



# QST

Official Journal of  
**ARRL**  
The national association  
for AMATEUR RADIO

April 2000

devoted entirely to

## AMATEUR RADIO

### QST reviews

- **Multimode communication processors**
- **HTX-10 10-meter transceiver**

**An amateur satellite primer**

The **W3RW**  
long wire  
for 6 and  
10 meters

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images from  
OSCAR 36!**

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# ICOM IC-756PRO

This is not your father's HF rig.  
This is all new, 32-bit DSP digital processing.

## THE GREATEST THING TO HIT HF SINCE...

The new IC-756PRO sets a new standard in ham radio design and construction. At the heart of the 'PRO' is a new, 32-bit floating point DSP. Older 16-bit fixed point DSP units limited the performance of earlier rigs. Not on the 'PRO.

## THE DX ADVANTAGE YOU'VE ALWAYS WANTED

The 144 dB dynamic range of 32-bit floating point technology blows away the limitations of older 16-bit technology. If your ear had that range, you could still hear a whisper while standing next to a



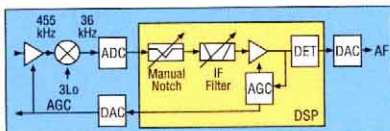
jet engine. With the 'PRO, you may not get the full theoretical performance, but you will get amazingly clear, crisp reception and almost no background noise.

## YOU'LL NEVER BUY ANOTHER FILTER

The IC-756PRO features 41 built-in, front panel selectable levels of DSP filtering. No additional filters or high stability crystal oscillators are available or needed. Our filters are the sharpest—more selective than any crystal or mechanical filters. The selectivity lets you pull out weak signals like never before.

## CD VS VINYL

The 'PRO's audio quality is revolutionary. You've got to hear it to believe it.



DSP IN THE IF, BEFORE THE AGC. Dual loop digital AGC eliminates strong signal pumping.



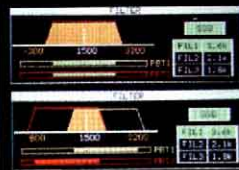
Customize the screen's look by changing colors, fonts, brightness, contrast, and more.

Keep tabs on memory channels with an alphanumeric readout of mode, frequency, filters & more.



A digital voice recorder has 4 slots for RX and 4 for TX, each 15 seconds long—a contesting bonus!

Copy RTTY DX without firing up your computer. A dual auto peak filter makes it easy.



Visual indicators of filter selection let you tweak the band pass. Choose from 31 steps of 100Hz between 3600–600Hz and 10 steps of 50Hz between 500–50Hz.

If the AGC is too fast or too slow, make it "just right" with a quick settings change. Use different settings for different modes.



**EASY TO USE, EASY ON THE EYES.** The IC-756PRO's front panel is well laid out and easy to control. The TFT LCD display is easy to see from wide angles, day or night. This handsome rig will great in any home or shack.

## SPECS & FEATURES

Subject to change without notice or obligation

Transmit: ..... All Amateur HF, 6 Meters

Receive: ..... 0.03 – 60 MHz

Mode: ..... USB, LSB, CW, RTTY, AM, FM

Power: ..... 5–100W (5–40W AM)

Power Supply Requirement: ..... 13.8VDC, 23A

Memory Channels: ..... 101 Total

Size & Weight : ... 13.4(W) x 4.4(H) x 11.2(D) in.  
340(W) x 111(H) x 285(D) mm., 21 lb / 9.6 kg

### • 5" TFT Color LCD

- Wide viewing angle, more information
- Adjustable colors and settings

### • 32 Bit Floating Point DSP Processor

- Digital AGC loop operation
- Digital IF filter, 41 selectable bandwidths
- Built-in RTTY demodulator / dual peak APF
- Built-in microphone equalizer
- Manual notch function

### • 8 Channel Digital Voice Memory

### • Digital Twin Pass Band Tuning

### • Built-In Auto Antenna Tuner

### • Dual Watch • VOX

### • Triple Band Stacking Register

### • Built-In Memory / Electronic Keyer

### • Independent RIT / ΔXT Control

### • 2 TX/RX, 1 RX Only Antenna Connectors

### • 100% Duty Cycle

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- **Meter functions (Output Power, ALC, VSWR)**
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- **Built-in keyer**
- **VOX**
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- **Optional DSP**



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## MH-C777 SMART UNIVERSAL CHARGER & CONDITIONER

- Rapid charge and rejuvenate almost any NiCD/NiMH battery packs for your two-way radio, camcorder, cellular, and notebook computer battery packs.
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## NEW IC-R75 HF RECEIVER

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Mail in offer for a free UT-106 DSP module. Limited time offers. See your dealer for details.

Hear **MORE** of what's out there. Pick up more amateur, marine and shortwave broadcasts. The new 'R75 covers from **0.03 – 60.0 MHz**\* – wider than most other HF receivers.

**Pull out the weak signals.** The IC-R75 sports a remarkable arsenal of signal detection weapons, ready for your command:

A **triple conversion** receive system rejects image and spurious signals. An **automatic notch filter** reduces interference by minimizing "beat" and "howl" signals. Use **Twin Passband Tuning (PBT)** to zero in on signals by shaping the IF passband. ICOM's all new **Synchronous AM detection (S-AM)** technology reduces signal

fading in AM broadcasts. Optional **Digital Signal Processing (DSP)** noise reduction in the AF stage converts analog SSB, AM and FM signals to crisp, clear audio output (you'll hear the difference on the 'R75's **large front mounted speaker**). Further tailor the 'R75 to meet your listening needs by installing **up to two optional filters**.

There's much more. Plan to test drive a surprisingly affordable new IC-R75 at your authorized ICOM dealer's showroom soon.

# ICOM brings you the BEST in wide band receivers

**SAVE \$50** **FREE CD**

Get a frequency database on CD ROM with each new IC-PCR1000. Limited time offers. See your dealer for details.



Computer not included.

### IC-PCR1000 The original "World in a Little Black Box".

100% PC hardware external. Impressive 0.01 – 1300 MHz\* wide band reception, all modes. Listen to your favorite broadcasts while working in foreground applications. Designed for Windows® 3.1 or 95.



"The PCR1000 has something to intrigue and satisfy everyone. This is a fun product." – QST, 7/98

**SAVE \$50** **FREE PC**

On the IC-R10. Also receive free PC software and connection cable. Limited time offers. See your dealer for details.

**IC-R10 (left) Advanced performance and features.** 0.5 – 1300 MHz\*; all mode; alphanumeric backlit display; attenuator; 7 different scan modes; beginner mode; 1000 memory channels; band scope; includes AA Ni-Cds and charger.

**IC-R2 (right) Excellent audio, tiny package.** 0.5 – 1300 MHz\*; AM, FM, WFM; easy band switching; CTCSS decode; 400 memory channels; large internal speaker; priority watch; auto power off; MIL SPEC 810 C/D/E (shock/vibration); weather resistant; includes 2 AA Ni-Cds and charger.



**IC-R8500** The expert's choice. 0.5 – 2000 MHz\*; commercial grade; all mode; IF shift; noise blanker; audio peak filter (APF); 1000 memory channels; built-in CI-V command control and RS-232C port for PC remote control with ICOM software for Windows®.

"If you want a receiver that is both a superior world band radio and a solid scanner, the new Icom IC-R8500 is the best choice."

– Passport to World Band Radio, 1998



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Computer not included.



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# CONTENTS

## Technical

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See page 10 for detailed contact information.

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- 33 A \$20 HF Mobile Antenna** *Frank W. King, KM4IE*  
This weekend project delivers a respectable "road radiator."
- 36 An Amateur Satellite Primer** *Steve Ford, WB8IMY*  
Learn the basics of amateur satellite operating.
- 42 Step Up to the 38,400 Bps Digital Satellites** *Stacey E. Mills, W4SM*  
If you think the 9600 bps digital satellites are hot, wait until you begin swapping files and downloading high-resolution images from OSCAR 36 at 38.4 kbps.
- 46 A Simple 6- and 10-Meter Long Wire** *Bob Witmer, W3RW*  
Boost your performance on 6 and 10 without expense of a beam and rotator.
- 58 Continuous PEP Metering the Easy Way** *Eldon Bryant, K7ZQR*  
Monitor your output up to 1.5 kW PEP with a couple of thermometers!
- 70 Product Review** *Joe Bottiglieri, AA1GW*  
This month we round up several popular multimode communication processors, test the new RadioShack HTX-10 10-meter transceiver, and explore the ICOM IC-T81A quad-band FM H-T.



## News and Features

- 9 "It Seems to Us...": Extra Value Meal**
- 15 DC Currents** *Steve Mansfield, N1MZA*  
Spectrum issues back on The Hill; more states introduce bills on "driving while cellular."
- 28 Bulgaria: Amateur Radio Friends and Fun** *George Pataki, WB2AQC*  
Meet the people behind the LZ call signs.
- 49 NE2Q's Antenna Fell From the Sky** *Jay Kolinsky, NE2Q*  
When you tell a ham to "go fly a kite," you never know what will happen.
- 53 How Hamvention Happens** *Rick Lindquist, N1RL*  
Get the behind-the-scenes scoop about the greatest ham show on Earth.
- 80 Happenings** *Rick Lindquist, N1RL*  
League readies certification program for rollout; flames claim Ham Radio Outlet's Anaheim store; setbacks alter plans for Amateur Radio's ISS debut; League officer elections set musical chairs in motion; ARRL asks FCC to deny Kenwood "Sky Command" petition; more...

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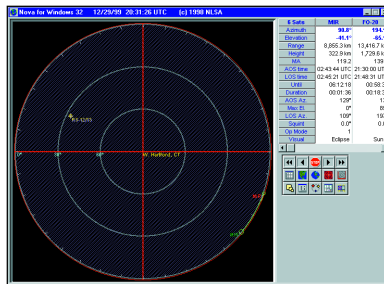


# QST Workbench

- 59 The Doctor is IN**  
CQ and IARU zones, calling for a taxi on the autopatch; more...
- 61 Add a Morse Readout to the AA4FB PIC SWR Meter** *Bert Kelley, AA4FB*  
An easy modification makes this popular meter ideal for the visually impaired.
- 62 Test Your Knowledge!** *H. Ward Silver, NOAX*  
Have a heapin' helpin' of ohm slaw!
- 63 A Tool for Winding Small Toroidal Cores** *Charlie Hansen, NOTT*  
This simple tool and technique takes the pain out of working with tiny torroids.
- 65 Short Takes** *Steve Ford, WB8IMY*  
*Nova for Windows 32*
- 66 The Help Desk**  
A QST Glossary
- 67 Short Takes II** *Steve Ford, WB8IMY*  
*Win95SSTV*
- 68 Hints & Kinks** *Bob Schetgen, KU7G*  
GE Master-II mods; prevent NiCd overcharging; an easy mobile mount; more...



53



65

## Operating

- 106 2000 IARU World Championship Rules** *Dan Henderson, N1ND*
- 108 Straight Key Night 2000** *Dan Henderson, N1ND*

## Departments

Amateur Radio World .....	102	QRP Power .....	93
Contest Corral .....	100	Section News .....	109
Coming Conventions .....	97	Silent Keys .....	104
Correspondence .....	24	Special Events .....	101
Exam Info .....	94	Strays .....	104, 107
Feedback .....	107	Technical Correspondence .....	78
Ham Ads.....	150	The World Above 50 MHz.....	90
Hamfest Calendar .....	98	Up Front in QST.....	19
How's DX? .....	88	VHF/UHF Century Club Awards .....	97
Index of Advertisers .....	174	W1AW Schedule .....	105
New Books .....	95, 107	We're at Your Service.....	10
New Products .....	99	YL News .....	103
Old Radio .....	96	75, 50 and 25 Years Ago.....	105
Public Service .....	86		



### Our Cover

This month we're treated to stunning images from the OSCAR 36 satellite. The background image is the Nile River with the Aswan dam clearly visible. Inset views (top to bottom): Las Vegas, the Grand Canyon and San Jose, California. All of these images were downloaded from OSCAR 36 with assistance from Chris Jackson, G7UPN, at Surrey Satellite Technology Ltd. See "Step Up to the 38,400 Bps Digital Satellites" by Stacey E. Mills, W4SM, in this issue.

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# ...Into the Light!

# ADI

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**Finally, a dual band handheld that is powerful, loaded with features, AND easy to use!**

Our ADI AT-600HP has a large dot matrix display, which *QST* magazine called "...the best we've seen in awhile," and a full-sized keypad, the largest keypad of any dual band HT on the market today. For night time operation, the AT-600HP features bright green back lighting on both the LCD display and the entire 16-digit DTMF keypad, making operation even in the darkest environments a snap. The AT-600 even programs intuitively. Even the reviewers at *QST* commented that they "were able to execute most basic functions without cracking the manual." ( **Source:** March '98 *QST* ) The AT-600HP is simply the most user friendly HT on the market today!

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## ADI AT-600HP

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## THE AMERICAN RADIO RELAY LEAGUE INC



The American Radio Relay League Inc is a noncommercial association of radio amateurs, organized for the promotion of interest in Amateur Radio communication and experimentation, for the establishment of networks to provide communication in the event of disasters or other emergencies, for the advancement of the radio art and of the public welfare, for the representation of the radio amateur in legislative matters, and for the maintenance of fraternalism and a high standard of conduct.

ARRL is an incorporated association without capital stock chartered under the laws of the State of Connecticut, and is an exempt organization under Section 501(c)(3) of the Internal Revenue Code of 1986. Its affairs are governed by a Board of Directors, whose voting members are elected every two years by the general membership. The officers are elected or appointed by the directors. The League is noncommercial, and no one who could gain financially from the shaping of its affairs is eligible for membership on its Board.

"Of, by, and for the radio amateur," the ARRL numbers within its ranks the vast majority of active amateurs in the nation and has a proud history of achievement as the standard-bearer in amateur affairs.

A *bona fide* interest in Amateur Radio is the only essential qualification of membership; an Amateur Radio license is not a prerequisite, although full voting membership is granted only to licensed amateurs in the US.

Membership inquiries and general correspondence should be addressed to the administrative headquarters; see page 10 for detailed contact information.

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## "IT SEEMS TO US..."

### Extra Value

Do you remember the last time you took an FCC exam?

I do—but just barely. The year was 1965. The Amateur Extra Class license carried no special privileges at the time, but a nerdy teenager could see the handwriting on the wall and it seemed like a good idea to get the Extra exam out of the way before the rush.

The written exam had 100 questions, including ten that required the applicant to draw diagrams. The Morse receiving exam required one minute of solid copy out of five at 20 words per minute. There was also a sending exam.

Some would have you believe that because I passed the Extra in 1965, that makes me a better ham than someone who did it later—or who will do it after April 15.

Nonsense.

Let's pretend that someone knew just enough to pass the Extra exam 35 years ago and hasn't learned anything since. Today they would know nothing about spread spectrum, packet radio, slow-scan television, or satellites. For that matter, they would know nothing about repeaters or semiconductors! They would recognize the schematic symbol for a vacuum-tube rectifier but not for a solid-state rectifier. They would not know the frequency limits for the amateur bands at 10, 18, 24, and 902 MHz; those bands did not exist until after 1979. Unlike any recently licensed Technician, they would know nothing about RF exposure limits.

"Oh, but in the 'good old days' the question pools weren't published, so there was no way to know what would be on the exam." Not exactly. Perhaps we should republish a '60s-vintage *ARRL License Manual* to put that particular misconception to rest. I don't remember everything that was on the 1965 Extra exam, but from looking at the 21 pages of Extra Class study material contained in the *License Manual* of the time—consisting of 240 sample questions with thumbnail explanations—I can tell you that both the first and the last sample questions were on it verbatim. Not only that, but the book gave the exact answer to each.

The point is *not* that yesteryear's Extra exam was easy. Unless you were an engineer, it wasn't. For example, there were questions about television and radar that were well beyond the scope of what most amateurs had any reason to know. There were questions about single sideband long before SSB was popular. The March 1952 *QST* editorial said the Extra Class exam was on a par with the first-class commercial, and no doubt it was. Still, it was possible to pass on the strength of a few hours' study and without an in-depth understanding of the subject matter.

The real point is twofold.

First, the fact that someone—I or anyone else—passed an FCC exam a long time ago says nothing about their ability today to fulfill the basis and purpose of Amateur Radio. Earning a license is not the end of the road. It's just the beginning. The measure of the ham is what one *does* with the license, be it Novice or Extra.

Second, today's exams are easily on a par

with yesterday's, as will be tomorrow's. Today's Advanced exam is at least as challenging as the old Extra written exam and is more difficult than the present one. After April 15, the new Extra—which will be drawn from a combined Advanced/Extra pool—will be a challenge worthy of anyone aspiring to the top rung on the licensing ladder. Yes, it will have "only" 50 questions, but they will be drawn from a pool that is broader in scope than any previous FCC amateur exam and the passing grade will be the same.

But if you pass, what then? Earning an Extra Class license in 1952, when it was first offered, did not mark the end of any worthwhile amateur's ascension of the learning curve. It didn't in 1965. It doesn't now, and it won't after April 15. We owe it to ourselves to extend our self-education beyond the licensing requirements of the moment, whatever they may be.

The ARRL already encourages continuing education in myriad ways. Our technical publications are the most obvious, but there are many others. We co-sponsor technical conferences. We support others by publishing their conference proceedings. We provide technical programs for conventions and hamfests. But we could do more, and soon we *will* do more.

In a report to the ARRL Board last July I identified a certification program to promote continuing education in Amateur Radio as one of the key initiatives the ARRL should undertake. "At the present time we rely on FCC licensing and the volunteer examination system to perform the function of encouraging radio amateurs to learn more than the bare minimum," the report said. "We would be selling ourselves short if we were to limit amateurs' continuing education merely to what one needs to know in order to pass the license tests. To do so is analogous to awarding a college diploma in recognition of good SAT scores."

The Board responded very positively to a follow-up report in January and established the ARRL Certification Program. The Board mandated that this is not to be a top-down, imposed-from-above program; members will have an opportunity to participate from the early design stages. The first step will be the creation of a Web-based message board where interested members can discuss the initial topics that should be included in the ARRL Certification Program. Prioritization of the topics, consideration of the standards to be required for ARRL certification and the development of appropriate means of measurement will follow.

The program is dedicated to the memory of Ethel M. Smith, K4LMB, whose bequest to the ARRL will provide the startup funding. For those who were fortunate enough to know Ethel, the dedication requires no explanation. For others, perhaps it will suffice to say that one of her last notes to me, sent just a few months before she succumbed after a long battle with cancer, was proudly signed "K4LMB/AE." She had earned her Extra—at age 79.—*David Sumner, K1ZZ*



# We're At Your Service

ARRL Headquarters is open from 8 AM to 5 PM Eastern Time, Monday through Friday, except holidays. Our address is: 225 Main St, Newington, CT 06111-1494. You can call us at 860-594-0200, or fax us at 860-594-0259.

If you have a question, try one of these Headquarters departments . . .

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You can send e-mail to any ARRL Headquarters employee if you know his or her name or call sign. The second half of every Headquarters e-mail address is @arrl.org. To create the first half, simply use the person's call sign. If you don't know their call sign, use the first letter of their first name, followed by their complete last name. For example, to send a message to John Hennessee, N1KB, Regulatory Information Specialist, you could address it to [jhennessee@arrl.org](mailto:jhennessee@arrl.org) or [N1KB@arrl.org](mailto:N1KB@arrl.org).

If all else fails, send e-mail to

[hq@arrl.org](mailto:hq@arrl.org) and it will be routed to the right people or departments.

### Technical Information Server

If you have Internet e-mail capability, you can tap into the ARRL Technical Information Server, otherwise known as the *Info Server*. To have user instructions and a handy index sent to you automatically, simply address an e-mail message to: [info@arrl.org](mailto:info@arrl.org)  
Subject: **Info Request**  
In the body of your message enter:

HELP  
SEND INDEX  
QUIT

### ARRL on the World Wide Web

You'll also find the ARRL on the World Wide Web at:

<http://www.arrl.org/>

At the ARRL Web page you'll find the latest W1AW bulletins, a hamfest calendar, exam schedules, an on-line ARRL Publications Catalog and much more. We're always adding new features to our Web page, so check it often!

### Members-Only Web Site

As an ARRL member you enjoy exclusive access to our Members-Only Web site. Just point your browser to <http://www.arrl.org/members/> and you'll open the door to benefits that you won't find anywhere else.

- Our on-line Web magazine, the *ARRL Web Extra* with colorful news and features you won't see in *QST*.
- *QST* Product Review Archive. Get copies of *QST* product reviews from 1980 to the present.
- *QST/QEX* searchable index (find that article you were looking for!)
- Previews of contest results and product reviews. See them here before they appear in *QST*!
- Access to your information in the ARRL membership database. Enter corrections or updates on line!

### Stopping by for a visit?

We offer tours of Headquarters and W1AW at 9, 10 and 11 AM, and at 1, 2 and 3 PM, Monday to Friday (except holidays). Special tour times may be arranged in advance. Bring your license and you can operate W1AW anytime between 10 AM and noon, and 1 to 3:45 PM!

### Would you like to write for QST?

We're always looking for new material

of interest to hams. Send a self-addressed, stamped envelope (55¢ postage) and ask for a copy of the *Author's Guide*. (It's also available via the ARRL Info Server, and via the World Wide Web at

<http://www.arrl.org/qst/aguide/>.) The guide contains all the information you'll need to craft an article to meet our requirements. Send article ideas or manuscripts to the attention of the *QST* Editor (e-mail [qst@arrl.org](mailto:qst@arrl.org)).

### Press Releases and New Products/Books

Send your press releases and new book announcements to the attention of the *QST* Editor (e-mail [qst@arrl.org](mailto:qst@arrl.org)). New product announcements should be sent to the Product Review Editor (e-mail [reviews@arrl.org](mailto:reviews@arrl.org)).

### Strays and Up Front

Send your Strays and Up Front materials to the *QST* Features Editor (e-mail [upfront@arrl.org](mailto:upfront@arrl.org)). Be sure to include your name, address and daytime telephone number.

### Interested in Becoming a Ham?

Just pick up the telephone and call toll free 1-800-326-3942, or send e-mail to [newham@arrl.org](mailto:newham@arrl.org). We'll provide helpful advice on obtaining your Amateur Radio license, and we'll be happy to send you our informative Prospective Ham Package.

### ARRL Audio News

The best way to keep up with fast-moving events in the ham community is to listen to the ARRL Audio News. It's as close as your telephone at 860-594-0384, or on the Web at <http://www.arrl.org/arrlletter/audio/>.

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# Get to Know Your Section Manager

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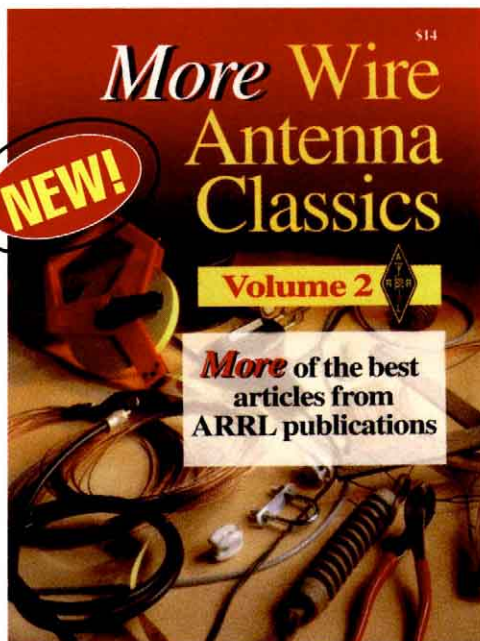
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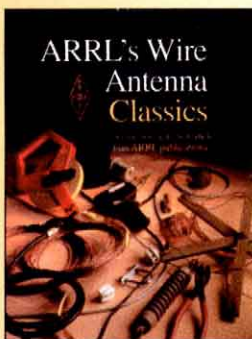
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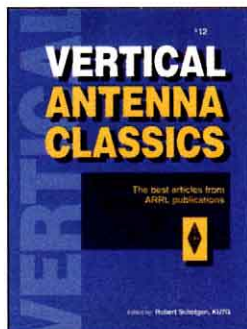
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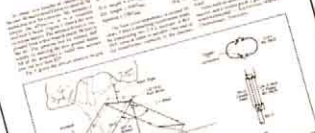
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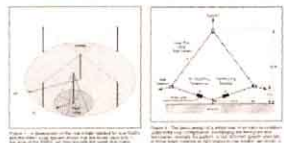


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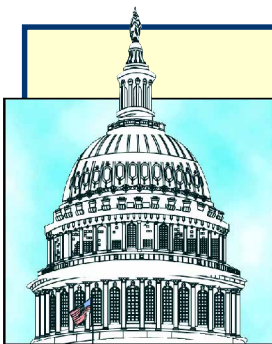
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QT 4/2000





# DC Currents



By Steve Mansfield, N1MZA  
Manager, Legislative and Public Affairs

Just as radio waves aren't constrained by artificial boundaries, neither is ARRL's government relations effort. "DC Currents" covers behind-the-scenes activity you need to know about in Congress, at the FCC and other regulatory agencies, as well as at worldwide bodies such as the International Telecommunication Union.

## Spectrum Issues Back on The Hill



The telecommunications "*issue du jour*" in Washington these days involves spectrum (again). This time it's how the FCC treats licenses coughed up by wireless companies that couldn't meet their auction payments, and what to do with an additional 60 MHz of spectrum now occupied by television channels 60-69 but slated to be reallocated to public safety, broadband access and next-generation wireless.

The wireless licenses are supposed to be re-auctioned, but the FCC, industry groups and some wireless service providers are quarreling over just how that ought to be done, and they've taken their case to Congress. At the center of the controversy are 95 licenses that were supposed to be owned by NextWave Telecom, which couldn't come up with the cash to complete its purchase at auction. The licenses were reserved for small companies with annual revenues of less than \$40 million. The debate now is over whether the licenses should be continue to be reserved for small companies, or should be opened up to the big players.

The channels 60-69 controversy involves whether or not to auction a six MHz "guard band" that was supposed to stand between 24 MHz of the reallocated TV frequencies and a 30 MHz block that was to be auctioned for a variety of commercial uses.

The FCC does seem to be sensitive to some of the public relations implications of using auctions to generate government revenues. At a recent Senate Budget Committee hearing on "Spectrum Budget Issues" FCC Chairman Kennard, responding to a question from Senator Gregg (R-NH) about who owned the spectrum, said, "Spectrum is a natural resource." (Just what the ARRL has been telling them for years!)

The spectrum flames on The Hill are also being fanned by the FCC's decision to go ahead in creating a new, low-power FM radio service that will consist of two classes of stations with maximum power levels of 10 W and 100 W. These stations would operate throughout the FM band. The new service will be exclusively noncommercial. The proposed new service is not popular with all members of Congress.

## HR.783 Cosponsor List Growing Again

◆ After the year-end layoff, Congress has returned to work and the cosponsor list is now beginning to grow again. Since last reported in the [January QST](#), 10 new House cosponsors have signed on. The new cosponsors are:

Jennifer Dunn (R-WA-8th)  
Asa Hutchinson (R-AR-3rd)  
Roscoe Bartlett (R-MD-6th)  
Robert Wise (D-WV-2nd)  
Jim DeMint (R-SC-4th)  
Joseph Crowley (D-NY-7th)  
Sue Kelly (R-NY-19th)  
James Moran (D-VA-8th)  
David Minge (D-FL-MN-2nd)  
Donald Manzullo (R-IL-16th)

We anticipate that the Senate companion bill will be in the hopper by the time you read this.

## Virginia Legislature Praises Hams For Emergency Work

Hams in Virginia received a well-deserved vote of appreciation from the State General Assembly for their hard work on behalf of the stranded residents of the city of Franklin following Hurricane Floyd last September. In a House Joint Resolution introduced by House members Joe T. May of Leesburg, William K Barlow of Smithfield, J. Paul Council of Franklin, and Senator John S. Edwards of Roanoke, the Assembly singled out the "147 Virginia ARES/RACES volunteers" who "worked more than 9,500 hours to help coordinate emergency operations in Franklin."

### HOUSE JOINT RESOLUTION NO. 81

Offered January 18, 2000

Commending the Amateur Radio Emergency Service (ARES) and the Radio Amateur Civil Emergency Service (RACES).

Patrons— May, Barlow and Council; Senator: Edwards

WHEREAS, on September 16, 1999, Hurricane Floyd totally isolated the City of Franklin, and rising flood waters forced city officials to abandon their Emergency Operations Center; and

WHEREAS, the flooding caused all electrical power and communications into and out of Franklin to be cut off; and

WHEREAS, amateur radio operators from across the Commonwealth, trained to respond to civil emergencies, volunteered their communication skills; and

WHEREAS, with traditional lines of communication inoperable, the amateur radio operators, members of the Amateur Radio Emergency Service (ARES) and the Radio Amateur Civil Emergency Service (RACES),

provided the only reliable communication throughout the flood-ravaged Franklin area; and

WHEREAS, in the widest geographical and longest-running ARES/RACES activation in Virginia's history, 147 Virginia ARES/RACES volunteers worked more than 9,500 hours to help coordinate emergency operations in Franklin; and

WHEREAS, ARES/RACES volunteers carried requests for emergency assistance, food, medicine, water, ice, sandbags, pumps, cots and all other supplies needed to sustain life and ease the suffering of Franklin residents; and

WHEREAS, amateur radio operators stayed in constant communication with local emergency management officials, firefighters, police officers, the National Guard, the State Police, the Virginia Forestry Department, and the National Weather Service; and

WHEREAS, due to the tireless efforts of these amateur radio volunteers, the tragic effects of Hurricane Floyd were mitigated, the lives of those in the flood zone safeguarded, and the suffering of Franklin's residents alleviated; now, therefore, be it

RESOLVED by the House of Delegates, the Senate concurring, That the General Assembly commend the Amateur Radio Emergency Service and the Radio Amateur Civil Emergency Service volunteers, whose vital communication links were instrumental in minimizing the impact of this disaster; and, be it

RESOLVED FURTHER, That the Clerk of the House of Delegates prepare a copy of this resolution for presentation to ARES/RACES as an expression of the General Assembly's admiration and gratitude for the vital contributions of Virginia's amateur radio operators.



# More States Introduce Bills on “Driving While Cellular”



Seven more states have jumped on the “driving while cellular” bandwagon since we last reported on the issue (see “DC Currents,” March 2000). They are Georgia, Hawaii, Indiana, Iowa, Kansas, Nebraska and Rhode Island. The list of states contemplating legislation that would affect driving while using a cellular telephone has now grown to 16. In addition, four states mentioned last month, Kentucky, New Jersey, New York and Pennsylvania have seen additional legislation introduced. The Colorado state legislature has reportedly tied up HB.1156 in committee after opposition by state police, truckers and the cell phone industry.

## Excerpts—State Legislative Proposals Affecting Cell Phone Use While Driving

### Georgia SB.298

“A driver...shall not engage in any use of a mobile telephone while such vehicle is in motion...provided that the proper use of a radio or citizens band radio shall not be a violation...”

### Georgia SB.323

“A driver...shall not engage in any actions which shall distract such driver from the safe operation of such vehicle, including without limitation any use of a radio, citizens band radio or mobile telephone which involves more than one hand simultaneously...” [The law currently exempts “radio, citizen band radio or mobile telephone.”]

### Georgia SB.353

“Any use of a mobile telephone by a driver while he or she operates a moving motor vehicle in violation of any other provisions of this chapter shall be a violation...”

### Hawaii HB.2079

“It shall be unlawful for any person to operate...a motor vehicle while the operator is using a cellular hand-held phone...Nothing in this section shall interfere with the use of a citizen’s band radio or the use of speaker phones which are voice activated...”

### Indiana SB.386

“A person may not operate a motor vehicle and simultaneously operate a mobile telephone.” [Exempts emergency, medical and volunteer fire personnel]

### Iowa HF.2051

“...a person shall not operate a motor vehicle on the highways of this state while using a cellular telephone.” [Gives driver one minute to make or complete a call while vehicle is in motion.]

### Kansas HB.2705

“It shall be unlawful for any person to operate a motor vehicle on a public highway while using a hand held cellular or cellular car telephone.” [Gives a two-minute grace period and exempts citizen band radio and voice activated phones.]

### Kentucky HB.172

“The operator of a motor vehicle shall not operate a wireless telephone while the car is on a public highway...”

### Nebraska LB.993

“Use of a mobile telephone while simultaneously operating a motor vehicle creates a rebuttable presumption of contributory negligence if the operator of the motor vehicle is involved in a traffic accident during such use.”

It shall be unlawful for any person to operate a motor vehicle while using a cellular telephone.” [AB.1929, SB.849]

“A driver shall not operate a telephone in a motor vehicle that is in motion.” [SB.480]

*Note: SB.408 was cited last month in error. It has nothing to do with cellular telephones.*

### New York SB.6339

“No person shall operate a motor vehicle on a public highway while using a hand held cellular or cellular car telephone.”

### Pennsylvania HB.2184

“The driver of a motor vehicle shall ensure that the use of a mobile phone does not impair the safe operation of the motor vehicle...the department or municipalities may ban the use of mobile phones by drivers...”

### Pennsylvania SR.127

“(A resolution) to study and develop recommendations concerning the issue of highway safety and driver distractions, including communications technology and electronic equipment such as wireless telephones, pagers, facsimile machines, locator devices, AM/FM radios, compact disk players, audio cassette players, citizens band radios and dispatch radios, and all other forms of nontechnical distractions.”

### Rhode Island HB.6907

“A person shall not drive a bicycle or motor vehicle upon any highway while wearing earphones or a headset, or operate a device for the sole purpose of which is to provide mobile telephone service.

“...shall not apply to mobile telephone devices which allow so called “hands free” operation...nor to the operation of a federally licensed two way radio communications system...”

## Kansas Antenna Bill Hits a Snag

◆ A bill that would “enhance and preserve the operation of amateur radio” in Kansas by requiring that all city and county zoning ordinances conform to the requirements of the 1985 PRB-1 Amateur Radio preemption (101 FCC 2nd 952) may have hit a snag in the Kansas House, and will likely not reach the House floor this session. The bone of contention apparently is specific antenna heights mentioned in the bill, which were objected to by the League of Kansas Municipalities. Proponents of the bill say that they will work with LKM on possible compromise language this summer, and encourage amateurs to contact their representatives and senators in support of such legislation. A modified bill will likely be reintroduced next year.















## Media Hits

- *The Detroit Free Press* featured an article on FCC license restructuring by writer Joel Thurtell, K8PSV. The article mentions Jim Wade, WB8SIW; George Goldstone, W8AP; Dan McCollough, WB8UXO; Clay Mitchell, W8JNZ; and Stan Briggs, K8SB, as well as Steve Ford, WB8IMY and Jennifer Hagy, N1TDY, of ARRL Headquarters.
- Vivian E. Douglas, WA2PUU, who writes a column on ham radio in the *Syracuse (New York) Herald Journal*, described the new licensing structure and featured information on how to find local licensing classes and club meetings.
- Another ham radio journalist, Bruce Grubbs, N7CEE, captured the front page of *Flagstaff Live*, in a wide ranging article on all major facets of Amateur Radio. Bruce’s article also discussed restructuring in some detail.
- Long Island’s *Newsday* also covered the buzz over restructuring. Mentioned in that article were Phil Lewis, N2MUN, the Rosner family: Nancy, N2TKA, Nicole, N2TKD, Lynda, N2WJK and Richard, N2STU, as well as Rich Moseson, W2VU, editor of *CQ* magazine, and Frank Fallon, N2FF, ARRL Hudson Division Director.
- A story in *The Tuscaloosa (Alabama) News* notes that Amateur Radio is “a popular hobby among young and old alike, with an estimated 2 million operators around the world.” The article mentions activities of the West Alabama Amateur Radio Society.
- Susan Hamm, W9SVL of Hagerstown, Indiana didn’t think an article on Y2K readiness in the Richmond, IN *Palladium Item* was quite accurate, apparently referring to ham operators as “CB operators.” She wrote a fine letter to the editor correcting the error and outlining many of the useful emergency and public service activities offered by local radio amateurs.
- The Quincy, Massachusetts *Patriot Ledger* featured a profile of ham operator Gareth Linder, W1ACL, who says “you meet people you never thought you would meet” on the radio.
- The Sebring, Florida *News-Sun* showed Gordon Blauser, AF4HZ and Roger Warrick, K2CP, operating at the Lakeshore Mall in celebration of the inauguration of the new ARRL West Central Florida Section.



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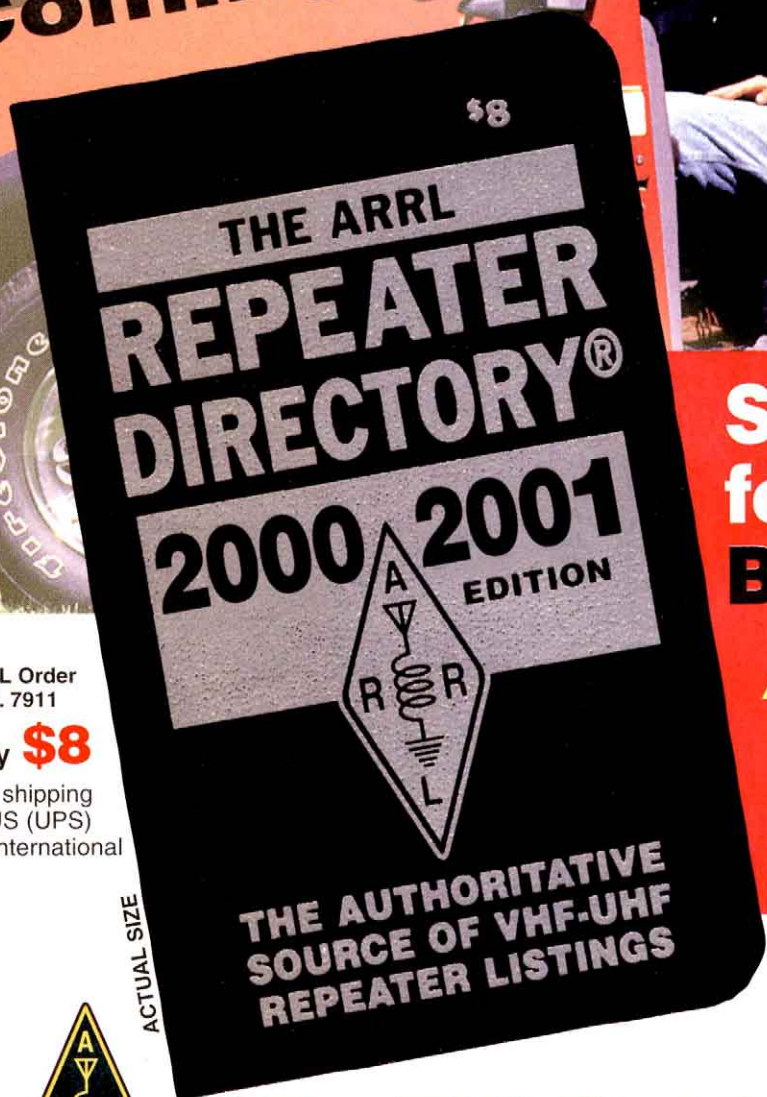
	Diameter in Inches	Jacket Material	Shielding (dB)	*Attenuation (dB/100')			
				30 MHz	146MHz	440 MHz	2.4GHz
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 LMR <sup>®</sup> 600	.590	Black PE	90	.42	.95	1.7	4.3
 LMR <sup>®</sup> 400	.405	Black PE	90	0.7	1.5	2.7	6.6
 Air Dielectric 9913	.405	PVC	90	0.8	1.5	2.8	7.5
 9914	.403	PVC	90	1.0	2.1	3.8	8.7
 RG-214	.425	PVC-IIA	60	1.2	2.8	5.1	13.7
 RG-213	.405	PVC-IIA	40	1.2	2.8	5.1	13.7
 LMR <sup>®</sup> 240	.240	Black PE	90	1.3	3.0	5.2	12.7
 RG-8/X	.242	PVC	40	2.0	4.5	8.1	21.6
 LMR <sup>®</sup> 200	.195	Black PE	90	1.8	3.9	6.9	16.5
 LMR <sup>®</sup> 195	.195	Black PE	90	2.0	4.4	7.7	18.6
 RG-58	.195	PVC-IIA	40	2.5	6.1	10.4	35.0
 LMR <sup>®</sup> 100A	.105	Black PVC	90	3.9	8.8	15.6	38.9
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**A father-and-sons mini-DXpedition!** Bill, KD6JUI, and his sons Ian (center) and Bruce (right) took a Ten-Tec Scout transceiver to a resort at the city of San Jose del Cabo in Baja California, Mexico. With just 20 W to an end-fed random-wire antenna, they worked stations throughout North America, Asia and Europe.



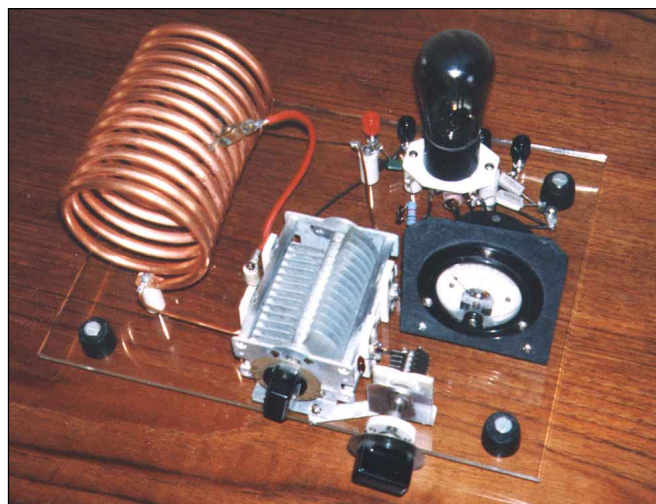
**The Lawrence County (Ohio) ARES/RACES promotes the public-service side of Amateur Radio with an annual event at a shopping complex in Burlington, Ohio.** Under an open canopy they set up HF, VHF, UHF, packet and ATV stations—all powered by batteries or generators. Other local emergency and public service agencies operate exhibits as well. The event has become so popular that in 1999 the Lawrence County commissioners proclaimed September 25 as Lawrence County Health and Safety Awareness Day.



**Here's the alternative to careful tower guying!** Randy, WA2OMT, spotted this injured installation while vacationing on Prince Edward Island, Canada. No, this isn't an amateur tower, but it's a sight to give any ham food for thought.



**They're accustomed to high winds in northeastern Montana.** K7SAM needed to work on his 50-foot fold-over tower, so he decided to tie it down securely. When the "breezes" can gust to 75 MPH, even a horizontal tower can take flight!



**Early amateurs were fond of "open" circuit designs on wood bases.** When Al, N2AO, revived this vintage transmitter he broke with tradition and opted for a Plexiglas base instead. The result is a neat, attractive layout. The tube is a 27 running at 5 W with 250 V on the plate, so Al plays it safe when operating this rig.





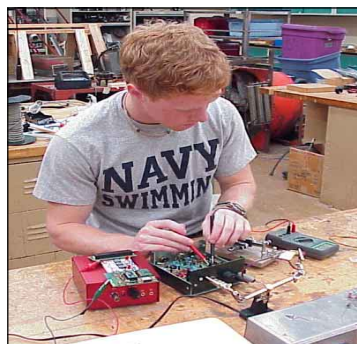
**The clock is ticking!** You have less than 10 months to work the 100 DXCC entities necessary to qualify for the beautiful DXCC 2000 Millennium Award. The award period ends at 2359 UTC on December 31, 2000. Application forms are available for a self-addressed, stamped envelope to: DXCC 2000 Millennium Applications, ARRL, 225 Main St, Newington, CT 06111, or you can download an application on the Web at: <http://www.arrl.org/awards/dxcc>. You'll find more information on page 47 of your December 1999 *QST*.



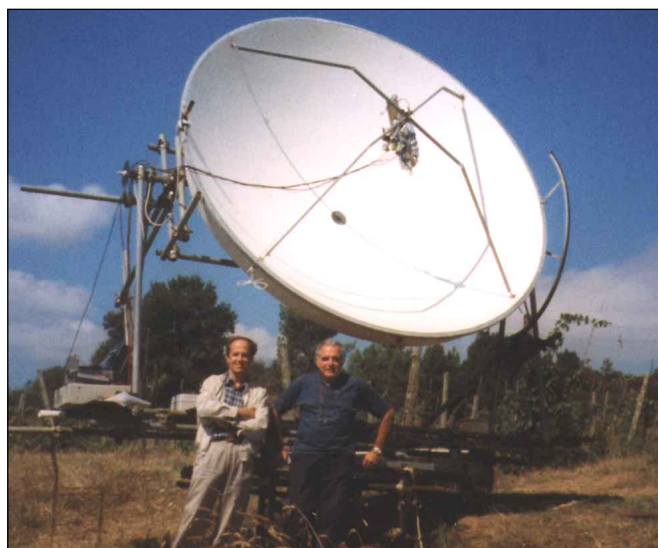
**Technical Excellence in San Diego.** ARRL Southwestern Division director Fried Heyn, WA6WZO (left), presented the 1998 Doug DeMaw, W1FB, Technical Excellence Award to Doug Smith, KF6DX (right), at the 1999 Southwestern Division Convention. Doug won the award for his series of digital signal processing tutorials. Soon after the series was published in *QEX* (*QST*'s sister publication for experimenters), Doug became the *QEX* editor!



**Thurman, N6QX, visited ARRL Headquarters last October and showed us his homebrew HF mobile antenna.** When he arrived back home, he sent us this photo. The mast that supports Thurman's unique "handlebar" antenna can be raised and lowered merely by pressing a switch inside his motorhome.



**Who says that young amateurs don't homebrew?** Reed, KF4ZWJ, a high school senior, checks out a Norcal 20 QRP transceiver. Perched atop the rig is a Morse code decoder Reed designed for his senior research project. It uses a Basic Stamp2 microcontroller running software that Reed wrote himself.



**Moonbounce—Italian style!** Alessandro, IK5WJD (left) and Pietro, I5PPE (right) built this 10-GHz moonbounce station using a 3-meter surplus dish. Installed at the focal point is a 10-GHz/2-meter transverter, a 10-GHz receive preamplifier and a Siemens traveling wave tube amplifier that generates an impressive 20 W output. Their aiming system is purely visual, with help from a video camera mounted on the edge of the dish.



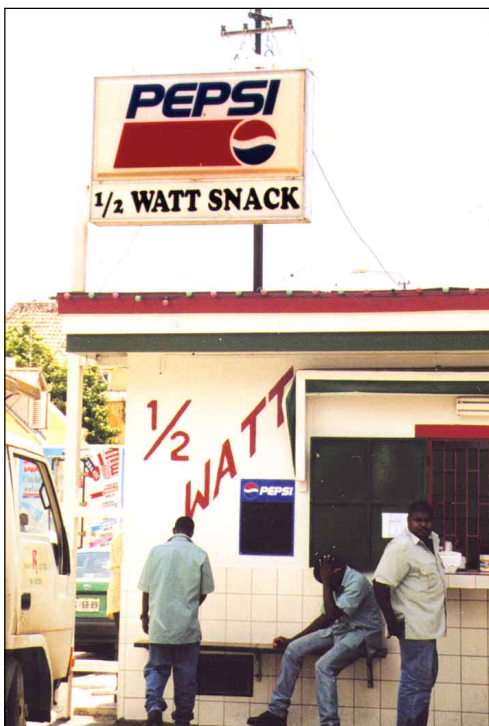


Yes, that is a potato chip can on his antenna. Tom, N1XWA (left), takes the concept of center-loaded mobile whips to a new extreme. Bruce, N1LN (center) and Tom, WA1RHP (right) seem bemused at the sight of Tom's contraption.



**SET is for everyone.** Laura Thompson, KC8GRS (age 15), operated a packet station during last October's Simulated Emergency Test in Mansfield, Ohio as Pat, N8JOZ, observed in the background.

**This tower is nothing to "grouse" about!** Paul, KQ9KX, spotted this ruffled grouse taking a brief siesta in the base of his tower. In addition to being a ham, Paul is an avid hunter. Fortunately for the grouse, he decided to "shoot" it with his camera.



**Only 1/2 watt?** It must be the new low-carb diet. While in Curacao N6HR found this local eatery. He assumes that it must be a hangout for QRP enthusiasts who visit the island!



**Curiosity and the cat.** In this case it is a precocious kitten named Sharon who was caught in the act of exploring the station of Dick, KB7BAD. After sniffing around the Yaesu FT-890 transceiver, Sharon decided that she needed a closer look at the clock—no doubt checking to make sure that she doesn't miss her 20-meter sked.





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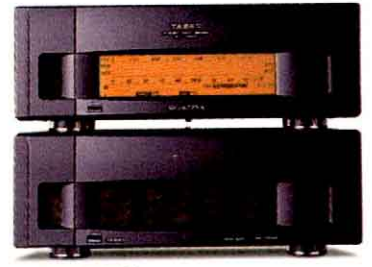
**FT-100**  
This ultra-compact HF/VHF/UHF 100 Watt Transceiver provides SSB, CW, AM, FM and AFSK coverage of the HF, 6M, 2M and 70 CM bands. Features include 300 memory channels, built-in Electronic Memory Keyer, DSP, IF Shift, IF Noise Blanker, and CTCSS/DCS.



**FT-840**  
Affordable yet feature filled, the FT-840 is an ideal traveling companion. It offers 160-10M TX with general coverage RX, 100 memory channels, DDS, CTCSS, Twin Band Stacking VFOs, and excellent receiver dynamic range.



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The VL-1000 Quadra System is a Solid-State Linear Amplifier featuring four twin-MOSFET PA modules to produce 1000 Watts of clean power output on 160-15 Meters (500 Watts on 6M, modifiable for 12/10 meters). Included are an Automatic Antenna tuner, 2 Input and 4 Output Antenna Jacks, and extensive status displays on the multi-function LCD.

**FT-847**

The introduction of the FT-847 completely redefines base station operation by offering three radios in one – HF, VHF/UHF and Satellite. A full power multi-mode transceiver, the appropriately named Earth Station covers the HF, 50 MHz, 144 MHz and 430 MHz bands, and it includes crossband Full Duplex operating capability for satellite work. Its exceptional receiver performance is ready for all aspects of DX work thanks to the DSP filtering. And for local FM work both CTCSS and DCS encode/decode are built in. The FT-847 is an engineering breakthrough offering you the earth, the sky, and the moon in one compact package.



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#### FT-8100R

The versatile FT-8100R Dual Band Mobile offers rugged RF design, 50 Watt (VHF)/35 Watt (UHF) power output, 310 memory channels, Dual Receive (VV/UU/VU), Enhanced Smart Search,<sup>™</sup> CTCSS Encode, and a TX Time-Out Timer. (ADMS-2E programming software available.)



#### FT-100

This ultra-compact HF/VHF/UHF 100W Transceiver provides SSB, CW, AM, FM and AFSK coverage of the HF, 6M, 2M and 70 CM bands. Features include 300 memory channels, built-in Electronic Memory Keyer, DSP, IF Shift, IF Noise Blanker, and CTCSS/DCS.



#### FT-3000M

This 70W high-powered 2M FM Mobile provides extended UHF receiver coverage, AM Aircraft RX, and is MIL-STD approved. The FT-3000M features 81 memory channels, Smart Search,<sup>™</sup> CTCSS/DCS, optional ADMS-2E programming software, and is 1200/9600 Baud Packet compatible.



#### FT-290RII

Ideal for base, vacation, or expedition use, this 25 Watt 144 MHz Multimode Transceiver is outstanding for emergency, travel, or weak-signal DX work. Optional battery pack allows over-the-shoulder portable use for search-and-rescue operation.

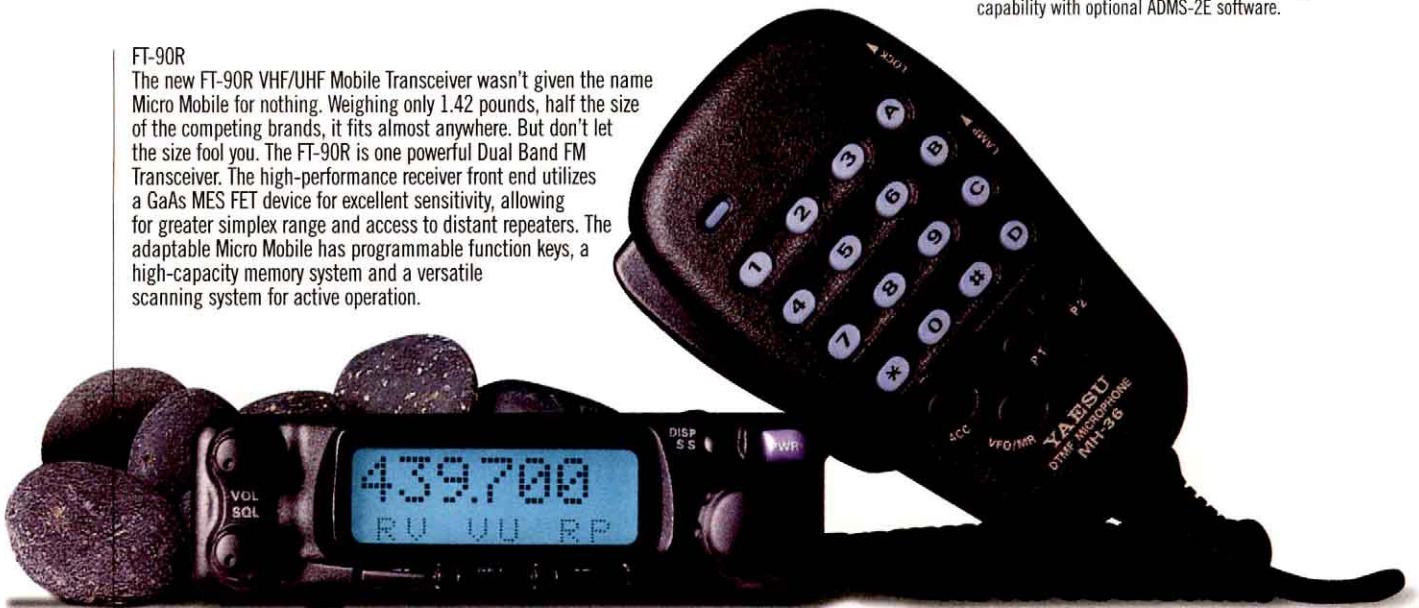


#### FT-2600M

This heavy-duty VHF FM Mobile is encased in a durable aluminum die-cast chassis/heatsink assembly, and manufactured to MIL-STD 810 requirements. Features include 60 Watt power output, 179 memory channels, direct keypad frequency entry from microphone, Alphanumeric memories, and PC programming capability with optional ADMS-2E software.

#### FT-90R

The new FT-90R VHF/UHF Mobile Transceiver wasn't given the name Micro Mobile for nothing. Weighing only 1.42 pounds, half the size of the competing brands, it fits almost anywhere. But don't let the size fool you. The FT-90R is one powerful Dual Band FM Transceiver. The high-performance receiver front end utilizes a GaAs MES FET device for excellent sensitivity, allowing for greater simplex range and access to distant repeaters. The adaptable Micro Mobile has programmable function keys, a high-capacity memory system and a versatile scanning system for active operation.



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# CORRESPONDENCE

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We read every letter received, but we can only publish a few each month. We reserve the right to edit your letter for clarity, and to fit the available page space. Of course, the publishers of *QST* assume no responsibility for statements made by correspondents.

## RESTRUCTURING

◆ After hearing about the restructuring of the Amateur Radio Service, I was a little taken aback at the drastic changes that would be going into effect in April 2000. But now that I have been able to think about it a little longer, I have come to a decision and I would like to share it with others in the ham community.

The real concern about the continuation of our complex hobby should not be about whether a single operating mode is one of the elements we consider in testing prospective new licensees. Instead, we should be worrying about the lack of mentoring for new hams (many know this better as "Elmering"). If the goal is to bring new amateurs and upgrades into the traditional mainstream, good mentors will be critical.

Newcomers will need our guidance. We can show them, by our best examples, if nothing else, how to properly operate HF voice, CW, PSK31 and all the other modes. The same will be true for VHF. The idea is to showcase the richness of Amateur Radio. We can also introduce them to the art of kit building, show them how to use an oscilloscope, how to use an antenna analyzer or even how to solder (an art unto itself, when done properly!).

Code is not the all and everything some of us would like to believe, and reducing the testing speed will not cause the death of anything. Code was the beginning of ham radio and should be revered for that, but not idolized. I will continue to use it almost exclusively because I gravitated to it naturally, not because I had to learn it to get a license.

The long-term impact of restructuring is ultimately up to us. Changes in license examinations won't kill CW, ham radio or anything else, but an embittered, unfriendly attitude toward newcomers surely will.—*Patrick Wilson, K4OW, Quinton, Virginia*

◆ Of all my years in Amateur Radio, I have never witnessed such a pathetic degradation of what used to be a wonderful hobby; a hobby of which I used to be proud. Restructuring has dealt the final blow, destroying everything that was good about Amateur Radio. The first major blow was struck when the "Incentive Licensing" program was implemented in the late '60s. That was pathetic enough.

I used to feel good about welcoming new hams into the hobby. The reason I felt good was because I could relate to their pride of accomplishment. I knew that those new

hams went through the same process I did; met the same requirements I did.

Well, I'm not going to welcome new hams who've obtained their Amateur Extras after 5-WPM CW exams when I had to demonstrate a 20-WPM skill level. How will these people feel when they find themselves among those of use who *earned* our Extra tickets?

I promise to come down hard on anyone holding a "5 WPM Extra." If I encounter any of these people in the Extra portions of the CW bands, I will tell them that if they can't keep up with me at 20 WPM, their Amateur Extra licenses are trash.—*Doug Loucks, W7YV, Eastlake, Colorado*

◆ When I first became involved in electronics, slide rules were the one absolutely necessary calculation tool owned by every engineer and technician. They were simple, uncomplicated, easy to use (after some period of rather tedious practice), and delightfully low tech. They were the calculation tool-of-choice for over three centuries.

Then, as the giant asteroid was to dinosaurs, overnight the \$9.95 pocket calculator killed the slide rule. Despite its ubiquity and utter simplicity the mighty slide rule went essentially extinct in less than a decade!

Perhaps somewhere, in a backward company in a backward country without sand from which to make silicon chips, a group of stalwart engineers still treasure their Pickett or K+E slipsticks, and still require a practical examination, down to the third significant digit, of an engineer's proficiency, and whether they actually could explain the difference between the CIF and DIF scales.

Perhaps some amateur mathematicians still are proficient on slide rules (after all, they haven't been outlawed!). I bet they even hold speed and accuracy contests at a nostalgic "Slippers" convention each spring in Akron, Ohio. Led by the scratchy but firm voices of their oldest club members, Vince Bentupcursor and Larry Elscale, they close each convention by quoting the 1940s fight song of that bastion of wood-assisted math, Cal Tech:

"E-to-the-x du dx, E-to-the-x dx,  
Cotan secant tangent sine,  
three point one four one five nine.  
Square root, cube root, QED  
Slipstick, slide rule, Hooray! CT!"

The next *SLIPS* newsletter duly reports the resolution of the IEEE BoD to gain legislation to include slide-rule competency testing as a requisite to all engineering

degrees, except those seeking 2-year Stickless Technician degrees.

Regular Technicians will require 5 CPM (Calculation Per Minute) exams, BSEE will require 13 CPM, and MSEE will require a 20 CPM exam.

On another front, when I first became involved in Amateur Radio, Morse code was the one absolutely necessary communications mode used by every ham. It was simple, uncomplicated, easy to use (after some period of rather tedious practice) and delightfully low tech. It was the amateur communications mode-of-choice for over three generations.

Then, as the giant asteroid was to dinosaurs, overnight...—*Hans Brakob, KOHB, Plymouth, Minnesota*

◆ Dissenting voices bemoan restructuring because making the requirements easier somehow diminishes their own accomplishments. It will also, they contend, open the floodgates to an invasion of riffraff.

I respect their opinions, but their assumptions are ill informed. I wonder how many have considered the fact that the new written tests might be considerably more difficult? Even though we had to pass a Morse code exam, our written tests were relatively easy. This may no longer be the case. The struggle and achievement will still be there.

We can choose to think big or small about the FCC's new restructuring order. We can grumble about the loss of a supposed Golden Age. We can wring our hands about the barbarians at the gates. We can even threaten to turn in our VE badges. That's the way to think small.

On the other hand we can think big. We can be glad that ham radio won't die when we go to the grave because restructuring will help encourage others to replenish our ranks. We can, in fact, be *optimistic* about our future and act accordingly!

I feel good about ham radio again. (And I still feel good that I had to work hard to get my Extra. I'll always have that sense of achievement.) The future is bright if only we can stop thinking small. We've needed a change for a long time. Incentive licensing wasn't working. It was choking ham radio. Think big and get over it! Enjoy the changes that are coming.—*Mark Edwards, W0QL, Foxfield, Colorado*

◆ After reading the Commission's *Report and Order*, I was disappointed to find that the requirements for the General and Ama-



teur Extra were reduced for no apparent reason. Those of us who studied hard to earn these licenses feel that this as a slap in the face.

The CW test really wasn't all that difficult, but it was a good yardstick of *motivation*. In fact, it was the only real test of motivation since the written exam could be mastered by anyone with a decent memory and/or a bit of tutoring. Now how will we test for motivation and discipline? With a mere 5 WPM exam?

I don't want HF to turn into 2 meters. I also don't want 2 meters to turn into CB. In the entire Report and Order I could find no valid reason why Amateur Radio licensing needed to be "dumbed down." I am afraid that the commission listened to those who would profit financially from the move—equipment manufacturers, radio schools, study material publishers, etc. A decade ago the "no-code" license was invented and the manufacturers did a booming business in VHF equipment. Although HF tickets have always been there for the earning, maybe the manufacturers felt that hams needed an easier, faster path to major HF purchases.—*Roy Davidson WP2F, Hemet, California*

## REVIVING THE "SLASH" ZERO (0)

◆ Having been a resident of the tenth call district (0) for my entire 37 years as a licensed amateur radio operator, I am certain that I have been asked at least a gazillion times about the "goofy looking character" in my amateur call sign. With the inrush of computer interest in recent decades, more and more *non-hams* came to recognize the military or "slash" zero (0) as a way to distinguish the number "zero" from the letter "O". Early DOS computer screens and dot matrix printers helped make this zero distinction common knowledge in most every household and business. I no longer had to explain that my call sign was W "Zero" FM, not W "Oh" FM. It was nice to finally live in a call sign district designated by a universally recognizable *number*, not some strange character that required constant explaining. Then it all changed!

As computers advanced to include sophisticated word processors with dozens of fancy fonts, the military or "slash" zero suddenly began to vanish. The zeros became basically tall and skinny and the letter "O" was generally more rotund. Mail began to arrive on which my call sign appeared to contain the letter "O" rather than the number zero. I instantly thought about those who held calls like W000, or K000 or N0000. How confusing! And what about those poor souls whose call signs actually *spell words* (and sometimes not very *nice* words) when the "slash" zero was replaced with the letter "O". You've seen them.

Some font styles depict very little dif-

ference between the letter "O" and number "zero". I receive QSL cards with QSO labels where I cannot make the distinction. Even some amateur radio publications (thankfully, *not QST*) no longer use the military zero when printing amateur's call signs in their own articles. That's almost *sacrilegious!* Was that article referring to K "Oh" zero E, or was it about K zero "Oh" E? Were some just too lazy to choose a font with the "slash" zero for amateur radio applications or did none exist?

I began to search for fonts that could provide military zeros. In response to my plea on a bulletin board, a nice guy sent me an email and attached a font file called "VAG Round" that featured the military zero. I was very grateful, but...*one lousy font?* That was it.

Then recently, Mark Buckner, a friend of mine who is the photographer for the St. Louis Blues hockey team, was kind enough to take some photos of my ham station for my new QSL cards. Mark's a true pro and works quite proficiently with digital imaging and desktop publishing. When the digitized proofs arrived for my new QSLs, Mark had already inserted my call sign *with the military "slash" zero* into the photo. Was I surprised! How did he do that? He's not a printer of QSL cards. And, how did he know? Mark explained that he had once held a ham license when he was younger, before f-stops proved more interesting to him than Morse code.

I was amazed at just how many font options Mark provided for my QSL card design. He said that I could have almost any font that I liked with a "slash" zero properly configured. Then Mark revealed his trick.

Using a shortcut in virtually any word processor or graphics package, you can "force" an authentic looking tenth call district zero (like this: 0) into almost any font by holding down the ALT key while typing 0216 on the *calculator-configured numeric keys* on the computer keyboard. The "NUMBER LOCK" feature must be ON. When you release the ALT key, a perfect 0 will appear. (*Note: This will not work with the number keys appearing across the top of the alpha characters. I also found that email would not recognize this "0" character in an address.*) This and other shortcuts are documented in the "special character" section of the Microsoft Word manual. Another approach is to click on SYMBOL under the INSERT menu in *Word*, but I find "ALT+0216" easiest for me. (Macs may have different commands for this.)

I immediately began adding "slash" zeros to all my amateur related documents and correspondences, including QSL and address labels, using this simple "ALT+0216" shortcut and they look great. It's right there. Try it! You'll make every ham in the tenth call district a very happy hammer!—*Terry Schieler, W0FM, St. Louis, Missouri*

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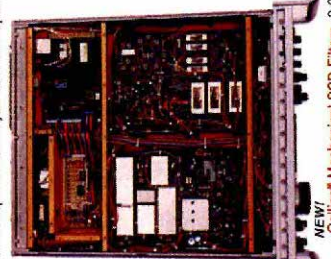
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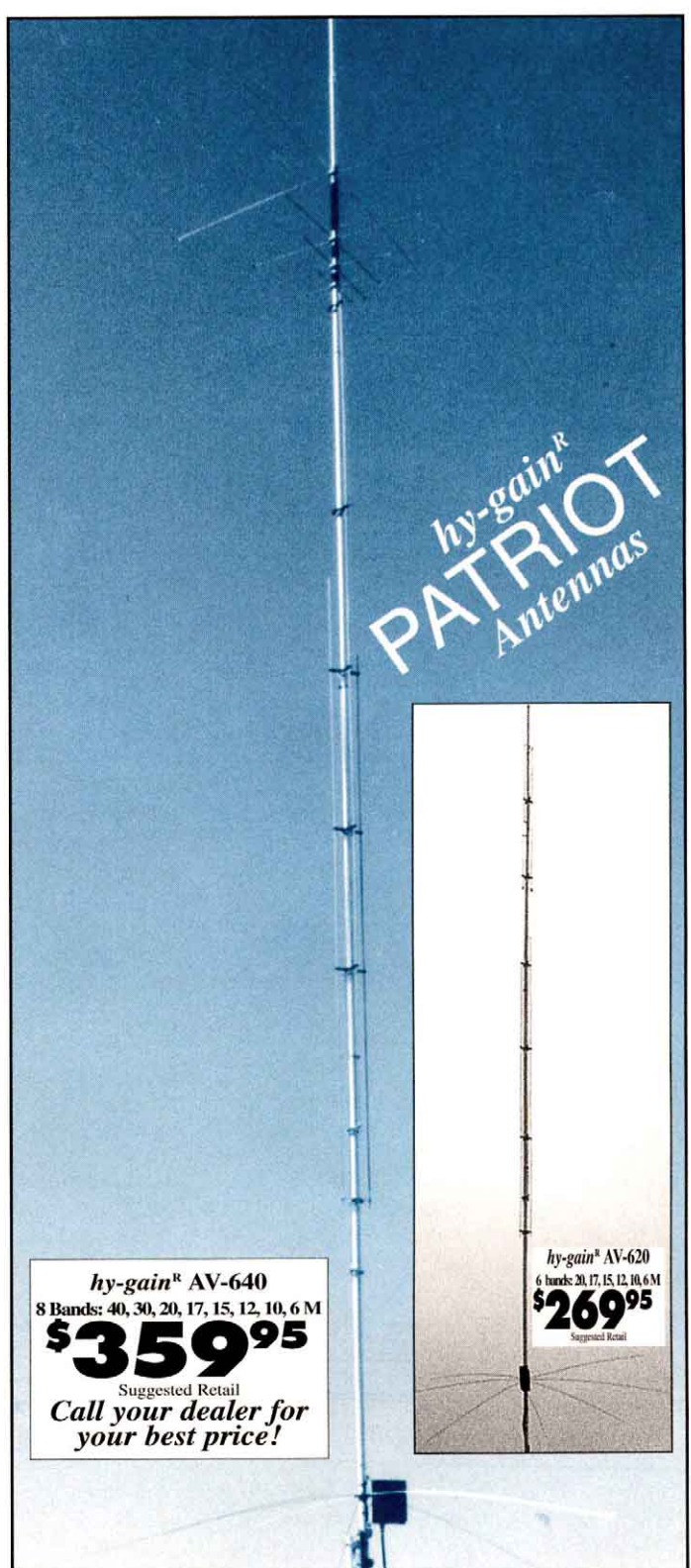
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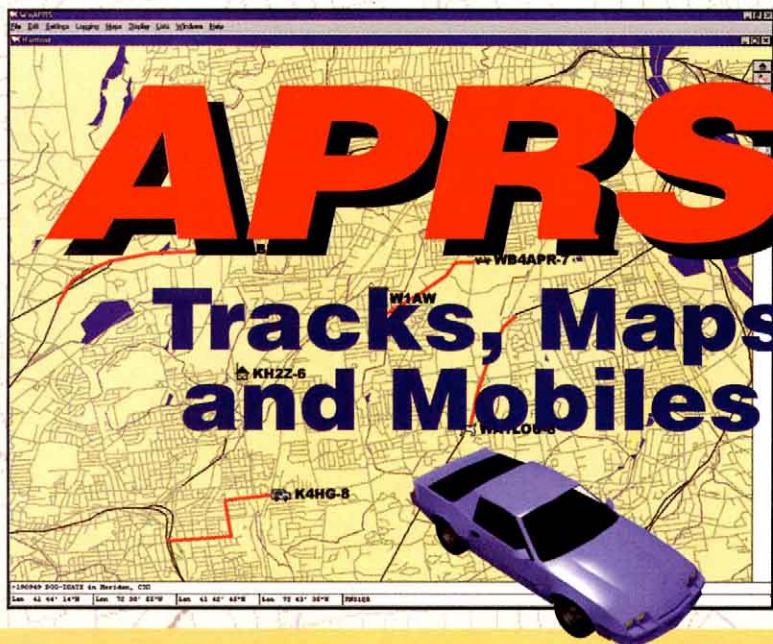


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Bands covered (meters)	6, 10, 12, 15, 17, 20	6, 10, 12, 15, 17, 20, 30, 40
2:1 VSWR Bandwidth (KHz)		
40M	N/A	150
30M	N/A	175
20M	500	500
17M	500	500
15M	500	500
12M	500	500
10M	1500	1500
6M	2000	1500
VSWR at resonance (typical)	1.5:1	1.5:1
Power handling (watts output) key down 2 minutes	1500	1500
Vertical radiation angle (degrees)	17	17
Horizontal radiation angle (degrees)	360	360
Height (feet)	22.5	25.5
Weight (pounds)	10.5	17.5
Wind surface area (square feet)	2.4	2.5
Wind survival (mph)	80	80



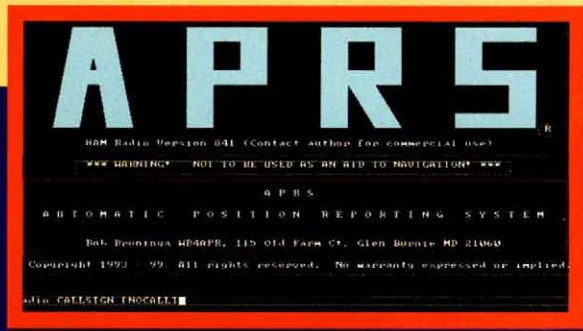


# A Guide to the Automatic Position Reporting System

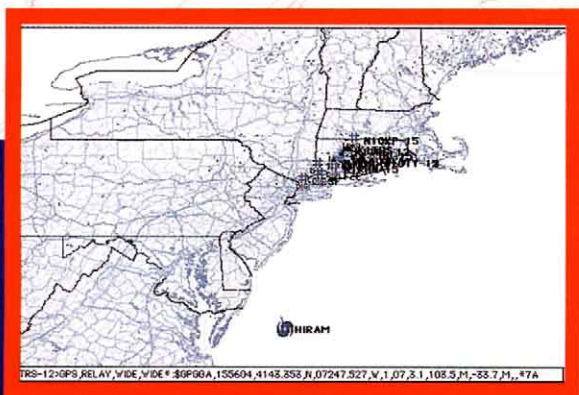
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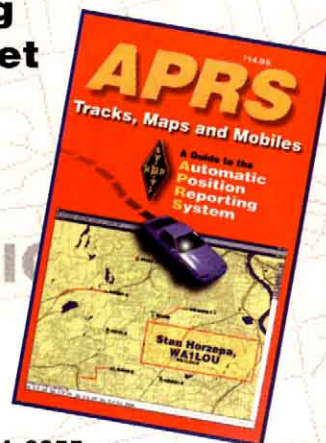
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# Bulgaria:

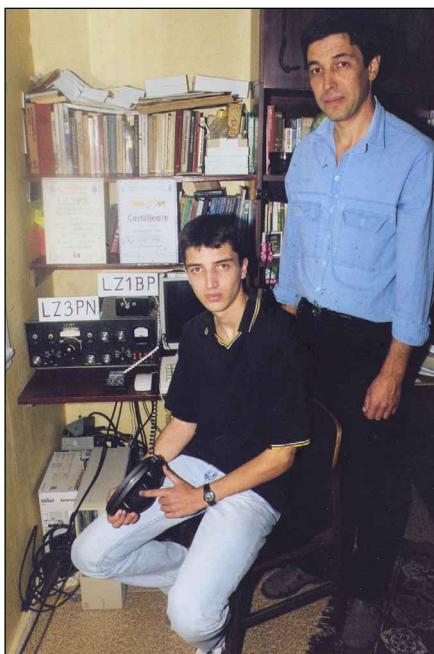
## Amateur Radio Friends and Fun

LZ hams abound in contests and on the air—but when it comes to really learning about hams from afar, there's no substitute for a face-to-face QSO. With that in mind, America's unofficial "Balkan Ambassador" visited hams and friends in Bulgaria for the first time in many years.

**T**he idea of visiting Bulgarian hams dawned in the spring of 1999, when I was in Spain. I was sitting with some local hams at an outdoor restaurant in Valencia one evening when one of them asked me where I'd go next. I was tired and sleepy and, without too much thought, I said, "Bulgaria." All four EA5 hams jumped up and in a choir yelled, "Why Bulgaria?" That woke me up. I had to come up with a suitable answer.

"When I was there a long time ago I met some very nice amateurs. Not many people visit Bulgaria these days and it would be an interesting trip," I stalled.

Besides, I had a hidden agenda. Many years ago, while visiting Bulgaria for the first time, I met a young and pretty female ham who accompanied me to the beach. I liked her, but I was very shy. Finally, we left the beach because I had to go to my hotel to change clothes for an evening event at a restaurant with local hams. When we got to the hotel I gathered all the courage I could



Peter, LZ3PN, and his father Todor, LZ1BP.

muster and I asked her if she would go dancing with me later that evening. Without saying a word she moved her head slowly from left to right, back and forth, a couple of times. I took that as a "no." I found out later that the Bulgarians—probably the only people in the world—nod their heads up and down for "no" and left to right, back and forth, to say "yes." It was too late for me!

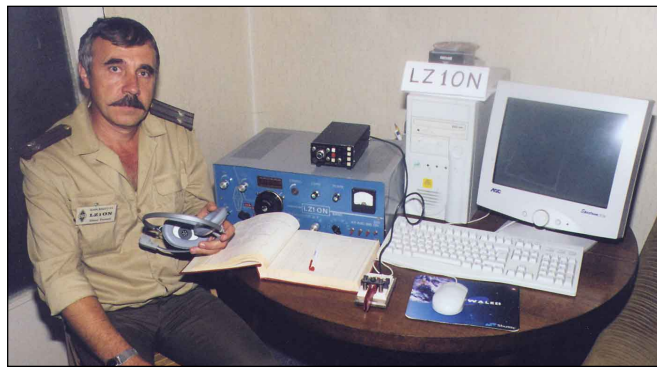
While preparing the trip, a friend advised me to contact Nick, LZ1JY, who knows everybody and is a good organizer. I sent him e-mail. He was very helpful in setting up meetings with local hams and groups in various cities. Nick also put me in touch with Yanko, LZ1BMV, from the LZ1KDP radio club.

### Sofia

Nick, LZ1JY, was waiting for me at the Sofia airport. He's the manager of the electronics division of Samsung Corporation. He's also known at the airport, so he pushed my luggage cart through customs without any interference.



A relaxed Svetlin, LZ1SJ.



The mostly homebrewed station of Dimo, LZ1ON.



I took a room in a little hotel near the Technical University campus where I paid \$20 per night. The hotel was really more of a student dormitory than a hotel. There was no radio, no TV and no air conditioning, and the telephone was “temporarily” out of order (as were most of the phones in the city).

My first visit was at LZ1KDP, the radio club of the Technical University of Sofia, located about five minutes from my hotel. The club is on the sixth floor, but it also has some rooms on the top (seventh) floor.

The chief of the club is Anna, LZ3GU, but she was out sick, so I met a very active and enthusiastic gang that included Yanko, LZ1BMV; Ventsi, LZ1HST; Ivan, LZ1PJ; Mila, LZ1ABB; and a few licensed operators without personal call signs. The club boasts 145 members comprising students and former students of the university.

One evening I met Jordan, LZ1UU, who spends the winter months working as a communications officer with the Bulgarian scientific expedition on Livingston Island in the South Shetland group. He has been there four times, operating as LZ0A. His LZ0A QSL card shows two penguins.

Nick, LZ1JY, took me to the Federation of Bulgarian Radio Amateurs, which is in the Postal Administration Building. There I met Federation Secretary Zdravka, LZ1ZQ; Kosta, LZ1FN, a telegraphy instructor; and Maria, who is in charge with the Bulgarian QSL bureau. Zdravka’s son is George, LZ3GC.

The LZ QSL bureau works well despite financial difficulties, and the Federation has a well-equipped club station (LZ1BFR). You can send e-mail via [lz1ms@qsl.net](mailto:lz1ms@qsl.net).

The last call sign directory published by the Federation was in 1997. The 1995 edition has an interesting list of well-known radio amateurs around the world, including kings, astronauts, scientists, movie stars, and more.

In 1998 the Federation published an interesting book about the history of Amateur Radio in Bulgaria, and in 1992-1993 it published a 50-page magazine titled LZ 73, which was eventually discontinued because of ailing finances.

At the Federation I met Dimiter, LZ1AF, who brought along a couple of pounds of his QSL cards to be sent through the bureau. Dimiter is the graphic designer who created the new look of ACOM 2000A automatic HF linear amplifier, made by the people who used to build the Alpha 91β. Dimiter’s new QSL cards feature the amplifier prominently.

I visited Dimiter’s station, which is equipped with industrial and homemade gear, including an IC-751A and a beta ETO 91 amplifier that’s easily capable of running the legal power limit. He is very active and has worked 325 DXCC entities, all on CW. He has a 6-element log-periodic for 10 through 20 meters, an 8-band vertical for 10 to 80 meters and a sloper for 160 meters. Dimiter was first licensed in 1956. He is the DX editor of the English section of Radio Bulgaria and his programs are aired several times a week.

Every Thursday evening about 6 PM, many Sofia hams meet at a local restaurant to eat, drink and talk about everything—sometimes even Amateur Radio! I joined in to meet about 20 hams.

I visited Todor, LZ1WE, a radio engineer licensed in 1970 and an active operator with more than 300 DXCC entities worked. His wife Dani, LZ3EW, is a chemist. She works on 2-meter FM making mostly local contacts. The two use mostly homemade equipment and can run up to 350 W. Their 3-element Yagi for 10 through 20 meters is also homemade and installed on the top of their very tall building. Todor uses computer logging and both have QSL cards.

I also visited Sergei, LZ1SE, a bedridden

ham who suffered a spinal injury in 1973. A college student at the time, he graduated as a radio communications engineer and is now is a computer programmer. Sergei has a Yaesu FT-757 and is running 100 W to a delta loop. He operates mostly SSB on 10 to 80 meters and has worked more than 200 DXCC entities.

With Ventsi, LZ1HST, I visited Yuri Tzenkov, who publishes with his brother Viktor, LZ3NN, a magazine devoted to radio electronics named *Elektron*. They also have a couple of stores that sell radio and electronic parts. Their e-mail address is [electron@bulnet.bg](mailto:electron@bulnet.bg).

Considering that Sofia is the capital and the country’s biggest city, I met very few amateurs, partially because the telephone system was so sporadic.

As I do on every trip, I sent a quick e-mail to my loving wife Eva, WA2BAV. From Sofia the message was:

“I don’t think I’ll ever come back. I’m having a wonderful time with Sofia—and I don’t mean the city.”

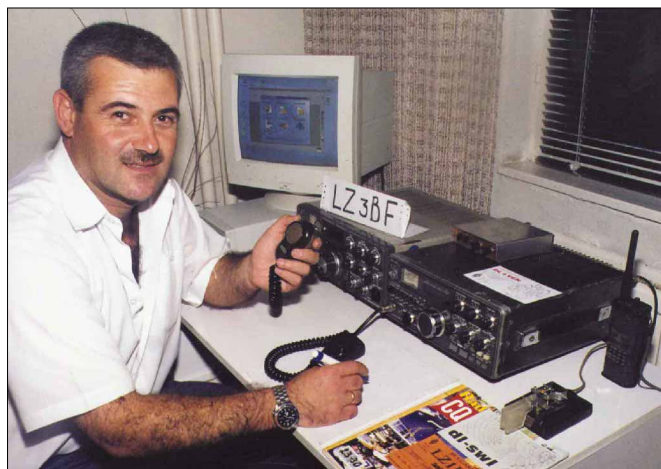
Her answer was short and sweet:

“When you run out of money you’ll be left only with Sofia—and I mean the city. Anyway, I moved your junk into the garage and rented your room. Have a wonderful time!”

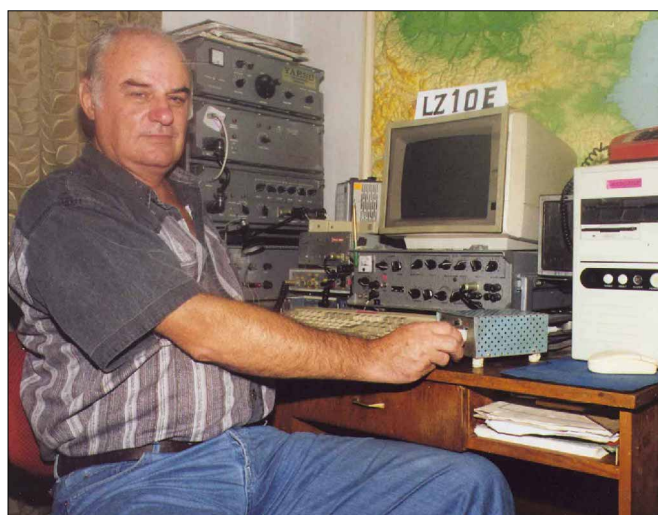
## Plovdiv

After two and half days in Sofia it was time to leave for Plovdiv. Nick, LZ1JY, said I should go by bus, but then he changed his mind, advising me to go by train because it would be safer and the train couldn’t break down somewhere along the way. He drove me to the railway station. The ticket to Plovdiv was 3.50 levas, about \$2

When I got on the train I noticed a big puddle of water coming from the toilet. I crossed the puddle on the way to my



Ivan, LZ3BF, is active on both HF and VHF. Notice the computer monitor. PCs are as popular in Bulgarian ham shacks as they are in the States.



Nick, LZ1OE, has an impressive array of gear.





The always smiling Ivan, LZ3GM, at the LZ1KRB club station.



A well-known voice on the airwaves—Hristo, LZ1HM.

compartment. I idly thought that with all this water, at least we wouldn't have a fire. How wrong I was! Somewhere between Sofia and Plovdiv my train car caught fire at *both* ends. The train stopped in a small town. We all got off to look at the fire, but I saw only smoke and steam.

During the crisis the railway workers seemed to shout contradictory instructions. "Get off the train," one said, while another yelled, "Get on the train." While half of the passengers were getting off, the other half were getting on, so the number of people in both locations stayed about the same.

I saw a passenger unselfishly sacrificing his bottle of mineral water trying to extinguish the fire. Finally a fire truck came by and sprayed some water on the undercarriage at both ends of the car, which seemed to take care of whatever mystery had caused the fires. We continued our journey wet, smoked and smiling from ear to ear.

I arrived to Plovdiv an hour late, but Yoan, LZ1YW, was waiting and recognized me because I was wearing a cap that displayed my name and call sign. Yoan is a retired electronics technician who was first licensed in 1965. He is a home-brewer and operates only on CW using an old Bulgarian military transmitter and receiver and lots of home-brew equipment for HF and VHF. His desk is always full of tools, parts, test instruments and equipment under construction. Using a 9-band Windom-type wire antenna, Yoan has worked more than 200 DXCC entities.

Next to see was Nick, LZ1NG, an electronics technician licensed in 1975; his wife Bistra, LZ1BV, an electrical worker licensed in 1980; his son Angel, LZ3AX, a 20-year-old computer school graduate; and son Stefan, LZ1EEE, a 15-year-old high school student who is studying computers. A real ham family, Bistra's father Stefan is LZ5GV, and her mother Maria is LZ1MID.

Stefan and Maria met at the LZ1KSP radio club in 1950 and got married in 1959.

Nick is a "big gun" and an A1 operator with 326 DXCC entities worked and many prestigious awards. Bistra, with five fewer years on the air, has worked 260 DXCC entities. You can contact them at [lz1ng@plov.omega.bg](mailto:lz1ng@plov.omega.bg). I slept very comfortably at Nick's place.

Georgi, LZ1CW, a retired electrical technician licensed in 1950, met his wife Vera at the local radio club in 1953 and married her in 1955. It seems that in Bulgaria, radio clubs are more than places where enthusiasts can learn Morse code and operate a station! Georgi has a Kenwood TS-120S and a 2-element quad for 10 through 20 meters, a 2-element wire Yagi for 40 meters and an end-fed wire for 80 meters. Georgi has QSL cards and despite the fact he has a computer, keeps his log on paper. His e-mail address is [lz1cw@plov.omega.bg](mailto:lz1cw@plov.omega.bg).

The last ham I visited in Plovdiv was Rumén, LZ5OL, a photographer; his wife Tony, LZ1BOL, a museum curator; and her 22-year-old son Rosen, LZ1RAZ. They operate only VHF, talking mostly with local friends.

## Stara Zagora

The next day I left Plovdiv for Stara Zagora. The two-hour train ride costs 2.70 levas, about \$1.50. In Stara Zagora, Del, LZ1DEC; Ivo, LZ3RN; and Kosta, LZ1DJ, were waiting for me.

Kosta, LZ1DJ, a radio technician at a broadcast station, licensed in 1971, proudly displays his call sign on the back window of his car. Using 100 W from an IC-706 transceiver and a wire dipole for 10 through 40 meters, he has worked more than 200 DXCC entities, mostly on CW.

Ivo, LZ1RN, a teacher of Bulgarian literature first licensed in 1992, runs 100 W from an IC-728 to a dipole for 10, 15

and 40 meters. He operates CW, RTTY and SSB, and has worked more than 250 DXCC entities.

