomagnetic storms and generally higher geomagnetic activity. The 12-month smoothed *Ap* -ndex centered on October 2009 is 4.0. Expect the overall geomagnetic activity to be unsettled to stormy during July. At the time of writing, the forecast holds that July will be a month seeing great variation between quiet periods and days with geomagnetic storminess due to recurring coronal holes, and possible coronal mass ejections (if flaring continues to increase with the expected rise in solar activity). Refer to the Last-Minute Forecast for the outlook on what days that this might occur.

I welcome your thoughts, questions, and experiences regarding this fascinating science of propagation. You may e-mail me, write me a letter, or catch me on the HF amateur bands. Please come and participate in my online propagation discussion forum at <http://hfradio.org/forums/>. If you are on Facebook, check out <http://tinyurl.com/fbswx> and <http://tinyurl.com/fb-nw7us>. Speaking of Facebook—check out the CQ Amateur Radio Magazine fan page at <http://tinyurl.com/fb-cqm>.

Now that the new solar cycle is active, I'll be keeping my ears to the radio, hoping to hear you on the air. Happy DX!

73, Tomas, NW7US

CQ — 1945 — Our 65th Anniversary — 2010 — CQ

Timeline of Ham Radio History 1945–2010

To help celebrate CQ's 65th anniversary, we've put together a timeline of significant events in ham radio history from 1945 to the present. Each month this year, we'll present five or six years' worth, and then put the whole list on our website when we're done. (Since this is a timeline and not a textbook, we had to be selective. We apologize in advance if we leave out something of importance to you.)

This month, we'll cover the years 1980–1984:

1980: FCC authorizes use of ASCII computer language on the ham bands as computers take on a greater role in many ham stations; first packet radio terminal node controller (TNC) for hams is introduced; hams up and down the U.S. east coast provide communications along the route of the Olympic Torch Run from Virginia to Lake Placid, New York.

1981: FCC authorizes experimental beacon stations on 30 meters, one of the three new HF ham bands authorized at WARC-79, for propagation research prior to opening the band for general use; ARRL launches *QEX* technical magazine; *Ham Radio Horizons* is absorbed into its parent publication, *ham radio.*

1982: FCC opens 30-meter band, first new HF ham band since 15 meters opened in 1947; Congress passes "Goldwater Bill" giving FCC more teeth in dealing with RFI matters in consumer electronics and authorizing the FCC to use volunteers to administer amateur radio license exams; Tucson Amateur Packet Radio (TAPR) introduces TNC-1, launching widespread popularity of packet for hams; CQ launches *Popular Communications* magazine to serve scanning and shortwave listening enthusiasts.

1983: Astronaut Owen Garriott, W5LFL, becomes the first ham to operate from space, aboard the shuttle Columbia; OSCAR-10 launched, first high-orbit ham satellite offering lengthy access periods and coverage of up to half the globe; FCC expands 20-meter phone band.

1984: Volunteer Examining program begins and FCC stops administering amateur license exams; FCC expands phone subbands on 80, 15, and 10 meters, and extends ham license terms from 5 to 10 years.

Next month, we'll look at 1985 through 1990, featuring PRB-1, Novice Enhancement and the beginning of the end of code testing.

Results of the 2010 CQ WPX RTTY Contest *(from page 27)*

Juan, EA8CAC, Olli, EA4BQ, and Pekka, EA8AH, drove the EA8AH super-station under the callsign EE8E to dominate the MS class with 14.2M points, smashing the world record by 64%.

Jim, W4TMO, shown here, really enjoys operating MS RTTY with father-in-law Bert, N4CW, at Bert's North Carolina station.

Ken, K1EA, and Randy, K5ZD, expertly support the log-checking process. SWL log checking is performed by Dan, I1-12387, using special log-check software written by Marek, SP7DQR.

See everyone in the next CQ WPX RTTY on 12–13 February 2011.

73, Ed, WØYK

QRM

Nice to have some sunspots around! Thanks for another good contest. Hope to be back next year. ... **2EØBPP**. My second ever RTTY contest, my first international RTTY HF contest. I think I've got the bug! I look forward to beating my score in the next contest. Thanks G3LDI, Roger for all your help with N1MM. ... **2EØRKY**. First time in WPX RTTY. Surprized at the many stations. I did not work all the time. I was on vacation! ... **6V7V**. I was able to enjoy this contest.Tnx for a fine contest again. ... **7N2UQC**. First major contest flying solo. First 15 meter opening, including 7 JAs in a row. Why didn't someone tell me how much fun this is? ... **AA4YL**. Best condx for a WPX RTTY contest in several years. Welcome back sunspots! ... **AA5AU**. I had a blast in this contest. The improved solar conditions made for a great time on 15 meters. As a little gun station, I'll take whatever solar help I can get. There were lots of new callsigns, both foreign and domestic, making their way into the log during this contest. No contacts were made on 10 meters. Let's hope for more sunspots and a higher solar flux as the year goes on. ... **AE5PW**. First I want to say many thanks to my friend Jim (W7EJ) for inviting me, giving me the oportunity to work the contest from his very nice Morocan station. Many thanks to all the stations I worked during these days. ... **CN2R**. This time it was very hard! Due to a cyclone in my zone a few days before the Christmas day, I lost all my antenna system. So for this test I made a homemade dipole for 14 MHz and TX with only 80W. You can imagine! Anyway, I enjoyed all the numbers exchanged! ... **CT1EEK**. What a contest. This was my first "serious" RTTY contest attempt! Running a K3 and a IC-746PRO in a SO2R setup with Writelog was big fun. I am surprised what can be done in RTTY with just 100 watts. And due to low power operation no BCI/TVI complaints from neighbors. ... **DK5WL**. The contest took place in the middle of the very busy summer season in Antarctica, so my time to participate was rather limited. I enjoyed good propagation to North America on 20m, and managed to work a few new RTTY countries to finish my DXCC from Antarctica. The location is Neumayer Station III in Dronning Maud Land, grid locator IB59UH. ... **DP1POL**. A bit more propagation on Sunday than Saturday , but I spent good hours in this contest. ... **EE5J**. My sixth RTTY WPX Contest and the best. Good conditions on 80m to 15m. I hope that the propagation will continue to improve. I tried 10m from time to time, but nobody, nobody. Thanks to all who worked me. ... **F5RD**. I'd almost forgotten how fun 15m can be! ... **GØMTN**. A much better event than last year. Sad there was no 10m opening, but we did try the band. Very enjoyable as ever and shows what can be done with a little pistol station. ... **G6BOX**. First time on this mode in 21 years of hamming! So quite a fun introduction! ... **G7DDN**. Thanks to everyone for the QSOs, especially the wonderful run of W/VE stations on Saturday evening (your time). But above all, thanks to all the spouses, partners, and cheerleaders who allowed us to enjoy a RTTY contest on Valentine's Day! ... **GM3SEK**. Without any earlier experience I tried the mode and I am satisfied with the result. Many thanks for the contacts! Rig TS-530SP 25W, ant end-fed wire 21 mtrs long above flat roof. ... **HA2MN**. Great fun with my R7 vertical, 400W, and TS2000X. I improved my last year score by a 30% and I hope next year to do much better hoping for a good 10 meter opening. ... **IK2SAI**. It was a contest that was able to be enjoyed by all bands this time. This is because "sunspot number" coming up. ... **JA1BWA**. I was able to work more stations than I thought thanks to good propagation for Europe on 15 meter band. Thanks to those who called me. See you again next year. ... **JA6DIJ**. My first RTTY WPX. 80m DX conditions were not the best, but a fair opening to EU on Saturday night made things more interesting. Fun contest! ... **KØPK**. What a blast! This is one fun contest! Like last year, the computer decided to mess me up. Spent two hours troubleshooting an audio problem, but I still bested my last year's score by 156 Q's and 166,212 points! Thanks *CQ* for a fun weekend! ... **KA1C**. The XYL got her ticket after more than two decades of marriage and now wants to contest. I Love It! ... **KC4WQ**. What a difference a few sunspots make. Moved up to 15 meters and had great luck with DX contacts. If I could hear them I could usually work them. Not bad for an attic antennna, 75 watts, and parttime operating. ... **KFØIQ**. It was interesting to work single-band (40m) in a contest and try to make a valid go of it. Watching live scoring made an additional motivation. Also my first contest as a part of YCCC made me work for the team a little harder. ... **KK1X**. It was nice to have some propagation for a change, but the window to Europe was fairly short up here in the Pacific Northwest. Backup station and antennas worked well, but should have the whole shooting match for upcoming contests, finally! Thanks to all those guys who jumped in giving out contacts. I had a blast! ... **KK7OO**. What a rollercoaster ride of RTTY fun! Had some great propagation on 15 meters, some challenging propagation to Europe on 20 meters, some exciting contacts on 40 meters, all mixing together for an awesome RTTY weekend. My best score yet! Thanks for the contacts and to *CQ* for sponsoring the biggest fun RTTY weekend of the year. The bands were bursting with RTTY signals, wow! ... **KL8DX**. Decided to work on my 15m DXCC and have some fun. High point was working 6W2SC for a new one. Go Sunspots! ... **KX7L**. Brilliant fun. Great having 15m open in such good shape. ... **MMØGPZ**. Murphy lives in my shack. ... **N2EIK**. Some nice DX found during the contest, always a bonus. Thanks to all the guys and gals who heard my 100 watts and apologies to the guy I left on 80m mid QSO when the rig finally died on that band. The real plus was to be, once again, in a contest with the SFI above 90. FANTASTIC! ... **N2FF**. Tried to fight off a cold with Nyquil. Should have fought off the Nyquil. Got lots of sleep in between short bouts of operating. ... **N6DW**. Our first effort as a multi-operator in this contest. Had a ball despite a rare six inch snowfall the first night. With fairly decent band conditions we managed over 1800 QSOs and hope to do better next year. ... **NC4CS**. Very nice moment spent with RTTY friends but a big power crash in the computer killed my end of the contest! ... **ON5SV**. Very nice contest after doing the PACC Dutch contest. ... **PE2KP**. Our first RTTY contest! ... **RM3M**. Wow! The upcoming sunspot cycle looks promising. 15m was a real blast with good openings both to JA and W. Can't wait for it to get even better. This was my 4th RTTY contest ever. Much fun! 99% run and just a few QSOs S&P. Thanks to everyone for calling! ... **SM6U**. Goodbye spotless days, welcome Solar Cycle 24! ... **SV1BDO**. Very good contest and very good propagation. 73s ... **TA7KA**. Over 300 Europeans just on 40 meters! Tks to VU2LBW for calling in on 15 meters! ... **VA3DX**. Work gets in the way again. I will have to retire soon so I can contest without interruptions! ... **VA3PC**. Murphy's Law: The more you practice and prepare before the contest the more likely it is that something will screw up when the contest starts. ... **VE5RI**. Great to see growing RTTY activity spreading so widely across the formerly quiet bands. Welcome back sunspots! Thanks to all who pointed to VK! ... **VK3TDX**. This was my first RTTY contest and I couldn't spend a lot of time on air as it was my birthday and Valentine's Day! Still I enjoyed operating mainly on 15m and 40m. Can't wait to do a serious effort in this contest next year to give lots of people the VK8 prefix. ... **VK8PDX**. Some of the biggest signals ever from North America were heard on 15m. This is very heartening and shows promise for the upcoming contest season. Even 10m showed some life to EU and Africa. I was running between 100 watts to 200 watts depending on mains power availability. ... **VU2PTT**. QRP operation using standalone NUE-PSK modem. Worked beyond my expectations! ... **VX3CW**. Great contest. Conditions were better on the first day. First time I've been able to get a run going on 15 meters. Good to see a lot of new contesters. ... **WØEM**. This contesting thing can really get under your skin My second contest in almost 40 years. What great fun. I am looking forward to many more. ... **W7JDE**. Wow! 15 was OPEN. Even made some Q's on 10! ... **WA9IVH**. Great to see 10 meters open for this year's contest. Let's hope the Sun gods continue the trend and keep things rockin'. ... **WB8JUI**. First contest for father and son team. We had a lot of fun and enjoyed 15 meter opening. ... **XE2AUD**. Was glad to run my first CQ WPX RTTY contest after three decades of classic RTTY traffic! Enjoyed the excellent TTY facilities of the IC-7000 and MMTTY combination. ... **YO2IS**. Poor condx into NA here! PACC Contest put out many RTTY active PA stations. ... **YU7AU**. A casual entry this year. Still learning how to drive N1MM and MMTTY. Spent quite a bit of time hunting the WWW in vain for suitable message files to import into N1MM (seems I will have to publish mine!). Apologies for messing up the odd exchange. N1MM's Enter-Sends-Message mode is particular about getting the right info entered in the right sequence, but my fingers don't always play ball. Took several breaks to feed an orphan lamb rescued from the forest on Sunday. Such is the life of a ZL contester. ... **ZM4G**.

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.)