Gandy, LZ1GST, a mechanical engineer licensed in 1996, uses a small IC-706 transceiver, a homemade power supply and a multiband wire dipole for 10 through 40 meters. Gandy is a DXer, works on CW and SSB, and is a good QSLer.

Dimo, LZ1ON, a Lt. Colonel in the Bulgarian Army, licensed in 1996, is one of the hams I met while visiting Subby, LZ5SS. Dimo has a homemade 40-W transceiver, a computer, a delta loop antenna for 40 and 80 meters and a dipole for 15 and 20 meters. Dimo is a DXer and works CW and SSB. Dimo's wife Svetla, LZ1TB, is an elementary school teacher. His 20-year-old son Daniel, LZ5OE, is in college studying economics. And his 14-year-old son Galian, LZ1GON, is in high school. Dimo's hospitality went beyond the fraternity of ham radio and reflects clearly on the changing times. In years past, an army officer could not have received a visiting American.

I also had an opportunity to drop in on Subby, LZ5SS, and Roussko, LZ1RT, two well-known hams in the community.

My last visit in Stara Zagora was with a father-and-son team: Zhivko, LZ1GDR, a civil engineer working for the army and his son Del, LZ1DEC, a high school student. Both received their Class C (VHF) licenses in 1997. They have a small 2-meter rig with a 4-element quad antenna. Both are computer literate and Del's English is very good. I slept at their house. The next morning, Roussko drove me to Kazanlak.

## Kazanlak

In Kazanlak I met Nasko, LZ1YE, and his large radio amateur family. Nasko is an electronics technician who now owns a printing plant where he and his crew make flyers, brochures and many of the beautiful



photo QSL cards used by LZ hams. Nasko was licensed in 1971 and has a Class A license. He was very active, has many awards (including 5BDXCC and US Counties), is on the Honor Roll for Mixed and SSB, among other things. His wife Nassy, LZ3FF, licensed in 1990, teaches Bulgarian. Nasko's father Peter, LZ3YE, licensed in 1993, is a cabinetmaker and electrician. Nasko's daughter Petya, LZ3YW, licensed in 1990, graduated from a radio communications high school. Nasko's other daughter Anny, LZ3YP, lives and works in France. Both daughters were national champions in high-speed telegraphy. Nasko's brother Koly, LZ1DB, an electronics technician, owns a ham radio store. Six members of a family—all hams! Their station is squeezed into a small storage space near the kitchen. They have several antennas, the most impressive of which is a quad installed high on the roof of the building. Nasko has a beautiful QSL card printed by his own company (Tempo). His e-mail address is [tempoqsl@sz.inetg.bg](mailto:tempoqsl@sz.inetg.bg).

Next to visit was Don, LZ1OJ, a mechanic first licensed in 1989. Don uses a transceiver; a 250-W power amplifier and a power supply—all homemade. He works mostly CW, has worked more than 265 DXCC entities and uses a very nice photo QSL card printed by his friend Nasko, LZ1YE.

With Nasko, LZ1YE; Don, LZ1OJ; Milen, LZ5DB; and Aleko, LZ3ZZ; I went to the LZ1KOZ club station near Lake Koprinka, about five miles from Kazanlak. During contests this station signs LZ5W. I operated for a while on 40-meter SSB, making about a dozen QSOs with Hungarian and Romanian hams, some of whom I knew from previous visits. The station has a Yaesu FT-890 and a huge homemade power amplifier. The ops said it puts out 1 kW, but I believe they were being modest.

This station also sports four 80-foot towers. One has a 4-element Yagi for 40 meters on a 64-foot boom. One supports a 6-element Yagi for 20 meters on a 73-foot boom. One twirls a 6-element Yagi for 15 meters on a 48-foot boom. And the last tower lofts a 6-element Yagi for 10 meters on a 38-foot boom.

No wonder the LZ1KOZ club station has won so many national and international contests! The ops have a large number of awards to prove it.

We had lunch in a nearby restaurant where Aleko, LZ3ZZ, works as a waiter. Then we went to see Todor, LZ1BP, and his son Peter, LZ3PN, both national champions in high-speed telegraphy. Todor, a metallurgical engineer licensed in 1993, has a Class B license. Peter, a student at the Technical University of Sofia, licensed in 1996, has a Class C license. Both work only



**Stoian, LZ3QX (standing) along with Stefan, LZ3OE (left) and Todor, LZ5QZ (right) at the LZ1KSN club station.**

CW using a homemade 100-W transceiver, a Windom antenna for 40 meters and a ground-plane for 15 meters.

The last person I visited in Kazanlak was Marin, LZ1RW, a mechanical engineer who works in power plant automation and runs a print shop with Liubomir, LZ2EV, where they make beautiful QSL cards for Bulgarian and foreign hams. Ironically, his cards are quite simple. His quad has also gone with the wind—a fate experienced by most quads sooner or later. Marin works CW and SSB. His e-mail address is [lz1rw@kz.orbitel.bg](mailto:lz1rw@kz.orbitel.bg).

Milen, LZ5DB, hosted me for the night. Early the next morning I took a train to Sliven.

## Sliven

I left Kazanlak for Sliven by train early in the morning. I was so tired from the previous day that I confused my toothpaste with my shaving cream. They look so much alike! Let me tell you, you *can* shave with toothpaste, but brushing your teeth with shaving cream will wake you in a *hurry*.

The two-hour train ride cost only 2.10 levas—less than a subway ticket in New York City. The train was running like an old jogger. It ran for a while, then it slowed and rested. It stopped, often waiting for other trains traveling on the same tracks from the opposite direction. I'm glad that it did!

At the Sliven railway station, four hams were waiting for me: George, LZ1WM; Stoian, LZ1VN; Ivan, LZ1GWM; and Dimiter, who gave his call sign as LZ1KDZ (a club call). Ivan, LZ1GWM, said he'd come along as a translator. The hams discussed among themselves about where to go and what to do. When it was official, Ivan said we

were on our way to see George's station.

George, LZ1WM, a retired electronics technician licensed in 1956, shares a nice station with his wife Vesa, LZ1SG, a retired insurance clerk licensed in 1964. The two use a tablefull of homemade equipment and some older manufactured gear. George was an active DXer and contester and has a wall full of awards, pendants and medals to show for it. He's worked more than 300 DXCC entities.

Hristo, LZ1HM, a mechanic who retired from a textile factory has a very nice station and lots of equipment—all homemade. His antenna is a W3DZZ for 10 through 80 meters. He operates CW, RTTY, SSB and 2-meter FM. His 22-year-old granddaughter Magdalena, LZ1MHM, licensed in 1998, has a Class C ticket.

Ivan, LZ1GM, has a small station in a living room corner. Licensed in 1967, he is test instrument specialist who uses a homemade 50-W transceiver and a 300-W linear amplifier. His 4-element Yagi for 10, 15 and 20 meters is fixed on Germany because he talks mostly with a friend living there.

Another Ivan I ran into in Sliven was LZ3BF. What a remarkably generous and hospitable fellow!

My last ham friend in Sliven was Svetlin, LZ1SJ. He also has a nice "all homemade" station—transceiver, linear amplifier, electronic keyer, power supply and voltage regulator. Svetlin works CW, SSB and keyboard CW. He is a DXer with 215 DXCC entities. On 6 meters he has worked 61 countries.

## Burgas

In Sliven I took the 5:25 AM train and



arrived in Burgas, on the Black Sea, at 8 AM. The ticket cost 2.30 levas, about a dollar and a quarter. At the railway station, three hams were waiting for me: Stefan, LZ3OE, an electronics technician working for the army; Stoian, LZ3QX, a radio communications sergeant; and Todor, LZ5QZ, a high school student.

I went to the Hotel Bulgaria—a nice place in the center of the town and a five-minute walk to the railway station. A double room set me back 56 levas, tax included, which comes to about \$30. (Breakfast was included in the price, but because I would be leaving early the next morning before the restaurant opened, I got a bag with two sandwiches and an apple.)

First, we all went to the radio club, LZ1KSN, sponsored by a large chemical plant, located at the Cultural Center. I took some photos there and went to see a station that belongs to Stefan, LZ1RN, an electrical engineer licensed in 1981. Stefan has an IC-735 and a 1-kW amplifier feeding a 2-element quad for 10, 15 and 20 meters (installed on a homemade tower). Stefan is a DXer with 301 DXCC entities worked, has several awards, does computer logging and has QSL cards.

My next hosts were Deko, LZ1QV, and his wife Ginka, LZ1GW. For 25 years Deko was a radio officer on cargo ships. He's now a purser on an oil tanker. Ginka is studying economics at the local university. The two use a computer, a Kenwood R-100 communications receiver, a Yaesu FT-990 and an all-band delta loop antenna.

We took a trip to the village of Dolno Ezerovo, four miles outside Burgas, to see Nick, LZ1ZM. Nick uses a Kenwood TS-820 and several antennas on HF and VHF. Nick operates CW, Pactor, RTTY and packet. His e-mail address is [lz1zm@mobikom.com](mailto:lz1zm@mobikom.com).

Last on my list in Burgas was Todor, LZ5QZ, a high school student licensed in 1995. He is the son of Kolyo, LZ1QZ. They share a Yaesu FT-707S and a homemade antenna tuner. Their antenna is an 80-meter delta loop. They have another house about 45 miles west of Burgas, Todor's grandparents' house, where they have a second station. Todor and Kolyo are avid contesters.

After I finished chatting with father and son I went to McDonald's to eat. Where else would a homesick American go? Later I went to the hotel to sleep, asking for a 4:45 AM wake-up call because my train was leaving for Veliko Tarnovo at 5:20 AM.

Burgas, after Varna, is the country's second-largest port city—lots of ships, lots of sailors and at least one McDonald's fast food joint.

## Veliko Tarnovo

Getting here required a longer train ride because I had to cross the Balkan Mountains from southern to northern Bulgaria. The first-class ticket for the five-hour ride was 8.95 levas, less than \$5. I had to change trains at Dabovo where, according to the schedule, I had three minutes between trains. My train was late—as was the train I had to catch! I stepped aboard the connecting train right on time.

The train traveled through many tunnels in complete darkness—some short, some long. I finally arrived in Veliko Tarnovo, where Kiril, LZ2JA, an electronics engineer and the director of Chamber of Commerce and Industry, was waiting for me.

We first went to the village of Kutsina, about 12 miles north of Veliko Tarnovo, to see George, LZ2VT. George has a Kenwood TS-830S with a separate VFO-230, a second homemade transceiver and three linear amplifiers, all homemade (350, 800 and 1000 W). George has a nice color photo QSL card and his e-mail address is [vtcci@vali.bg](mailto:vtcci@vali.bg).

Next we visited the village of Polikraiste to see Rumen, LZ2DD, a barman, first licensed in 1988, with a Class A license. Rumen has a homemade 50-W transceiver and a 4-element quad for 10 through 20 meters on top of an 80-foot tower.

Kiril, LZ2JA, took me to the Military Academy to see the LZ2KMS club station and some of its operators. Years ago it would have been unthinkable for an American to even go near a Bulgarian military installation and take photographs of smiling high-ranking officers!

The club station has a TS-830S, a TS-780 and a couple of huge, old military radios. I met the father-and-son team of Khristo, LZ4XG, an army colonel, and his son Kaloyan, LZ2GKX, a sergeant; colonel Iliia, LZ4JO; colonel Ivan, LZ4IX; and Wasil, a cadet at the Academy. All three colonels are professors at the Military Academy. Because LZ2KMS is a contest station, the ops there have worked more than 200 DXCC entities on CW, RTTY and SSB. The ops use a computer for logging and for high-speed telegraphy practice. As we were leaving the Academy we met Mike, LZ2NW, a sergeant and the president of another radio club, LZ2KBA (LZ6T during contests).

In the evening, Kiril, LZ2JA; Kiril, LZ2ZK (there is no shortage of Kirils in Bulgaria); the three ham radio colonels and their families; and I met in a little restaurant where we had a long and pleasant conversation.

I had finished my job. Now it was time to head for the hotel to catch some shuteye.

In the morning, I got up in a hurry. Kiril, LZ2JA, was waiting for me in front of the hotel to take me to the railway station. I left the hotel without taking my passport, which, according to past and present rules, I had to leave there until I departed. At the railway station, 16 minutes before my train was scheduled to leave, I remembered my passport. Kiril jumped in his car and went to get it. The train arrived and everybody stood up. I stayed near it, waiting. I suddenly saw Kiril running toward the train with my passport in hand. I threw my bags on the train and got onto the steps. The moment Kiril handed me my passport the train left for Russe.

## Russe

At the railway station, Mike, LZ2ZD, was waiting for me. Mike is a broadcast engineer working at the local television station. The building, shaped like a tall needle, is very contemporary, as is the equipment it houses. Mike, licensed in 1984, graduated from the Technical University of Sofia and is still a proud member of his "alma mater" radio club, LZ1KDP. He uses a "Volna"-type transceiver made in the Ukraine with a homemade 400-W amplifier. Mike's e-mail address is [lz2zd@yahoo.com](mailto:lz2zd@yahoo.com).

Mike took me to see the last station I'd visit in Bulgaria—the Technical University Student's Radio Club, LZ1KIM. When we arrived, Rumen, LZ2AF, was already there. This club used to be very active and was favored by a great many operators. Although years of financial shortfalls have taken their toll, LZ1KIM still has a Kenwood TS-830, a 1-kW amplifier and several wire antennas.

## Home Via Home

During my trip to Russe I slept in a guestroom in the television building, an arrangement made by Mike, LZ2ZD. In the morning, Mike took me to the railway station where I boarded the train that took me across the Danube river, all the way to Bucharest, Romania. There I changed trains and after another nine hours I arrived in my hometown of Timisoara, where I rested a few days before I took a plane back to New York City.

I'd had a wonderful time visiting the Bulgarian amateurs. They're good hams and good hosts—and friendly to a fault. But if you visit them, don't forget to nod your head up and down to indicate "no!"

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Q5T-



# A \$20 HF Mobile Antenna

A few hours of fun with PVC and wire and you've got yourself a respectable road radiator!

**W**hile returning home from a brief business trip one evening, I was listening to the chatter on a 2-meter repeater. As one ham extolled the virtues of a new generation of diminutive HF transceivers, several others lamented the expense of good antennas for the HF bands and 2 meters. I operate HF and VHF mobile every day. On VHF, I use a roof-rack-mounted  $\frac{5}{8}$ - $\lambda$  commercial mobile antenna that retails for \$14.95. On the HF bands, a bumper-mounted "homebrew" antenna—that costs about the same as the VHF antenna—added the bonus of a fun day at the workbench!

My HF antenna is a "bug-catcher" style vertical that has netted me CW and phone contacts worldwide using my ICOM IC-706MkII. The antenna consists of little more than some PVC pipe topped by a RadioShack replacement whip antenna and a couple of coils made from a small roll of #14 house wire. The beauty of this antenna lies not only in its under-\$20 price tag, but also in its simplicity and ease of tuning. The antenna can be built for a wide range of frequencies;

finding a good match and low SWR is no more complicated than moving two taps, one on the loading coil and one on the matching coil.

My current version of this antenna operates on 20 through 6 meters with an SWR of 1.5:1 or less in any segment of each band. The antenna is quite broadband even in a one-tap setup. One real joy of building this antenna is that because it's fully adjustable, construction dimensions are completely noncritical! How much easier could an antenna be?

## Construction

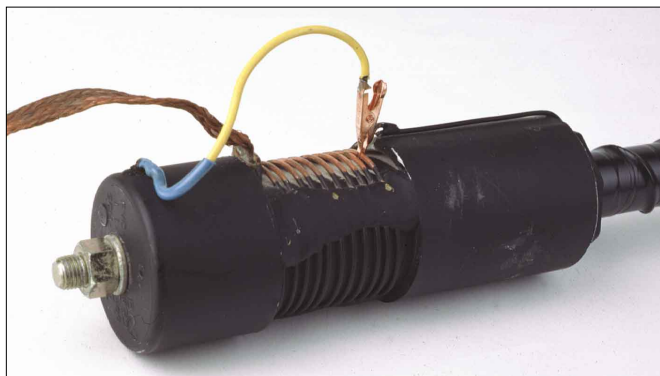
A trip to your local hardware store or do-it-yourself outlet and RadioShack should equip you with the majority, if not all, of the parts required; see the [Materials List](#). You'll need three pieces of schedule 40 PVC pipe. One piece is a three-foot-long section of  $\frac{1}{2}$ -inch pipe that forms the antenna shaft (center). For the loading and matching-section coil forms, I use  $1\frac{1}{4}$ -inch-diameter pipe so the antenna can be mounted reasonably close to the vehicle. The loading coil at the top of the antenna is a piece of



Ready for the road! A length of  $\frac{1}{2}$ -inch-diameter PVC pipe fastened to the vehicle's roof rack and antenna acts as a stabilizer.

$1\frac{1}{4}$ -inch pipe roughly 6 inches long. The third piece of PVC is a 4-inch length of  $1\frac{1}{4}$ -inch pipe used for the matching-coil form at the bottom of the antenna.

Refer to the accompanying photographs during the following discussion. Use a belt sander or a file to make a flat about  $\frac{5}{8}$  inch wide along the length of each of the two  $1\frac{1}{4}$ -inch coil forms. The flats provide room beneath the coil windings for attaching clip-lead taps. Each coil form has a PVC end

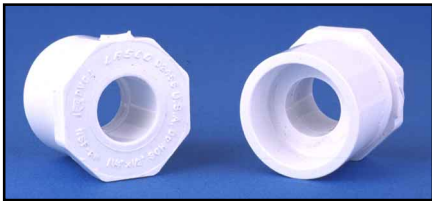


Close-up view of the matching coil. To the left is the  $\frac{3}{8}$ -24 mounting bolt. Attached to the bottom turn of the coil is a length of shield braid used as a ground strap. A small area of the PVC pipe OD is ground flat to provide room between the coil turns and the pipe form for an alligator-clip tap to firmly grasp a wire turn without interference.



The loading coil resembles the matching coil except it has a greater number of turns. A RadioShack whip is attached to the top PVC cap. The wire lead connecting the bottom of the whip to the top of the loading coil passes through a hole in the top of the pipe cap.





Two of these reducers (Genova and DO-IT #30245) are needed to make the transition from 1 1/4-inch pipe to 1/2-inch pipe.

cap on one end and a 2 1/2-inch-long dual female coupling fitted with a standard PVC 1 1/4-inch to 1/2-inch reducer (Genova and DO-IT #30245) on the other end. The reducers and couplers mate each end of the main shaft to the coil forms. You can assemble for fit, but don't glue the pieces together yet.

Center-drill both end caps. Drill the top cap on the loading coil to accept a RadioShack replacement whip assembly (RS 21-952). In the matching-coil's bottom cap, drill a hole to accept a 3/8-24 bolt for the mounting stud. Also, drill a small hole through the side of each top and bottom cap, near the top, to pass a length of #14 wire.

To the bottom of the whip and mounting bolt, attach 12-inch-long pigtails of #14 bare wire, passing the wires through their cap holes to the outside. These wires, respectively, connect the bottom of the whip to the top of the loading coil, and the mounting stud (RF feed) to a clip lead for the matching coil. Fasten the whip and the 3/8-24 bolt to their respective PVC caps, securing them tightly. Place a drop or two of thread-locking compound on the threads of the whip base in the upper cap and on the threads of the 3/8-24 bolt in the bottom cap. If either of those mounting nuts come loose once you have glued the whole thing together and wound the coils, you may—shall I say—utter a few words of disappointment! Once the connections are tight, align the flat sides of the two coil forms at the opposite ends of the main shaft and glue the entire shaft assembly. At this point, your creation starts to look like a real antenna!

Now, wind the coils. Strip a 25-foot roll of #14/2 (with ground) house wire. Wrap the wires on their respective forms, holding the turns temporarily in place with electrician's tape. The matching coil on my 20- through 6-meter antenna consists of 11 turns spaced 1/8-inch apart (a length of about 1 7/8 inches). The loading coil has 25 turns spaced 1/8-inch apart for a length of approximately 3 7/8 inches. Wind the third wire on the antenna shaft, spacing the turns about 1 inch to 1 1/4 inches apart. Don't wind the turns of the helix any closer than an inch apart, otherwise tuning the antenna on 10 and 12 meters will be a real challenge.

When the coils are wound to your liking, mix a couple of inches of epoxy putty and cut it into six strips. (Duro Epoxy Putty Sealant works well. I use the 30-minute

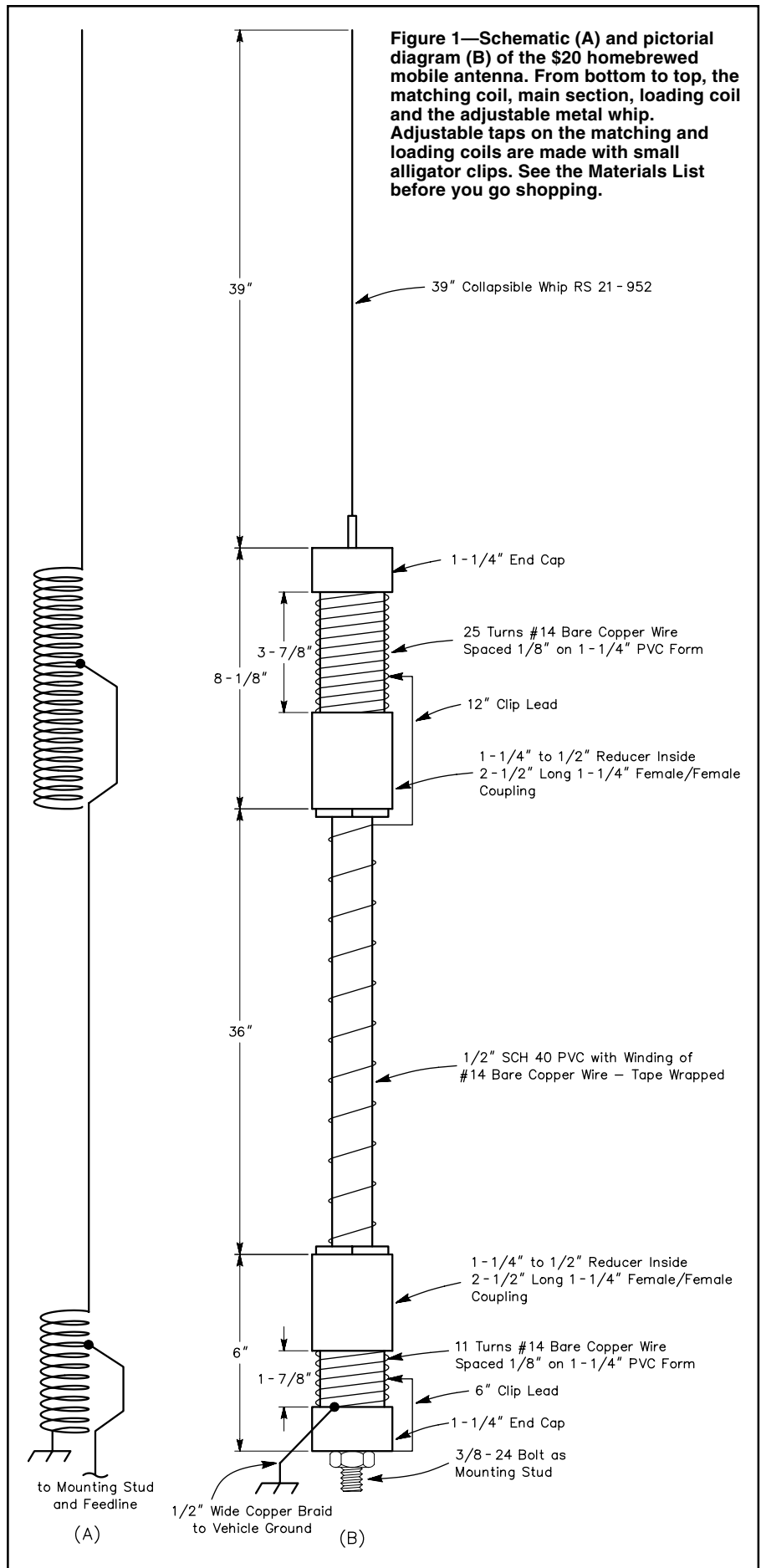


Figure 1—Schematic (A) and pictorial diagram (B) of the \$20 homebrewed mobile antenna. From bottom to top, the matching coil, main section, loading coil and the adjustable metal whip. Adjustable taps on the matching and loading coils are made with small alligator clips. See the Materials List before you go shopping.





The main shaft of the antenna is wound with a turns spacing of no less than one inch.

Table 1

Coil-Tap Positions and Whip Extension for the Mobile Antenna

Band (Meters)	Matching-Coil Tap (Turns)	Loading-Coil Tap (Turns)	Whip Position
20	6	8	Fully extended
17	9	14	Fully extended
15	8	20	Fully extended
12	10	23	Retracted 1 ft
10	10	24	Retracted 2 ft
6	10	12	Retracted 1 ft

variety and find that I have enough putty in one package for two antennas.) Roll each piece of putty into a bead long enough to extend the length of the matching and loading coils. Place three beads of epoxy on each coil, spacing them equally around the forms (but not over the flat areas). Lay each bead on its respective coil and press the bead until it flattens and contacts the coil form. When cured, the epoxy putty holds the coil turns securely in place.

Clip leads and cosmetics are next. Wrap the three-foot shaft and its winding with electrical tape. Spray the coils flat black taking care to mask the coil-tap areas above the flats. Solder a 6-inch-long clip lead to the  $3/8$ -24 mounting-stud pigtail and a 12-inch clip lead to the top of the helically wound shaft cutting off any excess wire. Connect the bottom turn of the matching coil to a length of  $1/2$ -inch-wide copper braid to serve as a ground connection. Solder the top of the loading coil to the whip's pigtail. Insert the whip and you're ready to install the antenna, tune it and get on the air!

### Installation and Operation

I use a standard bumper mount with an extra ground lug placed a few inches away to which the matching coil's braid is attached. Install the antenna and guy it—I use a length of  $1/2$ -inch PVC pipe attached to the vehicle's roof rack as a guy.

### Tuning

It helps to mark the tap points of the loading and matching coils for later reference. I use a gold-paint pen and place the marks on one of the flat beads of epoxy putty that runs the length of each coil. On my current antenna, I have dots placed every five turns and keep a small chart at the operating position. The reference points make band changes quick and consistent every time. The numbers in the coil-tap chart of Table 1 refer to the coil-tap points

as counted from the bottom of each coil.

This antenna tunes 20, 15 and 17 meters easily with the whip fully extended. I find that I have to drop the whip into the shaft about one foot to tune 12 meters, and about two feet to tune 10 meters. Get out a note pad and a pencil to make a tap-point chart for the various bands. Connect an SWR meter in the feed line between your transceiver and the antenna. (If available, you can use your rig's built-in SWR meter; my IC-706 is so equipped.)

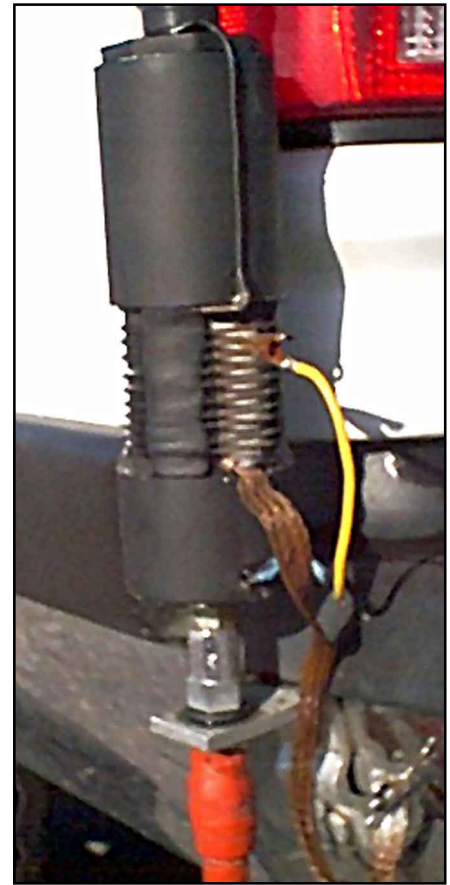
Key your rig and adjust the power output of your radio for just a few watts. The SWR is most affected by the movement of the loading coil tap (the upper coil) and fine-tuned by the placement of the matching-coil (lower coil) tap. Table 1 provides some starting points for finding the lowest SWR on each band. Each installation is different, so don't expect the number of turns given in Table 1 to match your installation exactly. Key the rig, check the SWR, move each tap up or down one turn and repeat the process until you've obtained the lowest SWR on each band.

On 20 through 10 meters, the antenna is  $1/4$ - $\lambda$  long. On 6 meters, the antenna is much too long to tune as a  $1/4$ - $\lambda$  radiator, but not too long to tune up nicely as a  $1/2$ - $\lambda$  radiator. With the whip fully extended, it's only a matter of some experimentation to find a "sweet spot" for 6 meters. (I wouldn't be surprised to discover a multiple of 2 meters hiding in there somewhere, although I haven't had the inclination to look for it).

The whip can collapse completely into the antenna shaft. This is great, especially if you keep your vehicle in a garage as I do. No matter how far into the shaft I retract the whip, at 100 W output, the dielectric and clearances are such that I have experienced no problems with whip-to-coil arcing.

### Summary

Now go have some fun with your "\$20 Martian Death Ray" (as my brother John,



A close-up of the antenna base.

### Materials List


- Length of  $1/2$ -inch-wide copper braid
- $3/8$ -24 mounting stud
- 25-ft #14/2 w/ground house wire
- Two  $1/4$ -inch PVC pipe caps
- Two  $1 1/4$ -inch to  $1/2$ -inch PVC reducers (Genova and DO-IT #30245)
- 36-inch length of  $1/2$ -inch PVC pipe
- PVC cement
- Epoxy putty sealant
- RadioShack collapsible whip (RS 21-952)
- Two alligator clips
- Plastic electrical tape

AB4GK, calls it). Just wait 'til the guys who ordered their expensive new HF mobile antennas hear from you tonight!

And look for me on 17 meters. I'd love to be the first person to compliment you on your new antenna!

*Frank W. King, KM4IE, was first licensed in North Carolina. He is an Episcopal priest and holds an Extra class license. He and his wife Jocelyn, KD4IMC, make their home on the Shores of Lake Michigan. You can contact Frank at 68121 Riverview Dr, South Haven, MI 49090-0149; frfrank@i2k.com.*

*Photos by the author and Joe Bottiglieri, AA1GW.*

<sup>1</sup>Fixed-station operators who have limited room for an antenna should give this antenna a try!.—Ed. 



# An Amateur Satellite Primer

Tired of the same old QSOs? Break out of orbit and set your course for the “final frontier.”

**S**atellite-active hams compose a relatively small segment of our hobby, primarily because of an unfortunate fiction that has been circulating for many years—the myth that operating through amateur satellites is overly difficult and expensive.

Like any other facet of Amateur Radio, satellite hamming is as expensive as you allow it to become. If you want to equip your home with a satellite communication station that would make a NASA engineer blush, it will be expensive. If you want to simply communicate with a few low-Earth-orbiting birds using less-than-state-of-the-art gear, a satellite station is no more expensive than a typical HF or VHF setup. In many cases you can communicate with satellites using your present station equipment—no additional purchases are necessary.

Does satellite hamming impose a steep learning curve? Not really. You have to do a bit of work and invest some brain power to be successful, but the same can be said of DXing, contesting, traffic handling, digital operating or any other specialized endeavor. You are, after all, communicating with a *spacecraft!*

The rewards for your efforts are substantial, making satellite operating one of the most exciting pursuits in Amateur Radio. There is nothing like the thrill of hearing someone responding to your call from a thousand miles away and knowing that he heard you through a satellite. (The same goes for the spooky, spellbinding effect of hearing your own voice echoing through a spacecraft as it streaks through the blackness of space.) Satellite hamming will pump the life back into your radio experience and give you new goals to conquer.

No doubt this is beginning to sound like an impassioned Captain Kirk delivery.

(“Answers! I need *answers*, Mr Spock!”) Let’s cut to the chase.

## Satellites: Orbiting Relay Stations

Most amateurs are familiar with repeater stations that retransmit signals to provide wider coverage. Repeaters achieve this by listening for signals on one frequency and immediately retransmitting whatever they hear on another frequency. Thanks to repeaters, small, low-power radios can communicate over thousands of square kilometers.

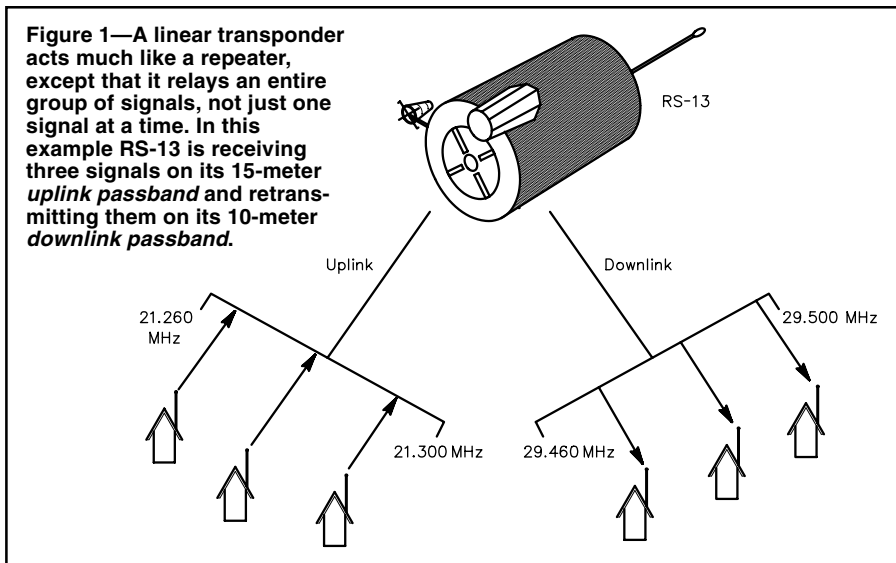
This is essentially the function of an amateur satellite as well. Of course, while a repeater antenna may be as much as a few thousand meters above the surrounding terrain, the satellite is hundreds or thousands of kilometers above the surface of the Earth. The area of the Earth that the satellite’s signals can reach is therefore much larger than the coverage area of even the best Earth-bound repeaters. It is this characteristic of



satellites that makes them attractive for communication. Most amateur satellites act either as analog repeaters, retransmitting CW and voice signals exactly as they are received, or as packet store-and-forward systems that receive whole messages from ground stations for later relay.

## Linear Transponders and the Problem of Power

Most analog satellites are equipped with *linear transponders*. These are devices that retransmit signals within a band of frequencies, usually 50 to 100 kHz wide, known as the *passband*. Since the linear transponder retransmits the entire band, a number of signals may be retransmitted simultaneously. For example, if three SSB signals (each separated by 20 kHz) were transmitted to the satellite, the satellite





would retransmit all three signals—still separated by 20 kHz each (see [Figure 1](#)). Just like a terrestrial repeater, the retransmissions take place on frequencies that are different from the ones on which the signals were originally received.

Some linear transponders invert the uplink signals. In other words, if you transmit to the satellite at the *bottom* of the uplink passband, your signal will appear at the *top* of the downlink passband. In addition, if you transmit in upper sideband (USB), your downlink signal will be in lower sideband (LSB). Transceivers designed for satellite use usually include features that cope with this confusing flip-flop.

Linear transponders can repeat any type of signal, but those used by amateur satellites are primarily designed for SSB and CW. The reason for the SSB/CW preference has a lot to do with the hassle of generating power in space. Amateur satellites are powered by batteries, which are recharged by solar cells. “Space rated” solar arrays and batteries are expensive. They are also heavy and tend to take up a substantial amount of space. Thanks to meager funding, hams don’t have the luxury of launching satellites with large power systems such as those used by commercial birds. We have to do the best we can within a much more limited “power budget.”

So what does this have to do with SSB or any other mode?

Think *duty cycle*—the amount of time that a transmitter operates at full output. With SSB and CW the duty cycle is quite low. A linear satellite transponder can retransmit many SSB and CW signals while still operating within the power generating limitations of an amateur satellite. It hardly breaks a sweat.

Now consider FM. An FM transmitter operates at a 100% duty cycle, which means it is generating its full output with every transmission. Imagine how much power a linear transponder would need to retransmit, say, a dozen FM signals—all demanding 100% output!

Having said all that, there *are* a few FM repeater satellites. However, these are very low-power satellites (typically less than 1 W output) and they do not use linear transponders. They retransmit only one signal at a time.

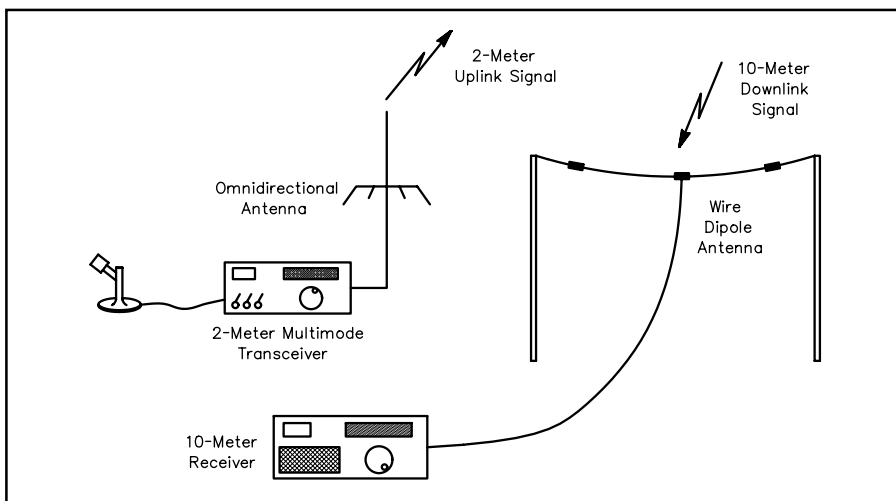
### Finding a Satellite

Before you can communicate through a satellite, you have to know when it is available. This isn’t quite as straightforward as it seems.

Amateur satellites do not travel in geostationary orbits like many commercial and military spacecraft. Satellites in geostationary orbits cruise above the Earth’s equator at an altitude of about 35,000



**A portable antenna array for working OSCAR 10. The array consists of a 2-meter Yagi, a 70-cm Yagi, and an azimuth/elevation rotator.**



**To work RS13 or RS15 by uplinking on 2 meters you’ll need a 2-meter multimode transceiver, a 10-meter receiver and antennas for 2 and 10 meters.**

kilometers. From this vantage point the satellites can “see” almost half of our planet. Their speed in orbit matches the rotational speed of the Earth itself, so the satellites appear to be “parked” at fixed positions in the sky. They are available to send and receive signals 24 hours a day over an enormous area.

Of course, amateur satellites *could* be placed in geostationary orbits. The problem isn’t one of physics; it’s money and politics. Placing a satellite in geostationary orbit and keeping it on station costs a great deal of money—more than any one amateur satellite organization can afford. An amateur satellite group could ask similar groups in other areas of the world to contribute money to a geostationary satellite project, but why

should they? Would you contribute large sums of money to a satellite that may never “see” your part of the world? Unless you are blessed with phenomenal generosity, it would seem unlikely!

Instead, all amateur satellites are either low-Earth orbiters (LEOs), or they travel in very high, elongated orbits. Either way, they are not in fixed positions in the sky. Their positions relative to your station change constantly as the satellites zip around the Earth. This means that you need to predict when satellites will appear in your area, and what paths they’ll take as they move across your local sky.

You’ll be pleased to know that there is software available that handles this prediction task very nicely. A bare-bones



program will provide a schedule for the satellite you choose. A very simple schedule might look something like this:

Date	Time	Azimuth	Elevation
10 OCT 01	1200	149°	4°
10 OCT 01	1201	147°	8°
10 OCT 01	1202	144°	13°
10 OCT 01	1203	139°	20°

The date column is obvious: 10 October 2001. The time is usually expressed in UTC. This particular satellite will appear above your horizon beginning at 1200 UTC. The bird will “rise” at an azimuth of 149°, or approximately southeast of your station. The elevation refers to the satellite’s position above your horizon in degrees—the higher the better. A zero-degree elevation is right on the horizon; 90° is directly overhead.

By looking at this schedule you can see that the satellite will appear in your southeastern sky at 1200 UTC and will rise quickly to an elevation of 20° by 1203. The satellite’s path will curve further to the east as it rises. Notice how the azimuth shifts from 149° at 1200 UTC to 139° at 1203.

The more sophisticated the software, the more information it usually provides in the schedule table. The software may also display the satellite’s position graphically as a moving object superimposed on a map of the world. Some of the displays used by satellite prediction software are visually stunning!

Satellite prediction software is widely available on the Web. Some of the simpler programs are freeware. My recommendation is to browse the AMSAT-NA site at <http://www.amsat.org>. They have the largest collection of satellite software for just about any computer you can imagine. Most AMSAT software isn’t free, but the cost is reasonable and the funds support amateur satellite programs.

Whichever software you choose, there are two key pieces of information you must provide before you can use the programs:

(1) **Your position.** The software must have your latitude and longitude before it can crank out predictions for your station. The good news is that your position information doesn’t need to be extremely accurate. Just find out the latitude and longitude of your city or town (the public library would have this data, as would any nearby airport) and plug it into the program.

(2) **Orbital elements.** This is the information that describes the orbits of the satellites. You can find orbital elements (often referred to as *Keplerian elements*) at the AMSAT Web site, and through many other sources on the Internet. You need to update the elements every few months. Many satellite programs will automatically read in the elements if they are provided as ASCII text files. The less sophisticated programs will require you to enter them by

hand. I highly recommend the automatic-update software. It’s too easy to make a mistake with manual entries.

## Getting Started with the FM Birds

Do you like elevated FM repeaters with wide coverage areas? Then check out the AMRAD-OSCAR 27, UoSAT-OSCAR 14 and SunSat-OSCAR 35 FM repeater satellites. From their low-Earth orbits these satellites can hear stations within a radius of 2000 miles in all directions.

You can operate the FM satellites with a basic dual-band VHF/UHF FM transceiver. Assuming that the transceiver is reasonably sensitive, you can use an omnidirectional antenna such as a dual-band ground plane or something similar. Some amateurs have even managed to work the FM birds with H-Ts,

but they often couple their radios to multi-element directional antennas. Of course, this means that they must aim their antennas at the satellites as they cross overhead.

Start by booting your satellite tracking software. Check for a pass with a peak elevation of 30° or higher. As with all satellites, the higher the elevation, the better. If you plan to operate outdoors or away from home, either print the schedule to a printer or jot down the times on a piece of scrap paper that you can keep with you.

When the satellite comes into range, you’ll be receiving its signal about 5 kHz higher than the published downlink frequency (see Table 1) thanks to *Doppler shifting* (see the sidebar, “Down with Doppler”). So, begin listening on the higher frequency. If you suddenly hear the noise

**Table 1**  
**Active Amateur Satellites: Frequencies and Modes**

Satellite	Uplink (MHz)	Downlink (MHz)
<b>SSB/CW</b>		
AMSAT-OSCAR 10	435.030—435.180	145.825—145.975
Fuji-OSCAR 20	145.900—146.000	435.800—435.900
		435.795 (CW beacon)
Fuji-OSCAR 29 (available biweekly)	145.900—146.000	435.800—435.900
RS-13	21.260—21.300	435.795 (CW beacon)
	145.960—146.000	29.460—29.500
RS-15	145.858—145.898	29.458 (CW beacon)
		29.354—29.394
<b>Packet—1200 bit/s</b> (FM FSK uplink, PSK downlink except as noted)		
AMSAT-OSCAR 16	145.90, .92, .94, .96	437.0513
<b>Packet—9600 bit/s</b> (FM FSK uplink and downlink.)		
UoSAT-OSCAR 22	145.900, .975	435.120
KITSAT-OSCAR 25	145.98	436.50
Fuji-OSCAR 29	145.85, .87, .89, .91	435.910
TMSAT-OSCAR 31	145.925	436.925
UoSAT-OSCAR 36	145.960	437.025, 437.400
<b>FM Voice Repeaters</b>		
UoSAT-OSCAR 14	145.975	435.070
AMRAD-OSCAR 27 (daylight passes <i>only</i> )	145.850	436.795
SUNSAT-OSCAR 35 (limited operation)	436.290	145.825

### Down with Doppler

The relative motion between you and the satellite causes *Doppler shifting* of signals. As the satellite moves toward you, the frequency of the downlink signals will increase as the velocity of the satellite adds to the velocity of the transmitted signal. As the satellite passes overhead and starts to move away from you, the frequency will drop, much the same way as the tone of a car horn or a train whistle drops as the vehicle moves past the observer.

The Doppler effect is different for stations located at different distances from the satellite because the relative velocity of the satellite with respect to the observer is dependent on the observer’s distance from the satellite. The result is that signals passing through the satellite transponder shift slowly around the published downlink frequency. Your job is to tune your uplink transmitter—*not your receiver*—to compensate for Doppler shifting and keep your frequency relatively stable on the downlink. That’s why it is helpful to hear your own signal coming through the satellite. If you and the station you’re talking to both compensate correctly, your conversation will stay at one frequency on the downlink throughout the pass. If you don’t compensate, your signals will drift through the downlink passband as you attempt to “follow” each other. This is highly annoying to others using the satellite because your drifting signals may drift into their conversations.



level dropping, chances are you are picking up the satellite's signal. At about the midpoint of the pass you'll need to shift your receiver down to the published frequency, and as the satellite is heading away you may wind up stepping down another 5 kHz. Some operators program these frequency steps into memory channels so that they can compensate for Doppler shift at the push of a button.

Once again, these FM satellites behave just like terrestrial FM repeaters. Only one person at a time can talk. If two or more people transmit simultaneously, the result is garbled audio or a squealing sound on the output. The trick is to take turns and keep the conversations short. Even the best passes will only give you about 15 minutes to use the satellite. If you strike up a conversation, don't forget that there are others waiting to use the bird.

The FM repeater satellites are a good way to get started. My recommendation would be to try OSCAR 14 or OSCAR 27 first. SunSat-OSCAR 35 operates on a somewhat variable schedule and may be difficult to catch. See the SunSat Web page at <http://sunsat.ee.sun.ac.za/> for the latest schedules.

Once you get your feet wet, you'll probably wish you could access a satellite that wasn't so crowded, where you could chat for as long as the bird was in range. Time to move up!

## Moving Up to the Fujis and Radio Sputniks

The RS—*Radio Sputnik*—satellites were built and launched by the former Soviet Union. There have been a number of RS satellites in orbit. At the time of this writing, only RS-13 and RS-15 are operating.

RS-13 is by far the more popular of the two active Radio Sputniks. It is actually a transponder module riding piggyback, so to speak, on much larger navigational bird. RS-13 carries a *Mode K* transponder, which means that it receives signals on the 15-meter band and retransmits on the 10-meter band. RS-13 also operates in *Mode A*, which means that it receives on 2 meters and retransmits on 10 meters.

When using RS-13 you don't need to know precisely where the satellite is positioned in the sky. After all, you aren't likely to be using narrow beamwidth antennas unless you're trying to uplink on 2 meters using a Yagi. Mainly, you want to know when the satellite will be in view. Of course, 15 and 10-meter signals are subject to ionospheric bending, so it pays to listen for the satellite before and after the predicted visibility period.

Once you've determined when the satellite is due to rise above the horizon at your location, listen for the satellite's CW telemetry beacon. This signal is transmitted

constantly by the satellite and carries information about the state of the satellite's systems, such as its battery voltage, solar-panel currents, temperatures and so on. You should hear it just as the satellite rises above the horizon. As soon as you can hear the beacon, start tuning across the downlink passband.

On an active day you should pick up several signals (you can hear recordings of actual RS-13 signals in the Amateur Radio section of my personal Web site at <http://home.att.net/~wb8imy/home.htm>). They will sound like normal amateur SSB and CW conversations. Nothing unusual about them at all—except that the signals will be slowly drifting downward in frequency. That's the effect of Doppler shift. It's not too serious on the 10-meter downlink, but it can be a challenge when the downlink is at 70 cm because the degree of shift is proportional to the transmitted frequency—the higher the frequency, the greater the shift.

Now tune your transmitter's frequency to the satellite's uplink passband (on either 15 or 2 meters). RS-13 does not use inverting transponders. If you transmit at the low end of the uplink passband, you can expect to hear your signal at the low end of the downlink passband. Discounting the effects of Doppler, the relationship between your uplink and downlink frequency is fairly direct. For example, if you transmit at 21.265 MHz you can expect your signal to be retransmitted by the satellite at 29.465 MHz. Generally speaking, CW operators occupy the lower half of the transponder passband while SSB enthusiasts use the upper half.

Assuming that you cannot hear your own signal from the satellite on a separate receiver, the best thing to do is make your best guess as to where your signal will appear on the downlink and set your receive frequency accordingly. Send several brief CQs ("CQ RS-13, CQ RS-13..."), tuning "generously" around your guesstimated receive frequency after each one. The station that is answering your call will also be making his or her best guess about where you are listening.

RS-15 operates in the same fashion, but listens only on 2 meters and retransmits on 10 meters. Unfortunately, RS-15 has been suffering from a damaged power system. As a result, its signal is often very weak.

Fuji OSCARs 20 and 29 are also linear transponder birds that function much like RS-13 and RS-15. The main difference is that they listen on 2 meters and retransmit on 70 cm. (They also use inverting transponders.) Not that many amateurs own receivers that can listen for 70-cm CW and SSB, so these satellites are not very active. During weekend passes, however, you should be able

to hear several conversations taking place.

## Station Requirements for the RS and Fuji Satellites

To work RS-13 you'll need, at minimum, a multiband HF SSB or CW transceiver. You *do not* need an amplifier; 100 W is more than enough power for the uplink. In fact, even 100 W may be too much in many instances. The rule of thumb is that your signal on the downlink should never be stronger than the satellite's own telemetry beacon.

A 15-meter wire dipole is adequate for sending and receiving with RS-13. (Yes, you'll be listening on 10 meters, but the 15-meter dipole should function adequately as a 10-meter receiving antenna.)

The ideal situation is to have *separate* 15- and 10-meter radios and antennas so that you can listen on 10 meters while you are transmitting on 15 meters. The ability to hear yourself simultaneously on the downlink is a tremendous asset for working any satellite. It allows you to operate full duplex as you listen to the Doppler shifting of your own signal, giving you the opportunity to immediately tweak your transmit frequency to compensate (rather than fishing for contacts using the haphazard half-duplex procedure I described earlier).

To work RS-13 and RS-15 in Mode A, you'll need a 2-meter multimode transceiver that can operate in CW or SSB. Remember that in Mode A RS-13 and RS-15 are listening for signals on 2 meters and retransmitting on 10 meters. This means that you'll still need a 10-meter SSB receiver. Choose your radios carefully. A number of modern HF transceivers also include 2 meters and even 70 cm. The problem, however, is that some of these radios do not allow *crossband splits* between VHF and HF. That is, they won't allow you to transmit on 2 meters and receive on 10 meters. At the very least they won't allow you to do this simultaneously.

Omnidirectional antennas for 2 meters are sufficient for transmitting to RS-13 and RS-15. A beam on 2 meters would be even better, but then you incur the cost of an antenna rotator that can move the antenna up and down as well as side to side—the so-called *azimuth/elevation rotator*.

For the Fuji OSCARs the ability to transmit and receive simultaneously is a must, in my opinion. The Doppler effect is pronounced on the 70-cm downlink. You need to listen to your own signal continuously, making small adjustments to your 2-meter uplink so that your voice or CW note does not slide rapidly downward in frequency. To achieve this you will need separate 2-meter and 70-cm transceivers (such as a couple of used rigs), or a dual-band transceiver that is specifically designed for satellite use. Kenwood, ICOM



and Yaesu have such radios in their product lines. These wondrous rigs make satellite operating a breeze, although their price tags may give you a bit of sticker shock (about \$1600). They feature full crossband duplex, meaning that you can transmit on 2 meters at the same time you are listening on 70-cm. They even have the ability to work with inverting transponders automatically. That is, as you move your receive frequency down, the transmit VFO will automatically move up (and vice versa)!

Although beam antennas and azimuth/elevation rotators are not strictly necessary to work the Fujis (I've done it myself with omnidirectional antennas on both bands), they vastly improve the quality of your signal. If you decide to go the omnidirectional route, you'll need to add a 70-cm receive preamp at the antenna to boost the downlink signal.

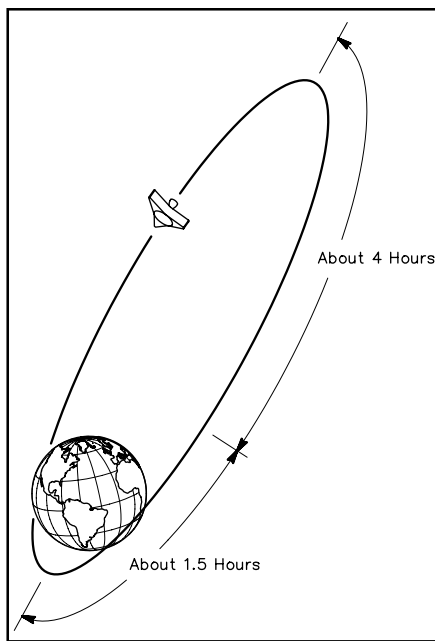
### Taking the High Road with OSCAR 10

The limitations of LEO satellites, especially their brief periods of availability, are overcome by a class of satellites called "Phase 3." The name comes from the various phases in the development of amateur satellites. The earliest ones, during Phase 1, contained beacon and telemetry transmitters, but not transponders. These early satellites were all in circular, low-Earth orbits—as were the Phase 2 satellites, which carried communication transponders.

Phase 3 satellites are not in low-Earth orbits. Rather, their orbits describe an ellipse. These satellites swing within a few hundred kilometers of the Earth's surface at one end of the ellipse (the *perigee*) and streaks out to 30,000 km or so at the other end (the *apogee*). The physics of an orbiting body dictates that the satellite spends much more of its time near apogee than perigee. Therefore, the Phase 3 satellites spend most of their time at very high altitudes. From a typical point in the Northern Hemisphere, a particular Phase 3 satellite is available for more than 10 hours per day. This is a remarkable improvement over the LEO satellites! And because the Phase 3 satellite is so much higher, it is visible from a greater fraction of the Earth's surface, too. The result is a vast improvement in the communications capability of the satellite.

There is a downside, however. The greater distance to the Phase 3 satellite means that more transmitted power is needed to access it, and a weaker signal is received from the satellite at the ground station. (This problem is alleviated somewhat by the use of gain antennas on the satellite.) The signal levels are such that you usually need ground-station antennas that exhibit significant gain (10 dBi or more).

At the time of this writing, the only Phase 3 satellite in orbit is OSCAR 10. It



**OSCAR 10 travels in a high, elliptical orbit. Phase 3D will achieve a similar orbit.**

is only intermittently available; its computer suffered accumulated radiation damage that rendered the satellite uncontrollable. OSCAR 10 occasionally operates when it gets sufficient sunlight.

When OSCAR 10 is working, however, it is a hot DX satellite! At apogee OSCAR 10 can see half of the globe. This means that you can enjoy transatlantic and transpacific conversations for hours at a time.

Such astonishing capability comes at a price in terms of station hardware. Not only will you need Yagi antennas and an az/el rotator, you will also need a VHF/UHF dual-band "satellite ready" SSB transceiver, a 150-W amplifier and a receive preamplifier. If you buy brand-new equipment, the cost of a station for OSCAR 10 could approach \$3000. Some careful shopping at fleamarkets and on the Web can bring the cost down to about \$1500.

### Phase 3D—The SuperSat

Late last year the amateur satellite community received the happy news that Phase 3D, the largest, most expensive Amateur Radio satellite ever created, finally had a launch commitment. If everything goes as planned, Phase 3D will be launched in the very near future.

Like OSCAR 10, Phase 3D is designed to travel in a high, elongated orbit that will provide spectacular DX coverage. Phase 3D will be a huge (by amateur satellite standards) communication platform offering transponders—both analog and digital—from HF to microwave!

The RF output of its 2-meter transmitter alone will be about 200 W. Compare that to the 50-W output of OSCAR 10 on 2



**The Phase 3D satellite, buttoned up and ready to go.**

meters. This isn't the whole story, though. OSCAR 10's 2-meter antenna offers an effective radiated power (ERP) of 180 W. The superior 2-meter antennas aboard Phase 3D are capable of yielding an ERP of up to 2500 W!

What does this mean to you? It means that you won't need the large multielement beam antennas you're accustomed to seeing on most OSCAR 10 stations. Depending on the sensitivity of your receiver you may not even need a mast-mounted receive preamp.

Phase 3D will pack a substantial punch on all of its transponders making large, expensive stations for high-orbiting amateur satellites things of the past. This will be especially true if you take advantage of Phase 3D's microwave capability.

Like most satellite operators I'm eagerly awaiting news about the launch of Phase 3D. When that powerful spacecraft reaches orbit, a new era of satellite hamming will begin.

### The PACSATs

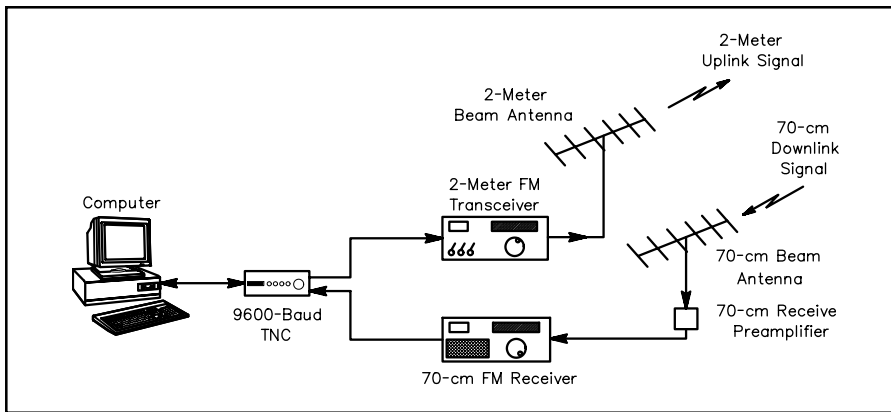
If you enjoy packet operating, you'll love the PACSATs! Several satellites comprise the currently active PACSAT armada: AMSAT-OSCAR 16, UoSAT-OSCAR 22, KITSAT-OSCAR 25, Fuji-OSCAR 29, TMSAT-OSCAR 31 and UoSAT-OSCAR 36.

Most PACSATs work like temporary mail boxes in space. You upload a message or a file to a PACSAT and it is stored for a time (days or weeks) until someone else—possibly on the other side of the world—downloads it. Many PACSATs are also equipped with on-board digital cameras. They snap fascinating images of the Earth, which are stored as files that you can download and view. Read "Step Up to the 38,400 Bps Digital Satellites" by Stacey Mills, W4SM, elsewhere in this issue.

### Which PACSAT is Best?

You can divide the PACSATs into two types: The 1200- and 9600-baud satellites. OSCAR 16 is presently the only 1200-baud PACSAT available for message storing and forwarding (OSCAR 19 may be coming back on line shortly). You transmit packets





This is a diagram of a typical 9600-baud packet satellite station. Both the 2-meter and 70-cm radios must be capable of handling 9600-baud data signals.

to AO-16 on 2-meter FM and receive on its phase-shift keying (PSK) signal on 435-MHz SSB. OSCARs 22, 25, 29, 31 and 36 are the 9600-baud PACSATs. You send packets to them on 2-meter FM and receive on 435-MHz FM.

So which PACSATs are best for beginners? There's no easy answer for that question. You can use any 2-meter FM transceiver to send data to a 1200-baud PACSAT, but getting your hands on a 435-MHz SSB receive could put a substantial dent in your bank account (although you could receive the signal on an HF rig by using a receive converter). In addition, you need a special PSK terminal node controller (TNC). These little boxes are not common and could set you back about \$250.

So the 9600-baud PACSATs are best for the newbie, right? Not so fast. It's true that you don't need a special packet TNC. Any of the affordable 9600-baud TNCs will do the job. The catch is that not all FM transceivers are usable for 9600-baud packet. You need rigs (or a single dual-band radio) capable of handling 9600-baud signals. And not all 440-MHz FM transceivers can receive down to the 435-MHz neighborhood of the PACSATs. As always, shop carefully.

### Broadcasting Data

Despite the huge amounts of data that can be captured during a pass, there is considerable competition among ground stations about exactly *which* data the satellite should receive or send! There are typically two or three dozen stations within a satellite's roving footprint, all making their various requests. If you think this sounds like a recipe for chaos, you're right.

The PACSATs produce order out of anarchy by creating two *queues* (waiting lines)—one for uploading and another for downloading. The upload queue can accommodate two stations and the download queue can take as many as 20. Once the

satellite admits a ground station into the queue for downloading, the station moves forward in the line until it reaches the front, whereupon the satellite services the request for several seconds.

For example, let's say that OSCAR 16 just accepted me, WB8IMY, into the download queue. I want to grab a particular file from the bird, but I have to wait my turn. OSCAR 16 lets me know where I stand by sending an "announcement" that I see on my monitor. It might look like this:

**WB8ISZ AA3YL KD3GLS WB8IMY**

WB8ISZ is at the head of the line. The satellite will send him a chunk of data, then move him to the rear.

**AA3YL KD3GLS WB8IMY WB8ISZ**

Now there are only two stations ahead of me. When I reach the beginning of the line, I'll get my share of "attention" from the satellite.

You may not be able to download an entire file in one shot. If the satellite disappears over the horizon before you receive the complete file, there's no need to worry. Your PACSAT software "remembers" which parts of the file you still need from the bird. When it appears again, your software can request that these "holes" be filled.

And while all of this is going on, *you're receiving data that other stations have requested!* That's right. Not only do you get the file you wanted, you also receive a large portion of the data that other hams have requested. You may receive a number of messages and files without transmitting a single watt of RF. All you have to do is listen. That's why they call it "broadcast" protocol. (The one exception to the broadcast method is Fuji-OSCAR 29. It operates more like a traditional packet BBS.)

### Station Software

You must run specialized software on your station PC if you're going to enjoy any success with the broadcast-protocol



Bruce Paige, KK5DO, and his daughter Mahana, W5BTS, are both active satellite operators. Bruce is responsible for the Houston AMSAT Net, which you can hear on the Web in RealAudio at <http://www.amsatnet.com/>.

PACSATs. If your computer uses DOS only, you need a software package known as *PB/PG*. *PB* is the software you'll use most of the time to grab data from the satellite. *PG* is only used when you need to upload.

If you're running Microsoft *Windows* on your PC, you'll want to use *WISP*. *WISP* is a *Windows* version of *PB/PG* that includes such features as satellite tracking, antenna rotator control and more. Both software packages are available from AMSAT. And while you're contacting AMSAT, pick up a copy of the *Digital Satellite Guide*. It gets deep into the details of PACSAT operation far beyond the scope of what we can discuss here.

### Just the Beginning

This article barely nicks the surface of satellite operating. There is much more to learn and enjoy. I suggest that you spend some time at the AMSAT Web site at <http://www.amsat.org>. You'll pick up a wealth of information there. Speaking of "picking up," grab a copy of the *ARRL Satellite Handbook* (see your favorite dealer, or buy it on the Web at <http://www.arrl.org/catalog/>). Between these two resources you'll be able to tap just about all the amateur satellite knowledge you're likely to need.

In the meantime . . . see you in orbit!





# Step Up to the 38,400 Bps Digital Satellites

Imagine downloading high-resolution views of the Earth from orbit at 38,400 bps. Is it Internet technology? No, it's amateur satellites!

**T**he first digital store-and-forward satellites developed by hams in the late 1980s were a revolution in communication that has spawned a considerable commercial counterpart. The downlinks on the first generation Pacsats (AO-16, LO-19), launched just over 10 years ago, were phase shift keyed (PSK) at 1200 bits per second (bps). Bits per second are roughly, but not exactly, equivalent to “baud”. The first Pacsats were quite a revolution in their day, but incredibly slow by today’s standards. PSK was chosen for the downlink because it has several major advantages primarily relating to its low duty cycle as an SSB mode, narrow bandwidth, and high data transmission efficiency. That is, reception is possible at a relatively low signal-to-noise ratio. These were important features for early “proof of concept” satellites with limited power budgets. However, PSK suffers from the need for very precise tuning of the downlink frequency. Allowable deviations from the center frequency are generally measured in Hertz. Successful tuning usually requires closed-loop feedback from the modem to the transceiver to activate “mike click” up/down tuning and keep the signal locked during the considerable Doppler shift that occurs with a low earth orbit (LEO) satellite transmitting on 435 MHz. Nonetheless, the Pacsats performed admirably. AO-16, in particular has had a long and active career, only recently suffering its first software crash in many years.

The Pacsats were followed by the UoSat generation of digital satellites (UO-22, KO-23, KO-25) using frequency shift keying (FSK). FSK is an FM mode requiring more output power from the satellite, but it enables high data transmission rates, at a correspondingly wider bandwidth, and is much more forgiving with regard to tuning, an important factor given the Doppler shift

of satellite signals. The allowable tuning error is large enough with FSK that closed loop feedback is not necessary and calculated Doppler offsets based on a fresh set of the satellite’s Keplerian elements will suffice. With the use of FSK on satellites came the blinding speed of 9600 bps downlinks. Coupled with the development of the *WISP*<sup>1</sup> software package by Chris Jackson, G7UPN, and a variety of compatible rotator and radio control interfaces such as the Kansas City Tracker/Tuner card, TrakBox, SatTrak, and others, fully automated digital stations became

<sup>1</sup>Notes appear on page 45.

commonplace. The digital satellite revolution was in high gear.

Although several of the 9600 bps satellites have had cameras on board, the newest member of this group, TmSat-OSCAR 31, makes widespread use of its high resolution color cameras and takes a large number of high-quality images. Downloading these images can be time consuming at 9600 bps, although the recent use of compression algorithms on board the satellite has greatly alleviated this problem. By their nature, however, hams like to “push the envelope” and the latest in the series of amateur digital satellites is UoSat-OSCAR 36. This satellite, like all of the UoSats, was built at Surrey Satellite Technologies Limited (SSTL) in Surrey, England (<http://www.ee.surrey.ac.uk/SSC/>). What makes UO-36 different is that it has several high-speed downlinks, including one at 38400 bps. A 38400 bps downlink may eventually also be active on TO-31. This article summarizes the software and equipment necessary to receive these new high-speed downlinks. With a little effort, the results are quite dramatic. We’re talking about data transfer rates that rival or even surpass what you may be enjoying with your home Internet connection. Despite the fact that these low-orbit satellites are only in range for about 15 minutes, 1.5 megabyte downloads are typical on each satellite pass.

In order to receive at 38400 bps, and uplink at 9600 bps, we need to consider requirements for the radio, modem, and software, as well as some general operating comments.

## The Radio

In the days of 1200 bps satellites, data came and went straight through the audio jack and microphone input of a conventional transceiver. No modifications were required. The bandwidth needed for the signal was similar to that of a voice transmission, so

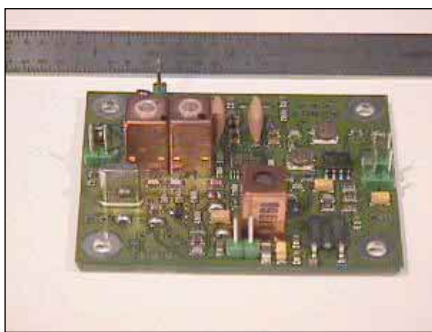


Figure 1—The Symek IFD board.



Figure 2—My IFD board installed in a Yaesu FT-736.

the shaping and selectivity filters normally used in voice transmissions were perfectly acceptable for 1200 bps data. For FSK, a good rule of thumb, given the modulation levels used, is that required receiver bandwidth is 1.5 times the data rate in bps. Thus, 9600 bps FSK requires approximately 14.4 kHz of bandwidth. A signal of this bandwidth is usually within the width of the IF passband, but will not pass unaltered through FM audio signal processing and speech shaping circuits, so these must be bypassed to receive and transmit the full signal. Some newer rigs now come from the factory with the appropriate data connectors for 9600 bps, but many older rigs (and some newer ones) require modifications. It is usually necessary to insert the FSK transmit signal directly into the FM transmitter's varactor diode and tap the FSK receive signal directly from the FM discriminator. The required modifications for a wide variety of radios are well documented and available on the AMSAT Web site at <ftp://ftp.amsat.org/amsat/mods/>. A large number of hams have successfully made these modifications.

If you are contemplating these 9600 bps modifications on a Yaesu FT-736R, be aware that the passband of the Yaesu FT-736 is slightly narrow for optimum 9600 bps FSK reception. This may be improved by replacing a filter in the transceiver with one having a wider bandwidth. Other rigs, such as the ICOM IC-475 have also been shown to benefit from changing their 15 kHz filters to 20 kHz filters. Information regarding this is also available on the AMSAT web site. Alternately, Symek (see below) has developed a simple demodulator on 455 kHz that they call a *ZFD board*. This sells for \$35 (US) and enables reception of FSK signals up to 19200 bps with excellent linearity. Because of the wider bandwidth of the ZFD compared with the standard FT736 demodulator, there is no need for absolutely precise tuning of the receiver.

When UO-36 is in 38400 bps downlink mode, the uplink bps rate is still 9600, so the modifications made for transmitting will work fine. In fact, the varactor diode signal insertion used for 9600 bps transmission is generally good up to 19200 bps.

For 38400 bps reception, the bandwidth required (approximately 57.6 kHz) far exceeds that normally present in the final stages of a conventional receiver. Amateur receivers are designed to be selective (narrow bandwidth) and the passband of the IF filters is considerably below this level. In order to get the signal bandwidth needed from a conventional amateur transceiver like the Yaesu FT-736R, Kenwood TS-790, ICOM-970, or ICOM IC-821, the receive signal must be intercepted at the first IF level, from the output of the first mixer, before any IF filtering has occurred. Until



Figure 3—The Symek TNC31S.

recently, this wasn't an easy feat to accomplish.

A new product from Symek (<http://www.symek.com/sat/main.htm>) in Germany provides precisely what you need.<sup>2</sup> Ulf Kumm and his co-workers have developed what they call an *IF demodulator* or *IFD board*. This is actually a small amplifier, receiver and signal demodulator—all in one. The intercepted first IF signal is amplified, converted to a second IF at 10.7 MHz, filtered and demodulated. The boards are specifically tuned for the first IF frequency of any of the commonly used 144/435 MHz dual band transceivers, some 435 MHz monoband rigs, and general coverage receivers as well. Power supply to the board is 8 to 20 V dc at approximately 35 mA. There are jumpers that allow you to select from a 5-V regulated power source, or to have the supply voltage present as dc bias on the IF input cable. In addition to providing data output, the IFD boards contain a few other niceties, which you may or may not need. Output of the filtered 10.7 MHz IF is readily available for use by other demodulators, such as a high speed PSK demodulator. There is an RSSI (S-meter) output that produces a dc voltage from 0 to 4 V, corresponding to signal levels from -110 dBm to -40 dBm. The discriminator output may be tapped if AFC is required.

When ordering an IFD board, in addition to indicating which type of radio (or first IF) you will be using, you must also decide about the passband filters on the board. There are three choices: 80 kHz (good to 38400 bps), 120 kHz (good to 76800 bps), and 300 kHz (good to 153600 bps). The 120 kHz filter is standard and if not otherwise specified your IFD will come with this. I also chose the 120 kHz filter to allow for future use at 76800 bps. I avoided the 300 kHz filters, because for the narrower 38400 bps signal, this would allow more adjacent noise into the passband, creating a lower signal to noise ratio.

If you don't see your rig listed on the Symek Web site, don't worry. If you can determine the first IF of your receiver,

they'll make a custom board. The boards measure 2.16 × 1.73 × 0.7 inches (55 × 44 × 18 mm) and easily fits inside most rigs (see Figure 1). Cost for standard boards is currently about \$125.00, plus shipping. Orders can be made over the Internet or by e-mail using a credit card. My IFD board arrived in about a week. For less common IFs, there may be a delay for fabricating the matching crystals of 4 weeks.

Symek provides detailed instructions (in English!) for the installation of these boards. These are partly available on their Web site, so you can see what's involved, before deciding about a purchase. If you were comfortable making 9600 bps transmit modifications, this is just as easy. In a Yaesu FT-736R the installation is especially easy, involving only the cutting and splicing of a single cable. The supply voltage is present on the IF cable, so no additional power connections are needed. The unit easily mounts on the back right-hand side of the top front bulkhead (Figure 2). I brought the connections for both 38400/9600 and 9600/9600 uplink/downlink to two separate 1/8-inch stereo jacks on the rear of the rig, just to the right of the 110-V power connector. Removing this plate and finding this small area for mounting the jacks was far more time consuming than installing the board, which only required an hour. If you want a faster approach, you can simply bring the cables out the back of the rig.

In my Kenwood TS-790 the installation is slightly more detailed, requiring a modification to one of the 435 MHz PC boards (cutting a land on the board) and installation of two small toroidal transformers, but following the instructions makes this easy if you're comfortable with working on small components. Symek recommends partially retuning the IF on some rigs after installation. Don't panic, the instructions are given for this as well, when needed. I was easily able to make this modification to a TS-790, including tweaking the tuning, in about 2 hours.

Importantly, once installed, the IFD board has no effect on normal function of the rig, either for normal audio usage or for 9600 bps operation. In fact, because the IFD is in series with the first IF and includes an amplification stage, you may actually notice a slight (1-2 dB) increase in receiver gain after the modification. This depends somewhat on the rig used. It should be noted that the IFD board is not meant to function at the narrow bandwidth of 9600 bps. Use the 9600 bps receive modification (discriminator pickup or ZFD board) for this bps rate.

If you don't want to modify your receiver for 38400 bps, Symek offers a *complete 70cm FM data transceiver*, the TRX4S, which is capable of transmitting and receiving data in narrow band mode up to



19200 bps and up to 153k bps in wide mode. This 20-W transceiver is fully programmable via RS232. It can be used for high speed terrestrial (receive and transmit) communications, as well as for 38400 bps satellite receiver operation just as it comes out of the box. To uplink on 2 meters (limited to 19200 bps) for satellite operation requires another radio, of course. Not surprisingly, compared with the low cost IFD add-on, this complete transceiver is more expensive (about \$940). However, if you're also thinking about terrestrial communications at these high data rates, this is a choice to consider.

### The Modem

Once you've modified your receiver and transmitter, you'll need a modem capable of handling 38400 bps FSK. At the moment the choices are somewhat limited. The standard G3RUH modem can be modified to run at 38400 bps. The modifications have been described by the modem's designer, James Miller, and are available on the Web at <http://www.amsat.org/amsat/articles/g3ruh/109a.txt>. The PacComm Spirit-2 (satellite version) is said to be capable of 4800 to 57600 bps right out of the box (<http://www.paccomm.com/>). I have not had experience with this unit, but I believe it is based on the G3RUH design, so it should be capable of handling this speed. The TAPR DSP group has been experimenting with the DSP56002EVM board at a variety of bps rates (<http://www.tapr.org/tapr/html/kitsf.html>). The processor in this unit is said to be "just barely" capable of handling a 38400 bps signal. Unfortunately, I have not had time to pursue this approach. The Motorola DSP56002EVM boards are no longer available, being replaced by several higher speed models. The latter are fully capable of handling 38400 bps and, hopefully, TAPR will develop appropriate interfaces and DSP software in the future.

Symek, the same company that produces the IFD boards I've already described, also makes two high-speed modems capable of 38400 bps, and beyond (>1Mbps). The TNC3S is a two port version, which may be set up to run 9600/9600 for the older satellites on one port, and 38400/9600 on the other port for UO-36 and TO-31. Software modifications to *WISP* to allow switching ports between satellites is currently in development and should be completed by the time this article appears. The TNC31S is a single port version of the TNC3S.

Currently, I am using the TNC31S (Figure 3). The unit can be set up to boot in "KISS" mode and to have 38400 bps receive and 9600 bps transmit functions. Having the modem boot in KISS mode makes it very easy to use. Just tell *WISP* that you're

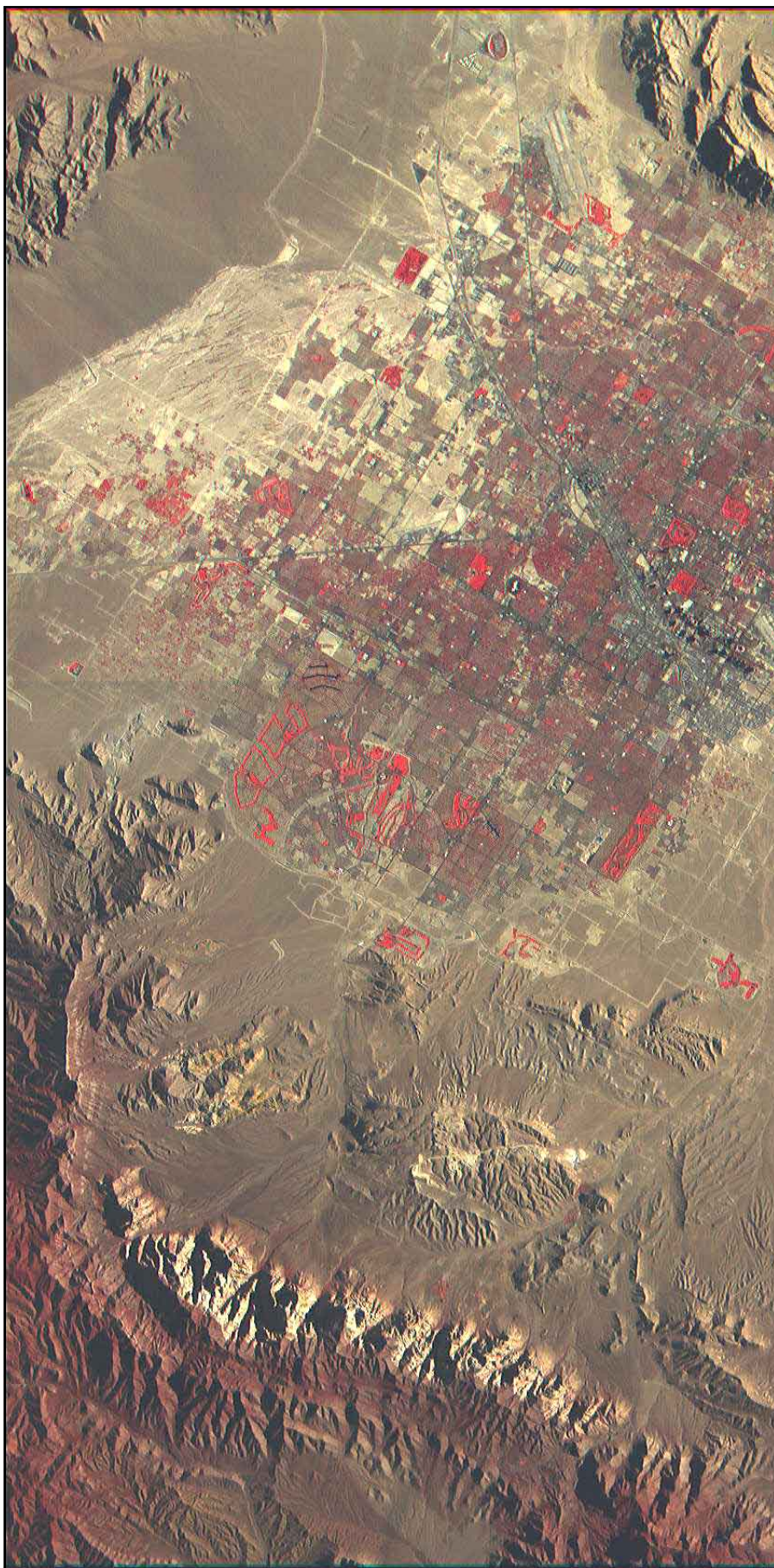


Figure 4—OSCAR 36 captured this image of a well-known city in the western US. Do you need a hint? Think "Caesar's Palace."



running a TNC-2; the TNC designation doesn't matter because *WISP* doesn't need special codes to place the modem in and out of KISS. The data link to my PC is at 57600 bps. It is important to have the transfer rate higher than the receive bps rate to prevent buffer overflows.

## Software

This is the easy part. The same *WISP* software package available from AMSAT that functions on the 1200 bps and 9600 bps satellites will work fine at 38400 bps. Remember to set your modem and *WISP* for a modem-to-computer data transfer rate higher than 38400 bps. I use 57600 bps. If the transfer rate from the modem to the computer is set at 38400, the modem can never "catch up" from data flow interruptions and the modem buffer will eventually overflow.

If you're going to enjoy the beautiful, high-resolution color photos available on UO-36 (and seen on the cover of this issue), you'll need the software package *CCD Display2000*, developed by Colin Hurst, VK5HI. This is also available from AMSAT. UO-36 and TO-31 have a variety of image formats, including wide and narrow angle, B&W, full color and spectral images. Many of the images are in compressed format, and also come with a smaller, "thumbnail" version that can be downloaded first and examined before downloading the higher resolution version. Color images require the assembly of multiple single-color images obtained through filters in the satellite's camera. Thumbnails as well as full size files are needed to reassemble the final image. A full description of the image file subtypes is beyond the scope of this article, but *CCDDisplay2000* includes a detailed Help file. The software handles decompression and assembly of the multiple image files into a final color image.

## Operation

Downlink at 38400 bps has to be seen to be fully appreciated! Currently, TO-31 is not operating in 38400 bps mode, so I will confine my comments to UO-36. This new satellite functions just like the other digital birds, and uses the standard Microsat File Transfer Protocol. Thus, image files (and other file types) can be specified for automatic downloading in the *WISP* MSPE equations. Details of this procedure can be found in the *WISP* setup and are familiar to users. *WISP* will then take care of requesting the files and requesting fills of file "holes" until the entire file has been downloaded. The downlink signal on UO-36 is at either 437.400 MHz or 437.025 MHz. Uplink is at 145.960 or 145.500 MHz.

Although the downlink signal is strong, I recommend that you use directional antennas and an azimuth/elevation rotator

for maximum efficiency. This doesn't mean that you can't use an omnidirectional antenna such as a ground plane or "eggbeater," but you definitely will not enjoy 1.5 megabyte downloads. Rather than grabbing an image in one pass, you may need several to complete the file. (*WISP* takes care of all of this automatically.)

If you are using directional antennas, you should know that the downlink signal is right-hand circularly polarized. As those familiar with AO-13 will remember, when the off-pointing angle of the satellite antenna is high, the apparent polarization at the listener's location can switch to left-hand. If you use circularly polarized antennas the ability to switch polarization is very helpful as occasionally the signal virtually disappears if the wrong polarization direction is selected. The alternative is to use linearly polarized antennas and give up a fixed 3-dB signal loss. Because of the high-speed data rate, you can lose a lot of data during the time it takes your antennas to reposition after hitting an azimuth "stop." For this reason, elevation "flip" mode is a big advantage if you can use it.

One of the benefits of the broadband signal at 38400 bps is that Doppler tuning for receive is very noncritical. In fact, you can tune to the nominal downlink frequency and do reasonably well for an entire pass. Since I use *WISP* with a Kansas City Tracker/Tuner card, I get the calculated Doppler offset correction automatically fed to my transceiver, but there is plenty of room for error with these bandwidths.

The Symek IFD board does an outstanding job of amplifying and demodulating the wideband 38400 bps downlink. Coupled with the Symek TNC31S that I use, download efficiencies of 95% to 100% are typical. It is not uncommon to download over 1.6 megabytes on good passes. Because of the high-speed link, it is easily possible to obtain a full set of satellite images on a single pass. Try that at 9600 bps! Often, "fill" block requests are handled so rapidly that you miss them in the queue.

To whet your appetite for what's available, I've included a spectacular image from UO-36. [Figure 4](#) is an unnamed town in the western US. See if you can figure out where.

## Conclusion

With relatively simple modifications, including a Symek IFD board, a standard dual band 144/435 MHz FM transceiver can be converted to handle a 38400 bps (and higher) downlink and transmit uplink data up to 19200 bps. The benefits are considerable with a four-fold increase in downlink speed as compared to the current 9600 bps UoSats. It seems likely that this will be a popular speed for future satellites and may be active on Phase 3-D. Why not jump in now and give it a try? After

watching 38400 bps downloads, the *WISP* byte counter on a 9600 bps pass appears to be moving in slow motion.

The modifications described can certainly be used for terrestrial packet as well. I'm convinced that the key to resurrecting packet in the United States, aside from the excellent functionality of APRS, lies in increasing the bps rate. In much of Europe, 9600 bps FSK is commonplace on terrestrial 435 MHz and several high speed (38400 bps and higher) packet stations have been established on 435 MHz and 1.2 GHz. The US has really lagged behind in developing terrestrial packet at rates above 1200 bps. "Internet speeds", perhaps with the newer TCP/IP style protocols, would sure "spice up" terrestrial packet as well!

## Acknowledgements


Several individuals have been extremely helpful in the construction of this article and the groundwork leading up to it. TO-31 and UO-36 are under the able control of Chris Jackson, G7UPN, at SSTL, who is also the author of the *WISP* software suite for automated satellite operation. In addition to managing their day to day functions, Chris programs the image requests into these satellites. Roy Welch, W0SL, is the stateside *WISP* "guru", a colleague in the checkout of UO-36 on 38400 bps, and provided helpful comments on this article. Colin Hurst, VK5HI, another colleague in early UO-36 adventures, is also the author of software needed to process the satellite image files. James Miller, G3RUH, former "master" of AO-13 and expert in all things digital supplied the modifications for the G3RUH modem necessary for 38400 bps.

Finally, it should be noted that the author is not affiliated with any company mentioned in this article, and has received no compensation from them with regard to the items mentioned.

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## Notes

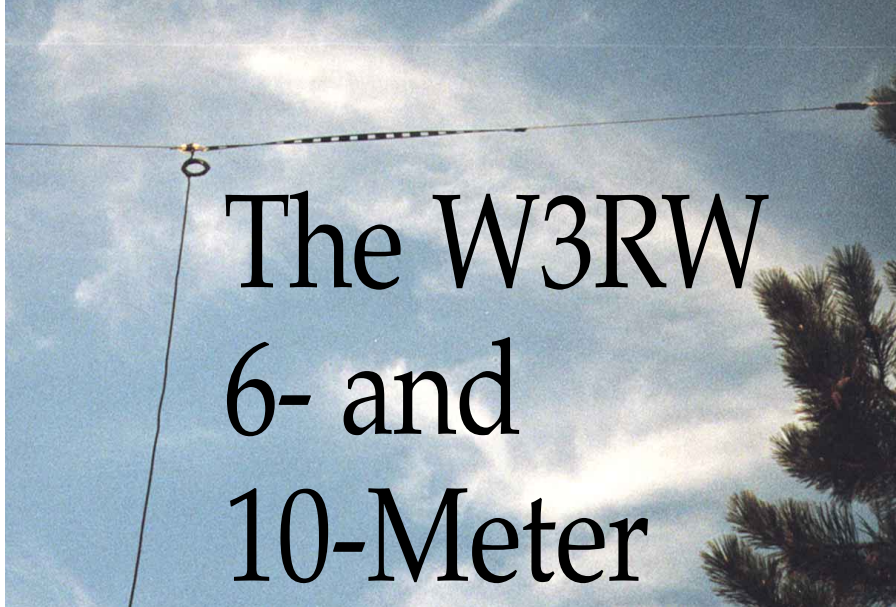
<sup>1</sup>To learn more about *WISP*, and about using the digital satellites in general, I strongly recommend that you pick up a copy of the *AMSAT-NA Digital Satellite Guide*. It is available from AMSAT, 850 Sligo Ave, Suite 600, Silver Spring, MD 20910-4703; fax 301-608-3410; tel 301-589-6062. \$12 in the US; \$13 in Canada and Mexico; \$15 elsewhere.