2010 WPX RTTY RESULTS
SINGLE OPERATOR
NORTH AMERICA
United States

K1SFA	**A**	**4,749,976**	**1835**	**701**
			(Op: @K1TTT)	
WE1H	*	2,138,314	1246	586
W1BV	*	2,075,409	1225	553
W1AN	*	1,766,430	1101	570
AK1W	*	1,765,500	1003	535
			(Op: K5ZD)	
NG1G	*	1,610,892	1071	522
KØDU/1	*	1,464,242	1271	566
W1BYH	*	1,152,270	850	465
W1ZK	*	909,410	720	422
W1EQ	*	745,953	714	403
K3IU/1	*	671,825	642	385
AE1T	*	512,259	541	361
W1TO	*	498,764	475	329
NA1QP	*	262,548	353	234
			(Op: W1CTN)	
K1LZ	*	115,050	235	177
KGØKP/1	*	96,368	233	152
KE1FO	*	88,128	182	153
N1SXL	*	73,576	170	136
WA1Z	*	31,648	98	86
K1GE	*	14,700	77	70
KN6OP/1	*	3,720	33	31
W1UJ	*	385	11	11
AE1P	**7**	**425,896**	**398**	**278**
***KA1C**	**A**	**517,632**	**621**	**337**
*NJ1H	*	442,294	492	281
*W1FA	*	310,329	400	261
*N8WXQ/1	*	266,240	406	260
*W1/YO7ARY	*	158,340	321	210
*KF1D	*	150,144	306	204
*W1MAW	*	147,804	356	218
*KA1CQR	*	88,796	187	158
*N1AO	*	60,858	161	138
*WO1N	*	29,164	113	92
*W2JU/1	*	26,400	126	100
*WA1ZYX	*	24,192	100	84
*W1MJ	*	21,504	113	84
*W1MIG	*	16,356	110	87
*N1UZ	*	14,421	83	69
*KJ1J	*	13,260	85	78
*W1IG	*	8,160	70	60
*W1QH	*	5,246	43	43
*KX9X/1	*	3,311	52	43
*K2RS/1	*	684	18	18
***NW1C**	**21**	**40,796**	**143**	**124**
***KC1UX**	**14**	**74,909**	**221**	**173**
***AB1J**	**7**	**415,872**	**419**	**288**
*KK1X	*	334,536	391	263
***W1CSM**	**3.5**	**2,916**	**33**	**27**
N2WK	**A**	**4,412,529**	**1821**	**747**
KF2O	*	2,325,036	1204	622
NO2T	*	2,011,746	1249	561
KA2D	*	1,645,788	1002	534
WA2ETU	*	1,279,632	968	503
AA2NA	*	715,500	709	375
W2LE	*	385,956	467	302
K2MK	*	327,510	421	270
K2NV	*	202,894	321	229
WB2JEP	*	94,227	195	147
NG2P	*	93,312	209	162
NJ1F/2	*	53,926	149	118
W2RZS	*	44,625	156	125
			(Op: WB2NVR)	
W2IUC	**14**	**7,260**	**58**	**55**
W1TY/2	**7**	**1,343,626**	**774**	**463**
N2EIK	**3.5**	**33,276**	**147**	**94**
***NV2G**	**A**	**1,162,974**	**907**	**478**
			(Op: N2ZN)	
*N2FF	*	839,375	678	425
*K2DSL	*	817,430	839	430
*AI9P/2	*	591,280	649	380
			(Op: N2NF)	
*N2CU	*	581,007	571	379
*NA2M	*	433,950	445	330
*K2ONP	*	428,120	474	308
*N2YBB	*	427,194	486	293
*K2YG	*	359,073	453	279
*K2SI	*	334,554	452	274
*WA2LXE	*	241,340	414	220
*N2MUN	*	233,748	390	258
*KD2MX	*	224,895	390	235
*K2UF	*	206,064	345	212
*KB2NB	*	200,265	317	237
*WA2MCR	*	175,695	313	221
*K2DB	*	145,299	262	187
*K2DAR	*	108,834	220	187
*WB2SXY	*	82,834	221	166
*W2MXL	*	82,546	196	149
*KS2G	*	66,305	205	149
*N2CQ	*	60,632	172	143
*AD2TM	*	49,764	167	132
*KA2FHN	*	44,526	153	123
*WA2NLL	*	40,626	135	122
*KB2ESY	*	37,932	141	116
*WB2TPS	*	29,760	104	93
*ND2K	*	28,296	137	108
*K2SZ	*	25,474	114	94
*KB2HSH	*	14,212	85	76
*N2NOM	*	14,140	91	70
*WV2ZOW	*	13,082	74	62
*KR2D	*	8,294	61	58
*WB2RIS	*	1,150	24	23
***N2ZAK**	**14**	**100,200**	**269**	**200**
***K2PAL**	**7**	**134,460**	**224**	**166**
K3MM	**A**	**6,158,748**	**2361**	**771**
AA3B	*	5,167,272	2087	759
W3FV	*	3,617,046	1606	666
W3MF	*	3,570,750	1649	690
KQ3F	*	1,688,084	1044	508
K3WW	*	1,444,480	966	488
WB3FIZ	*	797,397	664	393
K3RWN	*	743,785	758	395
K3MD	*	417,600	476	320
N3INJ	*	392,370	489	319
N3XL	*	291,192	419	264
K3PU	*	280,078	402	262
KD3TB	*	199,080	357	237
W3OAD	*	128,516	254	178
NN3RP	*	115,400	302	200
K3PG	*	109,900	261	175
K3RMB	*	101,976	250	168
WA3AAN	*	76,860	179	140
N3MX	*	56,070	151	126
WQ3X	*	24,138	96	81
AI3Q	**14**	**24,795**	**118**	**95**
WØBR/3	**7**	**136,416**	**222**	**174**
***WA1LWS/3**	**A**	**748,284**	**713**	**381**
*W3DQN	*	683,688	667	366
*KB3LIX	*	634,385	596	355
*NY3DX	*	335,514	399	281
			(Op: K3SV)	
*W3BUI	*	283,803	401	247
*AB3GY	*	211,770	311	234
*KT3W	*	201,798	364	222
			(Op: K1RY)	
*N3QO	*	198,360	350	228
*N3CHX	*	184,128	354	224
*W4EE/3	*	164,615	327	205
*KB3KXX	*	140,118	266	193
*KN3A	*	122,952	254	188
*K3TN	*	77,404	195	148
WX4TM	*	982,128	887	444
K4CX	*	980,208	918	432
KR4F	*	696,384	601	403
N4VV	*	574,979	609	347
NU4Y	*	504,510	488	335
KG4MGE	*	440,550	495	330
NJ4F	*	399,726	476	318
W7HJ/4	*	358,844	433	283
K4HAL	*	355,593	497	287
W4UK	*	333,494	535	287
N4QS	*	312,156	446	276
KC4SAW	*	297,550	379	275
WØYR/4	*	282,486	368	267
AI4WW	*	276,853	348	251
K4DLI	*	264,368	408	248
W2OO/4	*	234,588	316	226
K3KO/4	*	232,065	299	243
WC2Z/4	*	232,050	348	238
W4ZE	*	219,880	317	230
N2WN/4	*	207,318	311	218
N4TL	*	187,320	318	223
KD4XJ	*	170,345	367	217
NB4M	*	155,540	344	202
WF4W	*	154,660	318	220
K4EU	*	146,703	264	237
WD8RYC/4	*	101,850	189	175
N3UA/4	*	99,981	213	161
K4SV	*	76,446	181	137
AJ4FM	*	68,328	173	156
W4GHD	*	47,640	153	120
WD4HIM	*	44,254	122	109
KG4CUY	*	43,585	139	115
*AB4SF	*	416,784	510	304
*NA4K	*	300,300	415	275
*KT6D/4	*	279,009	413	261
*W4OTN	*	266,305	419	241
*WS9M/4	*	239,990	382	233
*AA4YL	*	196,650	326	230
*N4AAI	*	181,930	380	230
*KN4QD	*	179,208	300	228
*W8KHP/4	*	178,542	353	218
*K4MIL	*	163,815	253	201
*WØQQG/4	*	155,820	318	196
*WA4EEZ	*	153,252	227	198
*KM4JA	*	151,064	317	184
*KE4KY	*	150,176	307	208
*WB7ECS/4	*	114,896	218	172
*K4DSP	*	103,488	221	176
*KA4TEU	*	100,701	238	167
*ND4X	*	92,746	208	158
*AJ4CU	*	81,732	162	139
*WB5NMZ/4	*	76,500	246	150
*KJ4IZW	*	67,592	199	136
*KO4PU	*	66,582	225	137
*AA4FU	*	66,150	209	135
*W4BK	*	54,234	162	131
*KI4EEY	*	46,440	157	120
*NA4C	*	45,815	160	119
*KS4S	*	45,030	178	114
*K4FT	*	35,672	136	98
*KN4Q	*	32,318	139	113
*KG4JGQ	*	26,260	114	101
*AE4O	*	23,940	124	95
*K4WNW	*	23,822	106	86
K5DU	**A**	**2,696,343**	**1847**	**611**
WA5ZUP	*	2,230,232	1756	596
K7IA/5	*	1,396,500	1236	525
NX5O	*	1,364,639	1190	503
W5KI	*	533,750	561	350
AC4CA/5	*	323,628	534	298
KD5JAA	*	275,233	357	287
KZ5J	*	209,100	374	246
K5NZ	*	193,914	345	243
AA5VU	*	171,380	339	220
AB5C	*	134,830	299	194
K5HDU	*	121,260	256	188
W5AP	*	80,280	295	180
N5QN	*	49,432	198	148
N5VU	*	33,155	121	95
K5UO	*	22,274	98	86
KF5EHV	*	7,344	70	51
KU5B	*	3,192	53	42
KK5OQ	**21**	**1,146,036**	**931**	**516**
AA5AU	**14**	**1,438,686**	**1168**	**622**
AE5AA	**7**	**2,675,616**	**1169**	**593**
			(Op: N5ZM)	
N5WY	*	30,780	122	95
W5JAY	*	5,550	45	37
***AD5XD**	**A**	**724,928**	**895**	**376**
*K5DD	*	253,440	437	240
*N5DRB	*	227,584	478	254
*AE5PW	*	218,868	433	244
*WB5AAA	*	203,550	371	230
*KD5J	*	175,052	348	214
*AD5LU	*	171,810	431	207
*WB5TEQ	*	119,889	264	173
*N5THN	*	95,906	225	158
*KØGEO/5	*	57,834	213	126
*WØVX/5	*	52,820	181	139
*K5WW	*	46,736	229	127
*WA9AFM/5	*	45,136	184	124
*AE5MM	*	35,960	169	116
*NK5G	*	27,501	148	103
*N4JIK/5	*	9,280	81	64
*KE3D/5	*	7,800	66	60
*N1CC/5	*	4,416	59	46
***N5UWY**	**21**	**5,700**	**58**	**50**
***WM5DX**	**14**	**471,090**	**687**	**383**
N6IE	**A**	**1,255,422**	**1086**	**497**
K9YC/6	*	1,001,100	1058	426
WE6Z	*	982,328	1021	466
N6QQ	*	781,854	748	419
WX6V	*	761,192	667	386
KI6VC	*	659,362	951	374
K6EU	*	469,216	619	341
W6LED	*	450,524	656	332
W6SX	*	441,623	727	299
K6MM	*	435,540	603	357
WT6K	*	361,248	578	284
AF6T	*	342,693	493	261
			(Op: K6TD)	
K6HGF	*	209,616	510	264
NN6NN	*	202,252	368	236
N6EE	*	199,424	342	256
K6NR	*	187,060	352	235
K6TU	*	146,260	308	206
AB1U/6	*	90,872	240	148
			(Op: W6RKC)	
WB6JJJ	*	82,896	252	157
W6TQG	*	76,000	199	152
K6DGW	*	71,258	237	158
N6BY	*	70,760	272	145
K9JM/6	*	63,480	204	138
KT6YL	*	60,450	210	155
K6NV	*	52,164	179	126
N6JV	*	34,521	141	111
N6DW	*	31,410	115	90
K6DI	*	27,423	127	99
N6AJR	*	25,123	127	97
NF6A	*	19,166	83	74
			(Op: K6XX)	
N3FAW/6	*	9,856	87	64
W6OAT	*	616	15	14
WQ6O	**21**	**763,758**	**901**	**453**
			(Op: N6ML)	
WV6I	**14**	**1,496,302**	**1214**	**599**
			(Op: N6WM)	
NG6S	*	574,892	710	404
			(Op: W4UAT)	
W6WRT	*	133,704	314	215
KG6YHH	*	40,040	203	130
NM6K	**7**	**527,216**	**530**	**292**
			(Op: K6AW)	
AI6O	*	62,040	175	132
W6EU	*	43,818	153	109
***W6ONV**	**A**	**350,364**	**544**	**301**
*N3RC/6	*	200,788	443	202
*N6HE	*	192,759	426	201
*WN6K	*	161,590	386	226
*K6GEP	*	159,168	338	192
*AF6SA	*	159,049	344	209
*KE6SHL	*	119,510	289	170
*N6VH	*	98,728	285	164
*W6KY	*	83,752	247	152
*N6MSY	*	67,450	219	142
*KF6RY	*	66,462	238	159
*W6TK	*	60,858	165	138
*N6EF	*	50,180	160	130
*W6OPO	*	45,633	170	123
*K6LE	*	35,298	147	111
*NA6G	*	34,216	162	104
*W8RSU/6	*	33,136	158	109
*K6BIR	*	24,030	147	90
*KE6QR	*	20,412	103	81
*K6RIM	*	1,836	29	27
***KM6Z**	**14**	**199,584**	**437**	**264**
*N6BHX	*	3,268	51	43
***KM6I**	**7**	**6,160**	**53**	**44**
KR7X	**A**	**2,576,106**	**1760**	**654**
KK7PR	*	1,282,346	1153	481
			(Op: K7ZS)	
NC7J	*	1,082,525	1069	475
			(Op: W7CT)	
NI7F	*	409,825	636	325
K7LV	*	284,109	520	249
NK7Z	*	262,108	496	259
K7HC	*	249,645	450	267
KD7MSC	*	220,472	528	248
NQ7R	*	139,040	368	220
KO7X	*	138,736	322	208
KF7BBJ	*	47,960	151	109
W6SA/7	*	47,724	175	123
W3AG	*	72,828	173	126
*N3NZ	*	55,044	178	139
*W3TMS	*	32,918	131	109
*KB3CTX	*	32,436	119	106
*W3DQT	*	29,900	118	100
*WB9KPT/3	*	24,728	103	88
*AF3I	*	19,028	77	67
*N3JNX	*	17,480	96	76
*K3NK	*	9,576	72	63
*K3GMT	*	9,089	81	61
K4GMH	**A**	**7,876,920**	**2859**	**820**
K4RO	*	3,766,375	1973	725
W4PK	*	3,474,838	1661	662
AD4EB	*	2,710,632	1658	636
NS1S/4	*	2,681,546	1405	593
			(Op: K1ZZI)	
W4GKM	*	2,544,480	1663	608
AB4GG	*	2,470,455	1520	585
NR4M	*	2,123,632	1167	566
N6AR/4	*	1,759,653	1144	527
WJ2D/4	*	1,739,881	1093	529
AJ3G/4	*	1,563,624	1112	508
N4KG	*	1,315,602	882	486
W2YE/4	*	1,267,392	926	483
N4TB	*	1,202,019	1003	481
N4DA	*	1,193,868	963	468
AE4EC	*	36,708	157	114
AA4LR	*	29,639	136	107
W4OJC	*	29,145	112	87
W4BCG	*	23,859	139	99
N4FY	*	23,850	99	90
N3BM/4	*	18,620	78	70
W6UB/4	*	18,048	64	64
NN4K	*	14,740	74	67
NQ1W/4	*	9,891	70	63
			(Op: K1KO)	
K4KAY	*	693	24	21
K4FJ	**21**	**977,040**	**803**	**472**
WK4Y	*	5,712	55	51
WW4R	**14**	**1,810,284**	**1261**	**644**
			(Op: N4ZZ)	
WO4O	*	1,160,460	969	540
K4SKB	*	151,840	260	260
WR1Q/4	*	1,947	38	33
K9OM/4	**7**	**1,986,600**	**929**	**525**
W4CU	*	390,724	399	274
AA4VV	*	313,196	311	247
K4WW	**3.5**	**81,972**	**226**	**138**
***WE4M**	**A**	**3,325,880**	**1674**	**680**
*N4IG	*	1,135,464	900	484
*WB2RHM/4	*	718,685	645	365
*K1GU/4	*	658,665	590	357
*WF7T/4	*	519,612	634	318
*N4UC	*	22,960	103	80
*AA1AR/4	*	21,344	135	92
*K4FTO	*	16,932	107	83
*NG4L	*	15,244	82	74
*KB4RGW	*	14,626	79	71
*W4RVN	*	14,094	94	81
*AA4RP	*	10,608	72	68
*VE3JDF/W4	*	10,168	69	62
			(Op: VE3JDF)	
*W4WNT	*	6,930	51	45
*W4PFM	*	6,762	50	49
*WA3OFC/4	*	6,688	47	44
*WA8OJR/4	*	5,980	57	46
*WBØPOH/4	*	5,544	49	42
*N4LF	*	5,375	46	43
*W4DDR	*	5,040	42	40
*W4JHU	*	3,600	46	40
*WG4M	*	2,800	39	35
*K4EDI	*	1,638	27	26
*KR1ST/4	*	24	3	3
***W4LC**	**14**	**542,841**	**554**	**403**
*K4FPF	*	42,182	157	131
*KJ4IWX	*	2,048	37	32
*KJ4IWY	*	336	13	12
***KC4HW**	**7**	**692,040**	**580**	**365**
*N3TG/4	*	61,500	141	123
*WS4E	*	352	8	8

N6KW/7	*	28,160	132	88	*KA9O	*	74,088	177	147	*VE3VID	*	480	15	15	RM9RZ	*	1,612,737	948	483	JQ1BVI	*	63,872	158	128
WR7Q	*	24,748	117	92	*W9VQ	*	51,968	159	128	***VE3RHD**	**14**	**58,588**	**158**	**151**	UA9BS	*	1,070,784	725	396	JA1IZZ	*	53,845	157	121
W7ABC	*	18,700	107	85	*AK9F	*	48,037	158	121	***VE3GSI**	**3.5**	**96,768**	**196**	**126**	RW9UW	*	844,176	698	344	JA1KEB	*	5,402	50	37
KV7DX	*	18,656	116	88	*N9EP	*	46,740	161	123						RK9UE	*	827,436	543	318	JA1HGY	*	90	5	5
			(Op: KM5H)		*N7GVV/9	*	39,750	127	106	**VE4EAR**	**A**	**175,750**	**259**	**185**	RA9AAA	*	594,008	586	328	**JN1ROV**	**21**	**22,707**	**95**	**87**
K6LL/7	*	17,385	118	95	*W9AKS	*	34,983	118	117						UA9OQJ	*	378,720	388	263	7N4WPY	*	21,250	99	85
KE7FBY	*	6,000	49	48	*AE9K	*	33,000	142	110	**VE5MX**	**A**	**329,175**	**441**	**275**	UA9CDC	*	104,960	222	164	**JF1PJK**	**7**	**540,432**	**367**	**278**
KR7RK	*	5,616	37	36	*AI9K	*	24,196	132	92	***VE5ZX**	**A**	**672,370**	**788**	**355**	RA9UN	*	34,968	129	93	***JP1QDH**	**A**	**737,856**	**660**	**378**
W7WHY	*	3,007	37	31	*K9QH	*	22,761	98	81	*VA5LF	*	301,860	520	234	RZ9AR	*	24	3	3	*JO1WKD	*	713,856	560	338
W7ZR	**21**	**376,336**	**553**	**344**	*WR9Y	*	20,540	99	79						**RA9RR**	**21**	**424,080**	**499**	**310**	*7N2UQC	*	416,208	521	276
N7BV	*	196,980	448	245	*WQ9T	*	5,130	52	45	**VA6ZZZ**	**A**	**720,621**	**868**	**319**	**RZ9HT**	**14**	**1,419,894**	**989**	**531**	*JG1GGU	*	377,844	467	276
W7MRC	*	17,353	99	67	*AF9J	*	4,747	58	47	VX6AO	*	427,558	634	313	RV9WP	*	377,791	441	313	*JA1PJS	*	196,352	308	208
			(Op: NG7Z)		*KD9MS	*	3,978	36	34				(Op: VE6TC)		RU9AC	*	127,095	246	185	*JA1FRQ	*	154,980	263	180
KK7OO	**14**	**1,043,385**	**1079**	**523**	*K9PY	*	2,923	43	37	VE6RRO	*	9,176	79	62	RZ9OJ	*	10,089	71	59	*JA1BWA	*	153,340	277	170
			(Op: KL7OO)		*W9THD	*	816	29	24	**VE6SKY**	**14**	**3,696**	**44**	**42**	**RK9AX**	**7**	**77,760**	**129**	**108**	*JA1IZ	*	116,336	246	176
KZ7X	*	985,395	981	537	***W9ILY**	**14**	**167,760**	**283**	**240**	***VE6DJT**	**A**	**104,250**	**246**	**150**	***RA9SC**	**A**	**1,796,295**	**1060**	**465**	*JA1RQT	*	85,813	207	161
N7NM	*	730,800	832	450	***N9LJX**	**7**	**2,940**	**30**	**30**	*VE6MO	*	56,070	194	126	*UA9SP	*	1,316,934	802	414	*JA1AZR	*	61,628	180	124
K7ABC	*	17,575	152	95						***VX5WQ**	**14**	**1,087,788**	**969**	**494**	*RN9AA/9	*	1,241,172	816	414	*JA1IE	*	60,452	174	127
			(Op: K6LL)		**AB0RX**	**A**	**3,312,295**	**1773**	**787**				**(Op: VE5WQ)**		*UA9AFS	*	1,033,134	782	409	*JI1SAI	*	34,138	128	101
K7WP	**7**	**765,706**	**648**	**349**	KØFX	*	1,395,160	1110	520						*RA9XF	*	660,341	652	347	*JJ1OFQ	*	29,986	128	94
W6AEA/7	**3.5**	**77,832**	**232**	**138**	NØAT	*	1,389,588	1118	516	**VE7CF**	**A**	**642,147**	**733**	**363**	*UA9UNG	*	621,425	634	371	*JK1NSR	*	15,408	81	72
N6MA/7	*	2,752	39	32	KØALT	*	785,150	927	410	**VE7HBS**	**14**	**113,232**	**340**	**168**	*RA9JB	*	583,214	597	326	*JA1CPZ	*	12,180	68	60
***N7ESU**	**A**	**454,894**	**757**	**341**	KØJJR	*	624,764	728	371	**VE7KS**	**7**	**162,288**	**214**	**168**	*RA9MJ	*	391,389	437	283	*JK1TCV	*	3,393	31	29
*K7JE	*	361,121	585	331	NEØU	*	547,281	644	357	***VA7ST**	**A**	**983,754**	**916**	**387**	*RZ9HA	*	345,826	420	283	*7K1CPT	*	3,069	37	33
*KW7N	*	276,480	538	256	WØTY	*	521,043	623	339	*VA7KO	*	795,750	736	375	*RW4AA/9	*	342,076	427	266	*JA1OHP	*	2,730	33	30
*K7VIT	*	249,198	547	246	KSØAA	*	500,364	713	339	*VG7AM	*	512,262	725	298	*RA9HM	*	288,376	385	232	*JF1HJX	*	2,700	30	30
*N7WS	*	215,172	343	258	AI1P/Ø	*	478,500	576	348				(Op: VA7AM)		*UA9OAI	*	265,725	351	225	*7K3OZQ	*	954	20	18
*W7RV	*	211,692	402	236	WNØL	*	443,325	555	345	*VA7RY	*	422,712	502	309	*RK9AN	*	229,845	293	199	***JF1RYU**	**28**	**3,939**	**52**	**39**
*K7XC	*	199,565	352	239	KØTG	*	342,790	551	295	*VX7BC	*	292,876	414	236	*RU9AZ/9	*	216,890	325	205	***JI1ALP**	**21**	**78,343**	**189**	**157**
*WAØWWW/7	*	140,382	325	198	KIØF	*	327,222	521	318				(Op: VE7BC)		*RX9DJ	*	199,000	298	199	*JI1BBN	*	5,760	49	45
*W7IJ	*	121,808	233	184	WBØN	*	316,317	503	291	*VE7BSM	*	100,278	265	162	*UA9OLO	*	54,544	142	112	*JI1UDD	*	1,464	24	24
*W7NNN	*	109,061	273	191	WAØMHJ	*	315,600	393	300	*VE7FCO	*	63,512	178	136	*UA9OZ	*	23,100	93	75	*JI1EWK	*	1,007	21	19
*WE6EZ/7	*	105,452	306	164	WØEM	*	271,000	554	271	*VA7HZ	*	21,567	108	91	*RV9UB	*	11,820	70	60	*JR1NKN	*	21	3	3
*K6UM/7	*	105,300	299	180	KØJPL	*	217,944	356	216	*VA7ALK	*	14,040	75	72	*UA9OCZ	*	3,321	29	27	***JP1JFG**	**14**	**306,423**	**412**	**291**
*W4LSC/7	*	91,107	248	159	NØLEF	*	135,320	279	199						*RW9QA	*	3,264	32	32	*JG1IEF	*	100,998	230	181
*W7SUR	*	74,664	247	153	WT9Q/Ø	*	96,222	294	158	***VX9NC**	**A**	**673,843**	**623**	**359**	***UA9FFV**	**21**	**186,313**	**313**	**211**	*JA1BFN	*	1,633	25	23
*KG9JP/7	*	73,319	209	157	K6XT/Ø	*	96,048	222	174				**(Op: VE9NC)**		*RA9DZ	*	21,675	97	75	*JF1CKO	*	532	15	14
*K7HBN	*	73,024	222	163	WØBH	*	58,800	241	147	*VX9HF	*	198,340	314	235	***RV9CP**	**14**	**570,741**	**575**	**361**					
*K7EIQ	*	60,828	196	148	KØBX	*	55,944	157	126				(Op: VE9HF)		*RX9FG	*	375,136	446	304	**JA2FSM**	**A**	**726,510**	**648**	**366**
*WA7SHP	*	58,072	197	122	NØBK	*	53,218	154	118						*RN9AWU	*	374,080	439	320	JA2VHO	*	418,389	444	267
*AD7OG	*	49,794	169	129	K4IU/Ø	*	24,651	113	99			**Cuba**							(Op: RA9JR)	JR2PMT	*	39,552	123	96
*AC7GP	*	49,005	163	121	KBØL	*	480	17	16	**CO2EL**	**A**	**107,920**	**194**	**152**	*UA9WOB	*	164,866	277	221	JA2CUS	*	10,208	66	58
*W7JDE	*	44,312	159	116	**KØPK**	**3.5**	**146,610**	**325**	**181**	CO3CJ	*	31,500	126	105	*RA9AFZ	*	103,488	218	176	**JM2RUV**	**21**	**57,509**	**156**	**131**
*NF7T	*	41,638	173	109	***NTØF**	**A**	**1,331,408**	**1160**	**481**	***CO3JN**	**A**	**496,451**	**557**	**323**	*RA9MX	*	29,200	110	100	JH2FXK	*	34,917	118	103
*K6KR/7	*	40,870	175	134	*K7RE/Ø	*	813,093	929	447	*CM3RPN	*	372,658	405	286						JH2BTM	*	31,300	117	100
*AD7MQ	*	33,060	164	114	*KØRC	*	793,875	768	435	*CO2IZ	*	82,467	175	147	**RDØC**	**A**	**2,970,658**	**1490**	**607**	**JJ2PUG**	**7**	**14,586**	**59**	**51**
*KN6VVH/7	*	27,615	115	105	*NØBUI	*	377,280	596	320	*CO3LC	*	19,040	82	68				**(Op: UABCA)**		**JA2XYO**	**3.5**	**7,008**	**61**	**48**
			(Op: W6NF)		*WØSM	*	262,353	603	273	***CO2JD**	**7**	**139,500**	**227**	**155**	UAØAGI	*	1,612,608	898	454	***JA2AXB**	**A**	**106,738**	**212**	**166**
*K7GS	*	11,390	107	85	*WØTLE	*	242,820	424	284						UAØYAY	*	1,298,308	926	418	*JA2KCY	*	93,016	205	151
*AD7XV	*	10,880	76	64	*ABØS	*	231,424	464	226			**Dominican Republic**			UAØFAI	*	1,269,033	975	447	*JL2CZY	*	67,456	173	136
*KE7XM	*	7,638	59	57	*WTØO	*	196,554	391	246	***HI8PJP**	**14**	**75,360**	**215**	**157**	RAØQC	*	751,640	753	380	*JA2GHP	*	66,548	160	127
*W7GH	*	7,436	56	52				(Op: KØTI)							UAØSR	*	694,624	682	392	*JA2AYH	*	59,985	169	129
*W7ZRC	*	6,466	60	53	*WØPC	*	159,327	334	189			**Grenada**			UAØQBR	*	319,809	421	291	*JH2MYN	*	6,768	53	47
*W4JLS/7	*	3,320	49	40	*KSØM	*	154,212	305	213	***J39BS**	**A**	**2,115,930**	**1237**	**582**	UAØDC	*	297,076	448	197	*JA2VHG	*	6,280	52	40
*W8TK/7	*	2,013	37	33	*WGØM	*	143,715	383	195						RUØLL	*	281,000	403	250	***JP2MRD**	**21**	**8,904**	**63**	**53**
*NN6T/7	*	1,334	36	29	*WAØLJM	*	133,168	311	203			**Guadeloupe**			UAØSP	*	276,887	478	247	*JR2AAN/2	*	3,640	41	35
***K8IA/7**	**21**	**144,957**	**320**	**229**	*WØRAA	*	120,716	359	206	**FG5LA**	**A**	**221,260**	**351**	**230**	UAØZAM	*	20,748	118	78	***JE2UFF**	**7**	**523,848**	**385**	**276**
*KK7L	*	5,994	61	54	*WSØZ	*	112,175	298	175	***FG1PP**	**A**	**229,200**	**353**	**240**	UAØCW	*	9,971	60	59	***JF2IWL**	**3.5**	**10,200**	**90**	**51**
***W1ZD/7**	**14**	**211,184**	**352**	**288**	*WAØLPV	*	104,357	262	179						RAØFU	*	6,678	46	42					
*N7DB	*	104,854	279	206	*KØLDS	*	104,052	253	174			**Guatemala**			UAØBA	*	36	3	3	**JR3NZC**	**A**	**584,369**	**567**	**311**
***K2PO/7**	**7**	**275,850**	**371**	**225**	*NØEOP	*	99,712	300	164	**TG9ANF**	**14**	**636,720**	**749**	**379**	**UAØSW**	**28**	**13,860**	**109**	**63**	JN3SAC	*	241,738	337	217
*NN7SS	*	177,408	265	192	*NXØI	*	85,332	274	156	***TG9ADQ**	**14**	**109,968**	**298**	**174**	**RXØAW**	**14**	**478,380**	**533**	**335**	JA3IKG	*	168,861	284	187
			(Op: K6UFO)		*ACØE	*	59,860	215	146						UAØLMO	*	136,521	295	197	JR3UIC	*	32,226	95	82
*WA7BME	*	8,000	58	50	*AIØYM	*	56,980	213	140			**Honduras**			**RXØAT**	**3.5**	**258,020**	**252**	**190**	**JA3LEB**	**7**	**378,350**	**312**	**235**
***K7MH**	**3.5**	**1,998**	**33**	**27**	*KØYQ	*	56,420	171	140	***HR2/LU1DY**	**A**	**14,190**	**53**	**55**	***RAØACM**	**A**	**863,070**	**756**	**390**	JL3SBE	*	5,160	36	30
					*WBØQLU	*	53,119	200	121				**(Op: LU1DY)**		*RWØSR	*	687,360	703	358	***JH3CUL**	**A**	**538,160**	**536**	**310**
N8BJQ	**A**	**2,255,780**	**1230**	**610**	*KOØZ	*	51,152	168	139						*RAØFLP	*	431,206	536	298	*JA3JM	*	121,600	256	160
WA8RPK	*	601,152	635	404	*KAØEIC	*	48,840	198	120			**Mexico**			*UAØCNX	*	185,256	437	166	*JO3PSJ/3	*	62,830	163	122
AA8LL	*	456,060	428	330	*KØIDT	*	46,648	173	119	**XE1MM**	**A**	**970,080**	**828**	**430**	*RKØSP	*	68,976	201	144	*JA3MIB	*	53,240	171	121
AJ1M/8	*	439,680	505	320	*W7THY/Ø	*	44,286	170	121	***XE2FGC**	**A**	**260,106**	**404**	**231**	*RAØANO	*	21,630	72	70	*JA3PYC	*	48,832	126	109
ND8L	*	300,468	443	292	*NØST	*	34,440	149	120	*XE1EE	*	179,920	323	208	*RAØAY	*	17,908	89	74	*JR3PKD	*	47,957	156	119
N8NOE	*	298,389	447	273	*AAØAW	*	25,334	138	106	*XE3DX	*	65,010	169	110	*UAØIT	*	4,588	37	37	*JE3UHV	*	14,094	76	58
W8KEN	*	242,880	367	230	*NØLLH	*	21,648	108	88	***XE3N**	**21**	**504,738**	**644**	**351**	*RVØAUI	*	1,800	27	24	*JO3EVM	*	6,519	47	41
WD9FTZ/8	*	191,376	338	216	*KØMPH	*	12,210	90	74						*RAØSMS	*	880	22	20	***JI3FLA**	**28**	**33**	**5**	**3**
N8AGU	*	166,656	292	217	*KØAD	*	11,136	78	64			**Puerto Rico**			***RNØSS**	**21**	**652,632**	**633**	**383**	***JR3RIY**	**21**	**265,398**	**367**	**267**
K8ND	*	92,160	212	192	*WØCZ	*	7,812	86	63	***NP4BM**	**A**	**793,206**	**701**	**397**	*RVØAL	*	597,276	632	353	*JK3GWT	*	109,740	229	177
K3GP/8	*	44,226	162	126	*N1WQ/Ø	*	7,400	55	50	*KP4JFR	*	92,159	197	157	*RUØANW	*	504,612	575	321	*JG3FEA	*	66,304	167	148
K8ESQ	*	32,967	114	111	*KØAP	*	6,068	41	37	*WP3GW	*	12,730	74	67	*RWØAJ	*	38,760	136	114	*JH3DMQ	*	6,144	52	48
N8AA	*	29,568	109	96	*KCØNFB	*	2,988	41	36						*RWØLZ	*	33,812	124	107	***JO3JYE**	**14**	**77,182**	**209**	**149**
W8OHT	*	17,088	98	89	***KFØIQ**	**21**	**3,680**	**41**	**40**			**U.S. Virgin Islands**			*UAØWL	*	5,166	45	41	*JO3RCK	*	90	6	6
K8JWT	*	16,318	98	82	***AKØA**	**14**	**989,280**	**893**	**540**	***KP2DX**	**A**	**397,290**	**463**	**285**	***RNØCF**	**14**	**24,030**	**132**	**90**	***JL3MCM**	**7**	**5,046**	**32**	**29**
K8TJM	*	12,017	67	61	***KEØL**	**7**	**45,540**	**166**	**115**				**(Op: KP2BH)**		*RUØAT	*	13,195	73	65					
K8UT	*	6,364	45	43											***RWØAA**	**7**	**6,956**	**40**	**37**					
KK8X	**21**	**218,290**	**347**	**263**			**Alaska**					**AFRICA**								**JH4UTP**	**A**	**1,246,476**	**850**	**426**
W8WEJ	*	27,040	120	104	**KL8DX**	**A**	**1,003,475**	**891**	**451**			**Canary Islands**					**China**			JH4BTI	*	311,055	438	267
W7PP/8	**3.5**	**72,628**	**183**	**134**	AL9A	*	666,449	722	343	***EA8OM**	**A**	**2,112,512**	**1059**	**512**	**BD1BYV**	**A**	**444,960**	**442**	**270**	JO4CFV	*	67,881	185	121
***K8AJS**	**A**	**1,035,120**	**813**	**456**	KL5E	*	358,995	496	273				**(Op: DJ1OJ)**		BA4DL	*	361,790	436	253	***JH4UYB**	**A**	**1,911,668**	**1056**	**506**
*KK8MM	*	492,000	554	328	AL1G	*	263,958	524	246	*EC8ADW	*	541,404	490	324	BA6QH	*	855	15	15	*JR4DHK	*	21,830	108	74
*WB8JUI	*	462,168	624	294	***KL7AC**	**A**	**350,637**	**558**	**283**	*EC8AFM	*	49,572	120	102	**BA3RJ**	**14**	**31,512**	**140**	**101**	*JI4JGD	*	11,770	75	55
*AB8XG	*	313,986	452	258	***KL1SF**	**14**	**81,168**	**261**	**152**	*EA8AQV	*	570	15	15	***BD1QXU**	**A**	**136,500**	**241**	**150**	*JH4GLG	*	11,577	69	51
*KN8DMK	*	142,431	288	197						***EA8CQW**	**21**	**21,040**	**98**	**80**	*BD4TR	*	115,080	269	168	***JR4VEV**	**21**	**35,490**	**134**	**105**
*KB8UHN	*	139,480	283	220			**Canada**			***EA8NQ**	**14**	**26,410**	**97**	**95**	*BG6AHU	*	38,658	125	102	*JJ4CDW/4	*	3,672	40	36
*W5UHQ/8	*	121,632	235	181						*EA8ARG	*	10,919	64	61	*BD3PCH	*	27,027	111	77	***JI4UEN/4**	**7**	**13,974**	**69**	**51**
*N2OPW/8	*	103,090	243	169	***VO1TTY**	**A**	**974,400**	**794**	**435**						*BG1QEX	*	23,409	125	81					
*AF8C	*	50,400	172	126								**Ceuta and Melilla**			*BG1RUH	*	4,983	35	33	***JA5SUD**	**A**	**577,016**	**573**	**332**
*W8IDM	*	38,316	152	124	**VC2E**	**A**	**3,421,065**	**1572**	**655**						*BH1BCV	*	4,320	34	32	*JA5FNX	*	1,909	28	23
*K3JT/8	*	32,968	125	104				**(Op: VE2SB)**		***EF9K**	**A**	**378,810**	**409**	**270**	*BD1HW	*	3,737	49	37	***JG5DHX**	**14**	**12,352**	**84**	**64**
*WA8YVF	*	24,696	100	84	VA2WDQ	*	202,038	299	223				**(Op: EA9CF)**		***BD4SP**	**21**	**99,876**	**243**	**174**					
*K8GT	*	22,878	99	82	***VA2UP**	**A**	**4,134,200**	**1672**	**700**			**Chagos Islands**			*B4TB	*	19,760	104	80					
*AA8YN	*	18,306	98	81	*VE2AXO	*	1,138,956	823	447									(Op: BA4TB)		**JA6BZI**	**A**	**784,909**	**612**	**379**
*W8WTS	*	18,172	87	77	*VE2FK	*	823,284	690	363	**VQ9LA**	**21**	**104,006**	**218**	**161**	*BG4AHD	*	816	17	17	JH6QFJ	*	178,211	259	187
*KD8M8I	*	3,201	37	33	*VE2XAA	*	209,520	300	240						***BD2RJ**	**14**	**16,077**	**113**	**69**	**JA6FGC**	**7**	**71,008**	**132**	**112**
***KC8ZTJ**	**21**	**24,823**	**126**	**103**	*VE2QV	*	3,060	39	36			**Djibouti**			*BD2SH/7	*	940	22	20	***JA6DIJ**	**A**	**495,126**	**530**	**318**
***N8XI**	**14**	**22,969**	**136**	**103**				(Op: VE2FFE)		***J28AA**	**A**	**29,667**	**72**	**71**						*JQ1AHZ/6	*	4,320	50	36
					VA3DX	**A**	**3,325,000**	**1377**	**625**				**(Op: E7BA)**							***JH6WHN**	**28**	**2,370**	**37**	**30**
WB9Z	**A**	**3,562,221**	**1611**	**723**	VE3KF	*	1,841,840	1034	506											***JA6WFM**	**21**	**294,958**	**377**	**278**
AI9T	*	3,194,840	1739	685	VE3CX	*	1,460,109	1018	483			**Madeira Islands**					**Cyprus**			*JF6MGC	*	8,000	62	50
W9IU	*	2,067,506	1250	578	VA3SB	*	285,605	355	239	**CR3L**	**A**	**3,723,125**	**1645**	**625**										
WA9IVH	*	378,358	513	278	VA3VF	*	38,728	141	103	**CT3EN**	**14**	**3,447,686**	**1613**	**737**	**5B/UT8U**	**A**	**9,185,744**	**2959**	**816**	**JA7IC**	**A**	**1,146,688**	**819**	**437**
W9OL	*	323,250	554	250	VE3EJ	*	25,568	100	94	**CT3BD**	**3.5**	**157,982**	**293**	**167**				**(Op: UT5UDX)**		JH7QXJ	*	948,790	756	395
W9IL	*	249,644	395	278	VA3PC	*	5,152	48	46	***CT3KY**	**21**	**1,372,624**	**951**	**484**	***H2E**	**A**	**1,158,930**	**722**	**395**	JA7CDI	*	241,332	344	238
NS9I	*	163,560	340	235	**VA3TTU**	**14**	**24,479**	**97**	**91**									**(Op: 5B4AGE)**		JA7ZP	*	126,875	251	175
N9WKW	*	113,315	238	173	**VA3XH**	**7**	**269,872**	**299**	**202**			**Morocco**					**Georgia**			***JA7BME**	**A**	**386,888**	**415**	**274**
KB9AMG	*	68,354	180	143	**VA3THC**	**3.5**	**114,258**	**215**	**139**	**CN2R**	**A**	**6,469,920**	**2132**	**720**						***JH7RTQ**	**21**	**214,266**	**325**	**245**
KE9I	**21**	**270,884**	**405**	**281**	***VC3D**	**A**	**1,093,824**	**782**	**422**				**(Op: CN8KD)**		**4L1BR**	**7**	**329,260**	**286**	**202**	***JO7GVC**	**14**	**37,506**	**130**	**114**
KK9A	**14**	**1,696,442**	**1132**	**638**				**(Op: VE3JI)**																
***K9NR**	**A**	**2,288,387**	**1291**	**593**	*VX3FH	*	772,717	665	353			**Senegal**					**India**			**JA8TR**	**A**	**685,426**	**587**	**346**
*N9CK	*	1,620,729	1126	561				(Op: VE3FH)		***6V7V**	**A**	**1,090,695**	**824**	**445**	**VU2LBW**	**A**	**678,170**	**666**	**365**	JH8CXW	*	22,659	94	83
*W9HLY	*	292,600	422	266	*VA3PL	*	662,337	587	351	***6W2SC**	**21**	**1,235,433**	**880**	**471**	VU2PTT	*	30,502	107	101	**JA8JMG**	**14**	**380,987**	**485**	**307**
*N9LAH	*	200,100	434	230	*VE3RCN	*	244,532	332	226						***VU2NKS**	**A**	**586,960**	**522**	**319**	JA8DIV	*	54,656	149	128
*KG9IL	*	168,365	325	223	*VE3AJ	*	155,848	269	184			**South Africa**			*VU2RMS	*	117,528	214	166	JA8MXC	*	23,387	112	91
*KC9IRQ	*	150,294	287	222	*VE3DZ	*	152,036	255	199	**ZS2EZ**	**A**	**526,626**	**495**	**306**						**JA8BNP**	**7**	**2,552**	**22**	**22**
*W9OA/9	*	141,504	244	201	*VE3EK	*	96,944	183	166	***ZS2I**	**A**	**30,030**	**111**	**91**			**Japan**			***JA8EIU**	**A**	**296,164**	**418**	**254**
			(Op: W9OA/9)		*VA3ICW	*	89,199	194	159						**JA1OVD**	**A**	**2,042,368**	**1142**	**512**	***JH8SIT**	**14**	**198,198**	**317**	**231**
*N9LYE	*	135,792	312	184	*VE3MIA	*	87,659	195	143			**ASIA**			JE1LFX	*	1,257,060	887	438	*JH8DBJ	*	1,950	27	26
*W9IP	*	129,770	284	190	*VE3FWF	*	77,674	202	142			**Asiatic Russia**			JF1OPL	*	908,084	711	379					
*KT9L	*	110,589	269	191	*VE3XAT	*	48,708	129	108	**RG9A**	**A**	**4,502,606**	**1755**	**619**	JS1OYN	*	564,256	632	352	**JF9KVT**	**A**	**213,807**	**343**	**209**
*KB9DVC	*	103,820	251	179	*VE3NE	*	32,010	99	97				**(Op: UA9AM)**		JA1AYO	*	556,480	570	320	**JA9CWJ**	**14**	**322,536**	**409**	**302**
*W9PDS	*	89,142	234	179	*VX3CW	*	8,910	59	55	UA9OG	*	2,646,014	1528	571	7L4IOU	*	513,912	558	322	***JA9LX**	**A**	**72,960**	**183**	**128**
*N9UY	*	84,271	219	163	*VA3FN	*	6,580	55	47	RX9SA	*	1,984,694	1124	466	JA1SJV	*	276,146	356	247	***JA9EJG**	**7**	**4,864**	**32**	**32**
*AB9V	*	75,922	200	154	*VE3LR	*	5,032	39	37	RA9CB	*	1,810,245	1012	465	JA1HFY	*	159,978	318	182					
										RU9CY	*	1,792,318	1107	514	JA1IKA	*	115,144	222	148					
															JR1NHD	*	89,595	201	165	**JHØMHR**	**A**	**110,864**	**224**	**169**
															JH1HIC	*	81,370	192	158	***JHØNEC**	**A**	**177,868**	**277**	**212**