<sup>2</sup>Symek Datensysteme und Elektronik GmbH, Johannes-Kraemer-Str 34, D-70597 Stuttgart, Germany; tel 49 711 7678 923; fax +49 711 7678 924; [ulf@symek.com](mailto:ulf@symek.com). 





Looking for better-than-dipole performance on 6 and 10 meters without investing in a beam and rotator? Here it is! This novel antenna includes a matching section to deliver a near-50- $\Omega$  match on both bands.



# The W3RW 6- and 10-Meter Long Wire

I received many inquiries about the antennas described in my article, “Wire Gain Antennas for 6 Meters.”<sup>1</sup> My favorite wire antenna—in terms of overall ruggedness, simplicity and pattern coverage—is a 4- $\lambda$  long wire. In the spring of 1999, with the sunspot cycle improving, I decided I needed an antenna that would also provide some gain over a dipole on 10 meters. With this goal in mind, I investigated how to make a long-wire antenna that works well on 6 and 10 meters. Here’s what I found.

## Why Use a Long-Wire Antenna?

Wire antennas are among the easiest to install and use (and arguably lowest in cost), but most hams don’t think of using long-wire antennas on VHF. Long-wire antennas *can* be used on VHF—particularly on 6 meters—as easily as on the HF bands. The following paragraphs describe typical long-wire gain and pattern characteristics; feedpoint characteristics are discussed later.

## Gain

Antennas more than a couple of wavelengths long at the operating frequency exhibit gain over a dipole. The maximum lobe of an antenna 4 $\lambda$  long has an estimated gain over a dipole of approximately 3 dB (3 dBd); see Figure 1. The estimated gain for other multiple-wavelength wire antennas varies. A 3- $\lambda$  antenna should have a gain of slightly more than 2 dBd; a 5- $\lambda$  antenna exhibits a gain of about 4 dBd.

## Patterns

With the gain increase comes a change in the antenna’s radiation pattern. Along the axis of the wire, there is a narrowing and

increase in the amplitude of the gain lobes compared to those of a typical dipole antenna’s broadside pattern. Also, there’s an increase in the number of lobes (and nulls) that provides somewhat omnidirectional coverage. Figure 2 shows some theoretical pattern comparisons.

## Dual-Band Long-Wire Design Constraints

By changing which trees I used to support my wire antenna, I had room (just over 105 feet) to put up an antenna longer than the original 77-foot, 4- $\lambda$  antenna. After playing with the antenna-length formulas, I found that a 3- $\lambda$ , 10-meter long wire or a 5- $\lambda$ , 6-meter long wire would fit. Both antennas provide the gain I was looking for—but I didn’t have the room to put up *both*!

## Eureka! The Dual-Band Long-Wire Antenna

Like the 4- $\lambda$ , 6-meter long-wire antenna,

I wanted a configuration with its feedpoint at a current loop ( $1/4 \lambda$  from one end of the antenna) to present a low-impedance to the feed line. This approach essentially separates the antenna into a “long” section and a  $1/4\lambda$  section. After examining the individual 3- and 5- $\lambda$  antenna dimensions using 28.35 MHz and 50.15 MHz as frequencies of operation, it became clear that these antennas have one thing in common: The long sections are almost equal in length. With that in mind, I came up with a dual-band long-wire antenna design (see Figure 3) that uses ladder line as part of the  $1/4\lambda$  sections for each band and shares a common long section.

## Dual-Band Matching Issues

Figure 1 shows the variation of radiation resistance, as measured at a current loop, with wire antenna length. Using this as a guide, the dual-band long-wire antenna has a theoretical feedpoint impedance of about 125  $\Omega$  on 10 meters (3 $\lambda$ ) and 140  $\Omega$

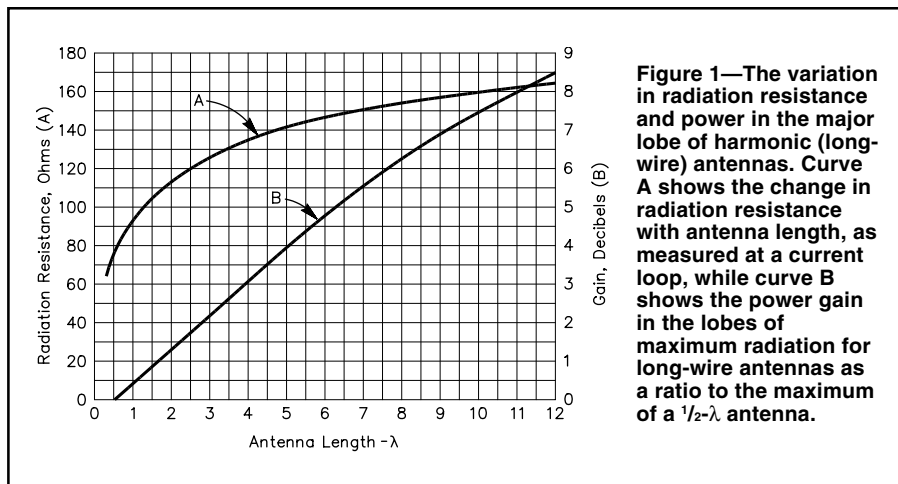
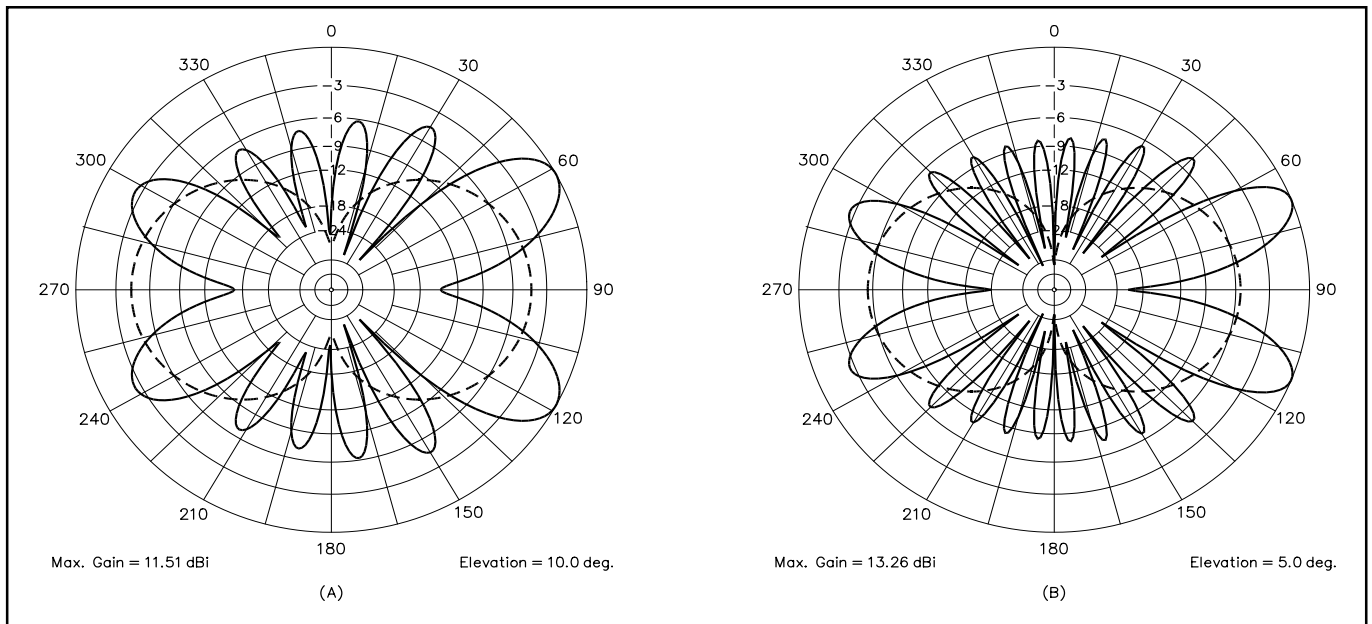
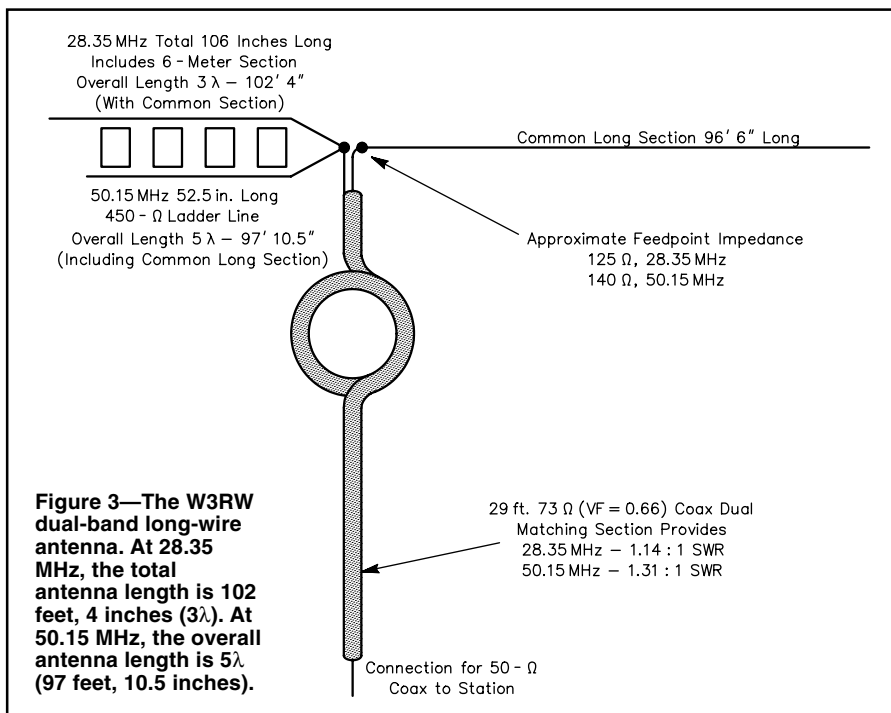


Figure 1—The variation in radiation resistance and power in the major lobe of harmonic (long-wire) antennas. Curve A shows the change in radiation resistance with antenna length, as measured at a current loop, while curve B shows the power gain in the lobes of maximum radiation for long-wire antennas as a ratio to the maximum of a  $1/2\lambda$  antenna.

<sup>1</sup>Notes appear on page 48.



**Figure 2—Predicted horizontal radiation patterns of a long-wire antenna as a function of length. At A, pattern of a 50-foot-high  $3\lambda$  long-wire antenna (solid lines) compared to that of a dipole (dashed lines). At B, pattern of a 50-foot-high  $5\lambda$  long-wire antenna (solid lines) compared to that of a dipole (dashed lines). Tnx Dean Straw, N6BV**



**Figure 3—The W3RW dual-band long-wire antenna. At 28.35 MHz, the total antenna length is 102 feet, 4 inches ( $3\lambda$ ). At 50.15 MHz, the overall antenna length is  $5\lambda$  (97 feet, 10.5 inches).**

on 6 meters ( $5\lambda$ ). Either feedpoint impedance lends itself to using a  $1/4\lambda$  75- $\Omega$  coax matching section to match a 50- $\Omega$  coax feed line, but the typical  $1/4\lambda$  coax matching section on 10 meters doesn't work on 6 meters and vice-versa. A wideband 4:1 balun could be used for matching, but the resulting impedance transfer would probably not be as close to 50  $\Omega$  as the  $1/4\lambda$  matching technique provides. Also, most 4:1 baluns are relatively heavy, adding to antenna sag. Wideband 4:1 baluns are also expensive compared to the cost of 20 to 30 feet of coax.

So, I decided to evaluate other approaches.

### Eureka Again! The Dual-Band Coax Matching Section

I thought of the dual-band matching solution when I decided to experiment by adding a number of  $1/2\lambda$  coax sections after the 6- and 10-meter  $1/4\lambda$  sections. Comparisons showed that there is a combination of  $1/4\lambda$  and  $1/2\lambda$  transmission-line sections that results in total coax lengths for *each* band that are almost the same. (See [Figure 4](#) and the sidebar "[Characteristics of Half-](#)

### Wavelength Transmission Lines.")

The total lengths of the two coax sections are close enough that the combination match works for the frequency pair of 28.35 and 50.15 MHz, although frequencies of 50 and 29.9 MHz provide an optimum calculated dual match. With the combination of the dual-band matching section and the dual-band long wire, an overall good match to 50- $\Omega$  line is obtained over the low-frequency ends of 6 and 10 meters.

### On-The-Air Performance: Does it Work?

The system appears to work well—just like individual 6- and 10-meter long wires! With the long-wire antenna's maximum-strength lobes favoring the North/South directions, I use a two-element 6-meter quad in the attic to provide extra gain to the West. Although there are directions in which the quad *is* significantly better than the dual-band long wire, I've found that the long wire can hear everything the quad can hear—including some signals the quad doesn't.

My first QSO with the antenna came just after I finished making some adjustments. With my IC-706 connected directly to the end of the coax matching section, I answered a station in upstate New York calling CQ on 50.125 MHz. He came right back to me and we exchanged good signal reports (he was off the slightly weaker major lobe's end of the antenna.) After that, I switched to 10 meters and proceeded to work quite a few South and Central American stations in the main line of the antenna's stronger gain lobes. With the help of a small antenna tuner, I stretched the antenna's 10-meter bandwidth to cover the repeater segment and proceeded



### Characteristics of Half-Wavelength Transmission Lines

A key factor in the dual-band matching solution is the  $\frac{1}{2}\lambda$  characteristic of transmission lines. Any impedance presented at one end of a  $\frac{1}{2}\lambda$  of coax—with coax of *any impedance* (that's the important part)—that same impedance is seen at the opposite end of the cable. For example, if you connect a  $\frac{1}{2}\lambda$  (or any multiple of  $\frac{1}{2}\lambda$ ) of 75- $\Omega$  coax to a 50- $\Omega$  load, a 50- $\Omega$  impedance is seen at the other end—even though the characteristic impedance of the coax in between is 75  $\Omega$ . (All wavelength references are to electrical lengths of coax; this takes into account the velocity factor of the cable.)

to work several additional stations.

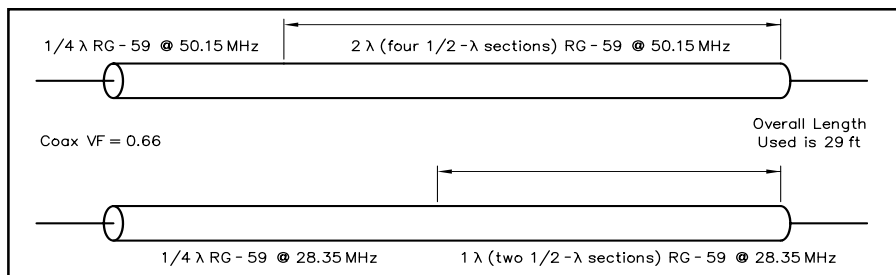
As I write this, the September VHF contest and Hurricane Floyd's visit occurred about two months ago. I didn't actively participate in the contest, but I did use it to further check the antenna's 6-meter performance. With a transmitter RF output of 100 W, I found I could work everything I heard, including several sporadic-E contacts late one Sunday, but I did have to use a 400-W amplifier to make an Auroral contact. Ten-meter performance has been great! I've had no trouble working most DX I can hear from all over, including 7X, 9K, JA, ZS, ZL—and even a DS—with just 100 W output.

### Construction Tips

Figure 3 shows the antenna details (not to scale). Cut the wire sections of the antenna a little long and wrap the far ends of the extra wire lengths back onto the main wire. This way, if you need to lengthen the antenna, you just unwrap the extra wire; you don't have to worry about adding more wire. If the antenna is too long, simply wrap more wire back onto the main run to reduce the antenna's overall length.

I started out with a little more than 5 feet of 450- $\Omega$  #14 stranded copper-clad ladder line for the  $\frac{1}{4}\lambda$  antenna section, allowing for connection to the center insulator and the 10-meter wire extension. As shown in Figure 3, one conductor of the 450- $\Omega$  line (the upper one) is used on 10 meters. The shorter conductor (lower one) is used on 6 meters. Make the cut for the 6-meter section so that it is *inside* one of the solid-dielectric sections of the line. Cutting the ladder line this way helps maintain the overall physical strength of the 6-meter section. (By the way, the dual-band long wire survived Hurricane Floyd's visit!)

Weatherproof the antenna by sealing the coax-to-wire connections, the connection between the matching-section coax and the 50- $\Omega$  feed line, and the connections at the ends of the matching section. Use a low-loss 50- $\Omega$  cable between the matching section and your shack.



**Figure 4—The W3RW dual-band matching section. Lengths shown here are for coax with a velocity factor of 0.66. The upper cable leg consists of a 50.15-MHz  $\frac{1}{4}\lambda$  section of RG-59 coax in series with a 50.15-MHz  $2\lambda$  (four  $\frac{1}{2}\lambda$ -lines in series) section of RG-59 coax. The lower leg is a 28.35-MHz  $\frac{1}{4}\lambda$  of RG-59 coax in series with a 28.35-MHz  $1\lambda$  section (two  $\frac{1}{2}\lambda$ -lines in series) of RG-59.**

To properly cut the matching line, you *must know* the velocity factor of the 75- $\Omega$  coax! The matching section I use is made of 0.66 velocity factor RG-59 coax, but cables with other velocity factors can be used as well. (When selecting the matching-section coax, remember that the center conductor in *foam-dielectric* coax has a tendency to migrate, potentially resulting in a short to the shield if the coax provides some structural support or is coiled.) I took the precaution of verifying the coax velocity factor by cutting an approximate  $\frac{1}{4}\lambda$  section and checking its length and frequency characteristics using a dip meter. Larger-diameter 75- $\Omega$  coax (such as RG-11) can be used if you want lower loss, but the cable is heavier than RG-59, and will likely increase the antenna sag. Interestingly, the data tables for coaxial cable show that the loss of many RG-59 coax types is similar to, or slightly *lower* than, RG-8X coax types at 50 MHz.

### Adjustment

To tune the antenna, first adjust the lengths of the  $\frac{1}{4}\lambda$  sections, then adjust the long-wire sections to minimize the SWR on both bands. Then check the  $\frac{1}{4}\lambda$ -section lengths again. It takes no more than a couple of iterations to achieve the lowest SWR on both bands. The exact length of the dual-band coax matching section doesn't appear to be critical. I cut the matching section a little longer than 29 feet (using 0.66 velocity-factor coax) to provide the extra length needed for the connections to the wire and ladder-line sections and for the end coax connector. The resulting match was close enough to not require adjustment.

### Coaxial Choke Balun

To isolate the feed line from the radiating currents of the antenna, I use a choke balun consisting of four feet of the matching-section coax wrapped in four turns just below the antenna feedpoint. This approach may not be as effective as using a traditional balun, but it seems to work; and considering the unbalanced antenna configuration, it may work almost as well.

I have had no complaints about RF in the shack or house on either band. I derived this approach from the information in Table 19.4 on page 19.16 of *The 2000 ARRL Handbook for Radio Amateurs*.<sup>2</sup>

### Summary

The W3RW 6- and 10-meter long-wire antenna is a resonant multiwavelength antenna that provides gain over a dipole on 6 and 10 meters and integrates a unique coax-cable matching section to provide a close match to 50  $\Omega$  on both bands. This is a predominantly horizontally polarized antenna optimized for the SSB portions of the 6- and 10-meter bands. Considering its simplicity and low cost, you ought to give it a try!

### Notes


<sup>1</sup>J. Robert Witmer, W3RW, "Wire Gain Antennas for 6 Meters," *QST*, Feb 1997, pp 66-67.

<sup>2</sup>ARRL publications are available from your local dealer, or directly from ARRL. See the [ARRL Bookcase](#) elsewhere in this issue, or check out the ARRL web site at: <http://www.arrl.org/catalog/>.

<sup>3</sup>Please contact me for price and availability of a partial kit consisting of the dual-band matching-section coax, the  $\frac{1}{4}\lambda$  open-wire section and additional assembly information. Bob Witmer, W3RW, 146 Forest Trail Dr, Lansdale, PA 19446-6415; [w3rw@arrl.net](mailto:w3rw@arrl.net).

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- ARRL's Wire Antenna Classics*, (Newington: ARRL, 1999)
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*Bob Witmer, W3RW, was first licensed in 1962 as K3VAX; he got his Extra class license in 1967. His Amateur Radio interests include equipment and antennas, 6- and 10-meter operating and HF DXing. Bob is a program manager for BAE Systems of Lansdale, Pennsylvania, with responsibility for a variety of electronic warfare programs. Bob has written several articles for QST. You can contact Bob at 146 Forest Trail Dr, Lansdale, PA 19446-6415; [w3rw@arrl.net](mailto:w3rw@arrl.net). *

# NE2Q's Antenna Fell From the Sky!

**S**ince becoming a ham in 1958 I've operated on most bands, but I've never really had a decent antenna for 160 meters. I tried tying the balanced feeders from my 80-meter dipole together at the tuner, but my signal on 160 wasn't moving S-meters very far. I needed a real antenna.

I recently became a member of GNARC, the Greater Norwalk Amateur Radio Club, a very friendly bunch with quite a few active experimenters. In late November 1999, the club sponsored a "Fun Fly" at Sherwood Island State Park, on the shores of Long Island Sound in Westport, Connecticut.

KE1GB and others flew model rockets. K1OF flew a kite supporting a tiny fast-scan TV camera and transmitter, which gave ATVers within 20 miles a good color picture of our operations on the ground. N1OLO set up a station to plug Amateur Radio. The station used a kite-supported end-fed wire. It worked quite well despite the rather weak wind conditions.

The day was unseasonably warm, and wind conditions had deteriorated by about 2 PM. We had trouble keeping the kites aloft. About this time a stranger came on the scene. He was carrying two long white objects under his arms. Nobody knew who this fellow was. He proceeded to unroll these articles, which he identified as homemade kites. They looked pretty large—about 15 feet from the top to bottom of the double tails and 10 feet wide.

I asked him if he expected to fly those things with the present wind conditions (a "non-breeze" of less than two miles per hour). He answered, "This is the way I like it!" He was "crazy" or he really knew his kites. He had a helper walk the kite about 200 feet downwind while he held the kite string. He yelled, "Let go," and the big kite soared almost straight up. I'd never seen anything like it.

After attaching the TV camera and transmitter from K1OF's kite, the stranger

Lofting large wire antennas with balloons and kites is an acknowledged part of Amateur Radio folklore. But the cost, danger, hassle and typically "irreproducible results" have kept these techniques from the mainstream—until now! If you've always dreamt of stratospheric antenna heights, NE2Q and AA1MY can show you the way.



The author (left) and Seab, AA1MY, with their kite creation.

launched his second kite. I couldn't feel even a hint of a breeze on my face but the kite climbed straight up. What a wonderful kite! I thought about how unfortunate it was that this fellow wasn't a ham. His kite would be great for lifting a vertical antenna for the upcoming 160-meter contest.

I approached him again and introduced myself. "It's too bad you aren't a ham radio operator. I think your kite could lift a large antenna," I said. He replied, "My name is Seabury, call me Seab, and I'm AA1MY. I've been wanting to lift a 160-meter vertical dipole since I started flying these large kites."

By now, many of us were curious about Seab's kites. He identified them as Scott Sled kites. They're made for heavy lifting in light winds, and they fly at very high angles—70 to 80° is not uncommon.

His kites were made of white Dupont Tyvek, three skinny sticks and fiberglass-reinforced adhesive tape. Tyvek is used to make vapor barriers (in new house construction) and high-strength mailing envelopes. It's very strong and lightweight. Seab offered to give us the diagrams to make kites of our own. He had a bunch of copies with him. I guess he attracts lots of inquisitive people whenever he flies his designs.



Over the next few weeks, Seab and I made plans to work the 160 contest. We were trying to get permission to use the state park, but we were turned down because the park superintendent claimed there would be no employees on duty at night in December. The park closes at sundown. We tried another park near the water, but we could only stay there until

midnight. So we gave up on the parks until next year when we'd have more time to set something up.

Because the parks were out of the question, I asked Seab about flying the kite from my QTH. I live on top of a 770-foot hill in northeast Westchester county, about 45 miles northeast of Manhattan. I have a clearing around my house that's about 200

by 175 feet. Where the clearing ends, 50-foot trees start. I'm surrounded by trees in all directions but one—southeast. My property drops off abruptly in that direction.

The wind would have to blow just right to get the kite out over the valley while avoiding the bordering forest. It would be like threading a needle blindfolded. And

## Roll Your Own

The kite described in this article is a proven "Scott Sled" design, which, after considerable searching and experimentation, seems to be the most economical and easy to build lifter adequate to my needs. This one is scaled to 9 feet tall by 10 feet wide, which is just right to be cut from a standard 9-foot roll of house wrap. Tyvek, or a clone, is available from most building supply stores. Tyvek is good because it's strong and white, which lets fliers decorate the kites with club names, call letters, etc. Fluorescent spray paint and brushed acrylics work well.

Struts can be made from any strong, lightweight material, but I prefer economical, ribbed screen door molding, also available at most building supply stores. Struts are fastened with contact cement to the back of the kite to maintain its shape in flight. The kite's perimeter and vent edges are securely rimmed with 1/2-inch fiberglass-reinforced tape to prevent tearing under stress.

Bridle tie loops (see Figure A) are fashioned from 20-inch strips of one-inch fiberglass-reinforced tape. Start on one side of the kite and end on the other, making the loops about four inches in diameter. Place an eight-inch piece "face-to-face" on the inside of the first strip to provide a smooth, non-stick surface inside the loops. Remaining strips are "fanned" on the kite surface (to distribute load) and overlap at the loops. Fold the loop material in from both edges to provide a dense, smooth tie for the bridle lines.

The bridle itself is at least three times as long as the kite is wide, in this case about 36 feet long. Short bridles cause instability. Make sure there is no "twist" to the bridle and that the connection point to the fly-line is precisely centered. Use a heavy-duty swivel at the tie point to prevent twist and raveling during launch and retrieval.

Flying line for this kite should be at least 150-pound-test in 4-10 MPH wind and 250-pound-test or more in 8-18 MPH wind. I buy the big rolls of no. 36 "seine line" or "carpenters twine" at Home Depot. The line *must* be kept on a winder that's up to the task of belaying and winding heavy line safely. I recommend an "H-type" winder of 5/8-inch exterior-grade plywood, smoothed and painted, equipped with a belaying knob (see Figure 1). Believe me, there is no way in the world you'll stop a drum-type winder safely if the handle gets away from you under 50 to 100 pounds of load. Don't even think about using a fishing reel.

*Never* handle the line under load or loop it around your hands. *Always* use good leather gloves to prevent very nasty cuts—right to the bone. Do not fly in wind above 20 MPH!

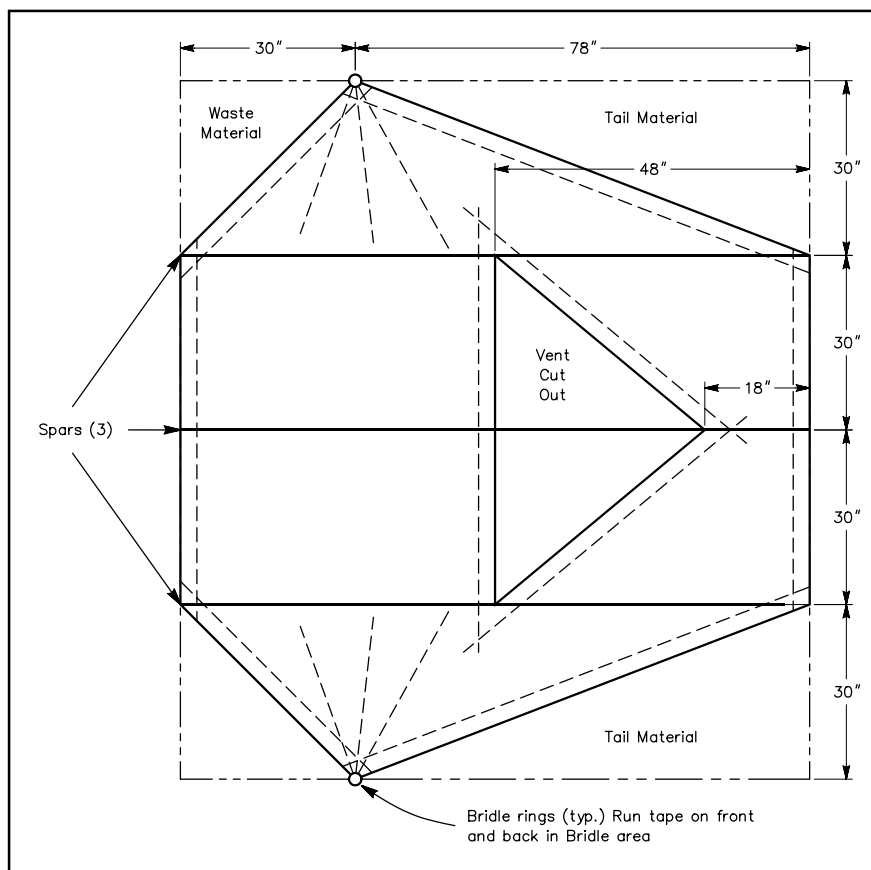
## Flying the Kite

To launch your kite, reel out at least 150 feet of line and have a second person hold the kite by the bridle ears with her/his *back to wind*. This can be difficult in a good breeze, so keep the kite rolled up until everything is ready for launch. Large kites are very efficient, so no running is required. When ready with all lines, the "pilot" signals the second person to open the kite and let it go. Have the line passed over the winder

knob to center the load. If wind is above 10 MPH, let the line out very carefully or you may lose control and possibly get hurt trying to wrestle it back.

Fly the kite above 300 feet to avoid most of the ground turbulence caused by buildings, trees, etc. Another advantage is that there is usually a flyable wind at altitude even when it's not apparent at ground level. Higher is always better. With an altitude limit of 500 feet, an antenna hung from the fly-line at the 100-foot mark leaves 400 feet of "free line" for the kite to play with, thus reducing instability. Of course, more free line is better.

This is important: If you must belay the line for control and securing, do so only on a smooth metal pipe such as a bumper or a



**Figure A**—This is the cutting pattern for a kite using a 9 × 10-foot section of Tyvek house wrap. The dotted lines indicate the placement of 1-inch Fiberglass reinforced tape on the back. The spars (I use screen door molding) are contact cemented to the back. Notice that the two sections labeled "Tail Material" are to be used to make the tail for the kite. The tail material is contact cemented to the back edge with the open V. Bridle rings can be made of 1-inch thick reinforced tape. The bridle must be at least 36 feet long for this kite.

we'd have to be cautious. A kite 500 feet above my lawn would be nearly 1400 feet above sea level. Seab suggested that we attach a battery powered strobe light to the kite for added safety.

## Up, Up and Away!

The dipole was to be fed via several hundred feet of balanced line. Seab would

park bench. The metal won't chafe the line and acts as a heat sink. Allowing the line to slip over wood, etc, will cause rapid melt-down and loss of the kite and antenna. Think about it.

Never attach wire directly to a kite. Make sure that the line from the antenna attachment point is *smaller* than the line back to the control point on the ground. That assures that any line breakage will occur *above* the wire, eliminating the very serious hazard of your kite dragging wire over power lines, etc. Again, think about it.

Adjust the anchor point to position the antenna feeder in a location that's convenient to your operating position. The feed line should be anchored separately at the operating position to prevent your rig from being yanked into the wild blue yonder. Juggling anchor and operating points can determine the directional orientation of arrays, slopers, Vs, etc. This requires constant attention, so a second (gloved) helper is highly recommended.

If the feed line is fragile, an additional, insulated messenger line must be added to avoid breakage from strain and flexing. Light monofilament line is great for this. Static discharge can be a problem, although I haven't suffered any ill effects—yet. That might be because of the low-resistance path to ground in my tuner.

Finally, when it's time to land your monster, have your helper "walk the line down" rather than trying to reel it in. The gloved "helper" walks away from the "pilot," pulling the line down for the desired distance, then secures the line temporarily while the pilot walks forward winding up the slack.

## Other possibilities

There are lots of possibilities to explore with a lifter of this capacity. We've hoisted ATV rigs, 8-mm video cameras, large banners, beacons and, of course, the 250-foot 160-meter vertical dipole in this article. I've hoisted several QRP "antlers" on camping trips with great success. Two kites will support a horizontal array such as a half square, though it's quite a challenge to keep things under control. Additional "guys" (monofilament) must be attached to the antenna attachment point to maintain the required configuration. Allow for lots of (nearly constant) tinkering time!

For intrepid experimenters willing to invest about \$25 and three hours of construction time, the return in fun and excitement is enormous. Let's hear about your adventures!—AA1MY

drive down the next day. The FAA was notified and we were ready to go.

Naturally, at 10 AM Saturday, the electricity went out at my home. Someone had knocked down a nearby power pole. Would we get the power back in time? Seab called me at 2 PM. He was leaving his home in Beacon, New York for the 90-minute drive to my QTH. I told him about the downed mains. We arranged to use 2 meters for the talk-in and hoped the power would come back on before dark.

Seab arrived about 3:30 PM. We had about one hour of daylight left. Fortunately, ac power was restored about 30 minutes before Seab's arrival. Seab pulled out his kite and all the wire and string. We had virtually *no wind* at ground level. My wind-speed indicator showed only one to two miles per hour, but the direction of the slight breeze was perfect. Once again I had the feeling that there wasn't enough wind to get the kite airborne. I shouldn't have worried.

Seab positioned me and the kite right at the edge of the overlook. He moved upwind about 175 feet. The kite string was precariously close—about 15 feet—to a stand of 50-foot trees. Seab yelled, "Let 'er go!" I did, and the big kite shot straight up, just like the first time I saw it fly. It was amazing.

The kite immediately rose to about 250 feet. Seab then attached one end of the dipole to the kite string. We let the kite rise until the dipole's center insulator was about four feet off the ground. Seab then attached the 450-ohm ladder line to the kite string and to the antenna. He left about 100 feet of feed line between the center insulator and the kite string.

After the antenna stuff was rigged the kite rocketed to its full altitude of about 600 feet (tethered by 700 feet of 150-pound-test string). The 160-meter dipole was hanging perfectly vertical while the feed line came away horizontally for 100 feet before dropping down at about a 45° angle right to my shack. The top end of the dipole was at least 1000 feet above sea level!

## "No Contest!"

I excitedly connected the balanced line to the tuner. The antenna tuned perfectly and the contest was in full swing. Many of the signals were 40 over 9 and higher. It was 2155 UTC when we made our first call (with 100 W) to W1TO. He shot right back with "599." We quickly worked nine stations in seven states including IL, WI and IA. I wanted to try things out at the 1-W level just for fun. WQ2G went in to the log first. We made eight more calls to eight stations, and they all came back on the first call despite the fact that other stations were calling. One was in North Carolina and one

was in Indiana. We knew we had an "Antenna."

Now it was time for a 30-dB boost above QRP power. I fired up my home-brewed 8877 amp, and at 1.5 kW, we were "in business." We couldn't find a clear spot, so we just jumped in around 1846 kHz. After only a few minutes of calling CQ and working stations at a rapid rate, the frequency became quiet. Everyone who had been calling CQ had moved away from us. We were all alone, and we each had big smiles on our faces. We didn't really take this first contest too seriously. Our main purpose was to see if we could indeed raise a full-size vertical dipole for 160 meters with a kite. We did that and we were happy.

My wife Ulla, N2IOJ, called us to dinner. We stopped operating for an hour and enjoyed a sumptuous meal. "Good thing we couldn't get permission to operate in the park," I remarked. After dinner we checked the kite, which was still flying majestically. It was a beautiful and unusually warm night. The sky was crystal clear and the big kite was surrounded by a sea of twinkling stars. We continued operating and quickly filled another five log pages.

At 0140Z we checked the kite with a high-power 12-V searchlight. We noticed that the kite string/feed line attachment had failed. The entire weight of more than 200 feet of feed line was being supported by the kite. We thought something else might have broken, but nothing was visible. The kite, no longer flying vertically, was leaning at about 60° and had dropped slightly in altitude. The wind was still showing about two to three miles an hour on my indicator.



The author holds the kite, ready for launch. You can just see the tail material on the ground below the vent opening.





**Seab, AA1MY (left), and the author with the “H-Winder” and a half-size version of the kite.**

After all the 599s, which is the standard signal report for contests nowadays, we decided to get some honest comments. At 0216Z, the kite was still up (but not as high as it had been). We went up to about 1910 kHz and found “Coke,” W4DHA, talking with NB4P and K4JZY. “Coke” said our signal was so strong we were probably running illegal power. This report came before we told Coke about our antenna. After we described our operations we had a nice chat. We signed off, went outside and searched for the kite. It was down!

### What Goes Up...

We grabbed a pair of flashlights and followed the kite string, which was leading

us to the northeast and was over the trees. We walked into the forest while shining our flashlights skyward to keep track of the string. It was now close to midnight. We found the kite floating in a tree about 30 feet high and about 700 feet northeast of my house. It was on my neighbor’s property. We tried retrieving the kite using a 30-foot telescoping pole. Unfortunately, the pole was a little too jiggly, which caused us to laugh. The more we laughed, the more it jiggled. We gave up until the following morning.

Sunday morning came, and at 9 AM I was out on my neighbor’s property with some additional hardware. I fashioned a hook from #10 aluminum wire and affixed that to the tip of my 30-foot pole with a hose

clamp. It worked. I was able to snag the kite and pull it down. The string seemed stuck on the trees somewhere, so I cut the cord and left it in the tree. Seab’s homemade kite was safe. The only casualty was a cracked stiffener, which would be easy to replace.

As I walked back to the house I started thinking about the antenna that was now draped over a thick forest of trees. I’d often wondered how I might string just such an antenna. Well, I’m happy to report that the treetop dipole is working *very* well. It works great on all bands up through 10 meters. It also shows good directivity from 40 meters on up. Who knows how long it will stay hanging up in the trees? I’ll enjoy it as long as it lasts.

It truly is “The Antenna that Fell From the Sky!”

### Be Careful and be Legal

If you’d like to try your hand at making AA1MY’s heavy lifter kite, you can follow the plan described in the sidebar “[Roll Your Own](#).” Be cautious when flying it. This is *not a child’s toy*. Avoid power lines and do not use a wire (instead of string) to hold the kite. A runaway kite of this size with a few hundred feet of dangling wire could be quite hazardous.

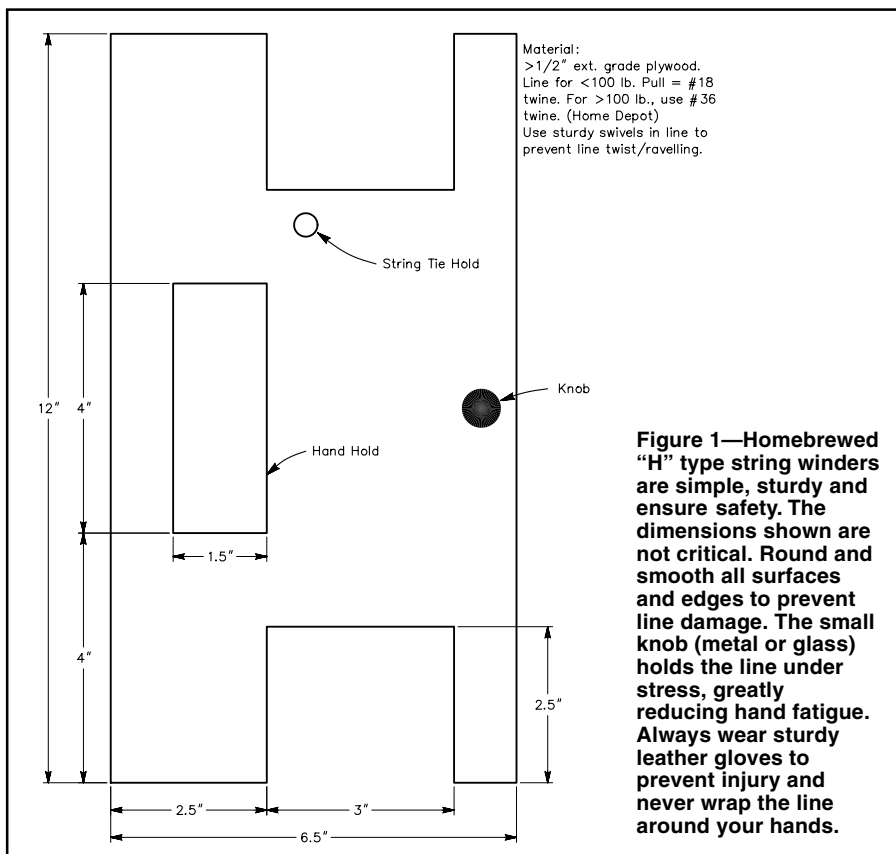
In addition, make sure you observe FAA regulations concerning moored kites. Our kite weighed less than 5 pounds, which exempts it from many FAA regulations. Even so, it is a potential hazard to pilots so you should contact your nearest FAA Flight Service Station 72 hours in advance and ask them to issue a NOTAM (Notice to Airmen) for the duration of your flight. You can locate and contact your nearest Flight Service Station by calling 800-992-7433.

If you attempt to fly a kite that is *heavier* than 5 pounds, other rules apply. Specifically:

- You cannot fly your kite less than 500 feet from the base of any cloud, or more than 500 feet above the surface of the Earth.
- You cannot fly your kite when visibility conditions are less than 3 miles.
- You cannot fly your kite within 5 miles of any airport
- If your kite will be flying higher than 150 feet, you must notify the nearest FAA Air Traffic Control facility 24 hours beforehand.
- Any kite flown at night must carry a light, preferably a bright strobe.

Our next project is a half-wave bottom-fed vertical for 160. This will eliminate the weight of the feed line needed for a center-fed dipole. How about a half-wave vertical director aimed at Europe in front of the driven element?

You can contact the author at PO Box 300, Pound Ridge, NY 10576; [jkolin@cloud9.net](mailto:jkolin@cloud9.net).



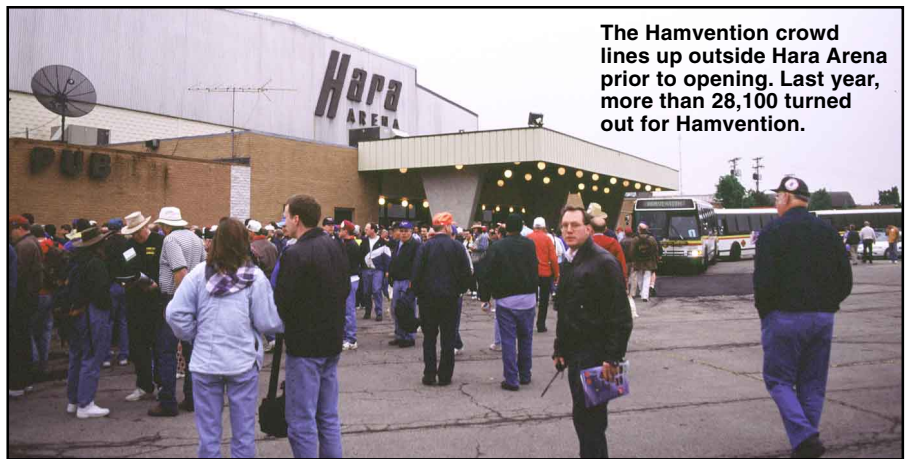
# HOW Hamvention happens

By Rick Lindquist, N1RL

Like a garage band that finally breaks into the top of the charts, Hamvention started small and grew into an Amateur Radio institution. Staying Number 1 involves lots of hard work, volunteers, and money.

**V**iewed from the outside, the Dayton Hamvention is the world's biggest and best hamfest—the place where amateurs from around the world gather each May to gawk at—and perhaps purchase—the latest gear, socialize with their cohorts, and haggle for bargains. Looking from the inside out, however, Hamvention is, at its core, a complex business that ultimately aims to delight upwards of 30,000 vendors, exhibitors, and visitors and make them want to return the following spring.

Making it happen each year means months of planning, countless hours of work, sizable sums of money, and a delicate network of personal relationships and rapport with key individuals and entities



The Hamvention crowd lines up outside Hara Arena prior to opening. Last year, more than 28,100 turned out for Hamvention.



The main arena Indoor Exhibits at Hamvention.



that's taken years to build. It also means attention to minute details, like arranging programs and forums, and for more down-to-earth concerns like contracting for three dozen porta-johns and 150 trash containers (with liners), and disposing of 45 tons of trash after everyone has gone home.

The result each May is greater than the sum of its parts. With the conjunction of the ARRL National Convention and Hamvention 2000, Hamvention officials say interest has been "early and intense."

### A Quick Hamvention History

What became the Dayton Hamvention started out in the early 1950s with \$100 from DARA and an inspiration to develop a quality Amateur Radio convention. A fellow named John Willig, W8ACE, is credited with first proposing the idea to DARA around 1950. It was turned down. The new DARA president, Frank Schwab, W8YCP (later W8OK) was more receptive to Willig's idea. The DARA Board allocated \$100 and the first organizational meeting was held in early 1952. The rest, as they say, is history.

Well, not quite. Willig was tapped as the first general chairman of the Southwestern Ohio Ham-vention, as the show was dubbed. It became Dayton Hamvention the following year, and the name now is a registered trademark.

The \$100 in seed money did not go very far. A small TV was raffled off to help raise money. The FCC agreed to give license exams, and the late Phil Rand, W1DBM, a pioneer in TVI elimination was on the program. Boat anchor fans will appreciate the fact that the first prize was a Collins 75A2 receiver, purchased locally.

The first "Ham-vention" ended up being held in March instead of April (as it was for many years) because the Biltmore Hotel in downtown Dayton already was booked for April. 1999 Hamvention Forums Chairman Ron Morefield, W8ILC, was there for "Ham-vention's" debut. "They geared up for 300 people. But 650 people showed up, and they didn't know what to do," he said. There were seven exhibitors and six forums at the first show.

By 1955, the Hamvention Committee had instituted its awards program with the Hamvention "Amateur of the Year." In 1964 the Hamvention moved to Hara Arena, its present location. In 1973, Hamvention expanded into a two-day event, and Sunday was added to make it a three-day event the following year. Next year's show is the 50th Hamvention.

### DARA: The Volunteer Side of Hamvention

The Dayton Amateur Radio Association—DARA—owns Hamvention. DARA chooses the show's general chairman, who then assumes the Herculean—and totally volunteer—task of orchestrating Ham-



Shuttle bus service costs Hamvention around \$70,000 each year.

vention. The Hamvention 2000 Chairman is Jim Graver, KB8PSO, who spent three years as assistant general chairman under the tutelage of former Chairman Dick Miller, N8CUB, before being given the reins in his own right. Hamvention has had 26 general chairmen over the years, some serving for more than one event. On the Hamvention Committee since 1992, Graver started out staffing the prize booth and worked his way up.

Graver views his chairmanship as an enormous responsibility. "The position has a lot of both politics and pressures," he concedes. The General Chairman is under the gun to not only generate the revenue DARA needs to operate as a club and to cover the costs of its scholarship and its educational and public service work, but also "to make sure the attendees are happy, the exhibitors are happy, take a look at what didn't work last year and continue to improve the show each year," he says. "And, of course, along with changes always

come some instability that you need to manage as well."

Graver says he has "a great team" behind him that includes 550 or so DARA volunteers on 28 core committees—each with its own chairperson and assistant. Committees meet regularly to discuss their respective areas of

COURTESY OF KB8PSO



Hamvention 2000 General Chairman Jim Graver, KB8PSO

responsibility. A monthly joint gathering lets committees compare notes as preparations ramp up for Hamvention.

DARA volunteers are most visible during the three-day Hamvention. They work in traffic control, assist vendors and visitors, provide security, handle tickets and programs, and generally keep an eye on things—among many other tasks.

One crucial role for Hamvention volunteers, Graver says, is to see to it that the show "continues to flow," as he put it. "Are the attendees enjoying themselves? Are they smiling?" Smiles are extremely important, he says.

During the show, DARA volunteers attend to "a humongous number of details," Graver

The Hamvention horde arrives on opening day!





EMS staffers prepare for a weekend of Hamvention duty.

says, and they try to handle incidents as they arise. This means “being everywhere, being in communication, and accessible to folks to answer questions, to get to a spot when someone needs help—there are questions coming up all the time.”

Those intimately involved with Hamvention consider maintaining a sense of continuity from one Hamvention to the next as critical to the show’s staying power. Drawing on the experience and expertise of past general chairmen is a real asset, says Graver, who consults a core group of past general chairmen for guidance.

Planning for the following Hamvention begins before the current show even takes place. Graver’s already working on the 2001 show—the 50th Hamvention. “This is a 365-day function that we volunteer for, so we’re all the time working on the show and what we want in it and looking at not only this year but next year,” he explains. “We have to be constantly looking forward.”

Monday-morning quarterbacking is part of the process. “Every year, after the show, we review what happened, what could we have done differently, what changes impacted

a situation, how we can look into the future to try and prevent things,” Graver says.

It’s a lot to keep on top of. Graver’s predecessor, Miller, says he purposely tried to *not* know about certain details of the show so he could keep focused on the bigger picture.

### The Wizard Behind the Screen

While DARA volunteers freely donate much of the human effort that makes Hamvention happen, Hamvention has grown too large to rely strictly on “free help.” For many years now, one professional in particular has attended to the very crucial nuts and bolts that make the show happen each spring and keep the amateur community coming back year after year.

This wizard’s name is Garry Matthews, KB8GOL. “I’m very attached to Hamvention,” says Matthews, who has been working behind the scenes producing Hamvention for more than three decades, starting out as a contractor with Hara Arena and later being hired by Hamvention to produce the show. While he devotes most of his working days throughout the year to Hamvention, he



Hamvention security personnel ham it up.

gives untold *gratis* hours as well, Hamvention officials say. Matthews’ company, Event Production Services, is his bread and butter and does shows all over the country, but Hamvention is the largest endeavor.

All of those familiar with Hamvention from behind the scenes view Matthews’ role as vital to ensuring a smoothly running Hamvention. Over the years, he’s been the glue that makes it all hold together. “He’s the core person who is consistent throughout the many years of general chairmen who come and go,” Graver says.

Matthews is the detail guy who deals with Hara Arena where Hamvention takes place. He makes myriad contractual arrangements, secures necessary permits, arranges ticket printing and program distribution (the program is produced by Mel Berman [W8GTR] & Associates), pays the obligatory fees, secures parking, communications, electrical power, locksmiths, trash collection and disposal, and even works out crowd and traffic flow patterns. “It’s because of the relationships that he’s developed that makes it happen,” Graver says. “It’s quite a task he does.”

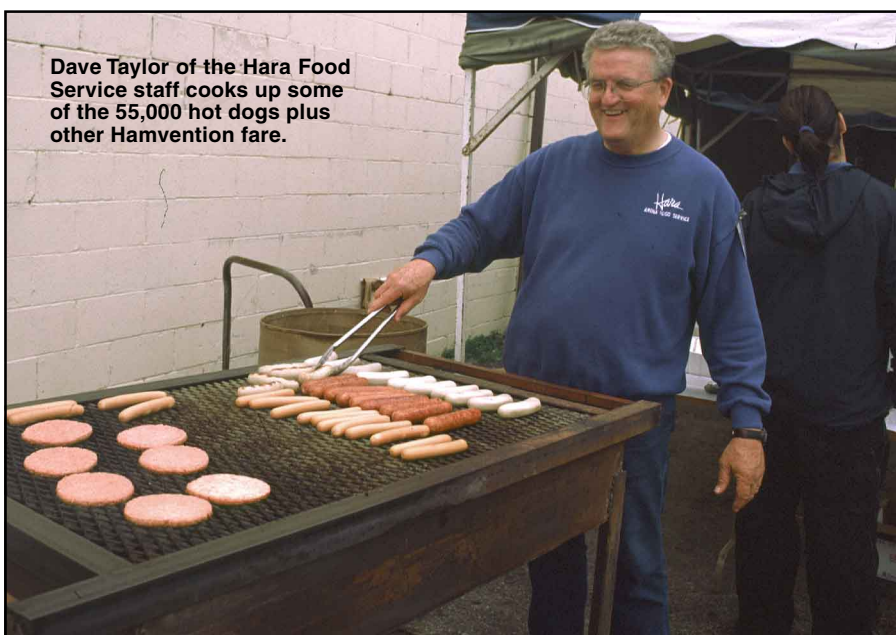
Some even suggest the show wouldn’t happen without Garry Matthews.

### The Madding Crowd and Critical Mass

Hamvention is nothing without the teeming throng of more than 25,000 that gravitates toward the big show each May. Managing and moving the madding crowd is the major logistical challenge for Hamvention officials. And while Hamvention attendance often is seen as a barometer of the show’s success, Hamvention officials agree that 30,000 visitors is critical mass, given the current facilities at Hara.

“Anything over 28,000 pushes it at Hara,” says Matthews. “It pushes our restroom facilities, it pushes our food concessions, it pushes our transportation, and it pushes our human comfort factor, which is important.”

While it’s nice to anticipate a bigger crowd each year, Matthews says, if people



Dave Taylor of the Hara Food Service staff cooks up some of the 55,000 hot dogs plus other Hamvention fare.





Hamventioners chill (only in a manner of speaking) outside Hara Arena.

don't enjoy themselves because they feel crowded or uncomfortable, they won't come back the next year.

The lack of parking at Hara to accommodate all Hamvention visitors necessitates a system of off-site parking and regular bus runs. "The transportation of folks to and from the show is always one of our biggest concerns," he says. It's also been a focus for complaints.

For the past few years, Graver says, the key to transportation happiness has been timely, professional bus service through an arrangement with the Dayton Regional Transport Authority—the RTA—which has ADA-compliant buses.

"Once we did that and went with the folks who know Dayton and know the area, our complaints have literally dropped to zero," Graver says.

Hamvention arranges the off-site park-and-ride areas, but there have to be enough riders to justify the service. Hamvention parking is available at Salem Mall, the University of Dayton, and other locations. Private parking, available for a fee across from Hara Arena, is not managed by Hamvention.

Hamvention pays for parking on the Hara Arena lot, however, as well as passes for the inside vendors, Graver says, so there's really no "free" parking. A traffic flow pattern worked out by Matthews and local police has eliminated tie-ups in the vicinity of Hara that used to occur each Hamvention weekend.

Once busing, pick-up sites and crowd-control fences have been planned and placed, Graver says, the rest is largely up to the crowd. "We then have to hope that every one goes with the flow and obeys the rules," he says.

Do some people still try to crash the gate at Hamvention? Not very often, Graver says. "For the most part, when people get turned away, usually they get pointed right to where they can buy a ticket, and that's it." Hamvention officials sometimes have to keep other prospective attendees outside the gates altogether, however.

"There's, uh, what I'll call 'ladies' who tend to come through the property and

advertise their services, and we try as discreetly as possible to show them the door," Graver says, chuckling. "They see some business there themselves, and they break the rules, and we have to say, 'thanks, but no thanks' and move on."

### Hamvention and Hara

Hamvention typically evokes the image of Hara Arena, the aging facility that has housed Hamvention for 36 years now. Hara will remain the venue at least until 2003, when Hamvention's current five-year contract with the arena expires.

"Before we signed the last contract, we looked at this area and there just wasn't anything that suited our needs," Miller explains.

Matthews points out that Hamvention is the only show that uses every square inch of Hara Arena. "We've grown with Hara, and Hara has grown with us," he says. "Hara



A Hamvention "roadie" installs one of the indoor exhibits.

would not be what it is today if it wasn't for Hamvention. By the same token, Hamvention would not be what it is today if it wasn't for Hara."

Matthews also says Hamvention has permanently installed a lot of equipment in Hara that it could not afford to walk away from at this point. The facility's East Hall and North Hall both were added to accommodate a growing Hamvention.

Hara Arena manages certain aspects of Hamvention as part of the contract. For example, food service is entirely Hara's responsibility, and the contract does not allow food items to be brought in. Neither DARA nor Hamvention have a say in this activity, and there's no financial return to either. "They gear up to have the food available," Graver says simply. During the show, visitors consume some 55,000 hot dogs and 1000 dozen pretzels, among other goodies.

Hara handles inside rest room facilities as part of the deal. "There's always a line, and because of the volume of folks, there's *always* some kind of problem," Graver concedes. He says Hara has people on staff to check the bathrooms periodically and take care of problems. "There's always feedback that we get about that, and we do our best to let Hara know."

Hara also maintains and manages the drayage area, where vendors and exhibitors can have products or exhibits delivered and stored in advance of the show. Hara handles local parking, primarily for vendors, exhibitors, and Hamvention officials.

While there are no immediate plans to move Hamvention elsewhere, "we'd be stupid not to be thinking about that in the future," Matthews says. He points out that a new owner could decide to raze the facility or convert it to another use.

"We have contingency plans for other buildings in the local area that we could use for Hamvention if something major happened," he says, "if the facility ceased to be there for whatever reason...tornado, fire." But, he notes, none of the facilities in the Dayton area could accommodate Hamvention's present size. "Our show would have to decrease by about 30 percent in size in order to fit into any other building in Dayton."

### The High Cost of Hamvention

Putting on Hamvention costs in excess of \$700,000 each year. Keeping expenses in check is a delicate balancing act, according to Graver. "We are continually being faced with increasing costs at Hamvention, and you have to balance that versus not detracting from the quality of the show if you make a cut somewhere," he explains. "You can only raise your prices to a certain point, so we're really struggling with income versus expenses versus maintaining the quality of the show."

Hamvention officials recall the days when the show used to get a lot of things at no

cost. Trash barrels, for example, used to be free, and the community once donated the necessary police and fire services. Now, just about everything carries a price tag. Matthews says costs especially skyrocketed during the past decade, and he's not sure the average Hamvention visitor appreciates the economic side of the show.

"Last year income did not meet projections, so it was not a very good year," he says. "What a lot of people don't understand is that now it's a full-blown trade show; you have to make certain contractual arrangements in advance that have to be paid for, whether you make money or not."

Advance tickets remain \$16 for all three days (\$22 at the gate), however. "The equation is: Will fewer people pay more money so that we can still make a profit, or do we need the volume at the lower price?" Matthews asks rhetorically.

Matthews is quick to point out that the show generates more than \$10 million in business each year for the Greater Dayton area, and local businesses now roll out the red carpet for Hamvention visitors. "This helps make people want to come back year after year."

Transportation is a huge chunk of Hamvention's budget, but it's also one place where show officials have made deep cuts. Hamvention no longer offers park-and-ride service from area hotels or from the Air Force Museum at Wright-Patterson Air Force Base.

"This is one we've taken a lot of heat over," Matthews concedes. Hamvention officials determined that only about 300 cars were parking at the museum, so the route was discontinued last year, saving about \$10,000. The bill for park-and-ride bus service used to run \$130,000. As a result of cuts, it's now around \$70,000, Matthews says.

Another potential budget buster is disposing of the estimated 90,000 pounds of debris left over after the Hamvention crowd goes home each year. The bill runs another \$10,000 to \$12,000, Matthews says. Some of that detritus is flea market leftovers. "When the show's over, they just leave it set," Matthews says, "and it's gotten to the point that it's a major problem."

### Dealing with the Outside World

To produce Hamvention each spring, Matthews deals with several outside entities. These include not just show vendors and exhibitors but local government officials, security service, and other services.

"One of the most critical things is to maintain a working relationship with our vendors, so that we don't have to pay more for the service than we absolutely do, and we get what we absolutely need," Matthews explains.

Some expenses generate additional costs of their own. For example, Hamvention requires some 140 uniformed security

personnel. Matthews says the State of Ohio then collects \$18 for each of them for the weekend.

Hamvention—which is not really in Dayton but in the City of Trotwood—also must cope with local ordinances. For example, Graver says the local fire marshal now prohibits vehicle traffic in the outside exhibits area.

Life used to be a lot simpler. "Years ago, we never had to do anything with permits. We just went in and did it," Matthews says. Hamvention now spends in excess of \$500 just for permits. "They pull inspection on Thursday," he says, "and until we get that final inspection, we don't know if the show's going to open on Friday or not."

When Madison Township was annexed by Trotwood in 1992, Hamvention suddenly came under a totally new set of zoning regulations and had to start paying for fire and police and first aid personnel it used to get for free. Hamvention now pays Trotwood Fire and Rescue personnel to be on site.

Given the show's size, there have been remarkably few health-related problems over the years. Most have been confined to spending too much time in the sun, cuts and bruises, and one apparent heart attack in the distant past.

Hamvention deals with the contractors that provide tents for outside exhibitors as well as those that supply the portable rest room facilities (a recent addition in this regard has been the so-called "Crowd Pleaser" multi-station rest room facility that has running water). Hamvention also arranges to hold Amateur Radio exams and forums at Meadowdale High School.

Required inspections and permits have become an administrative issue as well as a significant budget item. "When we expanded our show a few years ago and put in the outside vendors' tent and the electricity for that tent, we created a nightmare no one could have realized," Matthews recalls. Hamvention spent \$60,000 for electricity and "invoked a bunch of new code requirements," as he put it. The locality also requires drawings that are detailed right down to the location of individual trash bins.

### The Ins and Outs of Vendors

Don't call it "the flea market" anymore! "Outside Exhibits" is the revisionist Hamvention term. The 2500 outside spaces accommodate roughly 1500 vendors. For "Inside Exhibits" Hara offers 550 spaces typically occupied by some 200 exhibitors—since many larger vendors take up more than one space (the ARRL occupies six).

Hamvention determines who goes where. Typically, all spaces are sold out weeks, if not months, in advance, although officials say it's sometimes possible to squeeze someone in at the last minute. Major exhibitors tend to put in for the same spot

each year, so return visitors will know where to find them.

Top Amateur Radio equipment manufacturers anchor prime locations in the inside exhibit area and invest princely sums to put their best faces forward for the Hamvention crowd. Hamvention often marks the start of the "model year" for manufacturers. Yaesu, for example, has most of its Hamvention arrangements in place by January or February. "And then we all start looking for special discount sales on bulk quantities of our preferred pain relievers," jokes Yaesu's Chip Margelli, K7JA. He says while some planning for the next year starts right after Hamvention ends, "we then try to *forget* about Dayton for a few months, as it is a lot of work and one could get depressed thinking about it!" Yaesu's display is shipped in advance to drayage at Hamvention to be ready for setup at show time.

Kenwood's National Sales Manager Paul Middleton, KD6NUH, says his company makes extensive plans for Hamvention each year. The process starts within two weeks after the Hamvention ends, although "serious planning" doesn't start until January. Kenwood's Hamvention display lives in Dayton. "We look at Dayton as the Indianapolis 500 of ham radio," Middleton says. "We need Dayton as the momentum builder for *all* our activities throughout the year."


With its more modest presence, Ten-Tec starts planning some two months in advance, says Scott Robbins, W4PA, the company's Amateur Radio products manager. But the Tennessee company's goal is the same. "I don't think there's any question about it that this is the focal point of the whole year for ham radio," Robbins says.

### Maintaining Hamvention's Mystique

Changes at Hamvention are rarely radical and often subtle. Concerts at the Hamvention banquet are among the more recent new wrinkles, but officials greet change cautiously.

"Every year it changes, but at the same time it has a history of being very special, and therefore you don't want to mess with that tradition," Graver says. Hamvention officials try to maintain "the mystique of Hamvention" by making improvements and changes "to the peripherals but not to the core of the show," he says.

But defining that "mystique" is another matter altogether. "That's a question that I think anybody sitting around a campfire that's a ham radio operator has talked about more than once—including us on the committee," Graver says, suggesting that luck plays a role.

"We just know that we've got it, it's cherished, it's nurtured along every year, so that we never lose sight of how valuable that is to the Amateur Radio world." 



# Continuous PEP Metering the Easy Way

If you think mercury is limited to tilt switches and esoteric relays, think again. Mercury, dear friends, is the budget op's ticket to "PEP pleasure." Forget about voting, averaging, peak-reading, memory and DSP. When it comes to measuring PEP RF on a budget—it's heavy metal to the rescue!

**A**lthough measuring peak envelope power (PEP) can be expensive, there are cost-saving alternatives to traditional techniques. As with discoveries and innovations in every field, many Amateur Radio breakthroughs are purely accidental. Forget necessity: When you bundle a ham's interest in saving money with his insatiable curiosity, *that's* the real Mother of Invention.

For example, after I installed an indoor/outdoor (mercury) thermometer in my shack, I noticed that the outdoor reading seemed to fluctuate during radio transmissions. The fluctuations *were* slight, but they seemed to hold steady during SSB transmissions. What started this—I think—is the fact that I had run the wire to the outside temperature probe through the same conduit as my antenna coax.

At first the fluctuations weren't sufficient to determine a correlation between the amount of RF power and the temperature readings on the thermometer. Further experiments showed that making three turns in the probe wire about two millimeters apart greatly improved the fluctuations' magnitude.

Now came the last step in the process: correlating the fluctuation (in degrees) to the amount of RF power (in watts). To get an accurate reading, the temperature was recorded when no RF was present. Using a standard wattmeter, I loaded the transmitter to 100 W (key down) and noticed that the outdoor thermometer read 2° higher. Using the exciter and an amplifier, I made a chart of observed values as power was increased

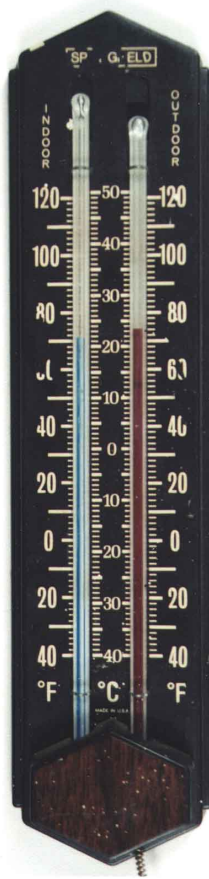


Figure 1—The effect of positioning the outside temperature probe *inside*.

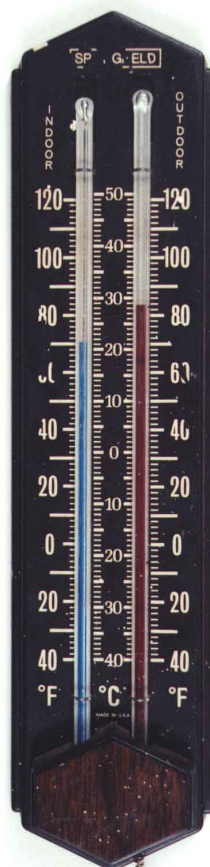



Figure 2—A increase of 12° correlated to 700 W PEP output.

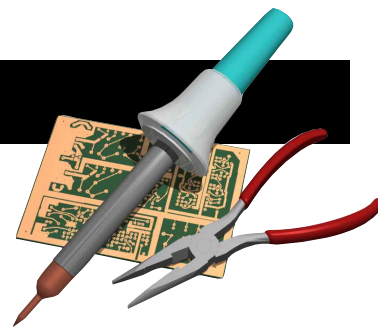
from 100 W to the legal limit (still key down). Now for the final test—to determine if my mercury based wattmeter could be relied on during SSB transmissions.

Most ops seem to think that 500 W dc input at the final amplifier will produce about 1000 W PEP. As I observed, this can be misleading. With the exciter again loaded to 100 W (key down), I switched to LSB and, sure enough, the thermometer read 12° higher (See Figure 2), which should correlate with about 700 W PEP. Because the mercury did not fluctuate, it was easy to see the difference. There was no difference between LSB and USB. Although additional fluctuation might be possible by adding turns to the probe wire, I had to be careful to allow sufficient headroom above my present outside temperature to get an accurate reading (below 1500 W PEP).

Further experiments showed that positioning the *outside* temperature probe *inside* increased sensor sensitivity. Because the inside and outside temperatures were now almost the same (see Figure 1), I didn't have to remember to record the outside temperature before transmitting. This also allows the technology to be used in areas that have elevated summer temperatures.

This project is ideal for anyone with the curiosity to pursue additional experiments. For example, I've discovered that weather conditions on certain days of the year can influence performance—especially readings taken on April 1st.

You can contact the author at 70 Bryant St, Ward, AR 72176; [k7zqr@futura.net](mailto:k7zqr@futura.net). 



## The Doctor is IN

**Q** Kim, N6LP asks, “There’s a contest on HF again this weekend. The stations are reporting 59 zero-three-four or something else. I’m not a contester, but I like giving them a point for my contact (and picking up new DXCC entities and states in the process). I’ve heard several different reporting methods. Sometimes it’s your grid square (I know that one), and other times it’s something else. Why are there so many different contest exchanges? How do I find out what they are looking for without having to waste their time and ask?”

**A** Contest exchanges depend on the sponsors of the event and generally are different in order to provide variety. Exchanges will range from grid squares (primarily in VHF/UHF contests) to serial numbers (in many contests) to names and states (North American QSO Parties, for example) to multiple pieces of information (ARRL November Sweepstakes). In contests sponsored by the League, you may find the exchange includes your ARRL/RAC section or state. In most contests sponsored by CQ, you will find that you exchange the CQ zone in which you reside (see Figure 1). Similarly, during the IARU HF World Championship in July you send your ITU zone (which is different from your CQ zone. See Figure 2).

The easiest place to start to unravel the mystery of the contest exchanges is “Contest Corral” which is published monthly in *QST*. See what contests are taking place on a given weekend and listen to several of the stations sending their exchanges. Also, “Contest

Corral” will often provide Web links for more extensive rules and other information.

Rules announcements for all ARRL sponsored contests are usually published in *QST* in the month preceding the contest (i.e. September VHF QSO party rules are found in the August issue of *QST*.) You can also find all of the current ARRL contest rules and forms at the ARRL Contest Branch Web page at: <http://www.arrl.org/contests/forms>.

**Q** John, K2CF, asks, “Sometimes on 10 or 15 meters I can make contact with stations that are 300 to 400 miles away. We can communicate, although we both report weak signals. The distance seems to be too great for so-called ‘ground wave’ propagation, and these stations are definitely in the skip zone, which would seem to preclude normal ionospheric propagation. Is there another mechanism involved?”

**A** The most likely explanation is that you are working them on what is known as “backscatter.” Within the skip zone a small amount of RF is scattered off the ionosphere itself, or from irregular ground at an intermediate reflection point within the zone. The levels are usually such that 100-W stations can just hear each other. Occasionally, you may also encounter situations where a sporadic-E cloud of intense ionization is located somewhere between you and another station within the skip zone. This cloud can reflect signals, creating what is known in amateur circles as “short skip.”

**Q** Bill Kendrick, WA6TMT, asks, “Can you define a couple of acronyms for me? I often see mentions of DTMF, CTCSS and DCS in *QST*, but I’m not sure what they mean.”

**A** **DTMF:** Dual-Tone Multi-Frequency. Everyone in the country has encountered DTMF signaling, but they wouldn’t recognize it by that acronym. DTMF is better known to the masses as *TouchTone*. In the DTMF system two audio tones are combined whenever you press a button on a telephone or radio keypad. Both tones must be decoded on the receiving end for the signal to be “valid.” This provides a certain measure of reliability. In amateur applications DTMF is commonly used for remote control.

**CTCSS:** Continuous Tone-Coded Squelch System. Many hams know this one by the Motorola trade names *Private Line*, or simply *PL*. CTCSS uses individual audio tones of very low frequency. The frequencies are so low, in fact, they are below the normal receiver audio passband. This means that the tones can be sent along with voice audio without causing interference. A receiver with CTCSS enabled will be silent unless it receives a transmission that includes the proper tone. Repeaters often use CTCSS to control access in situations where there is interference from other repeaters on the same input frequency.

**DCS:** Digital Coded Squelch. This popular method of signaling uses a burst of data tones. As with CTCSS, a DCS-equipped receiver will remain silent until it “hears” a data burst that it has been programmed to recognize.

**Q** I have a large number of 3.5-inch diskettes—almost all of which appear to be defective! I don’t see how this is possible, but recently when I needed to back up some log files on my station PC I kept getting “defective disk” messages. I’ve been storing the disks properly, and I haven’t exposed them to mag-

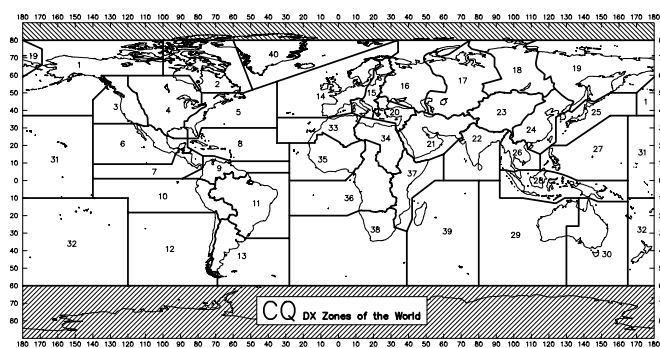


Figure 1—CQ Zones of the world.

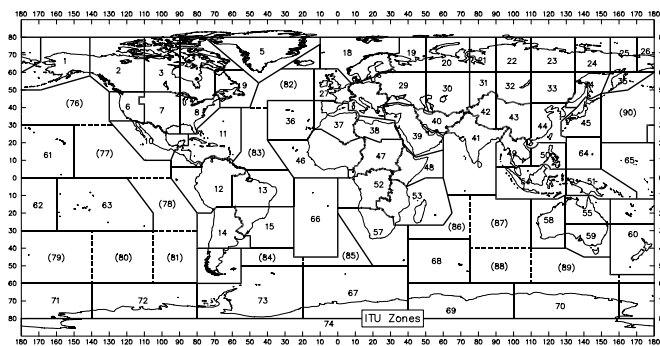


Figure 2—A map of ITU zones.



netic fields. Do you have any idea what might be causing this?

**A** If you have been carefully storing your diskettes, there is one culprit you may have overlooked: your disk drive. The Doctor is willing to bet that you have a flaky 3.5-inch drive. The read/write head could be dirty, or the tracking mechanism could be faulty. These drives are so inexpensive (less than \$20 in some stores), I'd suggest replacing the drive entirely. If that isn't the problem, hang onto your receipt and take the drive back.

By the way, consider adding a CD-R or CD-RW drive to your station computer. It is *much* easier to do backups when you can dump 650 Mbytes of data at a time! The CD-ROMs are more durable and reliable than diskettes, too.

**Q** Tim, KC4BBI, asks, "I am blind. As you might guess, I take a lot of taxis. I often call them from restaurants, malls, and other places where pay phones are hard to find. I do not have a cell phone. I would like to use the autopatch of our local repeater to call taxis. Does this violate the 'no commercial use' rule for Amateur Radio?"

**A** When the FCC liberalized the business rules they stated that amateurs may use Amateur Radio to conduct their personal communications, including ordering food over the air or making appointments.

Between 1972 and 1993, the FCC laid down stringent "no business" rules. Talk-ins to conventions and hamfests weren't legal, among many other things! Effective September 13, 1993, the "no business communications" language was replaced with a prohibition on communications for compensation on behalf of one's employer, or in which the amateur has a pecuniary interest [97.113(a)(2), (3)]. The current language is almost, but not quite, as relaxed as the pre-1972 rules. Now, instead of a flat prohibition on providing an alternative to other radio services, there is a less restrictive one against doing so on a regular basis [97.113(a)(5)].

These rules permit wider use of Amateur Radio to satisfy personal communications needs. To cite a classic example, as far as the FCC is concerned you may now use an autopatch to order a pizza. You may call your dentist's office to let them know you'll be late, or even to make an appointment. On your way home you may ask your spouse if you should pick up a loaf of bread on the autopatch without worrying about whether this will "facilitate the business affairs" of the grocery store. Repeater owners or trustees may set tighter standards if they want, but it's no longer an FCC issue.

The Commission doesn't want to hear questions about whether such-and-such is permitted. The FCC Report and Order, which carries the weight of a regulation, said:

"We [the FCC] have decided to amend the amateur service rules substantially...to allow amateur operators more flexibility to provide communications for public service projects as well as to enhance the value of the amateur service in satisfying personal communications needs. Amendment of the rules as proposed by the League will allow licensee to use amateur service frequencies, for example, to facilitate such events as races and parades, to support educational activities, to provide personal communications such as making appointments and ordering food, to collect data for the National Weather Service, and to provide assistance voluntarily even where there are other authorized services available. We believe that this action will expand the benefits derived from the amateur service by the general public as well as amateur service licensees."

The Report and Order also said, in part, that "...any amateur-to-amateur communication is permitted unless specifically prohibited, or unless transmitted for compensation, or unless done for the pecuniary benefit of the station control operator or his or her employer" [PR Docket 92-136, Report and Order].

How can you tell if a particular communication is legal? A simple checklist may help you determine if a communication is permissible under 97.113:

1. Is it expressly prohibited in the rules (music, obscenity, etc) [97.113(a)(1)]?

2. Is it transmitted for compensation [97.113(a)(2)]?

3. Does the control operator have a pecuniary interest? That is, could he or she benefit financially [97.113(a)(3)]?

4. Does the control operator's employer have a pecuniary interest [97.113(a)(3)]?

If you can answer "no" to all of these questions, the communication is okay as far as the FCC is concerned. In that regard, it is perfectly legal for you to use the autopatch to order a taxi.

Having said all that, you could face resistance from repeater owners. Some may not understand the new regulations, or they may simply not allow that type of use of their systems. Remember that repeaters are private property, although the frequencies on which they may operate are public. Some repeater owners may not permit the type of communications you are proposing, even though it isn't a rule violation. Since the repeater is their private property, you must comply.

**Q** Bruce, KC7ENB, asks, "What are the frequencies of the Citizen Band channels?"

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	26.965	15	27.135	28	27.285
2	26.975	16	27.155	29	27.295
3	26.985	17	27.165	30	27.305
4	27.005	18	27.175	31	27.315
5	27.015	19	27.185	32	27.325
6	27.025	20	27.205	33	27.335
7	27.035	21	27.215	34	27.345
8	27.055	22	27.225	35	27.355
9	27.065	23	27.255	36	27.365
10	27.075	24	27.235	37	27.375
11	27.085	25	27.245	38	27.385
12	27.105	26	27.265	39	27.395
13	27.115	27	27.275	40	27.405
14	27.125				

**Q** Fred, W9MMZ, asks, "Our club's 2-meter repeater has recently become inhabited by a group who are using it as a party-line, often holding QSOs lasting one, two and sometimes three hours, often in the wee small hours of the night. You rarely hear call signs. When users of a repeater fail to follow the FCC rules for proper station identification, is the control operator liable?"

**A** If a person operates through a repeater in violation of FCC rules, it is up to the control operator (CO) to take control of the situation. In short, the CO must shut down the repeater as soon as he or she is aware that violations are occurring. If they are aware of the fact that illegal communication is taking place and do not disable the system, they can indeed be held liable.


Of course, most control operators are not monitoring their repeaters in the middle of the night. Whatever takes place on a repeater operating under automatic control while the CO is unavailable is classified as "inadvertent" activity. In this situation, the CO is not liable. According to Part 97:

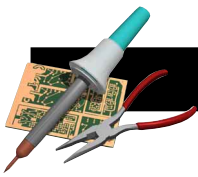
§97.205 Repeater station.

(g) The control operator of a repeater that retransmits inadvertently communications that violate the rules in this Part is not accountable for the violative communications.

**Q** Bob, KC2DT, asks, "I have recently returned to the air after a long absence. I notice that the readability report on CW is sometimes followed by NN. For example, RST 5NN. What does NN mean?"

**A** "NN" is simply shorthand for "99." So, 5NN is actually 599. You'll often hear this used during contest and DX exchanges because it is easier (and faster) to send.

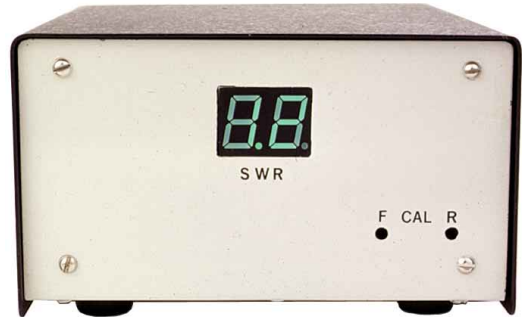
Do you have a question or a problem? Ask the doctor! Send your questions (no telephone calls, please) to: "The Doctor," ARRL, 225 Main St, Newington, CT 06111; [doctor@arrl.org](mailto:doctor@arrl.org). 



By Bert Kelley, AA4FB

# Add a Morse Readout to the AA4FB PIC SWR Meter

This easy modification of the popular AA4FB SWR meter makes it an ideal accessory for the visually impaired amateur.



**T**he reader response to my PIC SWR meter project in the December 1999 *QST* has been overwhelming. Many good suggestions have arrived in my e-mail, and one of the best was the idea of providing a Morse code readout for the visually impaired.

It's easy to adapt the PIC SWR meter to send the Morse equivalent of the value shown in the LED display to a small speaker. There is no change in construction except to add a pushbutton and, of course, a speaker. The PIC program does the real work. The existing LED readout is not affected in any way except that it turns off briefly while code is being sent.

The transmission consists of three characters: SWR units, decimal point, and SWR tenths (unless the display is showing either LP or HI). The speed is 20 WPM using 2000-Hz tones. Sending is activated by a pushbutton connected to the formerly unused spare pin 2 of the PIC. The speaker is connected to pin 3. The additions are shown on the schematic in Figure 1.

## Parts and Resources

The method used to convert numbers and text to Morse was first suggested in two articles in an early issue of the original *Byte* magazine<sup>1</sup>. A practical design appeared slightly later in *Ham Radio*

magazine and I built one of those keyboards<sup>2</sup>. The CPU and port chips used in that design are no longer available. Those interested in more details of how CW can be transmitted by a modern PIC processor can download my commented assembly language listing available on the ARRL Web site<sup>3</sup>.

The push button can be a normally open, momentary closure type such as a RadioShack 275-1556. The piezo speaker should be element-only without the driver circuit (RadioShack 273-073 should do). Piezo speakers are high impedance and require very little power, so it is not necessary to reduce the value of the 10 kΩ resistor R6. For Morse output the PIC should be programmed with PIC\_SWRR.HEX, where the additional "R" means "revised."

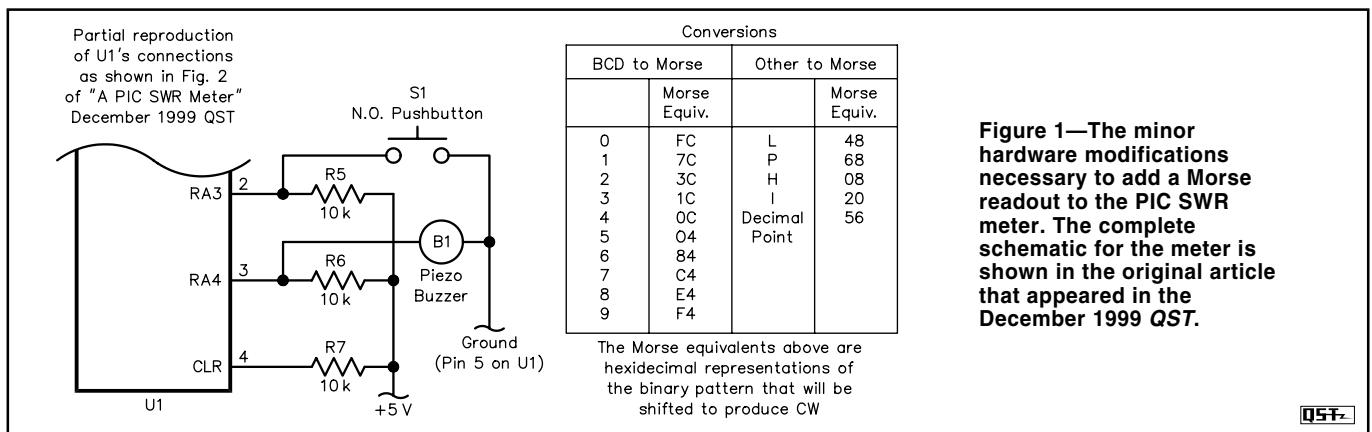
## Notes

<sup>1</sup>*Byte Magazine*, October 1976, L. Krakauer, "Efficient storage of Morse character codes", and W. Sewell, "If Sam Morse could see Us Now", same issue.

<sup>2</sup>*Ham Radio*, January 1978, "A Microprocessor controlled CW keyboard."

<sup>3</sup>The PIC code is available in *PICSWRR.ZIP* on the ARRL Web site at <http://www.arrl.org/files/>. The assembly listing is called *PIC\_SWRR.ASM*.

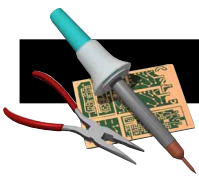
2307 S Clark Ave  
Tampa, FL 33629-5707; [aa4fb@mindspring.com](mailto:aa4fb@mindspring.com)



**Figure 1—The minor hardware modifications necessary to add a Morse readout to the PIC SWR meter. The complete schematic for the meter is shown in the original article that appeared in the December 1999 *QST*.**

**QST**





By H. Ward Silver, N0AX

# Test Your Knowledge!

There's always room for an extra helping of "Ohm slaw."

It is futile to resist! Allow me to dissipate your willpower as I conduct this examination on our favorite electronic component and concept—resistors and resistance.

- What has the lowest resistance at room temperature?
  - silver
  - copper
  - gold
  - hamfest customers
- In a "carbon comp" resistor, the "comp" is short for...
  - compensated
  - compendium
  - nothing, it's just "comp"
  - composition
- If your car battery voltage drops from 13 V to 9 V when you key your 25-W mobile rig, you might have a bad...
  - headache
  - cable or connector
  - fuse
  - ground strap
- If a resistor has a 10% tolerance, what does it have a tolerance of?
  - resistance value
  - bad design
  - power overload
  - badly written quizzes
- Three known-value resistors are in a series connection. How many measurements does it take to determine the power dissipation of all three?
  - 1
  - 2
  - 3
  - 4
- Certain materials, when cooled to very low temperatures, become...
  - extremely cold
  - irritable
  - superconductive
  - hypoallergenic
- High-voltage resistors are made in long, narrow packages to increase...
  - power rating
  - inductance
  - voltage rating
  - visibility

- The color-code sequence for resistor color bands is...
    - EGBDF
    - ROTFLMAO
    - ROTFLLOL
    - BBROYGBVWG
  - A resistor with a single, black band is...
    - a wire jumper
    - in mourning
    - defective
    - wirewound
  - Wheatstone invented what type of resistive circuit?
    - bridge
    - rat-race mixer
    - subjunctive clause
    - toaster oven
  - Negative resistance is a key feature of which component?
    - dean drive
    - tunnel diodes
    - Channel Tunnel diodes
    - gyrotrons
  - What is the end-to-end resistance of 10 feet of 50-Ω coaxial cable?
    - 50 Ω
    - 100 Ω
    - 10 Ω
    - 5 Ω
- Bonus:** In the "old days", what common household item could be transformed into a stable resistor with a little whittling?

## Total Your Score!

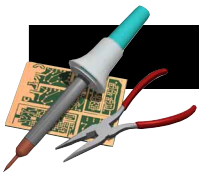
There are a total of 12 possible answers in this quiz, not including the bonus question. Give yourself one point for each correct answer.

- 9—12 Your knowledge is *irresistible*
- 5—8 Better hit the books again
- 1—4 Too many insulators in your neural circuits

**Answers**

1. a—The resistive material is a mix, or composition, of carbon and other binding materials.
2. a—It only takes 1-Ω of total resistance in a cable to cause a 4-V drop at 1 A.
3. b—A superconductor loses all resistance to current flow below a critical temperature.
4. a—A resistor's tolerance is the maximum variation above and below its nominal value.
5. Only 1. Measure either voltage or current across the entire string, calculate total power dissipation for the summed resistance value as if it was a single resistor, then allocate to each resistor its share of the heat in proportion to its fraction of total resistance value.
6. c—High-voltage resistors are specially made to keep applied voltages from arcing across them or leaking across them from terminal to terminal.
7. c—High-voltage resistors are specially made to keep applied voltages from arcing across them or leaking across them from terminal to terminal.
8. d—Black/Brown/Red/Orange/Yellow/Green/Blue/Violet/Gray/White from 0 to 9
9. a—These are often used on PC boards loaded by automatic assembly equipment.
10. a—The Wheatstone bridge is the basis for many sensitive instruments and strain-gages.
11. b—The tunnel, or leak, diode shows a negative dynamic resistance, decreasing forward voltage with increasing current, and makes a novel amplifier or oscillator.
12. Less than 1 Ω. A cable's impedance rating refers to its characteristics as a transmission line. (Tricky question!)

**Bonus:** A pencil! Many years ago, pencil leads could be pressed into service as high-value resistors and they were cheaper than the real thing.



By Charlie Hansen, N0TT

# A Tool for Winding Small Toroidal Cores

This simple tool and winding approach will help you snake thin wires through tiny iron and ferrite cores.



**H**ave you ever tried to wind thin wire onto a very small toroidal core? It can be a tedious, time-consuming and sometimes frustrating job! Recently, I needed to wind several RF chokes of fairly large inductance on some FT-37-43 cores. You know the ones I mean: You need a magnifying glass and a good light source to work with them! For the job at hand, I used hair-fine #34 wire and intended to put as many close-wound turns on the core as I could. (That is, up to the classic 30° wedge of open core to avoid capacitance effects at the ends.<sup>1</sup>) After struggling to wind a few turns using a bent paper clip and fishing the wire through the core with each turn, I knew I had to come up with a better way!

## The Old Shuttle

I thought about using the shuttle shown in Figure 1.<sup>2</sup> But because the hole in the FT-37-43 core is so small, I needed a *very* slender piece of plastic, stiff paper or other material to get through the hole. Also, I had used that shuttle many times before only to have the core slip from my fingers and fall to the floor. (Of course, it *had* to unwind itself on the way down!) I decided I needed a different approach. After some experimenting, here's what I came up with.

## A New Shuttle Experiment

The shuttle I designed is shown in Figure 2 and the accompanying photograph. No specialized tools or parts are needed to reproduce it. It's made of two lengths of small-diameter brass tubing available at hobby shops and hardware stores just about everywhere. You'll need a 2<sup>3</sup>/<sub>4</sub>-inch length of 1/16-inch-OD tubing and a 1<sup>1</sup>/<sub>4</sub>-inch length of 3/32-inch-OD tubing. The incremental sizes of brass tubing available telescope together for a perfect slide fit. Other materials used in this shuttle are common items likely found your junk box: a short length of plastic insulation and a 1<sup>5</sup>/<sub>8</sub>-inch length of heat-shrink tubing to fit the 1/16-inch-OD brass tubing.

## Cutting the Tubing

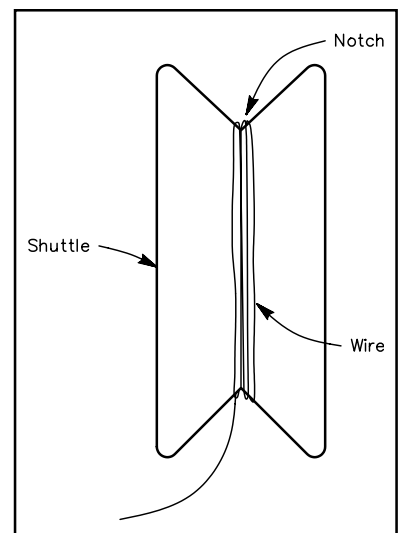
To cut the brass tubing to size, secure it in a vise. Pad the vise jaws to prevent deforming the tubing. Keep the area of the tubing being cut close to the vise jaws. Using a sharp edge of a small triangular file, make a groove around the tubing at the proper length dimension, then simply snap off the piece. This action

leaves a slightly burred end on the tubing. Use the file to square off the tubing ends, then finish the edges with fine sandpaper. (You could use a hacksaw with a fine-toothed blade to cut the tubing, but if the blade catches, it might bend the tubing.)

It's important to remove all the burrs from the tubing. This reduces the chance of nicking the insulation of the wire being wound on the toroid. Also, the larger-diameter tube (the bobbin) must rotate freely on the smaller-diameter tube (the shaft). To remove small burrs on the inside of the smaller-diameter tubing, I slightly flattened the point of a safety pin with a hammer to produce a small reamer. To ream the ID of the bobbin, I used a small drill bit. Both reamers can simply be twisted by hand.

## The Wire Guide

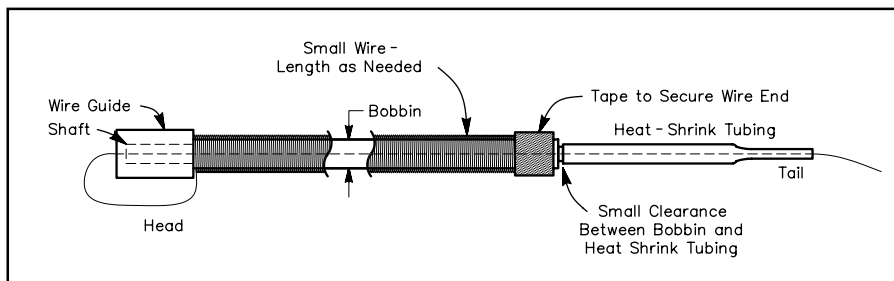
Strip a short piece of thick plastic insulation from a piece of wire (about #16) and force the insulation onto one end of the shaft to act as a wire guide (see Figure 2). The insulation should extend about 1/16 inch from the end of the shaft. If you cut the wire-guide insulation with wire cutters, the cut end of the tube won't be perfectly square. That's okay because the uneven areas tend to catch the wire and prevent it from wrapping around the guide as the wire is being pulled from the bobbin. The wire guide also provides enough friction to tension the wire while winding the toroid. Normally the wire makes less than one full spiraling turn around the wire guide as it is pulled from the bobbin, through the shaft and out the heat-shrink tubing tail.



**Figure 1**—The classic shuttle used for winding toroidal cores. This shuttle, described in *QST* and *The ARRL Handbook* (see Note 2), is usually cut from stiff paper or thin plastic material.

<sup>1</sup>Notes appear on page 64.





**Figure 2—Mechanical details of a shuttle designed for winding small-diameter toroidal cores. The shaft is made of a 2 $\frac{3}{4}$ -inch length of  $\frac{1}{16}$ -inch OD brass tubing. A 1 $\frac{1}{4}$ -inch length of  $\frac{3}{32}$ -inch OD brass tubing is used for the bobbin. In the drawing, one end of the wire (the right-hand end next to the heat-shrink tubing) is held to the bobbin with a piece of tape. The wire is then loaded onto the bobbin, passing the free end over the left-hand wire guide, through the tubing and out the heat-shrink tail (right).**

**Table 1**

**Approximate Wire Capacity of a Closely-Wound One-Inch Area of the Shuttle's Bobbin**

Wire Size (#)	Length (Inches)
26	17
28	22
30	27
32	34
34	42
36	53
38	65
40	84

The #16-wire insulation I used for the wire guide in my prototype is adequate for smaller-diameter wires, ie, those smaller than #33. For larger wire diameters, I use thick-walled Teflon tubing. This tubing is mechanically stiff and damage resistant. If needed, you can use several tubing layers to increase the wall thickness. The thicker plastic tubing works better than thin-walled insulation because it creates a larger bending radius for the wire as it is pulled through. Caution! If the wire cuts its way through the end of the wire guide to the brass tubing, the wire's insulation will likely be damaged.

Slip the bobbin onto the shaft and place the heat-shrink tubing tail at the opposite end of the shaft to hold the bobbin in place. Cut the heat-shrink tubing about  $\frac{3}{8}$  inch longer than the end of the shaft to allow its use as a threading guide. The tail also helps protect the insulation from damage as the wire is dispensed. Leave a small gap between the bobbin and the heat-shrink tubing to allow the bobbin to turn freely. I didn't apply any lubricant between the bobbin and the shaft, but you could use a single drop of lightweight machine oil at that location. Avoid using too much oil as it might migrate to the outside of the bobbin and prevent the tape (used in the next step) from adhering.

### Wire Handling

Before loading the bobbin with wire, cut some short strips of masking tape about  $\frac{1}{8}$ -inch wide. Tape one wire end to the bobbin at the heat-shrink-tail end. Load the bobbin with a rolling motion, and using the thumb and forefinger of one hand, guide the wire with the other hand into a closely wound coil. When the bobbin is full, slip the free end of the wire over and into the wire guide, and push it through the shuttle shaft and out the heat-shrink tubing tail. Hair-fine wire (about #40) is normally difficult to push through the shaft. I use a length of #30 wire with one end bent into a hook to pull the smaller-diameter wire through the shaft.

For its size, the bobbin holds a surprising amount of wire. I've wrapped over 40 inches of the #34 wire on it in a single layer. Table 1 shows the nominal bobbin capacity for a closely wound single layer of a given wire size. The lengths given allow for a  $\frac{1}{4}$ -inch-wide area for taping. The bobbin could be made slightly longer, but there is a practical limit. To accommodate more wire and/or larger cores, the shuttle could also be made of larger-diameter tubing. I've used wire sizes as large as #26 with the tubing sizes specified. Larger-diameter wire is more difficult to work with because of the small radius at the tip of the wire guide. With larger wire diameters, it helps to push the wire on the bobbin toward the guide. As more wire is dispensed, the tape securing the

other end of the wire can be removed to allow the remaining wire to move closer to the guide.

### Using the Shuttle

Holding a miniature core in your hand and simultaneously wrapping wire around the core can be difficult. Instead, use a small, smooth-jaw vise, lining the jaws with a layer of tape to hold the core by a small section of its sidewalls. The tape cushions the brittle core and provides some friction to keep the core in place. Clamp the core at a corner of the vise. That leaves most of the core material and the hole exposed to accept the wire. Tighten the vise just enough to keep the core from slipping. About halfway through the winding, I usually rotate the core to make the winding more visible, but never clamp the wire that's wound on the core.

To use the shuttle, slip the tail of the shuttle through the toroid and pull out about 1 $\frac{1}{2}$  inches of wire. Secure the wire end to the top of the vise jaws with some tape. This keeps the wire end out of the way and allows the first few turns to be tensioned. Pull out about four more inches of wire; pass the shuttle around the core, then through the center of the core. With two turns of wire on the core, continue to wind, pulling more wire from the bobbin as needed.

When close-winding toroids (especially with very small-diameter wire), I first space-wind the wire for a few turns while keeping tension on the wire, then push the turns together. This helps avoid any crossovers. The coiled wire has a tendency to spring around the core, so I use a drop of Superglue at the start of the winding and the end. I apply the glue to the core next to the wire and allow capillary action to carry the glue into the winding; it dries in a few seconds. In lieu of glue, I sometimes use a long, narrow strip of cloth tape around the core, pressing it into place as winding progresses.

This simple and inexpensive shuttle makes winding small toroids easy and fast! Add it to *your* workshop arsenal!

### Notes

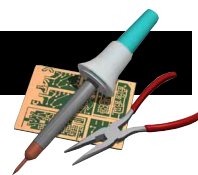
<sup>1</sup>See Figure 25.34 in the Circuit Construction Chapter of *The 2000 ARRL Handbook*, p 25.23—Ed.

<sup>2</sup>See Harold Muensterman, N9DEO, "Toroid-Coil-Winding Aids," Hints and Kinks, *QST*, Nov 1984, p 55, and *The 1984 ARRL Handbook*, Chapter 2, p 2-31, Figure 57.—Ed.

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Photo by Joe Bottiglieri, AA1GW





## Nova for Windows 32, Version 2.0

Reviewed by Steve Ford, WB8IMY  
QST Managing Editor

As the saying goes, you can't tell the players without a program. You also can't operate amateur satellites if you don't know where they are. There is free satellite software available on the Web that will give you "just the facts, ma'am", but if you want satellite-tracking software that will *really* give you the complete scoop, and visually knock your socks off in the process, I strongly recommend the 32-bit *Nova for Windows 32* by Northern Lights Software Associates.

*Nova* arrives on a single CD-ROM and installation is a breeze. You simply run the *setup.exe* file from the CD and it installs itself within minutes. According to the instructions, *Nova* will run on a 486-PC, but during my brief test I found the operation to be a bit too sluggish. On my 333 MHz Pentium II system, however, *Nova for Windows* ran like proverbial greased lightning. The manual states that Pentium systems are preferred and I suggest that you follow that advice.

### Tons of Features

*Nova* has more features than I've seen in any satellite-tracking software package to date. You have your choice among several "views," including exotica such as the "sky temperature" view looking out into space from your location (this is mostly of interest to moonbouncers, but it is fascinating just the same). One of my favorites is the so-called "radar view" (see Figure 1). In this view you see a circle with your station at the center. The satellite tracks through the circle as it passes overhead, showing you exactly where the bird is in relationship to your antennas.

*Nova* works with a variety of antenna-control interfaces including the Kansas City Tracker, SASI Sat Tracker, AEA ST-1, Orbit Electronics RIF-PC and the M2 RC-2800P. Setup is straightforward, allowing *Nova* to automatically aim your satellite antennas for you. If you don't happen to know the latitude and longitude of your station, you can select from a database of 2,000 cities. No matter where you live, chances are there is a city in the list that is close enough for reasonably accurate predictions.

*Nova* will provide detailed pass predictions for any satellite, any time and at any location. You can even "model" the horizon at your location, indicating, for example, that you have a large building that blocks the view to the south to an elevation of 45°.

A set of recent Keplerian elements is provided on the *Nova* CD, but I recommend that you grab an updated set from the AMSAT Web site at <http://www.amsat.org> after you install the program. *Nova* will read the Keps automatically if you save them to a standard ASCII text file. If you receive your Keplerian elements by e-mail, *Nova* will *update itself* if you "tell" *Nova* where to find them on your hard drive. You just dump the e-mail to the directory and forget it.

### More than Amateur Satellite Applications

As I mentioned earlier, *Nova* is also designed with moonbouncers in mind. There is a database of active amateur moonbounce stations (you can modify the database at will) and you can use it to set up schedules. Best of all, *Nova* will even graphically plot your chances of moonbounce success based on a number of factors including Moon position and sky temperature. By glancing at the graph you can quickly pinpoint the best times to make moonbounce QSOs between any two points on the globe.

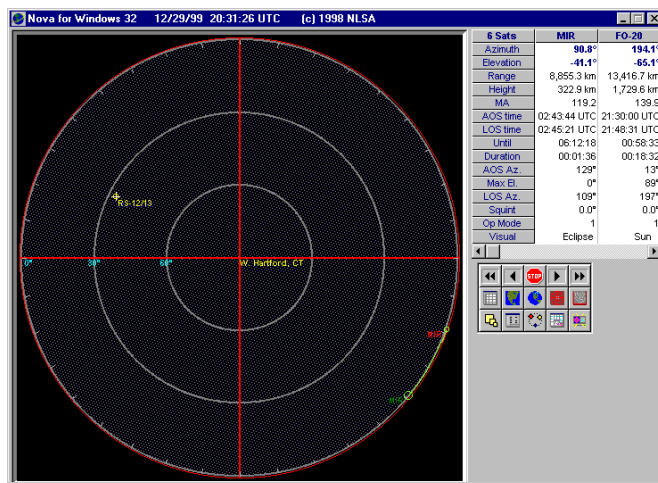
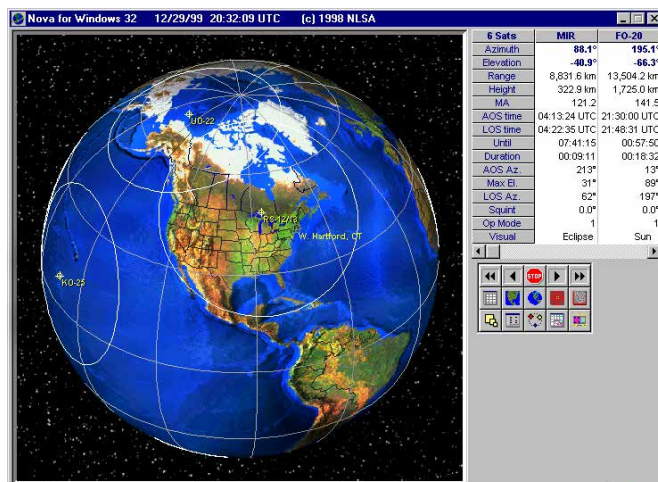


Figure 1—The *Nova* "radar view" (above) centered on West Hartford, Connecticut. RS-13 was passing through when this image was captured.

Many people enjoy spotting satellites visually as they zoom overhead, and *Nova* can assist in that activity, too. The software will predict the best days and times to observe various birds. I used it to find the *Mir* space station as it hurtled through my local sky just after sunset.

### The Ultimate?

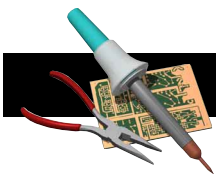
*Nova* may not be the ultimate satellite-tracking program, but it comes awfully close. Since this is a "Short Take," I can't even begin to describe everything that *Nova* can do. That would probably require a multipage full-fledged "Product Review." Suffice to say, however, that *Nova* is likely to provide every feature you'd want in a satellite-tracking program for years to come.

*Manufacturer: Northern Lights Software Associates. Available from AMSAT, 850 Sligo Avenue, Suite 600, Silver Spring, MD 20910-4703; tel 301-589-6062. \$50 for AMSAT members; \$60 for nonmembers.*



Next Short Take





# THE HELP DESK

This month we offer a glossary of terms, technical and otherwise, that you're likely to encounter in *QST*.

**Ω:** The Greek letter Omega, used as a symbol for resistance (ohms).

**AGC:** Automatic Gain Control. The receiver circuitry that automatically adjusts the gain to compensate for variations in signal strength, keeping the audio output constant.

**ALC:** Automatic Level Control. The transmitter circuitry that automatically adjusts the audio amplification stages to compensate for variations in audio input levels. ALC can also be applied to RF stages. A transverter, for example, may have ALC circuitry.

**Antenna tuner:** A device consisting of adjustable coil/capacitor circuits used to provide an impedance match between a transceiver and an antenna system.

**APRS:** Automatic Position Reporting System. Technology developed by Bob Bruninga, WB4APR, which uses packet radio and global positioning system receivers to track objects.

**ATV:** Amateur television.

**ARES:** Amateur Radio Emergency Service, established by the ARRL in 1935. Groups of trained operators who are ready to serve the public when disaster strikes.

**Blow-by:** Signals that "leak" through or around IF or audio filters. Often a characteristic of layout or system-design problems.

**Clover:** An HF digital communication mode that offers error-free performance under poor signal conditions. Available only in products manufactured by HAL Communications.

**Coax:** Coaxial cable—literally, "coincident axes." A transmission line with a center conductor surrounded by a braided or solid metal shield. The center conductor is insulated from the shield by air, plastics or other materials.

**COM port:** Serial communication port. The part of a computer designed to communicate with external devices ("external" can also include devices plugged into the motherboard bus sockets). Packet TNCs, for example, are often connected to COM ports.

**DFing:** See "Foxhunting."

**DSP:** Digital Signal Processing. Converting analog signals into digital data and manipulating the data to perform specific functions. For example, DSP audio filters can notch out the continuous tone produced when someone tunes up their transmitter on a nearby frequency. DSP can also be used to create signals for transmission.

**Dupe:** Duplicate. In a contest, a station you have already worked.

**Dynamic Range:** The ratio of the maximum signal level (with a specified amount of distortion) to the noise level (or minimum signal level), usually expressed in dB. When evaluating receiver performance, the higher the dynamic range figure, the better.

**EME:** Earth-Moon-Earth. Otherwise known as "moonbounce," it is the practice of using the Moon as a giant signal reflector to provide long-range VHF, UHF and microwave communication here on Earth.

**Feed line:** A cable used to connect an antenna to a transceiver. Also known as "transmission line."

**Foxhunting:** Tracking a signal (the fox) to its source. Also referred to as "DFing" (direction finding).

**GTOR:** Goley Teletyping Over Radio—an HF digital protocol that provides error-free text and data exchanges under poor signal conditions. Available only in products manufactured by Kantronics Corporation.

**IARU:** International Amateur Radio Union. A federation of international Amateur Radio societies founded in Paris in 1925.

**IF:** Intermediate Frequency. When a received signal is converted from one frequency to another, the resulting frequency is the IF. In a superheterodyne receiver, for example, the incoming signal is converted to an IF frequency before detection. The conversion can happen more than once, so there can be two or more IFs.

**kW:** Abbreviation for "kilowatt." 1000 W.

**Ladder line:** A two-conductor transmission line that uses ceramic, plastic or wood insulators to separate the wires. The insulators are spaced at regular intervals, which gives the transmission line a ladder-like appearance.

**LID:** A poor operator.

**Meteor scatter:** The practice of bouncing VHF signals off the fiery trails of meteors as they enter the Earth's atmosphere. By using meteor scatter it is possible to enjoy brief contacts out to a distance of almost 2300 miles.

**Mode:** A method of communication. SSB is a mode, as are FM, CW, packet, television, and so on. In amateur satellite work, "mode" also refers to combinations of uplink and downlink frequencies used to communicate with various satellites.

**Moonbounce:** See "EME"

**Mountaintopping:** In VHF/UHF/microwave contesting, the practice of operating at or near the top of a mountain.

**MUF:** Maximum Usable Frequency. The highest radio frequency that will support ionospheric communication between two points at a given time. MUF is distance dependent—the longer the distance, the higher the MUF.

**NiCd:** Nickel-cadmium battery.

**NiMH:** Nickel-metal hydride battery

**PACTOR:** A method of HF digital communication where text and data can be exchanged without errors under weak signal conditions.

**PIC:** Peripheral Interface Controller. A microprocessor that can be easily programmed to perform specific functions, such as transmitting and/or receiving Morse code.

**Pileup:** When many stations attempt to simultaneously contact a single station in a desirable location (a rare DXCC entity, a rare grid square, etc) on one frequency. The result is usually pandemonium.

**Potentiometer:** A type of variable resistor. Often referred to simply as a "pot."

**Preamp:** In Amateur Radio applications, usually used to refer to "receiver preamplifiers"—small amplifiers used to boost the sensitivity of a receiver.

**PSK31:** A popular HF digital communication mode designed for conversational use. Offers excellent weak-signal performance.

**RACES:** Radio Amateur Civil Emergency Service. Established in 1952 as a special subset of the Amateur Radio Service. It is designed to provide emergency communication to local or state civil-preparedness agencies. RACES is sponsored by the Federal Emergency Management Agency (FEMA).

**RF:** Radio Frequency energy.

**Rover:** A contest station that moves from place to place during a contest. Rovers are typically found in VHF/UHF contests.

**Running:** In a contest, contacting many stations in rapid succession on the same frequency. "I had a great run going this afternoon on 10 meters."

**RTTY:** Radio Teletype. A method of sending text via radio. Commonly used on the HF bands.

**Signal-to-Noise Ratio:** (SNR) The ratio of the amplitude of the signal vs. noise, usually expressed in dB.

**Silent Key:** A deceased amateur. Often abbreviated "SK."

**SKYWARN:** A National Weather Service network of volunteers, often including Amateur Radio operators, who monitor (and report) severe weather conditions.

**Slim:** A bogus or pirate DX station.

**Spatter:** A form of adjacent-channel interference caused by overmodulation.

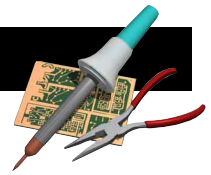
**SSTV:** Slow-scan television. A method of transmitting images using audio tones to carry picture information. Although it can be used on many bands, SSTV is primarily heard on HF.

**TNC:** Terminal Node Controller. In packet radio, a device that acts as the interface between the radio and the computer. A TNC translates radio signals into data and vice versa.

**Transmission line:** See "feed line."

**Transverter:** A device that converts a transmit signal from one frequency to another. Transverters usually convert received signals as well. Transverters are often used to communicate on UHF and microwave frequencies when coupled to HF or VHF transceivers.

**W:** Abbreviation for "watt." QST



## W95SSTV version 1.10

Ah, for the good old days of Slow Scan Television (SSTV). Remember those fuzzy amber images that would quickly fade from top to bottom? How about those bulky monitors and demodulators? Only hard-as-nails hams did SSTV in 1970, yes sir!

That was back when amateurs had to make their own integrated circuits out of raw silicon and walk five miles in raging snowstorms just to take their FCC exams. Kids today have it easy. With just a personal computer and a soundcard they can send and receive *color* SSTV images from anywhere in the world. (Color is for sissies; you have to be a real man to watch monochrome TV!)

W95SSTV from Silicon Pixels would astonish SSTV operators of 30 years ago and, yes, the software does make SSTV awfully easy and—perish the thought!—*fun*.

If your shack includes a 486/100 PC or faster (Pentium preferred) running *Windows 95/98*, and if the computer is equipped with a modern 16-bit sound card, you already own an SSTV station. All you need is W95SSTV to bring it to life.

### Features

W95SSTV is packed with useful features, but not so many that you'll find them overwhelming. Everything is manipulated by mouse clicks or drag-and-drop. W95SSTV supports a variety of image formats in the registered version (BMP, EPS, GIF, JPG, PCT, PCX, PNG, PSD, RAS, TGA, TIF, WMF, WPG), so you can send almost any digital image that is presently sitting on your hard drive. W95SSTV even includes an image processor (Figure 1) that allows you to retouch images at will, adding your name, call sign or whatever. Any image that you take with a digital camera, or scan into your system, can become an SSTV picture.

With W95SSTV's dynamic spectral display you can quickly tune in SSTV signals. W95SSTV does a good job of receiving in noisy conditions, no doubt thanks to its DSP bandpass filtering. Rather than tuning the signals after they begin, however, I achieved excellent results by just tuning for a natural sounding voice in USB. If the sender's voice was tuned correctly, the subsequent SSTV signal would probably be on target as well.

W95SSTV offers an *auto-start* function that is activated by data carried on a portion of the image waveform known as the vertical interval signal (VIS). Many SSTV programs (including W95SSTV) encode VIS data during transmission so that receiving stations can automatically identify the SSTV mode and begin reception. If you enable "VIS Start", W95SSTV will respond to the VIS signal by entering the receive mode and selecting the correct mode. W95SSTV can receive and transmit images in all of the popular modes including Scottie 1 and 2 (Scottie 1 is the most common mode among US hams); Martin 1 and 2 (Martin 1 is used heavily in Europe); Robot 36, 72 (used primarily in Japan, and with "stand-alone" scan converters); AVT 24, 90, 94 and Wrasse "SC2" 120 and 180.

You can activate the W95SSTV auto-save function, which automatically stores images while you are away. Use this feature with care because image data can quickly fill up a directory! I used the auto-save function one day to monitor 28.680 MHz for



A happy K8JGY, as received on 20 meters (14.230 MHz). Noise appears as speckled horizontal lines.

10-meter SSTV while I was at the office. I had 24 images waiting for me when I returned home.

### Installation

You can set up W95SSTV to receive images by merely connecting a shielded audio cable between your transceiver (at the speaker or accessory audio output) and your PC's sound card audio input (preferably the line input if one is available). You may have to use W95SSTV's slant controls to properly align your first few images, but once you have the alignment established you won't have to touch it again unless you switch sound cards.

You can transmit SSTV by routing the audio from your sound card output to either the accessory audio input or microphone input of your transceiver. You can use your VOX to key the rig, although I prefer "hard keying" with a single transistor interface plugged into my computer COM port. (The W95SSTV documentation describes how to wire your radio for transmission and reception.)

If this set up sounds familiar to those of you who operate PSK31 or one of the other digital modes with your sound card, it should. You can use the same set up to operate SSTV with W95SSTV. No changes required.

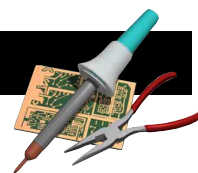
### Download and Get Started

You can download an unregistered trial version of W95SSTV on the Web at <http://www.siliconpixels.com>. My guess is that you'll find W95SSTV to be remarkably easy and enjoyable. If that's the case, go back to the Silicon Pixels site and buy it using their secure server. Trying new modes and expanding your horizons is always worth a modest monetary investment!

Manufacturer: Silicon Pixels, PO Box 579, Selah, WA 98942; [N7CXI@SiliconPixels.com](mailto:N7CXI@SiliconPixels.com). \$50.







## GE MASTER-II REPEATER MODIFICATIONS

◇ Commercial crystal-driven FM radio equipment is proliferating at flea markets with attractive prices. GE Master-II mobile radios are available, not because they're inferior or lack performance, but due to the incessant desire for more channel capacity. In the 1950s, a two-channel radio was thought to be all the radio anyone would want; today 64 channels are not enough.

The Master II radio is user friendly, reliable and simple to service. To convert a mobile (with its original control head and accessory cables) into a repeater is simple and easy as this article shows. All one need add is a duplexer, a time-out timer board and a controller board if "bells and whistles" are required. A few changes make the radio into a repeater with good audio and a dropout delay using very few components.

Table 1 explains the frequency ranges coded into digits eight and nine of the model number. If the radio frequency range suits your application, no tuning is necessary. If you need to shift the operating frequency range, there are several conversion articles on the Web.

First, obtain a service manual for the version of radio you have. You can find one at two-way service shops; GE radios are now serviced by Ericsson Inc, Private Radio Systems. A manual speeds

up the conversion and is necessary to find the jumper connections (GE prefixes them with "H") on the systems board. Locate and cut the jumper between H95 and H96; this eliminates receiver muting when transmitting. Cut another jumper between H79 and H80 on the same board to isolate the receiver-oscillator control from the switched +10 V receiver power. Now install a jumper between pin 11 and 12 on J903 of the same board. This jumper keeps the receiver channel-element energized all the time, thus keeping the receiver operating while the transmitter is on the air.

The second modification phase is to route the received audio to the transmitter. Do so by installing a 1  $\mu$ F capacitor in series with a 4.7 k $\Omega$  resistor from pin 19 of J904 on the receiver board (received audio) to pin 6 of J902 (microphone audio). In addition, install a 1 k $\Omega$  resistor between pins 5 and 6 of J902 to stabilize and improve the transmitter audio characteristics.

Next, we need to make the receiver key the transmitter when it hears a signal. This is accomplished by installing a diode, MOSFET and capacitor from pin 8 of J904 (see Figure 1) to pins 3 and 6 of P907, the connector to which a carrier-control timer board (CCT) mates. This CCT board is a factory timer that can be set to end transmissions after a fixed period. Suitable used boards are #19B226617G1 or #19C320134G1. Make the connections close to the systems board so that the CCT board can inserted without any obstructions. The capacitor and diode in conjunction with the MOSFET produce a transmitter dropout delay (hang time) of a few seconds. The length of this delay can be altered slightly by changing the value of the capacitor. If you substitute an LED for the diode, it serves as an on-board transmit indicator.

The mobile radio control-head volume control adjusts the audio level going into the transmitter. Set this control so that the average deviation of the transmitter is high and set the deviation control so that the deviation does not exceed 5 kHz. If the speaker volume is too great, install a padder at the speaker to reduce it.

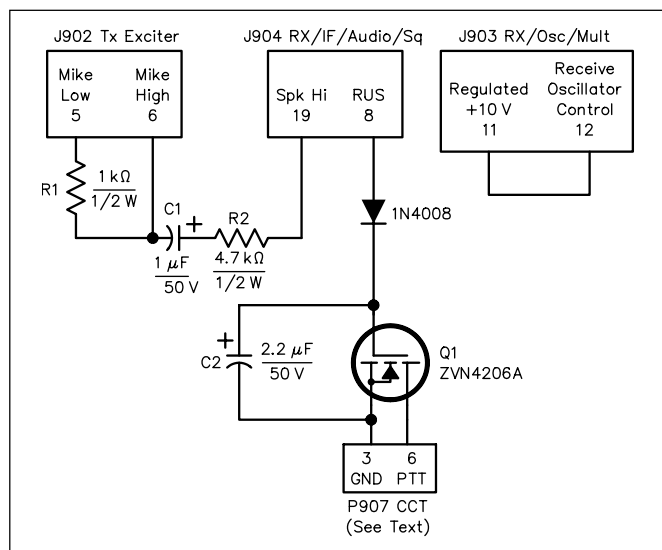
If your repeater will have a lot of users or long-winded operators, reduce the transmitter power output setting, which is controlled by a power control on the transmitter PA board. This will reduce chances of the PA overheating—these mobiles were not designed for continuous duty. A fan to cool the PA would also be helpful. This modification works well for me and the audio sounds great.

To go on the air, add an antenna duplexer and identifier circuit. Connect the duplexer transmitter port to the UHF connector on the radio front panel and the receiver port to J1 (phono jack) on the receiver RF/Mixer assembly. You can use a different controller to make the radio into a repeater, but the cost of the modification described here is easily less than \$10. Have you seen a controller lately for this price?—William Plante, K1PPN, 2 Debra St, Farmingdale, ME 04344; [billplante@hotmail.com](mailto:billplante@hotmail.com)

**Table 1**

### GE Master II Frequency Ranges

Model #	Frequency	Model #	Frequency
<b>Digits</b>	<b>Range</b>	<b>Digits</b>	<b>Range</b>
<b>8 and 9</b>	<b>(MHz)</b>	<b>8 and 9</b>	<b>(MHz)</b>
12	25-30	66	150-174
33	42-50	77	406-420
56	138-150	88	450-470



**Figure 1—Modifications to a GE Master II land-mobile two-way radio for use as a repeater. In addition, two jumpers must be cut as described in the text. Unless otherwise specified, use 5%-tolerance carbon composition or film resistors. Equivalent parts may be substituted.**

## SAVE NiCds FROM OVERCHARGING

◇ As we all know, nickel cadmium (NiCd) battery packs for H-Ts and other equipment can be very expensive to replace. They're also rather difficult to repair by replacing bad cells, because they are usually glued into nonserviceable plastic cases. I have successfully performed surgery on many such cases, but it is tedious and time consuming.

One way that cells in a pack can go bad is by overcharging. One mechanism appears to be the breaching of the cell vent, which allows the electrolyte in the cell to dry up. I understand that this

can result from oxygen gas generated at the anode, or may be due to electrolyte expansion from heat build up. Whatever the mechanism, it has been my experience that cells can go bad this way, or their life can be shortened.

The standard charge rate for NiCds is 10% of their rating (often expressed as 0.1 C) for fifteen hours. Many specially designed cells can be charged at much faster rates because they have special oxygen-absorbing anodes and perhaps other design improvements, but the tradeoff can be a somewhat shorter life span. In any event, overcharging fast-charge NiCds can be even more disastrous to cell life. Some better packs include technology to reduce the charge rate if overcharging is approached, but why depend on failsafe mechanisms that may not be perfectly failsafe when you can easily resolve the problem?

I have a problem remembering when the pack should be removed from the charger after 15 hours, or whatever amount of time the manufacturer of the charger/battery pack recommends. I have put a charger on a 24-hour timer, but sometimes forget to remove it—even after a day or two. The resulting double or triple overcharge can cause cells to go bad. I have also thought of designing a suitable one-shot circuit, but why go to all that trouble when you can purchase a solution inexpensively at your local department store!

The Intermatic #TN711 24-hour timer is ideal for charging NiCds! It can be purchased for less than \$10 at many stores. This and many similar timers use removable pins to set the start and stop times on the timer. The procedure for failsafe recharging is very easy: Insert the green (start) and red (stop) pins into the dial face to set the correct charge-time duration. (Insert the pins fully or they may not activate the ac switch. If a stop pin is not fully inserted, the timer will not switch off!) Then plug the charger into the timer and the timer into an ac outlet. Turn the timer face until the start pin just clicks the switch on; this enables 120 V ac to the charger. Now immediately *remove* the green start pin entirely, but leave the red stop pin in the timer. You now have a one shot timer that will run the required time to charge your batteries and shut off at the required time. It will *never* switch on again, no matter how long you forget about it! It is impossible to overcharge your expensive NiCd battery pack by this method!

I set the green (start) pin at 12 AM and the red (stop) pin at 3 PM, for a 15-hour charge. I turn the timer dial until the green pin just trips the switch, then remove the green pin. Fifteen hours later, my NiCds are perfectly charged, even if I go away on vacation for a week and forget to remove them from the charger. This means I have no more overcharged cells. Now battery-pack surgery is only needed when a cell fails from old age!

Remember! Don't leave those little green and red pins lying around if you have small children in the house, as the pins could be easily swallowed. Place your timer out of reach of small children (they could also turn the dial and switch it off prematurely).

I hope this technique helps you avoid the frustration of NiCd overcharge and get the maximum use out of your rechargeable batteries. Except for long-term storage, *always* keep your NiCds charged! Charge them as soon as they are fully discharged. Never leave uncharged NiCds lying around, and don't overcharge them. That way you should get the maximum life from your batteries. Best of luck.—Owen O'Neill, N2IWN, PO Box 222, Clarksburg, NJ 08510; [wilycoyote@juno.com](mailto:wilycoyote@juno.com)

## A QUICK, EASY MOBILE RADIO MOUNT

◇ Some vehicles have plastic boxes built into the dash to hold tapes, CDs and so on. I had a '92 Ford 150 pickup and a '96 Mercury Mystique that had them. Since most VHF-UHF transceivers will fit into these boxes, I developed a mounting system that works well. The boxes have small external ribs behind the instrument panel that snap them into place; they can be easily removed and replaced without any trouble.



Figure 2—A photo of W5LAN's mobile radio mount, with the hoses on each side.

I removed the backs of the boxes, so that the radio heat sinks and leads can protrude through the back. To hold the radios in place, I cut two three-inch-long pieces of ordinary automobile heater hose. I drilled two 1/4-inch holes in each hose that engage the radio's two mounting bolts on each side (see Figure 2). With both hoses in place, the radio makes a good friction fit with the box. Radios mounted with this arrangement can be easily removed and replaced.—Marland Old, W5LAN, Rte 1 Box 141b, Boston, TX 75570-9730; [m.old@att.net](mailto:m.old@att.net)

## RF-PROOFING PEAK-READING WATTMETERS

◇ Monitoring your peak power output is not only necessary to insure compliance with FCC power limitations but can provide you with invaluable information. However, my peak-reading meter uses an external power supply and was quite susceptible to RF, making its readings useless.


After considerable experimenting with several possible fixes, I found the following procedures to be quite effective:

1. Use a toroid core as a common-mode choke on the ac line of the dc supply used to power the meter (for example, a RadioShack 273-104 or 273-105). Place the choke as close to the cabinet of the power supply as possible.
2. Place the meter as close to its power supply as possible and use shielded wire for the connection. I have tried both shielded microphone cable and miniature coax with equal success.

These procedures eliminated the RF effects on my meter. I also experimented with different methods of supplying power to the meter. I discovered that the best method was to use a "real" power supply, such as a 3 to 7 A regulated supply. The worst method, and most susceptible to RF, was to use an ac to dc wall adapter.

Being able to adequately monitor your peak power output can be an invaluable aid in setting your microphone gain and amplifier tuning. However, in order to use an externally powered peak-reading meter, it's a good idea to make its power leads "RF-proof."—T. Stephen Thomason, W4IJ, 601 Black Oak Blvd, Summerville, SC 29485

Hints and Kinks items have not been tested by QST or the ARRL unless otherwise stated. Although we can't guarantee that a given hint will work for your situation, we make every effort to screen out harmful information. Send technical questions directly to the hint's author.

QST invites you to share your hints with fellow hams. Send them to "Attn: Hints and Kinks" at ARRL Headquarters (see page 10), or via e-mail to [rschetgen@arrl.org](mailto:rschetgen@arrl.org). Please include your name, call sign, complete mailing address, daytime telephone number and e-mail address on all correspondence. Whether praising or criticizing an item, please send the author(s) a copy of your comments. 



## Multimode Communication Processor Roundup

Reviewed by Steve Ford, WB8IMY  
QST Managing Editor

In the “old days” of amateur digital communication, your choices were simple. Prior to 1982, you operated RTTY using one of several *terminal units* on the market. Once the personal computer revolution was fully underway, your choices suddenly expanded to include AMTOR and packet—the first *handshaking* modes that could detect and correct errors. In the early '90s more sophisticated error-correcting modes appeared including PACTOR, PACTOR II, CLOVER II and G-TOR. And in 1999, a weak-signal alternative to RTTY known as PSK31 made its debut.

As early as 1985 hams were clamoring for a way to consolidate the necessary hardware and firmware for several digital modes into one convenient box. Manufacturers responded with devices known as multimode communication processors, or *MCPs*. Others might refer to them as *multimode data controllers*.

For more than 15 years the MCP has reigned supreme, offering an attractive assortment of digital modes. MCPs remain popular today, although they are beginning to encounter serious competition from software-based processors that exploit the capabilities of the ubiquitous PC sound cards.

There are several reasons for the MCP's enduring popularity:

- MCPs usually offer more modes in a single unit than you'll find in any of the current software/sound card products.

- MCPs can be used with just about any computer, old or new. If your computer has a serial port and terminal software of some sort, chances are it can “talk” to an MCP.

- MCPs are easy to install. It's usually just a matter of connecting the cables and switching on the box. There are no maddening software-compatibility issues.

- In some instances an MCP can operate independently of the computer if necessary. For example, you can set up an MCP to function as a PACTOR mailbox, then disconnect the computer and allow the unit to carry on by itself.

In this roundup we take a look at two new entries in the MCP market as well as two familiar units that have undergone significant changes. Our review team



included Larry Wolfgang, WR1B, and Mark Wilson, K1RO.

### Kantronics KAM '98

The KAM '98 is the latest in a family that can trace its roots back to the dawn of the MCP era. The original KAM and KAM Plus are among the most popular MCPs ever manufactured. So what does this relatively new contender have to offer?



Like its predecessors, the KAM '98 provides the standard list of modes (see Table 1) and includes G-TOR, Kantronics'

proprietary competitor to Clover and PACTOR II.

The KAMs of yore boasted the ability to operate separate VHF and HF ports simultaneously, which gave their owners the ability to work, say, VHF packet on one port and RTTY on the other. While this was a neat trick for contesting (you could watch the PacketCluster in one part of your screen while you chased HF contacts in the other), the feature strained the limits of the design, added to the expense and appealed only to a limited number of users. In the KAM '98 they've chosen a single-port design, but with greater flexibility. Owners of HF/VHF transceivers can use the KAM '98 on HF or VHF through a single audio/keying cable rather than the separate lines required with the earlier KAMs.

The KAM '98 includes a useful feature in the form of its AUX (auxiliary) port. Combined with the KAM '98's remote-access function you can use the AUX port to communicate and control outside

**Table 1**  
**MCP Feature Comparison**

	KAM '98	PK232DSP	PTC-IIe	DXP38
PACTOR	X	X	X	X
PACTOR II			X	
CLOVER II				X
G-TOR	X			
AMTOR	X	X	X	X
NAVTEX	X	X	X	
CW	X	X	X	
RTTY	X	X	X	X
PSK31			X	
ASCII	X	X	X	X
FAX	X	X	X	
HF Packet	X	X	X	
VHF Packet	X	X	X	
FSK	X	X		X
GPS compatible	X	X		
Mailbox	X	X	X	

devices. For example, there are four inputs with A/D converters that can be used to report temperature, signal levels, wind speeds or whatever. Two outputs can be coupled to switching circuits (optoisolators and relays, for example), allowing you to activate devices—or just turn on your house lights—via radio. The only catch is that remote control must be conducted using packet.

Installation of the KAM '98 was straightforward, assisted by detailed diagrams and other helpful information in the manual. Kantronics provides a DB-9 connector in the package, attached to a 3-foot long cable that connects to your transceiver. Setting up the audio drive levels is accomplished with software commands.

Kantronics has tightened up the modem filters in the KAM '98, going to a more selective 8-pole design. The difference was noticeable when copying RTTY. The KAM '98 did a good job of copying weak signals and held up well to interference (better than any of us remember seeing with the KAM or KAM Plus), but it fell somewhat short of the ability of the HAL DXP38 (the best of the group in terms of providing clean RTTY text). For casual RTTY operating, however, it is perfectly acceptable.

PACTOR performance was quite good. We were able to maintain QSOs even when conditions were decidedly marginal. CW copying ability was on par with the rest of the MCPs in the group—if the signal was of moderate strength and fist was good, you could copy 100%. When conditions deteriorated even slightly, however, the human ear/brain was the obvious winner.

G-TOR performance was outstanding—when you could find someone to link to. Despite that fact that thousands of KAMs have been sold over the years—most with G-TOR capability—it was difficult to find G-TOR signals on the air. After several days of monitoring and calling, we managed a couple of G-TOR links. In both cases conditions were poor, but G-TOR kept the text flowing with barely a hiccup.

The KAM '98 has a versatile packet TNC that has kept pace with amateur packet developments. In addition to the remote control/access functions we've already mentioned, the KAM '98 is fully GPS compatible for use with APRS.

*Manufacturer:* Kantronics, 1202 East 23rd St, Lawrence, KS 66046; 785-842-7745; fax 785-842-2031; [sales@kantronics.com](mailto:sales@kantronics.com); <http://www.kantronics.com>. Suggested retail price: \$449.

### Timewave PK232DSP

The PK232 is another MCP veteran. The original PK232 was the brainchild of AEA, and, like the KAMs, they sold by the

thousands. Several years ago Timewave purchased a portion of the AEA product line, including the PK232. Initially they offered DSP upgrade kits for the PK232s (and they still do), but Timewave also began manufacturing a substantially modified version of the PK232 that they call the PK232DSP.



One of the hallmarks of the original PK232 was its hardware flexibility, and Timewave has continued this in the PK232DSP. On the rear panel you find two radio ports, both with separate receive audio inputs. The PK232DSP will not handle two radios simultaneously, but you can select between the radio inputs by pressing a front-panel pushbutton. If you prefer to operate RTTY, AMTOR or PACTOR in FSK (where your radio does the job of generating the mark/space signals), there is 5-pin DIN jack for the purpose. Most hams use AFSK these days (where the MCP supplies mark/space tones to the radio), but FSK is handy—particularly if your rig allows you to use narrow IF filters only when you are in the FSK/RTTY mode. Finally, the rear panel offers keying outputs for CW and a connector in case you ever wish to add an external modem. (For example, you could add a PSK modem to copy data from the 1200-baud packet satellites.) Timewave has also included something not often found on MCPs—an external reset button.

The front panel is adorned with a bewildering array of LED status indicators, along with a small tuning indicator. You can adjust the receive audio threshold level with a front-panel control—always an appreciated feature! Timewave added an overload indicator to let you know when you are driving the PK232DSP with too much audio.

RTTY performance was on par with the Kantronics KAM '98 and rivaled some soundcard-based RTTY decoders in our informal tests. The only complaint concerned the tiny tuning indicator. Yes, it is the same one that has graced the PK232 for years—and it is still just as cumbersome to use in the PK232DSP.

The automatically adaptive aspects of the new DSP filtering were quite noticeable when operating PACTOR. Depending on the condition of the “channel” at any given time, the filters would adapt accordingly (increasing or decreasing bandwidth). As a result, we noticed that the PK232DSP

seemed to maintain PACTOR links in poor conditions longer than the Kantronics KAM.

The PK232DSP copied CW about as well as you would expect, which means it did well with machine-sent code and badly with less-than-perfect code. Its performance was nearly identical with the KAM '98 in this respect.

SIAM, the Signal Identification and Acquisition Mode, was a disappointment. SIAM is supposed to be able to identify unknown digital signals. Its performance was shaky in the PK232 and nothing has changed in the PK232DSP. SIAM often misidentified signals, or seemed to give up altogether (it labeled one PACTOR transmission as “noise”). In all fairness though, none of the other units in this roundup offer a similar feature.

A more notable feature is an oscilloscope output. This can be used with an external 'scope that is capable of X-Y display to supplement the built-in tuning indicator.

As a packet machine, the PK232DSP is essentially the same as earlier versions with one important exception—it is now GPS compatible for use with the Automatic Position Reporting System (APRS).

The PK232DSP is shipped with a demo version of *PK-Term 99*. The full version is available from Timewave. Of course, there are also third-party software packages that will work with the KAM '98, and you can always use whichever terminal program already resides on your computer (*HyperTerm*, in *Windows 95/98*, for instance).

*Manufacturer:* Timewave Technology, 58 Plato Blvd E, St Paul, MN 55107; 651-222-4858; fax 651-222-4861; [sales@timewave.com](mailto:sales@timewave.com); <http://www.timewave.com/>. Suggested retail price: \$450. Upgrade kit, PK232 to PK232DSP, \$150.

### SCS PTC-IIe

The SCS PTC-IIe is the smaller sized, and smaller priced, brother of the PTC-II controller. The PTC and PTC-IIe are the only MCPs that offer PACTOR II—and the PTC-IIe is the only MCP to date that includes PSK31 in its list of modes.

SCS invented both PACTOR and PACTOR II, the most widely used HF “burst” modes in Amateur Radio. PACTOR was a hit almost from the moment it





appeared in the early '90s, but PACTOR II has been slower to catch on. This has been primarily due to the \$800-900 price tag of the PTC-II controller. The PTC-IIe offers greater economy, but at \$649 it is still almost equal to the cost of a low-end HF transceiver. Is it worth it?

The PTC-IIe's PACTOR II performance was astonishing. In several instances we successfully accessed BBSs under abominable conditions where we could scarcely hear the other station's signals in the noise. With PACTOR II the data flowed smoothly, albeit more slowly in the midst of deep fades. On the basis of on-air tests, the PTC-IIe implementation of PACTOR II clearly outperformed G-TOR. When we put it up against Clover II, however, the differences were less obvious. In fact, it was impossible to determine a "winner" between the two modes.

In PSK31 the PTC-IIe was mediocre. We matched it head-to-head against sound card-based PSK31 software and the sound cards came out on top every time. Part of the problem may have involved the level of tuning precision required for PSK31. The PTC-IIe uses its multisegment LED bargraph in an interesting way, adjusting the intensity of the segments until the center three are glowing brightest when the PSK31 signal is properly tuned. Clever as this may be, it seemed as though we were able to achieve more accurate tuning, and better copy, using the more common PSK31 software "waterfall" displays.

RTTY performance was very good, better than either the KAM '98 or PK232DSP, but not quite as sharp as the HAL DXP38. One of our reviewers tried the PTC-IIe during the 2000 ARRL RTTY Roundup and was impressed with its ability to copy weak signals in strong interference. The PTC-IIe works strictly in AFSK; it does not provide an FSK output.

The PTC-IIe offers both HF and VHF packet, but the manual is vague about this feature. It spends several pages discussing 300-baud (HF) packet—correctly disdaining it as a poor mode for HF work—with hardly a mention of 1200-baud (VHF) packet. With a little experimentation we had the PTC-IIe working nicely at 1200 baud. The only drawback is that the unit is not GPS compatible for use with the Automatic Position Reporting System.

The DSP filtering functions of the PTC-IIe can be put to work for other applications. By entering the *Audio* mode you can use the PTC-IIe in the same way you would an external DSP audio filter. We fed the audio to an amplifier and listened as we experimented with the notch filter, noise filter, etc. All adjustments are made from the keyboard. This is a nifty feature for those times when you'd like to take a

break from digital and work a little phone or CW.

Speaking of CW, yes, the PTC-IIe does that, too. Once again, the copy ability was similar to the other MCPs we tested. The PTC-IIe also does SSTV and fax, but for these modes it functions more like a modem and requires external software to do the actual signal processing and display.

Installation of the PTC-IIe is fairly simple. On the rear panel there is a DIN jack for the audio in/out and transceiver keying lines. Connect the lines as shown in the manual and you are in business. Audio output levels are controlled through software commands.

The English manual has been translated well from the original German, but the organization is poor. It is not easy to locate the information you need, and you often find it lacking in detail. The software provided with the PTC-IIe is *DOS* only, and it performed reasonably well. At this price level, however, we had expected to find a full-featured *Windows* program.

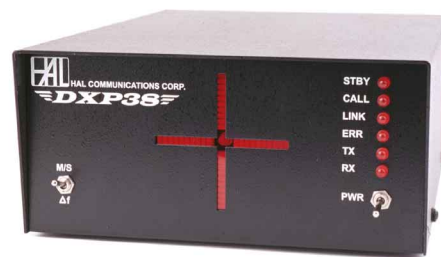
So the question arises once again—is the PTC-IIe worth it? The PTC-IIe is targeted to a particular market: the traveling hams. These are the folks who cruise the roads for months in recreational vehicles or roam the seas in private boats. Many of these travelers depend on the global Winlink 2000 BBS network to stay in touch via Internet e-mail (see "[Digital Dimension](#)" in your March 2000 *QST*). The great majority of these Winlink gateway stations operate using PACTOR or PACTOR II (usually both). So, it is important to have a high-performance PACTOR/PACTOR II MCP that can maintain connections under the worst conditions. When e-mail is one of your lifelines to friends and loved ones, price is less of a consideration than quality. For the average housebound ham, \$649 may be too steep to justify—even for the remarkable performance of PACTOR II. For the traveling amateur, however, that price tag is quite reasonable.

*Manufacturer:* SCS, Roentgenstr 36, D-63454, Hanau, Germany; <http://www.scs-ptc.com/>. Distributed in the United States by Farallon Electronics, 2346 B Marinship Way, Sausalito, CA 94965; 415-331-1924; fax 415-331-2063; [pactor@yachtwire.com](mailto:pactor@yachtwire.com). Suggested retail price: \$649.

### HAL Communications DXP38

The HAL DXP38 does not offer as many modes as the other MCPs in this group, but it does extremely well with what it *does* offer: PACTOR, RTTY, ASCII, AMTOR and CLOVER II.

The DXP38 manual is the best of the group. It is well written, well organized and concise. The writing style is conversational with a slight touch of humor.



You hardly need the manual to install the DXP38. Unlike the other MCPs in this group, the DXP38 uses RCA phono jacks on the rear panel, which makes cabling a breeze. (If you've ever soldered several wires onto a DIN plug, you know what we mean.)

Once you're up and running, you have your choice of FSK for RTTY, AMTOR and PACTOR, or AFSK for the entire set. Clover II must be sent using AFSK, so we opted for AFSK for all of our testing. A trim pot to adjust the transmit audio level is accessible from the rear panel.

HAL Communications has a long history in HF digital communication. Its RTTY terminal units are still considered among the best in the world. It's no surprise, then, that the RTTY performance of the DXP38 was the best in the group. In weak-signal conditions and brutal contest environments, the DXP38 consistently copied RTTY when the other MCPs displayed mostly gibberish. The hardware tuning indicator—an LED emulation of the traditional "crossed bananas" oscilloscope display—was a joy to use. Even weak, interference-laden signals could be tuned quickly and accurately.

The DXP38's PACTOR performance (HAL refers to this as *P-Mode*) was also outstanding. We were able to establish and hold PACTOR links under marginal conditions. Only the SCS PTC-IIe could top the DXP38 in this category.

We ran into difficulty testing the DXP38 on AMTOR, but that had nothing to do with the device itself. AMTOR signals are as rare as proverbial hen's teeth these days and the only way we could conduct AMTOR tests with this or any of the other MCPs was to arrange skeds. Despite the hassles, the DXP38 seemed to acquit itself very well in this mode.

And then there is Clover II. This complicated 4-tone mode is the chief competitor to SCS's PACTOR II. Both modes have been doing battle for dominance in the commercial and amateur markets for years. Of course, both companies insist that their mode is superior and can present evidence to prove their cases. In our brief, informal tests... it was a draw. We did not notice substantial performance differences between PACTOR II and Clover II. Under identical conditions

both modes appeared to transfer our sample files in roughly the same amounts of time. As with PACTOR II, the overall performance of Clover II was remarkable, maintaining links and transferring data in conditions under which we could just barely hear the other stations.

Clover requires high transceiver stability (+/- 5 Hz drift per hour, maximum) and slow, careful tuning for optimal results. The DXP38's tuning indicator was helpful, but it is only updated every 2 seconds in Clover II, so you have to tune very carefully. Once you find a Clover signal (it sounds like an extended *brrrrrrr*) and tune it in, the best thing to do is leave your radio

alone. Even a slight VFO tweak is sufficient to break the link.

HAL Communications was the only company to provide both *DOS* and *Windows* software with their product. We used the *Windows* software and it worked extremely well. (Some preferred the *Windows* tuning indicator for Clover II rather than the hardware display.) Unlike the other burst modes, Clover II is bi-directional, which means that it is sending and receiving information at regular intervals without waiting for an "over" command from the operator. This made live QSOs a bit tricky because the one operator could begin commenting on something you said before

you were even finished saying it!

Despite the excellence performance of Clover II, hams have not embraced this mode in large numbers. The fact that the Winlink 2000 e-mail network is almost exclusively based on PACTOR will not help this situation in the immediate future. Clover BBSs and live QSOs are not as scarce as G-TOR or AMTOR contacts, but they are not plentiful, either.

*Manufacturer:* HAL Communications, 1201 W Kenyon Rd, Urbana, IL 61801; 217-367-7373; fax 217-367-1701; [halcomm@halcomm.com](mailto:halcomm@halcomm.com); <http://www.halcomm.com>. Suggested retail price: \$395.

## RadioShack HTX-10 10-Meter Multimode Transceiver

By Wayne K. Irwin, W1KI  
Assistant to the ARRL VEC Manager

RadioShack has been a major player in the Amateur Radio business longer than most of today's hams have been licensed. Equipment manufactured by Hallicrafters, National, Johnson, Hammarlund and Drake, to name just a few, once graced their shelves.

Any truly successful company has to be sensitive to the changing marketplace if it is to survive. These days, RadioShack's primary focus is on the sales of "consumer electronics"—computers, TV, video, audio and telephone equipment. Nevertheless, they continue to cater to the amateur and business band communications market and still provide a convenient and respectable inventory of parts for the electronics experimenter and hobbyist.

Over the last decade or so, RadioShack has carried on their ham tradition by offering a selection of Amateur Radio transceivers under their own brand name, and has also made available (primarily by special order) amateur station accessories by a handful of the well-known manufacturers. Over this time span, their "house brand" transceivers have included a single band 10-meter mobile—the HTX-100—their wildly popular HTX-202 and HTX-404 VHF and UHF single band FM H-Ts, a now discontinued dual-band H-T and a VHF FM mobile transceiver.

With the incredible number of RadioShack franchises that dot the landscape (there are five within 20 minutes driving distance of ARRL HQ) and their constant barrage of newspaper inserts, direct mailings and catalogs, it's not surprising that so many new hams' first transceivers bear the RadioShack label.

At last year's Dayton Hamvention,

RadioShack debuted replacements for the HTX-202 and 404 H-Ts—the all-new subcompact HTX-200s and 400s. Even then, the rumors were already flying about a new 10-meter mobile transceiver to replace their long-discontinued HTX-100. The level of sunspot activity was right—the market was ready.

A couple of months ago, the HTX-10 10-meter mobile transceiver started showing up in the inventories of local RadioShack stores. The suggested price was just under \$150, and it was already sporting a lower "sale" price! We just *had* to have a closer look.

### At First Glance

By today's standards, the HTX-10 is fairly hefty—it's a bit taller and considerably deeper than the typical single band VHF mobile transceiver. With a little ingenuity, however, it should be able to take up residence in all but the tiniest cars.

The busy front panel includes five knobs

and six buttons. The knobs are rubberized and the buttons are large and nicely spaced. All of the controls are clearly labeled. Each button performs multiple operations—a **FINE** tuning knob, when pressed, activates a "function" operation that evokes these buttons' secondary assignments.

An LCD display window dominates the front panel. Frequency digits and function icons appear as black segments on a light gray background. The LCD display backlighting level is fixed, and "halos" of light appear around the perimeters of the rotary controls. The information shown in the window is easy to read—even at extreme angles. A 5-section LCD S/R/F meter extends across the entire lower edge.

Packaged with the transceiver is a simple mobile mounting bracket, a 5<sup>1</sup>/<sub>2</sub>-foot power cord with a conventional T-type power connector, a mobile microphone with frequency **UP** and **DN** keys and a hardware pack containing a spare fuse, mounting screws and a mike hanger clip.



### BOTTOM LINE

The RadioShack HTX-10 SSB/FM/AM 10-meter transceiver can be your low-priced ticket to worldwide radio adventure.



**Table 2**

**RadioShack HTX-10, serial number 901811**

**Manufacturer's Specifications**

Frequency coverage: receive and transmit, 28-29.7 MHz.

Modes of operation: USB, LSB, FM, AM.

Power requirements: 12-16 V dc;

Receive, not specified; transmit, 5 A (maximum).

Size (hwd): 2.0×6.1×9.6 inches; weight, 3.3 lb.

**Receiver**

Sensitivity, 10 dB S/N: 0.5  $\mu$ V.

Blocking dynamic range: Not Specified.

Two-tone, third-order IMD dynamic range: Not specified.

Third-order intercept: Not specified

FM adjacent channel rejection: Not specified.

Spurious response: Not specified.

Squelch sensitivity: Not specified.

Audio power output: 2.5 W at 10% THD into 8 $\Omega$ .

**Transmitter**

Power output: 25 W FM, SSB; 7 W AM.

Spurious signal and harmonic suppression: 65 dB.

SSB carrier suppression: Not specified.

Undesired sideband suppression: Not specified.

Third-order intermodulation distortion (IMD) products:

Transmit-receive turn-around time (PTT release to 50% of full audio output): Not specified.

Receive-transmit turn-around time ("tx delay"): Not specified.

Composite transmitted noise: Not specified

**Measured in ARRL Lab**

Receive and transmit, as specified.

As specified.

Receive, 0.75 A; transmit, 5.2 A, tested at 13.8 V.

**Receiver Dynamic Testing**

FM, 12 dB SINAD: 0.54  $\mu$ V. AM, 10 dB S+N/N: 0.48  $\mu$ V; SSB, noise floor (mids): -135 dBm.<sup>1</sup>

86 dB.

FM 53 dB; SSB, 68 dB.

-34 dBm.<sup>1</sup>

79 dB.

IF rejection: 74 dB; image rejection, 42 dB.

0.41  $\mu$ V at threshold.

2.2 W at 10% THD into 8 $\Omega$ .

**Transmitter Dynamic Testing**

FM, SSB, 30 W; AM, 7 W.

65 dB. Meets FCC requirements for spectral purity.

48 dB.

>65 dB.

See Figure 1.

Squelch on, S9 signal, 80 ms.

Unit is not suitable for use on AMTOR.

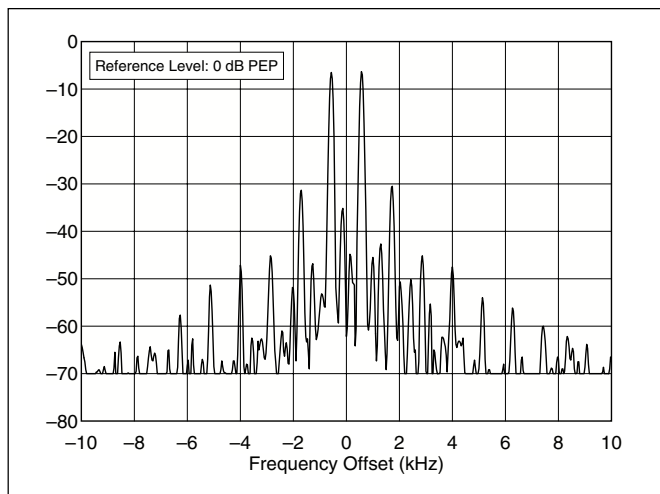
SSB, 32 ms; FM, 36 ms.

See Figure 2.<sup>2</sup>

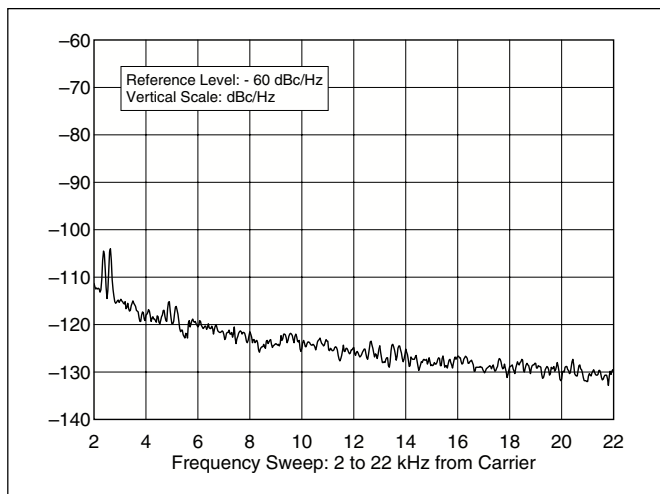
All dynamic range measurements are taken at the ARRL Lab standard spacing of 20 kHz.

<sup>1</sup>Due to the absence of CW mode capability, these measurements were taken at SSB bandwidth. This data should not be used for direct comparison with the numbers we typically report that are taken at or near our standard 500-Hz bandwidth.

<sup>2</sup>This parameter was measured in FM mode with the microphone input grounded. Although not directly comparable to a CW measurement, it is a reasonable approximation.



**Figure 1—Worst-case spectral display of the HTX-10 transmitter during two-tone intermodulation distortion (IMD) testing. The worst-case third-order product is approximately 32 dB below PEP output, and the worst-case fifth-order product is approximately 46 dB down. The transmitter was being operated at 25 W output at 28.350 MHz.**



**Figure 2—Worst-case spectral display of the HTX-10 transmitter during composite-noise testing. Power output is 25 W at 28.020 MHz. The carrier, off the left edge of the plot, is not shown. The plot shows composite transmitted noise 2 to 22 kHz from the carrier.**

A few points related to the microphone deserve mention. If the mike is not connected, you will not hear receive audio from the internal speaker. The microphone plug is a bit unusual too. While most

amateur transceivers use an 8-pin microphone jack, the '10 uses a 6-pin. RadioShack does not currently stock 6-pin microphone plugs in the stores—they do, however, typically stock the 4- and 8-pin

varieties. Hopefully they'll be adding these to their usual inventories for those of us interested in experimenting with the digital modes. The microphone pin configuration diagram is not included in the *Owner's*

*Manual.* Break out the DVMS!

The HTX-10 is capable of operation in four modes: upper sideband, lower sideband, FM and AM. RF power output is specified at 25 W on SSB and FM; 7 on AM. There are just 5 memories—but that’s probably adequate to satisfy the needs of most casual operators. (My main station transceiver provides 100 programmable memory channels, but I’ve never had more than a handful of them loaded.) There’s a “call” frequency key, a “last frequency recall” button and a scan feature that will search the entire band. The ability to scan just the five memory channels, or between user set frequency limits, is not available.

Notable highlights include a noise blander, an all-mode squelch, adjustable microphone and RF gain controls and a frequency shift setting—primarily intended for accessing the 10-meter FM repeaters. This shift feature can also be enabled in the SSB mode for working “split.” This is an operating method sometimes used by highly sought-after stations—rare DX and DXpeditions for example—for taming unwieldy pileups. (Refer to the *ARRL Operating Manual* [ARRL order #6141] for the gory details.)

### That Closer Look

The 33-page 4½ × 7-inch manual, although not overly detailed or technical, should be more than adequate to get you up and running quickly. Sections on amateur licensing requirements, installation, operation and troubleshooting are included. The step-by-step instructions are easy to follow and are accompanied by helpful diagrams. Unfortunately, a schematic diagram is not provided.

Curiously, unlike RadioShack’s earlier 10-meter mobile, the HTX-10 is not equipped for CW operation—but then again, that model didn’t include the FM or AM modes. This omission may come as a bit of a shock to a recently-licensed HF operator who worked hard to fulfill his 5-wpm code requirement only to discover that the entry-level HF radio he purchased doesn’t even operate in this mode!

If your primary use for this transceiver will be mobile operation, you may not find this a major concern. Although mobile CW can be an enjoyable form of amateur communication (*ask N1RL*), most of us are content to settle for just voice operation—especially from the driver’s seat! For fixed station and portable use (and transverter applications), the lack of the CW mode may certainly be considered by some to be a significant shortcoming.

For moving around in the band, the tuning increment of the main encoder knob can be set for 100, 10 or 1 kHz steps. Once

you’ve “coarse tuned” to a frequency of interest, you use an independent **FINE** tuning control to vary your frequency between the 1 kHz steps. The transmit and receive frequency are both simultaneously changed with this knob—the radio does not provide a separate receiver incremental tuning (*RIT*) control. The **FINE** control will allow frequency excursions of up to approximately 1.3 kHz above or below the displayed frequency. The manual is a bit vague concerning the behavior and proper operation of this control—you’ll probably want to keep it in the 12 o’clock position while trawling for activity (and especially while operating in the FM mode).

Memory operation couldn’t be easier. To program a memory you dial up the desired frequency, push in the **FINE** knob to activate “function,” press the **M-LOAD/M-SAVE** button and then press one of five available front panel buttons you want to assign the frequency information to. Once programmed, the memory channels are accessed by pressing the **M-LOAD/M-SAVE** button followed by the key labeled with the desired memory number. Memory number 2 serves double duty for one-touch call channel access. Each of the memories will hold the frequency, the mode and—for FM repeater operation—the repeater offset frequency and direction (typically -100 kHz for 10-meter FM repeaters). The memories will not retain the setting of the **FINE** control, so for SSB operation some final retuning may be required.

CTCSS capabilities are not provided and, apparently, there are no internal sockets for installing an optional tone board. The serious 10-meter FM repeater aficionado will consider the lack of CTCSS to be a disadvantage. While not *all* 10-meter repeaters are CTCSS protected, a significant number of them are. CTCSS is typically not used for FM simplex.

Aftermarket manufacturers, such as Communications Specialists (and others), offer a selection of CTCSS tone boards that should be adaptable for use with this transceiver, but some minor radio surgery will be required. Break out your soldering irons!

The microphone gain and the RF gain controls are a concentric pair of knobs located to the lower left side of the display. For single sideband operation, the RF power output can be varied using the microphone gain control. For the AM and FM modes, the power output is essentially fixed at the maximum level, but adjusting the control will still change the level of the transmitted audio. For SSB operation, you’ll want to avoid setting the mike gain (and subsequently the RF power output) to the fully clockwise position. This invariably results

in reports of distorted transmit audio. Settings between 2 and 3 o’clock seemed to solicit reports of the best balance between signal strength and audio quality. Set it much higher than that and—just as with any other HF SSB transceiver—you’ll end up overdriving the ALC (shame on you!).

RadioShack has tossed in an interesting function labeled **T-LOW** (tone low). When enabled, this circuitry acts as a low-pass audio filter, or as the manual calls it, a “high cut filter.” This feature is reasonably effective for reducing interference.

On-the-air reports were all favorable, with comments such as “nice sounding audio” commonplace. The received audio from the built-in speaker is acceptable, but—as with most radios—the improvement in the sound quality when using a decent external speaker was definitely apparent.

At 25 W, the HTX-10 is not exactly a powerhouse, but propagation on 10 meters can be a great equalizer. When the band is open, the world will be at your doorstep, even with simple antennas and “just” 25 W. When the band is closed, this same power level will give a good account of itself for local communication.

### A Few Closing Thoughts

It would have been nice to see CW, CTCSS and RIT on the HTX-10. With these points noted, this transceiver still certainly deserves serious consideration. Used 10-meter rigs are available, but with the great 10-meter band conditions we’re currently enjoying, it’s getting harder to locate any bargains in “pre-owned” equipment. RadioShack’s HTX-10 is definitely a viable option for those looking for a good basic 10-meter mobile transceiver, a convenient rig to take on trips or a simple, inexpensive radio for use at home.

At this price—lower than most single band FM H-Ts—it’s easy to imagine that RadioShack will be selling these by the boatload. Hopefully the combination of the comparatively small initial investment and the growing number of owners using and experimenting with this radio will lead to homebrew circuit changes and improvements that will help to overcome what some may perceive as its shortcoming. I’m wagering that this neat little rig will be generating *Hints and Kinks* material for years to come. Now, my ham brothers and sisters, go forth and modify!

*Manufacturer:* RadioShack, a division of Tandy Corp, Fort Worth, TX 76102; 800-843-7422; fax 817-415-2303; <http://www.radioshack.com/>.

Manufacturer’s suggested retail price: \$150. Typical current street price: \$140.



# The ICOM IC-T81A Quad-Band FM Hand-Held Transceiver

Reviewed by Joe Bottiglieri, AA1GW  
Assistant Technical Editor

As close as I can tell from the advertisements in the musty, dog-eared copies of *QST* in the HQ archives, the first commercially available truly hand-held single-band FM VHF transceivers first appeared about 30 years ago.

Yaesu broke the single-band H-T barrier sometime in late 1986 when they introduced their dual-band VHF/UHF FT-727R. ICOM was first to crack the two band limit in 1993 with a tribander (2 meters, 70 cm and 23 cm)—the IC-Δ1A.

Last year ICOM struck again—toppling the three band barricade with their IC-T81A—a *quad-band* H-T that covers 6 meters, 2 meters, 70 cm and 1.2 GHz. Kinda makes you wonder which manufacturer will lay claim to the world's first quint-bander. (At that point, I hope we can just agree to start referring to them as "multiband" H-Ts.)

## 1.2 Gigahertz ?!

The real hook for the IC-T81A is its 23-cm coverage. With the total number of 2-meter, 1<sup>1</sup>/<sub>4</sub>- and 70-cm repeater systems steadily increasing, it's becoming more difficult for groups or individuals interested in setting up new repeaters—especially in densely ham-populated areas—to locate available frequency pairs. While several of the amateur transceiver manufacturers do produce 1.2 GHz mobile and handheld transceivers, up 'til now the relatively small US market for this equipment has resulted in extremely limited stateside availability and astronomically high prices.

## Not Any More

For the US ham interested in experimenting on 1.2 FM, the IC-T81A is really quite a breakthrough. The current street price on this unit is actually less than what some of the single band 23-cm H-Ts were recently selling for. Add to this 6-meter, 2-meter and 70-cm transceiver; 120 alphanumeric memories; expanded receive (including AM aircraft, television audio and FM broadcast); multiple scan settings; 9 autodial memories; independent CTCSS encode and decode; CTCSS tone scan; radio to radio cloning; and optional *Windows* computer programmability; and you can begin to imagine just how welcome this transceiver is in the 1.2 GHz community!

In spite of this impressive list of capabilities, the 'T81 is surprisingly compact. Its short, squat stature is similar to—and in most cases smaller than—the other one band at a time hand-helds that are presently dominating the H-T market. Like

those transceivers, the IC-T81A is not capable of dual- (or tri-, or quad-) band simultaneous receive. Consequently, full duplex cross band operation is not possible. Unlike some of the others, there are also no provisions for programming half duplex cross band splits (typically used for FM satellite operation).

## All in the Family

At first glance, it's easy to mistake the IC-T81A for ICOM's tribander (6 meters/2 meters/70 cm) IC-T8A. They're nearly identical in size, color and shape, and share the same NiMH battery series. The overall quality of the fit and finish of the IC-T81A is excellent

The baseball bat-shaped antennas common to both models are bulkier than those used on most H-T's, but thankfully the 'T81's quad-band antenna is about half as long as the 'T8's king-sized 12-inch plus tribander antenna.

The most salient difference between the two is a 5-way **MULTI** button on the left side of the new transceiver's front panel. This joystick-style control keeps the number of front panel buttons to a minimum and is used to command a staggering number of operations.

The primary assignments for the **MULTI** button are volume and band changing. Rocking the control up or down adjusts the volume; rocking right or left will step you

through the band selections—6 meters, FM broadcast, AM airband, 2 meters, 70 cm and 23 cm. Pressing and holding the left or right edges will initiate a scan on the presently selected band.

## The Rub

The **MULTI** button is also used to enter set menus. Initially, gaining access to these led to a considerable amount of frustration.

After unpacking the radio and charging the battery, I was anxious to get on the air. The first thing I wanted to do was set up a CTCSS tone and duplex offset for one of our local repeaters.

The *Instruction Manual* clearly stated that to enter the set mode, you press and hold the center of the button. It certainly sounded simple enough...

Each of my early attempts to perform this feat resulted in an undesired response—the band would change, the volume would change, the scan feature would activate—there was no sign of a set menu whatsoever. I finally convinced myself that something must be wrong with the control on our unit. Rather than break out the screwdrivers and the contact cleaner (just kidding!), I decided to touch base with my local ICOM dealer.

The good news?—nothing was actually wrong with our transceiver. In order to press the **MULTI** button "straight" in, you need to take into account its position on the curved face of the radio. Even then, you've got to aim carefully—any variation of dead perpendicular to the surface of the button isn't going to cut it—the "sweet spot" seems very small.

I moaned and whined about this to ICOM, the local dealer, my coworkers, complete strangers—nearly anyone who would listen. After a bit of practice though, I must admit that working it quickly became second nature.

Once you've managed to get "the knack" and break in to the main set menu, you'll be rewarded with access to five choices—a scan timer, the repeater offset, the tuning step size, the CTCSS tone and the CTCSS tone squelch frequency settings. When you first toggle up each item, the current value with an abbreviated label appears—"5.0 TS" for example. A few seconds later, scrolling text—"TUNING STEP" in this case—appears to help you positively identify the specific menu selection.

Provisions to vary the duplex direction and CTCSS tone and/or tone squelch are accessed by quickly pressing (without holding) the **MULTI** control. Several other operations—including the receive mode type; an RIT/VXO for 23 cm; the memory naming feature and an *initial set mode*—

## Bottom Line

The IC-T81A provides nearly all of the most desirable features of the other one-band-at-a-time multibanders and offers the opportunity to experiment on the microwaves as well.



## ICOM IC-T81A, serial number 01271

### Manufacturer's Specifications

Frequency Coverage: Receive, 50-54 MHz, 76-108 MHz (WFM), 118-136 MHz (AM), 136-174 MHz, 400-470 MHz, 1240-1300 MHz; transmit, 50-54, 144-148, 430-450, 1240-1300 MHz.

Power requirements: 4.5-16.0 V dc; receive, 0.22 A; transmit, 1.4 A (maximum, high power).

### Receiver

FM Sensitivity: 12 dB SINAD, VHF and UHF, 0.18  $\mu$ V; 1270 MHz, 0.25  $\mu$ V; WFM, 76-108 MHz, 2.0  $\mu$ V.

AM Sensitivity: Not specified.

Two-tone, third-order IMD dynamic range: Not specified.

Adjacent-channel rejection: Not specified.

Spurious response: VHF, 60 dB (except IF rejection on 50 MHz); UHF, 50 dB; 1270 MHz, 38 dB.

Squelch sensitivity: VHF and UHF, 0.18  $\mu$ V; 1270 MHz, 0.25  $\mu$ V.

Audio output: 250 mW at 10% THD into 8  $\Omega$ .

### Transmitter

Power output: VHF and UHF, 5.0 W high; 0.5 W low; 1270 MHz, 1.0 W high; 0.5 W low.

Spurious signal and harmonic suppression: VHF and UHF, 60 dB; 1270 MHz, 40 dB.

Transmit-receive turnaround time (PTT release to 50% of full audio output): Not specified.

Receive-transmit turnaround time ("tx delay"): Not specified.

Size (hwd): 4.2x2.3x1.1 inches; weight, 10.9 ounces.

\*Measurement was noise limited at the value indicated.

### Measured in ARRL Lab

Receive and transmit, as specified.

Receive, 0.18 A (maximum volume, no signal); transmit, 1.4 A, with BP-200 battery pack and 13.8 V dc.

### Receiver Dynamic Testing

For 12 dB SINAD, 52 MHz, 0.13  $\mu$ V; 146 MHz, 0.14  $\mu$ V; 440 MHz, 0.14  $\mu$ V; 1270 MHz, 0.16  $\mu$ V; 76-108 MHz (WFM), 0.6  $\mu$ V. 10 dB S+N/N, 1-kHz tone, 30% modulation, 120 MHz: 0.32  $\mu$ V.

20 kHz offset: 52 MHz, 57 dB\*; 146 MHz, 54 dB\*; 440 MHz, 61 dB\*; 10 MHz offset: 52 MHz, 89 dB; 146 MHz, 68 dB; 440 MHz, 66 dB.

20 kHz offset: 52 MHz, 57 dB; 146 MHz, 54 dB; 440 MHz, 61 dB.

IF rejection, 52 MHz, 51 dB; 146 MHz, 105 dB; 440 MHz, 99 dB; 1270 MHz, 82 dB; image rejection, 52 MHz, 101 dB; 146 MHz, 94 dB; 440 MHz, 59 dB; 1270 MHz, 67 dB.

At threshold, VHF and UHF, 0.13  $\mu$ V; 1270 MHz, 0.18  $\mu$ V. 320 mW at 10% THD into 8 $\Omega$ .

### Transmitter Dynamic Testing

With BP-200 battery pack, 52 MHz, 5.1 / 0.6 W; 146 MHz, 5.7 / 0.7 W; 440 MHz, 4.5 / 0.5 W; 1270 MHz, 0.9 / 0.3 W; with 13.8 V dc: 52 MHz, 5.6 / 0.5 W; 146 MHz, 6.0 / 0.7 W; 440 MHz, 6.0 / 0.7 W; 1270 MHz, 0.9 / 0.3 W.

52 MHz, 64 dB; 146 MHz, 70 dB; 440 MHz, 67 dB; 1270 MHz, 65 dB. Meets FCC requirements. Squelch on, S9 signal, VHF, UHF and 1270 MHz, 200 ms.

52 MHz, 108 ms; 146 MHz, 122 ms; 440 MHz, 112 ms; 1270 MHz, 122 ms.

all involve pressing straight down on the **MULTI** control.

## Up and Running

I received universally good reports on the 'T81's transmit audio quality. The receive audio, although not as strong as some of the other recently released H-Ts, was adequate for hand-held applications. While some of the operating descriptions so far might lead you to believe that the IC-T81A is a handful to control, once you've become used to physically manipulating the **MULTI** control, radio operation is easy.

The button functions for the **0** through **9** digit keys on the main keypad are restricted to either frequency digit or DTMF tone activation. The fourth column (the DTMF **A**, **B**, **C** and **D** keys) serve multiple duties for VFO, memory write and recall, call channel and high or low power output level. The keypad **#** key also provides quick access to the CTCSS tone scan feature and, when operating on 23 cm, the RIT control.

As has been the case with most of their recent documentation, ICOM's *IC-T81A Instruction Manual* is complete and easy to follow. A pocket-sized 4-page fold out *Operating Guide* is also packed with the radio and is probably sufficient information

for experienced operators. A schematic diagram is not included.

## Lab Results

When commenting on the level of performance of a radio, we typically like to try to roughly define a category of similar transceivers on which to base our comparisons. Since there are no other available quad-banders, the radios that seem most appropriate to use for this purpose are the one band at a time dual-banders and tribanders.

Two-tone third order dynamic range for 10 kHz offset on 6 meters measured an impressive 89 dB, easily besting the performance of the other 6-meter equipped multibanders and even managing to top the numbers posted by the single band 6-meter H-Ts we've looked at. The 2-meter 10 MHz offset performance, usually a good indicator of a transceiver's ability to fight off interference from nearby commercial communications, is about on par for one band at a time radios. On 70 cm, it was near the top of the class. The adjacent channel rejection numbers, while respectable on 6 meters and 70 cm, fell below the median running average on 2 meters for similar units. Unfortunately, the ARRL Lab is not

currently equipped to collect data for these particular parameters on 23 cm.

## Consider Your Options

Before you gleefully dive on to the "more bands is better" bandwagon, you may want to take a few minutes to investigate the level of 23-cm activity in your area. Ask local hams, or at least scan through the *ARRL Repeater Directory*.

But whether you're joining in on existing activity or pioneering a move to the higher frequencies in your area, you'd certainly be hard-pressed to find a more fully featured and economically priced piece of gear to put you on 23-cm FM. And that's not even taking into account the added convenience of having 6, 2 meter and 70 cm capabilities—and expanded receive as well—all neatly packed into a single compact enclosure.

*Manufacturer:* ICOM America, 2380 116<sup>th</sup> Ave NE, Bellevue, WA 98004; 425-454-8155; fax 425-454-1509; [75540.525@compuserve.com](mailto:75540.525@compuserve.com); <http://www.icomamerica.com>. Manufacturer's suggested retail price: \$479. Typical current street price: \$350. CS-T81 programming software, \$13; OPC-478 computer programming cable, \$45; OPC-474 radio to radio cloning cable, \$18.





# TECHNICAL CORRESPONDENCE

## SOME TOOLS AND TRICKS OF THE HOBBY

By Wayne Yoshida, KH6WZ, 16428 Camino Canada Ln, Huntington, Beach CA 92649; [kh6kine@earthlink.net](mailto:kh6kine@earthlink.net)

◇ Following Paul (N1FB) Pagel's invitation in Technical Correspondence to identify one's favorite workbench tools,<sup>1</sup> I submit the following, along with a few construction tips.

### Smoothing Out Burrs

Take a look at the pencil-like device in Figure 1. It's a General #482 swivel-head deburring tool, and comes with an assortment of blades. I found this tool in a wood and metalworking specialty shop. After years of using my old pocketknife, I find this deburring tool to be a much more elegant way of cleaning holes in chassis, boxes and panels. It's useful for any size and shape of hole. (Another way to quickly deburr round holes is to use an oversize twist drill bit. A few twists by hand will smooth out the rough spots.)

### A Robust Tool for a Common Task

If you use spade lugs or other solderless terminals, get a *real* crimping tool. I've owned several terminal-mashers, but the ones that work the best are those ones that resemble a pair of pliers (see Figure 2). This pair is made by GB, and can be found in the electrical section of your local Home Depot.

### Soldering Tips and Tricks

Here are two old money-saving tricks to add to your soldering repertoire. If you have a soldering gun, you may never again have to buy a new tip! (See Figure 3.) Scraps of solid copper house wire can be recycled for this purpose; I've used pieces of #14, 12 and 10 wire. Simply strip the insulation from a six-inch length of wire and bend it into shape. If you want to get fancy, you can build a jig for this; see Figure 4. I find it easier and quicker to just bend the wire by hand.

When soldering SMD (surface-mount device) components, sometimes even the smallest tip in my toolbox is too big for the job! I employ the old "tip-extension trick." Strip a length of solid copper wire and wrap

a few turns around the soldering iron's barrel and tip, extending the wire past the existing iron tip as shown in Figure 5. The end can be shaped with a diagonal cutter, or can be squashed in a vise and then cut or filed to shape. Usually though, a quick snip with the cutters is all it takes. Warm up the iron, tin the new tip extension, and you're ready to go. This is also a good trick to use

when repairing a hard-to-reach joint in a tight chassis corner or behind a panel.

### Wire Strippers

I've collected several different wire strippers, from plain knives and razor blades (I've even used my teeth on Field Day...) to fancy, automatic strippers that use heat combined with a grip/strip/cut action.