*JGØAXT	*	4,284	45	36
***JRØBUL**	**21**	**1,875**	**28**	**25**
Kazakhstan				
UN7FDP	**A**	**14,325**	**75**	**75**
UN9PQ	**14**	**133,950**	**256**	**190**
UN1L	**7**	**2,133,330**	**847**	**445**
UN7PL	*	286,308	252	198
***UN6G**	**A**	**1,052,925**	**798**	**417**
*UN7CN	*	223,124	330	242
*UN7TW	*	3,852	41	36
***UP6P**	**21**	**797,406**	**748**	**383**
			(Op: UN6P)	
*UN9GD	*	723,151	680	389
*UN7TDB	*	329,784	443	273
*UN4PG	*	125,944	267	182
*UN8P	*	11,842	83	62
***UN5C**	**14**	**345,240**	**458**	**280**
*UN9LU	*	284,950	370	278
*UN6GD	*	135,994	262	194
Kyrgyzstan				
***EX8AI**	**14**	**123,510**	**263**	**179**
Saudi Arabia				
***HZ1PS**	**A**	**779,724**	**598**	**363**
South Korea				
DS5DNO	**A**	**119,646**	**243**	**153**
DS5QLJ	*	102,090	248	166
HL5JCB	*	41,310	129	90
HL9A	**21**	**1,239**	**21**	**21**
HL1/WX8C	**14**	**31,066**	**138**	**98**
***DS4GEX**	**A**	**125,136**	**208**	**158**
*DS5DYM	*	42,228	127	92
***HL2/KF6RCP**	**21**	**10,020**	**69**	**60**
***HL5YI**	**14**	**10,680**	**71**	**60**
Thailand				
***E21YDP**	**A**	**1,091,292**	**891**	**422**
Turkey				
TC2B1BCCE	**A**	**361,929**	**360**	**223**
			(Op: TA1DX)	
***TA1BM**	**A**	**58,496**	**157**	**128**
UK Bases on Cyprus				
***ZC4LI**	**A**	**2,758,800**	**1231**	**528**
United Arab Emirates				
A61BK	**14**	**464,468**	**512**	**332**
A61KM	**7**	**85,144**	**131**	**116**
***A61BM**	**14**	**17,334**	**91**	**81**
Uzbekistan				
***UK7F**	**21**	**268,422**	**398**	**249**
West Malaysia				
9M2CQC	**21**	**171,696**	**299**	**219**
9M2CCO	**14**	**12,606**	**78**	**66**
***9M2TO**	**A**	**235,940**	**376**	**251**
***9M2DRL**	**21**	**73,852**	**221**	**148**
EUROPE				
Austria				
OE8DLK	**A**	**431,668**	**487**	**311**
***OE2GEN**	**A**	**2,021,760**	**1084**	**540**
*OE6MDF	*	1,622,112	972	488
*OE5PEN	*	548,100	517	315
*OE9NRH	*	190,872	280	198
*OE6MMF	*	123,710	247	178
Azores				
***CU2AF**	**A**	**841,759**	**761**	**379**
Belarus				
EW4AA	**A**	**2,318,975**	**1204**	**545**
EV1R	*	665,280	586	378
***EW4MM**	**A**	**946,016**	**701**	**376**
*EW7KF	*	571,761	529	333
*EW8DD	*	502,991	532	313
*EW8OG	*	313,541	358	241
*EW1NA	*	292,932	358	237
*EU2MM	*	240,828	337	244
*EW7LE	*	175,769	279	209
*EV1P	*	124,584	205	179
*EW6GL	*	33,930	100	90
*EW5M	*	14,706	64	57
			(Op: EW8CY)	
*EW4DX	*	10,395	68	63
***EU1DX**	**14**	**302,820**	**436**	**294**
*EW8OF	*	201,128	368	248
***EU1AZ**	**7**	**836,944**	**548**	**362**
***EU8RZ**	**3.5**	**915,496**	**622**	**361**
*EW8DJ	*	13,908	61	57
Belgium				
ON6LEO	**A**	**652,192**	**561**	**356**
OQ5A	**21**	**189,318**	**325**	**227**
OQ5M	*	490	14	14
			(Op: ON5ZO)	
ON4AXU	**7**	**370,978**	**336**	**251**
***OP4A**	**A**	**805,222**	**633**	**374**
			(Op: ON6LY)	
*OR6C	*	566,742	521	341
*ON5SV	*	403,480	433	280
*ON6FC	*	270,300	360	255
*ON3AD	*	211,310	323	226
*ON6UF	*	158,080	266	190
*ON6UD	*	110,943	241	189
			(Op: ON5SD)	
*ON4ALY	*	440	11	10
***OQ4T**	**14**	**37,734**	**131**	**114**
			(Op: ON4TO)	
*ON8NT	*	27,405	114	105
***OS8S**	**7**	**488,880**	**422**	**280**
Bosnia-Herzegovina				
E74AA	**A**	**699,691**	**628**	**359**
E7ØT	*	75,482	184	146
***E76C**	**A**	**2,848,230**	**1345**	**630**
*E71DX	*	151,164	212	171
*E72U	*	86,858	176	137
***E79D**	**7**	**1,571,570**	**760**	**455**
Bulgaria				
LZ8E	**A**	**7,547,400**	**2512**	**840**
			(Op: LZ2BE)	
LZ3FN	*	136	8	8
LZ2ZG	**21**	**34,112**	**123**	**104**
LZ3CB	**14**	**379,669**	**550**	**313**
***LZ9R**	**A**	**2,118,202**	**1170**	**526**
			(Op: LZ3YY)	
*LZ2XF	*	150,154	245	193
*LZ2DF	*	65,018	156	118
*LZ1ØARDF	*	24,928	98	82
			(Op: LZ1MYL)	
*LZ1ZM	*	13,680	68	60
*LZ2OV	*	13,132	89	67
***LZ2JA**	**14**	**350,910**	**495**	**315**
*LZ8A	*	7,847	60	59
			(Op: LZ1KDP)	
***LZ1MC**	**3.5**	**15,930**	**69**	**59**
Crete				
***SV9COL**	**21**	**28,314**	**135**	**99**
Croatia				
9A5X	**A**	**390,397**	**472**	**301**
9A7V	*	239,190	284	210
9A5W	**21**	**1,515,220**	**1032**	**553**
9A7R	**14**	**1,987,925**	**1274**	**607**
9A1CCY	**3.5**	**2,486,304**	**1040**	**534**
			(Op: 9A3NM)	
***9A8W**	**A**	**772,540**	**591**	**361**
*9A1CMS	*	189,728	286	196
			(Op: 9A6KZH)	
***9A2BW**	**14**	**57,720**	**180**	**156**
***9A8A**	**7**	**231,548**	**257**	**214**
Czech Republic				
OL8M	**A**	**3,869,775**	**1596**	**675**
			(Op: OK1DRQ)	
OK2PF	*	1,008,380	701	397
OK2SFP	*	873,939	668	373
OK2PZ	*	525,584	497	307
OK1EP	*	318,200	296	296
OK2SG	*	125,730	207	165
OK2JNB	*	57,834	158	126
OK1MSP	*	56,232	123	99
OK8YD	**14**	**1,264,304**	**979**	**496**
OK3C	*	1,155,544	860	542
			(Op: OK2ZC)	
OK7RY	*	670,400	659	400
			(Op: OK1DF)	
OK2SAR	**7**	**48,400**	**112**	**110**
***OK1DBE**	**A**	**1,043,450**	**750**	**410**
*OK1HEH	*	674,624	559	332
*OK1VRF	*	508,151	510	317
*OK2KV	*	462,429	444	297
*OK1ZE	*	357,786	398	278
*OK2NMA	*	356,440	403	268
*OK2POS	*	333,078	400	258
*OK6Y	*	231,693	306	231
			(Op: OK2PTZ)	
*OK1UDJ	*	187,986	299	194
*OK2UHP	*	183,524	294	194
*OK5ZH	*	98,042	193	149
*OK2PAD	*	57,838	152	121
*OK2BHD	*	16,256	72	64
*OK2SWD	*	2,232	39	36
***OK2CLW**	**21**	**89,100**	**198**	**165**
***OK2PCL**	**14**	**203,163**	**339**	**241**
*OK1HGM	*	36,226	132	118
***OK2RU**	**7**	**1,168,172**	**653**	**419**
***OK1SI**	**3.5**	**166,520**	**228**	**181**
Denmark				
OZ5NJ	**A**	**1,694,325**	**1086**	**551**
OU4O	*	1,307,712	831	448
OZ2TF	*	948,915	717	405
OZ1AXG	*	141,792	210	168
OZ6EI	*	104,825	209	175
OZ1DSD	*	86,292	209	153
***5P9X**	**A**	**1,008,450**	**759**	**405**
			(Op: OZ9GA)	
*OZ4VW	*	492,952	487	344
*OZ7AEI	*	62,280	148	120
*OZ1DGQ	*	5,106	47	46
***OZ6TL**	**7**	**288,454**	**306**	**233**
*OZ1JVX	*	35,870	105	85
Dodecanese				
***SV5DKL**	**A**	**171,587**	**263**	**197**
England				
G4MKP	**A**	**1,426,920**	**921**	**460**
GØHDV	*	1,026,999	776	409
G4NOM	*	272,205	384	263
GØORH	**21**	**150,894**	**301**	**202**
MØOXO	*	108,180	249	180
G6MC	*	22,253	107	77
			(Op: MØWKR)	
G4RQI	**7**	**272,832**	**295**	**224**
***GØMTN**	**A**	**1,794,121**	**1069**	**511**
*GØHVQ	*	1,221,525	827	445
*G1XKZ	*	1,105,884	756	442
*G8APB	*	1,070,615	814	455
*G4WGE	*	494,508	513	294
*G8MIA	*	455,940	503	306
*G4SGI	*	451,400	501	296
*MØRYB	*	318,516	362	254
*2EØBPP	*	263,905	313	235
*GØCER	*	223,223	315	223
*G7TMU	*	215,378	331	226
*G6NUM	*	171,304	250	196
*MØSDY	*	159,238	239	206
*MØCNP	*	146,520	270	220
*G3SVD	*	143,090	252	205
*G4OBW	*	111,333	231	177
*G6CSY	*	108,438	188	159
*2EØTQR	*	51,528	138	114
*GØSNG	*	51,120	161	144
*G3RSD	*	39,479	115	97
*G3VQO	*	29,355	110	95
*G3IGU	*	15,756	89	78
*2EØRKY	*	13,920	62	58
*GØLGJ	*	6,030	50	45
*2EØVDS	*	5,166	46	41
*MØCFW	*	180	9	9
			(Op: JK3GAD)	
***G4ZOO**	**21**	**179,738**	**319**	**223**
*G3KNU	*	111,250	240	178
*M9W	*	51,084	173	129
			(Op: G1VDP)	
*G4ENZ	*	48,000	148	125
*G3LDI	*	9,128	65	56
*MØNQN	*	2,520	30	28
***G2YL**	**14**	**619,887**	**651**	**381**
*G3YBY	*	356,697	461	297
*MØDVV	*	2,160	32	30
*G7DDN	*	1,728	28	27
***MØVAA**	**7**	**818,244**	**534**	**357**
*M/YO4RDW	*	218,280	251	214
Estonia				
ES2DJ	**A**	**1,170,144**	**837**	**408**
ES4RD	*	187,590	334	222
ES5RY	**7**	**1,752,184**	**822**	**467**
ES5GP	**3.5**	**899,640**	**603**	**357**
***ES5TF**	**A**	**10,640**	**59**	**56**
***ES4MM**	**21**	**94,770**	**230**	**162**
European Russia				
RD3AF	**A**	**5,348,200**	**2160**	**748**
RA3CM	*	5,093,424	2075	744
RG3K	*	4,035,339	2041	647
			(Op: UA3QDX)	
RO4W	*	2,355,210	1455	585
			(Op: RD4WA)	
RN3ZC	*	2,180,950	1321	530
RA3ANI	*	2,086,700	1312	550
RZ3DX	*	2,042,652	1157	589
RA4HL	*	1,616,700	1180	510
UA6BQ	*	1,162,320	857	435
RV3WD	*	593,739	571	333
RU4WD	*	577,995	618	339
RA3PW	*	503,680	477	320
RV3IC	*	469,430	486	299
RJ3AA	*	400,140	381	260
RZ6HF	*	379,731	506	311
RX3AT	*	294,576	333	228
RD3DS	*	247,932	302	213
RX3AEX	*	231,352	375	242
UA4NC	*	170,753	296	209
UA1NFA	*	164,645	314	221
RZ6AK	*	119,392	230	182
RX6MR	*	103,320	209	164
RV1CC	*	55,230	126	105
RN3BW	*	54,252	154	132
UA3PPP	*	32,078	102	86
RN1ON	*	21,507	75	67
RU3EJ	*	16,994	74	58
RA3FD	*	13,530	58	55
UA3UBT	*	4,028	44	38
UA3ICK	*	700	15	14
RW3XS	*	560	14	14
RU6CQ	**28**	**12,012**	**79**	**66**
RA3SI	**21**	**608,300**	**667**	**385**
UA6CE	*	592,074	662	381
UA3EAY	*	70,775	200	149
RU4HU	*	38,307	136	113
UA3PAB	**14**	**1,072,377**	**972**	**489**
RW4WZ	*	823,302	807	477
RV3FF	*	679,185	723	405
RN3T	*	625,820	711	415
			(Op: RN3TE)	
UA4SAW	*	455,952	572	368
RA6DE	*	417,094	545	347
RL4R	**7**	**2,351,076**	**966**	**546**
			(Op: RW4PL)	
RW6CF	*	1,074,852	606	409
UA6AKD	*	313,296	315	244
UA3KM	**3.5**	**187,008**	**260**	**192**
RU4CO	*	76,626	155	129
***RZ6BU**	**A**	**1,219,044**	**953**	**452**
*RU4SS	*	1,075,620	898	420
*UA4HJ	*	825,096	711	372
*UA4FCO	*	694,155	642	385
*RU3PU	*	657,220	576	340
*UA4ALI	*	649,621	672	371
*RW3XZ	*	646,504	608	383
*UA3DCW	*	507,325	578	325
*RN6MA	*	496,774	534	323
*RV6LCI	*	461,869	511	317
*RK4YJ	*	448,224	532	322
*UA3PT	*	400,752	482	264
*RD1AW	*	396,416	475	304
*RU3SE	*	362,785	437	265
*RA3MB	*	361,514	412	271
*RA3BB	*	339,545	438	295
*RA3UAG	*	338,256	467	324
*RU6CH	*	330,750	414	270
*RK3ANL	*	291,852	395	268
*RW3PF	*	290,763	422	267
*RD4HD	*	290,642	371	242
*RW6CR	*	290,164	313	241
*RN4SN	*	226,176	294	228
*RU6YJ	*	218,120	258	205
*UA4FBG	*	205,242	320	237
*UA3AMZ	*	189,864	312	216
*UA3UHZ	*	172,788	281	204
*RU3AT	*	171,598	283	206
*RX3VF	*	162,640	295	190
*UA3TN	*	162,081	289	207
*RW3WX	*	161,602	258	194
*RW3TA	*	152,818	312	218
*RV3DCZ	*	148,996	274	193
*RA3FH	*	148,242	243	186
*RX3MX	*	108,416	215	176
*RV3DBK	*	95,147	226	169
*RA3QN	*	82,467	194	153
*RF3P	*	80,758	170	149
*RK6YD	*	79,152	193	136
*RD3AJB	*	68,775	165	131
*RD3QX	*	61,008	152	124
*RA1AR	*	60,656	136	136
*UA3PCP	*	58,882	154	118
*RU6BR	*	58,320	133	120
*RV3QX	*	53,406	162	129
*RA3IS	*	52,865	144	109
*RN1AO	*	37,878	153	118
*UA3MQN	*	27,423	109	99
*UA4ANZ	*	25,143	108	87
*RA4AFZ	*	16,720	90	80
*RN6DR	*	16,616	69	62
*RU3BU	*	11,144	58	56
*RA6AAW	*	10,896	60	48
*UA4FUW	*	6,580	52	47
*RV4LC	*	5,738	39	38
*RA3BQ	*	4,104	40	38
*RV3YR	*	3,182	39	37
*RV6ALI	*	1,800	25	24
*RX3MM	*	1,071	21	21
*RA3DW	*	464	16	16
*RV3LO	*	168	6	6
*UA1CEI	*	21	3	3
***RA4WC**	**21**	**226,950**	**407**	**255**
*RZ3AV	*	151,443	296	213
*RX1CQ	*	121,397	271	193
*RZ3ATE	*	82,432	225	161
*RN4SS	*	50,457	167	139
*UA2FFX/1	*	46,863	155	123
*RK6CM	*	44,392	156	124
*RN4HGP	*	29,892	125	106
*RU3XB	*	22,968	109	87
*RA3DCT	*	12,395	74	67
*RV4LS	*	7,384	52	52
***RN6HDX**	**14**	**316,316**	**509**	**308**
*UA6BJY	*	308,660	471	305
*RW6BN	*	272,060	419	305
*RW6AH	*	56,970	192	135
*RZ3AIU	*	34,452	145	116
*UA4ASE	*	33,292	132	116
*RV6ACC	*	30,564	135	108
*UA6ARR	*	14,014	82	77
*RK4PB	*	144	8	8
***RX3ZX**	**7**	**413,108**	**348**	**278**
*RN3DKE	*	3,348	31	31
*RA3ICK	*	2,226	21	21
*RW4LQ	*	140	5	5
***RA3QH**	**3.5**	**95,192**	**169**	**146**
*UA6CFD	*	55,500	130	111
Faroe Islands				
OY3JE	**3.5**	**1,269,884**	**741**	**418**
Finland				
OH2BBT	**A**	**1,679,415**	**1083**	**515**
OH2BP	*	1,468,128	1015	492
OG6R	*	1,121,988	682	399
OH7MJU	**21**	**821,328**	**780**	**426**
OH2HOO	*	66,209	192	143
OH2GI	*	9,512	67	58
OH6BA	**14**	**30,250**	**125**	**110**
OH6RE	*	4,407	41	39
OH2RI	**7**	**303,456**	**311**	**232**
OG8A	**3.5**	**157,552**	**224**	**172**
			(Op: OH8VJ)	
***OH2NT**	**A**	**450,759**	**495**	**291**
*OH2LZI	*	336,168	410	261
*OH8FAL	*	295,974	427	261
*OH7FKV	*	77,220	215	156
*OH2LNH	*	15,244	79	74
*OH8FKU	*	6,552	43	42
*OH6GAZ	*	6,345	53	47
***OH1TN**	**21**	**47,120**	**158**	**124**
France				
F4BKV	**A**	**1,920,951**	**1009**	**549**
F5CQ	*	1,664,224	988	524
F8BNN	*	454,800	486	300
F5AMH	*	449,694	479	301
F5PU	*	298,506	367	267
F5QE	*	298,165	345	245
F4GBW	*	235,068	294	228
***TM57M**	**A**	**1,135,472**	**822**	**424**
			(Op: F1NGP)	
*F5VBT	*	974,752	780	367
*F4FDA	*	694,892	568	374
*F5LGF	*	576,240	543	336
*F5RD	*	459,946	480	302
*F1IWH	*	224,874	336	234
*F5VMO	*	205,860	311	235
*F5TLZ	*	136,183	236	191
*F4FDR	*	96,255	215	155
*F6FTB	*	61,600	165	140
*F8CRS	*	29,993	105	89
*F6OBD	*	27,160	105	97
*F6CZV	*	810	15	15
***F6IRG**	**28**	**72**	**6**	**6**
***F5JY**	**14**	**60,345**	**179**	**149**
Germany				
DL4RCK	**A**	**2,619,190**	**1415**	**595**
DD5FZ	*	1,977,525	1043	517
DH6BH	*	1,785,467	1048	521
DL8OH	*	1,711,203	903	493
DL1NEO	*	1,580,316	991	474
DK3GI	*	1,460,290	899	470
DL7VEE	*	1,441,648	811	478
DL8SCG	*	1,207,359	792	461
DJ4MZ	*	1,117,974	737	429
DJ8QP	*	1,067,781	780	393
DD1JN	*	980,666	687	394
DK6CQ	*	940,890	712	395
DL4ME	*	898,730	696	370
DK1KC	*	830,468	626	382
DL3G	*	795,039	653	393
			(Op: DC3RJ)	
DL5BCF	*	714,000	626	375
DF6QV	*	676,985	587	355
DF5BX	*	527,206	495	314
DJ6TK	*	393,680	448	304
DL5YM	*	309,814	375	263
DL5ST	*	290,420	353	260
DJ9RR	*	255,151	343	247
DGØKS	*	250,920	355	246
DG1CMZ	*	224,280	267	210
DJ5IW	*	203,148	263	209
DL9NDV	*	202,349	301	211
DM3VL	*	200,596	246	188
DHØGHU	*	190,260	270	210
DK7ZT	*	137,550	216	175
DC2YY	*	136,104	256	214
DL6UNF	*	121,792	217	176
DL4FAP	*	102,648	211	168
DJ6TB	*	94,256	177	137
DN4NER	*	94,122	196	162
			(Op: DL4NER)	
DL9SEV	*	90,374	194	146
DL5AN	*	80,592	176	146
DL4PY	*	77,550	184	150
DL/LX1ER	*	72,836	163	139
			(Op: LX1ER)	
DL2SWW	*	70,176	162	129
DG1RTV	*	41,409	128	107
DL2YMR	*	32,204	114	97
DC3HB	*	27,552	98	84
DL2QB	*	25,456	97	74
DFBJK	*	17,496	89	81
DL1JB	*	16,184	82	68
DL5MEV	*	14,750	63	59
DK8EY	*	11,741	62	59
DL3BQA	**21**	**247,234**	**366**	**257**
DL9NDS	*	174,836	299	218
DJ8ES	*	94,140	201	180
DR1ØTCC	**14**	**1,463,924**	**1064**	**539**
			(Op: DK3DM)	
DF9ZP	*	1,246,278	958	506
DF3EH	*	146,544	285	213
DL9GTB	*	143,226	281	218
DL4CF	*	82,314	200	153
DL1YFF	*	54,627	160	131
DK4WW	*	27,342	108	98
DLØMOL	*	18,392	98	88
			(Op: DL1BTE)	
DL6JZ	**7**	**1,435,980**	**744**	**455**
DL1SWB	*	390,520	385	260
DJ4PI	*	179,712	218	192
DL4MCF	**3.5**	**1,530,780**	**855**	**465**
DJ3IW	*	800,808	574	366
DG1ATN	*	1,152	18	18
***DK5WL**	**A**	**1,643,898**	**951**	**498**
*DD5M	*	1,486,166	949	473
			(Op: DJØZY)	
*DJ8EW	*	1,092,200	782	430
*DFØBV	*	996,630	680	417
			(Op: DL1MAJ)	
*DK5MB	*	989,212	693	412
*DJ9MH	*	780,723	610	389
*DL8NBE	*	703,589	607	361
*DL4JYT	*	699,352	617	344
*DL4ZA	*	625,518	563	354
*DL2AL	*	619,216	563	338
*DD1LI	*	588,636	556	332
*DF8XC	*	573,978	559	353
*DL6SFR	*	550,392	522	323
*DL1HTY	*	530,553	498	303
*DL5ARM	*	511,506	492	314
*DL1LQA	*	480,788	395	308
*DM6DL	*	453,213	470	333
*DF2RG	*	413,136	436	302
*DL6NWA	*	393,240	457	290
*DL3KVR	*	381,238	425	286
*DL1EAL	*	356,950	399	275
*DF4ZW	*	330,644	359	262
*DM3HZN	*	320,864	382	271
*DL3WKG	*	315,534	387	258
*DO9ST	*	246,634	309	254
*DO9PL	*	241,528	337	227
*DQ6E	*	237,314	340	253
			(Op: DL3BBY)	
*DJ5TT	*	237,074	314	226
*DJ6JH	*	218,768	332	226
*DL2ZA	*	215,926	299	214
*DF6ZY	*	211,678	324	218
*DK5IR	*	209,568	335	222
*DM4YWL	*	209,418	278	209
*DL1APX	*	208,613	304	227
*DL4TL	*	206,635	339	221
*DO3PKE	*	191,520	277	210
*DK7UM	*	183,192	316	204
*DC8QT	*	181,486	280	206
*DJ4WM	*	180,699	278	201
*DL9SUB	*	173,635	291	205
*DL5JAN	*	156,519	229	187
*DL2YED	*	150,951	251	201
*DL6UAM	*	143,286	238	167
*DM5JL	*	143,172	259	194
*DL3EBX	*	135,459	224	173
*DL5JH	*	133,848	246	198
*DL1OLI	*	130,980	227	185
*DL7FCQ	*	128,148	212	181
*DO6SR	*	120,320	231	188
*DJ8UV	*	120,170	244	197
*DK6NF	*	110,160	222	170
*DL5GAC	*	104,832	219	168
*DL1DXF	*	103,116	196	156
*DL7UXG	*	101,712	200	163
*DK4VY	*	101,060	213	155
*DJ2YA	*	99,932	225	172
*DF6WE	*	96,918	195	174
*DGØAM	*	95,400	192	150
*DF7ZS	*	94,956	201	164
*DL3DRN	*	94,705	207	155
*DL1ZBO	*	93,930	203	155
*DL3OH	*	90,294	192	149
*DK7MCX	*	79,648	189	152
*DJ6UP	*	75,429	196	153
*DL1DBR	*	72,615	178	141
*DF6RI	*	71,548	167	124
*DJ3GE	*	68,666	164	139
*DK3PM	*	61,202	145	142
*DB3KE	*	59,856	152	129
*DK9MH	*	57,564	142	123
*DL1DSW	*	57,024	145	132
*DL6NDW	*	56,250	150	125
*DL5JWL	*	55,500	137	125
*DO1BEN	*	54,825	152	129
*DL8RDL	*	52,836	148	119
*DL6EAQ	*	49,920	140	128
*DL9NCR	*	49,268	136	113
*DL9FB	*	49,168	135	112
*DL4ALI	*	47,700	129	106
*DL5KUR	*	47,628	157	126
*DJ1AA	*	46,384	118	104
*DK4IO	*	45,652	131	113
*DL8ZU	*	43,273	126	109
*DL5ASK	*	41,922	112	102
*DL7UGO	*	38,841	144	107
*DJ2AX	*	33,562	110	97
*DL9YAJ	*	33,048	95	81
*DL8ZAJ	*	27,004	97	86
*DC2CB	*	23,312	107	94
*DO1HGS	*	23,144	94	88
*DF1HF	*	21,384	89	81
*DL5ZB	*	19,028	80	71
*DF3IS	*	18,525	96	75
*DB7MA	*	17,710	86	70
*DG3FAW	*	14,892	87	73
*DL5SZB	*	13,041	81	69
*DK8RE	*	12,780	68	60
*DK1LRS	*	12,444	78	68
*DO1DXX	*	8,721	53	51
*DL1KUR	*	6,321	56	43
*DG5HFS	*	6,149	45	43
*DG2BWG	*	4,472	46	43
*DL6RBH	*	4,176	39	36
*DL2NBU	*	2,160	24	24
*DF8TI	*	2,079	29	27
*DM1LM	*	1,344	22	21
*DGØOM	*	408	12	12
***DO6HMA**	**21**	**169,433**	**329**	**211**
*DL1DTL	*	168,960	298	220
*DF4WC	*	46,168	141	116
*DO5MCL	*	42,240	141	120
*DJ6KS	*	40,071	147	111
*DO6GZ	*	21,672	100	86
*DF7JC	*	7,520	56	47
*DO4DXA	*	5,246	50	43
***DL6KO**	**14**	**252,725**	**363**	**275**
*DJØMCZ	*	222,999	358	259
*DL8RCL	*	123,013	243	211
*DJ2TH	*	73,964	200	164

*DH3RB	*	61,124	184	148
*DR3W	*	25,365	106	95
		(Op: DL6MHW)		
***DL5KUD**	**7**	**526,854**	**408**	**317**
*DL2RUG	*	198,790	222	193
*DL8DUL	*	98,532	188	153
*DF6AD	*	87,640	164	140
*DL4JU	*	71,882	144	127
***DL2SAX**	**3.5**	**12,100**	**61**	**55**
Greece				
SV2FLQ	**A**	**222,560**	**303**	**214**
SV1DPI	*	103,722	237	177
SV1HKD	*	44,722	134	118
***SV8RX**	**A**	**790,272**	**644**	**392**
*SV1JG	*	212,576	328	224
***SV1BDQ/3**	**21**	**71,700**	**204**	**150**
***SV1BJW**	**14**	**278,832**	**426**	**296**
Guernsey				
***GUØSUP**	**A**	**1,102,000**	**749**	**475**
Hungary				
HA8JV	**A**	**3,624,770**	**1578**	**655**
HA7MB	*	704,421	590	369
HA7PL	*	189,000	272	216
HA5PT	*	89,424	169	138
HA9PP	**14**	**266,660**	**417**	**268**
***HA8BE**	**A**	**2,093,364**	**1144**	**546**
*HA6NL	*	789,964	608	356
*HAØML	*	522,477	516	333
*HA3OU	*	319,998	371	266
*HA6NN	*	200,550	283	210
*HA2ESM	*	161,875	245	185
*HA5OMM	*	144,204	263	183
*HA5AWT	*	122,973	278	179
*HA5NB	*	87,672	202	156
*HA5LV	*	47,495	137	115
***HA7TM**	**14**	**586,592**	**637**	**368**
*HA2MN	*	19,847	106	89
***HA5BSW**	**7**	**315,000**	**310**	**225**
*HAØGK	*	49,770	115	105
***HA8WY**	**3.5**	**231,744**	**282**	**204**
*HA5UY	*	51,660	126	105
Iceland				
TF3AO	**A**	**585,808**	**679**	**376**
TF3IG	*	179,250	336	239
***TF3PPN**	**A**	**397,495**	**473**	**277**
***TF3G**	**14**	**50,619**	**163**	**141**
Italy				
IK2SND	**A**	**1,403,811**	**849**	**477**
IK2SAI	*	1,188,585	829	433
IZ4MJP	*	1,167,628	746	446
IZ4GWE	*	1,090,910	802	430
I1OQI	*	834,410	651	362
IC8POF	*	680,362	515	326
IK1MEG	*	655,829	587	367
IV3XPP	*	483,891	508	303
IK3PQG	*	444,150	469	315
IZ5DKJ	*	444,066	438	291
I7CSB	*	442,728	457	312
IK4ZHH	*	435,182	475	302
IK2BUF	*	430,700	419	295
IK5FKF	*	348,634	418	286
I2DJX	*	331,018	354	281
IK2DPP	*	328,380	393	260
IWØSAF	*	161,880	294	213
I2TFJ	*	153,819	289	211
IZØFWD	*	108,329	220	169
IK1ZOE	*	88,938	207	162
IT9ESI	*	86,818	240	166
IK3ASM	**28**	**420**	**16**	**14**
I5JFG	**21**	**74,100**	**194**	**150**
IK6VXO	**14**	**1,352,754**	**1003**	**533**
IK4DCX	*	820,180	736	460
IV3RLB	*	641,080	666	376
IV3JCC	*	610,350	634	390
IK2LOL	*	86,295	207	165
I4IKW	**7**	**4,258,738**	**1306**	**649**
IW1PNJ	*	1,445,598	729	447
IZ8DVD	*	392,200	365	265
I5WNN/5	*	111,078	171	153
IZØGXM	*	21,924	66	63
IT9IMJ	*	15,488	70	64
I4AVG	**3.5**	**2,007,880**	**938**	**497**
IZØKBR	*	1,239,840	748	410
IZ5DIY	*	435,348	400	278
***IZ2FOS**	**A**	**2,025,540**	**1175**	**540**
*IKØCHU	*	998,778	721	409
*IW3RUA	*	827,170	647	362
*IZ2EWM	*	684,441	628	339
*IZ8OGR	*	640,053	602	361
*IV3IXN	*	555,776	532	334
*I2XLF	*	457,800	438	300
*IK5UAN	*	436,552	475	277
*IZ2JPN	*	376,380	441	270
*IK1WEG	*	371,756	430	284
*IK4QJF	*	336,640	383	256
*IK2AHB	*	321,288	406	264
*IZØRTP	*	317,520	370	252
*IZ3GOG	*	312,120	406	270
*IK8XFR	*	302,148	382	252
*IW8EHK	*	296,169	371	269
*IW1AYD	*	284,896	321	232
*IZ5OOP	*	278,300	346	242
*IN3FHE	*	199,950	285	215
*IZØFZM	*	193,148	289	218
*IV3RVN	*	173,760	285	192
*IW5ALG	*	173,528	265	199
*IN3IZT	*	164,052	273	196
*IW9HIK	*	159,800	273	200
*IWØGYC	*	157,688	250	184
*I2BZN	*	153,426	253	182
*IQ2CU	*	116,564	286	181
*IT9ESW	*	114,224	231	176
*IZ1DXS	*	111,028	200	164
*IT9JOF	*	105,175	222	175
*IV3XNF	*	103,737	192	151
*IØYQV	*	99,040	198	160
*IZ5HQB	*	96,354	206	159
*IZ2EEV	*	90,720	196	162
*IW3GXW	*	63,648	152	117
*IK2WYI	*	61,336	192	136
*IK1SOW	*	61,134	180	138
*IK2WFN	*	58,528	151	124
*IZ5DKO	*	53,966	149	121
*IZ2PCJ	*	53,550	144	126
*IZ7EUB	*	43,962	125	102
*IV3KSE	*	42,291	144	127
*IK7WPD	*	38,988	129	108
*IZ8MBW	*	36,500	127	100
*IK1VEK	*	34,272	120	102
*IZ2LSC	*	31,755	99	87
*IZ2FDY	*	25,398	87	83
*IN3RYF	*	24,196	102	92
*IK2NCF	*	23,534	97	82
*IZ1KGY	*	23,408	85	77
*I4HRH	*	21,588	98	84
*IZ2JNN	*	21,150	105	90
*IK2YSJ	*	18,408	94	78
*IK2SVF	*	14,570	68	62
*IZ5ILK	*	13,365	58	55
*IK2AUK	*	5,880	48	42
*IZ8FTW	*	5,670	47	45
*IK3CST	*	4,484	40	38
*IK1DPA	*	3,861	33	33
*IW6NZY	*	3,552	33	32
*IZ8JAI	*	2,314	28	26
*IZ2CSX	*	828	19	18
***IKØEIE**	**21**	**256,794**	**375**	**254**
*IW4EGX	*	62,764	173	142
*IZ3GYS	*	47,212	149	116
*I2WIJ	*	41,412	138	116
*IK8YFU	*	168	8	7
***IK3SSJ**	**14**	**212,744**	**350**	**252**
*IZ1PKV	*	195,580	348	254
*IZ2GIU	*	11,270	75	70
*IZØRMV	*	5,040	48	48
***IQ3UD**	**7**	**2,231,138**	**889**	**533**
			(Op: IW3SQY)	
*IK5AMB	*	944,680	594	380
*IK8NBE	*	128,612	196	158
*IK3QAR	*	114,750	196	153
*IZ3KSO	*	95,200	165	136
*IZ1MHY	*	3,944	29	29
***IV3YIM**	**3.5**	**1,085,466**	**707**	**393**
*IQ8RB/1	*	644,328	524	314
			(Op: IK1DFH)	
*IT9JDH	*	182,978	249	191
Kaliningrad				
RA2FB	**21**	**34,675**	**136**	**95**
***RV2FZ**	**A**	**6,528**	**37**	**32**
***RA2FDX**	**14**	**4,059**	**45**	**41**
Latvia				
YL7A	**A**	**3,184,954**	**1526**	**617**
YL2CI	*	1,911,765	1134	547
YL5T	*	497,616	491	336
			(Op: YL3DQ)	
YL2PA	*	428,544	384	279
YL9T	*	322,719	437	291
			(Op: YL2TW)	
***YL2NK**	**A**	**515,280**	**533**	**304**
*YL2QV	*	51,649	142	137
***YL2NN**	**21**	**107,439**	**235**	**177**
*YL2CV	*	98,615	238	163
*YL2PJ	*	67,760	196	140
***YL2GQG**	**3.5**	**405,594**	**388**	**259**
Lithuania				
LY9Y	**A**	**3,925,884**	**1672**	**683**
LY6A	*	3,795,638	1724	686
LY1R	*	3,454,496	1597	656
LY2BBF	*	6,396	43	41
***LY5W**	**A**	**424,560**	**449**	**290**
*LY2TS	*	267,525	348	225
*LY3BY	*	234,976	298	224
*LY3W	*	47,483	118	103
*LY2BOS	*	4,690	36	35
***LY2SA**	**21**	**49,920**	**159**	**120**
***LY2CG**	**14**	**69,600**	**198**	**160**
*LY2WN	*	16,849	92	83
Macedonia				
***Z35X**	**14**	**9**	**3**	**3**
			(Op: Z32MC)	
Moldova				
***ER3ZZ**	**A**	**429,948**	**544**	**324**
*ER3DX	*	31,008	119	96
Netherlands				
PG3N	**A**	**1,585,650**	**974**	**465**
PAØVHA	*	437,266	497	311
PA9DD	*	369,940	393	265
PA3EBP	*	351,690	387	285
PAØLSK	*	122,973	244	179
PE2KP	*	47,234	145	113
PAØBWL	*	42,630	104	98
PAØJNH	*	38,862	116	102
PI65ZI	*	6,160	44	40
			(Op: PA1TX)	
PAØVST	**14**	**7,590**	**57**	**55**
PI4DX	**7**	**308,712**	**318**	**228**
			(Op: PD1DX)	
***PA3DBS**	**A**	**1,006,950**	**737**	**411**
*PD5LO	*	685,526	576	353
*PD7BZ	*	486,595	447	307
*PA3ANN	*	206,184	290	213
*PD3ALX	*	72,670	153	130
*PA2CVD	*	58,625	153	125
*PA4B	*	54,356	154	127
*PA3ARM	*	35,604	100	86
*PA3GXT	*	27,990	106	90
*PA3EWG	*	25,647	97	83
*PAØMIR	*	22,185	100	87
*PA7RA	*	8,536	49	44
*PA7PTT	*	2,418	27	26
*PA9RD	*	1,633	23	23
*PE1MMZ	*	1,500	28	25
*PE1CVJ	*	1,485	27	27
***PDØMD**	**14**	**25,546**	**116**	**106**
*PA3HGF	*	12,648	76	68
***PB7XYL**	**7**	**64,400**	**130**	**115**
*PA2NJC	*	15,738	67	61
***PI4WLD**	**3.5**	**10,094**	**52**	**49**
			(Op: PAØMIR)	
Northern Ireland				
GIØKOW	**A**	**2,190,295**	**1120**	**515**
***MIØM**	**A**	**923,796**	**750**	**383**
			(Op: MIØSAI)	
*GI4SJQ	*	100,932	227	156
*GIØHXY	*	64,584	165	138
Norway				
LA8PDA	**A**	**1,744,140**	**1128**	**492**
LA9TY	*	618,732	496	337
LA5TFA	*	589,680	758	351
LA9TJA	*	300,828	370	258
LA5HPA	*	228,580	346	220
LN9Z	**14**	**1,465,568**	**1070**	**542**
			(Op: LB1G)	
***LA3BO**	**A**	**1,096,480**	**831**	**385**
*LN5O	*	759,375	549	375
			(Op: LA6FJA)	
*LA8AW	*	182,541	293	213
*LAØFA	*	144,872	249	199
*LA7CL	*	60,625	162	125
*LA9DK	*	59,976	187	147
*LA7WCA	*	35,148	105	101
*LA7SI	*	6,720	51	48
***LA1QDA**	**14**	**50,895**	**165**	**145**
*LA6BNA	*	210	10	10
Poland				
SQ8QUM	**A**	**4,793,256**	**1795**	**702**
			(Op: SQ9UM)	
SP3R8G	*	1,884,450	1013	510
SP3GXH	*	1,438,866	869	473
SO6X	*	625,737	594	359
			(Op: SP6IXF)	
HF8QB	*	443,889	479	279
			(Op: SQ7B)	
SN9P	*	272,400	329	240
			(Op: SQ9GAI)	
SP5GMM	*	198,513	247	207
SP5CJQ	*	69,126	158	123
SP1KAA	*	19,380	76	68
			(Op: SP1BNS)	
SP4GDC	*	3,720	35	30
SP7IIT	*	3,567	31	29
SN2M	**21**	**5,490**	**46**	**45**
			(Op: SP2XF)	
SN7Q	**14**	**2,079,004**	**1295**	**614**
SN3R	*	19,280	101	80
			(Op: SP6GNJ)	
HF4K	**7**	**3,831,264**	**1224**	**636**
			(Op: SP4K)	
3Z8QPZK	*	949,774	571	379
			(Op: SP4Z)	
SP9BGS	*	675,360	468	335
SP2UUU	*	31,648	102	86
SP6AXW	**3.5**	**469,780**	**408**	**283**
SQ7Q	*	329,770	348	245
			(Op: SP7DQR)	
***SN2I**	**A**	**2,103,232**	**1149**	**557**
			(Op: SP2EWQ)	
*SP8NR	*	1,600,169	953	491
*SP3BJK	*	1,007,692	735	406
*SP7QJB	*	755,744	607	352
*SP9NWN	*	537,920	492	328
*SQ8JX	*	462,300	462	300
*SP4BPH	*	372,296	412	269
*SP6JZP	*	358,846	388	269
*SP3DSC	*	317,020	395	262
*SQ8JLN	*	296,960	334	256
*SP9FT	*	274,017	358	241
*SP1MHZ	*	269,100	336	230
*SP7IDX	*	264,248	328	232
*SP2HXY	*	242,202	326	222
*SP3DOF	*	224,000	309	224
*SN51FBQ	*	218,360	299	206
*SP4IRS	*	195,975	278	195
*SP9AUV	*	143,016	236	177
*SP2IW	*	111,705	240	165
*SQ1WO	*	105,144	208	156
*SP7CCB	*	104,470	193	155
*SP6JIR	*	93,888	186	144
*SP9CXN	*	87,308	174	146
*SP9CQ	*	84,915	176	135
*SP8EEX	*	77,220	153	132
*SQ6FHP	*	65,274	163	129
*HF8QIU	*	49,724	161	124
*SN9Y	*	37,275	126	105
			(Op: SP9UOP)	
*SP6IHE	*	34,888	104	89
*SP3GAX	*	24,640	111	88
*SQ9IWT	*	22,176	82	77
*SP8IOV	*	15,600	94	80
*SP8DIP	*	11,935	68	55
*SQ3AUA	*	11,514	69	57
*SP1MWN	*	11,440	60	52
*SP5APW	*	11,407	66	61
*SQ3RX	*	21	3	3
***SP2HPD**	**21**	**98,778**	**225**	**163**
*SP2MKZ	*	39,785	142	109
*SP4NKJ	*	19,383	102	71
*SP3JIA	*	16,259	86	71
***SP3HC**	**14**	**109,440**	**238**	**192**
*SP6DMI	*	86,840	227	167
***SP3VSE**	**7**	**806,474**	**522**	**361**
*SN5B	*	66,878	140	119
			(Op: SP5SSB)	
***SP4BEIY**	**3.5**	**549,626**	**476**	**301**
*SP9CTS	*	380,460	405	255
*SP4GL	*	376,124	365	266
*SP5GDY	*	334,800	354	248
*SO9G	*	74,820	149	129
			(Op: SP9DTE)	
*SP4KNA	*	11,440	58	55
Portugal				
CT2IOV	**A**	**385,200**	**551**	**300**
CT4NH	**21**	**266,532**	**421**	**266**
***CT1ILT**	**A**	**4,130,634**	**1667**	**709**
*CT1BXE	*	930,093	813	411
***CT1EEK**	**14**	**413,118**	**507**	**354**
***CT1AOZ**	**7**	**13,208**	**52**	**52**
Romania				
YO9HP	**A**	**3,979,212**	**1729**	**669**
YQ6A	*	1,654,640	997	520
			(Op: YO6BHN)	
YO7BGA	*	262,654	375	257
YO4RST	*	163,392	260	192
YO3JW	*	3,154	38	38
YO2RR	**21**	**380,952**	**487**	**286**
YR5T	**14**	**499,737**	**590**	**371**
			(Op: YO5CBX)	
YO4DFT	**7**	**303,360**	**290**	**240**
YP2W	*	18,084	70	66
***YO3APJ**	**A**	**1,705,440**	**1019**	**510**
*YO8WW	*	1,311,924	870	436
*YO5OHY	*	1,107,135	773	417
*YO8DDP	*	690,475	611	355
*YO6HSU	*	622,934	571	338
*YO6OAF	*	497,760	500	305
*YO5BYV	*	374,710	400	265
*YRØWL	*	368,560	401	272
			(Op: YO9BXC)	
*YO8RFS	*	357,244	383	268
*YO4AAC	*	137,071	257	187
*YO6DBL	*	131,040	206	168
*YO2GL	*	92,075	173	145
*YO4UQ	*	77,970	194	138
*YO4BTB	*	27,927	100	87
*YO9XC	*	8,400	54	48
*YO2CMI	*	27	3	3
***YO3JF**	**21**	**315,792**	**450**	**272**
*YO5BBO	*	82,650	214	150
*YO2IS	*	60,759	180	129
***YO9CWY**	**14**	**175,032**	**331**	**234**
*YO3ZA	*	141,264	296	218
***YO7LGI**	**7**	**213,462**	**250**	**201**
*YO5OEF	*	181,602	239	177
*YO5OLD	*	126,170	196	155
*YO3GW	*	124,740	193	162
***YR5N**	**3.5**	**364,078**	**363**	**247**
			(Op: YO5PBF)	
*YP5Z	*	66,584	146	116
*YO5CUQ	*	2,350	25	25
Sardinia				
***ISØLFZ**	**A**	**425,282**	**415**	**286**
*ISØYEK	*	13,206	77	71
Scotland				
GM8SBH	**A**	**1,759,011**	**1119**	**501**
			(Op: GMØFGI)	
MMØGPZ	*	1,561,103	1055	509
GM3SEK	**7**	**2,763,834**	**1088**	**557**
***MMØEAX**	**A**	**1,662,128**	**971**	**488**
*GMØNBM	*	981,305	839	403
*MMØRKT	*	237,895	337	245
***MMØBQI**	**7**	**321,246**	**312**	**243**
Serbia				
YT8A	**A**	**3,188,772**	**1381**	**606**
			(Op: YU1EA)	
YT2U	*	1,640,820	966	492
YTØZ	*	414,432	451	288
			(Op: YU1ZZ)	
YT1VP	**7**	**2,648,268**	**993**	**558**
YU1BFG	*	368,010	338	261
			(Op: YT2PFR)	
YU7AU	**3.5**	**1,028,700**	**673**	**381**
***YT2T**	**A**	**2,245,698**	**1147**	**546**
*YT4RA	*	975,194	715	418
*YUØW	*	180,005	254	185
***YU2A**	**28**	**510**	**16**	**15**
***YT2B**	**21**	**199,808**	**340**	**223**
***YU8NU**	**14**	**404,044**	**546**	**332**
***YU5MOL**	**7**	**121,830**	**184**	**155**
***YU7YZ**	**3.5**	**617,382**	**496**	**309**
Slovakia				
OM5ZW	**A**	**3,590,341**	**1413**	**613**
OM3TPN	*	245,692	349	239
OM3TLE	*	168,674	261	187
OM8AMF	**14**	**55,044**	**206**	**132**
***OM7OM**	**A**	**1,307,250**	**858**	**415**
*OM1VA	*	690,000	595	345
*OM7AG	*	604,340	541	335
*OM3IAG	*	431,616	468	281
*OM5MX	*	343,161	376	273
*OM8LA	*	332,112	378	272
*OM7YC	*	85,848	200	146
*OM3ZBG	*	42,680	128	110
***OM3NI**	**14**	**124,032**	**290**	**192**
***OM5TX**	**3.5**	**610,000**	**505**	**305**
Slovenia				
S5ØA	**A**	**6,294,750**	**2052**	**770**
			(Op: S5ØXX)	
S51A	*	3,576,776	1462	644
			(Op: S55O)	
S59AKR	**14**	**1,538,537**	**1077**	**583**
			(Op: S52X)	
S5ØR	*	937,320	822	438
S51U	*	61,633	182	143
S53M	**7**	**4,715,540**	**1382**	**685**
			(Op: S51FB)	
***S56A**	**A**	**1,829,016**	**949**	**532**
*S57U	*	1,336,608	846	468
*S58M	*	1,250,770	824	454
*S59D	*	405,118	410	266
*S51JQ	*	155,877	297	223
*S57YX	*	142,080	223	185
*S56WPF	*	57,456	165	126
*S53NW	*	50,160	123	110
*S53F	*	27,040	89	80
***S51OE**	**14**	**337,900**	**461**	**310**
*S52OP	*	72,708	199	146
***S57SU**	**3.5**	**364,078**	**386**	**247**
Spain				
EA1AHY	**A**	**3,670,134**	**1695**	**669**
EA1WX	*	42,471	136	99
EA1HNP	*	14,560	76	70
			(Op: EA1HNP/P)	
EA1ACP	**21**	**351,553**	**430**	**317**
AN1A	**7**	**1,691,670**	**827**	**465**
			(Op: EA1AST)	
EA1CJ	**3.5**	**27,840**	**97**	**80**
***AM1W**	**A**	**1,018,647**	**803**	**437**
			(Op: EA1OS)	
*AM1Q	*	1,003,110	809	435
			(Op: EA1QA)	
*EA1VT	*	277,202	400	263
*EA1DR	*	226,614	347	211
*EA1DZM	*	171,360	263	210
*EA1DFP	*	36,456	116	98
***EA1GHT**	**7**	**93,396**	**155**	**129**
EG2R	**A**	**589,454**	**530**	**341**
			(Op: EA2RY)	
EA2AZ	*	73,948	158	133
***EA2VE**	**A**	**757,350**	**710**	**405**
*EA2ABI	*	703,800	629	391
*EA2BNU	*	644,046	585	359
*EB2GFA	*	294,656	410	256
*AN2K	*	278,500	344	250
			(Op: EB2RA)	
*AO2KY	*	136,612	252	196
*EA2DCF	*	133,110	208	170
*EA2OK	*	73,917	164	129
*EA2TA	*	7,150	50	50
***EA2BVV**	**21**	**13,690**	**88**	**74**
EE3R	**A**	**1,592,960**	**979**	**524**
EA3GP	*	242,181	355	213
EA3FF	*	6,344	57	52
EA3JW	**7**	**84,500**	**159**	**125**
***EA3FHP**	**A**	**452,828**	**505**	**316**
*EA3NP	*	345,168	406	282
*EB3JT	*	290,334	338	249
*EA3GBA	*	168,266	270	202
*EA3ANE	*	129,217	241	187
*EA3ALV	*	117,775	213	175
*EA3GLB	*	109,446	201	174
*EB3CML	*	70,308	154	126
*EB3FSS	*	46,917	144	117
*EA3HEU	*	12,285	73	63
***EA3NO**	**21**	**120,414**	**256**	**183**
***EB3FLY**	**14**	**145,360**	**286**	**230**
*EA3CS	*	16,464	89	84
***EA3DUM**	**7**	**93,264**	**167**	**134**
***AM3EGB**	**3.5**	**81,926**	**155**	**137**
			(Op: EA3EGB)	
***EG4M**	**A**	**145,550**	**284**	**205**
			(Op: EA4EQD)	
*EA4/YO8DHC	*	110,808	232	162
*EA4DQX	*	91,080	194	165
*EA4SG	*	28,952	102	88
***EA4AFP**	**21**	**29,149**	**113**	**103**
***EA4DB**	**14**	**377,865**	**535**	**311**
***EA4ETW**	**7**	**227,286**	**277**	**207**
EA5AX	**A**	**1,211,850**	**823**	**450**
EA5RM	*	561,121	530	319
EE5J	*	429,936	545	338
			(Op: EA5YJ)	
EA5HIH	*	187,950	306	210
EH5I	*	156,457	315	217
			(Op: EA5DWS)	
EA5IY	*	126,225	210	165
AN5E	**14**	**1,022,950**	**918**	**499**
			(Op: EA5HAB)	
***EA5DKU**	**A**	**1,121,779**	**808**	**437**
*EF5K	*	511,290	638	345
			(Op: EA5KB)	
*EB5AL	*	485,898	495	322
*EB5RR	*	467,838	516	282
*EE5V	*	219,520	304	224
*EB5CNK	*	212,762	303	209
*EA5ASM	*	188,125	275	215
*EA3GYK/5	*	66,845	190	145
			(Op: DK7TM)	
*EA5TT	*	33,418	114	98
***EA5GVZ**	**21**	**22,088**	**107**	**88**
***EA5XC**	**14**	**41,574**	**162**	**123**
***EC5CSW**	**7**	**1,114,876**	**638**	**406**
EC7AKV	**A**	**753,445**	**657**	**385**
EA7AZA	*	139,438	232	173
***EA7CIX**	**A**	**288,915**	**350**	**255**
*EA7TG	*	264,638	389	253
*EA7FIQ	*	65,340	166	132
*EA7VJ	*	44,020	143	124
*EA7CWA	*	42,008	138	118
***EA7ISH**	**21**	**658,530**	**689**	**405**
Sweden				
SM6U	**A**	**2,129,576**	**1240**	**554**
SM5FUG	*	634,893	556	343
SMØBSO	*	427,750	447	290
SMØGYX	*	355,040	435	280
SM3LBP	*	195,270	284	230
SM6VVT	*	192,192	304	231
SM6GKT	*	191,568	287	208
SM2M	*	84,370	198	143
			(Op: SM2LIY)	
SA1A	**21**	**240**	**10**	**10**
			(Op: SM1TDE)	
SM6NET	**14**	**64,094**	**186**	**146**
***7S5S**	**A**	**534,954**	**531**	**329**
			(Op: SM5CSS)	
*SM6BSK	*	530,910	445	347
*SD4ØJZ	*	336,336	406	264
			(Op: SM5DJZ)	
*SM5QU	*	326,835	407	269
*SM5CNQ	*	282,500	338	250
*SFØD	*	226,568	318	223
			(Op: SMØDSF)	
*SE5E	*	214,452	321	222
			(Op: SM5AJV)	
*SA3V	*	158,422	291	209
			(Op: SA3ARL)	
*SF6DX	*	135,486	245	193
*SA4A	*	111,136	226	184
			(Op: SM4PBT)	
*SE6C	*	98,728	219	164
			(Op: SM6CDN)	
*SM7CIL	*	82,656	218	164
*SA5ACL	*	82,544	202	154
*SM5OSZ	*	56,880	163	120
*SJ2W	*	45,612	149	126
*SM7ATL	*	29,584	96	86
*8SØC	*	28,809	110	97
			(Op: SMØMPV)	
*SM4RLD	*	19,440	95	80
*SA7ADI	*	4,255	39	37
*SM6AHU	*	312	13	13
***SE5S**	**14**	**79,827**	**215**	**177**
***SD3D**	**7**	**127,008**	**193**	**162**
			(Op: SM3DXC)	
Switzerland				
HB9ODP	**A**	**782,219**	**583**	**357**
HB9TTX	*	270	10	9
***HB9DHG**	**A**	**608,882**	**522**	**334**
*HB9SVT	*	236,652	339	246
*HB9DBK	*	96,499	195	169
*HB9BGF	*	46,920	134	115
***HB9TSU**	**14**	**17,085**	**94**	**85**
*HB9ELD	*	9,620	71	65
Ukraine				
ED5M	**A**	**5,198,842**	**2180**	**766**
			(Op: URØMC)	
UW8I	*	4,729,140	1863	774
			(Op: UT2IZ)	
EO3Q	*	3,606,800	1603	710
			(Op: UR3QCW)	
UV5U	*	2,290,170	1222	582
			(Op: UX1UA)	
UR7GO	*	1,931,250	1158	515
UR5EAW	*	1,494,614	744	451