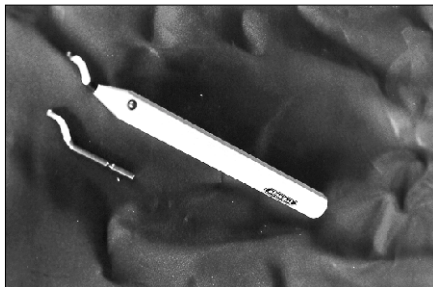


Figure 1

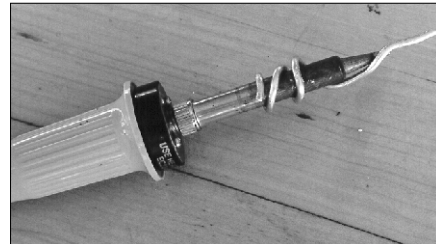


Figure 5



Figure 2



Figure 6

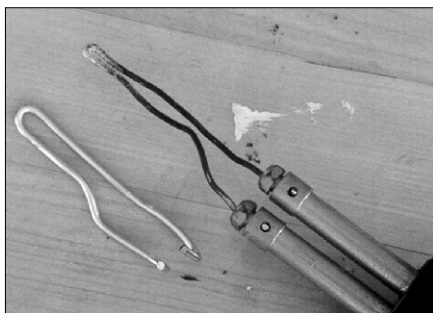


Figure 3

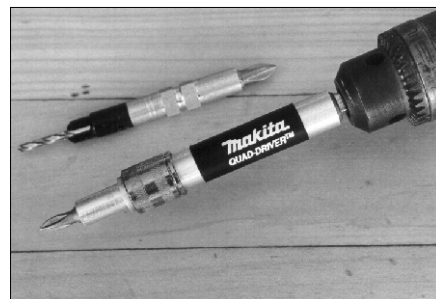


Figure 7

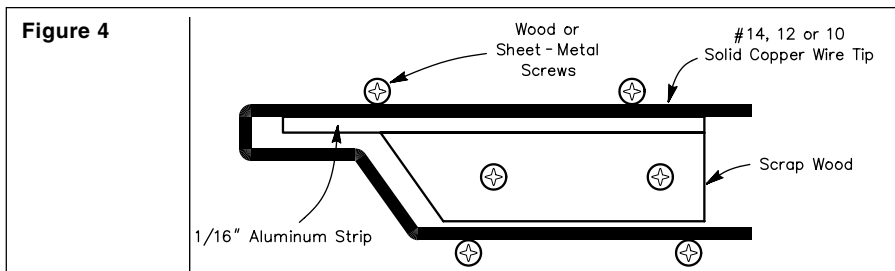
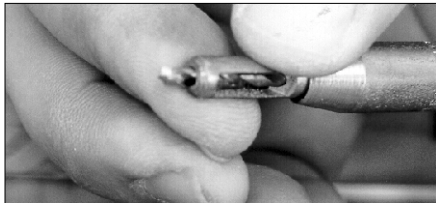


Figure 4

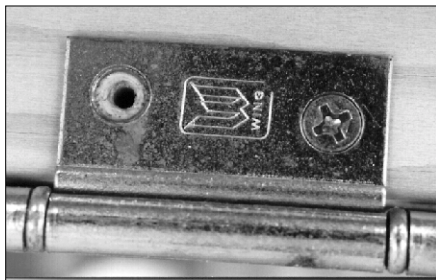
<sup>1</sup>Paul Pagel, N1FB, "Tool Tip," Technical Correspondence, QST, Dec 1998, pp 63-64.

Lately, though, I've been using the tool shown in Figure 6. This Klein stripper comes in two versions, but the most useful for electronics work is the model number 1011, which handles wires from 20 to 10 AWG. It cleanly strips solid or stranded wire without nicking. It also looks easy to sharpen, since it is held together with a screw, something that I didn't find in the other stripping tools I've owned. Simply put the wire into the appropriate slot in the jaws, squeeze the handles, twist a bit and pull off the insulation.

*Here's a tip:* For repair work, it's usually necessary to work with a wire that is already attached to something on the other end. Stripping wire with a mystery end can be annoying. You don't want to break the wire, because you may never know where it was attached before your repair. Here, you can



(A)



(B)

Figure 8

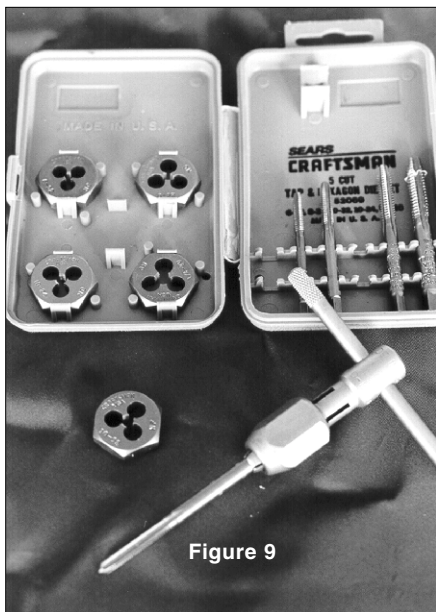


Figure 9

hold the wire tightly with a pair of long-nose pliers near the end you need to strip, safely protecting the existing joint at the other end.

### Useful Bits

There are two drill accessories I have to mention—they're shown in Figures 7 and 8. The Makita bit drills a hole and countersinks it, then can drive a Phillips-head screw. Figures 8A and 8B show a VIX bit, designed to drill pilot holes for hinges. This bit can be used to drill matching holes in enclosures. The VIX bit is always spot-on. Both devices are designed around a twist bit, so they can be used for working on metal and plastic as well as wood.

The VIX bit is especially useful for making precisely spaced holes in a pattern. I use the following method to drill out panels for speakers and ventilation.

Use an existing hole pattern from a piece of metal borrowed from a piece of equipment or use a piece of pre-punched sheet metal available from your local hardware store. For example, I usually use the top panel of a commercially built power supply as a hole template. Visualize your final pattern. You can drill the holes to make a square, hexagonal or other-shaped pattern in your panel as easy as 1-2-3:

1. Lay out the overall size and shape for your hole pattern on your panel. You don't have to mark each hole of the pattern, just the outline. Use double-stick tape (such as carpet tape) to fasten the sheet metal pattern to the panel.
2. Drill out the pattern using the VIX bit.
3. Remove the pattern sheet, remove the tape residue with a solvent (*Use adequate ventilation and safety measures—Ed.*) and admire your work of art!

To remove sticky tape residue, I've successfully used many solvents, lubricants and oils including alcohol, acetone, WD-40, 3-in-1 oil, car wax, olive oil, peanut butter, margarine and butter. The last four are biodegradable. I select my remover based on the material beneath the sticky residue. On plastics, I recommend using

one of the biodegradable removers; they usually don't affect plastics as some other types of removers do. Simply smear the remover onto the sticky area, let it soak a bit and wipe off the residue with a rag. It works every time!

### The Tap and Die

Figure 9 shows a Sears Craftsman 9-52069 tap and die set. This set has the most common and useful machine screw threads used in electronics work. I use threaded holes to mount large and thick objects, such as heat sinks, brackets, and die-cast metal parts to chassis. A lock washer helps keep things in place.

### The Batteryless, Cordless Screwdriver

Here's a tool that an electrician friend owns—and I just had to get one! It is the first tool that made me laugh! The crank screwdriver (Figure 10) is fun to use! The one pictured is made by Ideal Industries and can be found in the electrical section at your local Home Depot. A Phillips version is also available. The screwdriver has a crank-action, which speeds up the screwing-in and -out processes. It's a great time saver for electrical work, when you have dozens of breakout and pull-boxes to wire up. Yet, you still have more control than a powered screw gun or drill-driver. Best of all, it is energy-efficient.

### Safety

Finally, don't forget to wear safety glasses or a face shield and use hearing protection when working with power tools.

[Editor's note: Wayne is a former ARRL HQ staffer.]

Letters for this column may be sent to Technical Correspondence, ARRL, 225 Main St, Newington, CT 06111, or via e-mail to [ppagel@arrl.org](mailto:ppagel@arrl.org). Please include your name, call sign, complete mailing address, daytime telephone number and e-mail address on all correspondence. Whether praising or criticizing a work, please send the author(s) a copy of your comments. The publishers of *QST* assume no responsibility for statements made herein by correspondents.

**QST**

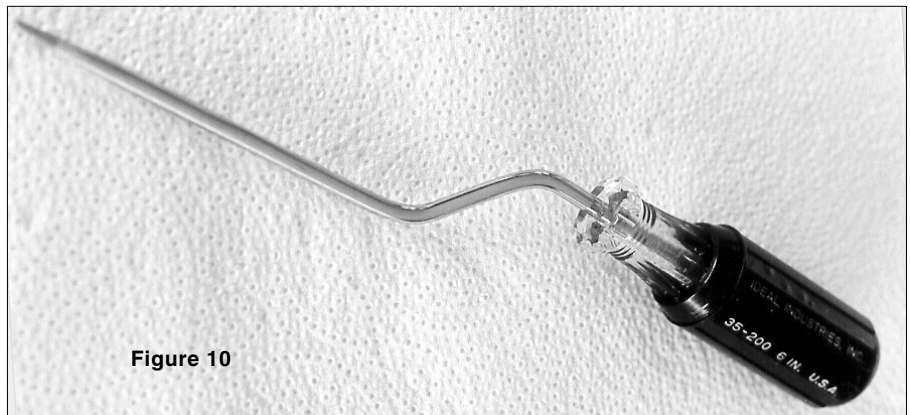


Figure 10



## ARRL to Seek Partial Reconsideration of Restructuring Order

The ARRL will seek partial reconsideration on two points in the Amateur Radio license restructuring plan announced by the FCC December 30 and set to go into effect April 15.

The League will ask the FCC to continue to maintain records that indicate whether a Technician licensee has passed a Morse code exam to earn current Tech Plus HF privileges. Under the current system, the license class of Technicians is designated by a "T" in the FCC's amateur database, and of Tech Plus licensees by a "P." Under restructuring, Technician and Tech Plus licensees all will be known simply as "Technician." The ARRL says the change eliminates any easy way to tell which licensees have passed the Morse code exam and which have not. The FCC has said that it would be up to Technician licensees to prove—if asked—that they have successfully passed the 5 WPM code test.

"We're going to try to persuade the FCC that it made a drastic error in deciding to change all those Ps back to Ts in the

database," said ARRL Executive Vice President David Sumner, K1ZZ.

The ARRL also plans to ask the FCC to stipulate that any amateur who provides proof of having passed an FCC-recognized Morse code exam prior to April 15 be entitled to receive Morse code exam element credit when applying for future upgrades. The FCC has indicated that starting April 15, code credit for Technician applicants passing Element 1, the 5 WPM test, would not survive beyond the 365-day term of a *Certificate of Successful Completion of Examination*—or CSCE. Without a change in the rules, affected Technicians attempting to upgrade more than a year after passing Element 1 would have to retake the Morse code examination, although their HF operating privileges would continue in effect.

The FCC already has made a small move in the direction of expanding Morse element credit. When posting the new rules February 10 in *The Federal Register*, the FCC included a provision giving Morse

element credit to anyone who ever held a Novice ticket—expired or otherwise. FCC rules already give Element 1 credit to those holding an expired or unexpired FCC-issued Technician Class operator license document granted before February 14, 1991, as well as to applicants possessing an FCC-issued commercial radiotelegraph operator license or permit that's valid or expired less than 5 years. (Tech Plus amateurs who held a Technician license prior to March 21, 1987, are eligible to apply for a General license on April 15, 2000.)

There has been no indication, however, that the FCC intends to extend Element 1 credit to applicants who once held any other FCC-issued licenses now expired, although many hams at one time held a Novice ticket. At least for now, the ARRL recommends that holders of Novice or Tech Plus licenses retain their license documents or copies in the event they need to claim Element 1 credit to upgrade under the new rules.

### LEAGUE READIES CERTIFICATION PROGRAM FOR ROLLOUT

The League's new Certification Program is expected to be up and running within a few months. The program is aimed at inspiring amateurs to continue acquiring technical knowledge and operating expertise beyond that required to become licensed and give them a chance to test their own limits. Following up on the "2010 Vision" discussions at last July's Board meeting, ARRL Executive Vice President David Sumner, K1ZZ, presented the broad strokes of the Certification Program during the January ARRL Board of Directors' meeting.

Sumner said he sees the certification program not only as a welcome opportunity for individual self-development but a response to the perceived "dumbing down" of Amateur Radio qualifications—especially in the aftermath of the FCC's license restructuring announcement. Although the Certification Program was not developed in response to restructuring, its timing could not be better, Sumner said, conceding that the restructuring debate "has moved it up the agenda."

A Web-based message board was set to open in early March to solicit the ideas of ARRL members on appropriate topics to include in the initial rollout. "The idea is to make this program what members want it to be, and not something imposed from 'on high,'" Sumner said. Noted Amateur Radio antenna and technical expert L.B. Cebik, W4RNL, has been tapped to serve as the moderator/facilitator for the message board. Members are being asked to suggest specific programs and areas of study or skills development they would like to see as part of the Certification Program. The League plans to seek outside expert assistance in setting the knowledge or performance threshold at the optimal level.

"Many ARRL members believe there is a widening gap between what the FCC requires amateur licensees to know and what it takes to be truly knowledgeable about Amateur Radio," Sumner said. "Whether or not you agree, it's certainly true that those of us who took our FCC exams years ago have never had to demonstrate an understanding of current technology. We could use a new challenge."

The new Certification Program will offer participants an opportunity to earn credentials at various levels of depth and difficulty in different courses of study—perhaps in such areas as ionospheric propagation, receiver design, and Morse code proficiency. Sumner said the ARRL should and will continue to encourage the development of Morse code proficiency beyond the basic HF licensing requirements. He observed that the standards for ARRL certification could be more stringent and more uniform than those used for FCC exams.

As envisioned, the program will be largely self-supporting, but startup costs will be funded from the Exceptional Merit Stipend established by the late Ethel Smith, K4LMB. The Certification Program will be dedicated to her memory. Smith—who helped found the Young Ladies Radio League and served as its first president—died in 1997, leaving the bulk of her estate to the ARRL.

The program hopes to include some professional development aspects and in some cases might be able to grant Continuing Education Units—CEUs. The

## FLAMES CLAIM HAM RADIO OUTLET'S ANAHEIM STORE

Ham Radio Outlet's Anaheim, California, store was destroyed by fire January 23. The fire—said to be of suspicious origin—apparently broke out in a dental office at one end of the strip mall that housed the HRO store, then spread through the rest of the business center, engulfing the HRO store and other shops.

The Anaheim HRO store's manager, Janet Margelli, KL7MF, said she was alerted to the fire by the store's alarm company. She arrived just in time to see flames engulf her store. "Talk about feeling helpless and hopeless—you just watch it burn," she said. Margelli said the store and its contents were a total loss.

More than 80 firefighters were called out to battle the four-alarm blaze, and it took them the better part of two hours to bring it under control. Margelli said flames were shooting 200 feet into the air as she arrived on the scene. No injuries were reported. Damage was estimated at \$1.5 million.

Operations at the HRO Anaheim store were handled temporarily by the company's Burbank store, using staffers from both stores.

A plastic owl decoy—of the type sold to scare birds away from towers and beams—was the only item recovered from inside the HRO store. "Smokey" (as it's now being called) has become the store's new mascot, Margelli said, and will get his own display case in the new store.

HRO operates a dozen stores across the US, including five stores in California. HRO expected to have the new Anaheim location open for business by mid-February in an undamaged store area in the same business center.



JANET MARGELLI, KL7MF

## NOTABLE SILENT KEYS

• **Spread spectrum inventor, actress Hedy Lamarr:** Hedy Lamarr, the sultry, sexy screen star of the 1930s and 1940s who also conceived the frequency-hopping technique of spread spectrum, died in January. She was believed to be 86. Born Hedwig Kiesler in Austria, Lamarr came to the US in 1937 after being signed by MGM. Among her most successful films was the 1949 *Samson and Delilah*, directed by Cecil B. DeMille. In her 1992 book *Feminine Ingenuity*, Lamarr recalled how she came up with the idea of a radio signaling device for radio-controlled torpedoes that would minimize the danger of detection or jamming by randomly shifting the frequency. She and composer George Antheil developed the concept and received a patent for it in 1942. The concept never saw fruition during World War II, but when the patent expired, Sylvania developed the idea for use in satellites. "I read the patent," Franklin Antonio, chief technical officer of the cellular phone maker Qualcomm Inc, said in 1997. "You don't usually think of movie stars having brains, but she sure did." Lamarr lived in an Orlando, Florida, suburb in recent years and shunned publicity. Lamarr's role in spread spectrum is described in the IEEE book *Spread Spectrum Communications*, published in 1983.—*thanks to André Kesteloot, N4ICK and Bill Ricker, N1VUX*

• **Swan, Atlas Radio Founder Herbert G. Johnson, W6QKI, SK:** Herb Johnson, W6QKI—who founded Amateur Radio equipment manufacturer Swan Electronics in the 1960s—died February 1. Johnson, of Cardiff, California, was 79 and had been in ill health for several years. According to Gary Smith, VE4YH (proprietor of the VE4YH Virtual Swan Museum, <http://www.pcs.mb.ca/~standard/>), Swan Electronics, then Swan Engineering, began during the winter of 1960-1961 as a one-man operation with Johnson, then W7GRA, building the first 10 Swan SSB rigs in a garage in Benson, Arizona. Johnson previously had been employed by Gonset. Swan moved to California in 1962 and became a subsidiary of Cubic Corporation in 1967. Amateur equipment production continued until around 1979. In its heyday, Swan cranked out some 400 transceivers a month from its Oceanside, California, plant. Swan was among the first manufacturers to contribute to the shift from AM to SSB in the early 1960s by providing economical transceivers for the mode. Swan also manufactured station accessories. Johnson subsequently formed Atlas Radio, which produced solid-state transceivers, including the popular Atlas 210. In 1995, a revived Atlas Radio promised to produce a new-generation Atlas 400X and even collected

deposits and full payments for radios it ultimately failed to deliver or that failed to meet expectations.

• **Former Vermont SCM, James H. Viele, W1BRG, SK:** Former Vermont Section Communications Manager James H. Viele, W1BRG, of Burlington, died January 2. He was 90. Viele served as Vermont's SCM from 1972 until 1976. During his professional years, he rose to become president of Vermont Hardware Company. He also was active in church and community affairs. He was a member and past officer of the Burlington Amateur Radio Club. His wife, Helen, and two children are among his survivors.—*Joseph E. Frank, WISOV*

• **Hallicrafters engineer Ferdinand W. Schor, K6HPB, SK:** Former Chief Engineer of the Hallicrafters Company, Ferdinand W. Schor, K6HPB, died January 14 in Santa Barbara, California. He was 94. During World War II and the years following, Schor was responsible for the design of many of the Hallicrafters products and receivers, including the S-40, SX-42 and SX-62. Survivors include his son, Warren Schor, KD3GA, and daughters Kathleen and Mary.—*Warren Schor, KD3GA*

• **Larsen Antenna Founder Jim Larsen, K7GE, SK:** The founder of Larsen Antenna, Leland J. "Jim" Larsen, K7GE, of Vancouver, Washington, died February 2, reportedly after suffering a heart attack. He was 81. An ARRL member, Larsen had been a ham for more than 67 years. He and his wife, Chris, sold their interest in Larsen Antenna in 1986. Larsen was a contester and DXer, enjoyed CW, and was a member of the First-Class CW Operators Club. Paul Nyland, K7PN, described Larsen as an "experimenter and mad scientist." Memorial donations are invited to The Radio Club of America, c/o Meredith & Hopkins 244 Broad St, Red Bank, NJ 07701-2003 and the First-Class CW Operators' Club, c/o E. Wolheim, W2MUM, 41 Silversmith Ln, Levittown, NY 11756.—*thanks to Paul Nyland, K7PN, and Ty Stober*

• **Wilbur E. "Bip" Bachman, W6BIP, SK:** Well-known San Francisco-area amateur and contester Wilbur E. "Bip" Bachman died of heart failure February 2 at his home. He was 88. During his working years, Bachman was employed as an electrical engineer at Ford Aerospace. An ARRL member for nearly 70 years, Bachman also was an active member of the South Peninsula Amateur Radio Klub in Palo Alto. "Bip" was an active CW operator, and W6BIP was a familiar call sign in the ARRL November Sweepstakes and many other contests. Survivors include his wife, Elsie, and five children.—*R. Gary Hendra, W6NOE/SPARK*



• **Forms 610 phased out:** The FCC has reminded Amateur Radio applicants that the FCC Form 610 series is no longer valid for use. As of February 17, applicants must use the Universal Licensing System forms (Forms 605, 606). There is *one* exception: FCC Form 610B Club Station application continues to be valid until the FCC finalizes its privatized club station call sign administrator program.

• **FCC to retest on “old” elements:** FCC Special Counsel for Amateur Radio Enforcement Riley Hollingsworth says licensees called in for retesting by the FCC after the April 15 restructuring will face examination elements comparable to the ones in force when they got their tickets—with the exception of the Morse code test. Although the FCC no longer will issue Advanced class licenses after April 15, an Advanced licensee called in by the FCC to retake his or her amateur examinations would retest using the pre-April 15 examination elements, not the new ones. Similarly, Amateur Extra licensees who qualified for their licenses before April 15, 2000, would have to take Elements 4A and 4B as part of their requalification, instead of the new single Element 4 test. Morse code retesting, if required, would be at the 5 WPM speed, however. The FCC has the authority to require any licensee who obtained an amateur license through a volunteer examiner session to retake his or her examinations.

• **Hollingsworth honored in sunny San Juan:** Special Counsel for Amateur Radio Enforcement Riley Hollingsworth was honored as “Citizen of the Year” by the Puerto Rico Amateur Radio League during its convention January 23. Puerto Rico SM Victor Madera, KP4PQ, said the recognition goes annually to someone who’s shown interest in the enhancement of Amateur Radio. During his visit, Hollingsworth spoke to more than 250 convention visitors to outline the FCC enforcement program. He told the gathering that the survival of Amateur Radio depends on the integrity and the character of licensees and how much they appreciate the hobby. He also promised more action on examination fraud.

### *Amateur Enforcement News*

#### **MICHIGAN HAM YIELDS LICENSE UNTIL 2004 IN EXAM CASE**

The FCC has cut a deal with former ARRL-VEC Volunteer Examiner Andrew Penn, N8JVA, whose license was designated for a revocation hearing in the wake of 1997 examination irregularities in Michigan. A February 7 letter to Penn from FCC Special Counsel for Amateur Radio Enforcement Riley Hollingsworth affirmed the terms of a voluntary agreement calling for Penn to turn in his Amateur Extra class license for three years and ten months in lieu of facing a license revocation hearing.

The FCC action stemmed from a June 3, 1997, Oak Park, Michigan, examination session for which Penn was a VE and submitted the paperwork for applicants, one of them his son. As a

result of an FCC investigation, the FCC downgraded the license class of two applicants and canceled the license of Penn’s son, Steven A. Penn, formerly KC8HUM. FCC evidence indicated that Andrew Penn added paperwork to the exam session package for applicants who did not pass the required examination elements at the Oak Park session. Evidence also indicated that Andrew Penn apparently applied to the application papers the signatures of three other VEs without their knowledge.

The FCC said three of the examiners knew nothing of the scheme. The other three VEs brought the situation to the attention of the ARRL-VEC and the FCC.

The FCC agreement calls for Andrew Penn to turn in his license by April 20, 2000. He will be allowed to request renewal of his license on February 21, 2004, the day before his current license term ends.

#### **FCC WIDENS W5YI-VEC AUDIT**

Citing complaints concerning the administration of Amateur Radio examinations, the FCC has expanded its audit of the W5YI-Volunteer Examiner Coordinator operated by Fred Maia, W5YI, in Dallas, Texas. In a February 2 letter, FCC Special Counsel for Amateur Radio Enforcement Riley Hollingsworth said the complaints “allege the selling of both original licenses and upgrade licenses in Puerto Rico and the Virgin Islands” by W5YI-VEC volunteer examiners.

The eight-page FCC letter also cited an ongoing probe begun late last fall into three 1999 W5YI-VEC exam sessions in South Carolina and sought additional details from Maia. At the South Carolina sessions, Hollingsworth said, VEs have filed statements claiming their names were forged on session documents by the W5YI session manager. The FCC said a session manager’s license apparently was upgraded to Amateur Extra, an unannounced “sub session” was held after a regular VE session, and a General class session manager administered an Extra class examination.

Maia, who’s been cooperating in the FCC’s South Carolina probe, told the ARRL that he was surprised, confused, and “a little discouraged” to learn that the FCC had expanded its audit. He suggested that the FCC might be acting on the basis of “incorrect information” and said he’s not aware that anyone ever paid for any licenses through a W5YI-VEC volunteer examiner.

In his letter, Hollingsworth noted that no Virgin Islands licensees originally tested by W5YI-VEC and later called in by the FCC for retesting have appeared for retesting. The FCC canceled licenses of five US Virgin Islands residents for failing to appear for retesting. Maia said the W5YI-VEC has not administered amateur exams in the US Virgin Islands since 1992. “I am totally in the dark on that one,” Maia said of the Virgin Islands inquiry.

Of W5YI-VEC examinees recalled in Puerto Rico, the FCC said, only one showed up for retesting. Maia said he knew of only one situation in Puerto Rico that involved a VE who was discredited after being called in for retesting.

League is seeking cooperative arrangements with related professional organizations. It already has a memorandum of understanding with the National Association of Radio-Television Engineers and has approached the Society of Broadcast Engineers for a similar agreement.

The voluntary certification program dovetails neatly with goals expressed by the League’s new President Jim Haynie, W5JBP. Following his January election,

Haynie said he favors even greater promotion of Amateur Radio, especially among youth and in schools, as well as programs to rekindle interest and activity among current licensees.

#### **LEAGUE OFFICER ELECTIONS SET MUSICAL CHAIRS IN MOTION**

Officer elections at the January ARRL Board of Directors meeting generated a ripple effect of vacancies within

the ARRL hierarchy. The elevation of West Gulf Director Jim Haynie, W5JBP, to the League presidency set off a game of musical chairs that saw Vice Director Coy Day, N5OK, accede to the director’s slot, creating a vacancy in the West Gulf Vice Director’s chair. Haynie has appointed Dr David A. Woolweaver, K5RAV, of Harlingen, Texas, to be the new Vice Director. Dr Woolweaver is a periodontist in private practice.

The FCC letter asked Maia if he'd received complaints about the possible selling of licenses and upgrades by W5YI-VEs in Puerto Rico, the US Virgin Islands, and South Carolina and, if so, how they've been handled. Among other things, the Commission also sought details regarding screening and accreditation of W5YI-VEC volunteer examiners; examination materials and their handling and grading; how exam results are verified; and the names of VEs and the applicants they tested over the past three years. The FCC asked W5YI-VEC if VE sessions are announced publicly in advance, as required by Part 97, and if any have not been.

The FCC asked the W5YI-VEC to respond within 30 days.

In January, the Commission wrote Volunteer Examiner William J. Browning, ex-AB4BB and AF4PJ, and several W5YI-VEC volunteer examiners as part of an audit of a July 14, 1999, W5YI-VEC Amateur Radio examination session in Clemson. Browning was listed as the manager of the session. His Amateur Extra license was canceled after he failed to appear for retesting.

Subsequently, the FCC sought details on another W5YI-VEC exam session in Iva, South Carolina. In separate letters January 28 Hollingsworth requested that Volunteer Examiners Eugene D. Watring, AF4DB, and James F. Chambers, KF4PWF, provide detailed information concerning an October 9, 1999, exam session in Iva, at which both were listed as assisting VEs under Browning. Copies of testing-related documents that Browning had submitted following the examination session accompanied the FCC inquiry. Watring and Chambers were requested to provide the information within 30 days. The FCC has requested that Chambers retake his Amateur Extra class examination.

## FCC PROBES CALIFORNIA ARRL-VEC TEST SESSION

The FCC is investigating possible irregularities in a Huntington Park, California, ARRL-VEC examination session late last summer. In separate letters on January 28, 2000, FCC Special Counsel for Amateur Radio Enforcement Riley Hollingsworth posed a series of questions to the three Volunteer Examiners listed on the manifest for the September 12, 1999, session—Moises Morales, KB6QMR, of Garden Grove; Juan Huitron, AC6HK, of Santa Ana; and Daniel Granda, KA6VHC, of Whittier.

In his letter, Hollingsworth noted "several irregularities regarding the examinations" and requested the VEs provide specific details regarding several Form 610 packages submitted following the session. None of the 20 applicants in question at the September 12, 1999, session has been issued an Amateur Radio license.

The FCC asked for an explanation of missing and/or incorrectly graded Morse code and written examination documents. The FCC also asked each of the VEs whether he signed the documents in question; whether he authorized anyone to sign on his behalf and, if so, whom he authorized; whether he was present for the September 12, 1999, examination session at Huntington Park or any part of it; and his involvement, if any, in the examination

Haynie filled vice directors' openings in the Atlantic and Roanoke divisions from within the section manager ranks. In the Atlantic Division, Director Kay Craigie, WT3P, was elected a Vice President, and Vice Director Bernie Fuller, N3EFN, moved up to Director. Western Pennsylvania SM Bill Edgar, N3LLR, has been appointed as the new Atlantic Vice Director. In the Roanoke Division, Director John Kanode, N4MM, was elected a Vice

President, and his second-in-command, Dennis Bodson, W4PWF, moved into the top slot. South Carolina SM Leslie Shattuck Sr, K4NK, was tapped to replace Bodson as Roanoke Vice Director.

Replacing Edgar as Western Pennsylvania SM is John V. Rodgers, N3MSE, of Butler. In South Carolina, Patricia Hensley, N4ROS, of Richburg has succeeded Shattuck.

January was a good month for Edgar. A

Tech Plus licensee, Edgar passed all of the written elements he'll need to upgrade to Amateur Extra when the new FCC licensing rules go into effect April 15.

Meanwhile, Puerto Rico got a new section manager as a result of a resignation. ARRL Field and Educational Services Manager Rosalie White, WA1STO, has appointed Victor Madera, KP4PQ, to replace Raul Escobar, KP4ZZ, who stepped down for personal reasons.

## VIRGINIA GENERAL ASSEMBLY HEAPS HIGH PRAISE ON HAMS

Virginia's General Assembly has praised Amateur Radio efforts during the response to Hurricane Floyd last fall. A joint resolution unanimously passed the House and Senate January 27. A signing ceremony was held February 17 at the Capitol in Richmond.

The resolution praised the work of Virginia's ARES/RACES members last September when Hurricane Floyd totally isolated the City of Franklin, and rising flood waters forced city

officials to abandon their Emergency Operations Center, forcing the city to rely completely on Amateur Radio for communication. "With traditional lines of communication inoperable, the Amateur Radio operators, members of the Amateur Radio Emergency Service (ARES) and the Radio Amateur Civil Emergency Service (RACES), provided the only reliable communication into and out of the flood-ravaged Franklin area," the resolution said.

The resolution noted that the Hurricane Floyd activation was "the widest geographical and longest-running ARES/RACES activation in Virginia's history" and involved nearly 150 ARES/RACES volunteers who put in some 9500 hours of duty to help coordinate emergency operations in Franklin.

"Due to the tireless efforts of amateur radio volunteers, the tragic effects of Hurricane Floyd were mitigated, the lives of those in the flood zone safeguarded, and the suffering of Franklin's residents alleviated," the resolution said in expressing the General Assembly's "admiration and gratitude for the vital contributions of Virginia's amateur radio operators."

For more information, visit <http://www.aresva.org/>.—  
Tony Amato, KR4UQ



**Holding the General Assembly resolution are Virginia Section Manager Lynn Gahagan, AF4CD (left) and A.F. "Fred" Vincent, Deputy Operations Director, Virginia Department of Emergency Services.**

MARTIN GARY, W2MG

session. The FCC also wants to know why 19 of the 20 applicants cited missed Question 5 of the Morse code examination.

The VEs were given 30 days to reply to the FCC. The ARRL-VEC is cooperating in the FCC investigation.



## ARRL ASKS FCC TO DENY KENWOOD "SKY COMMAND" PETITION

The League says the FCC should deny a request by the Kenwood Communications Corporation to permit operation of its "Sky Command" system in the 2-meter band. In November, Kenwood asked the FCC either to declare that Sky Command complies with Commission rules or to waive applicable sections of the rules to make it legal. The ARRL filed comments on Kenwood's petition January 31.

## News in Brief:

• **What's the *Frequency*, Dennis?** *Frequency*, a new movie that features Amateur Radio as a plot device, is set for release in April. The movie stars Dennis Quaid and is directed by Gregory Hoblit. The ARRL was consulted in the interests of accuracy and came up with an unused W2 call sign for the movie's protagonist (Quaid) to use. *Frequency* is billed as a sci-fi thriller. The gist of it is that a long-dead father and his adult son meet up on the airwaves via ham radio (during the mother of all sunspot cycles), and the son tries to prevent his father's death by altering the past. Both also attempt to prevent a murder. Information on *Frequency* is available at <http://www.frequencymovie.com>.

• **Court of Appeals upholds FCC preemption on RFI issues:** The US Court of Appeals for the 10th Circuit has upheld FCC preemption of RFI issues. In *Southwestern Bell Wireless Inc v Johnson* [Kansas] County Board of County Commissioners, the court invalidated a zoning regulation adopted by the county that permitted the county zoning administrator to determine that a communications tower or antenna was causing interference to public safety communications and to order the site to cease operations. The county included a restriction that tracked the terms of the regulation in a conditional-use permit to construct a 150-foot tower to be used by Southwestern Bell. Southwestern Bell successfully sought a declaratory judgment that the regulation was preempted by federal law. On the county's appeal, the 10th Circuit held that Congress intended the FCC to have exclusive jurisdiction over RFI matters, leaving no room for local regulation.—*Edward Ricco, NSLI/Ham-Law Reflector*

• **Kansas has PRB-1 legislation in the hopper:** Kansas has become the latest state to introduce a PRB-1 companion bill

in its legislature. HB 2644, the Kansas Amateur Radio Service Act, cites PRB-1, reinforces the concept of "reasonable accommodation" and sets minimum allowable restriction heights for three tiers of lot sizes. The bill was introduced by 121st District Rep Jim Morrison, K0CVY, (R-Colby). Morrison says the bill has a good chance to become law. HB 2644's author Kerry Steffens, W0ON, of Wichita and ARRL Midwest Vice Director Bruce Frahm, K0BJ, of Colby led a group that testified February 8 on behalf of the measure. For more information, visit <http://www.ink.org>. —*Bruce Frahm, K0BJ*

On the market for more than two years, Sky Command lets users control a fixed HF station via a pair of dual-band transceivers. Sky Command advertisements have not appeared in *QST*, however, because the League maintains that the system is not legal to use as configured.

Sky Command operates in full duplex, using a 70-cm frequency to transmit audio and control commands to a dualband transceiver at the remote station and a 2-meter frequency to transmit received audio via the remote station's Sky Command transceiver to the operator's

transceiver. The League said Kenwood's use of a 2-meter frequency would cause amateurs using the system to violate Section 97.201(b), which limits auxiliary operation to certain frequencies above 222.15 MHz.

In its comments to the FCC, the League said the type of operation employed by the Sky Command System is "clearly auxiliary operation, and as such is not permitted in the 144-148 MHz band." Kenwood had asserted that the 2-meter link constitutes third-party communications. The League noted that third-party traffic relates only

• **1999 outgoing QSL stats reflect increased activity:** In 1999, the ARRL Outgoing QSL Service shipped more than 1.8 million cards to DX stations, up from nearly 1.6 million in 1998. The final tally was 1,853,870, according to Martin Cook, N1FOC (see right), who manages the Service at ARRL HQ. He says that works out to approximately 5.8 tons of cards. The Service serves approximately 260 DXCC countries, including nearly every active country. Cards are forwarded from the ARRL Outgoing Service to a counterpart bureau in each of the respective countries. ARRL members can ship cards to DX bureaus for \$6 a pound (or \$1 for 10 or fewer cards; \$2 for 11 to 20 cards; \$3 for 21 to 30 cards). For more information on the ARRL Outgoing QSL Service, contact Cook at [n1foc@arrl.org](mailto:n1foc@arrl.org). Here, Cook sorts some of the nearly six tons of QSL cards that passed through the Service's hands last year.

• **France authorizes 136-kHz amateur band:** The 135.7-137.8 kHz band has been authorized for use by French amateurs on a secondary basis and in conformance with conditions existing in other European countries. Maximum radiated power is 1 W.

• **American Lung Association seeks hams for 2000 "Big Ride":** The American Lung Association is recruiting ham radio "communicators" to assist in its Big Ride



Across America 2000. The 2000 ride—only the second to use ham radio operators—is the third annual event to raise money and awareness for the American Lung Association's fight against lung disease. It's a 3500-mile bicycle trek from Seattle, Washington, to Washington, DC, from June 19, 2000 to August 5, 2000. Details are available at <http://www.bigride.com>. For more information or to volunteer, contact Volunteer Support Manager Mark Ewert, KB1ECH, [bigride@lungusa.org](mailto:bigride@lungusa.org) or call toll free at 877-BIGRIDE (877-244-7433).

• **QST Cover Plaque Award winner:** The winner of the *QST* Cover Plaque Award for January was John Devoldere, ON4UN, for his article "The 1999 Solar Eclipse and Amateur Radio." Congratulations, John!

to the message content, not to the station's technical configuration.

The League called Kenwood's Sky Command System "a fine product" that would be of interest to many hams if designed for frequencies where auxiliary operation is legal. Carving out an exemption by waiving the rules for Kenwood's product, the League argued, would amount to "inappropriate favoritism."

The League suggested that Kenwood could remedy its problem by using its TH-89 transceiver, which operates in the 430 MHz and 1.2 GHz bands. "Auxiliary operation is permitted in both of these bands," the League said. "Kenwood markets the TH-89 in Japan but has chosen not to export it to the United States."

The full text of the ARRL comments is available at <http://www.arrl.org/announce/regulatory/arrl-da99-2805.pdf>.

### CLEARWIRE WITHDRAWS SPREAD SPECTRUM PETITION

Clearwire Technologies has withdrawn its *Petition for Reconsideration* asking the FCC to reconsider the revised spread spectrum rules it issued last summer. The new rules became effective November 1.

Clearwire manufactures high-speed wireless Internet and network access devices operating at 2.4 GHz, where there's an amateur allocation. Fearing possible amateur interference with its Part 15 products, Clearwire had asked the FCC to require that amateur transmitters capable of operating in excess of 1 W on bands in which its Part 15 devices operate be FCC certificated. It also wanted transmitters in those bands to automatically transmit an ID and telephone number and the spreading algorithms made available on a public Web site.

Calling Clearwire's *Petition* "frivolous," the ARRL in January asked the FCC to dismiss it and to reaffirm its original *Report and Order*. The League said none of Clearwire's requests was reasonable and suggested the company had no standing to propose "new, burdensome restrictions" on amateur operation. The ARRL noted that FCC rules do not afford Part 15 devices any protections from interference from licensed services, such as Amateur Radio.

In mid-February, Clearwire told the FCC that it was withdrawing its *Petition for Reconsideration*. But the company said it "expressly reserves" its position that Part 15 users such as Clearwire are "entitled to seek protection from an Amateur station that operates unlawfully." Disagreeing with the ARRL's stance, Clearwire said that while Part 15 devices must accept interference from "authorized" radio stations, "Clearwire does not waive its right to seek relief from unlawful Amateur

operation in the future."

TAPR—Tucson Amateur Packet Radio—also had filed in opposition to the Clearwire petition.

### SECTION MANAGERS ELECTED

Section manager election ballots were counted February 22 at ARRL Headquarters in races in North Carolina and South Dakota. In North Carolina, John Covington, W4CC, outpolled G. Roger Allen, KD4MYE, 951 to 891. Covington, an Extra class licensee from Charlotte, will succeed outgoing SM Reed Whitten, AB4W. In South Dakota, incumbent SM Roland Cory, W0YMB, defeated challenger Katherine "Trina" Blanks, KB0TYW, 146 to 88. An Extra class licensee, Cory lives in Mobridge.

Candidates in six other ARRL sections ran uncontested. In Louisiana, Mickey Cox, K5MC, was elected to succeed retiring SM Lionel "Al" Oubre, K5DPG. Cox holds an Extra ticket and lives in West Monroe. Incumbent section managers reelected were Robert Leiden, KR2L, Eastern New York; Tuck Miller, K6ZEC, San Diego; Allen R. Breiner, W3TI, Eastern Pennsylvania; Ronald Phillips, AH6HN, Pacific; and Lynn Gahagan, AF4CD, Virginia.

Terms of office begin April 1, 2000.

### CANADA, AUSTRALIA EYE MORSE REDUCTION

Canada and Australia could follow the US in reducing the Morse code examination requirement to 5 WPM for full HF access and privileges. Radio Amateurs of Canada announced plans in February to ask Industry Canada to eliminate that country's 12 WPM Morse requirement. If enacted, the change would leave 5 WPM as the sole Morse code examination requirement for full HF access in Canada.

Meanwhile, the Wireless Institute of Australia said it's seriously considering whether to push the Australian Communications Authority to reduce the maximum Morse code license test speed Down Under from 10 to 5 WPM. The WIA says a majority of its membership divisions appear to favor the reduction. The general issue of Morse code licensing requirements is expected to be a topic for debate at the IARU Region 3 conference the WIA will host later this year. Discussion of the Morse code requirement in the *International Radio Regulations* could come up as early as the 2003 World Radiocommunication Conference.

A single 5 WPM Morse code examination requirement for full HF access and privileges goes into effect in the US on April 15. The United Kingdom and Sweden also have adopted 5 WPM as the Morse code examination requirement for full HF access.

### Section Manager Election Notice


To all ARRL members in the Connecticut, Idaho, Minnesota, North Dakota, Ohio, Oklahoma, Southern Florida, Western New York, Puerto Rico, and Virgin Islands Sections. You are hereby solicited for nominating petitions pursuant to an election for section manager (SM). Incumbents are listed on [page 12](#) of this issue.

To be valid, a petition must contain the signatures of five or more full ARRL members residing in the section concerned. Photocopied signatures are *not* acceptable. No petition is valid without at least five signatures, and it is advisable to have a few more than five signatures on each petition. Petition forms (FSD-129) are available on request from ARRL Headquarters but are not required. We suggest the following format: (Place and Date)

Field & Educational Services Manager,  
ARRL  
225 Main St  
Newington, CT 06111

We, the undersigned full members of the \_\_\_\_\_ ARRL section of the \_\_\_\_\_ division, hereby nominate \_\_\_\_\_ as candidate for Section Manager for this section for the next two-year term of office. (Signature \_\_ Call Sign \_\_ City \_\_ ZIP \_\_)

Any candidate for the office of Section Manager must be a resident of the section, a licensed amateur of Technician class or higher and a full member of the League for a continuous term of at least two years immediately preceding receipt of a petition for nomination. Petitions must be received at Headquarters by 4 PM Eastern Time on June 9, 2000. Whenever more than one member is nominated in a single section, ballots will be mailed from Headquarters on or before July 1, 2000, to full members of record as of June 9, 2000, which is the closing date for nominations. Returns will be counted August 22, 2000. Section managers elected as a result of the above procedure will take office October 1, 2000.

If only one valid petition is received from a section, that nominee shall be declared elected without opposition for a two-year term beginning October 1, 2000. If *no* petitions are received from a section by the specified closing date, such section will be resolicited in the October 2000 *QST*. A section manager elected through the resolicitation will serve a term of 18 months. Vacancies in any section manager's office between elections are filled by the Field & Educational Services Manager. You are urged to take the initiative and file a nomination petition immediately.—*Rosalie White, WA1STO, Field & Educational Services Manager* 



## Is Your Foot in the Door?

*Among the comments heard from Emergency Coordinators after Y2K-night, one of the most frequent was, "We'd been trying for years to work with that agency, but got our foot in the door when they asked us to be on standby for Y2K problems." If you got your foot in the door, keep working the whole body in. What follows is what one ARES group did to get their services welcomed into the community.—Rosalie White, WA1STO*

### AMATEUR RADIO EMERGENCY SERVICE AND SCHOOLS

*By Jim Andera K0NKK, alternate Johnson County (Kansas) Emergency Coordinator*

While we would like to think our schools are safe havens from disaster and tragedy, school officials across the nation have learned that crisis situations can develop at any school, any time. They are becoming aware of the importance of good communication in a crisis, and how inadequate their present communication system may be. In Olathe, Kansas, school officials have not only integrated Amateur Radio into their crisis plan, but have also put an Amateur Radio station in their Crisis Command Center (CCC). School districts nationwide are now starting to consider Amateur Radio for part of their emergency plans.

Even before the Columbine school tragedy, Olathe School District (OSD) officials realized their communications network might not be adequate in an emergency. They were working on a crisis plan that included buddy schools where students could be evacuated. One problem became apparent: If phone lines went down, how could officials communicate with schools? When OSD instructor, Darryl Evans, W5VK, mentioned Amateur Radio's capabilities to OSD's Crisis Management Team (CMT), they listened. Darryl put OSD in touch with our Johnson County ARES group. The groups met regularly over the next year. Emergency Coordinator June Jeffers, KB0WEQ, worked to understand OSD's needs and explain how ARES could help.

#### What They Need—What We Need

During an emergency, OSD needs communications between the CCC and any of their 37 schools. Our ARES suggested positioning VHF/UHF mobile units at affected schools, and proposed a permanently installed base station and antenna system at the CCC. OSD purchased a dual-band



(l-r) Dale Braathen, KC0CGJ; Josh Tuel, KB0GUS; Steve Rainey, WD0DPB; June Jeffers, KB0WEQ and Jim Andera, K0NKK, at the Johnson County (Kansas) ARES Command Center.

station because we helped them understand what we needed to support them. We avoided technical details. We simply said our response time could be decreased significantly by mounting an antenna as high as practical and having a station at a key location.

To meet communication needs of OSD and other served agencies, our field units needed to be properly equipped as a quick response team. Because our units may operate from someone else's vehicle (school official's car or bus), we ask hams to have a mag-mount antenna, cigarette-lighter cable for their mobile rig and a gel-cell battery (buses may not have cigarette lighters). Many members can operate Field Day style from a gym or principal's office. Members enjoyed shopping for gear and accessories to support ARES, or building ARES-related projects.


An important item in the field is proper identification. Our ARES group's bright yellow ball cap with ARES patch has been invaluable for served agencies to easily spot us. We can also purchase matching ARES T-shirts and jackets.

#### What Schools Learned—What We Learned

Those who think cell phones are replacing Amateur Radio in emergencies need to think again. At last July's National School Public Relations Association (NSPRA) crisis communication conference, schools recently experiencing tragedies stated that

inadequate communication was their most widespread problem. Schools learned that cell phone networks quickly become overloaded by media up-links, the batteries don't last, and school telephones are blocked by parents calling. Two dozen agencies may be on site, and communities may have a frequency for fire, ambulance and police, but the frequency may become swamped. School officials, utility companies or hospitals may not be linked.

OSD learned it had the only school representatives at the conference who had addressed crisis communications. When OSD Information Coordinator Lauralee Baker-Rapue discussed the relationship she helped forge between OSD and our ARES, other schools listened. Based on her report, NSPRA's October newsletter encouraged schools to, "...consider forming a partnership with a local chapter of the ARES." With schools learning about emergency communications, don't be surprised if your school asks your ARES group for assistance. Better yet, ask your school if they need your help!

We experience great satisfaction seeing our hobby elevated as it becomes part of an emergency plan involving our children. If you have questions on integrating ARES within your school, contact June Jeffers, KB0WEQ, at [kb0weq@arrl.net](mailto:kb0weq@arrl.net) or 913-764-3683. June serves as NSPRA national contact person for schools wishing to get in touch with their ARES. 

# ARRL Numbered Radiograms—Continued

The letters ARL are inserted in the preamble in the check and in the text of a radiogram message before spelled out numbers that represent texts from this list. Note that some ARL texts include insertion of numbers. There are two groups of ARRL Numbered Radiograms: Group One for relief emergency use and Group Two for routine messages. The first twenty Numbered Radiograms appeared last month in March *QST*, p. 85.

## Group One— For possible “Relief Emergency Use” — continued

- TWENTY ONE** Search and Rescue assistance is needed by local authorities here. Advise availability.
- TWENTY TWO** Need accurate information on the extent and type of conditions now existing at your location. Please furnish this information and reply without delay.
- TWENTY THREE** Report at once the accessibility and best way to reach your location
- TWENTY FOUR** Evacuation of residents from this area urgently needed. Advise plans for help.
- TWENTY FIVE** Furnish as soon as possible the weather conditions at your location.
- TWENTY SIX** Help and care for evacuation of sick and injured from this location needed at once.

*Emergency/ priority messages originating from official sources must carry the signature of the originating official.*

## Group Two — Routine messages

- FORTY SIX** Greetings on your birthday and best wishes for many more to come.
- FIFTY** Greetings by Amateur Radio.
- FIFTY ONE** Greetings by Amateur Radio. This message is sent as a free public service by ham radio operators at \_\_\_\_\_. Am having a wonderful time.
- FIFTY TWO** Really enjoyed being with you. Looking forward to getting together again.
- FIFTY THREE** Received your \_\_\_\_\_. It's appreciated; many thanks.
- FIFTY FOUR** Many thanks and good wishes.
- FIFTY FIVE** Good news is always welcome. Very delighted to hear about yours.
- FIFTY SIX** Congratulations on your \_\_\_\_\_, a most worthy and deserved achievement.
- FIFTY SEVEN** Wish we could be together.
- FIFTY EIGHT** Have a wonderful time. Let us know when you return.
- FIFTY NINE** Congratulations on the new arrival. Hope mother and child are well.
- SIXTY** Wishing you the best of everything on \_\_\_\_\_.
- SIXTY ONE** Wishing you a very Merry Christmas and a Happy New Year

## Field Organization Reports

### Public Service Honor Roll January 2000

This listing is to recognize amateurs whose public service performance during the month indicated qualifies for 70 or more total points in the following 8 categories (as reported to their Section Managers). Please note the maximum points for each category: 1) Checking into a public service net, using any mode, 1 point each; maximum 60. 2) Performing as Net Control Station (NCS) for a public service net, using any mode, 3 points each; maximum 24. 3) Performing assigned liaison between public service nets, 3 points each; maximum 24. 4) Delivering a formal message to a third party, 1 point each; no limit. 5) Originating a formal message from a third party, 1 point each; no limit. 6) Serving as an ARRL field appointee or Section Manager, 10 points each appointment; maximum 30. 7) Participating in a communications network for a public service event, 10 points each event; no limit. 8) Providing and maintaining an automated digital system that handles ARRL radiogram-formatted messages; 30 points. Stations that qualify for PSHR 12 consecutive months, or 18 out of a 24-month period, will be awarded a certificate from HQ on written notification of qualifying months to the Public Service Branch at HQ

843	W4ZJY	174	159	147
NM1K	195	K4IWW	KB2VVB	W2AKT
404	KB2LML	173	156	146
W9RCW	WB5NKC	KR4MU	N0SU	NR2F
384	194	171	155	145
N5JZ	WB4GM	KJ3E	N2KPR	KB2KLH
371	193	170	153	W0OA
KB8ZYY	WA4GQS	N0KJ	K2UL	N2CCN
311	191	N2RPI	WD9FLJ	WA1FNM
WB8SIW	K5IQZ	168	K4RBR	K4YVX
289	188	KA2GJV	WNOY	144
KB5WEE	W6DOB	K6YR	152	WA0KS
244	185	K8FCC	AF4GF	KF4NFB
WB5ZED	KA4FZI	N8FPN	143	WX4H
WB2UVB	183	W6IVV	WU4C	N8FWA
220	WX8Y	164	KR4MU	N2XOJ
KA2ZNZ	181	KD2AJ	151	WA4QXT
218	K7VVC	W4CAC	W5GKH	W9YCV
KK3F	N5XGI	N5NAV	150	WB2FGL
205	N2LTC	W6IVV	K5MC	142
WA9VND	N2OPJ	163	K3CSX	K8GA
N7DXH	180	KA5KLU	K2GTS	N5JCG
202	W4EAT	162	N2JBA	KB5W
N2YJZ	179	WA1JVV	AF4PU	KD4GR
K7BDU	K9FHI	W6QZ	N7YSS	141
201	NN7H	161	149	WD8IMO
W7TVA	178	KC2ALG	N5OUJ	K5DPG
199	AD4DO	160	148	WA4DOX
KB2RTZ	175	N8JGS	KC4TLG	WB2ZCM
198	KC5OZT	WB4TVY	NY2V	140
N5IKN	KB2VVD	WA1TBY	K9LGU	W0LAW
			WA1TBY	KF1L
				WA0TFC

139	AA3GV	K5DMC	116	W4XI	87
N2WDS	W2MTA	KC2ETO	KC8LYY	NY2CQ	WX2NJ
N9BDL	N9BMT	WB2QIX	W3VK	101	KC2DAA
N2GJ	K0IBS	W7GHT	K3RB	N3ZKP	86
KB5TCH	127	127	K8LEN	K8LEN	WA4GLS
W7ZIW	K0BFX	W1PEX	115	KE4DNO	KD4HGY
WA4DOX	WD4MIS	KD1LE	KB0DTI	W4CAC	KA0DBK
138	126	126	KA2CQX	100	85
WD8DHC	K4FQU	KF6UMU	N7AIK	KC3Y	W7EP
WB0ZNY	113	113	AF4NS	99	N4CQR
W3BBQ	K4AIF	113	KE6MIW	98	W5XX
N2WXF	KA10TN	125	98	84	84
K4SCL	K04OL	NC4ML	KE0K	KK1A	KB2ETU
W7GB	KB2ETO	WA8EYQ	K2VX	W2LC	PY2CGB/
WA6ODQ	KT4PM	123	97	W5	83
KT6A	112	W1ALE	WA2YBM	83	W7VSE
N3WAV	N8DD	N3WAV	96	KE4SKY	KB2UQZ
K7GXZ	WA8SSI	122	AA4YW	82	82
137	W2FR	N2AKZ	W3CB	KB3FL	KB2GK
N1VXP	121	KE1AI	K06SK	95	W4DGH
136	AG9C	121	K06RZ	82	K9JPS
N3WKE	KA4LHM	N3WK	KA4HHE	82	WB4ZNB
K4YVX	111	K4LFRM	111	KB2GK	KE4PAP
K2DN	N2WFN	120	N2WFN	95	81
NN2H	WD0GUF	K4YVX	WD0GUF	81	K8ZJU
WD4JJ	W2MTO	N2XJ	W2MTO	80	AA8PI
N2XJ	AD4IH	W2EAG	N1STN	80	K8VZF
W7NWP	KD6YJB	121	121	K8SH	79
134	110	W1JX	110	KC0CEG	78
W2RJL	110	N1JBD	110	81	KB4EH
AA2SV	WA4EIC	AA2ED	WA4EIC	77	AC5Z
AF2K	W3BL	AF2K	W3BL	76	W1PEX
120	KE6VOA	109	KE6VOA	76	W9RCW
119	93	KC7ZZB	KC8GMT	75	K7BDU
WA1QAA	N9KNJ	KG5GE	WA2CUW	75	N2LTC
KB2VRO	KA4BN	WB5NKD	KA4BN	75	K9JPS
108	K4WKT	108	K4WKT	13	WA9VND
AE4NW	WB7VYH	118	WB7VYH	73	N5IKN
KB2VZ	92	KB2VZ	92	10	K7VVC
W4NTI	AC5Z	W4NTI	AC5Z	10	W6DOB
KT4SJ	KB3AMO	KA7AI	KB3AMO	47	W5SEG
K5MXX	76	N2ZMI	W4ZNB	71	W6IVV
KC5VLW	AC4ZO	91	N2ZMI	70	W9PYV
NOMN	W4ZBA	91	W4ZBA	70	KK3F
107	K9JPS	N5JUJ	KB4WBY	28	NOKJ
K3UWO	WA9VND	KB2WII	73	42	N5JZ
K4JN	N5IKN	90	WA8WBZ	221	W9IHW
N21D	K7VVC	N2WXE	KE4WBI	0	K9GU
106	10	N21CTC	71	0	88
K5WOD	303	KA1VEC	K5UCQ	0	KC8HTP
W2PII	289	W4PIM	KB2YJD	0	KF4KSN
K2PB	300	89	W2AZ	0	KD5AHW
104	328	W9CC	KA7TTY	0	W5AUX
W8SDH	328	W8SZU	N4MM	0	88
KF5A	300	AB4XK	70	0	KC2BYM
KJ7SI	300	88	KB2YB	0	KC2ETU
102	609	88	KC4CHW	0	W2JHO
N2WXG	609	88	KA1VAX	0	88

The following stations qualified for PSHR in December 1999, but were not listed in this column last month: WA3HJC 115, W5AYX 87, KE3FL 72. (Nov) W5ZX 185.

### Section Traffic Manager Reports January 2000

The following ARRL section traffic managers reported: AL, AR, CO, CT, EMA, ENY, EPA, GA, IA, ID, IL, IN, KS, KY, LA, MDC, ME, MI, MN, MO, NC, ND, NFL, NH, NJ, NNJ, NTX, OH, OK, OR, ORG, SBAR, SC, SD, SDG, SFL, SJV, SNJ, STX, SV, TN, VA, WI, WCF, WMA, WNY, WPA, WVA, WY.

### Section Emergency Coordinator Reports January 2000

The following ARRL section emergency coordinators reported: CT, ENY, EWA, IN, KY, WDC, MI, MN, MO, NLI, SD, TN, VA, WCF, WMA, WPA, WVA.

### Brass Pounders League January 2000

The BPL is open to all amateurs in the US, Canada and US possessions who report to their SMs a total of 500 points or a sum of 100 or more origination and delivery points for any calendar month. All messages must be handled on amateur frequencies within 48 hours of receipt in standard ARRL radiogram format.

Call	Orig	Rcvd	Sent	Divd	Total
WX4H	12	847	1395	20	2274
NM1K	714	279	887	3	1883
W1PEX	0	946	132	13	1091
W9RCW	0	587	27	319	933
K7BDU	26	440	422	8	896
N2LTC	0	401	428	13	842
K9JPS	0	381	48	348	777
WA9VND	13	435	304	14	766
N5IKN	0	356	104	252	712
K7VVC	10	255	386	3	654
W6DOB	0	302	281	50	633
W5SEG	47	297	266	0	610
W6IVV	6	303	300	0	609
W9PYV	0	289	328	0	609
KK3F	28	146	366	54	594
NOKJ	42	247	257	32	578
N5JZ	221	95	228	25	569
W9IHW	0	272	37	244	553
K9GU	0	253	31	253	537

BPL for 100 or more originations plus deliveries: WX7V 218, WB8SIW 133, KB5WEE 111, N7DXH 105.





## Sao Tome and Principe

By Matthew De La Hunt, DA1MH

My wife and I enjoy reading about DXpeditions in *QST*. It seems that each time I read about a new location, I'm tempted to pack my bags and be off on the next flight! Recently, after years of interest in DXing, I was able to make a contribution to the fascinating field myself by going to Sao Tome and Principe, S92.

The December 1999 "How's DX?" column titled "Never Pay Airline Overweight Charges! Well, Almost Never" contained great tips on getting airlines to accept extra heavy and long bags at no charge. My wife and I muddled through and paid only a minimal amount, but next time we'll have a better idea how to go around it—thanks to that column. We also found a hard-bottomed, three-meter long rig bag for windsurfing that was perfect to transport antennas and masts. The bag, from Northsails, has built-in pockets just the right sizes for the elements and mast sections, heavy-duty zippers and padded canvas sides and, best of all, wheels at one end so we didn't have to lug it around.

Tucked into the Gulf of Guinea, Sao Tome is a tiny tropical island and one of Africa's smallest independent nations. DXers have visited the island recently, but none of them took along equipment for my favorite band, 6 meters. In fact, as far as we could determine, no one had ever put 6 meters on the air from Sao Tome. Given the current upswing in the sunspot cycle, fall of 1999 seemed an ideal time for someone to get active from S92. But who?

The more we thought about it, we realized how much we enjoyed the idea of doing it ourselves. While Sao Tome is part of Africa, it's a peaceful, quiet place without civil unrest, perfect for getting our feet wet on our first DXpedition. In July 1999 Markus Hammelmann, DK5AX, and I applied for a license to operate. We made an invaluable contact on the Internet with Francisco Costa, CT1EAT, of Portugal, who had done his own trip to Sao Tome and advised us on everything from hotels to getting the permits from CST, Companhia Saotomense de Telecomunicacoes. He also advised us not to worry when the licenses didn't come in September, October or November. In the end, we left on a flight from Germany without licenses, but with assurances they were waiting for us. When we showed up at the CST office the morning after our arrival, there they were: S92DX and S92CW.



**Matt, DA1MH (left) and Markus, DK5AX (right), operated from Sao Tome Island in November 1999 as S92DX and S92CW.**

We chose a hotel that had its own generators in case of power outages (an everyday occurrence). They were kind enough to allow us to erect two antennas in the garden: an A3S tribander on a 15-meter Fiberglass mast for 10, 15 and 20 meters, and a 5-element Yagi on an 8-meter aluminum mast for 50 MHz. Our location directly on the island's northeast coast was ideal, giving us a clear shot in almost all directions.

Markus mainly worked the HF bands. Meanwhile, I monitored 6 meters religiously, listening for the slightest flutter of an opening. I made my historic first contact with PY5CC on November 24 at 2304Z. Among the countries I worked were Italy, Sicily, Sardinia, Spain, Portugal, Greece, Slovenia, Croatia, England, Netherlands, Belgium, Germany, Luxembourg, France, Switzerland, Madeira, Malta, Ceuta and Melilla, Burundi, Tanzania, Nigeria, Brazil, Puerto Rico, Fernando de Noronha, and Paraguay. Worth noting were the ZD8 and 7Q7 beacons, which came in every evening.

Markus and I took turns operating during the CQ World Wide CW DX Contest on November 27 and 28. We ended up with a total of 4637 contacts worked in eight days. To our extreme disappointment, conditions on 6 meters weren't as productive as we had expected. However, we can report 167 happy 6-meter fans who'll be receiving QSL cards from S92DX.

The good news is that we met a local resident, American Gary Shirk, S92AT, who was looking for a new diversion on the airwaves. We left our Yagi with him to be installed on his 90-foot tower. Once his new 6-meter radio arrives, perhaps I'll also get a chance to add S92 to my logbook.



**Al Watson, W4ABW, completed the DXCC 2000 Millennium award application and faxed it to the DXCC Desk on January 3! You still have about 10 months left to send your application.**

### DX TIDBITS FROM AROUND THE WORLD

#### Chesterfield Islands

Don't forget that members of the Association des Radio Amateurs de Nouvelle Calédonie (ARANC) plan to be operating as TX0DX from the Chesterfield Islands from about March 15 to April 1. More than likely this will be a new DXCC Entity so make sure you work them just in case. Keep a close eye on the DX bulletins for future developments on this possible new one. The TX0DX Web site can be found at <http://www.n4gn.com/tx0dx>. OH2BN will be the QSL manager for all contacts except for 6 meters, which go via JA1BK.

#### New CQ DX Editor

Congratulations to Carl Smith, N4AA, editor of *QRZ DX* and *The DX Magazine*, in his new role as editor of *CQ Magazine's* DX column. Carl replaces Chod Harris, VP2ML/WB2CHO, who passed away in early December 1999. He'll be a busy fellow now with three deadlines!

#### DXCC 2000 Millennium Award

Congratulations to Al Watson, W4ABW; Joe Reisert, W1JR; and Cliff Ahrens, K0CA, for being first to receive the DXCC 2000 Millennium Award. These guys were fast; all three had their applications faxed in to HQ on January 3. Bob Rosier, K4OCE, took exactly 2 weeks to clinch his award, but he was QRP running 5 W! It's not too late for you to earn your DXCC 2000 certificate. You have until 2359Z on December 31, 2000. See the December 1999 *QST* page 47 for full details, or visit the ARRL DXCC home page at <http://www.arrl.org/awards/dxcc>. You can see the attractive DXCC 2000 Millennium award in "Up Front" in this issue.

#### 2000 International DX Convention

This year's International DX Convention

will be sponsored by the Southern California DX Club and will be held on April 14, 15, 16 at the Holiday Inn in Visalia, California. At press time Harv, K6EXO, was still working on the final program and has some great presentations lined up for this year's event. For complete details contact the SCDXC by e-mail at [visalia@scdxc.org](mailto:visalia@scdxc.org), or visit their home page at <http://www.scdxc.org/>. If you don't have access to the Internet you can write to the Southern California DX Club, Attn: Herb Rosenberg, KG6OK, 17861 Fairhaven Ave, Santa Ana, CA 92705-1111. Becky, N3OSH, and I look forward to seeing everyone at Visalia this year.

### 3DA—Swaziland

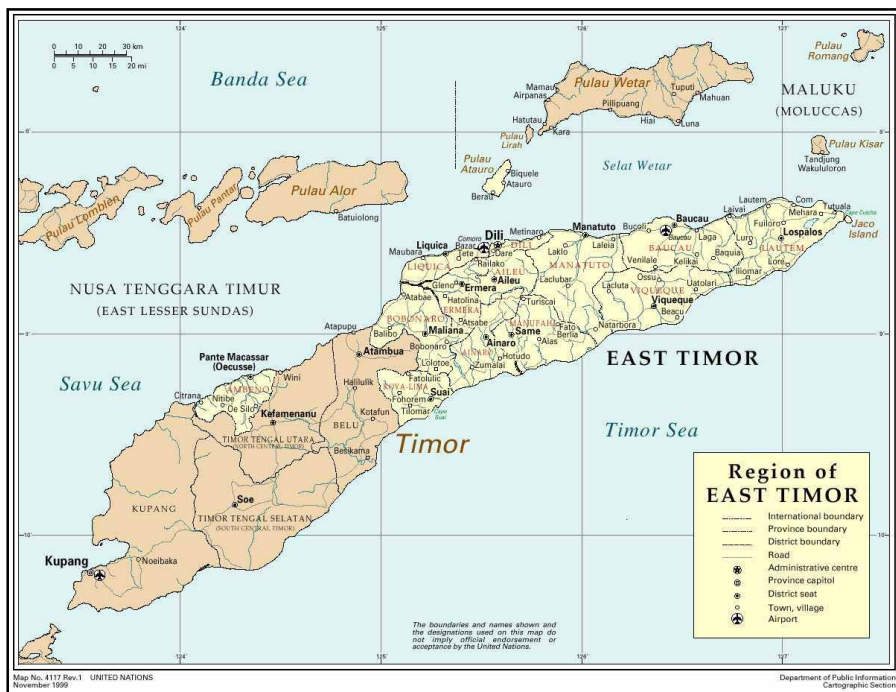
Andre, ZS6WPX, has recently made two trips to Swaziland and operated as 3DA0WPX. Since Jon, 3DA0CA, departed there has been little activity. Andre plans to be active in the following contests: ARRL SSB DX, CQ World Wide WPX SSB, IARU HF World Championship, CQ World Wide SSB DX, and Japan International DX. He is also looking into the possibility of operating from Mozambique (C9) sometime in May.

### East Timor

An official from the International Telecommunication Union (ITU) stated that meetings were underway in January with the telecommunication administrators from East Timor and the United Nations concerning the transfer/reallocation of call signs. Once completion of these procedures takes place, the pertinent information will be given to the ITU member nations. When asked how long this could take, the official responded, "The time frame for implementing changes depends mainly on the action taken by the telecommunication administration concerned and is beyond the control of the ITU Radiocommunication Bureau." He did, however, go on to say, "Each official request which fulfills the criteria for a new allocation is treated by the Bureau with high priority." In late January Fred Eckhard, a spokesman for the Secretary-General of the UN, stated, "East Timor has won the approval of its own international country code from the International Telecommunication Union (ITU); its new code will be 670, although it will take some more time before that code is operational." No word yet on a call sign prefix block, which would open the door for a new DXCC Entity. The good news is that several UN peacekeeping members there are Amateur Radio operators. We should see this new country sometime in 2000.

### BV9P/BQ9P—Pratas Island

Charles, W1FH, found an interesting article in his local paper that reports Taiwanese officials are eyeing Pratas Island (BV9P/BQ9P), about 432 kilometers south of Taiwan (BV), as a possible future tourist spot. The tiny horseshoe shaped island is located in a flashpoint area of the South China Sea and has been home to a military garrison up until now. Last November military officials announced plans to withdraw troops from the Pratas and Taiping Islands. Chen Wen-hsiung, a cruise director from Kuohsiung, said, "It's kind of different, but we definitely see possibilities" and "we ought to make visitors feel safe." Taiwanese officials and tour groups say they can get by the current infrastructure



**East Timor will consist of the eastern half of the island of Timor, the former enclave Oecussi-Ambeno on the north coast of West Timor and the islands of Palau Atauro and Jaco.**

by having tourists lodge on floating hotels. Don't be surprised to see some activity from this semi-rare one, possibly this month!

### FR/T—Tromelin Island

Gil, F5NOD, reports a French expedition to Glorioso Island in the Indian Ocean (#9 on the ARRL's '98 DXCC Most Wanted list) that was announced last August is still on! But the plan has been changed and the target is now Tromelin, which is one notch higher (#8) on the list. Gil says it should happen in July or August and the call sign still is not known. The operation has been authorized for four operators and they'll be on Tromelin for 15 days. Gil also mentioned, "This expedition will be possible only if we can gather enough money to cover the budget." See the Tromelin 2000 DXpedition Web page at: <http://perso.easynet.fr/~f5nod/> and follow the FR/T link.

### JX—Jan Mayen

Per, LA7DFA, says he will once again be active and working from Jan Mayen starting April 7 as JX7DFA. He will be there for either 6 or 12 months this time. Plans are to take a Yagi for his 144 MHz EME station, which will have 20.8 dBd with vertical and horizontal polarity and full az/el. On 6 meters he will take a 100-W rig and a 6-element Yagi. Yes, he will also be active on 10 through 160 meters and plans to put up a 25-meter-high inverted L with 100 radials. Also in the works is an AP-8 at 20 meters above the ground at the west side QTH, which will be perfect for the US and Pacific. He plans to be at that QTH during some weekends. Per prefers CW but will also be on SSB, RTTY, PSK31 and SSTV. While there he hopes to make the first JX-USA contact on 6 meters. QSL via LA7DFA Per-Einar Dahlen, Royskattveien 4, 7670 Inderoy, Norway.

### YV0—Aves Island

Ramon, YV5EED, reports the February 2000 scheduled DXpedition to Aves Island (YV0) had to be cancelled because of a December storm, that devastated parts of Venezuela. The group of 20 operators from both Venezuela and several other nations had transportation with the Venezuelan Navy. However, due to the navy's budget and recent humanitarian relief work, the team would have only been able to go for either one day or 30 days. The group decided it would be best to postpone because it would take too much effort for just one day, and members of the group could not spend 30 days on the island. The group has not given up and will continue to work closely with the officials to help activate Aves Island in the future.

### 4U/KC0PA—Western Sahara, 1995

Tim, KC0PA, notified us that due to the long-term illness of his manager, QSL requests for his operation in Western Sahara in 1995 were not always answered. Tim has assumed all responsibility for acknowledging QSLs and asks anyone who did not receive a response to their QSL request to contact him either by e-mail or regular mail. His e-mail address is [kc0pa@arrrl.net](mailto:kc0pa@arrrl.net) and his mailing address is KC0PA, 207 River Valley Trail, Kathleen, GA 31047-2135, USA.

### WRAP UP

That's all for this month. Looks like DX is alive and well. Thanks this month go out to BV4FH, DA1MH, F5NOD, G3NOM, K6EXO, KC0PA, KE3Q, KG6OK, LA7DFA, N4GN, N6RT, W1FH, YV5EED and ZS6WPX for their contributions. Please continue to send your pictures, articles, letters and newsletters. I really appreciate them. I look forward to meeting some of you in Visalia in mid April. Until next month, see you in the pileups!—Bernie, W3UR





## What's Happened to Cycle 23?

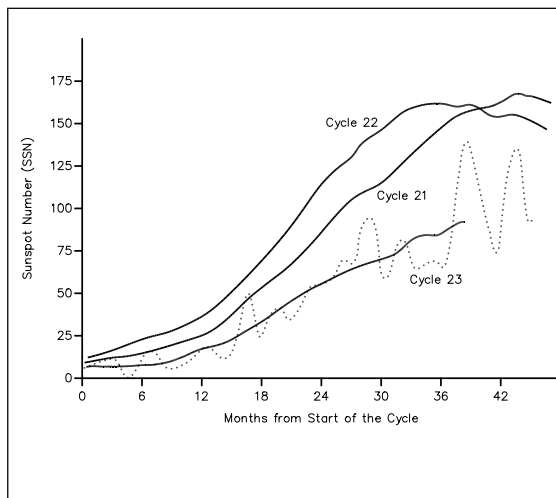
It has been clear for many months now that Solar Cycle 23 has not been living up to most predictions. Many 6-meter operators around the world looked forward to a glorious winter season of DXing, but actual results fell well short of expectations. The most spectacular contacts were primarily along the easy paths adjacent to the equator and one- or two-hop contacts across the equatorial zone. Mid- and high-latitude east-west contacts, such as between North America and Europe, were scarce from November to January—the high point of the F<sub>2</sub> season for much of the US.

The spring season, just reaching a peak as you read this, may be better. Preferred paths from early March to May are from the South Pacific to much of the southern half of the US. There is a considerably smaller chance that stations in more northerly portions of the US can work into the Pacific as well. Auroral and transequatorial field-aligned irregularities are statistically more common and perhaps more intense around the equinox periods, so late March and early April could bring some other sorts of surprises.

### Symptoms

Consistent transatlantic 50 MHz propagation usually occurs when the solar flux is sustained above 175 (135 SSN) during the late fall and early winter seasons. Even with the daily flux at 200 (158 SSN), experience from Cycle 22 has demonstrated there is just a 40% chance of openings from New England to western Europe. The solar flux did exceed 200 for several days running in November and again in December, but these were short-lived peaks. The flux just as quickly dropped below 175. In addition, the long-term average has not risen as steeply as in previous cycles (see Figure 1). Consequently, there were only a few days with mediocre transatlantic openings in each month, and they were nothing like the openings at a similar stage in Cycle 22.

There have been many fewer and less intense geomagnetic storms as well. This also may be an indirect result of overall lower solar activity. In contrast, the early years of Cycle 22 had several strong auroras and one quite extraordinary event—the great aurora March 13-14, 1989. During this geomagnetic storm, stations as far south as Florida, Texas and Arizona made aurora contacts. Nothing



**Figure 1—Solar Cycle 23 compared with the two previous cycles. Solid lines show 13-month moving sunspot averages. The dotted line shows the monthly averages for Cycle 23 through January 2000. Cycle 21 started in June 1976 and lasted 10 years, 3 months. Cycle 22 began in September 1986 and lasted 9 years and 8 months. Cycle 23 began in May 1996 and had been in progress for 3 years, 8 months, by January 2000. Based on the graph at the DX Listeners Club Web page <http://www.dxlc.com/solar/cyclcomp.html>.**

like that has happened yet this cycle.

### Reasons

Solar activity has simply been lower than expected. The underlying causes are simply not clear. Each of the 22 recorded solar cycles has been unique in terms of rise to maximum, peak activity, duration and other quantifiable characteristics. Most predictions are essentially statistical probabilities based on the observations of previous cycles, with some modifications based on certain recurrent patterns. Some experts suggested, for example, that the peak of Cycle 23 might be one of the highest on record because odd-numbered cycles have generally been more active than even-numbered ones. It seems clear that Cycle 23 is going to upset that rule.

### What Next?

As of early this year, the Cycle 23 appeared to be building toward a peak that still seems on track for late this year or early next. It is unlikely that the peak will be anywhere near as high as the previous two

cycles. Thus, it now appears that 6-meter activity will probably not be as good as during Cycle 22. Next fall may well provide the best opportunities for worldwide DX on 6 meters for this cycle. How good that activity may be is anyone's guess.

You can follow the progress of the cycle and the changing predictions of the experts on the NASA Web site at <http://science.msfc.nasa.gov/ssl/pad/solar/predict.htm>.

### ON THE BANDS

January's activity was quite a mixed bag. Lackluster solar activity trimmed 6-meter DXers' hopes, but expected sporadic-E openings and several ordinary auroral events took up the slack. Propagation during the January VHF Contest weekend was the best in many years. There was some aurora on Saturday evening and most areas of the country had several opportunities to make 6-meter E-skip contacts on Sunday. Finally, a rare winter tropo event across the Gulf of Mexico provided a good deal of excitement and a new DX record. Dates and times are UTC unless otherwise noted.

### Tropospheric Ducting

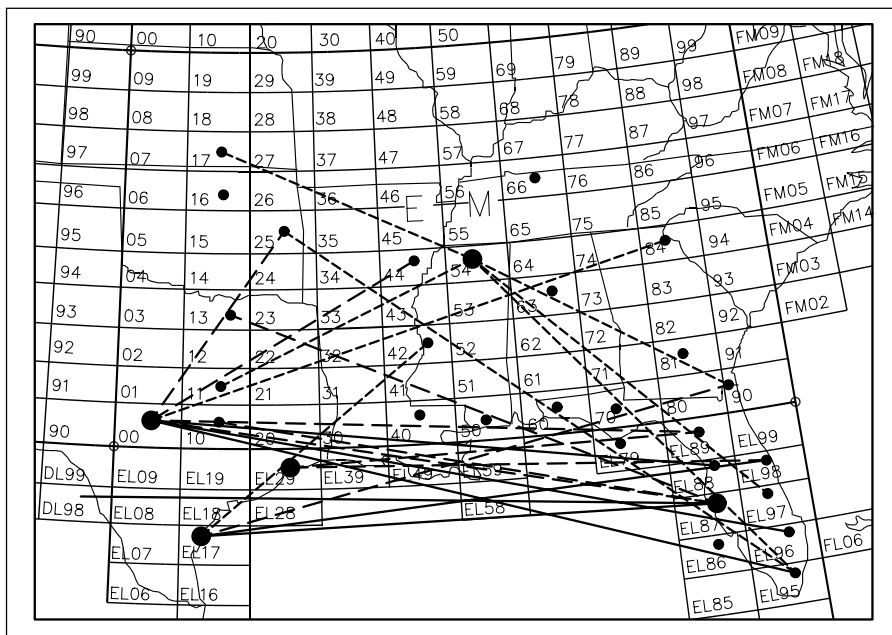
Ducting rarely makes top billing in January's news, but one of the strongest openings in many months covered the southeastern US and Gulf of Mexico on January 11 and 12. Figure 2 summarizes some of the longer paths. Note the number of 2.3 GHz contacts plotted—probably the largest tally ever in one session over the Gulf of Mexico.

### Across the Gulf of Mexico on January 11

There was good activity on all the bands from 144 through 2304 MHz between the

### This Month

April 8-9	DUBUS/REF 432 and 2300 MHz and Up EME Contest
April 14-15	Southeastern VHF Society Conference (Marietta, GA)
April 16	Good EME conditions
April 28-30	CQ Spring VHF Activity Weekend



**Figure 2—Representative DX contacts on 144, 432 and 2304 Mz on January 11 to 12, 2000. Temperatures had been well above normal for some days over the southeast. A huge high-pressure system dominated the region when ducting conditions appeared and then slowly drifted northeast. Large dots represent grid locations of reporting stations. Small dots indicate other grids in which there was VHF activity. Solid lines show 2304-MHz contacts, dashed lines are 432 MHz and dotted lines are 144 MHz. Many more contacts were made than can be shown here, including those on 222 and 1296 MHz.**

Texas coast and Florida on the evening of January 10-11 and continuing into the next morning. John Butrovich, W5UWB (EL17), worked a dozen Florida stations on 144, 222, 432 and 1296 MHz after 0540 on January 11. He hooked up with K0VXM (EL98) on all four bands at about 1675 km for his longest series of the evening. John also worked W2BZY and KU4WD (both EL98) and K5WTA (EM90) on 144 MHz at distances over 1500 km.

John Goodwin, K5IUA (EL29), had similar results the next morning, but on 2304 MHz. He completed 13-cm contacts with K0VXM at 1327 and KB4DFO (EL89) at 1408, using 432 MHz for coordination. The contacts were over the quite remarkable distances of 1474 and 1334 km—just under the existing US DX record of 1540 km. They were also probably the first Texas-Florida contacts on 13 cm.

Former "World Above 50 MHz" columnist Bill Tynan, W3XO/5(EM00), worked many Florida stations on 144 MHz, but also completed with N0LBH (EL88), KD4ESV (EL87) and WD4MGB (EL87) on 432 MHz. These contacts were in the 1500 to 1600 km range. W5UWB continued to work across the Gulf. John found K0VXM on 1296 MHz at about 1650 km and worked WA8TTM and WD4MGB on 144 and 432 MHz as late as 1930 in the morning. Paul Womble, AJ4Y (EL97), worked XE2OR (DL98) on 144 MHz for a new country and probably the longest contact of the entire opening—about 1875 km. As extraordinary as these contacts were, there were more the following evening.

### Activity Expands on January 12

W3XO/5 resumed working across on the Gulf on 144, 222 and 432 MHz after 0200 that evening. Bill extended his range to 1800 km or so on 222 MHz by working WB2WIH (EL96) and K9KNW (EL95) on 432 MHz at around 1850 km. W3XO/5 also made a 222

MHz contact with K5SW (EM25) to the northeast in Oklahoma.

K0VXM and W5LUA had alerted Buddy Morgan, WB4OMG (EL87), of the opening that morning, but unfortunately Buddy had only a 13-cm station running. So when he got home on the evening of the 12th, Buddy started calling CQ on 2304.1 CW. Tom Haddon, K5VH (EM00), answered his CQ and they completed the contact over a 1509 km path. The pair then switched to SSB and chatted for more than an hour as signals got as strong as 20 dB over S9—astounding! At 0325, Buddy worked NQ9Q (EM10) at 1453 km for another remarkable QSO.

### 2304 MHz DX Record

K5VH made one further 2304 MHz contact before calling it quits for the evening. At 1506, he hooked up with Rolf Marx, KB4DFO (EL89), over a 1553 km path for a new North American DX record for the band. Well done indeed. Tom used a Down East Microwave transverter with 1.2 W output, through 45 feet of 7/8-inch Hardline and fed into a 34-inch dish.

The opening seemed to spread much further north and west by the following morning, based on 2-meter activity. W7ROD (EM63) in northern Alabama worked down to EM90 in northern Florida, west to EM34 in Arkansas and north into EM66 in Tennessee. David Counce, N5YLS (EM54) in northern Mississippi, worked as far south as EL95 in the Miami area, southwest to EM11 in Texas and northwest into EM17 in Kansas. K5SW (EM25) in Oklahoma reported contacts south to EL95 in Florida. WB4OMG was also at it again on 2304 MHz, adding W5LUA (EM13) at 1453 km and AA5C (also EM13) at 1442 km to the log.

### More Tropospheric Openings

Other noteworthy tropospheric events over the southeast took place on January 2 and 19.

W5UWB (EL17) reported a dozen 2-meter and a few 70-cm contacts to the northeast after 0255 on the 2nd. He worked as far as AG4V and N4JQQ (both EM55) in southwestern Tennessee. Distances were up to 1150 km. Jason Wilborn, KG4BMH (EM76), worked W5UWB on 2 meters the next morning, as did his neighbor K4AR. The 1500-km contact down to Texas provided a new state for Jason. The January 18 event supported 2-meter contacts from eastern Oklahoma to north Georgia and eastern Tennessee at distances up to 1100 km.

### Skunked on 6 Meters

There is no other way to put it. January was disappointing for most 6-meter DXers around the world. This should have been the high point of the winter season, yet there were no openings between North America and Europe and few remarkable contacts elsewhere in the world. Here are the highlights, such as they were.

### South America

Ed Rodriguez, WP40, was favorably placed in Puerto Rico to take advantage of the high MUF north-south paths across the equator, continued to work PY, CX, LU and HK stations on several days during January. WP40 probably has the honor of making the first 6-meter DX contact of the new year as well, when he worked CX4II on January 1 at 0003. On January 8, he added CE0Z on Juan Fernandez Island, a nice catch any time. N5JHV worked several LUs on January 27, possibly on a sporadic-E link to a more southerly F-hop. W5OZI and N5XU reported Mexican stations at the same time. Meanwhile, the Brazilians were struggling even to work Spanish stations, as was so common a month or two previously.

### The Pacific

Transpacific paths were a little more active, yet still down from the previous two months. Hatsuo Yoshida, JA1VOK, reported Japanese DXers worked BG7OH as well as 9M2, 9M6, DU, HL, V7, VK, VR2 and ZL prefixes during the first three days of the year. On the 5th, JS6CDB and 7J6CCU in the Ryukyus worked PY2NKY, PY2PA and others in Brazil. Mainland JA3, JA4 and JA6 stations found Brazilians on the 23rd. On January 26, several JA6s landed a real prize—XZ0A (NJ99), the expedition on Tahtay Kyun Island (Myanmar).

North Americans were not completely shut out from the Pacific. XE1/G0JHC (DL70) worked VK3 and ZL stations on January 3 and 6 while vacationing on the Mexican coast. K7ICW made a marginal contact with VK2DN on the 10th. Stephen Wheelock, YN1SW (EK61), worked ZL2AGI on the 14th. W1LP/mm (FJ09) found VKs on the 27th just before entering the Panama Canal from the Atlantic side. Finally, W5UWB in south Texas ran off a string of a dozen ZLs on the afternoon of January 29.

Aside from some widely scattered contacts from Hawaii into the Midwest on January 3, 6 and 9 (some of which may have been via sporadic E) and southern Europeans who heard the ZD8 beacon on several days, that is about it for January. Spring usually brings better conditions into the Pacific, so perhaps that activity is brightening your day as you read this.

### Transcontinental

There were no transcontinental F-layer contacts during January, but there were some



on the afternoons of December 11, 18 and 19. These events followed a familiar pattern. Typically, 6 meters opened abruptly around 1700 for an hour or two, when eager stations quickly filled the band to 50.200 MHz and higher. Those in the Canadian Maritimes and Quebec then south to Maryland easily hooked up with stations from British Columbia and western Montana, south to Arizona and New Mexico.

SSB was the most popular mode for making transcontinental QSOs, because signals were usually strong, but QSB prone. The success of George Yazzolino, K27HKP (CN85) in Oregon, provides an example of what was possible. On December 18 and 19, George worked many stations in Nova Scotia, Quebec, Maine, Massachusetts, Connecticut, New York and Pennsylvania with 100 W and a five-element Yagi, probably a typical station.

Even this much power was not necessary to get in on the fun. Mike Gutman, K2CMH (FN41) in Massachusetts, made several contacts into Oregon, Nevada and California running just 10 W from an FT-620B and a multiband ground-plane antenna. Several mobiles and at least one station running as little as 1 W into a small Yagi participated in these openings.

### Transequatorial FAI on 144 MHz

WP4O reported that he and KP4EIT continued to work into South America on 144 MHz from Puerto Rico via transequatorial field-aligned irregularities (TE) during the month. The afternoons of January 10, 20, 23 and 29 seemed to be the most productive for making contacts into Argentina and Uruguay. These contacts were in the 6000-km range, typical for true TE contacts.

There are greater possibilities for TE. A few 222-MHz TE contacts have been made over similar paths and at least one claimed 432-MHz heard only. TE peaks around the equinoxes (that is about March 21 and September 21) and is more intense during the solar-cycle maximum. This could be the year for some extraordinary TE contacts.