UZØU	*	1,451,325	1013	523	(Op: UY5ZZ)
UT6IS	*	717,232	651	368	
UW7LL	*	691,200	601	360	
UR1HM	*	653,196	536	348	
UR7EU	*	488,636	491	302	
UR4EI	*	294,060	393	260	
UT8IO	*	292,775	344	239	
US0LW	*	189,056	297	211	
UR4IOR	*	176,256	304	216	
US0YW	*	172,584	280	216	
UR5MBA	*	137,982	232	183	
UR0IM	*	100,928	189	152	
UT1IK	*	73,084	170	151	
UY5QO	*	38,456	110	92	
UR9QQ	*	15,372	67	63	
UU2JQ	*	9,342	59	54	
UT2UU	*	5,934	49	46	
US3IZ	*	1,804	24	22	
UXØFF	**21**	**1,208,832**	**934**	**512**	
UW1M	*	1,066,418	943	478	(Op: UR5MW)
UR2VA	*	67,095	193	135	
US5I	**14**	**1,546,360**	**1161**	**577**	**(Op: US5IQ)**
UW5U	*	1,090,764	928	492	(Op: UY2UA)
ED1I	*	907,722	864	478	(Op: UT1IA)
UT2II	*	876,120	858	447	
UR5ZMK	*	221,696	390	256	
UY8LM	*	28,785	127	101	
UX8ZA	*	21,204	108	93	
UT3N	**7**	**758,004**	**557**	**339**	**(Op: UT3NK)**
UX5IO	*	654,376	485	314	
UR0IQ	*	525,402	399	303	
UTØNT	*	5,400	36	36	
EMØX	**3.5**	**1,762,992**	**883**	**477**	**(Op: UT2XQ)**
UX1IL	*	284,850	339	225	
UR7EQ	*	229,632	295	208	
***UY1HY**	**A**	**1,569,201**	**1005**	**489**	
*UT5EPP	*	1,528,880	1037	464	
*UR0HQ	*	1,305,255	994	465	
*US0HZ	*	1,255,632	920	444	
*UX1UX	*	1,218,620	879	436	
*EN7U	*	1,155,727	849	461	(Op: UR4UDI)
*UT8EL	*	1,007,676	841	414	
*US6IQ	*	996,990	778	398	
*UT2IO	*	990,702	819	414	
*UR8IDX	*	916,838	703	394	
*US6CQ	*	900,984	755	372	
*UR8QR	*	805,896	679	364	
*UX6IB	*	639,324	575	354	
*UT4HZ	*	576,380	484	322	
*UY2UQ	*	561,816	549	324	
*US7IID	*	545,468	551	308	
*UT3RS	*	490,347	527	297	
*UR5ETN	*	483,081	464	283	
*US8UA	*	471,801	492	319	
*UT1IM	*	423,085	474	299	
*UT5CL	*	388,314	428	282	
*UT5ECZ	*	379,440	408	272	
*UT4XU	*	379,316	434	266	
*UY5TE	*	372,465	458	267	
*UY7C	*	347,319	426	259	
*UY7MM	*	341,278	450	266	
*UR7EW	*	332,856	420	268	
*UT8IM	*	311,577	395	259	
*US7IA	*	308,124	397	243	
*UX7IB	*	268,950	439	275	
*UX7FC	*	233,232	342	226	
*UR3AC	*	231,975	340	225	
*UX7FD	*	211,138	342	229	
*UT5ERV	*	191,992	276	206	
*UR5KED	*	186,308	272	188	
*UT7MR	*	178,396	293	206	
*UT5UKY	*	147,384	243	184	
*UU9JQ	*	111,870	193	165	
*UU1K	*	97,767	192	153	(Op: UUØJM)
*UR5IHC	*	97,474	235	163	
*US8IBS	*	84,096	180	144	
*UR3QM	*	83,995	196	157	
*UT2QQ	*	75,338	192	139	
*UXØSX	*	73,272	193	142	
*UR5EIT	*	37,022	122	107	
*UT1UW	*	20,066	93	79	
*UR5IFB	*	12,350	75	65	
*US5ZE	*	6,468	43	42	
*UT2AB	*	3,420	31	30	
*UR5XMM	*	1,872	26	24	
***UZ7HO**	**21**	**320,910**	**463**	**285**	
*UT2IV	*	138,226	293	206	
*UXØUW	*	123,210	263	185	
***UT4EK**	**14**	**126,896**	**290**	**206**	
*US3QW	*	66,976	188	161	
*UT5PQ	*	32,970	127	105	
*UR7QM	*	25,300	115	100	
*UT3FM	*	15,054	89	78	
***UR7TZ**	**7**	**1,303,736**	**709**	**434**	
*US0MM	*	768,812	521	346	
*US0KS	*	612,468	464	321	
*UT4XD	*	550,800	460	300	
*UT5ERP	*	381,810	351	267	
*UT5KL	*	336,600	320	255	
*UR3LTD	*	5,244	39	38	
***UT5KO**	**3.5**	**502,680**	**448**	**295**	
*UZ2HZ	*	472,610	440	283	
*US0GH	*	388,096	386	256	
*US0ZZ	*	329,022	349	243	
*UR8MH	*	175,750	256	185	
*UZ7U	*	9,800	51	49	(Op: UT3UA)

Wales

GB5ØATG	**A**	**3,180,485**	**1436**	**605**	**(Op: GW4SKA)**
MW2I	*	828,837	739	393	(Op: GW5NF)
GW4BLE	*	168,535	306	185	
***MWØCRI**	**21**	**194,400**	**324**	**240**	

OCEANIA

Australia

***VK2ACC**	**A**	**7,990**	**56**	**47**	
VK3TDX	**A**	**964,260**	**750**	**396**	
VK3FM	*	112,793	220	149	
***VK3VT**	**14**	**6,912**	**51**	**48**	
***VK4EJ**	**21**	**72,864**	**190**	**138**	
***VK5NPR**	**A**	**120,649**	**230**	**151**	
VK6HZ	**A**	**125,307**	**228**	**189**	
VK7XX	**A**	**17,155**	**81**	**73**	
***VK7AD**	**A**	**10,494**	**60**	**53**	
***VK8PDX**	**A**	**92,880**	**203**	**135**	

East Malaysia

***9M6YBG**	**14**	**300**	**11**	**10**	

Guam

KG6DX	**A**	**935,766**	**816**	**351**	

Hawaii

KH6ZM	**A**	**3,275,475**	**1614**	**525**	
KH6GMP	*	631,680	630	320	
AH7C	*	8,450	58	50	
***AH6RR**	**A**	**399,796**	**481**	**254**	
*KH6CO	*	107,417	235	163	(Op: KH6OO)
*KH6/AA4V	*	99,396	213	132	
***AH6NF**	**21**	**2,002**	**28**	**26**	

Indonesia

YBØPAH	**14**	**536,200**	**543**	**350**	
***YBØJIV**	**A**	**4,033**	**46**	**37**	
*YBØKYM	*	833	19	17	
***YB8EL**	**21**	**221,270**	**356**	**218**	
***YB2ECG**	**14**	**29,928**	**124**	**87**	
*YB8EXL	*	4,600	42	40	
***YB8FL**	**7**	**194,076**	**217**	**162**	
*YB1ALL	*	137,456	185	142	
*YG8EL	*	378	9	9	

New Zealand

ZL1BYZ	**A**	**1,908,552**	**1143**	**562**	
ZM2B	*	785,210	592	337	
ZM2A	*	187,400	267	200	
ZM4G	*	66,584	167	116	(Op: ZL2IFB)
ZL3TE	**7**	**324,816**	**283**	**201**	**(Op: W3SE)**
***ZL4NX**	**A**	**11,700**	**58**	**50**	**(Op: JM1CAX)**
*ZL3GA	*	6,800	43	40	

Philippines

***DV1JM**	**A**	**575,050**	**621**	**310**	

SOUTH AMERICA

Antarctica

DP1POL	**A**	**42,488**	**146**	**94**	**(Op: DL5XL)**
R1ANP	*	351	9	9	(Op: RW1AI)

Argentina

LTØH	**A**	**2,886,051**	**1469**	**609**	**(Op: LU3HY)**
LP2F	**21**	**2,222,207**	**1231**	**611**	**(Op: LU1FDU)**
LU5OM	**7**	**34,804**	**80**	**77**	
***LU5FF**	**A**	**1,388,968**	**935**	**476**	
*LU5CAB	*	54,312	163	124	
*LU6QI	*	20,536	79	68	
*LU4VEW	*	4,838	53	41	
*LU8ADX	*	2,987	36	29	
***LU3JVO**	**21**	**4,100**	**41**	**41**	
***LU6FT**	**14**	**100,794**	**231**	**157**	
*LW9ETQ	*	25,810	107	89	

Aruba

P49X	**A**	**13,300,632**	**3426**	**886**	**(Op: WØYK)**

Brazil

PP5BZ	**A**	**4,998**	**36**	**34**	
PY2KP	*	3,770	29	29	
PY2XAT	**14**	**98,745**	**241**	**145**	
PY1CJ	**7**	**1,400**	**22**	**20**	
***ZX2B**	**A**	**4,569,532**	**1806**	**697**	**(Op: PY2MNL)**
*PY2NY	*	1,622,390	989	490	
*PY2SEX	*	575,840	605	305	
*ZV2K	*	313,496	388	263	(Op: PY2SHF)
*PU8TEP	*	28,124	90	79	
*PY2AC	*	11,584	69	64	
*PY2DEZ	*	4,158	44	42	
*PY3FOX	*	1,932	29	28	
*PU4HUD	*	570	20	19	
***PU5AAD**	**28**	**1,160**	**20**	**20**	
***PY1ZV**	**21**	**31,155**	**119**	**93**	
*PY4XX	*	12,864	72	67	
***PY2HL**	**14**	**63,979**	**176**	**137**	
*PR7AR	*	48,990	146	115	
*PY7ZY	*	1,260	23	21	

Chile

***CE2WZ**	**21**	**91,630**	**214**	**154**	

Colombia

***HK6P**	**A**	**904,680**	**656**	**360**	
*HK3W	*	63,882	155	117	

Ecuador

***HC1JQ**	**14**	**48,840**	**153**	**111**	

Netherlands Antilles

***PJ4R**	**A**	**5,412,550**	**1970**	**650**	**(Op: N4RR)**
*PJ2T	*	3,119,020	1384	563	(Op: WBAV)

Suriname

PZ5RA	**A**	**411,904**	**393**	**256**	

Uruguay

CW7T	**A**	**459,650**	**499**	**317**	
CX5TR	*	28,980	113	92	
CX4AAJ	**21**	**1,725,636**	**1048**	**561**	
***CX1CW**	**A**	**9,222**	**65**	**58**	

Venezuela

4M5IR	**A**	**2,320,058**	**1186**	**493**	**(Op: YV5KG)**
YW5T	**7**	**297,606**	**260**	**193**	**(Op: YV5JBI)**
YW4V	*	122,544	153	138	(Op: YV4DYJ)
***YV5LI**	**A**	**421,596**	**416**	**252**	
***YV1FM**	**21**	**1,037,848**	**818**	**431**	
***YV4BCD**	**14**	**16,117**	**79**	**71**	
***YW5RY**	**7**	**798,984**	**453**	**324**	**(Op: YV5KAJ)**

MULTI-OPERATOR SINGLE TRANSMITTER NORTH AMERICA

United States

WW4LL	**4,941,015**	**2089**	**773**
NA8CW	**4,414,410**	**2045**	**770**
NC4CS	3,507,400	1761	710
N4CW	2,654,334	1405	617
KT1I	**1,935,744**	**1361**	**568**
WY7SS	**1,137,955**	**1325**	**455**
NR5M	**1,005,648**	**873**	**438**
WX5S/6	**914,081**	**897**	**469**
WX7P	776,662	947	431
KUØK	658,026	830	417
K9SG	**557,040**	**581**	**330**
W7VXS	394,142	608	329
WB8SKP/4	225,342	429	234
KE3OA	**95,284**	**222**	**166**
KC4WQ	68,034	193	138

Alaska

KL2R	**200,790**	**372**	**230**

Belize

V31MU	**2,003,967**	**1299**	**483**
V31GW	290,604	417	244

Canada

VG7G	**603,936**	**752**	**324**
VE7NSR	102,432	291	176

Mexico

XE2AUD	**425,980**	**600**	**295**

Puerto Rico

WP4WW	**309,985**	**428**	**247**

AFRICA

Canary Islands

EE8E	**14,208,960**	**3467**	**960**

ASIA

Asiatic Russia

RK9CWA	**7,431,585**	**2566**	**735**
RK9JWR	2,109,627	1274	507
RK9KWI	709,374	670	382

Japan

JQ1YWK	**3,480**	**31**	**29**

Kazakhstan

UN8LWF	**770,649**	**672**	**363**

Turkey

TA7KA	**4,271,220**	**1779**	**610**

EUROPE

Belgium

ON4ANL	**780,624**	**664**	**351**
OR5EU	50,864	160	136

Bosnia-Herzegovina

E73M	**8,044,411**	**2488**	**881**

Croatia

9A5D	**5,396,653**	**2175**	**757**

Czech Republic

OK1KSL	**356,460**	**405**	**260**

Denmark

OZ7A	**1,792,990**	**1032**	**530**

England

G6BOX	**965,844**	**734**	**396**

European Russia

RK3MWI	**2,985,310**	**1617**	**613**
RK4WWQ	2,122,848	1432	546
RM3M	1,506,120	1068	489
RK3DXW	641,344	613	352
RZ3DZI	11,400	63	57