### Sporadic E

Sporadic E appeared on 6 meters somewhere across the country on January 1 through 7, 10, 12, 23 and 28, according to WIRMA, WB2AMU, K4MSG, K7ICW, NOLL and others. Most were the usual short-lived single-hop affairs, hardly worthy of special notice, but they still can enliven a mostly dead band. Other days were a bit more exciting.

The openings over January 3-4 were noteworthy for their duration (up to eight hours in some areas) and because there were many double-hop coast-to-coast contacts. W6OAL/0 made over 300 contacts in all US call areas, except 5 and 6, plus VE3 and VE4. K6YK (CM97) worked stations in the Midwest, but also hooked up with VE2DFO, VE2FGU, VE3KZ and VE3LBZ via double hop. W3EP (FN31) also found many midwestern stations and completed double-hop contacts with W7KQU (CN878), KG7WC (DN17) and W7SAZ (DN17) all on CW below 50.100 MHz.

Multiple 6-meter openings over the VHF Contest weekend, January 22-23, provided a needed jolt to jaded operators. Most of the country had at least some E-skip, although you had to be on your toes. Minnesota stations were surprised by a strong opening to the East

Coast already in progress at 5:30 AM local time Sunday morning, for example. It lasted for at least 2 hours. New England enjoyed additional openings to the Midwest and to Florida and adjacent states. Florida operators worked into the Midwest at the same time. There were also plenty of reports of contacts between the West and Midwest as well. Did you miss the any of the action?

### Aurora and Auroral E

Aurora appeared on at least three late afternoons in January, including one session during the VHF Contest. On the 11th, John Feltz, W9JN (EN54) in central Wisconsin, worked west to Minnesota and east to New York on 50 MHz. His coverage on 144 MHz was somewhat more restricted, with the southern-most contacts in EN51 (northern Illinois) and EN81 (northern Ohio).

The January 22 aurora began for stations that are more northern as early as 2000, but despite the high activity due to the contest, it seemed to take a long time before most operators were aware an aurora was in progress. Many stations reported unusually strong local power-line noise, due to the extreme cold and high winds. Despite the problems, WB2AMU (FN30) hooked up with W2AXX (FN12) on 144 MHz while running only 10 W and a portable Yagi.

Most contacts on 50 and 144 MHz seemed confined to northerly latitudes from coast to coast. Even so, there were some exceptions. Al Olcott, K7ICW (DN26) in southern Nevada, heard W0UC (EN44) in Wisconsin suddenly coming through on 6 meters with a distinct auroral buzz around 2317. Al eventually worked him and W9BLI. He also worked WA2BPE and KB2ZPP, both in western New York, but probably aided by sporadic E.

Russ Miller, W1RMA (FN65) in northern Maine, had a somewhat different experience. He had his antenna pointed northeast after 2130 and heard auroral sounding European TV video at 48.250 MHz, probably from Norway and Sweden. At the same time, he heard the VE8BY/b and Greenland beacons on 6 meters via aurora. There has been a good deal of speculation about the chances of actually working Europe on 6 meters via auroral E (the likely cause in this case). It has been done once before during a much stronger aurora, but signs like these are sure encouraging.

Finally, on January 28, New England stations worked into the Canadian Maritimes via 6-meter aurora for less than an hour after 0045, but this event did not seem to attract wider attention.

### NOTES FROM ALL OVER

#### First 432 MHz EME QSO between Two-Yagi Stations

Ramiro Aceves, EA1ABZ, reported the first 432 MHz EME contact made between stations running two-Yagi arrays in his February "VHF-UHF-SHF: El mundo por encima de los 50 MHz" column in the Spanish *CQ* magazine. Honors go to EA3DXU and IK5QLO, who made this unusual contact on December 23 at 0530. The Moon was in an especially favorable position at the time, resulting in an unusually low path loss.

EA3DXU has been making 432 MHz EME contacts for more than six years with two 38-element Yagis and 1350 W. Josep has 114 initials to his credit, 35 DXCC countries and worked all continents. He also was part of the

first 144 MHz EME QSO between stations running just two Yagis, completed with the remarkable PA0JMV in September 1988. IK5QLO used two 28-element Yagis and 1 kW on his end of this historic contact.

This and other news of 432 MHz and higher EME activities can be found on the online version of *432 and Above EME News*, edited by Allen Katz, K2UYH. Point your browser to <http://www.nitehawk.com/rasmit/em70cm.html>.

### VHF/UHF/MICROWAVE NEWS

#### 50 MHz US Firsts

There has been 6-meter activity from more than 300 DXCC countries some time during the past few decades. How many of these countries do you suppose have been worked from the continental 48 United States? The answer may be surprising—just 188 at last count. K1SIX (formerly WA1OUB) in New Hampshire leads individual honors with 133 DXCC countries. We still have a long way to go in comparison with the HF crowd.

A compilation of the first station in the continental 48 United States to work each DXCC country on 6 meters can be found at <http://user.itl.net/~equinox/50usa.html>, courtesy of Geoff Brown, GJ4ICD. The 50 MHz US Firsts list also appears in the February issue of *Six News*, the bimonthly magazine of the UK Six Metre Group. The list is constantly updated as new claimants come forward.

#### RMG Cumulative Contest

The newly formed Roadrunners Microwave Group is sponsoring a yearlong cumulative contest to promote activity on the bands above 222 MHz. The same station can be worked every day for additional points. Although the contest began on January 1, you can still go over your logs for the previous few months and count contacts you have already made. For details, see the RMG Web pages at [www.clarc.org/rmg/](http://www.clarc.org/rmg/) or send an SASE to the RMG at PO Box 93175, Austin, TX 78709, for rules and scoring sheets.

#### DUBUS/REF Worldwide EME Contest 2000

The first weekend of the *DUBUS/REF* EME Contest—limited to 144 and 1296 MHz—was held March 18 and 19. The second leg, for 432 MHz, 2.3 GHz and higher runs the full UTC days of April 8 and 9. Exchange call signs and signal reports. The entry categories and scoring are a bit complicated, so if you plan to send in a log, check first with Joachim Kraft, DL8HCZ, at [joachim@kraft.net](mailto:joachim@kraft.net). Even if you do not care to compete, this is a great weekend for operating off the Moon, as many stations are sure to be on the air.

#### FEEDBACK

There are some small corrections in the Alaska and Japan section of the Six Meter DX reports in *February*'s column. G3FPQ worked JA5FFJ on November 11, rather than G3FPK. JA6VU made the first contact between Japan and the Dodecanese Islands (not Greece) when he worked SV5BYR on November 14. Finally, JA1VOK's contact with EY8MM on the same day was not a Japanese first with Tajikistan. JS6CDB had an earlier QSO with EY8MM on October 9. Thanks to JA1VOK and G3FPK for noticing these lapses.



## Three Cool Kits

The QRP portion of the ham radio hobby has many facets. This month we'll review three rigs that you can build and enjoy. One question that quickly arises is, "Do I have to be an electronics technician or engineer to build a rig?" The answer is an emphatic "No!" Today's crop of QRP kits are very well documented and are, in my humble opinion, much better than the Heathkits of the 1950s, 60s and 70s.

### Wilderness Radio

The NorCal-40A offered by Wilderness Radio, is a revised version of the first kit project offered by the Northern California QRP Club (NorCal). Designed by Wayne Burdick, N6KR, the NC-40 quickly became the portable QRP rig to own. The Wilderness rig is an improved version of the original kit and assembles quickly (about 10 hours for an average kit builder). Alignment is ultra simple. This rig offers a true superhet receiver with crystal filtering, AGC and RIT. Power output is about 2 W. Receive idle current is around 25-30 mA and key down current is about 350 mA, making this an ideal backpacking rig. Tuning is accomplished via a front panel mounted 100 k $\Omega$  potentiometer that varies the bias voltage on a varactor diode. Tuning is somewhat nonlinear and the normal tuning range is around 40-50 kHz. This can be expanded by methods explained in the manual. The price for the Wilderness NC-40A kit is \$129 plus \$5 shipping and handling. *Wilderness Radio, PO Box 734, Los Altos, CA 94023-0734; tel 650-494-3806; [qrpbob@datamers.com](mailto:qrpbob@datamers.com); <http://www.fix.net/jparker/wild.html>.*

### Small Wonder

Dave Benson, NN1G, of Small Wonder Labs (SWL) offers two versions of his extremely popular 40 meter monobander, the Small Wonder 40+. One is a standard analog version (the SW 40+) for \$55 and the other is a direct digitally synthesized version (the DSW-40) at \$90. Case and controls are options available from SWL (\$40 + s/h). The SW 40+ is a treat to build and operate. It features a superhet receiver with IF crystal filtering, RIT can be added with an optional board from SWL, and power output is around 2 W using a 12-V supply. Current consumption is extremely low at about 20 mA on receive. The SW 40+ is so popular that the NorCal QRP Club devoted an entire issue of their quarterly newsletter, *QRPP*, to the de-



The Wilderness Radio NorCal 40A offers a superhet receiver and 2 W output.



The popular Small Wonder Labs SW40+ transceiver.



Red Hot Radio's 5 W NC 20.

tailed workings of the rig. Reprints are available for \$12 from Quicksilver Printing, PO Box 757, Socorro, NM 87801. Ask for "Elmer 101." *Small Wonder Labs, 80 East Robbins Ave, Newington, CT 06111; [dave@smallwonderlabs.com](mailto:dave@smallwonderlabs.com); <http://www.smallwonderlabs.com>.*

### Red Hot Radio

Finally, Red Hot Radio's NorCal-20 is an outstanding example of taking the latest NorCal club kit and going commercial. Dave Fifield, AD6A, the original designer of the NC-20, decided to take the design and turn into a commercial venture and Red Hot Radio was born. Dave further refined the design of the 20-meter monobander to

include an AGC modification, and improved Audible Frequency Annunciator (AFA) operation. This radio, unlike the previous two offerings, has an audio digital frequency readout and TiCK keyer as standard equipment and is capable of operating at a "QRP Full Gallon" of 5 W. Actually, it will put out between 0 and 5 watts, fully adjustable via an internally mounted trimpot.

The Red Hot NC-20 is a nice little kit and the red anodized aluminum case really makes it stand out in a crowd. Overall receiver performance is great. Minimum discernable signal (MDS) is around -135 dBm, which means it hears *very* well. Selectivity is excellent, owing to the five matched crystals used in the IF filter section. Current consumption is a bit more than the Wilderness NC-40A and the SWL SW-40+ (160 mA on receive and close to 1 A on transmit, using a 13.8-V source at an output of 5 watts). The higher receive current is directly related to the use of a JFET preamp and a TFM-2 double balanced mixer in the receiver front end. Price: \$135 plus shipping and handling for an excellent kit. *Red Hot Radio, tel 408-390-6805; fax 800-881-6120; [sales@redhotradio.com](mailto:sales@redhotradio.com); <http://www.redhotradio.com>.*

I can heartily recommend all of these monoband radios for the beginning QRP kitbuilder. None require an intense knowledge of electronics and only the usual assortment of hand tools and minimal soldering equipment. The instructions are outstanding and so is the technical support from the manufacturers. All the builder has to do is read the instructions carefully and resist the temptation to hurry. Best of all, the prices of these monobanders are in keeping with modest budgets, enabling the frugal QRPer to build a rig at a fraction of the cost of purchasing a commercial transceiver. On a personal note, I have built two NorCal NC-40s, one SW 40+ and its digital cousin, the DSW 40 and all worked the first time!

Building the radio is only a portion of the enjoyment you'll receive. The pride and satisfaction of operating a homebuilt station is unbelievable. These rigs are equally at home in the shack or on the road. Add a small L-Match tuner, a simple wire antenna, battery, key or paddles, and headphones, and you have a very compact, easily transportable QRP station that can accompany you on family outings, camping and/or business trips. QST



## New Exam Question Pools go into Effect April 15

The Amateur License Restructuring Report and Order, released December 30, 1999, takes effect on April 15, 2000. Because the new structure has only three license classes, there will be only three question pools. (The present [pre April 15] system has six license classes with five question pools.)

Given the short time frame it had to work with, the National Conference of VECs Question Pool Committee (QPC) found itself under a 116-day deadline to organize the content of five question pools into three, while still allowing publishers, educators, VECs and VEs ample time to prepare for administering tests based on the new question pools. Since the window of time necessary for editing, publishing and distributing study guides was measured in terms of months rather than days, it became evident that the QPC had to complete its work by the beginning of February. The best the QPC could do, for the time being, was to provide a workable Band-Aid. The QPC placed three new question pools into public domain in early February.

To create the new Element 2 Technician pool, questions from the current Technician (Element 3A) pool were moved over to the new pool. Also, questions from the Novice pool relating to VHF/UHF operation and Novice/Technician HF band operation, were moved into the new pool. The new Element 2 Technician question pool remains our VHF-and-above entry level test. Beginning April 15, Technician class exams must contain 35 questions drawn from this new question pool, 26 of which must be answered correctly to pass the exam.

To create the new Element 3 General question pool, nearly every question from the current (Element 3B) General group was brought to the new pool. Plus, to make up for the additional five exam questions (50 new pool questions total, to adhere to the FCC's 10xrule), additional questions on the same General syllabus were gleaned from unused material from the Novice pool. Beginning April 15, General exams must contain 35 questions drawn from this new question pool, 26 of which must be answered correctly to pass the exam.

To create the new Element 4 Amateur Extra question pool, many technical questions were drawn from the current (Element 4A) Advanced pool and combined with

questions from the current (Element 4B) Amateur Extra question pool. The new Element 4 Amateur Extra question pool is our premier, all-privilege exam. Beginning April 15, Amateur Extra exams must contain 50 questions drawn from this new question pool, 37 of which must be answered correctly to pass the exam. The three new question pools can be found on the ARRLWeb at <http://www.arrl.org/arrlvec/pools.html>.

### Question Pool Revisions Schedule

The three new pools (and any exam designs based on these question pools) will be valid (and then revised) on the following schedule:

**Amateur Extra Element 4**—Valid from 12:01 AM April 15, 2000 through midnight June 30, 2002

**Technician Element 2**—Valid from 12:01 AM April 15, 2000 through midnight June 30, 2003

**General Element 3**—Valid from 12:01 AM April 15, 2000 through midnight June 30, 2004

(This cycle is expected to repeat indefinitely.)

We expect the first revision cycle for the Amateur Extra pool to commence later in 2000 and to be completed by the end of 2001. The Technician and then General pool revisions will follow the Amateur Extra pool revision by one year and two years respectively.

### Seeking Public Input (Your Input!) to the Question Pools Revision Process

Once the QPC call for public input is made, *your input* will be requested and invited. These revision cycles will be our opportunities for complete and comprehensive reviews of each of our new question pools.

The QPC received very little input from the amateur community over the past decade of question pool revisions. But, since public awareness appears to be now at an all-time high, the QPC looks forward to significant contributions for the upcoming pool revision cycles.

Don't miss out! This will be *your* chance to shape the future question pools and the knowledge base required of our future Technician, General and Amateur Extra licensees.

### READY TO UPGRADE AT THE STROKE OF MIDNIGHT?

The FCC's new restructuring rules take effect at 12:01 AM April 15. At that time, persons seeking a new license or upgrade can qualify under the FCC's new licensing structure of three license classes and one 5-WPM Morse code exam.

FCC has told us that all applicants seeking an upgrade under the new rules must apply through a VE team to receive their desired upgrade. The VE team must have a completed NCVEC Form 605 for each applicant (this form is available from the VE team and can be completed at the test site). For persons who qualify for an upgrade, three qualified members of the VE team must sign the NCVEC Form 605 for the applicant. The VE team must complete and sign a Certificate of Successful Completion (CSCE) showing the new license class earned, and the team will collect a processing fee from the applicant (\$6.65 for ARRL VEC exams during 2000).

### Valid Forms of Examination Element Credit

At a test session, the VEs will review all credit documents presented by applicants. Such valid credit documents may include:

- A CSCE issued within the previous 365 days for Element Credit (credit as indicated). Some credit presented on/after April 15 will not be useful. For example, if an applicant is seeking a General to Amateur Extra upgrade, the applicant must have obtained Element 4A and Element 4B credit before April 15. (Element 4B credit alone is only valid if you have an Advanced license.)

- Proof of General written Element 3 test credit (persons who took a 50-question Technician/General written test) for Technicians who were licensed before March 21, 1987, can be verified if an applicant presents *any* of the following:

- Per FCC Rules, a Technician license issued before March 21, 1987, as indicated on the license. Applicants potentially could have taken the Element 3 written test up through midnight March 20, 1987, which would not have resulted in a license issuance until July 15, 1987. For ARRL VEC purposes, we are advising ARRL VE teams that a Technician license issued through July 15, 1987, is acceptable for General grandfather credit.

- An *original* Element 3 CSCE issued before March 21, 1987.

- An FCC-issued License Verification Letter (see items 5 and 6 at <http://www.arrl.org/news/restructuring/faq.html>) indicating that the applicant was licensed as a Technician prior to March 21, 1987. To request such a letter, write to FCC, ATTN: Amateur Section, 1270 Fairfield Rd, Gettysburg, PA 17325 (or fax 717-338-2696).

- An International Transcription Service (ITS) FCC Records Contractor extract/certi-

fication from FCC Fiche Records. There is a charge for this service. You can obtain contact information for ITS by calling 717-337-1433 (or visit <http://www.itsdocs.com/>).

—A 1987 edition, or earlier, *Radio Amateur Callbook* listing is acceptable as proof (be sure to include the year of publication reference, if not printed on the page). *Radio Amateur Callbook* will, for a \$10 fee, provide a notarized “Proof of Licensing” document which will serve your credit-proof requirements. For more information contact: *Radio Amateur Callbook*, 575 Prospect St, Lakewood, NJ 08701; [103424.2142@compuserve.com](mailto:103424.2142@compuserve.com); tel 732-905-2961 (choose option 5).

—QRZ.COM has posted a copy from their archives of their very first CD ROM product on their Web page, as originally published in 1993. This data includes licensees from 1983 to 1993. A printout of such a listing from this CD ROM, showing a Technician license effective/begin date prior to 3/21/87, is acceptable. Their URL is: <http://www.qrz.com/search1993.html>

Any other reasonable form of verification, showing license class as Technician and the license ending date, along with a license beginning/effective date before 3/21/87, may be acceptable as well. Contact your local VE team to determine if some other form of credit proof is acceptable.

### Advanced VEs Get More Administrative Privileges on April 15

Within the FCC’s License Restructuring Report and Order, Advanced VEs gained additional VEC administrative privileges. Beginning April 15, VEs holding an FCC-granted license can administer Elements 1, 2 and 3 (5 WPM Morse and the Technician and General written tests). General VEs will continue to have authority to administer the Element 1 and 2 (5 WPM Morse and Technician written exams). Amateur Extra VE can administer all

elements. Per FCC requirements, no VE may exercise new VE privileges resulting from an upgrade until the new higher-class license grant appears in the FCC’s data base.

### ULS REGISTRATION—EASIER THAN YOU THINK

It’s easier than ever to send updates to the FCC, especially since you can do it on line at: <http://www.fcc.gov/wtb/uls>.

Of course, you must first register in ULS by following the instructions indicated with the “TIN/Call Sign Registration” tab. Once you’re registered follow the instructions indicated in the “Connecting to ULS” tab (this involves configuring your PC and modem to dial in to the FCC’s secure WAN via a toll-free number). With the modem connection established, you start your Web browser and take it from there. If this approach seems overly complicated, take heart. The FCC says that within a year they will launch *complete* ULS access via the Web.

If you wish to send updates by mail, you can still do so with FCC Form 605. Form 605 can be obtained by writing ARRL, 225 Main St, Newington, CT 06111. An SASE is appreciated. Form 605 also is available from the FCC via the Web at: <http://www.fcc.gov/formpage.html>, or <ftp://ftp.fcc.gov/pub/Forms/Form605/> or by fax at 202-418-0177 (request Form 000605). The FCC Forms Distribution Center will accept orders by calling 800-418-3676.

Form 605 has a main form, plus a Schedule D with two parts. The main form is all that is needed for most updates, while Schedule D is required for systematic (next one up) or Vanity call sign changes only, beginning April 15. Other than for Vanity call sign requests, mail Form 605 to: FCC, 1270 Fairfield Rd, Gettysburg PA 17325-7245. This is a free FCC service. For Vanity call sign requests see the

ARRLWeb at: <http://www.arrl.org/arrlvec/vanity.html>.

### FORM 610 (RIP)

Effective February 16, 2000, FCC Form 610 ceased being accepted by FCC. A familiar document for decades, this form has been the mainstay for amateur license applications.

VE teams now use “NCVEC Form 605.” It resembles the old Form 610, but it cannot be mailed to FCC—it is for VE and VEC use only. For FCC license changes, renewals or other direct interaction with FCC, “FCC Form 605” is used.

### BRIEFS...

#### Too-Early License Renewals

Remember that license renewals can only be requested from FCC at *90 days or less* before the license expiration date, or up 2 two years *after* expiration. If you’re only changing an address, indicate the application purpose as “AU”. Do not indicate “RM” for Renewal and Modification, or the entire application will be dismissed for untimely renewal filing if you are not yet eligible for renewal.

#### Physician’s Certification Morse Code Exemptions to End

Beginning April 15, 2000, Physician’s Certifications for 13 or 20-WPM Morse code exemptions will go away as will the ARRL VE Policy limiting ARRL VEs to administering only those code elements which they themselves have passed (by default, every VE must have passed 5 WPM tests). Remember that all accommodations described on the back of the former Form 610, NCVEC Form 605 or on FCC Form 605, Schedule D, *are applicable and must be considered for handicapped/disabled persons needing accommodative consideration in order to pass the 5 WPM exam.*

Q57-

## NEW BOOKS

### HAM PRICE GUIDE—SECOND EDITION

By Eugene Rippen, WB6SZS

Second edition. Copyright 1999 by Sound Values, PO Box 9, Auburn, CA 95603. Softcover, 8 1/2 x 11 inches, 82 pages. \$11.95 plus \$2 shipping within the United States, \$4 elsewhere.

Reviewed by Steve Ford, WB8IMY  
QST Managing Editor

◇ How much is that used transceiver? Sure looks like a bargain, doesn’t it? Are you sure you’re getting the best deal, though?

One way to hedge your bet is with Eugene Rippen’s second edition of the *Ham Price Guide*. This handy reference is a compendium of what might be called “market data.” In this case, it is a comprehensive survey of what hams have been paying for various types of gear from roughly 1993 through 1999. As the author points out in the introduction, *Ham Price Guide* is not intended to be a bible of

prices. The market is fluid, moving up and down with demand and supply. The *Ham Price Guide* is designed to give you an snapshot view of equipment prices at particular points in time based on actual transactions. A seven-year spread might seem pretty loose, but the used-gear market doesn’t fluctuate *that* much. The pricing data shown in the second edition is likely to be applicable for at least the next several years.

The *Ham Price Guide* is a valuable reference for vintage radio hunters. Not only does it provide prices, but also the condition of the equipment at time of purchase. I looked up the Hallicrafters S-40B—the first radio I ever owned. (No, I’m not that old! The rig was about 18 years old when I took possession of it.) Turning to the Hallicrafters listings I see about eight entries for the S-40B. According to the *Ham Price Guide* an S-40B in excellent condition sold for \$157 less than a year ago. How about a Ten-Tec PM-3, my first HF transceiver? If I find one in good condition with the original manual,

the *Ham Price Guide* says that I can expect to pay about \$100 for it.

The *Ham Price Guide* includes pricing information on recent equipment as well, making the book useful for anyone who is prowling the flea-markets and classified ads for affordable, late-model gear. With this reference in hand you’re less likely to be gouged into paying more than you should.

There are no photographs in the *Ham Price Guide*—just page after page of raw data for more than 3800 items. The book is well organized, though. You can find the information for any manufacturer very quickly. It is important to remember that the price information may not apply to radios sold through auction services such as Ebay. While the *Ham Price Guide* will at least provide a yardstick for most transactions, auctions have a way of spiraling prices into the stratosphere when bidding fever strikes. At that point the price will probably not track with the *Ham Price Guide* at all—or with reality in general!

Next New Book

Q57-





## Hamfests and Collecting

With the hamfest season starting, you need to do some planning if you want to start a collection. Attention to details will bring success.

### Getting Started

I'm often asked, "How do I get started collecting and how much should I pay for something I know nothing about?" The easy answer is to start a collection by buying your first piece without spending too much. A better answer would be to follow this advice:

Plan to spend some time learning about old radios. Read *QST* and other radio classifieds to see the asking prices of equipment. Search the Internet for radio-collecting news groups.

Ask your friends if they know anyone who collects. Then visit someone who has a collection and listen to what they tell you. If asked, your new friend should gladly tell you how he found his first old radio. Maybe he'll tell you about the time when he was in the right place and found a favorite radio. During your visit, when you see something you like, ask what it's worth and where you could find something like it. Ask about other local collectors. I have found collectors to be very friendly. They really enjoy talking about their collections and are anxious to share information.

Find out if there are any clubs nearby for radio collectors. Meet as many collec-

tors as you can by visiting a radio-collecting club. It probably won't be a ham radio club, but you will find hams there. Meeting and getting to know other collectors is very important. It's called networking and you need to do this.

Most collectors will have some radios, or other radio items, they no longer need or want. Collectors usually trade and sell things from time to time, and as time goes by, their interests change and they want to make room. This can be a good opportunity for you. Ask!

Browse through old magazines and books. Just as *QST* today reports on all the new products and modes of operation, the magazines and books from the '20s, '30s, '40s and '50s did the same thing. Reading the "ancient" advertisements and studying the photos can help you recognize good radios and accessories at a glance. This is very important at hamfests, where the collecting competition is sometimes fierce. The first one to pick up the radio often ends up owning it.

### How Much Should I Spend?


Accept the fact right now that in the beginning you will probably pay too much from time to time. Everybody does. Even experienced collectors go over the top once in a while! (This may make you feel a little better.) Of course, it's always nice to find

a bargain, but if you see something you really want, and the price is affordable, then buy it and enjoy. In time, your experience will improve your collecting savvy and negotiating. Several genuine bargains later on will make up for those early mistakes.

There is no hard-and-fast list for radio values. There just are too many factors involved, such as appearance, working condition, documentation and historic value (i.e. owned by somebody famous). The values of radios seem to change as often as the wind direction. This is where your experience and research pays off in knowing what to spend.

The value of collectable radios is on the rise. If you buy wisely, you are actually making an investment! The good thing about this kind of investment is that you can enjoy using it while its value appreciates. For additional collecting tips visit my Web page at <http://www.eht.com/oldradio/arrrl/index.html>.

### K2TQN's Old Radio Museum Schedule for April 2000.

I'm planning to take my mobile Ham Radio Museum to the Penn-Del Hamfest 2000, host to the ARRL Delaware State Convention on Sunday April 30, 8 AM-1 PM at the Nur Temple in New Castle, Delaware. Look for my call letters on my hat, and say hello.— K2TQN 

### Collector Profile

One of the great things about Amateur Radio is its diversity. Another is how patiently it will wait for you while other interests, like jobs and family, occupy your time. When you are ready to return, Amateur Radio gladly accepts you back into the fold.

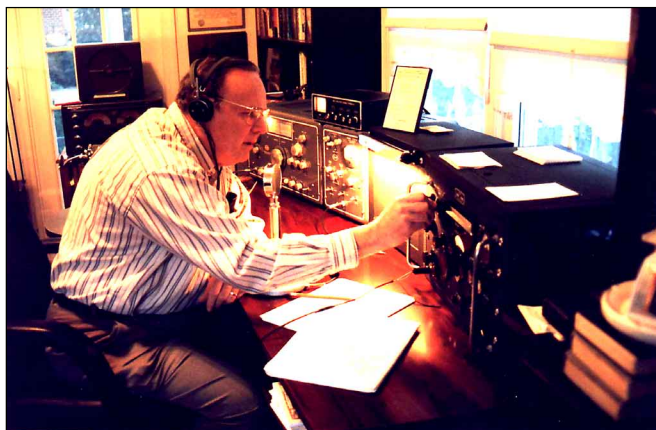
Stephen Aug, W3DEF, discovered this fact first hand. His ham radio experience started in 1953 as K2EOF. Like many of us, his teen-age years were exciting as he discovered radio. In the first eight to ten years he owned (and still has) a National NC-125 receiver, a Shure 55S and a D-104 microphone and a Bud FCC-90 100-kHz frequency calibrator.

Next came a busy career as a business reporter and editor at the old *Washington Star*. Radio took a back seat as he continued as a business and economics correspondent at ABC News. When the "ABC Early Morning News" started in July 1982, he began his long morning career. For 6 years he also participated on the "Business World" show, anchoring it for its final year and a quarter.

"Since I retired in 1995, I've become a lot more active in ham radio," Steve said. "Most of my time is spent with older rigs." In 1990 he began to collect, starting with a Collins 51J-4 receiver and 312-A-1 speaker. In refurbishing his radios he found that he needed to re-learn what he knew about vacuum tubes. He received much help from his friends, he said.

Since then he has added a B&W 5100-B transmitter with a 51SB-B phasing SSB generator. This along with the 51J-4 is one of his favorite stations, where he enjoys AM as well as vintage SSB operation.

"Changing bands on the B&W takes almost five minutes. There are about 19 dials, knobs and switches that must be manipulated if you're operating sideband," he said. "Phasing out the carrier with those tiny pots can be very challenging, but it's still fun."



# COMING CONVENTIONS

## SOUTHEASTERN VHF CONFERENCE

**April 14-15, Marietta (Atlanta), GA**

The Southeastern VHF Conference, sponsored by the Southeastern VHF Society, will be held at the Marriott Hotel Northwest, Windy Hill Rd; Exit 110 off I-75. Features include VHF-UHF technical presentations, antenna gain measurements, noise figure measurements, auction, flea market, vendors, exhibits, VE sessions, banquet (Saturday night, special guest speaker ARRL 1st Vice President Joel Harrison, W5ZN). Talk-in on 145.47. Admission is \$30 in advance, \$35 at the door. Tables are \$5 per day. Contact Dick Hanson, K5AND, 7540 Williamsburg Dr, Cumming, GA 30131, 770-844-7002, [k5and@ga-prestige.net](mailto:k5and@ga-prestige.net); <http://www.svhfs.org/svhfs>.

## INTERNATIONAL DX CONVENTION

**April 14-16, Visalia, CA**

The International DX Convention, sponsored by the Southern California DX Club, will be held at the Holiday Inn Plaza, 9000 W Airport Dr. Features include DX forums, vendors, banquet with DXpedition speakers. Admission is \$60 in advance, \$65 at the door. Contact Cathy Gardenas, N6DXC, 1873 N Dundee St, Highland, CA 92346, 909-862-0720; [wu6d@dreamsoft.com](mailto:wu6d@dreamsoft.com); <http://www.scdxc.org>.

## ARKANSAS STATE CONVENTION

**April 21-22, Little Rock**

The Arkansas State Convention, sponsored by the Arkansas Radio Emergency Services and 9 other clubs, will be held at the Expo Center, Exit 126 off I-30 in SW Little Rock, near the Pulaski County line. Doors are open Friday 4-8:30 PM, Saturday 8 AM to 4 PM. Features include flea market, computer and equipment dealers, vendors, tailgating, special exhibits and displays, forums, technical talk (test your own equipment), contests, foxhunts, Wouff Hong ceremony, ARES/RACES, VE sessions, handicapped accessible. Talk-in on 145.13. Admission is \$7. Tables are \$30 (8-ft, dealers), \$20 (flea market, electric power \$5 per outlet). Contact Jim Blackmon, K5VZ, 1008 Pine St, Arkadelphia, AR 71923-4919, 870-246-6734 or 870-246-7833, fax 870-246-6736, [k5vz@ezclick.net](mailto:k5vz@ezclick.net); <http://www.aristotle.net/~ares/hamfest/>.

## DELAWARE STATE CONVENTION

**April 30, New Castle**

The Delaware State Convention, sponsored by the Penn-Del ARC, will be held at the Nur Temple on Rte 13, 1/4 mile N of the intersection of Rtes 13 and 40. Doors are open for setup 6 AM; public 8 AM to 1 PM. Features include vendors, tailgating (\$10 per space; first-come, first-served basis), certified SKYWARN spotter training class, VE sessions, ARRL and club leaders forum, refreshments. Talk-in on 146.955, 224.22. Admission is \$5, under 12 free. Tables are \$15 (with electricity), \$12 (without electricity), includes vendor admission ticket; by reservation only (send payment to Penn-Del Hamfest 2000, Box 1964, Boothwyn, PA 19061). Contact Hal Frantz, KA3TWG, 302-793-1080, [hfrantz@snip.net](mailto:hfrantz@snip.net); <http://www.magpage.com/pennndel>.

## LOUISIANA STATE CONVENTION

**May 5-6, Baton Rouge**

The Louisiana State Convention, sponsored by the Baton Rouge ARC, will be held at the Baker Municipal Auditorium, 3325 Groom Rd (Baker), approximately 6 miles N of Baton Rouge, just off Hwy 19. Doors are open Friday 5-8 PM, Saturday 8 AM to 4 PM. Features include flea market, tail-

**March 24-25**  
Maine State, Lewiston\*  
West Gulf Division, Tulsa, OK\*

**March 25-26**  
Maryland State, Timonium\*

**April 9**  
North Carolina State, Raleigh\*

**May 13-14**  
Washington State, Yakima

**May 27-28**  
Wyoming State, Casper

**June 2-3**  
Georgia Section, Atlanta  
Midwest/Dakota Division, South Sioux City, NE

**June 2-4**  
Northwestern Division, Seaside, OR

**June 9-10**  
Texas State, Arlington

**June 10**  
Eastern Pennsylvania Section, Bloomsburg

\* See **March QST** for details.

## The ARRL National Convention: Dayton, OH, May 19-21

Be a part of Amateur Radio history! Join hams and League officials from across the country at the 2000 ARRL National Convention to be held at the Hara Arena, Dayton, OH, May 19-21. The event is sponsored by the Dayton Amateur Radio Association. This is one Hamvention you'll not want to miss! For convention information, call 937-276-6930; or write [info@hamvention.org](mailto:info@hamvention.org); or see <http://www.hamvention.org/>.

gating (limited space available), forums (technical, ARRL, MARS), VE sessions (Saturday noon). Talk-in on 146.79. Admission is \$4 in advance (until Apr 25), \$5 at the door. Tables are \$15. Contact Herb Ramey, W5LSU, Box 68, Greenwell Springs, LA 70739, 225-654-6087 or 800-256-3378, [w5lsu@worldnet.att.net](mailto:w5lsu@worldnet.att.net); <http://www.brarc.org>.

## ALABAMA SECTION CONVENTION

**May 6-7, Birmingham**

The Alabama Section Convention, sponsored by the Birmingham ARC, will be held at the Zamora Temple, 3521 Ratliff Rd; I-459, Exit 27, follow signs; or Exit 135 off I-20. Doors are open Saturday 9 AM to 5 PM, Sunday 9 AM to 4 PM. Features include flea market (Ellis Dobbins, K4LL, 205-608-1866), commercial vendors (Eddie Oliver, KD4BWW, 205-956-9636), tailgating (Dan Morgan, KB4MDI, 205-822-5242), exhibitors, forums, VE sessions, banquet (Pam Hopson, KF4ANJ, 205-497-7293). Talk-in on 146.88. Admission is \$5 (good for both days), under 12 free when accompanied by an adult. Tables are \$30 (vendors), \$20 (flea market). Contact Glenn Glass, KE4YZK, 205-681-5019, [ke4yzk@bellsouth.net](mailto:ke4yzk@bellsouth.net); <http://www.bro.net/barc/fest.html>.

## Attention Hamfest and Convention Sponsors:

ARRL HQ maintains a date register of scheduled events that may assist you in picking a suitable date for your event. You're encouraged to register your event with HQ as far in advance as your planning permits. Hamfest and convention approval procedures for ARRL sanction are separate and distinct from the date register. Registering dates with ARRL HQ doesn't constitute League sanction, nor does it guarantee there will not be a conflict with another established event in the same area.

We at ARRL HQ are not able to approve dates

for sanctioned hamfests and conventions. For hamfests, this must be done by your division director. For conventions, approval must be made by your director and by the executive committee. Application forms can be obtained by writing to or calling the ARRL convention program manager, tel 860-594-0262.

**Note:** Sponsors of large gatherings should check with League HQ for an advisory on possible date conflicts before contracting for meeting space. Dates may be recorded at ARRL HQ for up to two years in advance. **Q57-**

## VHF/UHF CENTURY CLUB AWARDS

Bill Moore, NC1L  
Century Club Manager

The ARRL VUCC numbered certificate is awarded to amateurs who submit written confirmations for contacts with the minimum number of Maidenhead grid-square locators (indicated in *italics*) for each band listing. The numbers preceding the call signs indicate total grid squares claimed. The numbers following the call signs indicate the claimed endorsement levels. The totals shown are for credits given from December 11, 1999 to February 3, 2000.

The VUCC application form, field sheets and complete list of VHF Awards Managers can be found on the Web at <http://www.arrl.org/awards/vucc/>. Please send an SASE if you cannot download the forms online. If you have questions relating to VUCC, send an e-mail to [vucc@arrl.org](mailto:vucc@arrl.org).

50 MHz	N2WK	275
1039 VE6PY		<b>432 MHz</b>
1040 KB9TLV		50
1041 KC8LGL	279	N6RMJ
1042 KB0STN		<b>902 MHz</b>
1043 N9RG		25
1044 N1ZUK		K8TQK
1045 N3YPJ	28	
1046 N3ZTZ		<b>1296</b>
1047 WD8Q		25
1048 K8KFJ		K8TQK
1049 WB2WIH	131	K8TQK
1050 KF4LVF		K3HZO 90
G8BQX 425		WW8M 85
N5MYH 150		<b>5.7 GHz</b>
VE6NTT 250		5
WB0ULX 250		K8DAZ
KC7IJ 475	42	
WA1ECF 325		<b>10 GHz</b>
W1WHL 425		5
WB2WIH 200		103 WA0QII/G
K2CS 225	103	
N3KEV 200		<b>Satellite</b>
K3HZO 325		100
W4WTA 500		94 KF8VX
KM4H 275		VE6SWC 175
K5LOW 200		K5OE 250
<b>144 MHz</b>		WA5VKS 175
100		KC7QFS 350
570 N0DQS		KF8VX 225
571 W1LP		<b>Q57-</b>
572 W6OUF		



# HAMFEST CALENDAR

**Attention:** The deadline for receipt of items for this column is the **1st of the second month preceding publication date**. For example, your information must arrive at HQ by **April 1** to be listed in the **June** issue. Hamfest information is accurate as of our deadline; contact sponsor for possible late changes. For those who send in items for Hamfest Calendar and Coming Conventions: Postal regulations prohibit mention in *QST* of prizes or any kind of games of chance such as raffles or bingo.

(Abbreviations: *Spr* = Sponsor, *TI* = Talk-in frequency, *Adm* = Admission.)

†**Alabama (Albertville)**—Apr 15, 8 AM to 3 PM. *Spr*: Marshall County ARC. Albertville Recreation Center, 915 W McKinney Ave. VE sessions. *TI*: 147.2. *Adm*: \$5. Tables: \$8. Buddy Smith, KC4URL, 102 George Washington Dr, Boaz, AL 35957, 256-593-2516; [kc4url@hiwaay.net](mailto:kc4url@hiwaay.net).

**Alabama (Birmingham)**—May 6-7, Alabama Section Convention. See “Coming Conventions.”

†**Alabama (Moulton)**—Apr 29; set up 7 AM; public 9 AM to 4 PM. *Spr*: Bankhead ARC. H. A. Alexander Park, 1 mile W of Moulton on Court St. VE sessions (promptly at 9:15 AM; bring original license, photo ID, CSCE, \$7). *TI*: 146.96, 442.425. *Adm*: \$4. Tables: \$6 (Mike Slayton, 256-341-0073). Lee Kreuzer, N8MHC, c/o Bankhead ARC, 215 County Rd 599, Moulton, AL 35650, 256-351-7916, [N8MHC1@CS.COM](mailto:N8MHC1@CS.COM); <http://www.n4idx.org>.

†**Arizona (Sierra Vista)**—May 6; set up 6 AM; public 7 AM to 4 PM. *Spr*: Cochise ARA. Green Acres Hqtrs and Antenna Farm, 2756 Moson Rd; from the intersection of Fry Blvd and State Hwys 90 and 92 (at the Target store), go E on Hwy 90 (an extension of Fry Blvd), 4 miles to Moson Rd, go S (right) on Moson Rd for 2 miles, Antenna Farm on right. VE sessions (9 AM), vendors, tailgating (\$5), refreshments. *TI*: 146.76 (162.2 Hz), 147.02 (162.2 Hz), 449.525 (100 Hz), 146.52. *Adm*: \$2 (includes parking). Tables: outside \$5, inside \$7. Dale Tongue, KA7IQV, 520-458-5051.

**Arkansas (Bentonville)**—Apr 29. Jess Weiberg, N0POC, 417-435-2332.

**Arkansas (Little Rock)**—Apr 21-22, Arkansas State Convention. See “Coming Conventions.”

**Arkansas (Siloam Springs)**—May 6. Kathie Engelke, KD5EYX, 501-524-2969.

†**California (Fresno)**—Apr 29, 8 AM. *Spr*: Fresno ARC. Coombs Ranch, Ave 12 (Madera); from Hwy 99 exit E on Ave 12, proceed approximately 1 mile after crossing Hwy 41, on right. Swap tables, BBQ lunch. *TI*: 146.94. *Adm*: Free. Jim Haynes, W6PXM, 1781 Holland Ave, Clovis, CA 93611, 559-294-8390; [w6pxm@arri.net](mailto:w6pxm@arri.net).

†**California (Sonoma)**—Apr 29; set up 7 AM; public 8 AM to noon. *Spr*: Valley of the Moon ARC. Sonoma Valley Veteran's Memorial Building, 126 First St W, 1 block N of the central Sonoma Plaza, Hwy 12. Electronics swapmeet (\$10 per space), VE sessions (walk-ins, register 9 AM, exams 10 AM, all license elements), forums, operating QRP station, display of homebuilt equipment, beginner's DF hunt, refreshments. *TI*: 145.35 (88.5 Hz). *Adm*: Free. Darrell Jones, WD6BOR, 358 Patten St, Sonoma, CA 95476; 707-996-4494.

**California (Visalia)**—Apr 14-16, International DX Convention. See “Coming Conventions.”

†**Colorado (Monument)**—May 6, 8 AM to 2 PM. *Spr*: Pikes Peak RA Assn. Lewis Palmer High School, 1300 E Higby; I-25 N, Exit 158 (Baptist Rd), right (E) on Baptist Rd for 50 ft, then N to Struthers Rd to Higby Rd, turn right (E) to school. Programs, operating stations, VE sessions. *TI*:

146.97 (100 Hz), 146.52. *Adm*: \$4, under 18 free. Tables: \$12 (for first table with one free admission), \$10 each additional table. Robert Ryals, KI0GF, 3390 Blodgett Dr, Colorado Springs, CO 80919, 719-265-9950, [rrysals@pcisys.net](mailto:rrysals@pcisys.net); <http://www.qsl.net/ppraa/swapfest.htm>.

**Delaware (New Castle)**—Apr 30, Delaware State Convention. See “Coming Conventions.”

†**Georgia (Calhoun)**—Apr 22, 8 AM to 2 PM. *Spr*: Cherokee Capital ARS. Sugar Valley Community Center; exit I-75 at Exit 320, travel W 4.2 miles to Hill City Rd, turn left, travel 1.3 miles, turn left, go .9 miles to hamfest. Tailgating, VE sessions, refreshments. *TI*: 145.23. *Adm*: \$5. Tables: \$5. James Howard, WQ4T, 171 Brian Dr SW, Calhoun, GA 30701, 706-625-0508; [kr4cg@nwg.com](mailto:kr4cg@nwg.com).

**Georgia (Marietta/Atlanta)**—Apr 14-15, Southeastern VHF Conference. See “Coming Conventions.”

†**Idaho (Idaho Falls)**—Apr 22, 8:30 AM. *Spr*: Eastern Idaho UHF Society. Elks Lodge, 640 E Elva St; Yellowstone Hwy N to Elva St, turn right (E) on Elva, lodge on right side of road. Hamfest and Computer Swapmeet, VE sessions (all license classes), two DX talks by Bill Frede, W7II. *TI*: 147.15, 443.0. *Adm*: advance \$2, door \$3. Tables: advance \$5, door \$7 (includes 1 admission). Jay Greenberg, WA4VRV, 2582 Granite Way, Idaho Falls, ID 83402, 208-524-1388 or 208-526-7033, [wa4rvv@srv.net](mailto:wa4rvv@srv.net); <http://www.srv.net/~wa4rvv/hamfest.htm>.

†**Illinois (Arthur)**—Apr 30, 8 AM to 1 PM. *Spr*: Moultrie ARK. Moultrie/Douglas County Fairgrounds, SE edge of Arthur, S of Rte 133, behind high school. *TI*: 146.655, 444.275. *Adm*: \$5, under 14 free. Tables: 8-ft \$10 (paid in advance). Ralph Zancha, WC9V, c/o MARK, Box 91, Lovington, IL 61937, 217-543-2178 or 217-873-5287, [rzancha@one-eleven.net](mailto:rzancha@one-eleven.net).

†**Illinois (Galva)**—Apr 30. *Spr*: Area Amateur Radio Operators. Galva National Guard Armory, Morgan Rd; Exit 27, S 17 miles off I-80, 2nd street in city limits, turn right (W), go 1 block. Outdoor flea market, VE sessions. *TI*: 145.49 (88.5 Hz). *Adm*: advance \$5 (2 stubs), door \$5 (1 stub). Tables: 8-ft \$10. Bill Anderson, WA9BA, 920 W Division St, Galva, IL 61434, 309-932-3023; [bill@inw.net](mailto:bill@inw.net); <http://www.qsl.net/aaro/index.html>.

†**Illinois (Sandwich)**—May 7; set up 6 AM; public 8 AM to 1 PM. *Spr*: Kishwaukee ARC. Sandwich Fairgrounds, just N of Rte 34 intersection of Suydam and Gletty Rds. Vendors, free tailgating, overnight camping (electric hookup \$10), refreshments. *TI*: 146.73, 146.52. *Adm*: advance \$5 (double stub), door \$6 (single stub). Tables: 8-ft \$10. Bob Yurs, W9ICU, 1107 Commercial St, Sycamore, IL 60178, 815-895-3219, fax 815-895-7584, [w9icu@tbcnet.com](mailto:w9icu@tbcnet.com); <http://tbcnet.com/~jeonard/hamfest.htm>.

†**Illinois (Stickney)**—Apr 29; set up Friday 3-6 PM, Saturday 6 AM; public 8 AM to 2 PM. *Spr*: DuPage ARC. Hawthorne Race Course, 3500 S Cicero Ave. Hamfest/Computer Show, indoor commercial dealers, outdoor flea market, electronics, computers, ham equipment, free tailgating, VE sessions (9 AM to noon, all classes), handicapped accessible, free parking, refreshments. *TI*: 145.25. *Adm*: advance \$5, door \$6, under 12 free. Tables: \$20. Ed Weinstein, WD9AYR, 7511 Walnut Ave, Woodridge, IL 60517, 630-985-9256, [darchamfest@aol.com](mailto:darchamfest@aol.com); <http://www.w9dup.org>.

†**Iowa (Des Moines)**—Apr 29; set up Friday 6-10 PM, Saturday 6:30-7:30 AM; public 8 AM to 1 PM. *Spr*: Des Moines RAA. Iowa State Fairgrounds; I-235 to University Ave to East 30th to Grand Ave, Fairgrounds main entrance. Vendors, free tailgating, forums, VE sessions (all classes). *TI*: 146.94. Duane Bower, WBOUCY, 207 SE Diehl

Ave, Des Moines, IA 50315, 515-287-6542; [duaneab@uswest.net](mailto:duaneab@uswest.net).

†**Kentucky (Elizabethtown)**—Mar 25, 8 AM to 2 PM. *Spr*: Lincoln Trail ARC. Pritchard Center, 404 S Mulberry; Exit off I-65 to Hwy 62 W. New and used vendors, VE sessions, refreshments. *TI*: 146.98. *Adm*: advance \$4, door \$5. Tables: \$7 (includes 1 chair). Archie Mack, AF4EB, 102 Primrose Ln, Radcliff, KY 40160, 270-351-6931, [amack1@prodigy.net](mailto:amack1@prodigy.net); <http://www.qsl.net/w4bej>.

†**Kentucky (Louisia)**—May 6, 9 AM to 3 PM. *Spr*: Big Sandy ARC. Louisa Middle School, Bulldog Ln; off US 23 to Rte 3, go to Rte 644, 1/2 mile on left, across from Three Rivers Hospital, by football field. ARE forum, SSTV demo, NOAA-WX, speakers (KY SM and ASM), refreshments. *TI*: 147.39. *Adm*: \$2. Tables: \$3. Fred Jones, WA4SWF, 511 N Lackey Ave, Louisa, KY 41230, 606-638-9049, [wa4swf@arri.net](mailto:wa4swf@arri.net); <http://www.qsl.net/wa4swf/>.

†**Kentucky (Murray)**—Apr 22, 8 AM to 1 PM. *Spr*: Murray State University ARC. National Guard Armory, State Hwy 121 N; 1 mile N of Murray. VE sessions (10 AM). *TI*: 146.94. *Adm*: \$5 (nonham spouses and children free with paid ham admission). Tables: advance, before Apr 15, \$10 (first), \$7 (second), \$5 (each additional); door \$12 (first), \$9 (second), \$7 (each additional). Billy Miller, KB9RPO, 2490 University Station, Murray, KY 42071-3301, 270-762-6433 or 618-244-1179, [billy.miller@murraystate.edu](mailto:billy.miller@murraystate.edu); <http://www.mursuky.edu/clubs/msuarc/hamfest/ham-fest.htm>.

**Louisiana (Baton Rouge)**—May 5-6, Louisiana State Convention. See “Coming Conventions.”

**Maryland (Grasonville/Kent Island)**—May 6. Ray Allen, W2KBR, 410-969-8042.

†**Maryland (Hagerstown)**—May 7, gates 6 AM, building 8 AM. *Spr*: Antietam Radio Assn. Hagerstown Community College Recreation Center; from I-70 take Exit 32B to Edgewood Dr, turn right at Home Federal Bank, college entrance is located approx 1.4 mi on left, follow signs. Hamfest/Computer Show, commercial vendors, paved tailgating (\$5 per space plus admission), new and used computers and supplies, ATV seminar, ARRL forum, VE sessions (8:30 AM, 2nd floor of Recreation Center, walk-ins accepted; Greg Lanham, WA4VE, 540-772-4792, [kuan@visuallink.com](mailto:kuan@visuallink.com)), refreshments. *TI*: 146.94, 147.09. *Adm*: \$5, under 13 free. Tables: advance \$10, door \$15. Tina Jones, KB8ZQM, 1164 Halltown Rd, Harpers Ferry, WV 25425, 304-728-7769, fax 304-728-3024, [kb8zqm@intrepid.net](mailto:kb8zqm@intrepid.net); <http://www.qsl.net/w3cwc>.

**Massachusetts (Cambridge)**—Apr 16. Nick Altenbernd, KA1MQX, 617-253-3776.

†**Michigan (Cadillac)**—May 6, 8 AM to 2 PM. *Spr*: Wexauke ARC. Cadillac Jr High School, 800 Chestnut; US 131 to Cadillac, turn W at Pine St, go 3 blocks to School. Net meetings, VE sessions. *TI*: 146.98. *Adm*: \$5. Tables: \$6 (8-ft). Alton McConnell, NU8L, 4189 48 Rd W, Cadillac, MI 49601, 231-862-3774; [amcconnell3@hotmail.com](mailto:amcconnell3@hotmail.com).

†**Michigan (Grosse Pointe Woods)**—Apr 16, 8 AM to 2 PM. *Spr*: South Eastern Michigan ARA. Grosse Pointe North High School, 707 Vernier Rd, exit I-94 at Vernier Rd Exit, go E approximately 2 miles, between Mack Ave and Lakeshore Rd. Trunk sales (\$10 per space plus admission; first-come, first-served), VE sessions (Donald Olszewski, WA8IZV, 810-294-1567; [donols@prvide.net](mailto:donols@prvide.net)), forums, handicapped parking, free parking, refreshments. *TI*: 146.74. *Adm*: advance \$5, door \$6. Tables: 8-ft \$15. Jerry Rosner, N8FGK, Box 646, St Clair Shores, MI 48080-0646, 313-331-3336, [n8fgk@amsat.org](mailto:n8fgk@amsat.org); <http://members.home.net/semara>.

†**Minnesota (Blaine)**—Apr 15. *Spr*: Robbinsdale ARC. National Sports Center, 1700 105th Ave NE;

Gail Iannone ♦ Convention Program Manager

Hwy 65 N to 105th Ave; or 35 W to Exit 32, follow signs to National Sports Center. Flea market, VE sessions. *TI*: 147.0. *Adm*: advance \$6, door \$8. Tables: advance \$18. Harriet Johanson, KB0UPG, 19000 Clearview Dr, Minnetonka, MN 55345, 612-474-7346 or 612-537-1722, [k0ltc@visi.com](mailto:k0ltc@visi.com); <http://www.visi.com/~k0ltc>.

**Minnesota (Shakopee)**—Apr 16. Dave Zellman, WB0YDF, 612-466-5852.

†**Missouri (Joplin)**—Apr 15; set up Friday 6-10 PM, Saturday 6-8 AM; public 8 AM to 3 PM. *Spr*: Joplin ARC. John Q. Hammons Trade Center, 3615 Range Line Rd; from I-44, Exit 8-B (Business US 71), right at first street, go 1/4 mile E, next door to Holiday Inn. Vendors, dealers, VE sessions (walk-ins welcomed). *TI*: 147.21. *Adm*: \$5, under 12 free when accompanied by paying adult. Tables: private \$10, commercial \$20. Ray Brown, KB0STN, c/o JARC, Box 2983, Joplin, MO 64803-2938, 417-781-4967, [raybrown@ipa.net](mailto:raybrown@ipa.net); <http://www.joplin-arc.org>.

**Nebraska (Omaha)**—Apr 15. Todd LeMense, KK0DX, 402-397-7465.

**New Hampshire (Henniker)**—Mar 26. Jock Irvine, N1J1, 603-428-3476 (x256).

†**New Jersey (Hamilton Twp/Trenton)**—Apr 9; sellers 6:30 AM, buyers 8 AM. *Spr*: Delaware Valley Radio Assn. Tall Cedars of Lebanon picnic grove, Sawmill Rd; I-95 N to I-295 S, Exit 60A to I-195 E, Exit 2 to Yardville, S Broad St to end, approximately 3.7 miles, left at Yield onto Old York Rd, next right onto Sawmill Rd, site is 1.1 miles on right. Tailgating (\$10 per space, includes 1 admission), ARRL table, free parking, refreshments. *TI*: 146.67. *Adm*: \$6, nonham spouses and children free. Tables: covered space \$15 (includes 1 table and 1 admission). Darryl Foyuth, N2JVP, c/o DVRA, Box 7024, W Trenton, NJ 08628, 609-882-2240, [dfoyuth@juno.com](mailto:dfoyuth@juno.com); <http://www.slac.com/w2zq>.

**New Mexico (Albuquerque)**—Apr 29. Chuck Opdyke, KC5GA, 505-858-0306.

†**New York (Poughkeepsie)**—Apr 30; sellers 6 AM, buyers 8 AM to 2 PM. *Spr*: Mt Beacon ARC. John Jay High School, Rte 52 (Fishkill); Exit 15 off I-84, turn right on Lime Kiln Rd, left onto Rte 52; school is on left after passing Hudson Valley Research Park. Large indoor and outdoor location, computers, electronics, tailgating (\$6 per space), VE sessions (all license classes), refreshments. *TI*: 146.97. *Adm*: \$5, spouses and kids free. Tables: advance \$10, door \$12 (\$4/spot discount if you bring your own table). Ken Akasofu, KL7JQC, 8C Hudson Harbor Dr, Poughkeepsie, NY 12601, 914-485-9617, fax 914-485-2402, [kl7jq@arrrl.net](mailto:kl7jq@arrrl.net); <http://www.mbarc.org>.

†**New York (Yonkers)**—May 7; set up 7 AM; public 9 AM to 3 PM. *Spr*: Metro 70cm Network. Lincoln High School, Kneeland Ave; Exit 2 (N) NYS Thruway to Yonkers Ave, go W to St Johns Ave, left to Theresa Ave, right to school. Giant electronic indoor flea market, vendors, VE sessions, free parking, unlimited free coffee. *TI*: 146.91, 440.425 (156.7 Hz), 223.76 (67 Hz), 145.27 (79.7 Hz). *Adm*: \$6, under 12 free. Tables: advance \$19, door \$25. Otto Supliski, WB2SLQ, 53 Hayward St, Yonkers, NY 10704, 914-969-1053; [wb2slq@juno.com](mailto:wb2slq@juno.com).

†**North Carolina (Morganton)**—Apr 15, 8 AM to 4 PM. *Spr*: Catawba Valley Hamfest Committee. Burke County Fairgrounds, Hwy 181 N. Catawba Valley Hamfest and Computer Fair, flea market, dealers (Larry Withrow, AF4HX, 828-738-8529; [af4hx@worldnet.att.net](mailto:af4hx@worldnet.att.net)), ARES, SKYWARN, packet (APRS) demo, free parking, refreshments. *TI*: 147.15, 146.745. *Adm*: advance \$4, door \$5. Tables: 1 table free with 10x10-ft space, additional tables \$10 each. Tom Taylor, KC4QPR, Box 8003, Morganton, NC 28680-8003, 828-433-6205, [kc4qpr@vistatech.net](mailto:kc4qpr@vistatech.net); <http://www.wp.cc.nc.us/~cvhamfest/>.

†**Ohio (Athens)**—Apr 30, 7 AM to 2 PM. *Spr*: Athens County ARA. Athens Recreation Center, 733 E State St; E on E State St, exit off US Rte 33, go 1/4 mile to signs indicating parking. Flea market, exhibits, commercial vendors, refreshments. *TI*: 145.15. *Adm*: \$5, nonham spouses free. Tables: advance \$8, door \$10 (outdoor flea mar-

ket free). John Cornwell, NC8V, 15100 Scatter Ridge Rd, Athens, OH 45701, 740-593-6474; [jcornwell@eurekanet.com](mailto:jcornwell@eurekanet.com); <http://www.seorf.ohiou.edu/~xx017/hamfest.html>.

**Ontario (Ottawa/Stittsville)**—May 6. John Barnhardt, VE3ZOV, 613-521-8910.

**Oregon (Eugene)**—May 6. Karl Fuller, K7ARL, 541-942-1624.

†**Pennsylvania (Washington)**—Apr 30, 8 AM to 3 PM. *Spr*: WACOM. County Fairgrounds, Arden Downs; from PA Turnpike go S on Rte 79 to Meadow Lands Exit, right to light, left to next light, right to stop sign, right to Fairgrounds. VE sessions. *TI*: 145.49. *Adm*: \$3. Tables: \$8. Dave DeMotte, N3IDH, 1696 E Maiden St, Washington, PA 15301, 724-228-8178; [n3idh@bellatlantic.net](mailto:n3idh@bellatlantic.net).

†**Pennsylvania (Wrightstown/Bucks County)**—May 7. *Spr*: Warminster ARC. Middletown Grange Fairgrounds, Penns Park Rd; N on Rte 232 to Penns Park Rd. VE sessions. *TI*: 147.09. *Adm*: advance \$6, door \$7. Tables: advance \$10, door \$12. Roy Conners, K3TEN, 232 Barnsley Ave, Huntingdon Valley, PA 19006, 215-947-9373, fax 215-947-7237, [k3ten@arrrl.net](mailto:k3ten@arrrl.net); <http://www.voicenet.com/~k3dn>.

†**South Carolina (Greenville)**—Apr 29, 8 AM to 3 PM. *Spr*: Blue Ridge ARS. Spartanburg County Fairgrounds, 275 Bishop St (Spartanburg); I-85 to Exit 79, turn toward Spartanburg, after passing under Business I-85, turn right at 2nd light, then left at first light, Bishop St is approximately 1/2 mile on right, follow signs. Large outdoor tailgating area, indoor vendor area, dealers (John Chism, ND4N, 864-967-0001, [nd4n@arrrl.net](mailto:nd4n@arrrl.net)), exhibitors, RV camping, VE sessions, plenty of parking. *TI*: 146.61. *Adm*: advance \$4, door \$5. Tables: \$11, electricity \$5, chair \$1. Bob Watson, W4RGW, 501 Ferguson St, Clinton, SC 29325, 864-833-2204, [w4rgw@arrrl.net](mailto:w4rgw@arrrl.net); <http://www.brars.org>.

†**South Carolina (Windsor)**—Apr 29, 9 AM to 4 PM. *Spr*: Salkehatchie ARS. Community Center; take Hwy 78 and when it forks, take right turn towards Aiken, site is a few miles. Tailgating (\$5), BBQ plates with all the fixings (\$5). *TI*: 147.03 (156.7 Hz). *Adm*: Free. Adam Hoffman, KG4BZH, Box 93, Bamberg, SC 29003, 803-245-4673, [kg4bzh@yahoo.com](mailto:kg4bzh@yahoo.com); <http://www.qls.net/kf4cvo>.

†**Texas (Abilene)**—May 6-7; Saturday 8 AM to 5 PM, Sunday 9 AM to 2 PM. *Spr*: Key City ARC. Abilene Civic Center, 1100 N 6th and Pine St; I-20 to Pine St Exit, S on Pine to the intersection of Pine and N 6th, Civic Center on NW corner. VE sessions, limited RV parking (\$5 per night), foxhunt (Saturday night), on site T-hunts, handicapped accessible, free parking, refreshments. *TI*: 146.76. *Adm*: advance \$7 (must be received by May 1), door \$8. Tables: \$6. Peggy Richard, KA4UPA, 1442 Lakeside Dr, Abilene, TX 79602, 915-672-8889; [ka4upa@arrrl.net](mailto:ka4upa@arrrl.net).

**Texas (Belton/Temple)**—Apr 29. Mike LeFan, WASEQQ, 254-773-3590.

**Texas (Weatherford)**—Mar 25. Elizabeth Hunkele, N5ONE, 817-594-1700.

†**Virginia (Chesapeake)**—Apr 15; set up 6:30-7:30 AM; public 8 AM to noon. *Spr*: Chesapeake AR Service. Civitan Acres, 2210 Cedar Rd; 2.3 miles E on Cedar Rd from US Rte 17; 1.5 miles W on Cedar Rd from US Rte 104. Ham Radio and Boat Anchor Tailgate (\$5, includes admission; bring your own tables), acres of space, parking. *TI*: 146.61. *Adm*: \$5. Sonny Hood, K4WYS, 2125 Arbutus Cir, Chesapeake, VA 23323, 757-487-0357, [wrhood@axis.net](mailto:wrhood@axis.net); <http://www.qls.net/cars>.


†**Wisconsin (Cedarburg)**—May 6; set up 6:30 AM; public 8 AM to 1 PM. *Spr*: Ozaukee RC. Circle-B Recreation Center, intersection of Hwy 60 and County I, 20 mi N of Milwaukee, W of Grafton. Swapfest, VE sessions (exams 9 AM), free parking, refreshments. *TI*: 146.97, 146.52. *Adm*: \$4. Tables: \$5 (4-ft, limited power available on request). Send SASE to Joe Holly, AA9HR, 1702 Holly Ln, Grafton, WI 53024, 262-377-2137, [aa9hr@execpc.com](mailto:aa9hr@execpc.com); or Skip Douglas, 262-284-3271.

†**Wisconsin (Superior)**—May 6, 10 AM to 2 PM. *Spr*: Arrowhead RAC. Multi-use Building, Head

of the Lakes Fairgrounds; take I-35 (Duluth, MN) to US 2/Bong Bridge (goes to Superior, WI), left on Belknap, right on Tower, approximately 2 mi to Fairgrounds, turn left. VE sessions (11 AM). *TI*: 146.94, 147.0. *Adm*: \$5. Jim Nielson, KB9RQD, 1115 N 18th St, Superior, WI 54880, 715-392-3697, [jnielson@bresnanlink.net](mailto:jnielson@bresnanlink.net); or Bud Fisher, KBOSBL, 315 William St, Cloquet, MN 55720, 218-879-9284, [kb0sbl@cp8internet.com](mailto:kb0sbl@cp8internet.com).

#### Attention All Hamfest Committees!

Get official ARRL sanction for your event and receive special benefits such as free prizes, handouts, and other support.

It's easy to become sanctioned. Contact the Convention and Hamfest Branch at ARRL Headquarters, 225 Main St, Newington, CT 06111. Or send e-mail to [giannone@arrrl.org](mailto:giannone@arrrl.org). 

## NEW PRODUCTS

### WINDOWS LOGGING PROGRAM FROM DATAMATRIX

◇ Datamatrix announces the release of *ProLog2K*, a Windows-based Amateur Radio contact logging program.

*Prolog2K* will monitor and track your progress towards most of the major awards, such as DXCC, WAC, WAS, WAZ and IOTA, for nearly any mode—including PSK31. You can also custom design up to 16 additional award trackers.


The program supports CDROM call sign databases, including Call Book, Buckmaster, QRZ and SAM, and can place information from them into the logging form. *Prolog* can also pull in QSL routing data from an optional QSL Route Database that currently includes over 71,000 DX listings.

The new software will allow the creation of up to 36 separate logbooks—very handy for multi-operator families, special event logging, or for QSL manager applications for example.

*PacketCluster* spotting is fully supported using TNC or Internet connections—and can provide an audible alert when a DX spot arrives from a new prefix, zone or continent. With radio/computer interfacing, the band and mode data for logging will be automatically updated as you tune. Some radio control operations can also be accessed from within the program.

Extensive award progress tracking and reporting, QSL label generation and ADIF format file import and export capabilities are also featured.

System requirements for *ProLog2K* are quite minimal. It will run in a Win 95/98/2000 or NT environment. A logbook containing 5000 contacts and awards files will typically occupy approximately 2 MB of hard disk space. The optional QSL Route Database requires about 13 MB of additional hard disk space. If you intend to run both rig control and a TNC-based packet connection simultaneously, you will need two dedicated serial ports.

Price: *ProLog2K*, \$49; *ProLog2K* with QSL Route Database, \$64. Shipping is additional. For more information contact Datamatrix, 5560 Jackson Loop NE, Rio Rancho, NM 87124; tel 800-373-6564 (orders); 505-892-5669; [prolog@rt66.com](mailto:prolog@rt66.com); <http://www.gth.com/prolog>. 



# CONTEST CORRAL

## Feedback

In the **1999 ARRL International DX Phone contest**, **W7FB** was listed incorrectly as **W7FP**.

In the **1999 IARU HF World Championships**, a corrupt log file caused the **VA7RR (VE7SZ, op)** score to be under-reported. The correct score was 2,303,070 points based on 2504 QSOs and 210 multipliers. This moves him from 10th place to a **2nd place** finish overall, and also makes him the top score among W/VE stations in the Phone Only category. **R1MV** should have been listed as a Multi-Multi Headquarters station, making **H20A** the first place Multi-Single World station.

In the **1999 September VHF QSO Party**, **KAIZE** should have been reported in the Western PA section and **N2GKM/R** shown in the Atlantic division. This makes **KAIZE** the Atlantic division Single Op winner and **N2MH** the Hudson division rover winner. This also moves **K1UHF** into **First Place** as Single Op New England division.

**WIAW Qualifying Runs** are 9AM EST Tuesday, April 4, and 4 PM EST Wednesday, April 19. The **K6YR West Coast Qualifying Run** will be at 9 PM PST on Wednesday, April 5. Check the **WIAW schedule** for details.

## April

### 1-2

**EA RTTY Contest**, sponsored by Union de Radioaficionados Espanoles, from 1600Z Apr 1 until 1600Z Apr 2. 80 40 20 15 10 meters, single op all band and single band and multiop all band. Send RST and CQ Zone (EA stations send RST and province prefix). Everyone works everyone. Score 1 pt/QSO on 20, 15 and 10 meters within your own continent; 2 pts/QSO on 20, 15 and 10 meters outside your continent; 3 pts/QSO on 80 and 40 meters within own continent; and 6 pts/QSO on 80 & 40 meters outside your continent. Contacts within your own DXCC country are valid for multipliers, but not for points. Final score is QSO points  $\times$  DXCC countries (including EA, EA6, EA8, EA9) and EA provinces worked per band. Awards. Send logs by June 30 to EA RTTY Contest Manager, Antonio Alcolado, EA1MV, PO Box 240, E-09400 Aranda de Duero, Burgos, Spain; [alcolado@redestb.es](mailto:alcolado@redestb.es).

**SP DX Contest**, sponsored by the Polski Zwiasek Krotkofalowcow (PZK), 1500Z Apr 1 to 1500Z Apr 2. Phone and CW, 160 80 40 20 15 10 meters. Single operator, all band or single band, mixed mode, phone only or CW only; multiplier (multiband, mixed mode only). Non-Polish stations send a RST and 3-digit QSO number. Polish stations send RST plus two-letter province designator. Work stations once per band and mode. Count 3 pts/SP-station QSO. Multipliers are provinces (49 max). Final score is QSO points  $\times$  multipliers. Awards. Mail entries by Apr 30 to PZK, SPDX Contest Committee, PO Box 320, 00-950 Warszawa, Poland; [spdx-logs@write.com](mailto:spdx-logs@write.com); <http://dendro.sggw.waw.pl/sp5zcc/spdx/spdx.htm>.

**500th Anniversary of Brazil Discovery Contest**, sponsored by Rede dos Emissores Portugueses, 0000Z April 1 to 2400Z April 2, 80 40 20 15 10 meters. SSB only. Exchange signal report and district for Portuguese stations; signal report and state for Brazilian stations; signal report and serial number starting at 001 for everyone else. Count 3 points for each Brazilian or Portuguese station. Multipliers are the total numbers of different districts or states on each band. Final score is total QSO points  $\times$  total multipliers. Awards. Send logs by May 31 to: Rede dos Emissores Portugueses, c/p Awards and Contest Manager, PO Box 2483, 1112 Lisboa, Portugal.

### 7-9

**Japan International DX Contest, CW**. High-band portion (20-10 meters). See January 2000 QST, p 100.

**QRP ARCI Spring QSO Party, CW**, sponsored by QRP ARCI International, from 1200Z Apr 8 until 2400Z Apr 9. Single band, all band, high band (20 15 10 6 meters) or low band (160 80 40 meters). Operate 24 hours max. Work stations once per band. Send signal report, state/province/DXCC country and ARCI number (if member), or power output (if nonmember). 1.810 3.560 3.710 7.040 7.110 14.060 21.060 21.110 28.060 28.110 50.128 MHz. Score 5 pts/QSO with ARCI member, 2 pts/QSO with nonmember on same continent and 4 pts/QSO for nonmember, different continent. Final score is QSO points  $\times$  states/provinces/DXCC countries  $\times$  power multiplier (0-250 mW,  $\times 15$ ; 250 mW to 1 W,  $\times 10$ ; 1-5 W output  $\times 7$ ;  $< 5 W \times 1$ ). Team competition. Awards. Mail entry (SASE for results) to QRP ARCI Contest Manager, Randy Foltz, K7TQ, 809 Leith St, Moscow, ID 83843; [rfoltz@turbonet.com](mailto:rfoltz@turbonet.com); <http://www.qrparci.org/>.

**His Majesty the King of Spain Contest**, sponsored by Union de Radioaficionados Espanoles, 1800Z Apr 8 to 1800Z Apr 9. Single operator, multiplier and SWL. Phone and CW are separate contests and require separate logs. 80 40 20 15 10 meters. Exchange RST and serial number, Spanish stations send RST and province. Count one point per QSO. Non-Spanish stations only work Spanish stations; Spanish stations work everyone. Multipliers are Spanish provinces on each band. Final score is total QSO points  $\times$  total multipliers. Awards. Send logs by May 14 to URE Contest Manager, PO Box 220, 28080 Madrid, Spain; [ure@ure.es](mailto:ure@ure.es).

### 10

**VHF/UHF Spring Sprints**, sponsored by the East Tennessee DX Association, 144 MHz, 7 PM to 11 PM local time on Mon, Apr 10. (Other Spring Sprint dates are 222 MHz on Tue, Apr 18; 432 MHz on Wed, Apr 26; 902 MHz/1296 MHz/2304 MHz on Sat, May 6; and 50 MHz on Sat-Sun, 2300Z, May 13 to 0300Z May 14.) The 902 MHz, 1296 MHz, and 2304 MHz Sprints will run simultaneously on Sat, May 6, 6 AM to 1 PM local time; you may work any five consecutive hours during this time period. The 902, 1296 and 2304 MHz Sprints are separate, but run concurrently. The usual VHF/UHF rules apply. Exchange grid-square locations (see Apr 1994 QST, p 87). Signal reports are optional. Score 1 pt per valid QSO. Final score is QSO pts  $\times$  grid squares. Contests are separate; there is no accumulation of scores. The official entry forms, found in the *1998 ARRL Contest Yearbook*, are recommended. Logs must indicate time, call sign and complete exchange for each valid QSO. Multipliers must be clearly marked in the log. Submit separate log and summary sheets for each Sprint entered. Awards. Mail entries to: East Tennessee DX Assn, 1620 Hidden Hills Dr, Clinton, TN 37716.

### 15-17

**The TARA PSK31 Rumble**, sponsored by the Troy ARA. 0000 through 2400Z, Apr 15. PSK31 only. 80, 40, 20, 15, 10 and 6 meters. Work stations once per band. Exchange name, state/province; DX send DXCC prefix. Operate 1 of 5 categories: *Normal*, 100 W max; *Great*, 20 W max; *Super*, 5 W max; *Novice* or *SWL*. Final score is QSOs  $\times$  (W + VE + JA + VK call areas + 1 point per DXCC entity including your own). Multipliers count once per band. To be valid, scores must be received via our online score submission form found at <http://www.qsl.net/wm2u/score.html>. Logs must be available for review if requested. Entries must be received by 30 April 2000. Please read rules for exact contest frequencies and other information on the Web at <http://www.qsl.net/wm2u/rumble.html> or <http://www.n2ty.org>.

**Michigan QSO Party**, sponsored by the Mad River Radio Club, from 1600Z April 15 until 0400Z April 16. Stations may operate the full 12 hours. Phone and CW. 80 40 20 15 10 meters. Single op, multiop and mobile; only one transmit-

ted signal at a time. Work stations once per band and mode. MI-to-MI QSOs allowed. Work portables and mobiles again as they change county, state or province. Exchange QSO number and QTH (county for MI stations, state/province/DXCC country for others). CW—3.545 7.045 14.045 21.045 28.045; phone—3.850 7.225 14.250 21.300 28.450. Count 1 pt per phone QSO and 2 pts per CW QSO. Count multipliers once per mode. Multipliers are MI counties for all entries, plus states and provinces for MI entries. Power multipliers:  $\times 5 < 5 W$ ;  $\times 2 100 W$ ;  $\times 1 > 100 W$ . Final score = QSO points  $\times$  power multiplier  $\times$  total mults. Awards. Mail logs no later than 30 days after the contest to Mad River Radio Club, c/o Dave Pruett, 2727 Harris Road, Ypsilanti, MI 48198; [mqp@contesting.com](mailto:mqp@contesting.com); <http://www.qsl.net/mrrc/mqp.html>.

**DXYL-NAYL Contest, CW**, sponsored by the YLRL, from 1400Z Apr 15 until 0200Z Apr 17 (phone contest is Apr 22-24). YLs only. Send RS(T), QSO number and section/province/DXCC entity. W/VE YLs work DX YLs, and vice versa. KL7 and KH6 count as DX. Work stations once per band. Score 1 pt/QSO. Multipliers are sections/provinces/DXCC countries (they count only once). Stations running  $< 150 W$  output (phone: 300W PEP) multiply score by 1.5. Final score is points  $\times$  multipliers  $\times$  power multiplier. Awards. Send logs within 30 days to Phyllis Shanks, W2GLB/7, 1345 W Escarpa, Mesa, AZ 85201-3853; [pshanks1@juno.com](mailto:pshanks1@juno.com); <http://www.qsl.net/~ylrl/ylcontests.html>.

**EA QRP Contest, CW**, sponsored by the EA QRP Club. Three contest periods, 20 meters April 16 1700-2000Z, 80 meters April 16 2000-2300Z and 40 meters April 17 0700-1300Z. EA stations send RST and provincial license plate letter/s. Non-EA stations send RST only. Count 1 point per QSO; 2 points for contacts with QRP stations. Multipliers are Spanish provinces and DXCC countries. Final score is total QSO points  $\times$  total multipliers worked. Awards. Send logs to: Angel Garcia Garcia, EA4CM, C/ Jose Arcones Gil no.70, 5-2, 28017 Madrid, Spain.

### 18

**222 MHz Spring Sprint**. See April 10.

### 22-24

**Six Meter Sprint**, sponsored by Six Club, 2300Z Apr 22 to 0400Z Apr 23. Six meters only. Exchange grid square. Count 1 point for each QSO in your country and 2 points for QSOs outside your country. Final score is total QSO points  $\times$  total number of grid squares worked. Awards. Send logs before May 27 to Six Club, PO Box 307, Hatfield, AR 71945; [sixclub@6mt.com](mailto:sixclub@6mt.com); <http://6mt.com/contest.htm>.

**DXYL-NAYL Contest, phone**, see April 15-16

**Low Power Spring Sprint**, sponsored by the Slovak ARA, 1400Z-2000Z Mon Apr 24. CW only, 160 80 40 20 15 and 10 meters on IARU recommended contest band segments. Single op only: single band, three bands, all bands. Exchange RST, Maidenhead grid square and power category (A =  $< 1 W$ ; C =  $< 5 W$ ; Q =  $< 25 W$ ; X =  $< 50 W$ ; Y =  $< 100 W$ ). Count 3 pts/QSO with own continent, 9 pts/QSO with other continents and 18 pts/QSO with OM stations. Multipliers are grid squares plus and prefixes (WPX rules) worked per band. Final score is QSO pts  $\times$  multipliers. Send entries within 30 days to SS Contest, Radioclub OM3KFV, PO Box 129, 036 01 Martin I, Slovakia.

**QRP to the Field**, sponsored by the NorCal QRP Club, 1600Z to 2400Z Apr 22. CW HF QRP only (5 W max), 160 80 40 20 15 10 meters. Exchange RST and state/province/country (SPC). This year's theme is "Run to the Borders." Stations operating from an SPC border get an extra multiplier for each SPC intersecting at their exact location. For example, KI6DS operates from the

CA-AZ border, getting a x2 "border operator" multiplier. He must exchange a signal report with each state (e.g. 579 CA, 579 AZ). Stations working K16DS would get SPC multiplier credit for each state, as well as QSO pts for each separate signal report received. Scoring: Count 5 pts/QSO. Multipliers: SPC total per band; for border operators, the number of SPCs intersecting at your position; and location (home x2, field x4; field = battery power and temporary antennas). Final score = QSO pts x SPC total x location x border operator multiplier. Awards. Send logs by June 1 to Joe Gervais, AB7TT, PO Box 322, Peoria, AZ 85380-0322; [vole@primenet.com](mailto:vole@primenet.com); <http://www.fix.net/~jparker/norcal.html>.

## 26

**432 MHz Spring Sprint**, see April 10.

## 29-30

**Florida QSO Party**, sponsored by the Florida Contest Group, 1600Z Apr 29 to 0159Z Apr 30 and 1200Z-2159Z Apr 30. Twenty hours total time. 40 20 15 and 10 meters. Categories: single op, mobile (single op or multiop), Novice/Tech (mixed mode, phone only, CW only); multi-single and multi-multi (mixed mode only; max 1 signal per band). Three power classes for all categories: QRP (<5 W), low power (<150 W) and high power (>150 W). Exchange signal report and state/province (DX stations send entity); Florida stations send county. Work stations once per band and mode. Work Florida mobile stations again as they change county. Count 1 pt per phone QSO, 2 pts per CW QSO. Multipliers: for Florida stations, 50 states; Canadian areas (MAR, NL, VE2-VE8, YT); DXCC countries (except W, VE, KH6, KL7). All others count Florida counties (67). Count multipliers once per mode. Final score: Multiply QSO points by total multipliers by the power multiplier (<5 W, x 3; <150 W, x 2; >150 W, x 1). Logs must be postmarked by May 30. Send your entry to Florida QSO Party, c/o Ron Wetjen, WD4AHZ, 5362 Castleman Dr, Sarasota, FL 34232; [fqp@qsl.net](mailto:fqp@qsl.net); <http://www.qsl.net/fqp/>.

**Helvetia Contest**, sponsored by USKA (Switzer-


land), 1300Z Apr 29 to 1300Z Apr 30. 160 80 40 20 15 and 10 meters (CW only on 160 meters). Mixed mode only, single op or multi-single. Work stations once per band. Send RS(T) and serial number. HB stations will also add Canton prefix. Abbreviations of the 26 cantons: AG, AI, AR, BE, BL, BS, FR, GE, GL, GR, JU, LU, NE, NW, OW, SG, SH, SO, SZ, TG, TI, UR, VD, VS, ZG, ZH. Count 3 pts/QSO with HB stations. Multipliers are Cantons worked per band (max 26 per band). Awards. Send logs by May 31 to Nick Zinsstag, HB9DDZ, Rimattstrasse 7, CH-5084 Rheinsulz, Switzerland.

**Nebraska QSO Party**, sponsored by the Nebraska QSO Party Group, from 1700Z Apr 29 until 1700Z Apr 30. Single op, multi-single, mobile, and Novice/Tech. Send RS(T) and state/province/DXCC country (NE stations send county). Work stations once per band and mode. CW—1.805 and 60 kHz up from band edge; phone—1.865, 3.860, 7.260, 14.260, 21.360, 28.360 146.46; Novice—28.380 and 10 kHz up from band edge. Score 1 pt per phone, 2 points per CW QSO. NE mobiles may add 50 QSO pts for each county operated from; NE portables may add 100 QSO pts for each county operated from (excluding county of residence). Work mobiles/portables again as they change county. Final score is QSO points x NE counties (max 93); NE stations multiply by states (50), provinces (8) and DXCC countries (max 35) for a possible maximum of 93. Club Competition (3 entries min). Awards. Send logs by May 31 to Nebraska QSO Party, POB 375, Elkhorn, NE 68022-0375; <http://www.qsl.net/hdxa/neqso/neqso.htm>.

**Ontario QSO Party**, sponsored by the Ontario DX Association, 1800Z Apr 29 to 1800Z Apr 30. Phone and CW, 160 80 40 20 15 10 meters and all VHF/UHF bands (no repeater QSOs and keep 146.52 MHz clear). Categories: Single operator low power (<150 W on HF and <50 W on VHF/UHF); single operator high power; single operator, single band; mobile; HF QRP (<5 W); VHF/UHF FM QRP (<5 W); multioperator; CW, SSB or mixed mode. Exchange signal report state/province/DXCC country. Ontario stations exchange signal report and county/district/regional municipality. Work Ontario stations only

(Ontario stations work everyone). Work mobile and portable stations again as they change county/district/regional municipalities. Work stations once per band. Count 1 pt/QSO, 10 pts (each band) for working VE3ODX and VA3RAC. Multipliers are Ontario county/district/regional municipalities (for Ontario stations: county/district/regional municipalities, and state/province/DXCC countries). Final score is total QSO points x total multipliers worked (max 48). Awards. Send logs by May 31 to Ontario DX Association, Box 161, Stn A, Willowdale, ON M2N 5S8 Canada; [ve3sre@rac.ca](mailto:ve3sre@rac.ca); <http://www.odxa.on.ca/oqrprules.html>

**County Hunters Contest**, phone, sponsored by the Mobile Amateur Radio Awards Club (CW competition is May 6-7). 80 40 20 15 10 meters. Exchange signal report, county and state. Canadian stations send signal report and province, DX stations send signal report and country. Count 1 point for US fixed station; 5 points for DX (including Canada); 15 points for mobile stations. Work stations once per band, except work mobiles in each new county. Mobiles on county lines count for only one QSO, but you can count a multiplier for each county. Awards. Send logs by May 29 to: Alan Fischer, K8CW, 259 W. Cook Rd, Mansfield, OH 44907.

**North American High Speed Meteor Scatter (HSMS) Contest**, sponsored by the Western States Weak Signal Society. HSCW only, 0000Z Apr 29 to 2400Z May 7. Make as many contacts as possible using HSCW (99 WPM and above) on the amateur bands above 50 MHz. Operate up to 48 hours during the contest period. Single op limited (5 kW ERP and less); unlimited (ERP greater than 5 kW); multi-band or 2 meters only. Multipliers are 4-digit grid squares per band. On 6 meters count 1 point/QSO, on 2 meters 3 points/QSO, on 1.25 meters 9 points/QSO and on 70 cm 9 points/QSO. Random QSOs count double on 2 meters and up. Score is total of QSO points times the total multiplier. Send logs by May 30 to WSWSS HSCS Contest, c/o Steve Harrison K0XP, 37 Plainfield Ave, Shrewsbury, MA 01545; [hscw@contesting.com](mailto:hscw@contesting.com); <http://www.qsl.net/n7stu/hscw.html>. 

# SPECIAL EVENTS

**Wausau, WI:** Wisconsin Valley Radio Association, W9M, 1500Z Apr 1 to 0300Z Apr 2, to celebrate Marathon County's 150th birthday and 65 years of WVRA. 14.250 21.325 28.375. Certificate. Wisconsin Valley Radio Association, P O Box 363, Wausau, WI 54402-0363.

**Port St. Lucie, FL:** Port St. Lucie Amateur Radio Club, K4PSL, 0000Z Apr 1 to 0000Z Apr 16, to commemorate the discovery of Florida by Ponce de Leon in April 1513. 14.015 14.250 21.250 28.350. Certificate. Dr Maurice I. Sasson, 8598 Florence Dr, Port St Lucie, FL 34983.

**Green Valley, AZ:** Green Valley Amateur Radio Club, N7GV, 1800Z Apr 8 to 2100Z Apr 9, 2000, honoring the 9th anniversary of the closing of all Titan 2 missile sites. 7.272 14.272 21.372 28.372. Certificate. GVARC, 601 N La Canada, Green Valley, AZ 85614.

**Piscataway, NJ:** Piscataway Amateur Radio Club, K2VOA, 0000Z Apr 8 to 2400Z Apr 9, from Voice of America relay station WBOU. 7.245 14.245 21.345 28.445. Certificate. Piscataway Amateur Radio Club, PO Box 1233, Piscataway, NJ 08854-1233.

**Gig Harbor, WA:** Peninsula Amateur Radio Emergency Team, K7E0C, 1400Z Apr 8 to 0200Z Apr 9, during the annual Gig Harbor Health and Safety Expo. 14.040 14.280 28.380 146.560. Certificate. Mark Yordy, KC7BBO, 8914 149th St NW, Gig Harbor, WA 98329.

**Pine Bluff, AR:** Pine Bluff Amateur Radio Club, K5DAK, 1600 to 2200Z Apr 8, celebrating the third annual Railroad-a-Rama and 819 Steam Engine. 14.250. Certificate. PBARC, PO Box 1402, Pine Bluff, AR 71613.

**Fort Wayne, IN:** Mizpah Shrine Temple Radio Unit, W9FEZ, 1200Z Apr 8 to 0500Z Apr 9, commemorating the 90th anniversary of Mizpah Shrine Temple. 7.250 14.250. Certificate. Gary Reece, WB9UYT,

5126 Ann Hackley Rd, Fort Wayne, IN 46835-1410.

**East Stroudsburg, PA:** Eastern Pennsylvania Amateur Radio Assn. N3IS, 1300Z to 1700Z Apr 9, during the MS Walk 2000 at East Stroudsburg University. 7.235 147.045. QSL. Jim Jordan/KB3CRG, 238 Becca Ln, Stroudsburg, PA 18360-9448.

**Ames, IA:** Cyclone Amateur Radio Club of Iowa State University, W0YI, 1300 to 2300Z Apr 15, during the Iowa State University VEISHEA 2000 Celebration. 7.240 14.240 21.325 147.375. QSL. Cyclone Amateur Radio Club, Iowa State University, Friley Hall Box 7275, Ames, IA 50012.

**Vieques, PR:** Cadena El Conquistador, NP3P, 1300Z Apr 15 to 1700Z Apr 16, during the 23rd Vieques Cultural Festival at Fort Count Mirasol—IOTA 99. 14.300 21.350 28.350. Certificate. Cadena El Conquistador, NP3P, PO Box 161, Fajardo, PR 00738.

**Bellefonte, MI:** Stu Rockafellow ARS and Yankee Air Museum, N8D, 1200Z Apr 15 to 2100Z Apr 16. Jimmy Doolittle WWII B-25 raid anniversary. 7.270 14.270 28.370 146.565. Certificate. Dave Langston, KB8RAP, c/o Maritz, 1000 Town Center, Suite 1200, Southfield, MI 48075.

**Blacksburg, VA:** Virginia Tech Amateur Radio Association, K4KDJ, 1400Z Apr 28 to 0200Z Apr 30, for the Virginia Tech Alumni Net. All stations welcome. 14.260 7.260 7.040 28.460. Certificate. VTARA, 347 Squires Student Centre, VPI&SU, Blacksburg, VA 24061.

**Bedford, NH:** US National Marconi Museum, W1FGM, 2300Z Apr 28 to 2359Z Apr 29 for International Marconi Day. 14.275, 3.920, 29.300. QSL. W1FGM, 18 N. Amherst Rd, Bedford, NH 03110.

**Fort Monmouth, NJ:** QCWA Marconi Chapter 138, WA2GM, 0000 to 2359Z Apr 29, for International Marconi Day. 7.025 7.250 14.025 14.250. QSL. Bob

Bus, W2OD, 8 Donner Street, Holmdel, NJ 07733.

**Wall, NJ:** Ocean/Monmouth ARC, N2MO/IMD, 0000 to 2359 Apr 29, for International Marconi Day. General class portions of HF phone and CW bands. QSL. OMARC, PO Box 267, Oakhurst, NJ 07755.


**Edmond, OK:** Edmond Amateur Radio Society, W5W, 1500 to 2000Z Apr 29, celebrating the arrival of the traveling Vietnam Wall in Edmond. 7.289 14.289 28.055 28.489. Certificate. EARS, PO Box 48, Edmond, OK 73083.

**Mason, MI:** Central Michigan Amateur Radio Club, W8MAA, 1500 to 2100Z Apr 29, celebrating 50 years of ARRL affiliation. 14.250 145.390. Certificate. Ken Faiver, W8HNI, PO Box 80406, Lansing, MI 48908.

**Mt. Clemens, MI:** Utica Shelby Emergency Communications Assoc, W8A, 1100 to 1700Z Apr 30, during the 30th annual March of Dimes Walk America. 7.250 14.250 28.450. Certificate. USECA, PO Box 1222, Sterling Heights, MI 48311-1222.

**Manitowoc, WI:** Mancorad Radio Club, W9DK, 1400Z Apr 29 to 2000Z Apr 30, for the USS *Cobia* Submarine Memorial Radio Reactivation. 7.243 14.243 21.343 28.343. QSL. Fred Neuenfeldt, W6BSF, 4932 S. 10th St, Manitowoc, WI 54220.

**US International Police Association Radio Club**, various calls, 0000Z Apr 30 to 2359Z May 14, during the US IPAEC Annual Celebration. 3.850 14.240 21.410 28.355. Robert Faulkner, US IPARC Awards Chairman, 15733 Rancho Ramon Dr, Tracy, CA 95376.

You can submit your special event information online at <http://www.arrl.org/contests/speveform.html>. Submissions may be mailed to George Fremin III, K5TR, at the address shown on this page; faxed to ARRL HQ at 860-594-0259; or e-mailed to [events@arrl.org](mailto:events@arrl.org). 



## Asia Leads Amateur Radio Growth

After a decline the previous year, information supplied by IARU member-societies during 1999 shows a rebound in the number of Amateur Radio licenses worldwide. Asia led the way with substantial increases in several countries. As of December 1999, statistics compiled by the IARU International Secretariat reflected a total of 2,784,000 amateur stations licensed worldwide. The number of licensed operators is somewhat larger, but these figures are less meaningful because some countries issue lifetime operator licenses and the records are not purged when operators die or become permanently inactive for some other reason.

Japan remains the country with the largest number of radio amateurs with 1,296,059 stations. In Region 3 it is now followed by the Republic of Korea with 51,172 stations and Thailand with 50,988 stations (mostly licensed to operate only on VHF). The next largest Region 3 country is probably Indonesia, but the most recent information that is available is from 1997; it shows 28,173 stations. Taiwan has shown impressive growth recently and now has

24,373 amateur stations. India, China, and Malaysia are among the countries also reporting recent growth. Region 3 has slightly more than half of the world's amateur population with 1,491,000 licensed stations.

Next in order by population is Region 2 with 843,000 licensed stations, a drop of 4,000 from the previous year. Of these, 81% are in the United States. US and Canadian licenses were up slightly during the year but the general trend in the rest of the region, to our south, is downward. Some officials of IARU member-societies in Latin America report declining interest in Amateur Radio as telephone and other personal communications services improve.

The smallest region in terms of the number of amateur licensees is Region 1, which may surprise those who have observed the high levels of Amateur Radio activity in Europe. The number of amateur stations reported by Region 1 member-societies grew by 15,000 between 1998 and 1999, to 451,000. Most of this increase is attributable to a single country, Ukraine, which had not reported since 1993. Region 1 countries reporting significant growth in 1999 include

the Czech Republic and Hungary. The United Kingdom reported a small decline. Up-to-date information has not been received from some of the larger countries in Region 1, which makes comparisons difficult.

Less encouraging are the reported numbers of members of national organizations. While Japan has more licensed amateurs than the United States, the ARRL is somewhat larger than the Japan Amateur Radio League. ARRL membership remained essentially flat during the year while JARL membership continued a decline that began several years ago. Reported membership of the member-societies by region declined from 224,000 to 215,000 in Region 1, from 191,000 to 187,000 in Region 2, and from 204,000 to 198,000 in Region 3. These figures include unlicensed individuals. When only licensed members are counted the three regions are virtually identical: Region 1 has 187,000, Region 2 has 180,000, and Region 3 has 185,000.

A summary of the statistics compiled by the IARU is available at the IARU Web site at: <http://www.iaru.org/statussummary-99.html>.

### UK TO ALLOW AMATEUR RADIO-INTERNET LINKS

The Radiocommunications Agency in the United Kingdom has announced that interconnection between Amateur Radio and the Internet is now allowed. The action, first announced in October 1999 and implemented in late January, followed consultation with the Radio Society of Great Britain and a number of interested individuals. David Hendon, the Agency's Chief Executive, made the announcement in response to requests from the Amateur Radio community to be permitted to link their radio equipment through the Internet. The RA said it recognized the need to encourage young people to become involved in Amateur Radio as "a valuable training ground for future careers in radio and electronics" and expressed hopes that its decision would "open up whole new avenues into Amateur Radio." Connection of ham equipment to non-amateur networks in the UK will require written permission from the Secretary of State.

A further clarification was issued by the RA on February 10: "It was never our intention to prevent individuals from having equipment which is connected both to the amateur service and non-amateur networks such as the public switched telephone network. The point of the Gazette Notice was to prevent the automatic transfer of information between amateur radio and other networks except with specific written permission from the Agency. This will allow us to develop an understanding of licensees' requirements while considering

how we handle this facility in the future."

### IARU, ARRL BUSY AT ITU MEETINGS

IARU and ARRL representatives have been kept busy attending recent meetings of various ITU bodies.

Hans-Joachim Brandt, DJ1ZB, represented the IARU at a meeting of ITU-R Task Group 1/5 in Bangalore, India, January 6-14. Task Group 1/5 is attempting to find a mutually acceptable solution to the problem of interference to services such as radioastronomy from unwanted emissions from satellite and other services. ARRL Technical Relations Manager Paul Rinaldo, W4RI, was a member of the US delegation and was asked to serve as chairman of one of the principal drafting groups. The technical issues being dealt with in TG 1/5 are quite difficult, and it has been a challenge to keep unintended consequences from affecting the Amateur-Satellite Service. Peter Chadwick, G3RZP, who has been attending meetings of TG 1/5 as a member of the UK delegation, has been particularly helpful in this regard.

IARU President Larry Price, W4RA, spent the week of January 17 in Geneva attending a meeting of the Radiocommunication Advisory Group. The RAG advises the Director of the ITU Radiocommunication Bureau. Paul Rinaldo, W4RI, attended as a member of the US delegation.

Ken Pulfer, VE3PU, represented the IARU at meetings of ITU-R Working Parties 7C and 7D in Orlando, January 24-28. ARRL Technical Relations Specialist Walt Ireland, WB7CSL, attended as a member of the US del-

egation. WP 7C has been studying the issue of sharing between proposed satellite borne Synthetic Aperture Radar (SAR) and other services, including the Amateur and Amateur-Satellite Services, in the band 420-470 MHz. Not surprisingly, the proponents of SARs and the representatives of the incumbent services have been unable to agree that sharing is feasible. Extensive technical input has been provided by the IARU. It is expected that the work will continue in a new Working Party, 7E. WP 7D has been dealing with reallocation issues in the frequency range 71 to 275 GHz; no new issues that might cause concern were raised in Orlando.

IARU Vice President David Wardlaw, VK3ADW, attended a meeting of the Asia-Pacific Telecommunity Conference Preparatory Group for WRC-2000 held in Tokyo, January 31-February 4. The purpose of the meeting was for administrations in the Asia-Pacific area to identify common positions and proposals they can take to the World Radio-communication Conference in Istanbul, May 8-June 2. An IARU position paper on WRC-2000 issues was referred to during the discussion of every WRC-2000 agenda item on which the IARU had offered comment, and the IARU positions were supported. The IARU also submitted a paper outlining the need for an international call sign series for multi-government projects such as the International Space Station. It was agreed that the APT would write to the ITU Secretary General asking that consideration be given to the allocation of a single call sign series which can be drawn on for specific international usage. Q57-

## A Conversation with Kay Craigie, WT3P

There are quite a few women in Amateur Radio who have held various offices in the ARRL, but no woman had risen above division director until last January when Kay Craigie, WT3P, Atlantic division director, was elected ARRL second Vice President. In a recent interview, Kay talked about some of her experiences in Amateur Radio and her goals in her new position...



**Kay, you've been elected to second vice president of the ARRL. What was your first reaction when you found out you'd won?**

I felt very happy and honored that the directors had expressed their confidence in my abilities.

**To my knowledge you are the first women to hold this office. Has being female had any advantages or disadvantages in your Amateur Radio career?**

Although several YLs have been ARRL directors, I am the first YL to be elected an officer of the League. But that point never came up until after the elections were over! That is as it should be. Gender should not be a factor because it's irrelevant to whether a person can do the job. I've never felt that being a YL was either an advantage or a disadvantage in my work with local radio clubs and the ARRL. In my experience, most hams treat people as individuals. They'll give you a chance to show what you can do and prove what kind of person you are. The most important YL advantage I have experienced is that a higher-pitched voice breaks through pile-ups better. Also, the lines are not as long in the ladies' restrooms at hamfests!

**Many women will be interested in how you got started in Amateur Radio. Could you explain a little of your personal background and beginnings in the hobby?**

My husband, Carter Craigie, N3AO, became licensed a little over a year before I did. I got into ham radio mostly out of jealousy of the fun he was having working DX and getting a lot of QSL cards. I was a computer hobbyist at the time and put off getting a ham license while I learned to write programs. A local ham named Jerry White, WB3FPU, taught me how to repair my computer when the timing system blew out. Electronics didn't seem so mysterious after

that. The local hams were, and are, friendly people and I wanted to be one of them. So I asked Bob Haase, W3SA, to give me the Novice test, and I passed. As soon as possible I upgraded to General and had my Advanced before the year was out. A few years later I upgraded to Amateur Extra. Learning the code wasn't hard because I had been a musician as a young person and sound patterns are sound patterns. However, in school I was a liberal arts major who avoided science and math courses. One of ham radio's contributions to my life was the discovery that I could learn much more about science and technology than I ever supposed I could. Now, I look back and wish I had paid attention when my father tried to interest me in electronics when I was a kid. My father, who's now a Silent Key, finally got his ham license about the time I got mine. My daughter, Jenny, is licensed as KA3WVD, so at one time we were a three-generation ham radio family.

**What aspects of the hobby do you enjoy most?**

On the air I enjoy contesting, DXing, and award hunting. Like any other ARRL official with plenty of responsibilities, I run the risk of having ham radio turn into just another desk job. I make sure that doesn't happen. I enjoy being active on the air, and it keeps me in touch with the real world of being a ham. I also enjoy local radio club work. I've edited the Mid-Atlantic ARC's newsletter for 17 years and held various club offices. I also belong to the Frankford Radio Club, a DX contest club. They say I'm the first YL member of Frankford to score over a million points in a contest. In recent years, I've become interested in VHF award hunting, too.

**What are your goals as ARRL second Vice President?**

With license restructuring we are entering a period of extraordinary challenge and opportunity for ham radio and the League. My goal is to work with President Haynie and the other officers to carry out the policies adopted by the Board to meet the challenges and take advantage of the opportunities. I want to see the ARRL's financial situation become stronger, so we have the resources to serve our members better, expand our volunteer and educational programs and advocate for ham radio more effectively.

**Do you have any words of advice to YLs who are just getting into the hobby?**


To new YL hams, in fact to any new hams, my advice is this: The best way to feel included is to get involved. Join a local radio club. Join ARES/RACES. Join the ARRL, then get busy! Be active on the air. Do public service events. Work at the club hamfest. Sign up for a committee. Operate at Field Day. Apply for an ARRL Field Organization appointment. Run for office. The greatest benefits of ham radio come into our lives when we are willing to give something back as well as enjoy the fun. When our kids see their parents involved in service along with the fun part of ham radio, it sets a good example of values.

**What do you think are the major challenges facing Amateur Radio, and the YL community in particular, in the next few years?**

The biggest challenge is keeping the faith. From the beginning of Amateur Radio in the days of Hiram Percy Maxim, there have always been other entities that wanted to grab "our" spectrum. There have always been other forms of communication and other avocations competing for people's attention. Today it's wireless phones, video games, and the Internet; decades ago it was wire-line phones, broadcast radio, movies and TV. Challenges and obstacles are nothing new. Our predecessors had the courage and spirit to deal with what came up in their day. We must have the same kind of belief in the value of ham radio and the same kind of positive, confident attitude towards the future. If we hams don't believe in ham radio, who will?

One of the changes in ham radio is increasing diversity. More YLs are becoming hams. More people from a variety of backgrounds and occupations are becoming hams. I think that makes us stronger as a radio service. America is a nation of immigrants that has become great in large measure because we are not all alike. Now this is happening for ham radio, and we will be the better for it in the long run.

### K1TQY, SILENT KEY

A well-known YL, Dawn Cummings, K1TQY, President of WRONE, the Women Radio Operators of New England, became a Silent Key in early February. According to Anne Manna, WB1ARU, YLRL District 1 Chairman, "Dawn was a very active ham, especially in the traffic nets. She was very outgoing and would spend hours on crafts (knit, plastic canvas, crochet, etc) to give to others. She also earned some money from her work, but donated much of it to charities." 



# SILENT KEYS

It is with deep regret that we record the passing of these amateurs.

N1EV, Evelyn R. Gross, Norwalk, CT  
 W1FVY, Carl T. Milner, Block Island, RI  
 \*W1FYR, Alan C. Merrill, Gilsom, NH  
 W1GXC, Leigh Alexander, Sidney, ME  
 WA1OEC, William F. Sherlock, North Andover, MA  
 \*W1RDC, Walter R. Walczak, Holyoke, MA  
 \*N1RM, Douglas A. Blakeslee, Verona, WI  
 W1SAI, Morris Allen, Hull, MA  
 \*W1UKR, Eunice B. Gordon, Homosassa, FL  
 KN1X, Thomas J. Scanzillo, Monroe, CT  
 N1YDB, Margaret M. Kelleher, Newburyport, MA  
 N1ZKF, John E. Schmeltzer IV, Greenwich, CT  
 W2ABM, Roy M. Dahlhaus, Elmira, NY  
 WA2AEA, Leslie E. Schmarder, Elizabethtown, NY  
 N2AKS, Gordon J. Newell, New Hartford, NY  
 W2BSL, Frank Jacobs, Orangevale, CA  
 \*KB2CO, Joseph J. Desher, New Providence, NJ  
 W2EBF, Donald H. Drennan, Wooster, OH  
 N2GG, Gerald L. Gervais, Moira, NY  
 KB2GKR, Jose R. Maldonado, Bronx, NY  
 W2GW, George W. Wright, Toms River, NJ  
 N2JSZ, Alfred J. Bowers, Rochester, NY  
 KA2JUG, Millard F. Timm, New Monmouth, NJ  
 WA2KDK, Kevin D. Slucker, Beverly Hills, CA  
 W2KN, Harold Robins, New York, NY  
 K2KZL, William M. Bush, Jamesville, NY  
 WA2WAK, Paul G. Friedman, Tupper Lake, NY  
 K2ZOD, Donald E. Smith, Auburn, NY  
 K3BXU, Charles J. Hart, Bethesda, MD  
 WA3DYV, Robert H. Stracener, Rockville, MD  
 K3GUG, Robert S. Emch, Bethesda, MD  
 N3IQF, Linda M. Schools, Bethel, PA  
 \*WA3TVG, Edward R. Briner, Acme, PA  
 KA3VLU, Eric N. Casiano, Philadelphia, PA  
 W3YBV, Clarence E. Wendleton, Landover Hills, MD  
 K4AEL, Angela E. Loner, Blairsville, GA  
 K4AQO, Cecil D. Cliburn, Fort Walton Beach, FL  
 AD4BE, Albert J. Monteiro, Pensacola, FL  
 KM4C, Harry C. Wheeldon, South Carrollton, KY  
 W4CYU, Robert Hecksher, Fort Myers, FL  
 KF4CZO, T. K. Wilson, Albertville, AL  
 KD4DJC, John D. Steele, Ashland, KY  
 KE4DWC, Virgil N. Davis, Harrison, TN  
 K4GBN, Roy T. Horton, Memphis, TN  
 K4GFK, Harry W. Lawson, Jupiter, FL  
 WB4GNX, David K. Hughes, Prospect, TN  
 N4HZR, James W. Armstrong, Ocala, FL  
 WB4NCL, Bud B. Shoup, Port Charlotte, FL  
 KB4NVA, Chester W. Rossiter, Daytona Beach, FL  
 K4OM, Joseph E. Perkinson, Rossville, GA

K4VJI, Wyatt S. Bishop, Sarasota, FL  
 KD4YCK, Leo K. West, Lexington, KY  
 \*K4YI, James A. Smith, Columbus, GA  
 K4YWS, Alonzo E. Oliver, Hoover, AL  
 \*N5AJW, Michael D. Heimlich, Dallas, TX  
 K5DCM, Ross E. Phillips, Sargent, TX  
 W5EAW, Harold W. Isehower, Albuquerque, NM  
 W5EXY, Hanno E. Kanz, New Braunfels, TX  
 KA5FPH, Vernon D. Aulgur, Hugo, OK  
 WA5FXQ, Ralph W. Schimmel, Houston, TX  
 KB5GST, Raymond Petrie, New Braunfels, TX  
 WB5KMN, E. T. Bangert, Waco, TX  
 WB5MPU, Larry E. Papke, Arcadia, FL  
 W5RMY, Edward Milesosky, Albuquerque, NM  
 KC5WQD, Markham T. Cline, Sulphur Springs, TX  
 K5WXY, James A. Harmon, Huntsville, AL  
 N5XJT, Walter Smith, New Braunfels, TX  
 W5YQZ, Henry P. Dingus, Spring, TX  
 W6BA, William A. Adams, Twentynine Palms, CA  
 W6BCC, Kenneth R. Crosher, Santa Rosa, CA  
 K6CL, Edward F. Munsell, Culver City, CA  
 WD6CXO, Roger F. Wolcott, Huntington Beach, CA  
 \*K6EJF, John S. Tanner, San Jose, CA  
 WB6EZR, Edward J. Dettweiler, Reedley, CA  
 KD6JDN, Warren H. Wetherall, Banning, CA  
 KE6JQL, Carl B. Brummund, San Diego, CA  
 N6KQX, Sue Knox, Long Beach, CA  
 WA6L, Frank Le Port, Redwood Valley, CA  
 WA6MDQ, Russell Sterling, Weed, CA  
 WA6MDT, Russell C. Porter, Corona, CA  
 WB6MHE, E. H. Satchell, Greeneville, TN  
 W6MHI, Eugene Baron, La Canada, CA  
 W6NPN, Bruce K. French, Los Angeles, CA  
 W6PCG, Donald W. Blancher, Northridge, CA  
 \*W6SMD, Fred Hansen, Rancho Palos Verdes, CA  
 W6UVM, Herman J. Hoehstetter, Hartsville, SC  
 WB6VPG, James Schwabenland, Visalia, CA  
 KD6W, Frank H. Beardsley, Redding, CA  
 W6WXU, S. A. Sullivan, Sonoma, CA  
 KM6Z, Ed W. Marler, Roseville, CA  
 KL7AHH, Benjamin J. Hilderbrand, Puyallup, WA  
 KC7EQW, Myra G. Thompson, Post Angeles, WA  
 K7HRL, Charles R. Morris, Seattle, WA  
 WA7JXL, George W. Statler, Walla Walla, WA  
 AL7KR, Harold W. Stevenson, Sequim, WA  
 WK7L, Edward R. Balaker, Sun City West, AZ  
 \*KE7MJ, Harold A. Rogers, Dayton, NV  
 W7OOF, Keith F. Thomas, San Francisco, CA  
 WA7SKH, Thomas Beverley, Bountiful, UT  
 W7UMZ, S. Patrick Donahue, Portland, OR  
 K7VUA, Edward W. Robinson, Auburn, WA  
 N8APE, Lyle O. Behner, Lagrange, OH  
 WA8DEZ, Donald Jackson, Elyria, OH

WA8DFE, Merle L. Williams, Miamisburg, OH  
 K8EJB, Joe E. Novak, Tow, TX  
 WA8GBA, Theodore C. Bell, North Canton, OH  
 K8GEJ, Raymond O. Sanford, Holly, MI  
 K8GPD, Robert A. Galloup, Battle Creek, MI  
 W8JLA, H. S. Whitehead, Milford, OH  
 K8KVA, Karl F. Osborne, Elyria, OH  
 W8LGO, Richard L. Voeller, Columbus, OH  
 K8LYY, Charles M. Dewilde, Monroe, MI  
 W8NGO, E. P. Mac Kenzie, Newton, NC  
 KE8O, Walter H. Rike, Port Richey, FL  
 W8VRV, William Winters, Montague, MI  
 WB8WAV, Gordon B. Ingram, Cincinnati, OH  
 N8XAJ, James C. Bauer, Escanaba, MI  
 W8YFB, William A. Wildenhein, Elyria, OH  
 KA9FDC, Walter S. Kozol, Griffith, IN  
 WB9KKW, Nelson J. Cole, Belvidere, IL  
 W9KU, Warren L. Schlaugat, Tucson, AZ  
 W9NKK, Douglas W. Kluge, Milwaukee, WI  
 W9SYI, David J. Gatton, Conyers, GA  
 WA9UXM, Dan Wiese, Green Bay, WI  
 N9UYS, Robert A. Craigin, Hobart, IN  
 W9XH, John Offerdahl, Mt Horeb, WI  
 KB0AIL, William P. Unger, Milbank, SD  
 \*K0BLH, George C. Stephens, Boulder, CO  
 KB0CDS, Don H. Campbell, Junctionia, MO  
 \*W0CHJ, Clarence S. Schultz, Columbia City, KS  
 W0PKD, Joe W. Addison, Salina, KS  
 N0WJX, Mervin Kirkpatrick, Utica, NE  
 DL2HZM, Hartmut Mueller, Weissenfels, Germany  
 DK8XJ, Reinhard Sieb, Deutsch-Evern, Germany  
 ES7RE, Tiit Praks, Viljandi, Estonia

\*Life Member, ARRL

Note: Silent Key reports must confirm the death by one of the following means: a letter or note from a family member, a copy of a newspaper obituary notice, a copy of the death certificate, or a letter from the family lawyer or the executor. Please be sure to include the amateur's name, address and call sign. Allow several months for the listing to appear in this column.

Many hams remember a Silent Key with a memorial contribution to the ARRL Foundation. If you wish to make a contribution in a friend or relative's memory, you can designate it for an existing youth scholarship, the Jesse A. Bieberman Meritorious Membership Fund, the Victor C. Clark Youth Incentive Program Fund, or the General Fund. Contributions to the Foundation are tax-deductible to the extent permitted under current tax law. Our address is: The ARRL Foundation Inc, 225 Main St, Newington, CT 06111. **QST**

Kathy Capodicasa, N1GZO ♦ Silent Key Administrator

## STRAYS

### FRIENDSHIP FORCE

♦ The "Friendship Force International", a professional exchange home-stay organization, is sponsoring an Amateur Radio trip to Moscow. This journey will be a "ham adventure" of a lifetime as the group tours the city and visits hundreds of Russian amateurs. If you're interested, contact Guy Shields, W4GBU, via e-mail at: [w4gbu@mindspring.com](mailto:w4gbu@mindspring.com). For more information about the program, go to: <http://w4gbu.home.mindspring.com/russia.htm>.

### QST CONGRATULATES WA9CCQ

♦ Raymond Stair, W9CEJ (left), president of the Six Meter Club of Chicago, presents the 1999 Six Meter Club Ham of the Year



award to Karl Weissshapel, WA9CCQ (right), for outstanding service and dedication to Amateur Radio and the Six Meter Club of Chicago.

### BLUEGRASS PRIDE!

♦ Members of the Gateway Amateur Radio Club in Mt Sterling, Kentucky pose with their new ARRL Affiliated Club certificate. The certificate was presented by Todd Schrader, KF4WFZ, ARRL Affiliated Club Coordinator, at the club's January 25 meeting.

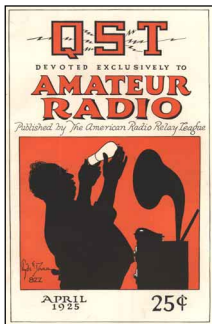
Next Stray



# 75, 50 AND 25 YEARS AGO

## April 1925

◊ The cover, by Clyde Darr, 8ZZ, shows a ham holding a tube up to the light for a visual inspection. The editorial, "This Interference Business," is a bit impatient with the current situation of hams causing increasing amounts of interference to broadcast listeners at a time when the state of the art of transmitting has advanced so far.



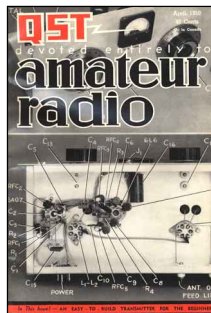
The lead article, "The Reflection of Short Waves," by John Reinartz, 1XAM, presents "an article of the first importance in radio affairs.... We consider this article one of the most important contributions made to radio literature." In it, Reinartz describes the conclusions drawn from extensive radio tests, with diagrams showing how radio waves are reflected from "the Heaviside layer" to reach intercontinental distances. R. R. Batcher discusses "The Design of the Grebe Synchronphase," the latest Grebe receiver, which uses "binocular coils." The article "Navy Picks Schnell for Test" reports that "The Traffic Manager accompanies the Fleet to Australia on Summer Cruise with short wave set signing NRRL. Handy of 1XAH becomes Acting [Traffic Manager]." W. F. Hoffman, 9EK, describes "A Reliable 3 to 5 Meter Sending Set." Glenn Browning presents information on building "The Regenaformer," a receiver that can cover 15 to 200 meters. "The Eclipse Tests" tells the results of radio tests made during the recent solar eclipse, including the joint A.R.R.L.—Scientific American tests. "Fair Warning!" reprints a letter recently received by HQ from the US Department of Commerce's Bureau of Navigation,

wherein interference is addressed. The letter says that "If the amateurs can so construct their transmitters as not to produce interference during the silent hours and fail to do so they will of course not be permitted to use their stations during this period if interference results...." The letter concludes with "Please advise the Bureau promptly what action you are taking." Oh-oh, fellows, it's time to clean up our act!

## April 1950

◊ The cover photo shows the underside view of "A Two-Stage Transmitter for the Beginner," described in this issue. The editorial, "League Control," explains, once again, the organization of the A.R.R.L.

George Lippert, W8YHR, discusses "A 'Constant-Modulation' Phone System," which offers "lowered modulation-power requirements and high over-all efficiency." Don Mix, W1TS, provides the cover article, "A Two-Stage Transmitter for the Beginner." Cary Isley, W3OCZ, writes about "Coupling Unbalanced to Balanced Lines." George Grammer, W1DF, presents Part III of "Eliminating TV with Low-Pass Filters." Lew McCoy, W1ICP, writes of the "Results—Ten-Meter WAS Contest." By Goodman, W1DX, tells how to adjust transmitter keying in "Key Clicks and Receiver Bandwidths." Part I of the "16th Sweepstakes Contest" presents the CW results, with 952 entrants, 82 of whom scored over 100,000 points—a record! W4FU had the top score of 185,400 points. Ed Tilton, W1HDQ, continues



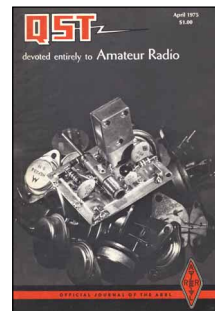
with "A 2-Meter Station for the Novice"—this month's Part III covers the modulator, power supply and control unit. The inimitable and always thought-provoking Larson E. Rapp, W1OU, writes of "50 Years of Progress—A Report on Amateur Radio," with special reference to the New Philosophy of Integers as it applies to RST reports.

## April 1975

◊ The cover photo shows the completed oscillator stage that's in this month's article in the series "Learning to Work with Semiconductors." The editorial presents a thumbnail history of the IARU in "IARU Fiftieth Anniversary."

Jerry Sevick, W2FMI, tells about "Simple RF Bridges."

Under the "Beginner and Novice" banner, John Ellison, W0ERZ, describes "A Ten-Meter Swiss Quad—Missouri Style." Doug DeMaw, W1CER, and Jay Rusgrove, WA1LNQ, tell about transmitter design in Part I of "Learning to Work with Semiconductors." Howard Batie, W7BBX, describes his backpack rig, "The Ultramountaineer." Alek Trahn, KL00GE, describes, in detail, "The Lossless Radiator." [Written in the days when KL call signs used only the number 7, the reader immediately senses that this is a *very special* article—Ed.] Katashi Nose, KH6IJ, describes "A 160-Meter Receiving Loop." A "Stray" shows Ed Handy, W1BDI, receiving his ARRL 50-year plaque. In "Happenings," Dick Baldwin, W1RU, is introduced as the new General Manager of ARRL and the Editor of *QST*. —Al Brogdon, W1AB



## W1AW SCHEDULE

Pacific	Mtn	Cent	East	Mon	Tue	Wed	Thu	Fri
6 AM	7 AM	8 AM	9 AM		Fast Code	Slow Code	Fast Code	Slow Code
7 AM-1 PM	8 AM-2 PM	9 AM-3 PM	10 AM-4 PM	Visiting Operator Time (12 PM - 1 PM closed for lunch)				
1 PM	2 PM	3 PM	4 PM	Fast Code	Slow Code	Fast Code	Slow Code	Fast Code
2 PM	3 PM	4 PM	5 PM	Code Bulletin				
3 PM	4 PM	5 PM	6 PM	Teleprinter Bulletin				
4 PM	5 PM	6 PM	7 PM	Slow Code	Fast Code	Slow Code	Fast Code	Slow Code
5 PM	6 PM	7 PM	8 PM	Code Bulletin				
6 PM	7 PM	8 PM	9 PM	Teleprinter Bulletin				
6 <sup>45</sup> PM	7 <sup>45</sup> PM	8 <sup>45</sup> PM	9 <sup>45</sup> PM	Voice Bulletin				
7 PM	8 PM	9 PM	10 PM	Fast Code	Slow Code	Fast Code	Slow Code	Fast Code
8 PM	9 PM	10 PM	11 PM	Code Bulletin				

W1AW's schedule is at the same local time throughout the year. The schedule according to your local time will change if your local time does not have seasonal adjustments that are made at the same time as North American time changes between standard time and daylight time. From the first Sunday in April to the last Sunday in October, UTC = Eastern Time + 4 hours. For the rest of the year, UTC = Eastern Time + 5 hours.

### ◆ Morse code transmissions:

Frequencies are 1.818, 3.5815, 7.0475, 14.0475, 18.0975, 21.0675, 28.0675 and 147.555 MHz.

Slow Code = practice sent at 5, 7<sup>1/2</sup>, 10, 13 and 15 wpm.

Fast Code = practice sent at 35, 30, 25, 20, 15, 13 and 10 wpm.

Code practice text is from the pages of *QST*. The source is given at the beginning

of each practice session and alternate speeds within each session. For example, "Text is from July 1992 *QST*, pages 9 and 81," indicates that the plain text is from the article on page 9 and mixed number/letter groups are from page 81.

Code bulletins are sent at 18 wpm.

W1AW qualifying runs are sent on the same frequencies as the Morse code transmissions. West Coast qualifying runs are transmitted on approximately 3.590 MHz. At the beginning of each code practice session, the schedule for the next qualifying run is presented. Underline one minute of the highest speed you copied, certify that your copy was made without aid, and send it to ARRL for grading. Please include your name, call sign (if any) and complete mailing address. Send a 9x12-inch SASE for a certificate, or a business-size SASE for an endorsement.

### ◆ Teleprinter transmissions:

Frequencies are 3.625, 7.095, 14.095, 18.1025, 21.095, 28.095 and 147.555 MHz.

Bulletins are sent at 45.45-baud Baudot and 100-baud AMTOR, FEC Mode B. 110-baud ASCII will be sent only as time allows.

On Tuesdays and Fridays at 6:30 PM Eastern Time, Keplerian elements for many amateur satellites are sent on the regular teleprinter frequencies.

### ◆ Voice transmissions:

Frequencies are 1.855, 3.99, 7.29, 14.29, 18.16, 21.39, 28.59 and 147.555 MHz.

### ◆ Miscellanea:

On Fridays, UTC, a DX bulletin replaces the regular bulletins.

W1AW is open to visitors from 10 AM until noon and from 1 PM until 3:45 PM on Monday through Friday. FCC licensed amateurs may operate the station during that time. Be sure to bring your current FCC amateur license or a photocopy.

In a communication emergency, monitor W1AW for special bulletins as follows: voice on the hour, teleprinter at 15 minutes past the hour, and CW on the half hour.

Headquarters and W1AW are closed on New Year's Day, President's Day, Good Friday, Memorial Day, Independence Day, Labor Day, Thanksgiving and the following Friday, and Christmas Day.



# 2000 IARU HF World Championship Rules

**1. Eligibility:** All licensed amateurs worldwide.

**2. Object:** To contact as many other amateurs, especially IARU member society HQ stations, around the world as possible using the 160, 80, 40, 20, 15 and 10 meter bands.

**3. Date and Contest Period:** The second full weekend of July, beginning 1200 UTC Saturday and ending 1200 UTC Sunday (July 8-9, 2000). Both Single and Multi operator stations may operate the entire 24-hour period.

**4. Entry Categories:**

4.1. Single Operator

4.1.1. Categories

4.1.1.1. Phone only

4.1.1.2. CW only

4.1.1.3. Mixed mode

4.1.2. One person performs all operating and logging functions.

4.1.3. Use of spotting nets or packet is not permitted.

4.1.4. All operators must observe the amateur radio regulations of their country at all times.

4.1.5. Single operator stations are allowed only one transmitted signal at any given time.

4.2. Multi Operator, Single Transmitter, Mixed Mode only

4.2.1. Must remain on a band and mode for at least 10 minutes before changing bands or modes.

4.2.2. Only one transmitted signal is allowed at any given time.

4.2.2.1. Exception: Only IARU member society HQ stations may operate simultaneously on more than one band, with one

transmitter on each band and mode.

4.2.2.2. Only one HQ station call sign per member society per frequency band is permitted

4.2.3. All operators must observe the amateur radio regulations of their country at all times.

**5. Contest Exchange:**

5.1. IARU member society HQ stations send signal report and official IARU member society abbreviation. IARU club station NU1AW counts as a HQ station. Members of the IARU Administrative Council and the three IARU regional Executive committees send "AC," "R1," "R2," and "R3" as appropriate.

5.2. All others send signal report and ITU zone.

5.3 A complete exchange must be logged for each valid QSO.

**6. Valid Contact:**

6.1. The same station may be worked once per mode per band for QSO credit.

6.1.1. Mixed-mode entries may work a station once per mode per band.

6.2. A station may only be worked for credit in the portion of the band that is generally accepted for the mode used.

6.2.1. On any band, a station may be worked once on phone (in the phone segment) and once on CW (in the CW segment).

6.2.2. Cross mode, cross band and repeater contacts are not valid QSOS.

6.3 Where contest-preferred segments are incorporated in regional band plans, participants should observe them.

6.4 The use of non-amateur radio means of communications (eg, telephone or

the Internet) for the purpose of soliciting a contact (or contacts) during the contest period is inconsistent with the spirit and intent of these rules.

6.5 Active use of packet (i.e. "please come work me" or other self-spotting techniques) is inconsistent with the spirit and intent of these rules.

**7. QSO Points:**

7.1. Contacts within your own ITU zone, as well as QSOS with any IARU member society HQ stations, count one point.

7.1.1. Contacts with a station in the same ITU zone but on a different continent count one point.

7.2. Contacts within your continent (but different ITU zone) count three points.

7.3. Contacts with a different continent and IARU zone count five points.

**8. Multipliers:** The total number of ITU zones plus IARU member society HQ stations worked on each band (not mode.) IARU officials represent a maximum of four multipliers per band (AC, R1, R2 and R3)

8.1. IARU member society HQ stations and officials do not count for zone multipliers.

**9. Scoring:** The total number of QSO points times the total number of multipliers worked.

**10. Reporting:**

10.1. Entries must be postmarked or emailed no later than 30 days after the end of the contest (August 8, 2000). No late entries can be accepted. Entries that are received after mid-October, 2000, even if mailed in time, may not be received in time to be included in the official results.

**Prefix, Continent and ITU Zone**

1A0	EU	28	8P	NA	11	CT	EU	37	FY	SA	12	LA-LN	EU	18	T33	OC	65	VP2	NA	11
1S	AS	50	8Q	AS,AF	41	CT3	AF	36	G-GX, M-MX	EU	27	LO-LW	SA	14, 16	T5	AF	48	VP5	NA	11
3A	EU	27	8R	SA	12	CU	EU	36	H4	OC	51	LU	EU	27	T7	EU	28	VP8(F)	SA	16
3B6-9	AF	53	9A	EU	28	CV-CX	SA	14	HA, HG	EU	28	LX	EU	29	T9	EU	28	VP8	SA	73
3C	AF	47	9G	AF	46	CY	NA	09	HB, HE	EU	28	LY	EU	28	TA-TC	EU/AS	39	VP9	NA	11
3C0	AF	52	9H	EU	28	D2, 3	AF	52	HC, HD	SA	12	OA-OC	SA	12	TF	EU	17	VQ9	AF	41
3D2	OC	56	9I-9J	AF	53	D4	AF	46	HH	NA	11	OD	AS	39	TG, TD	NA	11	VR6	OC	63
3D2(R)	OC	56	9K	AS	39	D6	AF	53	HI	NA	11	OE	EU	28	TI, TE	NA	11	V56, VR2	AS	44
3D2(C)	OC	56	9L	AF	46	DA-DL	EU	28	HJ-HK	SA	12	OF-OI	EU	18	TJ	AF	47	VU	AS	41, 49
3DA	AF	57	9M2, 4	AS	54	DU-DZ	OC	50	HK0(M)	NA	12	OH0	EU	18	TK	EU	28	XA-XI	NA	10
3V	AF	37	9M6, 8	OC	54	E3	AF	48	HKO	NA	11	OJ0	EU	18	TL	AF	47	XA4-XI4	NA	10
3W, XV	AS	49	9N	AS	42	E4	AS	39	HL, DS	AS	44	OK-OL	EU	28	TN	AF	52	XT	AF	46
3X	AF	46	9O-9T	AF	52	EA-EH	EU	37	HO-HP	NA	11	OM	EU	28	TR	AF	52	XU	AS	49
3Y	AF	67	9U	AF	52	EA6-EH6	EU	37	HO-HR	NA	11	ON-OT	EU	27	TT	AF	47	XW	AS	49
3Y(P)	AN	72	9V	AS	54	EA8-EH8	AF	36	HS, E2	AS	49	OY	NA	5, 75	TU	AF	46	XX9	AS	44
R1MV	EU	29	9X	AF	52	EA9-EH9	AF	37	HV	EU	28	OX	EU	18	TY	AF	46	XY-XZ	AS	49
R1FJ(FJL)	EU	75	9Y-9Z	SA	11	EI-EJ	EU	27	HZ	AS	39	OZ	EU	18	TZ	AF	46	YA	AS	40
4K	AS	29	A2	AF	57	EK	AS	29	I,ISO,IMO	EU	28	P2	OC	51	RA-RZ, EU/	19-26,	YB-YH	OC	51, 54	
4L	AS	29	A3	OC	62	EL	AF	46	J2	AF	48	P4	SA	11	UA-UI	AS	29-35,	YI	AS	39
4P-4S	AS	41	A4	AS	39	EP-EQ	AS	40	J3	NA	11	PA-PI	EU	27	UJ-UM	AS	30	YJ	OC	56
4U(ITU)	EU	28	A5	AS	41	ER	EU	29	J5	AF	46	PJ2, 4, 9	SA	11	UN-UQ	AS	30, 31	YK	AS	39
4U(UN)	NA	08	A6	AS	39	ES	EU	29	J6-8	NA	11	PJ5,6,7,8	SA	11	UR-UZ,EM-	EU	29	YL	EU	29
4X, 4Z	AS	39	A7	AS	39	ET	AF	48	JA-JS, 7K-N	AS	45	PP-PY	SA	12,13, 15	EO		YN	NA	11	
5A	AF	38	A9	AS	39	EU, EV, EW	EU	29	JD(Minami)	OC	90						YO-YR	EU	28	
5B	AS	39	AP-AS	AS	41	EX	AS	30, 31	JD	AS	45						YS	NA	11	
5H-5I	AF	53	BV	AS	44	EY	AS	30	(Ogasawara)								YT, YU, YZ	EU	28	
5N-5O	AF	46	BY, BZ, BT	AS	33, 42, 44	EZ	AS	30	JT-JV	AS	32, 33	PY0(T)	SA	15	V5	AF	57	YV-YY	SA	12
5R-5S	AF	53				F1	EU	27	JW	EU	18	S0	AF	37	V6-7	OC	65	YO	NA	11
5T	AF	46	C2	OC	65	FG	NA	11	JX	EU	18	S2	AS	41	VE,VA,VO,	NA	2-4, 9,	Z2	AF	53
5U	AF	46	C3	EU	27	FJ, FS	NA	11	JY	AS	39	S5	EU	28	VY	75	Z3	EU	28	
5V	AF	46	C5	AF	46	FH	AF	53	K,W,N,	NA	6, 7, 8	S7	AF	53	VK	OC	55, 58,	ZA	EU	28
5W	OC	62	C6	NA	11	FK	OC	56	AA-AK			S9	AF	47		59	ZB	EU	37	
5X	AF	48	C8-9	AF	53	FM	NA	11	KG4	NA	11	SA-SM	EU	18	VK(LHI)	OC	60	ZC4	AS	39
5Y-5Z	AF	48	CA-CE	SA	14, 16	FO (Clip)	NA	10	KH0	OC	64	SN-SR	EU	28	VK9(W)	OC	55	ZD7-9	AF	66
6V-6W	AF	46	CE0A	SA	63	FO	OC	63	KH1	OC	61, 62	ST	AF	47, 48	VK9(X)	OC	54	ZF	NA	11
6Y	NA	11	CE0X	SA	14	FP	NA	09	KH2	OC	64	SV	AF	38	VK9(C, K)	OC	54	ZK1-3	OC	62
70	AS	39	CE0Z	SA	14	FR	AF	53	KH3-7	OC	61	SV-SZ, J4	EU	28	VK9(M)	OC	56	ZL-ZM	OC	60
7P	AF	57	CM, CO	NA	11	FTBW	AF	68	KH8	OC	62	T2	OC	65	VK9(N)	OC	60	ZP	SA	14
7Q	AF	53	CN	AF	37	FTBX	AF	68	KH9	OC	65	T30	OC	65	VK0(H)	AF	68	ZR-ZU	AF	57
7T-7Y	AF	37	CP	SA	12, 14	FTBZ	AF	68	KL	NA	1, 2	T31	OC	62	VK0(M)	OC	60	ZS8	AF	57
						FW	OC	62	KP1-5	NA	11	T32	OC	61, 63						

10.2. For 2000, the Cabrillo file format is preferred for electronic entries, but any previously acceptable ASCII text format will be accepted. Spreadsheet or program document files (example: Excel, Word) do not meet file format requirements.

10.2.1. The Cabrillo file format and specifications may be found at the <http://www.kkn.net/~trey/cabrillo/> or in the November 1999 issue of *QST* magazine.

10.2.2. Any entry which has been generated using a computer (either during the contest or after the contest) must be submitted either as an attachment to an email or on a 3.5-inch diskette.

10.2.3. Electronic files must use the entrant's callsign as the file name.

10.2.4. The log file must be a chronological list of QSOs as made, not separated by band or mode.

10.2.5. Entries sent as attachments to email must be sent to [IARUHF@iaru.org](mailto:IARUHF@iaru.org).

10.2.6. Entries sent on diskette should be mailed to: IARU HF Championship, IARU International Secretariat, Box 310905, Newington, CT 06111.

10.2.6.1. Diskettes must be clearly

labeled with the station call sign, contest name, entry class and date.

10.2.7. Electronic entries may be sent by anonymous FTP to: <ftp:arrrl.org/logs/>

10.3. Paper logs must clearly indicate for each contact: band, mode, date, time (in UTC) callsigns, complete exchanges sent and received, multipliers and QSO points.

10.3.1. Multipliers should be marked in the paper log only the first time they are worked on each band.

10.3.2. Paper logs with more than 500 QSO's must include dupe sheets.

10.3.3. All contacts in paper logs must be in chronological order, not separated by bands.

10.4. All paper entries must include an official summary sheet or reasonable facsimile thereof with complete contest information.

#### 11. Awards:

11.1. A certificate will be awarded to the high scoring entry in each category in each US state, each ITU zone and each DXCC country.

11.2. A certificate will be awarded to the highest scoring IARU member society HQ station.

11.3. Achievement level awards will be issued to those making at least 250 QSOs or having a multiplier total of 50 or more.

11.4. Additional awards may be made at the discretion of each country's IARU member society.

**12. Conditions of Entry:** Each entrant agrees to be bound by the provisions of this announcement, by the regulations of his/her licensing authority, and by the decisions of the ARRL Awards Committee, acting for the IARU International Secretariat.

**13. Disqualification:** Any entry may be disqualified if the overall score is reduced by more than 2%. Score reductions do not include correction of arithmetic errors. Any entry may be disqualified if more than 2% of duplicate QSOs are left in the log. A three-QSO reduction will be assessed for each duplicate QSO found during log checking or for mis-copied callsigns.

**14. For contest information,** contact [n1nd@iaru.org](mailto:n1nd@iaru.org) or IARU HF Contest Information, PO Box 310905, Newington, CT 06111.

14.1. Contest forms may be downloaded at: <http://www.iaru.org/contest.html>. 

## NEW BOOKS

### A RADAR HISTORY OF WORLD WAR II

By Louis Brown

First edition. Copyright 1999 by Institute of Physics Publishing, Dirac House Temple Black, Bristol, BSI 6BE England; tel 0117-929-7481; <http://bookmark.iop.org/>. Hardcover, 6 x 9 inches, 584 pages. \$38.

Reviewed by Steve Ford, WB8IMY  
QST Managing Editor

◇ Don't let the title of this book intimidate you (or the name of the publishing house, for that matter). *A Radar History of World War II* is a fascinating read.

Author Louis Brown begins with a taut description of the perils faced by German Vice Admiral Gunther Lütjens as he uses one of the first primitive naval radars to avoid the Royal Navy (and a fleet of icebergs) in the waters between Greenland and Iceland. Brown provides other historical examples as well, all written in a style that echoes of Tom Clancy.

From the first chapter Brown follows the explosive development of radar as hostilities erupt in Europe. He does this without bombarding you with equations and diagrams. Instead, Brown keeps the pace moving smartly, giving relevant technical details but not allowing arcane information to derail the narrative.

A good historical text is almost guaranteed to torpedo at least a few of your comfortable assumptions. I found myself taken aback by Brown's exposure of the huge gaps in my knowledge of radar and how it had been used during the war. I knew, for example, that English coastal radar stations had played an important role in warning of Luftwaffe attacks. What I didn't know was

that by the end of the war radar was in the air as well—even aboard some types of fighter aircraft. Radar was also directing both German and British anti-aircraft batteries on the ground. Both sides even resorted to elaborate radar jamming.

Brown's delivery is wry and opinionated, which is part of what makes *A Radar History of World War II* such a pleasure to read. Tesla fans beware: Brown credits Tesla with at least conceiving the idea of radar, but then states that Nikola squandered the idea as he "descended into self-delusion." Ouch!


Brown's dry wit is evident throughout. At one point he describes the failed attempts of the Soviets to develop radar in the early days of the war...

"Whoever wishes to learn how governments fail in the duties of protecting their peoples from disaster should study the history of the Soviet Union; whoever wishes to learn how competent engineers can best be thwarted in their efforts to provide weapons vital for defense should study the history of Soviet radar."

Brown discusses radar applications not only in Europe, but in the battle for the Pacific as well. In one chapter he describes how a radar-savvy American battleship commander used the new detection device to catch a Japanese flotilla utterly by surprise in the dead of night.

*A Radar History of World War II* is illustrated with excellent black and white photography. Of course, there are multitudes of radar antenna, installation and operator images. One interesting photo in particular shows exactly how the first radar worked. Rather than the customary radar "beam" sweeping around a circle (known as a plan position indicator), the earliest radar used something that looked more like a standard oscilloscope or spectrum analyzer display. A large vertical

spike on the left-hand side of the screen indicated the transmitter pulse while the distant target echoes appeared as smaller spikes farther to the right.

*A Radar History of World War II* is definitely intended as a scholarly work, probably with college students in mind. The book is thoroughly footnoted and indexed. Even so, Brown's writing broadens the appeal of *A Radar History of World War II* to include anyone with some technical knowledge and an interest in understanding how this remarkable radio technology played a crucial role in human history. 

## STRAYS

### DAYTON QRP BANQUET


◇ Tickets are on sale for the 2000 Dayton QRP Banquet. This festive dinner will be held Friday, May 19, 2000, at 7:00 PM at the Days Inn Dayton South in Miamisburg, Ohio. The cost is \$25 per person. The banquet speaker is QRP Hall of Famer and Norcal/Wilderness/Elecrafter designer Wayne Burdick, N6KR. To register for the banquet, send a check or money order in the amount of \$25 (per ticket), payable to QRP ARCI to:

Scott Rosenfeld, N7JJ  
766 Brookside Dr  
Eugene, OR 97405-4931

Please include an SASE so that the tickets can be mailed to you.

## FEEDBACK

◇ Please refer to Charlie Cheney, K1LDZ, "The QR Ser: A CW Operating Aid," *QST*, Mar 2000, p 36, endnote 4. Strike the text "Price: \$27.50" at the end of the note. The prices given earlier in the in the footnote are correct.

Disregard the text on page 36 referring to the below-board installation of D2. Current PC-boards have provisions for mounting D2. 



# Straight Key Night 2000

As the clock counted down to Y2K, this was a night to remember!

**In** this day of “modern technology” it is sometimes hard to remember when life was a bit less complicated. Labor saving devices have certainly reduced the “workload” for society. I don’t know many who would give up their dishwashers, washing machines or power lawn mowers to revert back to scrubbing dishes by hand, cranking clothes through wringers, or spending hours pushing old spinning blade mowers across acres of yard.

“High Tech” permeates ham radio as well. When you inventory the typical ham shack today, you will find pretty much the same laundry list of equipment. An HF transceiver, VHF/UHF equipment, books, antenna switches and the ever-present personal computer (for performing a myriad of duties from logging and operating packet to whiling away a few hours playing *Freecell* while trying to bust the latest DX pileup)—all standard.

But in many shacks, at least on New Year’s, a strange piece of gear will appear. Hundreds of operators put aside those new-fangled electronic gadgets and reach into their secret storage places and pull out odd contraptions. Some will be simple; others more complex. But all are the same in basic principle: two conductors insulated from each other but with the ability to be pressed together to complete a circuit and cause a “Continuous Wave” of radio energy to be released from the transmitter. On this day many operators are seemingly transported back in time and participate in what we know as Straight Key Night (SKN).

## A Special Celebration

SKN 2000 took on a special meaning. Whether you viewed January 1, 2000 as the start of the last year of the second millennium or the first day of the third millennium, hams with a passion for CW and an appreciation for the nostalgic took to the airways and completed thousands of QSOs. An examination of the logs showed several hundred different callsigns of operators who participated.

If one considers good CW as a “symphony for the ears” then the bands were alive with stirring melodies. Fifty-seven different



**W6AQ/KH6 pounded brass as the surf gently pounded the beach at his Hawaii home during Straight Key Night 2000.**

“maestros” were nominated by their peers for having the “best fist” in SKN 2000. After the chorus of suggestions subsided, **John Riles, WA3WNK**, of Duquesne, Pennsylvania emerged as the “Best Fist.” Quite an accomplishment when you consider a jury of your peers is always tough.

It was equally difficult for the orchestra of operators to select the “best score” (Most Interesting QSO) of the 24 hour event. Forty-three “composers” were recommended by their peers in this category. In another very close contest, three operators emerged tied for the honor in the eyes of the other operators. Congratulations to **Brian Roberts, K9VKY**, of Fombell, Pennsylvania; **John Hall, W5ETK**, of Dallas, Texas and **Carl Volker, NW3H**, of Mohrsville, Pennsylvania for participating in the top-ranked “Most Interesting QSO.”

Artisans who can “turn out” a large volume of good work are to be admired. In that vein, special kudos go out to **Margaret Putnam, WP2T**, of Elgin, Illinois who produced 56 quality QSOs during the 24 hours of SKN. This is quite a feat, considering that the normal SKN QSO is more than a quick signal report, name and QTH exchange. Runners-up in this were **Ronald Clark, K3SEW** of Northumberland, Pennsylvania; **Robert Sechler, K3PX**, of Middle Island, New York and **Charles Nevel, W3KSO**, of Pocono Summit, Pennsylvania. They all completed over 30 QSOs during SKN.

The time of Arthur Clarke’s landmark book *2001 A Space Odyssey* looms before us as we look ahead to the next annual gathering of Brass Pounders. We’re not certain

if the contacts of the 21st Century and the 3rd Millennium will be a space odyssey. But modern technology will make contacts with shuttle astronauts or the inhabitants of the international space station commonplace soon. Perhaps contact with extraterrestrials may be on the horizon. But we are certain that at 0000 UTC on January 1, 2001 anyone interested will be able to venture nostalgically back to the simpler times via the harmony of sounds on the air during SKN 2001.

## Soap Box

The *only* radio event I look forward to more than SKN is Field Day. SKN’s casual operating style and ragchew QSOing has far more appeal than other contests. (N8KC)... K5HPF told me he had made Y2K changes to his rig. All 1999-Ω resistors were changed to 2 kΩ for the occasion. (KG4DUF)... A real nostalgia trip when working stations running vintage gear (NQ4Q)... Nice to see many of the ops firing up the ‘boat anchors’ for this event (VE7SL)... Stations were using a lot more of the band segment. Not so crowded. SKN is definitely kick-back, low-stress CW (W6SGJ)... Had to reduce SKN activity this year because of involvement in Y2K net. Looking forward to next year’s SKN and working more stations (W0HXL)... No Y2K bugs here. Just a sore arm after all the dits and dahs were hammered out on my old Speed-X key (WA0VQY)... The shack smelled of hot wax and heated mildew from the HRO-5 and a variety of Heathkit transceivers where added to the day’s effort (K9VKY)... When everyone is fast asleep, I put on my headphones and talk to the world on CW—something I can’t do on SSB for fear of waking the household (WA2ELW)... I used 10 different straight keys during the event, changing every few QSOs. Each was connected to the transceiver via a 1/4-inch plug via an antique cast brass/bronze jack with “Thos. A. Edison, Inc” inscribed in the casting (K3PX)... During the QSO with LA7SKN, civic authorities here began a New Year’s fireworks display. Air bursts and loud! Be alert. Sometimes the best filter is between your ears (K9LCK)... My brother W4AGI and father W5KL and I have worked SKN for over 25 years. I doubt if many “ham” families can equal that (W4YE) [Both sons now hold call signs previously held by Dad—Ed]... I am not aware of any other event which honors operators of the past who have enriched this hobby, which I recently adopted (KC0FMA)... Had no Y2K problems here in Dallas, but I had my 2 kW gas-powered generator ready just in case. I wasn’t going to miss SKN! (W5ETK)... One of my QSOs was with Fairbanks, Alaska where the temperature was -53° F. At that time here in Honolulu it was 80° F. I wonder if that 133° temperature spread is an SKN record? (W6AQ/KH6)

**Q5T-**

# SECTION NEWS

## The ARRL Field Organization Forum

### Field Organization Abbreviations

ACC	Affiliated Club Coordinator
ARES	Amateur Radio Emergency Service
ASM	Assistant Section Manager
BM	Bulletin Manager
BPL	Brass Pounders League
DEC	District Emergency Coordinator
DXFR	DX Field Representative
EC	Emergency Coordinator
LGL	Local Government Liaison
NCS	Net Control Station
NM	Net Manager
NTS	National Traffic System
OBS	Official Bulletin Station
OES	Official Emergency Station
ORS	Official Relay Station
OO	Official Observer
OC	Official Observer Coordinator
PBBS	Packet Bulletin Board Station
PIC	Public Information Coordinator
PIO	Public Information Officer
PSHR	Public Service Honor Roll
SGL	State Government Liaison
SEC	Section Emergency Coordinator
SM	Section Manager
STM	Section Traffic Manager
TCC	Transcontinental Corps
TA	Technical Advisor
TC	Technical Coordinator
TS	Technical Specialist
VC	Volunteer Counsel
VEE	Volunteer Consulting Engineer
VE	Volunteer Examiner

### ATLANTIC DIVISION

**DELAWARE:** SM, Randall Carlson, WB0JXX—Many thanks to those who participated in the Delaware QSO party. It's important to continue to let folks know that there is indeed Amateur Radio activity in Delaware. Thanks also to the FSARC for again sponsoring the event. When April 16 rolls around many of you will be gaining additional privileges. To those that are gaining 80 meter phone privileges for the first time, I would like to invite you to join the Delaware Traffic Net and the Delaware Emergency Phone Nets. The Delaware Traffic Net meets daily Monday through Friday at 1830 local time on 3.905 MHz. The Delaware Emergency Phone Net meets on Saturday at 1800 local time, also on 3.905 MHz. Both nets are affiliated with the National Traffic System. They also will provide an excellent opportunity to meet some of your fellow Delaware hams. Traffic (Jan) DTN QNI 196 QTC 13 in 21 sess.; DEPN QNI 48 QTC 1 in 5 session. K3JL 42, WB0JXX 2, 73, Randall.

**EASTERN PENNSYLVANIA:** SM, Allen R. Breiner, W3TI—SECT: Eric Olena, WB3FPL. ACC: Steve Maslin. OOC: Alan Maslin, N3EA. PIC: E. Max Peters, K16NJ. STM: Paul Craig, N3YSI. TC: Cully Phillips, N3HTZ. SGL: Allen Breiner, W3ZFR. ASMs: K3CFFV, N3YSI, WB2YGA, K3TX, N3KYZ, WB3FQY, W3KOD. Sorry for the short report. My thanks to all who sent cards and made telephone calls during my open-heart surgery and recuperation. We're looking forward to Spring. Traffic (January): N3YSI 371, N3EFW 207, K3EAB 148, W3IPX 121, N3HK 120, W3KOD 61, W3UAQ 52, K3TX 49, W3JXK 40, N3SW 36, KA3LVP 19, N3AT 18, W3DP 14, K3CKO 14, W3NNL 12, N3AO 10, W3ZQN 7, W3BNR 6, N8JSO 6, KA3KMH 6, W3ROO 5, N3KYZ 5, K3BCKD 5, N3AS 5, K3ARR 4, W3DAB 3, KB3CVO 2, KB3BBR 2.

**MARYLAND/DC:** SM, Bill Howard, WB3V—MDC Section Web homepage [www.erois.com/wb3v/mdc/](http://www.erois.com/wb3v/mdc/). ANAR EC N3QXW reports 38 members, 4 ANAR ARES Net sessions on 147.805 with liaison to EPA, NCAC, MPEP, WVA, BTN, and MDD. The EC attended Y2K & Winter Storm preparation meetings at the EOC, and ARES/RACES members staffed EOC radio room from 0800 on 12/31, to 0200 1/1/00. FRED EC N8AAAY reports 10 members and 5 Fredrick County ARES net sessions on 147.06. CARO RO NV3V has the new call W3FA. PRGE EC W3J3N reports activity during the recent snowstorm. He was requested by PRGE EM director to place personnel at the EOC. He contacted Jim, KD3JA from CMARC, and GMRA for permission to use the GMRA Repeaters 146.61 and 146.88 for ARES activities. The Laurel Amateur Radio Club had 9 members helping the Laurel Regional Hospital with its 4wd program. They set up net control at the hospital station on 147.54 simplex and monitored 146.61 so W3J3N could be in contact with the EOC. Members rode along with 4wd volunteers, some of whom did not have cell phones. The station was secured at 1900 per request of the hospital. At the request of Kay Graham, we supplied one operator for the EOC station from 1000 - 1400 on 26 January. We had an operator standing by to ride with a 4wd if needed. CARR EC N3JIA reports 64 members and 4 net sessions on 145.410

with liaison to MPEP, MDD, and MSN by KE3FL, and liaison to BTN, WVPN, DTN, MPEP, Central Net, and Western Net by KG6TU. OES reports received from KE3FL WX3F N3JIA N3TOT and N3SOK. I was very pleased to see ARRL standup for the spread spectrum regulations. As a member of the original ARRL AD HOC committee on spread spectrum I have a continuing interest. I'm getting the shack setup for psk31 on 20M, see you there. 73 - Bill Howard WB3V - and with the nets: Net/NM/QND/QTC/QNI: MSN/KC3Y/31/48/375, MPEP/N3WKE/31/54/656, MDD/WJ3K/65/276/857, MDD Top Brass: KJ3E 294, AA3SB 174, K3JL 177, BTN AA3LN, 31/46/396, SMN/KE3OX/no report. Tfc: KK3F 594, KJ3E 328, N3QA 257, AA3SB 138, AA3GV 134, W3YVQ 91, WB4FDT 80, N3WKE 67, N3DE 55, N3WK 45, W3CB 44, KO4A 40, KC3Y 38, KB3AMO 37, WJ3K 31, K3CSX 28, N3KGM 22, WA1QAA 16, W3YD 16, N3ZKP 14, W3VK 11, N3EGF 11, W3FZT 8, WA3WRT 6, KE3FL 2, KD3JK 1, Dec: KE3FL 4. PSHR: KK3F 218, KJ3E 171, K3CSX 150, AA3GV 139, N3WKE 136, W3YVQ 133, AA3SB 130, KO4A 130, N3WK 121, WA1QAA 119, KD3JK 117, W3VK 116, N3ZKP 101, KC3Y 100, W3CB 96, KB3AMO 92, KE3FL 82, DEC KE3FL 72.

**NORTHERN NEW YORK:** SM, Chuck Orem, KD2AJ—Web: <http://www.northernnet.org/nyham>. ASMs: KD2AJ, WB2KLD, N2ZMS, WA2RLW. ACC: WZ2T. BM: KA2JX. OOC: N2MX. PIC: N2SZK. SEC: KF2GC. STM: N2ZGN. TC: N2JKG. On February 15 I attended a Ham Radio breakfast meeting at Clarkson University, Potsdam NY in St Lawrence County. There were about 50 attending from Essex, Clinton, Franklin and St Lawrence counties. The meeting was very interesting and met a lot of old friends and met a number of new amateurs. After breakfast we went on to Canton NY and had the opportunity to tour the St Lawrence County OC and the RACES station. A great job has been accomplished in St Lawrence County for Emergency Services. The CVARC has downgraded their hamfest on April 29 to a ham radio flea market and computer show. The event will still be April 29 at the St Peters School in Plattsburgh, and can be held indoors in the event of bad weather. They seem to be having trouble getting vendors to travel so far north. 73, KD2AJ.

**SOUTHERN NEW JERSEY:** SM, Jean Priestley, KA2YKN (@K2AA) e-mail: [ka2ykn@arrl.org](mailto:ka2ykn@arrl.org)—ASM: W2BE K2WB W2OB N2OO. SEC: N2SRO. STM: WB2UVB. ACC: KB2ADL. SGL: W2CAM. OOC: K2PSC. PIC: N2YJA. TC: W2EKB. TS: W2PAU, W2BE, WB2MNF, KD4HZW, WB3JIB, N2QNX, N2XFM, WA2NBL, AA2BN. I'm pleased to announce that Kay Craigie, WT3P, is now 2nd Vice President at ARRL. Kay is highly qualified and has the best teacher, Hugh Turnbull. We extend congratulations to Bernie Fuller, N3EFN, on moving up to Atlantic Div Director. Although I'll miss working with Kay, I look forward to working with Bernie. You will have an opportunity to meet Bernie at the "Hamfest by the Shore" in August. SNJ is proud of John Dilks, K2TQN. John's passion for old radios and his traveling display are very well known in the Amateur community. He is now writing a monthly column for QST on old radios. Well done, John. We look forward to your column. January stats: WA2CUW 108, WB2UVB 98, AA2AV 73, K2UL 72, KB2RTZ 71, K2UL-4 69, N2VQA 24, KA2CQX 19, N2WFX 17, N2WFN 12, W2AZ 12, KB2VYZ 8, WX2NJ 6, N2ZMI 6, K2CFVSR, KB2YJD 3, NN2Y K2CAZO 2, K2BWC RB2YBM KB2ETU. 1. QNI rpts: Jersey Phone Net 203 NJ Net Early 240 NJ Net Late 215 NJ Morsing 207 NJ Slow Net 169 Jersey Shore Amateur Radio Soc Net 447 SJVN 351.

**WESTERN NEW YORK:** SM, Scott Bauer, W2LC — Congratulations to Bill, W2MTA, on 20 years of fine service to the ARRL & WNY as SCM and SM. BAPRA hosted Bill & Betty for a fine send-off into SM retirement. Bill, please accept a big THANK YOU from everyone in WNY! I am honored that Bill chose me to succeed him as SM. Trivia: Who ran against W2MTA for SCM 20 years ago? Hamfests: March 25, Drumline at Newark; May 6, Owego; June 2-4 Rochester, Atlantic Division Convention. Remember to send hamfest info early. Congratulations to: ARAST for a fine Y2K effort at the Chemung County EMO. Really impressed EMO Dir Michael Smith, nice web page too; and Yates ARC for doing a code practice prior to the start of their monthly meeting, nice idea! Welcome to Jack, W2QYT, new Cayuga Cty EC, and Jeff, KC2EOT, new ORS. Have club or section news? I want to hear from you! How about that Kid's Day on Jan 17? See Dec QST. Lots of kids talking on the radio, many licensed kids too! How about KB0VVT an Extra at age 8! Thanks Boring ARC for starting a great event. See you in the June event.

Net	NM	Sess	QNI	OSP	Net	NM	Sess	QNI	OSP
BRVSN	WB2OFU	31	252	3	VHFTTHN	N2JRS	1	20	0
CNYTN	WA2PUU	31	354	56	CHN	W2EAG	31	204	42
NYPHONE	N2LTC	31	223	309	EBN	WB2JLZ	22	461	0
NYS/IE	WB2QIX	31	425	214	NYPON	N2YJZ	31	365	176
NYS/M	KA2GJV	31	257	91	NYS/L	W2YWG	31	285	205
NYS/STEN	K2D2	31	367	50	NYS/SCN	W2MTA	5	24	4
OCTENE	KA2ZNZ	31	1692	190	OARC	N2KPR	4	4	5
OCTENL	KA2ZNZ	31	639	178	SDTN	N2WDS	9	44	9
OMEN	K2DYB	2	14	1	W/DNL	KB2UOZ	31	542	32
WDN/IE	N2JRS	31	659	118	STAR	N2NCB	31	426	20
WDN/M	KB2VVD	31	632	85					

Traffic (Jan 2000). \* indicates PSHR, # indicates BPL: N2LT#\* 842, KA2ZNZ\* 475, W2MTA\* 371, KA2GJV\* 320, KF1L\* 269, WB2JLH\* 249, NN2H\* 211, W2IG\* 201, W2P1\* 121, WB2QIX\* 117, W2FR\* 113, N2KPR\* 76, K2GTS\* 73, KB2VVD\* 72, KG2D\* 65, AA2ED\* 63, AF2K\* 62, NY2V\* 50, KA2DBD\* 50, N2CCN\* 47, KB2UOZ\* 44, KC2EOT\* 41, N2WDS\* 34, K2DN\* 23, KB2ETO\* 22, W2LC\* 17, NY2CQ\* 15, KB2W1I\* 13, W2RH 10. Digital; Stn Rx/Tx: K2DN 0/0, KA2GVJ 39/5, N2LTC, 189/

133, NY2V 1/3. If you don't see your net/call, that's because I didn't get your report. Send reports promptly at the end of each month. A station appointment application form is now on-line. Link thru WNY Web Page at <http://www.dreamscape.com/phaedrus/WNY/> or my home page at <http://pw2.netcom.com/~w2lc/w2lchome.htm>. Thanks to N2IKR for maintaining the WNY Section Web Page. Net Managers take note: April brings relaxed requirements for HF operation. Start recruiting for those VHF/Section Net slots.

**WESTERN PENNSYLVANIA:** SM, John Rodgers, N3MSE—ASM-ARES: WB3KGT. ACC: open. SEC: N3SJR. ASM-Packet: KE3ED. ASM-Youth & Education: KE3EE. OOC: KB3A. PIC: W3CG. STM: N3WAV. TC: WR4W. DEC-S0: KD3OH. DEC-N1: N3QCR. DEC-N2: KA3UVC. DEC-S1: KA3HUK. DEC-S2: N3BZW. DEC-Rapid Response: N3HJY. I would like to congratulate Kay Craigie, WT3P, on her election to the position as second vice president of the ARRL. With this, Bernie Fuller, N3EFN, has become the director of the Atlantic Division. Replacing Bernie is Bill Edgar, N3LLR, as the Vice Director. Congratulations to these fine gentlemen as well. I have had the privilege to work with both Bernie and Bill as an assistant, and I appreciate the confidence they have in appointing me to fill the remainder of Bill's term as Section Manager. I am looking forward to representing the amateurs of this section and welcome input from individuals or clubs. As we move into the nicer weather of spring and summer, our thoughts turn to activities of hamfests, contests, club picnics and the big event of Field Day. I look forward to seeing many of you at the various activities at which I will be attending. As in the past, I will be visiting various field day sites in the section, so if your group is interested in having me stop by, please send me the information regarding your activities. I will be establishing my route in mid June. If you would like me to speak at a club meeting or other event, let me know for scheduling. There are many field appointments available and if you would like to volunteer for one, please get in touch with me and I will advise you of the opportunities. Introduce someone to the wonderful world of Amateur Radio. 73 John Rodgers, N3MSE, WPA-SM, [n3mse@arrl.org](mailto:n3mse@arrl.org)

### CENTRAL DIVISION

**ILLINOIS:** SM, Bruce Boston, KD9UL—SEC: W9QBH. ACC: N9PK. STM: K9CNP. PIC: N9EWA. TC: N9RF. OOC: KB9FBI. DEC-Central: N9FNP. DEC-S/W: KB9AIL. The new officers of the DuPage ARC are Pres N9NWA, VP N9HRT, Sec WB9UGX, Treas N9URU. The club is planning a special event station in May for Armed Forces Day. Arne Harris, producer and director of sports for TV station WGN was the featured speaker at the Metro ARC. He discussed the technical aspects of TV sports production and shared some anecdotes from over the years. The new officers of the Sangamon Valley RC are Pres KA9HLZ, VP KB9ROZ, Sec KB9PCC, Treas KB9BIV. Saline Co ARES EC WB9SKB reports the Saline County ARES/RACES group worked in conjunction with Williamson County ARES to provide backup communications for AmerenCIPS for the local area during the start of the new year. ARES members attended meetings at Williamson County and local meetings in Saline County. Jacksonville ARS had a good turn out for their first two fox hunts. KAOSNL, Area Coordinator for AMSAT, was the featured speaker at the JARS annual dinner. Technical Coordinator N9RF is often asked to solve interference problems. In his latest report he states that listening to the interfering signal and using an oscilloscope that is synchronized to 60 Hz to look at the receiver audio can supply some clues. "If the pattern remains stable," the TC said, "it is caused by the power grid. If the pattern moves slowly, it is usually due to a TV set or cable. If little or no sync can be established it is due to atmospheric." The Schaumburg ARC is discussing the advantages of using their corporate status to save money on group purchases. Since many radio clubs in the section are incorporated, this may allow cost savings for them as well. It's something to keep in mind. SARC held ham classes at the Schaumburg Fitness Club in January and February. The club also had a field trip to a Chicago Wolves Hockey game at the Allstate Arena. The new officers of the Peoria Area ARC are Pres N9MSG, VP N9ZBE, Sec KB9PUW, Treas KB9NW. The Suburban Technical Amateur Radio System (STARS) elected a slate of officers recently and the winners are: Pres WW9VW, VP WB9JGG, Sec KB9RGI, Treas WB9LRK. January traffic: WB9TVD-35, W9HLX-35, N9DT 34, NC9T 22, KA9IMX 8, W9FIF-7. ISN de WB9TVD QNI-267, QTC-72, Sessions-31. Ninth region C4 report for Dec—traffic 357 sessions 62 time 455 min average 5.75 rate .784 percent rep 95%—ILN K9CNP KF9ME NS9F. Ninth Region C4 report for Jan—traffic 217 sessions 62 time 390 min average 3.5 rate .556 percent rep 90%—QNI—ILN K9CNP KF9ME NS9F. 9RN report for January de KF4UBX: 62 sessions held, total traffic 153, average per session 2.46, rate of traffic 4.66, total percentage section represented during month 88%. W9VEY Memorial Net report de K9AJS not available.

**INDIANA:** SM, Peggy Cullter, W9JUU—Sympathy extended to the families and friends of Silent Keys: Nov 18, 99 WA9DWT, Garfield L. Walker, Mishawaka; 1/8, W9HMS, James Hatfield, Fort Wayne; 1/16, WA9ERN, Norman H. Smith, Muncie; 1/21, W9BC, Lambert B. Howard, Evansville and 2/3, N9RP, Joseph R. (Dick) Perry, Middletown. They will be missed. Thanks to the following ECs having submitted their 1999 annual report: N9KQO, WB9NCE, N9LRO, KG9LX, N9ADS, WD9BKA, WB9UNL, and N9YNF. If your EC isn't listed

Continued on page 116.



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

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## FT-1000MP HF Transceiver

- Enhanced Digital Signal Processing
- Dual RX
- Collins SSB filter built-in
- 100W, Power supply built-in

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

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

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## FT-2600M 2M Mobile

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

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## VR-500

Handheld Receiver

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

**Great Sound. Call Today!**



## VX-5R

50/2M/440HT

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

**Call For Low Intro Price!**



## VX-1R

2M/440 Sub-Mini HT

- 290 Memory Channels
- .5W output
- Receives 76-999mHz plus AM BCB (Cell Band Blocked)
- Lithium Ion Battery

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## FT-50RD

2M/440mHz Compact HT

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

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## FT-847

Ultimate Base Station, HF, VHF, UHF

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

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## FT-90R

2M/440 Mini Dualbander Transceiver

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

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## FT-920 HF+6M Transceiver

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

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## FT-8100R 2M/440 Mobile

- Ultra Compact • 50w/35w 2m/440
- 110 memories • Wide Band RX
- Backlit mic • Remotable front panel w/op

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**DR-605TQ** 2M/440 Dual Band Mobile

- 50W 2M, 35W 440
- Built-in Duplexer
- 9600 Baud ready
- 50 Memory channels
- RX Range 136-174mHz/420-470mHz
- CTCSS built in



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\$599.95

**DX-77EQ** HF Transceiver

- 100W SSB, CW, FM, 40w AM
- 100 memories • Dual VFO • Speech Processor
- IF shift • CTCSS for 10M FM
- Gen Cov Rx 150kHz-30mHz
- Ham Band TX 160-10M
- CW filter + keyer optional
- Hand mic included • 13.8V DC



**DJ-C5T**

- 2M/440 Tx + Rx
- Extended Rx VHF/UHF
- Built-in Enc./Dec.
- 300 MW Tx output
- 50 Mem. + Scanning
- Built-in Lithium-Ion battery
- Complete w/fast charger

**Call for Low Price!**



**DJ-S41T/DJ-S11T**

440 Tiny HT 2Mtr Tiny HT

- 340 mw
- 21 memories
- Uses 3 "AA" Batteries
- Encode built-in
- Pivot antenna
- Less than 5" high and 2 1/4" wide (DJ-S41T)

(DJ-S41T shown)



**DJ-70TH** HF Transceiver

- 100W 160-10 Mtrs • 100W 6M, Gencov. Rx
- Full QSK, 100 Mem. • Compact, Remotable
- Dual VFO, 12VDC • 6.2 lbs.

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**COMET**

**SMA-501** Dual Band

Dual band "Miracle Baby" style antenna, with a male SMA connector. Shown on the popular FT-50R by Yaesu. The antenna is only 1.75 inches tall, and exhibits surprising performance.

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**CA-UHV**

40M-70cm Mobile Antenna

40"/20"/17/15/10/6/2M/70cm  
\* optional coils

A 6M/2M/70cm whip that accepts 1, 2 or 3 HF coils for up to 6 band operation. Simply screw on any combination of HF coils you choose.

Standard PL-259 connector allows easy mounting. Convenient fold-over hinge for entering garages, parking structures, etc...

HF/VHF/UHF on a single antenna!! Contact any Ham Radio Outlet store for duplexer/triplexer options.

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**MSG Series**

2M/70cm Mobile Antennas with spring-loaded whip to absorb impacts. Fold-over hinge included as well.

**MSG-1000C**

Length: 39 inches  
Max Pwr: 150W  
Conn: PL-259

**MSG-1100C**

Length: 43 inches  
Max Pwr: 150W  
Conn: PL-259



**MH-510**

6/2M/70cm HT Antenna w/SMA Connector  
The first aftermarket gain antenna for the YAESU VX-5 and the ICOM T8A.

A dramatic improvement over the stock antenna, 20.75 inches of TRIBAND performance.

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- RTTY, CW, Packet, GTOR, AMTOR, WEFAX
- GPS, NMEA-0183 compatible
- 6-16 VDC, DB-9 connector port

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- GARMIN X12 GPS Built in, Active GPS antenna.
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High-performance, low power TNC.  
Great for packet, and APRS compatible.

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- 40 memories + CALL channel
- Wide receive 130-180 MHz
- Built-in CTCSS enc./dec.
- Full-sized, backlit keypad
- 5 watts RF output

**\$50**  
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- Dual receive • 200 memory channels
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- CTCSS enc./dec. • CTCSS tone scan

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### AR-147 Plus

- 2M mobile
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- 80 memories plus a CALL channel
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- Wide receive cov. 130-171 MHz

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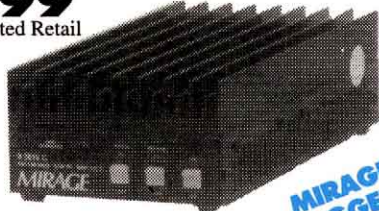
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# MIRAGE... 160 Watts on 2 Meters!

Turn your mobile, base or handheld into 160 Watt powerhouses and talk further, longer, clearer... All modes: FM, SSB, CW... Superb GaAsFET preamp... Overdrive, high SWR, Over-temperature protection... Remote controllable...

B-5016-G  
**\$299**  
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**MIRAGE RUGGED!**

**Power Curve -- typical B-5016-G output power**

Watts Out	130	135	140	145	150	155	160	165
Watts In	20	25	30	35	40	45	50	55

The MIRAGE B-5016-G gives you 160 watts of brute power for 50 watts input on all modes -- FM, SSB or CW!

Ideal for 20 to 60 watt 2 Meter mobile or base. Power Curve chart shows typical output power:

Hear weak signals -- low noise GaAsFET preamp gives you excellent 0.6 dB noise figure. Select 15 or 20 dB gain.

B-5016-G has legendary ruggedness. We know of one that has been in constant use since 1979!

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Fully protected from high SWR and excessive input power. Has warning LED.

Has smooth adjustable Transmit/Receive

switching with remote external keying.

RC-1B, \$45, Remote Control. On/Off, pre-amp On/Off, selects SSB/FM. With 18-ft cable.

Draws 17-22 amps at 13.8 VDC. 12x3x5 1/2 in.

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**B-1016-G Great for ICOM IC-706!**

## 100 Watts for 2 Meter HTs

B-310-G  
**\$199**  
Suggested Retail



**Power Curve -- typical B-310-G output power**

Watts Out	25	50	75	95	100	100+	100+
Watts In	1/4	1/2	1	2	4	6	8

- 100 Watts out with all handhelds up to 8 watts
- All modes: FM, SSB, CW
- Great for ICOM IC-706
- 15 dB low noise GaAsFET preamp
- Reverse polarity protection/SWR Protection
- FREE mobile bracket • Auto T/R switch
- FREE handheld BNC to B-310-G cable
- Ultra-compact 4 3/4 x 1 3/4 x 7 3/4 inches, 2 1/2 pounds
- One year MIRAGE warranty

Boost your 2 Meter handheld to 100 Watts!

Ultra-compact all mode B-310-G amp is perfect for all handhelds up to 8 watts and multimode SSB/CW/FM 2 Meter rigs. Great for ICOM IC-706!

## 6 Meter Amplifier

FCC Type Accepted



The A-1015-G, \$389, is the world's most popular all mode FM/SSB/CW 6 Meter amplifier. 150 watts out for 10 in. For 1 to 15 watt transceivers.

## 70cm Amplifiers (420-450 MHz)



D-3010-N, \$365, -- 100 W out/30 in. For 5 to 45 watt mobile/base. D-1010-N, \$395, 100 W out/10 in. Dual purpose -- for handhelds or mobile/base. D-26-N, \$269, 60 W out/2 in, for handhelds.

## Amateur TV Amps



Industry standard ATV amps -- D-1010-ATVN, \$414, 82 watts PEP out / 10 in. D-100-ATVN, \$414, 82 watts PEP out/2 in. (without sync compression).

## Remote Control Head for Amps



RC-1, \$45, remote controls most MIRAGE amps. Power On/Off, preamp On/Off, switch for SSB/FM. 18 foot cable (longer available). 1 3/4 x 3 3/4 x 2 1/2 inches.

## 35 Watts for 2 Meter HTs

B-34-G  
**\$89.95**  
Suggested Retail



**Power Curve -- typical B-34-G output power**

Watts Out	18	30	33	35+	35+	35+	35+	35+
Watts In	1	2	3	4	5	6	7	8

- 35 Watts Output on 2 Meters
- All modes: FM, SSB, CW
- 18 dB GaAsFET preamp
- Reverse polarity protection
- Includes mobile bracket
- Auto RF sense T/R switch
- Custom heatsink, runs cool
- Works with handhelds up to 8 watts
- One year MIRAGE warranty

35 watts, FM only... \$69.95

B-34, \$69.95. 35 watts out for 2 watts in. Like B-34-G, FM only, less preamp, mobile bracket. 3 1/8 x 1 3/4 x 4 1/4 inches.

**MIRAGE RUGGED!**

## Repeater Amps



11 models -- continuous duty all mode FM/SSB/CW repeater amps for 6, 2, 1 1/4 Meters, 70cm, 450 MHz ATV.

## Low noise GaAsFET preamps

High gain ultra low noise GaAsFET preamps for receiving weak signals. Selectable gain prevents receiver intermod. 15 to 22 dB gain. Less than 0.8 dB noise figure. Automatic RF switching up to 160 Watts. Choose In-Shack model or Mast-Mount (includes remote control) model to reduce loss. Rugged die-cast enclosure.

Frequency (MHz)	In Shack \$139	Mast Mount \$195
28-30	KP-1/10M	KP-2/10M
50-54	KP-1/6M	KP-2/6M
144-148	KP-1/2M	KP-2/2M
220-225	KP-1/220	KP-2/220
430-450	KP-1/440	KP-2/440

## MIRAGE Dual Band 144/440 MHz Amp

BD-35  
**\$159.95**  
Suggested Retail



**MIRAGE RUGGED!**

**Power Curve -- typical BD-35 output power**

Watts Out (2Meters)	30	40	45	45+	45+	45+	45+
Watts Out (440 MHz)	16	26	32	35+	35+	35+	35+
Watts In	1	2	3	4	5	6	7

- 45 Watts on 2 Meters/35W on 440 MHz
- Auto Band Selection
- Full Duplex Operation
- FREE mobile bracket
- Single Connector for dual band radios and antennas
- Reverse polarity protection
- Works with all FM handhelds to 7 watts
- One year MIRAGE warranty

Add this Mirage dual band amp and boost your handheld to a powerful mobile or base -- 45 watts on 2 Meters or 35 watts on 440 MHz! Mirage's exclusive FullDuplexAmp™ lets you talk on one band and listen on the other band at the same time -- just like a telephone conversation. (Requires compatible HT).

## 1 1/4 Meter Amps (223-225 MHz)



Choose from 10 models -- 20 to 220 watts out for 2 to 50 watts in, \$129 to \$655.

## Commercial Amps (\$199 to \$395)

FCC Type Accepted



Commercial amps for 150 - 174, 450-470 MHz and VHF marine bands, 70 - 130 watts out.

## Accurate SWR/Wattmeters



Read SWR directly and Forward/Reverse, Peak/Average power. Remote Coupler. 1.8-30, 50-200, 420-450, 1260-1300 MHz band models.