Finland

OF5ØRR	**4,673,378**	**2095**	**734**
OH3I	3,874,360	1784	707
OH2HAN	3,557,478	1672	673

France

TM4P	**5,973,708**	**2164**	**771**
F5KFF	28,906	105	97

Germany

DD1LD	**5,712,470**	**2041**	**739**
DKØEE	5,039,615	1846	763
DF1LON	3,527,433	1483	657
DM3DA	2,483,425	1281	575
DR2N	2,109,800	1150	550
DR2Ø1ØL	1,420,716	918	458
DKØED	5,588	50	44
DFØDG	1,520	20	20

Greece

SX1L	**5,254,535**	**2237**	**715**

Hungary

HA3E	**2,000,768**	**1120**	**539**

Italy

IZ1LBG	**6,678,000**	**2271**	**840**
IQ3TN	1,494,847	917	457
IQ9BF	878,256	787	428
IZ6OVE	122,836	223	164

Netherlands

PA1ØØBEVER	**417,088**	**488**	**304**

Poland

SP9KDA	**1,303,302**	**861**	**434**
SP1KRF	697,900	562	350
SP9KRT	261,744	393	246

Serbia

YTØA	**5,692,866**	**2030**	**743**
YU7AJM	45,339	155	119

Slovakia

OM3RRC	**3,374,991**	**1533**	**603**
OM3KWZ	2,163,645	1162	517

Slovenia

S53P	**2,191,895**	**1204**	**535**

Spain

EA1AP	**574,244**	**581**	**341**

Sweden

SI4G	**3,834,039**	**1680**	**669**

Ukraine

UW3E	**2,240,472**	**1329**	**559**
UT7AXA	84	7	7

OCEANIA

French Polynesia

TX4T	**154,071**	**315**	**153**

SOUTH AMERICA

Argentina

LV6D	**1,641,792**	**1062**	**503**
L73D	255,794	372	242
L25X	132,022	254	187

Aruba

P41YL	**7,904,256**	**2422**	**768**

Brazil

PU5ATX	**336,832**	**427**	**277**

MULTI-OPERATOR TWO TRANSMITTER NORTH AMERICA

United States

KF4QGY	**2,718,232**	**1449**	**632**
N2BJ/9	**2,118,714**	**1307**	**598**
WØIW	**1,820,880**	**1399**	**562**
NK7U	**554,382**	**641**	**342**

Canada

VE5RI	**1,361,750**	**1164**	**419**

AFRICA

Canary Islands

EA8URL	**8,419,428**	**2684**	**813**

ASIA

Asiatic Russia

RWØA	**9,293,220**	**3183**	**765**

Japan

JA6ZPR	**2,225,862**	**1249**	**558**

EUROPE

European Russia

RF3T	**1,034,990**	**890**	**485**

Finland

OH6R	**8,923,150**	**3117**	**895**

Germany

DLØCS	**7,709,998**	**2635**	**866**

Italy

IK1TWC	**1,842,880**	**1020**	**520**
IQ8MD	1,214,400	924	460

Lithuania

LY2W	**6,204,716**	**2242**	**763**

Macedonia

Z37M	**12,047,140**	**3561**	**931**

Montenegro

4O3A	**14,493,792**	**3917**	**996**

Spain

EF7R	**5,907,094**	**2355**	**758**

MULTI-OPERATOR MULTI-TRANSMITTER NORTH AMERICA

United States

KA4RRU	**6,617,322**	**2752**	**837**

Canada

VE7UF	**5,221,755**	**2444**	**693**

Grenada

J38XX	**142,428**	**218**	**166**

EUROPE

Bulgaria

LZ9W	**8,702,370**	**2807**	**835**

Germany

DL3VTA	**4,398,732**	**1784**	**723**

Hungary

HG1S	**14,452,838**	**3862**	**998**

Check Logs

The following submitted check logs. Thank you.
OE9R, RA6EE, HA1SN, RW9MZ, EH5J, WB2CDY, G3KMQ, OK2DW, G3RWL, K2QD, SP3CFM, DL9NO, SP7HQ, DL8MBS, OK4RQ, W4EEH, EC1AJV, DF9KF, YO3FOM, EA2DOT, UA3AGW, DR2Q, EA1AW, RN1NU, EA1IT, UT5ZA, WS4C, RA9AMO, VR2XLN, SP3UQG, RU6YY, OK7SX, RA3FF, SP9WZP, YO2LSP, LU6AM, IK2AOO, OL3A, EA1HLL, SP6NVK, SP9GKJ, EA7GV, SP2GJV, IZ4OUA, CU2JT, US5EEK, SP1DMD, K5ZD/1, DL1EKO, JG1WNO, UX6IR, RN3GE, IZ4DZD, SP1HJK, LA2GH, SP3QYQ, VE3IKT, KR5T, UXØIK, KF7ADB/4, DL2MJ, UR5IKN.

ham shop

Advertising Rates: Non-commercial ads are 20 cents per word including abbreviations and addresses. Commercial and organization ads are $1.00 per word. Boldface words are $1.50 each (specify which words). Minimum charge $2.00. No ad will be printed unless accompanied by full remittance. All ads must be typewritten double-spaced.
Closing Date: The 10th day in the third month preceding date of publication (example: Jan. 10th for the March issue). Because the advertisers and equipment contained in Ham Shop have not been investigated, the Publisher of *CQ* cannot vouch for the merchandise listed therein. The publisher reserves the right to reject any advertisement. Direct all correspondence and ad copy to: CQ Ham Shop, 25 Newbridge Road, Hicksville, NY 11801 (fax: 516-681-2926; e-mail: <hamshop @cq-amateur-radio.com>.

CB-TO-10M CONVERSIONS: Frequency modifications, FM, books, plans, kits, high-performance CB accessories. Catalog $3. CBCI, Box 30655CQ, Tucson, AZ 85751. <www.cbcintl.com>

At **www.HamRadioExpress.com** we know you can't afford to waste time looking for Ham Radio Antennas & Accessories. With **over 3,000 products in our four warehouses**, you can rely on **Ham Radio Express** to have the parts you need, in stock, especially those special, hard-to-find parts, fixed station antennas, baluns, mobile antennas, mobile antenna mounts, accessories, and RF connectors. **Custom Built Cable Assemblies** for your Packet TNC/KPC to radio interface devices. We stock interface cables for all amateur radio makes and models: AEA, Kantronics, MFJ, PacComm, and more Packet Controllers. All cables are in stock or can be built in one day. All cable assemblies are double-checked before they are shipped. Toll-Free Order Lines: M–F 9 AM to 4 PM: **1-800-726-2919** or **1-866-300-1969**; Fax **1-434-525-4919**. **Help and Tech Support:** *Not sure what model you need?* At **www.HamRadioExpress.com** our Technical Support staff (1-434-509-0617, 9 AM to 4 PM weekdays) can help you decide what you need, and all available for same-day shipment. On-line visit: **www.HamRadioExpress.com**

QSLs FOR DX STATIONS: Our new "International Division" was established to handle QSL needs of DX hams. We understand the problems of packaging, shipping, and dealing with the customs problems. You can trust us to deliver a quality QSL, usually much cheaper than you can find locally. Write, call, or FAX for free samples and ordering information. "The QSL Man—W4MPY," 682 Mount Pleasant Road, Monetta, SC 29105 USA. Phone or FAX 803-685-7117.

"QRZ DX"—since 1979: Available as an **Adobe PDF file** each Wednesday or by regular mail. Your best source for weekly DX information. Send #10 SASE for sample/rates. **"The DX Magazine"—since 1989:** Bimonthly – Full of DXpedition reports, QSL Information, Awards, DX news, technical articles, and more. Send $3.00 for sample/rates. DX Publishing, Inc., P.O. Box DX, Leicester, NC 28748-0249. Phone/Fax: 828-683-0709; e-mail: <DX@dxpub.com>; WEB PAGE: <http://www.dxpub.com>.

$400 WEEKLY ASSEMBLING Electronic circuit boards/products from home. For free information send SASE: Home Assembly – AR, P.O. Box 450, New Britain, CT 06050-0450.

CERTIFICATE for proven contacts with all ten American districts. SASE to W6DDB, 45527 Third Street East, Lancaster, CA 93535-1802.

MAUI, HAWAII: vacation with a ham. Since 1990. <www.seaqmaui.com>, telephone 808-572-7914, or <kh6sq@seaqmaui.com>.

ALUMINUM CHASSIS AND CABINET KITS, UHF-VHF Antenna Parts, Catalog. E-mail: <k3iwk@flash.net> or <http://www.flash.net/~k3iwk>.

REAL HAMS DO CODE: Move up to CW with **CW Mental Block Buster III.** Succeed with hypnosis and NLP. Includes two (2) CDs and Manual. Only $29.95 plus $5.00 s/h US. FL add $2.14 tax. Success Easy, 160 West Camino Real #128, Boca Raton, FL 33432, 800-425-2552, <www.success-is-easy.com>.

NEAT STUFF! DWM Communications— <http://qth.com/dwm>

QSLing SUPPLIES. e-mail: <plumdx@msn.com>.

WWW.PEIDXLODGE.COM

WANTED: HAM EQUIPMENT AND RELATED ITEMS. Donate your excess gear—new, old, in any condition—to the Radio Club of Junior High School 22, the Nation's only full time non-profit organization working to get Ham Radio into schools around the country as a teaching tool using our EDUCOM—Education Thru Communication—program. Send your radio to school. Your donated material will be picked up ANYWHERE or shipping arranged, and this means a tax deduction to the full extent of the law for you as we are an IRS 501(c)(3) charity in our 30th year of service. It is always easier to donate and usually more financially rewarding, BUT MOST IMPORTANT your gift will mean a whole new world of educational opportunity for children nationwide. Radios you can write off; kids you can't. Make 2010 the year to help a child and yourself. Write, phone, or FAX the WB2JKJ "22 Crew" today: The RC of JHS 22, P.O. Box 1052, New York, NY 10002. Twenty-four hours call 516-674-4072; fax 516-674-9600; or e-mail <crew@wb2jkj. org>. Join us on the WB2JKJ Classroom Net, 7.238 MHz, 1200–1330 UTC daily and 21.395 MHz from 1400 to 2000 UTC.

IMRA-International Mission Radio Assn. helps missioners—equipment loaned; weekday net, 14.280 MHz, 1:00–3:00 PM Eastern. Sr. Noreen Perelli, KE2LT, 2755 Woodhull Ave., Bronx, NY 10469.

CASH FOR COLLINS, HALLICRAFTERS SX-88, & DRAKE TR-6. Buy any Collins equipment. Leo, KJ6HI, phone/fax 310-670-6969, e-mail: <radioleo@earthlink.net>.

"World of Keys – Keys III" features highly detailed views and photos of keys, bugs, and paddles like few people have ever seen! I's available on CD ($16) or as a full-size book ($18). Also still available, **"Keys II"** ($16) and **"QRP Romps!"** ($18), plus **"Your Guide to HF Fun"** ($16). Available from dealers nationwide.

PACKET RADIO AND MORE! Join TAPR, connect with the largest amateur radio digital group in the U.S. Creators of the TNC-2 standard, working on Software Defined Radio technology. Benefits: newsletter, software, discounts on kits and publications. For membership prices see the TAPR website: <http://www.tapr.org>).

FOR SALE: CQ/Ham Radio/QST/73 magazines and binders. SASE brings data sheet. W6DDB, 45527 Third Street East, Lancaster, CA 93535-1802.

WANTED: VACUUM TUBES – Commercial, industrial, amateur. Radio Daze, LLC, 7620 Omnitech Place, Victor, NY 14506 USA (phone 585-742-2020; fax 800-456-6494; e-mail: <info@radiodaze.com>).

RFI Filters <www.RFchoke.com>

NEAT STUFF! DWM Communications—<http://qth.com/dwm>

HAWAII HAM STATION RENTAL: Beautiful Big Island location. Brochure: <KD4ML@juno.com>.

CALL-MASTER CALLSIGN DATABASE $25.00 SHIPPED. Complete US/VE/DX listings. Use with our Prolog2K Logger or stand-alone. Secure order on our website at <www.prolog2k.com> or call toll free 1-800-373-6564. DataMatrix

MicroLog by WAØH
Free download . . . www.wa0h.com

OVERSEAS AIRMAIL POSTAGE plus complete line of airmail envelopes. Order directly from our web site – James E. Mackey, proprietor. www.net1plus.com/users/ryoung/index.htm

DXPEDITION DVD VIDEOS: For full description and how to order . . . <www.k4uee.com/dvd/>.

LOOKING GREAT on the wall behind your equipment. <www.hamradioprints.com>

SMART BATTERY CHARGERS: 5A model for larger deep cycle down to 1/4A model for smaller QRP lead acid batteries. <www.a-aengineering.com>

***Budget*Bertha ROTATING TOWERS**. No guy wires, Entire pole rotates, Ground level rotor, Small yard footprint, Perfect for stacking all your antennas on one tower. **NEW LOW PRICES:** 36ft = $9,997. 54ft = $11,997. 72ft = $14,997. 90ft = $18,997. Contact Scott, W3TX, at SuperBertha.com, 814-881-9258, or scottw3tx@verizon.net for free catalog by e-mail.

HAWAII DX VACATION: SteppIR antennas, amplifiers. KH6RC, <www.leilanibedandbreakfast.com>.

***OWA* OPTIMIZED WIDEBAND MONOBAND YAGIS:** Sustained optimal high gain, high F/B, clean pattern, and low SWR across entire SSB, CW, RTTY, and DIGITAL passbands. Medium-boom length models 24ft to 36ft. Long-boom models 48ft to 65 ft. Contact Scott, W3TX, at SuperBertha.com, 814-881-9258, or scottw3tx@verizon.net for free catalog by e-mail.

TOWER ACCESSORIES Gin Pole Kits – stand off brackets – antenna mounts – vehicle radio mounts – for 30 years. IIX Equipment Ltd., 708-337-8172, <http://www.w9iix.com/>.

<http://www.vintagehamshack.com>

HY POWER ANTENNA COMPANY <http://www.freewebs.com/hypower> Multiband dipoles, delta loops, half squares and QRP antennas.

WWW.KM5KG.COM

HAM TRAVELERS Discount travel, tours, cruises, more. **www.GreatExpectationTravel.com**

www.SecondHandRadio.com Advertise your used radios and surplus electronics **FREE.** Upload up to 16 photos per ad **FREE.** No commissions, no fees. Dealers are welcome.

PROMOTIONAL VIDEO: 22-minute DVD showcases ham radio. Details: <www.neoham.org>.

ENIGMA GERMAN CIPHER MACHINES WANTED: Museum buying. Information and Repairs available: <http://w1tp.com/enigma>.

WANTED: OLD QSL CARD COLLECTIONS. Collector seeks US & DX cards. W2VRK, 9 Laird Terrace, Somerset, NJ 08873; e-mail: <tpllrs@comcast.net>.

TELEGRAPH KEY INFORMATION AND HISTORY MUSEUM: <http://w1tp.com>

DISPLAY YOUR CALL SIGN IN NEON. To order call toll free 1-866-287-9174, Duncan DeSigns

ARUBA RADIO RENTAL: www.p49v.com

HOMEBREW! "Recollections of a Radio Receiver" a 565 page book on HBR homebrew receivers. $10 delivered (eBook on CD-ROM). Details <www.w6hht.com>

HONDURAS DX VACATION: K3, Alpha 86, SteppIR, Meals, Private Facilities. HR2J, (206) 259-9688.

AMATEUR RADIO OPERATOR NEEDS HELP: <www.KG4TRT.com>

HAM RADIO GIFTS: <www.mainestore.com>

WANTED: Ten-Tec Century 21 Transceiver, analog or digital. Paul, WBØMPG, 538 North Walnut, Wichita, KS 67203; phone 316-265-3885.

www.oldqslcards.com

advertisers' index

including website addresses

10-10 International Net, Inc.	113	www.10-10.org
A & A Engineering	111	www.a-aengineering.com
Advanced Specialties Inc.	26	www.advancedspecialties.net
Alpha Delta Communications, Inc.	79	www.alphadeltacom.com
Ameritron	71	www.ameritron.com
Amidon Associates	73	www.amidoncorp.com
Array Solutions	11	www.arraysolutions.com
BATTERIES AMERICA/Mr. Nicd.	115	www.batteriesamerica.com
Bilal Co./Isotron Antennas	113	www.isotronantennas.com
Boxboro Hamfest	77	www.boxboro.org
Buddipole Antennas	39	www.buddipole.com
Butternut Antenna	57	www.bencher.com
C.A.T.S.	93	www.rotor-parts.com
CQ Bookshop	65	www.cq-amateur-radio.com
Cable X-PERTS, Inc.	81	www.cablexperts.com
Champion Radio Products	113	www.championradio.com
CheapHam.com	47	www.CheapHam.com
Command Productions	37	www.LicenseTraining.com
Communication Concepts, Inc	21	www.communication-concepts.com
Cubex	103	www.cubex.com
Cutting Edge Enterprises	26	www.powerportstore.com
DX Store	91	www.dxstore.com
DZ Company	63	www.dzkit.com
Depiction, Inc.	97	www.depiction.com
Diamond Antenna	53	www.diamondantenna.net
Dishtronix, Inc.	26	www.dishtronix.com
Elecraft	51	www.elecraft.com
Electric Radio Magazine	93	www.ermag.com
Electronic Products Design, Inc.	74	www.epd-inc.com
FlexRadio Systems	5	www.flex-radio.com
Force 12, Inc.	93	www.force12inc.com
Green Heron Engineering LLC	101	www.greenheronengineering.com
Ham4Less.com	87	www.ham4less.com
Ham Radio Outlet	12,116	www.hamradio.com
HamTestOnline	21	www.hamtestonline.com
Huntsville Hamfest	43	www.hamfest.org
Hy-Gain	1,9	www.hy-gain.com
ICOM America, Inc	27,29,107,Cov IV	www.icomamerica.com
KJI Electronics, Inc.	103	www.kjielectronics.com
Kanga US	103	www.kangaus.com

our readers say

Radios from China

Editor, *CQ*:

On page 20 of the February 2010 issue of *CQ* magazine there is a brief "editorial" on importing radios from China. Unfortunately, much of the information contained therein is wrong!

First of all, there is *no* certification of amateur radio equipment required *except* for external RF amplifiers that are commercially produced and that are for operation below 144 MHz. This per 47 CFR Part 97 Section 97.317. There is 47 CFR Part 15 notification (not certification) required for commercially manufactured receivers that operate between 30 MHz and 960 MHz of the type used in amateur radio equipment. This "notification" is a *very* simple process. Any unit which has received certification for 47 CFR Part 90 use definitely has met the 47 CFR Part 15 "notification" requirements. This per 47 CFR Part 15 Section 15.101(a) and Section 15.101(b).

It is *perfectly* legal for amateur radio operators to modify equipment designed for other services to use on amateur radio frequencies, as well as it is legal for amateur radio operators to construct their own equipment. The only restriction is that the individual amateur radio operator is responsible for the equipment meeting the technical specifications of 47 CFR Part 97 Section 97.307(a), 97.307(b), 97.307(c), 97.307(d), and 97.307(e). The individual amateur radio operator *is* responsible for spurious emissions even from commercially manufactured equipment designed for the amateur radio market. The manufacturer is *not* responsible if the equipment does not meet these technical requirements. It would be "nice" if the manufacturer was responsible. However, under present FCC regulations all the responsibility *is* put on the individual amateur radio operator and *not* the manufacturer except in the case of external RF amplifiers capable of operation below 144 MHz.

Also, there are provisions in 47 CFR for an individual to "import" up to 5 examples of a particular "device" for "personal use" even if the 47 CFR Part 15 "notification" and "certification" requirements have not been met. However, it is illegal to transmit using such units on frequencies where certificated (new "buzz word" for "type accepted") equipment is required. But, there are no certification requirements for amateur radio equipment except for the aforementioned external RF amplifiers and therefore, under current regulations, it is *perfectly* legal for an amateur radio operator to obtain and use this type of equipment on amateur radio frequencies *only*. It is *not* legal to use any non-certificated unit on any 47 CFR part 90, 47 CFR Part 95, or other Radio Services where certificated radios are required.

The idea of "certification" of amateur radio units is, unfortunately, misunderstood by a lot of amateur radio operators today. Those persons are familiar with the fact that certificated units ARE required for operation on the 47 CFR Part 95 Subpart D ("CB") radio services and therefore "assume" that such certification is required for amateur radio equipment. However, again with the exception of commercially manufactured external RF amplifiers capable of operating below 144 MHz there are *no* certification requirements for any amateur radio transmitting equipment. Commercially manufactured receivers capable of operating between 30 MHz and 960 MHz have a "notification" requirement which is considerably different from "certification."

Glen E. Zook, K9STH

W2VU replies: Thank you for this information, Glen. We were not suggesting that it is illegal to import, sell or use amateur gear that has not received FCC certification. What we were suggesting was that old Latin precaution, *caveat emptor*—buyer beware. If a commercially manufactured radio has not received either FCC or EU certification, you have no guarantee that it will meet even basic non-interference rules (which are your responsibility as a user), and that generally speaking, you get what you pay for. We'll stick with our basic advice regarding these "red radios"—*caveat emptor.*

April Fool or Not?

The following letters were directed to "Magic in the Sky" columnist Jeff Reinhardt, AA6JR.

Dear Jeff,

With great admiration and interest I read your article in the April 2010 issue of *CQ* magazine. As you very well pointed out, it is the spirit of ingenuity and the willingness to fail and try again that made many of the entrepreneurs of science and ham radio of our past and present successful.

I co-own a USDA certified laboratory with my friend John, and the same spirit that I put into ham radio, I also put into my business. I am a microbiologist and chemist and John is a chemical engineer. John is not a ham, but together we have our junk boxes full of stuff and more electronic parts that I want to tell you about. We get together and make things work.

With the spirit of try, fail, learn, and try again, we have built a facility that is not only fun to work in but also supports both of our households. My education along with my experiences with ham radio taught me how to "invent stuff" and make things work, and for this and for both avocations, I am forever grateful. I have a six-year-old little boy who sits at the station and works the contacts with me, and I will pass all that I know and the spirit of ingenuity on to him. He doesn't have a callsign yet but I am sure he will.

Best regards and thanks much for a great article and continuing inspiration.

Pete Golz, KR4TI

Dear Jeff,

I really enjoyed your *CQ* article. There is one error, though. My father invented the TV remote in 1955, powered the same way as your dad's invention. (*Jeff claimed that* his *father invented the TV remote in 1956 ... "Jeff, go change the TV to Channel 2!"*) I am looking forward to your next article.

Jim Hester, K5HTK

A Nice Resource

Editor, *CQ*:

Tucked away in the 2009 CQ WW RTTY DX Contest article in the May 2010 issue is referenced the ability to request a copy of our individual Log Check Report (LCR). Hmm ... a contest "after action report" or a "report card"? I jumped at the chance to see how I did, so I sent off a request to Ed Muns, WØYK. He sent me the report right away.

WOW! This is cool. It really gave me a breakdown of how I actually did in the contest. My overall goal each contest is accuracy and number of QSOs. In fact, I had a busted call, off by one letter. I corrected the call in my master logbook, re-uploaded it to LoTW and BAM! Got the QSL that I never would have had confirmed if I had not checked this report. You can bet I will want a copy of this after each contest. The LCR is nice resource.

David Jackson, NK5G

Looking Ahead in CQ:

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

- SSB Results, 2009 CQ WW DX Contest
- Hot Stuff at Hamvention®
- Contesting from Zone 2

Do you have a ham radio story to tell? See our writers' guidelines on the CQ website at <http://www.cq-amateur-radio.com/guide.html>

advertiser's index

including website addresses

Kenwood U.S.A. Corporation..	Cov. II	www.kenwoodusa.com
LDG Electronics, Inc.	58,59	www.ldgelectronics.com
M² Antenna Systems, Inc.	31	www.m2inc.com
MFJ Enterprises, Inc.	45,61	www.mfjenterprises.com
National RF, Inc.	113	www.NationalRF.com
Nemal Electronics International, Inc.	87	www.nemal.com
Penny's Stitch n' Print	87	www.pennystitch.com
PowerPort	26	www.powerportstore.com
QCWA	63	www.qcwa.org
QRO Technologies, Inc.	101	www.qrotec.com
QSLs by W4MPY	26	www.qslman.com
R & L Electronics	49	http://randl.com
R.F. Connection	101	www.therfc.com
RF Parts Company	33	www.rfparts.com
RSGB Books	83	www.cq-amateur-radio.com
Radio Club of J.H.S. 22	89	www.wb2jkj.org
Radio Works	39	www.radioworks.com
Reflections III	80	www.cq-amateur-radio.com
Rig Expert Canada	103	www.rigexpert.net
Shelby Amateur Radio, Inc.	69	www.shelbyhamfest.com
SteppIR Antennas Inc.	23	www.steppir.com
TG Electronics	21	www.tgelectronics.org
Ted Cohen, N4XX	103	www.AuthorHouse.com
TEN-TEC, Inc.	15	www.tentec.com
Ten-Ten International Net, Inc.	113	www.ten-ten.org
TENNADYNE, L.L.C.	103	www.tennadyne.com
Texas Towers	55	www.texastowers.com
The Xtal Set Society	113	www.midnightscience.com
Timewave Technology Inc.	17	www.timewave.com
TOKYO HY-POWER LABS, INC.–USA	3	www.tokyohypower.com
Universal Radio, Inc.	19	www.universal-radio.com
Vibroplex	47	www.vibroplex.com
W2IHY Technologies	99	www.w2ihy.com
W4RT Electronics	67	www.w4rt.com
West Mountain Radio	35	www.westmountainradio.com
Yaesu	6,7,Cov III	www.vxstdusa.com

It's easy to advertise in CQ. Let me know what I can do to help.
Don Allen, W9CW
(217) 344-4570 or FAX (217) 344-4575
e-mail:ads@cq-amateur-radio.com
Please direct editorial and subscription questions to (516) 681-2922

12 STORE BUYING POWER

HAM RADIO OUTLET

WORLDWIDE DISTRIBUTION

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

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

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

SAN DIEGO, CA
5375 Kearny Villa Rd., 92123
(858) 560-4900
(877) 520-9623
Jose, XE2SJB, Mgr.
Hwy. 163 & Claremont Mesa
sandiego@hamradio.com

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

NEW CASTLE, DE
(Near Philadelphia)
1509 N. Dupont Hwy., 19720
(302) 322-7092
(800) 644-4476
Chuck, N1UC, Mgr.
RT.13 1/4 mi., So. I-295
newcastle@hamradio.com

PORTLAND, OR
11705 S.W. Pacific Hwy.
97223
(503) 598-0555
(800) 765-4267
Leon, W7AD, Mgr.
Tigard-99W exit
from Hwy. 5 & 217
portland@hamradio.com

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

NEW LOCATION!

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

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

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

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

Summer Specials From Yaesu

Coupons shown expire 8/31/10

YAESU

FTM-350R 2m/440 Dualband

NEW!

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

FT-897D VHF/UHF/HF Transceiver

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

Call Now For Our Low Pricing!

FT-950 HF + 6M TCVR

- 100W HF/6M
- Auto Tuner built-in
- 3 roofing filters built-in
- DMU-2000 Compatible

NEW!

Call Now For Low Pricing!

FT-8800R 2M/440 Mobile

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

Call Now For Low Pricing!

FTDX5000MP 200w HF + 6M Transceiver

- Station Monitor SM-5000 Included
- 0.05ppm OCXO included
- 300 Hz Roofing filter included
- 600 Hz Roofing filter included

NEW!

VX-7R/VX-7R Black

50/2M/220/440 HT

- Wideband RX - 900 Memories
- 5W TX (300mw 220Mhz)
- Li-Ion Battery
- Fully Submersible to 3 ft.
- Built-in CTCSS/DCS
- Internet WIRES compatible

Now available in Black!

VX-6R

2M/220/440HT

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

NEW Low Price!

VX-8DR/VX-8GR

50/144/220/440 (VX-8DR)
2m/440 w/ Built-in GPS (VX-8GR)

- 5w (1w 222 Mhz VX-8R/DR only)
- Bluetooth optional (VX-8DR only)
- waterproof/submersible 3 ft 30 mins
- GPS/APRS operation optional
- Li-ion Hi-capacity battery
- wide band Rx

FT-857D

Ultra compact HF, VHF, UHF

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

Call for Low Price!

FT-7900R 2M/440 Mobile

- 50w 2m, 45w on 440mHz
- Weather Alert
- 1000+ Mems
- WIRES Capability
- Wideband Receiver (Cell Blocked)

FREE
YSK-7800

Call Now For Your Low Price!

FT-2000/FT2000D HF + 6M tcvr

- 100 W w/ auto tuner • built-in Power supply
- DSP filters / Voice memory recorder
- 200W (FT-2000D)
- 3 Band Parametric Mic EQ • 3 IF roofing filters

Call For Low Pricing!

FT-450AT HF + 6M TCVR

- 100W HF/6M • Auto Tuner built-in • DSP Built-in
- 500 Memories • DNR, IF Notch, IF Shift

Call Now For Special Pricing

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

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

#1 In Customer Service

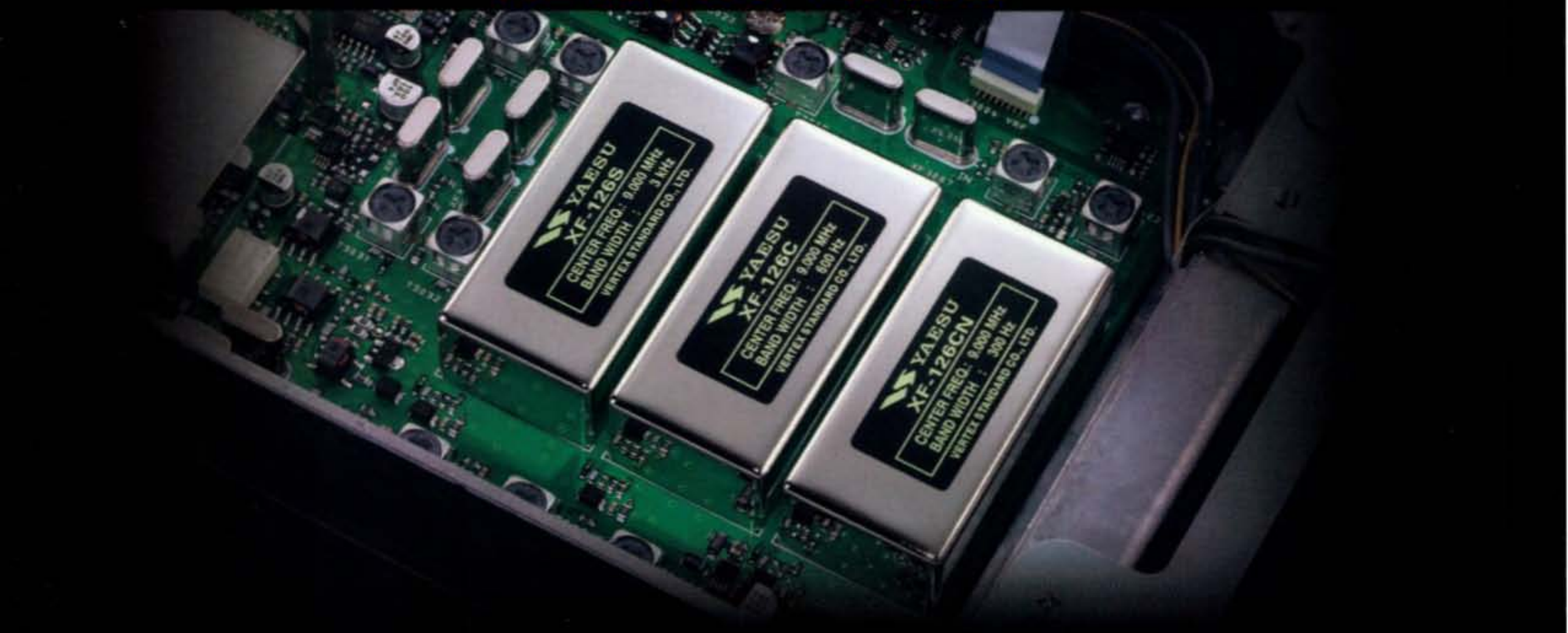
COAST TO COAST FREE SHIPPING
UPS - Most Items Over $100
Rapid Deliveries From The Store Nearest To You!

The New Premium HF/50 MHz Transceiver

FT DX 5000 Series

The Dawn of a New Era - Dynamic Range

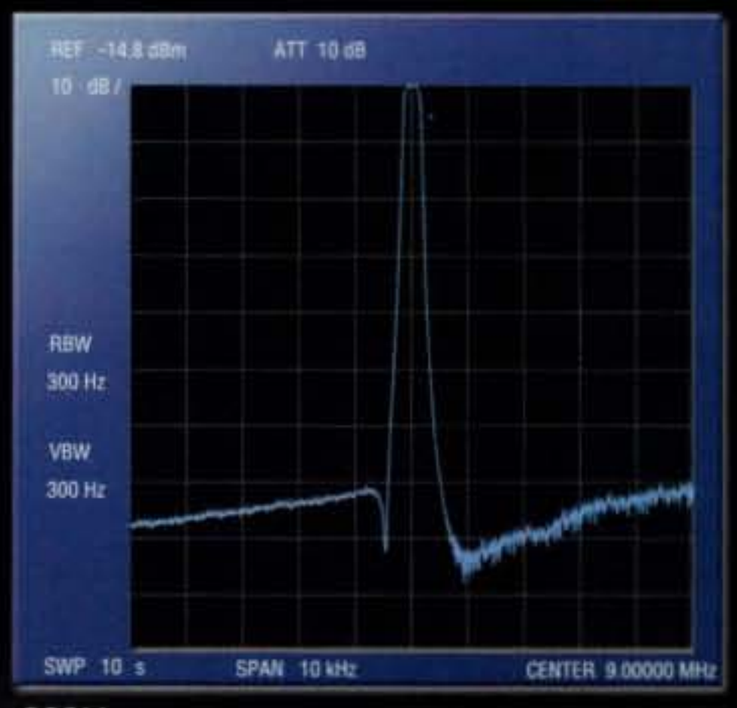
112 dB / IP3 +40 dBm



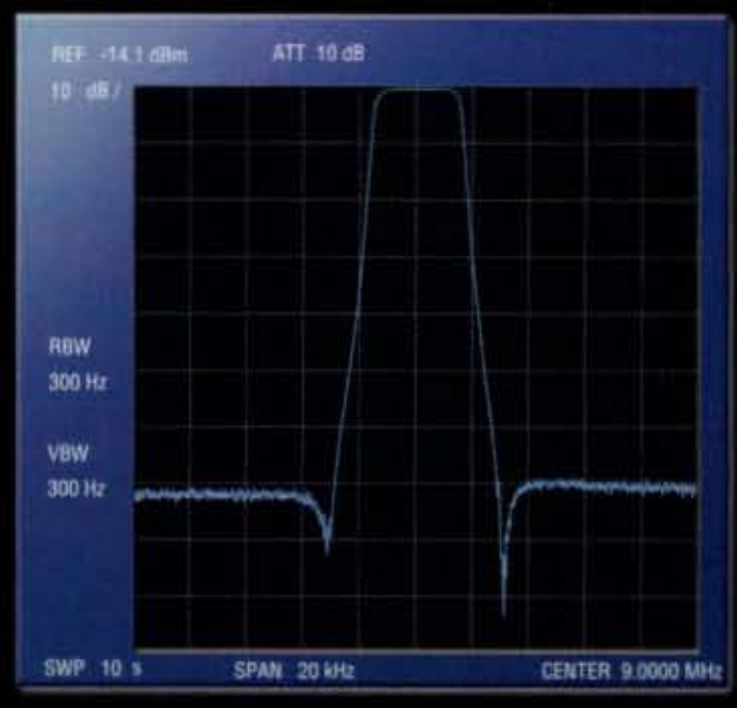
Super sharp "Roofing" filters for VFO-A/Main Receiver to give you the best performance and flexibility

Newly designed sharp "Roofing" filters for VFO-A/Main Receiver, selectable between 300 Hz, (optional/included in MP), 600 Hz, 3 kHz (6-pole crystal filter), 6 kHz, 15 kHz (4-pole MCF).

Roofing Filter Performance



300Hz



3kHz

NEW

Photograpy shows FT DX 5000MP

HF/50 MHz 200 W Transceiver
FT DX 5000MP

- Station Monitor SM-5000 included
- ±0.05ppm OCXO included
- 300 Hz Roofing Filter included
- 600 Hz Roofing Filter included
- 3 kHz Roofing Filter included

HF/50 MHz 200 W Transceiver
FT DX 5000D

- Station Monitor SM-5000 included
- ±0.5ppm TCXO included
- 600 Hz Roofing Filter included
- 3 kHz Roofing Filter included

HF/50 MHz 200 W Transceiver
FT DX 5000

- Station Monitor SM-5000 optional
- ±0.5ppm TCXO included
- 600 Hz Roofing Filter included
- 3 kHz Roofing Filter included

For the latest Yaesu news, visit us on the internet:
http://www.vertexstandard.com

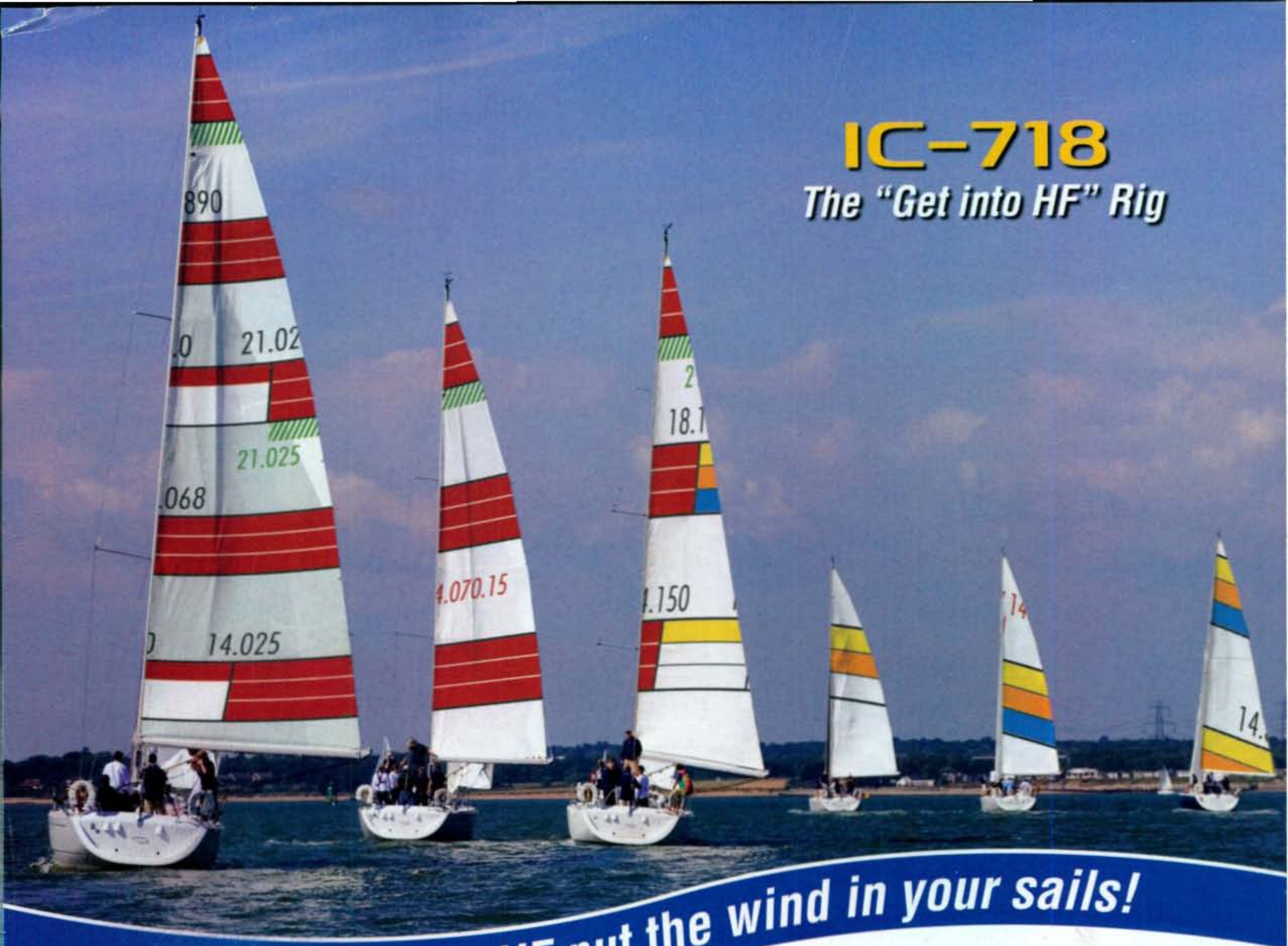
Specifications subject to change without notice. Some accessories and/or options may be standard in certain areas. Frequency coverage may differ in some countries. Check with your local Yaesu Dealer for specific details.

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

Vertex Standard US Headquarters
10900 Walker Street Cypress, CA 90630 (714) 827-7600

IC-718

The "Get into HF" Rig



Let amateur HF put the wind in your sails!

Straightforward operation, user friendly features, and low, low price make this one rig you can grow with.

160-10M Coverage* • 100W Output Power (40W on AM) RX Coverage 0.03 - 30MHz • 101 Memories Multiple Scanning Functions • Front Mounted Speaker • IF Shift • Mic • Compressor • RF Gain Control • Noise Blanker • RF Attenuator & PreAmp Auto Notch Filter • Electronic Keyer • VOX • Digital S/RF Meter • Flexible Filter Selection • Optional DSP Optional Voice Synthesizer • *And much more!*

Many sailors enjoy amateur radio while at sea. However, the amateur hobby bands are not a substitute for a marine SSB set, and the 718 is not FCC approved as a marine SSB. If you are looking for a genuine marine SSB, please visit an authorized Icom marine dealer or visit www.icomamerica.com/marine

See "It's Time to Take to the Water" article in July 2009 QST.

AH-4
antenna tuner

Optional. Tunes 160m-10m. Weatherproof, so it's great for car to boat to RV. Simple and easy, works with many different HF rigs.

Proud Sponsor

Free literature: 425.450.6088
www.icomamerica.com

*Frequency specs may vary. Refer to owner's manual for exact frequency specs.

ICOM®