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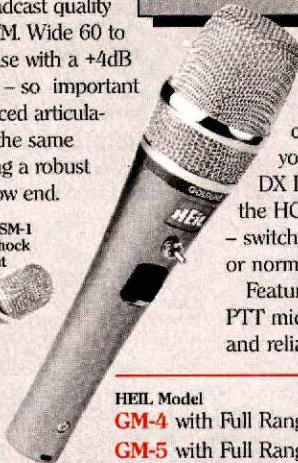


Optional SM-1 Studio Shock Mount

5/8-27 thread mic. clip supplied

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- HEIL Model**  
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**GM-5** with Full Range/HC5 ..... **\$139<sup>95</sup>**  
**GM-V 'VINTAGE GOLDLINE'** w/built-in matching transformer for use with those older hi-Z 'boatanchor' inputs ..... **\$159<sup>95</sup>**  
**CC-1** Connecting Cable for Icom, Kenwood, Yaesu or TenTec radios..... **\$29<sup>95</sup>**

**HEIL SOUND**

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ask him why? Thanks to K8LEN, KO9D and K9ZBM for their dedication as NCS on ICN. MARC, South Bend presented the Ham of the Year award to Eldon Haden, KA9SUF, also certificates were presented to Hal Brueseke, KA9MXW, and Patricia Haden, KA9SUG, for their outstanding services to their club. Some other interesting awards were presented to Kay K9CLM who received a Y2K compliant laptop computer (etch-a-sketch) no batteries or AC power required so she can take notes even if her computer fails. The CW expert Keith WA9S received a MasterMind game to help further develop his code skills. George WB9SCC received a Busy Bee trophy as a reminder of all his activities and Earl KA9EKA was presented two bananas in keeping with a tradition from previous years when there was nothing else to give him. Congratulations to the Indpls Radio Club receiving a certificate for 75 years continuous affiliation with ARRL. I have mentioned this several times, please send me your club's Amateur of the Year nomination for the IRCC Amateur of the Year award. My address is on page 12. Send it now before you forget it. NMS ITN/W9ZY, QIN/N9PF, ICN/K8LEN, WN/AB9AA, VHF/N9ZZD.

Net	Freq	Time/Daily/UTC	QNI	QTC	QTR	Sess
ITN	3910	330/2130/2300	2904	447	1514	93
QIN	3656	1430/0000	no report			
ICN	3705	2315	154	34	524	30
IWN	3910	1310	2173	-	310	31
IWN VHF Bloomington			503	-	465	31
IWN VHF Kokomo			662	-	155	31
IWN VHF Northeast			1040	-	620	31
Hoosier VHF nets (11 nets)			640	55	930	40

D9RN Total QTC 153 in 62 sessions IN represented. 95 % by WB9QPA, W9UEM, KB9NPU, and K9GBR. 9RN Total QTC 217 in 62 sessions IN represented by K9PUI, KO9D, N9PF, WA9QCF, AA9HN, WB9UYU and W9FC. Tfc: W9FC 263, W9ZY 112, WB9QPA 90, N9ZZD 75, K9GBR 70, KO9D 58, W9UEM 56, AB9AA 43, N9WNNH 37, W9JUJ, KA9EIV 32, KB9NPU 26, K9PUI 22, KA9QWC 15, AA9HN 15, W9BRW 14, W9EHY 11, K8LEN 10, K9RPZ 8, AB9A 6, WB9NCE 3, K9OUP 1, K9DIY 1.

**WISCONSIN:** SM, Don Michalski, W9IXG—BWN 3985 0600 W9RCW, BEN 3985 1200 KE9VU, WSBN 3985 1715 WB9WHO, WNN 3723 1800 KB9QCC, WSSN 3645 1830 N9BDL, WIN-E 3662 1900 WB9ICH, WIN-L 3662 2200 W9UW. It is with deep regret that I inform you of the following Silent Keys: Bob Stockfish, AA9EF, Bob, age 47, was a member of the Washington County ARC. Also, John Scarvaci, W9GIL, passed away at age 86. John was a life member of MRAC and member of QCWA. MRAC reports that Sam Saffro, K9OXH, age 95, and Jerry Melotik, KC9EV, age 57, are Silent Keys. Daniel, W9NXE, is now net control for the WSBN on Sundays. Join the WSBN and consider becoming a net control. Contact our STM, K9LGLU, for more info and visit the WNA site: [www.wna.eboard.com](http://www.wna.eboard.com) for photos and tips for traffic handling. Good news from 9RN land-KF4UBX reports 100% representation by Wisconsin hams! Keep it up and more help is needed to pass traffic! Coming soon to the section Web site, [www.w9ixg.eboard.com](http://www.w9ixg.eboard.com), a list of all section Technical Specialists and their areas of technical expertise. Members will be able to contact a TS to answer specific questions. Use this service! Also, our SGL, AD9X, Jim Lackore, has posted current government legislation news as it relates to Amateur Radio in Wisconsin. This is the time of year to think about providing ham support for the various public service events in your community. Get involved in the early planning stages so you can help insure that communications will be fully integrated and not just an afterthought. Remember, that these events can be used as training for emergency communication. Get your new club members involved and tag them up with an experienced operator! 73. Don, [w9ixg@arll.org](mailto:w9ixg@arll.org) Tfc: W9RCW 933, K9JPS 777, W9YYP 609, W9IHW 553, K9GU 537, WZZV 469, N9TVT 392, W9CBE 172, K9FHI 137, N9KHD 102, NCK 91, AG9G 80, N9BDL 77, W9UW 71, K9LGLU 61, KE9VU 60, W9YCV 47, K9GB 43, KB9OB 40, W9BHL 37, KA9FVX 34, KN9P 34, AA9BB 33, WB9ICH 33, KB9QPM 32, WD9FLJ 21, N9JIY 8, W9ODV 7, W9PVD 3.

**DAKOTA DIVISION**

**MINNESOTA:** SM, Randy Wendel, N0FKU—By the time you read this, the Minnesota ARRL Section and NTS Net will have vacated 3870. Look for us at 5:30 PM on 3860. Don't forget the 23rd year of the Rochester Hamfest to be held Sat April 8 at the Olmsted Co fairgrounds at 8 AM. Check Web site <http://www.members.aol.com/rarclams> for additional info. Of the many hamfests that are held each year, this is one you want to attend. This writing comes after-the-fact, but the MN State Dept. of Emerg Mgmt was in process of putting a group of radio operators together who could staff the state EOC in St Paul during any emergency event that would utilize radio comms via the Amateur Radio service. Because of the timeline involved, I'm late and unable to solicit any volunteers via this news column, but I have done so via the ARES reflector thru the ARES ECs. I will pass along any news regarding the DEM, though the ARES groups will have already received it via their ECs as far as I can tell, every ARES EC has e-mail and we also have the ARES HF Net held weekly, so we have good means of communicating both ways among each other. Gary and XYL Gladys, along with ARES DECS Ed LaPlante and Russ Marsolek, helped out with John Beargrease comms in early Feb. Lastly, I'm slowly trying to add more info of interest to my web site, so check it out if you can: <http://www.pclink.com/rwendel>.

Net	Freq	Time	QNI/QTC/Sess	MGR
MSPN/E	3860	5:30 P		W0WVO
MSPN/N	3860	12 P	524/138/31	WA0TFC
MSSN	3710	6 P	N/A	vacant
MSN/1	3605	6:30 P	283/83/31	W 00HPD
MSN/2	3605	10 P	163/37/31	K0PIZ
PAW	3925	9A-5P	3030/97/91	KA0IZA

Tfc: W0OA, KB0AI, W0TFC, W0LAW, W0GRW, K0PIZ, KB0OH, W0HPD, KN9U, W3FAF, K0WPK, K0PSH, KA0IZA, KB0AIJ, K0OGI, W0GUF, N0JP.

**NORTH DAKOTA:** SM, Bill Kurtz, W0COM—Make your plans

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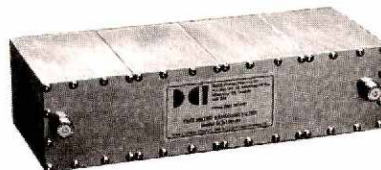


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**OUTBACKER® - HP** Same as above — 500 watts P.E.P. *Model # OB8HP*.....\$299.00

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**OUTBACKER® SPLIT** 6 ft 300 watts P.E.P. Breaks down into two 3 ft sections for easy storage. 8 Bands 75-10m. Storage pouch included. *Model # OBS8*.....\$299.00

**OUTBACKER® TRI SPLIT** Same as above except breaks down into 3-2ft sections. *Model # OB8TRI*.....\$329.00

**OUTBACKER® MARINE** Although all OUTBACKER®s can be used in a marine environment, the OBM includes ham, and ITU bands. 5 Amateur bands 75-10m, ITU bands 2.182MHz, 4.1MHz, 6.2MHz, 8.2MHz, 12.4MHz, 16.5MHz, 22.1MHz. 6 ft black, rated at 300 watts P.E.P. *Model # OBM*.....\$429.00

**OUTBACKER® TRUNK LID MOUNT** This mount is used for trunk and hatch mounts. It is fully adjustable. Comes with spring and coax. Suitable for Perth, Perth Plus and Stealth Plus models only. *Model # OB360*.....\$99.00

The **OUTBACKER®** Spring Base has standard 3/8-24 threads. The spring is made of zinc plated steel. The base is nickel-plated machined brass with an SO-239 female connector. Requires 1/2" hole for mounting. *Model # OBSB*.....\$99.00

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now to attend the Peace Garden Hamfest July 7 to 9 at the Peace Gardens located on the ND MB border on hwy USA 281. Lots of fun for the entire family Children's & Ladies events, transmitter huts, contests, meetings & flea market for the Hams plus a lot more. Sorry to report that WDCPX is a Silent Key, Vern was a radio operator in the south Pacific in WW2 he liked to tell the story how during the big typhoon in Okanawa the wind was so strong to walk you had to have your back to the wind & lean into it then push yourself forward with your feet. Year 2000 came with no problem into ND but the Dickinson Hams & yours truly were ready with they YK2 survival kits just in case. Was great to see WAOHUD making a fast recovery from his operation last fall. Net: Sess/QNI/QTC/ Mgr: Goose River, 1895 kc 8:30 AM Sun: 5/74 /0/KEOXT. DATA 3937 kc 6:30 PM daily: 31/742/16 KEOXT. WX Nets 3937 kc 8:30 AM, 12:30 PM: 54/1197/43/KEOXT. Storm Net 3937 kc, continuous as needed during storms.

**SOUTH DAKOTA:** SM, Roland Cory, W0YMB—NU0F, Frank Shaw, of Rapid City, has received an appointment as Assistant ARRL Director for South Dakota. New Huron ARC officers are WAOTDK pres; K0OH vp; WB0LUX sec/treas; and K10BV activities. Hub ARC at Aberdeen has installed a complete station at the Brown Co emergency management office. They will have a test session on May 6. Watertown will have a test session on April 29. Huron ARC are planning license classes for fall. Sioux Empire ARC, Sioux Falls, will have a convention on September 30th. The SD Novice Net participation has increased and also the NE S Dak Two Meter net has shown a large increase. The license restructure has caused VE exams to spring up all over the state so people who want a certificate to upgrade after April 17 will be able to with only 5 wpm code. Traffic reported for January was 541.

## DELTA DIVISION

**ARKANSAS:** SM, Roger Gray, N5QS, e-mail n5qs@arrl.org —This month, I enjoyed visiting the Stone County ARC meeting. We exchanged a lot of interesting information and had very good turnout and a very good meal. Among the items discussed were the new license structure, Field Day, public relations, and the repeater linking system now in place there. See <http://sun1.hu.edu/~hamradio/repeaters.htm> scroll down to Stone County and follow the links. I attended the hamfest in Memphis this last weekend and enjoyed the large turnout. It was nice to see the multi-club event turn out so well. The ARRL forum was well attended and the guest speakers (Rick Roderick, K5UR and Joel Harrison, W5ZN) answered many questions and presented a lot of information about the new license structure and the new DXCC checking system. Over the last few weeks I have had a large increase in interest in new licenses. Don't miss this opportunity to promote our hobby with the new license structure and the sun spot cycle improving 10 meters for beginners. Arkansas section traffic and net reports for January 2000. Tfc: K5B0C 142, K7ZQR 72, K55TMU 49, W9YCE 18, KA5MGL 14, KF5PN 4, KC5UEW 4, AB5ZU 4, KA5RJK 2. Nets : ARN 162, AMN 28, APN 19, OZK 17.

**LOUISIANA:** SM, Lionel A "Al" Oubre, K5DPG, e-mail k5dpg@arrl.org—ASM: KB5CX, K5MC. ACC: KA5JU. BM: K5ARH. SEC: N5MYH. OOC: WB5CXJ. STM: KG5GE. NM LTN: WB5ZED, NM LCW W4DLZ. As we approach the spring season, we must be mindful of the serious weather conditions that prevail at this time of the year. Tornado watches and warnings abound. Closely following this is the hurricane season. A reminder to all of the emergency frequencies used in LA, MS and STX. Official traffic: 3873 kHz nights (7285 kHz days) and H&W Traffic 3935 kHz nights (7290 kHz days). Hopefully we will not need emergency nets, but are realists and know that we must be prepared. Club officers for 2000: AARA: Pr NG5T, VP N5RLM, Sec K5DPG, Tr K5ARH. Upcoming hamfests AARA-Rayne March 11-12, Baton Rouge May 5-6. Shreveport July 22. Go out and support your area hamfest events. Louisiana Section Net Schedule: LTN 6:30 PM 3910 kHz nightly WB5ZED Mgr: LCW 6:45 PM 3673 kHz nightly W4DLZ Mgr. Reports for January: LTN QNI 362 QTC 72 in 31 sessions. LCW QNI 193 QTC 49 in 26 sessions. PSHR: WA5WBZ 73, K5WOD 106, KG5GE 109, K5DPG 141, K5MC 150, K5IQZ 191, WB5ZED 244. Tfc: K5WOD 10, WA5WBZ 16, KG5GE 32, K5DPG 34, K5MC 145, K5IQZ 217, WB5ZED 428.

**MISSISSIPPI:** SM, Malcolm Keown, W5XX—STM: KD5P. NM: N5JCG, KB5W, K15UK, K5XU, KB5WJJ, N5YNY. Mississippi Hams enjoyed an informative VIP Tour through the MFJ Plant in Starkville on January 15. Thanks to Martin and his staff for the great hospitality. Check out the new Mississippi Section Web Page at [www.armlms.org](http://www.armlms.org) which was constructed by K5IBM. A major effort is being made to keep information current on the Web Page including dates for VE tests, club meetings, hamfests, etc. Send update info to [w5xx@arrl.org](mailto:w5xx@arrl.org) or [k5ibm@arrl.net](mailto:k5ibm@arrl.net). The Attala County ARES Net activated during the January ice storm. KD5IZN was able to report an accident on I-55 via repeater which considerably speeded up the emergency response. The Jackson Hamfest was another success with over 1200 hams in attendance. Thanks to AB5WF and the Jackson ARC for hosting a very enjoyable weekend. EC Reports: KB5DZJ, WB4CD, K5TYL, KB5ZEA. How about the MSPN and PBRA QNI? New Records. Wow! Net Reports: sessions/QNI/QTC. MSPN 31/3265/89, MTN 31/169/59, MSN 31/984/10, PBRA 32/1224/22, Jackson Co ARES/RACES 31/598/28, MSSN 22/118/2, Hancock Co ARES 15/184/8, MAEN 5/94/0, Stone Co ARES 5/66/0, MBHN 4/27/0, Lowndes Co 4/63/0, JARCEN 4/90/1. PSHR: N5XGI 181, N5JCG 142, KB5W 142, K5VU 129, K5DMC 118, W5XX 85. Traffic: KB5W 327, N5XGI 137, K5DMC 81, N5JCG 70, K5VU 44, W5XX 7.

**TENNESSEE:** SM, O. D. Keaton, WA4GLS—ACC: WA4GLS. ASM: WB4DYJ. PIC: KE4CES. OOC: AD4LO. SEC: WD4J. STM: WA4HKU. TC: KB4LJV. Milo, WB4DYJ, who directs the activities of the CW nets, is back to just about full speed after heart surgery. He was unable to publish a CW Net Bulletin just before the December holidays. The CW net meets M-S on 3635 kHz at 7:00 PM with the following NCSs: M-Jim, N4PU; T-Milo, WB4DYJ; W-Andy, W4SQE; Th- Jean, W4TYU. F-Jim, N4PU. S- Jan, KF4GQN and a rag chew session on Sunday. The slow speed training net meets on 3682 kHz + or - QRM at 7:30 PM with the following NCSs at the helm: M- Jan, KF4GQN; T- Marvin, AF4BD; W- is vacant; Th- Milo, WB4DYJ; f- Paul, W4NPL; S- Jan, KF4GQN. All



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interested are welcome to participate in the net activities. ARC elects new officers: Kathy, KE4UYU-pres, Melinda, KE4DXN-VP, Tommy, KD4TJO-Sec. bob, KF4NDH-Treas. Tom, K4TTA-Dir of Training. Freddy, KF4ZGJ Dir of Programs, Mike, KG4BVK- Dir of Meetings & Special Events, Ken, K4DIT- Dir of Publications, Ben, KU4AU- Past Pres., Bill, WA4MUM- Repeater Trustee, Joan NK4PM- VE Liaison. Notice that the Pres and VP are YLs. DARC had two winners of "The Ham of the Year Award." They were Joan, NK4PM, and Tommy, KD4TJO. "The Newcomer of the Year Award" went to Freddy, KF4ZGJ, and "The Marconi Award" went to David, KD4NOQ. Paul Wilson, W4HHK, a pioneer in Amateur Radio research in the TN Section became a Silent Key on Nov 29, 1999. NARC elects new officers for the year 2000: Jim, K4INI- Pres, Jim, KF4OAL-VP, Chuck, N5JUD-Sec, Frank, WB4DXW- Treas. DRN-5 rpt: 62 sess, 539 msg, TN rpt 62% by W4OGG, KE4GYR & K4WWQ. Net sess/QTC/QNI: TPN 31/35/2332; TCWN 26/44/228; TEMPL 21/49/650; TEPN 25/70/2974; TSCWN 26/150. Tfc: N4PU 202, W4SQE 128, WB4DYJ 101, WA4HGU 58, W4SYE 26, KA5KDB 17, WD4JJ 14, K14V 12, WA4GLS 6, KD4BAM 4.

## GREAT LAKES DIVISION

**KENTUCKY:** SM, Bill Uschan, K4MIS—ASM: Tom Lykins, K4LID. SGL: Bill Burger, WB4KY. SEC: Ron Dodson, KA4MAP. STM: John Farler, K4AVX. PIC: Steve McCallum, W2ZBY. ACC: Todd Schrader, KF4WFZA. TC: Scotty Thompson, K14AT. BM: Ernie Pridemore, KC4IVG. Severe storm season is fast approaching. Most ARES/SKYWARN groups should already have scheduled severe weather spotter classes. If not they need to contact the nearest NWS office. Hamfests season is just around the corner. The new question pools are ready and available on the ARRL Web page. I have not heard anything concerning the Cincinnati Hamfest, I heard that the Etown Hamfest will be held on March 25, 2000, April 23, 2000 is the Murray State Univ Fest. The Louisa, KY Hamfest will be held on May 6, 2000. The Northern KY Hamfest will be held on June 11, 2000. The Central KY Hamfest will be held on August 6, 2000, and last the Greater Louisville Hamfest will be held on September 9, 2000. It is with deep regret that we mention that Jim Erskine, WA4AUR, became a SK on January 31, 2000. Tom Lykins, K4LID, is requesting input on combining the KY traffic nets under one name. The times and days of the net would remain the same as know. Send comments to [k4lid@arrl.net](mailto:k4lid@arrl.net). Net QNI/QTC/Sess/Mgr: KRN 785/21/21/N4AFP; MKPN 1271/26/31/K4LID; KTN 1172/43/31/K4LID; KYCW 370/55/30/K4AVX; TSTM 505/26/31/KG4EAB; CARN 303/27/27/AD4E1. Tfc: N4CQR 4, K4AVX 57, N4GD 32, K4YKI 17, KO4OL 34, KF4RBK 76.

**MICHIGAN:** SM, Dick Mondro, WB8FQT ([w8fqt@arrl.org](mailto:w8fqt@arrl.org))—ASM: Roger Edwards, WB8WJV ([w8wvjv@arrl.net](mailto:w8wvjv@arrl.net)). ASM: John Freeman, N8ZE ([n8ze@arrl.net](mailto:n8ze@arrl.net)). SEC: Deborah Kirkbride, KA8YKK ([ka8ykk@arrl.net](mailto:ka8ykk@arrl.net)). STM: James Wades, WB8SIW ([w8siw@arrl.net](mailto:w8siw@arrl.net)). ACC: Sandra Mondro, KG8HM ([kg8hm@arrl.net](mailto:kg8hm@arrl.net)). OOC: Donald Sefcik, N8NJE ([n8nje@arrl.net](mailto:n8nje@arrl.net)). PIC/SNE: David Colangelo, KB8RJU ([dcolangelo@ameritech.net](mailto:dcolangelo@ameritech.net)). SGL: John LaRock, K8XD ([k8xd@voyager.net](mailto:k8xd@voyager.net)). TC: Dave Smith ([carin8zd2w@juno.com](mailto:carin8zd2w@juno.com)). Youth Activities: Carl Hillaker ([carin8zd2w@juno.com](mailto:carin8zd2w@juno.com)). BM: Thomas Durfee, Jr, W18W ([w18w@arrl.net](mailto:w18w@arrl.net)). Congratulations to the newly elected officers of the Saginaw Valley Amateur Radio Association for the year 2000. They are President: Steve Block KC8BTE, Vice President: Robert Jerome N8PTI, Treasurer: Judy Weirauch KC8BYI, Secretary: James Harvey, KC8LBH. I regret to report that Our State Government Liaison, Ed Hude, WB8QJE, has resigned due to an increasing workload. Please join me in thanking Ed for his seven years of service and dedication to this assignment. Ed will continue as Local Government Liaison and Technical Specialist, two appointments he has held for a number of years. Thanks Ed. Taking over as SGL is John LaRock, K8XD, of Lansing. John brings with him a wealth of experience as a past ASM. This is a most important position within the Section and requires monitoring of our State Legislators, as well as local legislators through the Local Government Liaison Program, to insure that no legislation is passed that would be detrimental to our service. If you would like to get involved in this effort within your home community please get in touch with John at the address above. Did you know that your ARRL Special Service Club can get 2 weeks of fame in the ARRL Spotlight for exemplary Special Service Clubs? A new club will be featured every second week on the ARRL Website. Send your SSC information to [dmiller@arrl.org](mailto:dmiller@arrl.org), including e-mail and Web page addresses. 73, Dick. Please support the following Section Traffic Nets: January 2000 NTS Net Reports.

Net	QNI	QTC	Sess	NM	Freq	Time	Day
OMN	657	251	68	WB8SIW	3.663	6:30-10 PM	Daily
MACS	232	55	31	WB8NQ	3.953	11 AM	Daily (1 PM Sun)
MITN	478	162	31	N8FPN	3.952	7 PM	Daily
UPN	1270	42	35	A88SN	3.921	5 PM	Daily (Noon Sun)
GLETN	630	89	31	VE3SCY	3.932	9 PM	Daily
SEMNTN	357	67	31	W8EK	146.640	10:15 PM	Daily
WSSBN	849	48	31	KJ8RE	3.935	7 PM	Daily
ARAHH	39	0	4	K8LAT	145.130	8 PM	Wed
DB ARES	39	0	4	VE3EUI	3.932	7:30 PM	Friday
VHF Nets	283	7	31	KB8ZY	Various		

Traffic reports for January 2000: WB8SIW 212, K8BZY 170, WX8Y 163, KB8G 148, K8LJ 126, N8FPN 111, N8JGS 56, A88SN 51, W8RNG 50, A88PI 49, W18K 46, K8ZJU 45, K3UWO 34, K8BUE 30, N8OSC 27, W8RF 26, WA8DHB 24, W8YIQ 19, K8AI 15, KC8GMT 14, K18GR 7, KB8EIW 7, N8EXS 2.

**OHIO:** SM, Joe Phillips, K8QOE, Fairfield, to contact me, see page 12)—Remember next month the ARRL National Convention is in our backyard. If you've never been to the Dayton Hamvention, this is the year. Many clubs throughout the Ohio have organized bus tours to Hamvention but time for reservations is getting short...Interested in Fox Hunting and Direction Finding? Write to Dick Arnett, WB4SUU, or Bob Frey, [w4ezv@arrl.net](mailto:w4ezv@arrl.net), to get information for the May 7th demonstration and competition at McFarland Woods...The Ohio QSO Party was not in March as earlier reported but moved to August. Contact the Mad River Radio Club...Ohio Section Journal's deadlines for this year are April 10, June 10, August 10 and October 30, according to Editor Ron

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25' \$24.<sup>95</sup> 15' \$21.<sup>95</sup> 10' \$18.<sup>95</sup> 6' \$12.<sup>95</sup> 3' \$11.<sup>95</sup> 1' \$10.<sup>95</sup>

RG213/U strd BC Mil-Spec NC/BD/UV JKT. 1.2dB 2500 watts @ 30MHz.  
200' \$89.<sup>95</sup> 175' \$79.<sup>95</sup> 150' \$69.<sup>95</sup> 125' \$59.<sup>95</sup> 100' \$49.<sup>95</sup> 75' \$39.<sup>95</sup> 60' \$34.<sup>95</sup>  
50' \$29.<sup>95</sup> 25' \$19.<sup>95</sup> 15' \$17.<sup>95</sup> 10' \$15.<sup>95</sup> 6' \$11.<sup>95</sup> 3' \$9.<sup>95</sup> 1' \$8.<sup>95</sup>

RG8/U strd BC foam 95% braid UV resistant JKT. 0.9dB 1350 watts @ 30MHz.  
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25' \$14.<sup>95</sup> 15' \$15.<sup>95</sup> 10' \$13.<sup>95</sup> 6' \$11.<sup>95</sup> 3' \$9.<sup>95</sup> 1' \$8.<sup>95</sup>

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50' \$44.<sup>95</sup> 25' \$29.<sup>95</sup> 15' \$26.<sup>95</sup> 10' \$23.<sup>95</sup> 6' \$14.<sup>95</sup> 3' \$13.<sup>95</sup> 1' \$12.<sup>95</sup>

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Griffin, N8AEH, Assistant SM for NW Ohio. If you don't know what the OSJ is, contact me immediately. A comment on recent ham radio restructuring "I have recently noticed a flurry of comments about the upcoming license restructuring that we all are facing, some good, and some bad. I don't know if I agree with it 100% myself, but I think it holds much promise for Amateur Radio. Ham Radio for the most part has experienced declining numbers in the past few years, and as the old saying goes 'If you don't use it - you lose it'. We have already lost some frequencies, do we dare let them take more?" While I'd like to take credit for this, actually Rick McKee, KC8AON, Lawrence County ARES/SKYWARN, wrote it....OHIO SECTION CONGRATS: (A) To Salem Area ARA's new officers, pres, Mel Lippiatt, KA8EOB; Veep, Bill McClaren, KB8MNE; sec, Roger Thawley, KC8CTV; tres, Lela McClaren, KB8YPD; trustees, Roger Tullis, W8HZ, Tom Spellman, KB8EOG, Dave Sprouse, N8GOB; newsletter, Johnathan Thawley, KC8CPW, (B) To Skip Westrich, WB8OWM as Massillon ARC Ham of the Year for 1999, (C) To Lawrence County ARES newsletter "Hello Radio" on its fifth birthday and to editor, Ken Massie, WN8F, (D) To Joanne Solak, KJ3O, Mantua, for 15 years of serving the Ohio Section as ACC and more, (E) To Findlay Radio Club's for its newest addition to its club station, W8FT, an Omni-6 transceiver...APRIL HAMFESTS, Athens on April 30 de K8QOE. Now for the January traffic reports.

Net	QNI	QTC	QTR	Sess	Time	Freq	Mgr
BN (E)	183	53	291	31	1845	3.577	WB8KFN
BN (L)	213	77	351	31	2200	3.577	NY8V
BNR	101	29	974	30	1800	3.605	WB8DQ
OSN	214	62	720	31	1810	3.708	WB8KQJ
OSSBN	2428	400	2600	93	1030, 1615, 1845	3.9725	KF8DO
OH Section ARES Net					1700 Sun	3.875	WB8IHP

Tfc: WDBKFN 149, N8IXF 144, KF8DO 136, KA8FCC 109, N8FWA 106, WA8SSI 94, W8BMO 87, KC8JUL 83, KB8WQ 79, N8NTN 65, KD8HB 62, W8BO 50, K8BIM 50, WB8PMG 48, N8CW 48, WA8HEH 47, N8SC 47, N8RD 46, N8RRB 42, W8DKBW 37, K8OUA 34, K8G 33, WB8HHV 31, WA8EYQ 30, W8LDQ 29, KA8VWE 27, NY8V 25, KD9K 25, K8BO 20, KC8BDM 16, KB8UEJ 16, KB8JMP 15, W8RG 15, KC8HTP 14, KB8TIA 14, N8WLE 12, KB8RDK 12, KC4IYD 10, KF8FE 10, W8RPS 10, W8GDQ 9, W8GAC 8, N8IBR 7, KC8HFV 5, W8GDQ 4, K8GOB 4, W8BIOU 4, KC8KYP 4, K8BSIA 4, K8GW 3, KB8ESY 2, KE8FK 2, K8WC 2, W8DYF 1, K8QIP 1.

### HUDSON DIVISION

**EASTERN NEW YORK:** SM, Rob Leiden, KR2L—STM: Pete Cecere, N2YJZ. SEC: Ken Akasofu, KL7JQC. ACC: Shirley Dahlgren, N2SKP. SGL: Herb Sweet, K2GBH. PIC: John Farina, WA2QCY. BM: Ed Rubin, N2JBA. OOC: Hal Post, AK2E. TC: Rudy Dehn, W2JVF. ASM: Tom Raffaelli, N2BNC. ASM: Bob Chamberlain, N2KBC. ASM: Andrew Schmidt, N2FTT. ASM: Richard Sandell, WK6R. ASM: Phil Bradway, KB2HO. Net Reports (January 2000) Check-ins (QNI)/Traffic handled (QTC+QSP): AES 32/6 CDN 359/123 CGESN 38 HVN 562/192 SDN 360/138 NYPHONE 223/622 NYPON 365/358 NYS/ E 425/439 NYS/M 255/160 NYS/L 285/419. The Hudson Division Convention is coming to Westchester 9/15-16. Mark your calendar! Upgrade now and avoid the April rush! K2ZDH is coming to SARA April 3 - All hams are invited! PSHR: N4YDZ 202, N2JBA 150, W2AKT 147, W2ZCM 141, WA2YBM 97, KC2DAA 87, W2JHO 70. Tfc: N2YJZ 406, N2JBA 62, W2ZCM 37, KC2BUV 24, KC2DAA 22, WA2YBM 17, W2JHO 15, W2AKT 10, W2CJO 5, KC2BUV 3, WA2BSS 2, N2NMF 2, K2AVV 1, KL7JQC 1, N2AWI 1.

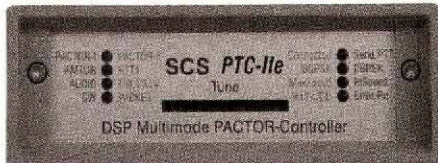
**NEW YORK CITY / LONG ISLAND:** SM, George Tranos, N2GA—ASM: KA2D, N1XL, K2YEW, W2FX, KB2SCS. SGL: N2TX. SEC: KA2D. ACC: K2EJ. PIC—East: N2RBU. PIC—West: K2DO. TC: K2LJH. BM: W2IW. OOC: N1XL. STM: WA2YOW. Congratulations to the Grumman ARC on their 55th anniversary! Grumman is now meeting at the Underwriters Lab building in Melville on the 3rd Wednesday of the month at 6:30 PM, contact Pat, KE2LJ. Congratulations to LIMARC on their 35th anniversary! LIMARC is celebrating with a 35th Anniversary Dinner on April 9, contact Diane K2DO. Tom, KA2D, the NLI Webmaster, is asking for contributions to the EVENTS calendar. Please e-mail Tom at ka2d@arrl.net. Check the NLI Web page at www.arrlHUDSON.org/nli for more information on upcoming events. Please note all Suffolk county area codes change from 516 to 631 on April 1. NYC/LI VE exam list follows: Islip ARES, 1st Sat 9 AM, Islip Town Hall, 401 Main St, Islip, Len Battista, W2FX, 631-277-0893. Bears VE: ABC Bldg Cafeteria, 125 West End Ave at 66th St. Call Hotline 212-456-5224 for exact dates & times, Jerry Cudmore, K2JRC. Grumman ARC (W5YI) 2nd Tues 5 PM. Northrop-Grumman Plant 5 S Oyster Bay Rd via, Hazel St Bethpage, NY. Bob Wexelbaum, W2ILP, 516-499-2214, LIMARC, 2nd Sat 9 AM NY Inst of Tech, 400 Bldg Rm 409, Northern Blvd. Old Westbury, Al Bender, W2QZ, 516-623-6449. East Village ARC, 2nd Friday 7 PM, Laguardia HS, Amsterdam Ave and West 65 Street, Manhattan. Robina Asti, KD2IZ, 212-838-5995. Great South Bay ARC, 4th Sun 12 PM, Babylon Town Hall, ARES/RACES Rm 200 E Sunrise Hwy N Lindenhurst, Michael Grant, N2OX, 516-736-9126. Hellenic ARA, 4th Tues 6:30 PM; Pontion Society, 31-25 23rd Ave, Astoria, NY, George Anastasiadis, KF2PG, 516-937-0775. Larkfield ARC, Huntington Town Hall, room 114, 2nd Saturday in Feb, May, Sep, Nov, Contact Stan Mehman, N2YKT, 631-423-7132. Columbia U VE Team: 3rd Mon 6:30 PM, Watson Lab 6th floor 612 W 115th St NY, Alan Crosswell, N2YGG, 212-854-3754. PARC: exams held every three months at Southold School Oaklawn Ave, Southold, NY, on next to last Friday of the month. 6:30 PM all classes of licenses. For info contact Ralph Williams/N3VT, 631-323-3646. Mid-Island ARC, Last Weds of each month at 7 PM at 36 Drew Flag Rd, Ridge, NY 11961, Contact Mike, W2IW, at 631-924-3535. HOSARC, 3rd Saturday at Queens Hall of Science, 9:30 AM. Pre-registration requested (for free admittance to the Hall), Lenny, W2LJM, 718-323-3464. Report all changes to N2GA before the 12th of the month. Tfc: WB2GTG 297, N2AKZ 136, KB2KLL 95, W2RLL59, N2XOJ 53, K2GCE 37, WA2YOW 21, KB2GK 18.

**NORTHERN NEW JERSEY:** SM, Jeffrey Friedman, K3JF—Net and traffic data compiled by STM David Struebel, WB2FTX.

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Net	NM	Sess	QNI	QTC	QSP	QTR
NJM	WA2OPY	31	207	80	66	327
NJPN	W2CC	36	203	32	26	167
NJSN	K2PB	28	169	8	5	329
NJNE	AG2R	31	240	101	81	365
NJNL	AG2R	31	215	57	53	271
CJTN	N3RB	31	301	45	35	252
NJVNE	N2RPI	31	420	49	42	269
NJVNL	N2OPJ	31	318	37	36	208

Tfc: N2XJ 112, W2MTO 79, N2OPJ 71, K2VX 59, N2GJ 43, N2RPI 38, K2PB 37, N3RB 30, KB2VRO 24, W2CC 22, N2QAE 6.

### MIDWEST DIVISION

**IOWA:** SM, Jim Lasley, N0JL—ASM: N0LDD. SEC: NA0R. ACC: N0JUP @ KE0BX. BM: K0IIR @ W0CXX. SGL: K0KD. I regret to announce that Bob Mason, W0DIA, has elected to resign his post as the Section Technical Coordinator. Bob is finding that working QRP DX is too much fun. Thank you for the service, Bob. I am seeing lots of examinees for the testing sessions. Might as well get credit for what you have half done! (3A, 4A!) DMRAA reports that during Operation Santa Claus they collected 1-1/2 TRUCK loads of donated presents at one house! I count 66 in the list of those helping! Uh, Norm. DSM Hamfest is April 29! In the EIDX newsletter, K0RX reminds their members to renew their ARRL membership. A Life Membership eliminates that problem. TSARC notes problems getting a clear freq for their comms for Y2K... try CW. It worked in MI. I regret to report that W0RFE has gone SK. Looks like the City of Marion is looking at a tower ordinance. CVARC is gearing up for another year; the hamfest, ARES, etc. Can you help? How about in your area! FMARC is reviewing the tower climbing safety tips given by W0EJ in the EIDX some time back. Good advice. I have word of two groups doing DF/Fox hunting in the near future. The new repeater at Beresford is almost ready to go. TSARC has some interest in a code class. Have you completed the exams you would like before April 15? Time is about expired. How many years have gone past when you made no attempt to upgrade. I see much of a "something for nothing" syndrome in this rule change. Newsletters were received from NIARC, DMRAA, EIDX, TSARC, ACRS, CVARC, FMARC, SARA, SA/SN, OARC. Traffic: W0SS 169, KA0ADF 39, N0JL 38, KA0ADF (Dec) 54.

**KANSAS:** SM, Orlan Cook, W0OYH—ARRL KS State Convention August 27 at Salina. Thanks to Ron, KB0DTI, I will have less work as he has taken the STM job. Scott, KC0DYA, has accepted the PIC job. Bill, WA0CBW, has accepted a TS job. Many tks. Bob, W0BH, has left the EC position. Tks for FB job. Milo McNall, W0NSW, of Topeka, has been nominated for the ARRL 1999 Herb S. Brier Instructor of the Year Award. Let me recognize reports from TSs WN8P & N8FN PIO KB0DTI. Let me hear from you if you have a suggestion for the ARRL KS 2-hour Section meeting Aug 27. This is your meeting. Any volunteers? Thanks to all the Net Managers, ORSs and Net Controls for giving Kansas our many many fine nets Dec Kansas Nets: sessions/QNI/QTC. K5BN31/1302/106 KPN 22/301/30 KMWN31/614/4803 KWN31/1078/706 CSTN 27/1786/176 QKS 57/315/63 QKS-SS 13/34/7 SEC 33/329/8QNS KB0AMY N0BTH W0DDDG W0DDMY AA0IQ N0LJR KF4LM W0PWB KB0PQP. TEN 481 msgs 62 sessions KS 68% KB0DTI AA0FO KX0I K0PY NBOZ W0BOZNY W0SS mgr. DTRN KS 100% with KB0AMY N0KFS KFOWS AA0OM W0OYH W0WWR NOXAQ N0KJ Mgr BBS reports: W1AW Bul/Per/NTS AA0HJ 3/538/2 N0OBM 73/503/0 Ks Stns tlc N0KJ 578, W0BOZNY 74, WA0KS 73, NBOZ 66, W0OYH 56, KB0DTI 31, KX0I 23, W0WWR 19, K0RY 18, KB0NDT 14, N0ZIZ 13, K0BJ 13, N0LL 10, K0BXF 6, W0FLC 4.

**MISSOURI:** SM, Dale Bagley, K0KY—ASM: John Seals, WR0R. ACC: Keith Hays, WE0G. BM: Brian Smith, K10MB. OOC: Mike Musick, N0QBF. PIC: Dennis McCarthy, AA00A. SGL: E.B. DeCamp, K0UD. STM: Charles Boyd, KE0K. TC: Wayland McKenzie, K4CHS. The Friends of Amateur Radio Hamfest in Springfield, MO, held their first Hamfest. Mike Blake, N0NQW, Skip Crane, KB0RUP, and Richard Wood, KB0MPO, provided the leadership for the hamfest. There was a good Hamfest and a nice turnout even with the 3+ inch snow that fell. Brian Smith, K10MB, of Monett, Missouri, has been appointed to the position of Section Bulletin Manager. He is an excellent addition to the Section Cabinet. In April, there will be a Hamfest on April 1st in Lebanon, MO. Micki Jensen, KC0EEX, is the contact person for the Lebanon Hamfest. On April 15 the Joplin Amateur Radio Club will sponsor a Hamfest in the J.Q. Hammonds Trade Center. The Four States Amateur Radio Club has been confirmed as an ARRL affiliated club. The club will facilitate contest, DX repeaters and public service. Alan Shannon, KC0BUM, is the President of the Newly Affiliated Club. To check on current happenings in the Missouri Section, Amateurs can check on the Section Website <http://www.qsl.net/arrl-mo>. Information on hamfests can also be found on that site. Net Sess/QNI/Tfc: AUDRAIN ARC 4/42/1; CARL 3/38/0. WAECI 5/129/0; MTN 31/675/90. HAMBUTCHERS 21/763/37 MON-1-2 62/197 41; QCWA-35 4/73/0; ROLLABILLBOARD 31/353/4; JACKSON CO ARES 5/50/0; MACON CO AREA 4/59/0. Paul Revere 5/200/0 Tfc: KE0K 63. PSHR: KE0K 98.

**NEBRASKA:** SM, Bill McCollum, KE0XQ—It is with deep regret to inform you that Janice Ziller, KB0ZTB, became a Silent Key on January 13. She was the YL of NUOUP and mother of NOXJG. Our heart goes out to Neal and his son, Michael. It seems like we are seeing more Silent Keys: KD0CQ, W0ZUY, W0EGV and KB0DFD. Amateurs from the Omaha and Lincoln area provided communications for the Cornhusker Winter Games on Feb 5 - 6. ATV coverage of the Mt. Crescent (IA) was provided and the games officials were quite impressed. I am pleased to announce the following appointments: KC0GDG, EC for Kimball & Banner counties, N7GT, EC for Scottsbluff county. This part of the state has been without any ECs for quite some time and we welcome them. Also I want to welcome KB0MTT as Net Manager of the Eastern NE 2 meter ARES Net. Net Reports: ENE 2M ARES: QNI 341, QTC 2 & 31 sessions. NE 40 M Net: QNI 466, QTC 13 & 29 sessions. NE CW Net: QNI 210, QTC 12 &



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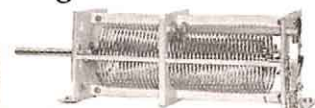
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### MFJ-906/903 6 Meter Tuners

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NE Storm Net: QNI 1006, QTC 17 & 31 sessions. NCHN:  
QNI 403, QTC 24 & 31 sessions. MARES: QNI 342, QTC 4 &  
6 sessions. NMPN: QNI 1559, QTC 3 & 31 sessions. Traffic:  
K0PTK 100, W0AP 38, KE0XQ 20, W0RWA 12, W0CAL 7,  
KA0DBK 6, WY0F 4, WOEXK 2, W0UJI 2, KB0MTT 2, WC00  
2, NU0UZ 2, KA0DOC 2, PSHR: KA0DBK 86, KB0YTO 23,  
KB0YTM 16.

**NEW ENGLAND DIVISION**

**CONNECTICUT:** SM, Betsy Doane, K1E1C—BM: KD1YV.  
OOC: WA1JT, PIC: W1FXQ, SEC: WA1D, SGL: K1AH, STM:  
K1HEJ, TC: W1FAI. There's lots of talk in the CT club news-  
letters about operation on PSK31. Jim, KD1YV, of CARA and  
several members of the Newington Amateur Radio League  
started the New Year off by experimenting with a mode new  
to them. Have fun! Speaking of new activities, The Lyman  
Hall High School is starting an Amateur Radio Club! John,  
KB1EEN is president; John, KB1ETB is VP and members of  
the Meriden ARC will serve as Elmers! Congrats to all the  
members of this new school club—just say the word if you  
need a hand. CT traffic handlers mourn the loss of Dawn,  
K1TQY, recently appointed NM of First Region Net. Dawn, a  
very active traffic handler from New Hampshire became a  
Silent Key suddenly just as she was preparing her monthly  
report for Headquarters. She was an active ham, owned a  
repeater and active in the community. Unhappily, two other  
FRN members passed away within the last few months:  
former NM Ed KT1Q and Alan, W1FYR who had a very ac-  
tive APLINK traffic BBS on the air. These friends will be  
missed by many of us. I had the pleasure of meeting each  
of them—terrific ops. On a happier note, start thinking about  
the Division Convention in Boxboro, MA, to be held the last  
weekend in August. Contact Mel early to make your room  
reservations! The W1QI DX packetcluster 145.73 is back on  
the air and N4GAA BBS will be up and running at full speed  
soon. Need an idea for an activity for ur club? NARL invited  
area radio amateurs to ask technical questions and bring their  
equipment for possible analysis to a free Clinic & Tech Ses-  
sion at their January meeting. Tnx to u all for ur hard work-c  
u next month! Net sess/QNI/QTC: WESCON 31/398/77;  
NVTN 31/219/106; ECTN 31/315/61; CPN 31/271/57; CN 29/  
95/39. Tfc: NM1K 1883, KA1VEC 452, KA1GWE 144,  
KB1CTC 140, KE1AI 102, WA4QXT 89, N1VXP 66.

**EASTERN MARCHSHUSETTS:** The following was submit-  
ted by STM Bill Wornham, NZ1D—

Net	Sess	QTC	QNI	QTR	NM
EMRI	62	240	288	468	K1SEC
EMRIPN	31	83	213	476	WA1FNM
EM2MN	31	100	331	449	N1LKJ
HHTN	31	45	250	295	N1IST
CITN	31	66	327	586	N1SGL
WARPSN	5	13	78	NA	K1BZD
NEEPN	5	8	15	NA	WA1FNM
CHN	31	42	204	429	W2EAG
OSTN	16	14	25	77	KA1JXH

Tfc: W2EAG 219, WA1TBY 139, N1LKJ 112, NZ1D 100,  
WA1FNM 82, K1SEC 62, WA1LPM 49, N1AJJ 43, N1TPU  
40, K1BZD 38, N1IST 36, NG1A 35, KY1B 28, N1LAH 27,  
K8SH 24, KD1LE 16, N1TDF 15, KB1EB 14, KA1VAX 12,  
WA1VRB 11, N1OBL 8, N1BNG 5.

**MAINE:** SM, Bill Woodhead, N1KAT—ASMs: WA1YNZ,  
KA1TKS, STM: NX1A, BM: W1JTH, SGL: W1A0, ACC:  
KA1RFD, OOC: KA1WRC, PIC: KD1OW, SEC: N1KGS, Asst  
Dir: W1KX, KA1TKS, K1NIT, Web Site: N1WFO. With Spring  
arriving, Hams' thoughts start to turn to repairing winter's  
wrath. Antennas need repair, towers require attention. Re-  
member to be safe; the list of SKs has been growing. We  
don't want to see your call there; be sure to use a full body  
harness and 100% tie off when on the tower and hard hats for  
all the ground crew. Radio activity will be in the extreme level,  
come Summer. W9WBA is still looking for help with OpSail  
2K; if you can help, contact Dale at [W9WBA@juno.com](mailto:W9WBA@juno.com).  
Also, the AMSAT and the RV convention, as well as Light-  
houses On The Air will give Hams statewide a variety of events  
to get involved with. Planning for Field Day? Count me in! As  
Section Manager, it gives me great pleasure to visit as many  
sites as time allows. If I can't make it personally, hopefully  
some of the other cabinet appointees can stop by to give sup-  
port to your Field Day activity. 73, Bill, N1KAT.

**NEW HAMPSHIRE:** SM, Mike Graham, K7CTW— ASMs:  
WW1Y, W1NH, WB1ASL, N1KIM, TC: WA1HOG, STM:  
WA1JVV, PIC: KA1GOZ, OOC: WS1E, SGL: K1KM, BM:  
KH6GR, ACC: AA1QD, SEC (acting): WW1Y. Amateur Radio  
in New Hampshire and the NTS has suffered yet another loss  
- Dawn Cummings, K1TYQ, has become a Silent Key. Dawn  
was very active in the NTS, ARES, and in her local commu-  
nity. She was 1RN Cycle 2 Net Manager, served as Interim  
Net Manager for the Granite State Phone Net, and was a  
trustee for the Keene Repeater. I must also report that Larry  
Beavers, longtime OOC on the Section Staff, has had to re-  
sign due to his having accepted a new engineering position  
for a Portsmouth, RI firm. Larry, we all thank you for your  
service to Amateur Radio in New Hampshire. I am pleased  
to announce that John Gaffey, WS1E, OO and past presi-  
dent of NARC, has accepted the position of OOC to replace  
Larry. Heartiest congratulations to Don 'DEG' Grant, N1ZBM,  
on attaining the rank of Eagle Scout. A Hillsborough County  
Superior Court judge has reversed a decision by the Town of  
Hudson to permit Jerry Muller, K0TV, to erect several towers  
on his property. Jerry reports it will most likely go to the NH  
Supreme Court. Stay tuned. For now, best 73. Net NM/Sess/  
QNI/QTC: GSFM N1RCQ/31/253/31; VTNH WA1JVV/31/157/  
152. Tfc: W1PEX 1091, WA1JVV 188, N1NH 110, W1ALE  
57, KA1OTN 56, N1CPX 13.

**RHODE ISLAND:** SM, Armand Lambert, K1FLD—Elections  
at the PRA/W1OP have resulted in the following line-up: Con-  
gratulations to, Pres, Neville, N1JDA, Vice Pres, David, K1DT,  
Sec, John, W1GS, Treas, John, KZ1K. The PRA founded in  
1919 has been ARRL affiliated since 1921, a big hand for  
these dedicated operators while we wish them continuing

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success. A video on the origins of Amateur Radio and the ARRL furnished by the AWA was obtained by Norm, W1AUT, the video was featured at the February meeting of the BVARC Sparked great interest and rekindled appreciation for our proud beginnings. OSARG has landed a new meeting site with plenty of parking at the Norwood Elementary School at 226 Norwood Ave. Warwick RI. Recent elections at the OSARG radio club have installed the following officers, congratulations to: Pres, Judy, KC1RI, Vice Pres, Mike, N1VSU, Treas, Joe, W1IJ and Sec, Dave, KB1AKJ, keep up the good work folks. With Ken, KB1AWV, presiding at the Feb meeting of the PVARC held at the West Warwick EMA Center, a special demonstration on Fox hunting using Doppler DF units and other methods was presented by Brian, N1BS. Neat stuff. Reminder to get your reservations in early for the ARRL Boxboro Convention this Year to be held on August 24-25, see ya all there. The next New England Division Cabinet Meeting is being scheduled for July, please have your club compile a list of topics you would like to have mentioned for discussion and get them to me before hand e-mail to [k1fld@arrl.org](mailto:k1fld@arrl.org). Reminder the 76 auction and flea is on May 20, talk in on 146.76 rptr. 73, till next time.

**WESTERN MASSACHUSETTS:** SM, William C. Voedisch, W1UD, [w1ud@arrl.org](mailto:w1ud@arrl.org)—ASM: N1NZC. ASM (digital) KD1SM. STM: W1SJV. SEC: K1VSG. OOC: WT1W, Sigurd, K1JK, and Ed, N1FGY, presented an interesting program for the NOBARC club members on UHF/VHF contesting. Fireworks brought in 2000 with a spectacular display from the summit of Mt Greylock. Paul, N1QDX, demonstrated to the MARRA gang how simple it was to use a computer to send and receive SSTV. Almost all households have a video camera. Paul illustrates the ease of showing your shack and antenna installation using freeware software and a sound card. It was a fascinating display. Bob, WA1IDA, and his ARES gang in Worcester came to the forefront during the horrendous fire in Worcester that left six firefighters dead. They also maintained backup communications during the President's visit to the city for a wake and funeral of these men. Too many call signs to mention in this medium, but I want to thank one and all for an exceptional job. Well done. Under the able supervision of our SEC Dennis, K1VSG, and all the drills we have had, we are prepared to handle any emergency in this section. Thank you, all! Tfc: N1USB 16, W1ZPB 106, KD1SM 5, K1TMA 54, N1RLX 2, W1BKM 2, N1RFQ 18, N1RKY 3, W1SJV 12, W1UD 231.

### NORTHWESTERN DIVISION

**ALASKA:** SM, Kent Petty, KL5T — ASM: KL7JBV. OOC: KL7IKX. SEC: NL7DL. DEC: WL7JBV. DEC: WL7GK. TC: WL7CE. Sniper's Net 3920 daily 1800 AST, bush Net 7093 daily 2000 AST, Motley Group 3933 daily 2100 AST, and Alaska Pacific Net 14292 M-F 0830 AST. Code Practice Station (KL7G) 3575 kHz, 7075 kHz at 7:00 AM, 10:00 AM, 4:00 PM, 7:00 PM and 10:00 PM. AST daily. The speeds are 22 WPM, 15 wpm & 7 wpm. Congratulations to Ed Cole, AL7EB, new President of the Moose Horn ARC, and to Greg Griffith, KLOMW, elected President of the Juneau ARC. Moose Horn ARC preparing for Tustumena 200 Sled Dog Race. Arctic ARC preparing for Yukon Quest Sled Dog Race; may have ATV up this year. Anchorage and Matanuska Valley hams provided comm support to Eagle River Sled Dog Race and are now preparing for Fur Rendezvous. Juneau ARC to again to support local High School Science Fair. Numerous section cabinet positions are vacant; contact KL5T at [k1st@arrl.org](mailto:k1st@arrl.org) to volunteer. Please report activities on FSD-157 to KL5T.

**EASTERN WASHINGTON:** SM, Kyle Pugh, KA7CSP—This is the month (April) that the new license re-structuring goes into effect. You will keep your present operating privileges and the amateur sub-bands will stay the same. It appears the new rules have stirred some interest in the hobby and many hams are seeking to upgrade. Hopefully soon there will be more newly upgraded young hams on the HF bands. Attention traffic handlers, Don, W7GB, is in need of TCC operators. Please contact Don if you are interested. Mark Tharp, KB7HDX, Assistant Section Manager in Yakima, reports a new SAR repeater with good coverage in Central WA is on 146.86/26, pl 123. The Lilac City hamfest is in Spokane on April 8, 8 out of 12 OO stations reported monitoring activity. In Memorium — Patrick Stewart, W7GVC, of Walla Walla, Silent Key on Jan 5. Net Activity: WSN: QNI 831, tfc 257; Noontime Net: QNI 8273, tfc 213; WARTS: QNI 3610, tfc 93. Tfc: K7GXZ 224, W7GB 189, K7BFL 103, KA7EKL 79. PSHR: W7GB 138, K7GXZ 123.

**IDAHO:** SM, M.P. Elliott, K7BOI — OOC: N7GHV. SEC: AA7VR. STM: W7GHT. It is hamfest time! If your club or area is holding a hamfest let me know so that we can help with publicity for the event. K7BDS and AA7VR along with several other hams are meeting on a regular basis to work on proposed tower legislation to introduce in the state legislature. While the draft legislation is being patterned after successful bills that have passed in other states, they are working to include those items important to Idaho hams. If you have suggestions or wish to participate please let them know. It is hoped that the legislation can be complete and introduced as a bill during the 2001 session. 73 — Mike, K7BOI. Tfc: W7GHT 298, KB7GZU 99, WB7YH 54, and N7MPS 33. PSHR: W7GHT 128, WB7YH 93, and N7MPS 65. Net (Sess/QNI/GTC/Mgr.): FARM-31/2869/24/W7WJH, WTN-31/1413/63/KC7RNT; IDACD -21/541/20/K7UBC; IMN-31/477/213/W6ZOH.

**MONTANA:** SM, Darrell L Thomas, N7KOR [[n7kor@mcn.net](mailto:n7kor@mcn.net)] —The restructuring announcement of the Amateur Radio licenses appears to have taken a positive effect on members of the Montana Section. Clubs are reporting an increase in candidates at VE sessions and at least two clubs, Great Falls and Helena are holding classes to assist their members in learning code and higher level theory in anticipation of upgrading. This is the biggest push to attempt any up-grades we have seen for a long time. Congratulations go out to two Montana Hams who were selected as ham of the year by their respective clubs. The Yellowstone Radio Club of Billings MT has chosen Robert Blumer WB6EHV and the Capital City Radio Club of Helena has chosen Duane McNeil, K7SYO. Congratulations to both on their honor as ham of the year. Net/QNI/GTC/NM MSN 135/0 W7OW MTN 2189/40 N7AIK. PSHR 115 Cat 1/51 2/15 3/24 4/8 5/7 6/10.

**OREGON:** SM: Bill Sawders, K7ZM—ASM: KK7CW, ASM:

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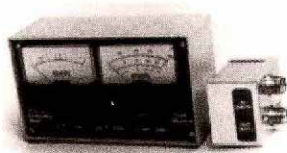
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KG7OK. SEC: WB7NML. STM: W7IZ. SGL: N7QQU. OOC: NB7J. STC: AB7HB. ACC: K7SQ. Two more clubs reporting new officers for the year 2000: President at the Hoodview Amateur Radio Club is Joe Machaud, N7HA. Vice President is Ed Coery, K7OC. Secretary, Buck Layton, KD7FY1, and Treasurer, Bryan Hoffman, W7BJB. Y2K officers of the Willamette Valley DX Club include: President, Mike Conatore, K7NT. Vice President, Hank Lonberg, KR7X. Secretary, Jim Cassidy, K17Y, and Treasurer, Rob Hinz, W7NX. Directors are Sandy Lynch, W7BX. Ron Hyllton, AD7L, and Russ Fillingier, W7LXR. Good luck to all of you for a successful new year in office. Karl Fraser, KK1A, has received his BPL medallion, and has qualified for the Public Service Honor Roll, for having been on the PSHR for more than 18 months. Also receiving Certificates of Merit from the ARRL, are Alice Mc Cullough, K7RQZ. Mary Anderson, N7DRP. Jim Arnold, K6AGD, and Glenn Evelove, N7YSS. These awards are for promoting and dedication of the National Traffic System for 1999. Congratulations to all, for a job well done! Get ready for Seaside, and it's "not too early" to plan for Field Day. Keep in touch.

**WESTERN WASHINGTON:** SM, Harry Lewis, W7JWJ—This report via SEC N7NVP, Clallam Co. ARES/RACES signed an MOU with SAR to install and operate a GRC-193A general coverage HF transceiver in their Comm Truck. The MOU also provides for ARES/RACES assisting SAR with communications and other suitable tasks. Several searches were supported by the hams in Cowlitz Co. for a total of 66.5 public service hours and 629 miles. The Medical Service Team reported over 450 public service hours between support of the World Trade Organization visit to Seattle and Y2K. This is how Marina Zuetell, N7LSL, Med DEC described it, "WTO turned out to be way more of a problem than the city anticipated, and the role of the amateur radio teams escalated proportionately. Twelve Seattle ACS and twelve MST hams provided over 500 hours of service over the 6 days. I personally spent 54 hours over 4 shifts. Our role was to monitor many different radio systems and report items of interest to the EOC personnel. While Y2K turned out to be a non-event, the planning and preparation over the past 2-3 years by all the hospitals and other agencies was what made it a non-event. We staffed 14 hospitals in King Co, 2 in Pierce Co, one in Snohomish Co and several in Thurston, Lewis, Mason and Grays Harbor counties. Several other counties were on standby only and did not participate in the net. From the new Radio Room at Riverton Operations Center, we were able to track the bed count status and facility status of 24 different hospitals in seven different counties. In almost all of the hospitals, it was a very high visibility project as executive-level hospital staff were present in the hospital command centers throughout the evening, and the radio operators were integrated into the operation. I have heard nothing but high praise from the hospitals about the value added by the radio operators and the overall net in determining the status of the inter-dependent regional health care organizations." During the transition of the century, the OOs were all ears monitoring. More recently, Seattle area hams played an important, but invisible role during demonstrations near the Microsoft facility. Counties reporting during January were Island, San Juan, Skagit, Snohomish, Whatcom, King, Clark, Cowlitz, Wahkiakum and Skamania. In the world of traffic the top tlc handlers for the month were K7BDU 896, K7MQF 165, W7TVA 218, W7ZIW 157 and W7NWP 154, 73, W7JWJ.

## PACIFIC DIVISION

**EAST BAY:** SM, Andy Oppel, KF6RCO—SEC: KE6NVU. DECS: WA6TGF/Alameda County, KO6JR/Contra Costa County, WA7IND/Napa County, K6HEW/Solano County, N6UOW/Training, W6CPO/Technical Services, KQ6TM/Section Plans and Administration. STM: K6APW. OOC: W6NKF. Check out the EB WWW Page at <http://www.pdarrl.org/ebsec/>. Webmaster is KB6MP. ORCA's new EOC is becoming operation with the installation of VHF/UHF radios. They setup a special packet BBS to save bulletins regarding the status of Y2K activities. LARK and SBARA have been sponsoring T-Hunts, generally held two Saturdays per month in the evening. SARS reported a successful Y2K operation at their OES and recognized K7LK for raveling all the way from Montana to attend their year-end pizza party. The VVRC Holiday Party was attended by over 40 people. SIRARC is delighted to have their old meeting place back - Spenger's Seafood in Berkeley; they welcome new members W6MBB and N6TUM. CCCC's Year 2000 board includes Pres/KC6VLL, VP/KF6FU, Sec/KE6MSF, Tres/KD6GJK, Trustee/N6MNL, Dirs/AC6GQ, AC6WF, KD6JCT. MDARC's new education chairman is K3ZJJ. Congratulations to MDARC's W6CX Award winners W6OFH, KE6ELP, KE6TOT, KC6SOE, KR6CR and Ham of the Year KE6PTT. Tfc: W6DOB 633, WB6UZX 24. PSHR: W6DOB. BPL: W6DOB. Tfc nets: NCN1/3630/7PM; NCN2-SLOW SESSION/3705/9 PM; NCN-VHF/145.21/7:30 PM; RN6/3655/7:45 PM & 9:30 PM; PAN/3651/7052/8:30 PM.

**NEVADA:** SM, Bob Davis, K7IY—ASM: Jan, NK7N. ASM: Jerry, W7YDX. SEC: Joe, N7JEH. TC: NW7O. ACC: N7FFF. STM/SGL: N7CPP. PIC: WW7E. OOC: N7ELV. Hello to all in the Nevada Section. Spring has nearly sprung now and many of the section clubs and organizations have submitted plans for major expansions and upgrades to their repeater systems. Many of the improvements involve full-time linking into systems outside of the local area. Please take time to learn and use the appropriate protocol when using these systems. Reports in from both the ARRL and W5YI VEC test sessions around the Section for the last two months have been tremendous. We should all take advantage of this opportunity to welcome these new and upgraded licensee's into our clubs and the League. They will most likely provide a new level of interest and activity within our organizations. With the license restructuring due date approaching of April 15th, please remember that you are required to register with the FCC first, via the ULS before attempting to submit your upgrade paperwork. Hello to Dennis, W6OGG in Rolling Hills. Thanks and 73, Bob, K7IY.

**PACIFIC:** SM, Ron Phillips, AH6HN—ASMs: Harry Nishiyama, KH6FKG; Lee Wical, KH6BZF; Jim Reid, KH7M; George Heloca, Sr. KH6ANA; Mel Fukanaga, KH6H. Stu Johnston, NH6DR. SEC: Dennis Carvalho, KH7H. TC: Chuck

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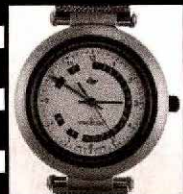
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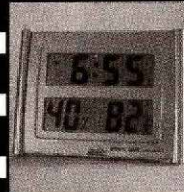
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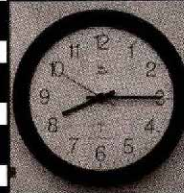
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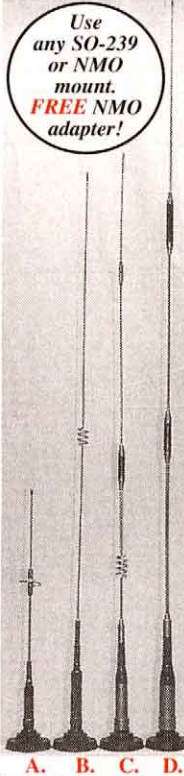
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Extra-wide four inch lip and large reinforcing tabs on each side safely distributes the load over your vehicle's lip.

Two large set screws on each end of the mounting lip locks your mount in place. A scratch-proof rubber guard protects your vehicle's finish.

Secures large VHF, UHF and medium size HF antennas even at highway speeds.

Mounts on lips at any angle. Two axis of rotation lets you position your antenna vertically, horizontally or at any desired angle. Serrated swivel joints locks securely in place with huge 3/8 inch set screw.

Has SO-239 base mount. Use adapter for NMO. Includes low loss coax with PL-259 connector, Allen wrenches and protection caps for SO-239 and locking screw, One year MFJ No Matter What™ limited warranty.

MFJ-345 Lip Mount is shown mounted vertically to a mini-van's angled hatchback lip. Note extra-wide mount with reinforcing tab at right -- safely secures heavy antennas. Swivel mount is adjusted so antenna is near vertical away from mini-van to clear luggage rack.



### Mirror/Luggage Pipe Clamp Mount

MFJ-340 MFJ's RuffRider™ Mirror/Luggage Pipe Clamp Mount mounts on support rod of mirror, luggage rack or spare tire carrier of your truck, van, RV or SUV. Mounts on any horizontal, vertical or angled rod or pipe up to 5/8 inches in diameter.  
**\$34<sup>95</sup>**  
add s/h

MFJ-340 Pipe Clamp Mount is shown clamped solidly to vertical mirror support rod on a pickup truck. Antenna is slightly swiveled to the left and positioned about 30 degrees from vertical to clear cab of the pickup truck.

Secures VHF, UHF and medium size HF antennas even at highway speeds.

Two axis of rotation lets you position your antenna to any desired angle. Serrated swivel joints locks securely in place with huge 3/8 inch set screw.

Convenient Thumb and Finger turn knob makes fold-over operation quick and easy. Locks in twelve positions.

Fold down your antenna at night when pulling into your garage and quickly put it back up to its operating position in the morning.

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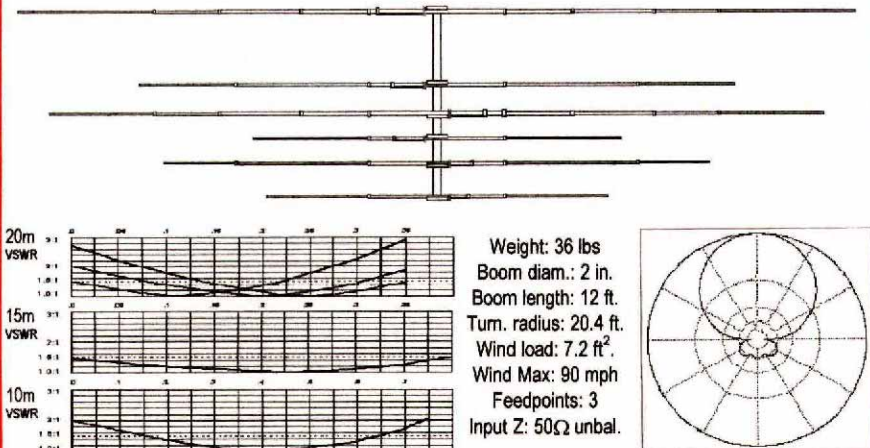
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Cartwright, AH7Y. PIC: Russ Roberts, KH6JRM. ACC: Bob Schneider, AH6J. HI QRP Club had their first monthly Hilo Hamfest and tail-gate swap meet Saturday, Jan 15. It was attended by KH6AFQ, KH6BMM, KH6HME, KH6AFS, WH6CME, W6ORS and KH6B. Corky Kirk, W6ORS, reports that t/c for Jan equals a big zero. December was: rcvd 3, del 3, orig 0, for a total of 6. Thanks, Corky, for your report. It is with deep regret that I report the passing of Myrtle Barton, NH6WX, of Hilo and Ernest Kurlansky, KH6CCL of Waimea. Both were members of BIARC and will be greatly missed. Planning is underway for a hamfest to be held in Waimea on March 18. All amateurs are welcome to attend. QST delivery is still slow to the Pacific. Please keep the reports coming. 73 and Mahalo, Ron, AH6HN.

**SACRAMENTO VALLEY:** SM, Jettie Hill, W6RFF—As of April 1, 2000 (no April Fool joke), there will be a new Section Manager for the Sacramento Valley Section. Because of personal reasons, I have submitted my resignation to the ARRL as of March 31, 2000. The new SM will be JERRY BOYD, K6BZ. Jerry has been active in the section for several years as the Section Emergency Coordinator. He is very experienced in emergency work, Public Service and Management. I know he will do an excellent job - otherwise I would not have recommended him. I want to thank all of the section staff and appointees for their dedication and hard work during the 10 and a half years I have been SM. Also to the affiliated clubs, thanks for your cooperation and hospitality through the years. I still plan to be active with the ARRL but not in an elected position. I have been a ham and a member of the ARRL for 61 years and enjoyed every minute of it!! Now back to section news. North Hill RC will be holding their annual hamfest on May 21, 2000 in Fair Oaks - same place as last year. They always get a good turn-out and there are lots of "boat anchors" to look at. See you there. Tom Schiller, N6BT, gave a talk on antennas to Sierra Foothills ARC. Tom is owner of Force 12 Antennas. Many hams taking exams now so they can up-grade their license on April 15. Amador County RC had good turnout at their annual dinner. I presented a 100% ARRL membership Certificate to the Mother Lode DXCC. The new SMs address is PO Box 252, Ono, CA 96047, e-mail k6bz@c-zone.net. Thanks, 73, Jettie.

**SAN FRANCISCO:** SM, Leonard Gwin, WA6KLK—ASM: N6KM. SEC: WB6TMS. Valley of the Moon Radio Club will hold a hamfest and swapmeet in Sonoma on 29 April. San Francisco Radio Club has repaired their repeater and renovated their station complex. They are looking for new members and help for their events. Lambda Radio Club visited W6HDU for a review of old transmitters and receivers and have an interesting talk on radios and underground caving coming up. USS Pampanito Radio Club has an interesting project on a submarine. Ask!! Redwood Empire DX Club has certificates for working the north coast counties. Ask!! K7WVA new DEC for Mendocino County. Congratulations to all new club officers. Please send club news to WA6KLK, SM.

**SAN JOAQUIN VALLEY:** SM, Donald Costello, W7WN—With the advent of the new HF/VHF/UHF combination radios now showing up on the bands in abundance there is good reason to broaden the scope of our operating. In one radio now working the birds, local repeaters, weak signal two meter or four thirty, and HF is simple and will broaden our Amateur Radio experiences. I suggest that you check out ssb operation of 2 meters and the 430 MHz band for activity in the SJV Section as well as working the birds in space as you will hear some of your fellow SJV hams there. During the month of February, W1LP was heard, shipboard, in CM76 as he cruised toward San Francisco on a large commercial ship. He worked some of our SJV hams on VHF and UHF. N6KMR can be heard working the birds from many grid squares and giving out counties from his truck as he traverses the highways of California delivering wine from many of California's vineyards. In the news is that Kent LeBarts, K6IN, who is SJV Sections Emergency Coordinator has accepted the position of Assistant Radio Officer, State OES, Inland Region 5. Congratulations, Kent, on a choice well made by the State of California. Kent LeBarts and I would like to thank all who participated in the Y2K vigil that took place on Jan 1 of this year. Although thankfully, nothing significant happened. What was significant is that our relationship with the State of California, the counties and local hospitals and the Red Cross was substantially improved for future cooperation.

**SANTA CLARA VALLEY:** SM, Glenn Thomas, WB6W—SEC: KM6GE. BM: WB6MRQ. TC: WA6PWW. OOC: KB6FPW. A short report this month - there's a LOT going on! Santa Clara County ARES/RACES held a very successful EOC-to-EOC traffic handling drill. The Naval Postgraduate School ARC meets the 2nd Thursday of the month at 7 PM local in Spanagel Hall Room 400 at the school. An informal group has started having lunch together every Wednesday at noon at Harry's Hofbrau on Saratoga Ave. Swing by and visit if you're in the area! The Millbrae ARC meets the 1st Thursday of the month, 7 PM in the community room of the Millbrae library at #1 Library Ave. You guys on our roster for sure! The Saratoga ARA net meets every Tuesday at 7:30 PM on 28.4 MHz (SSB) and 146.655- (114.8 pl). The Santa Clara County Amateur Radio assoc. meets on second Mondays at 7:30 PM at HP Oak Room, contact Clark, KE6KXO, at 408-262-9334, for more info. The Santa Cruz County ARC meets at 7:30 PM on the third Friday at the Dominican Education building, 1515 Soquel DR, Santa Cruz. The Los Cumbres meets on the third Thursday at 7:30 PM in Hewlett-Packard bldg 48 (Cupertino) in the Oak Room. Talk-in on K6FB/R 145.45- pl 100. The Garlic Valley ARC meets at 8 AM on the LAST Saturday of each month, at the Little House Restaurant in Gilroy on Monterey Avenue. The South County ARES net is held each Tuesday at 7:30 PM on K6THR/R (147.825 - 600, no PL). Palo Alto Amateur Radio Association heard about the Orbiting Picosatellite Automated Launcher (OPAL) Satellite program at Stanford University at their Dec meeting. They meet the first Friday at 7:30 PM in the Menlo Park Recreation Center, 700 Alma Street, Menlo Park. For general information on clubs and other activities in the section, take a look at the SCV section Webpage at <http://www.pdarri.org/scvsec/index.html> If you'd like to see your club mentioned in these pages, send me a copy of your club newsletter to me at home or via e-mail ([wb6w@arrl.org](mailto:wb6w@arrl.org)). I can't report it if I don't see it! - See you next month! 73 de Glenn, WB6W. T/c: W6PRI 4.



# 10 Bands -- 1 MFJ Antenna!

*Full size performance . . . No ground or radials*

*Operate 10 bands: 75/80, 40, 30, 20, 17, 15, 12, 10, 6 and 2 Meters with one antenna  
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**Operate** 10 bands -- 75/80, 40, 30, 20, 17, 15, 12, 10, 6 and 2 Meters with this MFJ-1798 vertical antenna and get *full size performance* with no ground or radials!

**Full size performance** gives high efficiency for more power radiated. Results? Stronger signals and more Q-5 QSOs.

**Full size performance** also gives you exceptionally wide bandwidths so you can use more of your hard earned frequencies.

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

**Get** very low radiation angle for exciting DX, automatic bandswitching, omni-directional coverage, low SWR. Handles 1500 Watts PEP SSB.

**MFJ's** unique *Elevated Top Feed™* elevates the feedpoint *all the way to the top* of the antenna. It puts the maximum radiation point high up in the clear where it does the most good -- your signal gets out even if you're ground mounted.

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

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

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

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**Super** easy-to-use! Only MFJ's super remote control has *Auto Band Selection™*. It auto-tunes to desired band, then beeps to let you know. No control cable is needed.

**Fast/slow** tune buttons and built-in two range Cross-Needle SWR/Wattmeter lets you quickly tune to your exact frequency.

**All** welded construction, no mechanical joints, welded butterfly capacitor with no rotating contacts, large 1.050 inch diameter round radiator -- not a lossy thin flat-strip -- gives you *highest possible efficiency*.

**Each** plate in MFJ's tuning capacitor is welded for low loss and polished to prevent high voltage arcing, welded to the radiator, has nylon bearing, anti-backlash mechanism, limit switches, continuous no-step DC motor -- gives smooth precision tuning.

**Heavy** duty thick ABS plastic housing

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

**Ideal** for limited space -- apartments, small lots, motor

homes, attics, or mobile homes. contacts mounted vertically.

Get both low angle radiation for excellent DX and high angle radiation for local, close-in contacts. Handles 150 watts.

Super easy-to-use! Only MFJ's super remote control has *Auto Band Selection™*. It auto-tunes to desired band, then beeps to let you know. No control cable is needed.

Fast/slow tune buttons and built-in two range Cross-Needle SWR/Wattmeter lets you quickly tune to your exact frequency.

All welded construction, no mechanical joints, welded butterfly capacitor with no rotating contacts, large 1.050 inch diameter round radiator -- not a lossy thin flat-strip -- gives you *highest possible efficiency*.

Each plate in MFJ's tuning capacitor is welded for low loss and polished to prevent high voltage arcing, welded to the radiator, has nylon bearing, anti-backlash mechanism, limit switches, continuous no-step DC motor -- gives smooth precision tuning.

Heavy duty thick ABS plastic housing

has ultraviolet inhibitor protection.

**NEW!** MFJ-1788, \$429.95. Same as MFJ-1786 but covers 40 Meters-15 Meters continuous. Includes super remote control.

**MFJ-1782, \$339.95.** Like MFJ-1786 but control has only fast/slow tune buttons.

**MFJ-1780, \$249.95.** *Box Fan* Portable Loop is about the same size (2x2 foot) as a box fan, complete with handle. Covers 14-30 MHz. Control has fast/slow tunes.

## MFJ Portable Antenna

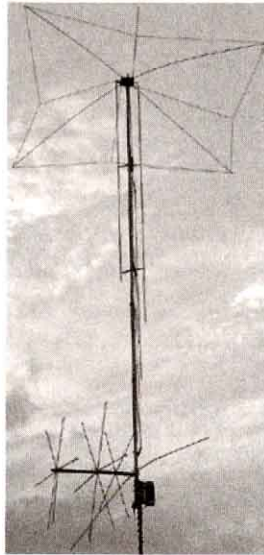
**MFJ-1621** \$79.95 Ship Code A  
MFJ-1621 lets you operate in most any electrically free area -- apartment, campsite, hotel, the beach, etc.

DXCC, WAZ, WAC, WAS have been won with MFJ-1621! Work 40, 30, 20, 17, 15, 12 and 10 Meters with a telescopic whip that extends to 54 inches. Mounted on a sturdy 6x3x6 inch cabinet. Built-in antenna tuner, field strength meter, and 50 feet of RG-58 coax cable. Handles 200 Watts.

## MFJ's G5RV Antenna

**MFJ-1778, \$34.95** Ship Code A  
Covers all bands, 160-10 Meters with antenna tuner. 102 feet long, shorter than 80 Meter dipole. Use as inverted

vee or sloper to be more compact. Use on 160 Meters as Marconi with tuner and ground. Handles full legal limit power. Add coax feedline and some rope or other nonconductor and you're *on the air!*



MFJ-1798

\$269.95  
Ship Code F

beyond it. *In phase* antenna current flows in all parallel radiators.

**This** forms a very large equivalent radiator and gives you incredible bandwidths.

**Radiator** stubs provide automatic bandswitching -- absolutely *no loss* due to loading coils or traps.

## End Loading

**On** 30, 40, 75/80 Meters, end loading -- the most efficient form of loading -- gives you highly efficient performance, excellent bandwidth, low angle radiation and automatic bandswitching.

**MFJ's** unique *Frequency Adaptive L-Network™* provides automatic impedance matching for lowest SWR on these low bands.

**Tuning** to your favorite part of these bands is simple and is done at the *bottom* of the antenna.

## No Ground or Radials Needed

**You** don't need a ground or radials because an effective counterpoise that's 12 feet across gives you *excellent* ground isolation.

**You** can mount it from ground level to roof top and get awesome performance.

## No Feedline Radiation to Waste Power

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

## Built to Last

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

**Efficient** high-Q coils are wound on tough *low loss* fiberglass forms using highly weather resistant *Teflon®* covered wire.

## MFJ halfwave vertical

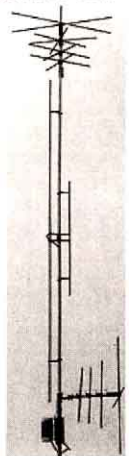
**6 bands: 40, 20, 15, 10, 6, 2 Meters . . . No radials or ground needed**

**Only** 12 feet high and has a tiny 24 inch footprint! MFJ-1796 \$199.95 Ship Code F  
Mount anywhere -- ground level to tower top -- apartments, small lots, trailers. Perfect for vacations, field day, DXpedition, camping.

**Efficient** end-loading, no lossy traps. Entire length is always radiating. Full size halfwave on 2/6 Meters. High power *air-wound* choke balun eliminates feedline radiation. Adjusting 1 band has minimum effect on others.

**MFJ-1792, \$159.95.** Full size 1/4 wave radiator for 40 Meters. 33 feet, handles 1500 Watts PEP. Requires guying and radials.

**MFJ-1793, \$179.95.** Like MFJ-1792 but has full size 20 Meter 1/4 wave also.



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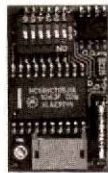
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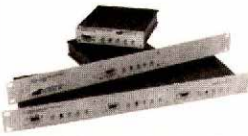


- DIP switch programmable
- Miniature in size
- 37 EIA tones, 27 non-standard tones from 33.0 to 254.1 Hz included
- Reverse Burst built-in
- Easy 3 wire hookup



SS-64 CTCSS Encoder  
.66" x 1.08" x .21"

SS-64 DIP Switch Programmable CTCSS Encoder \$28.95



TP-3200 Shared Repeater Tone Panel

- TP-3200D Table Top Version \$269.95 each
  - TP-3200RM-A Single Rack Mount version \$279.95 each
  - TP-3200RM-B Triple Rack Mount version \$279.95 each
- \*Holds up to three TP-3200s

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<http://www.com-spec.com>

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- Signalling Formats: CTCSS, DCS & DTMF

- Fully enclosed CTCSS encoder
- All 32 EIA tones from 67.0 to 203.5 Hz included
- Perfect for mobile / base applications



TE-32 Multi-Tone CTCSS Encoder \$49.95

TE-32  
5.25" x 3.3" x 1.7"

- Eight programmable, selectable messages
- Fully field programmable via included keypad
- Meets all FCC identification requirements



ID-8 Automatic Morse Code Identifier  
1.85" x 1.12" x .35"

ID-8 Automatic Morse Station Identifier \$69.95



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## W9GR DSP-3 Kits \$168 + \$7 S/H



As featured in the ARRL Handbook: Powerful adaptive noise filtering, automatic notching, tunable CW filters, narrow SSB/FSK/SSTV filters, and even CTCSS and DTMF decoders! Includes custom cabinet.

WRITE for more info: Quantics, P.O. Box 2163, Nevada City, CA 95959  
Or see and Hear the DSP-3 on the world wide web at:  
<http://www.w9gr.com>

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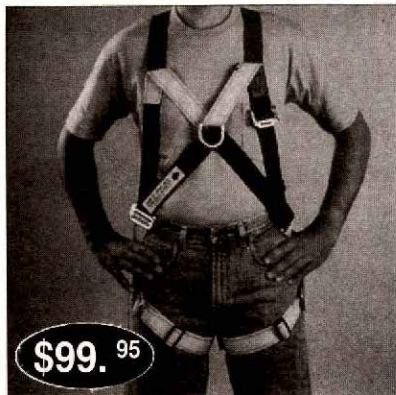
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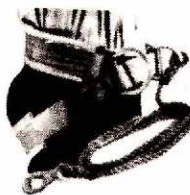
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NOW FEEL SAFE CLIMBING TOWERS

## ROANOKE DIVISION

**NORTH CAROLINA:** SM, W. Reed Whitten, AB4W— SEC: KE4JHJ. STM: K4IWW. TC: K4ITL. SGL: K14AN. OOC: W4ZRA. PIC: KN4AQ. ACC: W4CC. BM: KD4YTU. <http://www.ncarrl.org> Part 97 (CFR 47) of the FCC Regulations is titled "THE AMATEUR RADIO SERVICE" and the first stated "fundamental purpose" is "service to the public...particularly with respect to providing emergency communications." I think it is most significant that the word SERVICE is used both in the title and in defining the purpose of Amateur Radio. (The word "hobby" does not appear in Part 97.) Along with the fellowship and fun comes the obligation of providing emergency communications to the public. Your ARRL has established the Field Organization and ARES to facilitate this, and your local Emergency Coordinator (EC) is the key person. The EC works with both county and relief agency officials to assure that we will be used effectively and in appropriate circumstances. The EC works with local Amateurs to assure that we will be trained and available when the opportunity to provide backup communications arises. The EC works with our PIOs and the media to assure that the public is aware of Amateur Radio's emergency communications activities. This PR activity may be the EC's most important job! I firmly believe that we need to take advantage of every opportunity to publicize Amateur Radio's emergency communications activities. Public perception that Amateur Radio is an essential emergency communications resource is, in my opinion, essential for the continuing existence of the Amateur Radio Service. (NOTE: I never call Amateur Radio a hobby in any public statements. I think it trivializes what we do.) The Em Mgt community is accustomed to dealing with groups that are part of national organizations with state and local level officials, e.g., the Salvation Army and Red Cross. ARRL has the advantage of a comparable organizational structure. There is little advantage, other than petty egos, not to function as ARES, a unified national organization. It served us well during our recent record snowstorms. Ask your EC to give you the opportunity to help fulfill our obligation for "service to the public." RARS Hamfest & State Convention in Raleigh Apr 9. Catawba Valley Hamfest in Morganton Apr 15. Jan tlc: W4EAT 451, AB4E 188, N4AF 185, K4IWW 157, N4C4ML 154, AA4YW 121, K4IYV 111, W4IRE 83, KE4JHJ 68, K4AIF 61, W3HL 54, AC4DV 51, KE4AHC 37, AB4W 34, WA4SRD 28, AD4XV 22, N4SU 21, WD4MRD 21, W2CS 18, NT4K 15, W4CC 14, AC4ZO 12, KF4OZF 12, KL7NL 11, KB8VCZ 8, W4DYW 8, KR4ZJ 7, KT4CD 7, KF4YMA 6, N2JLE 5, KF4YHG 4, KR4OE 2.

**SOUTH CAROLINA:** SM, Les Shattuck, K4NK— Greetings...This will be my last column as your section manager. As most of you know I am now the new Vice Director of our division. Your new section manager is Pat Hensley, N4ROS. I have enjoyed my stint as your section manager and hope I lived up to the job. I feel that I did the best job I could representing the ARRL in our state. As a Vice Director, I will continue to keep my eye on happenings in South Carolina. Please help Pat as she makes the transition. I would like to thank my staff for all the hard work. Hope to see you all at the Hamfest. Traffic, Jan 2000: KT4SJ 132, KA4LRM 77, K4JMV 70, KA4UIV 56, WA4UGD 28, W4CQB 16, W4DRF 15, WD4BUH 15. PSHR for Jan 2000 KA4UIV 133, KA4LRM 121, KT4SJ 108.

**VIRGINIA:** SM, Lynn Gahagan, AF4CD—ASM: W4TLM. SEC: K4EC. ASM/DSEC: KR4UQ. TC: W4IN. PIC: W2MG. OOC: KR4UQ. STM: ACC: AF4CD. A New DXCC Field Checker Program: The League is making the field checking of QSL cards for the DXCC Awards Program a little simpler for everyone. This would help eliminate a lot of the participants from having to send their cards to Newington to be checked for credit. Under the new rules, which will become effective on April 1st, the VA Section could have as many as three (3) checkers under the new program. This is determined by how many approved DXCC related clubs are in the Section. Bottom line folks is this: if we want more checkers in our Section, let's form more DX related clubs! For more details checkout the ARRL web site at [www.arrl.org/awards/dxcc](http://www.arrl.org/awards/dxcc). Buddy, W4YE, invites all amateurs in his area (Roanoke) to join him and others at a QCWA chapter 202 meeting. They usually meet monthly for breakfast on a Saturday. All amateurs who were licensed at least 25 years ago are eligible to join Quarter Century Wireless Assoc. All Hams are welcome to attend. At least three field handlers of the Virginia Net (CW) belong to the chapter 202, W4UQ, W44DOX, and W4YE. For more information, contact [w4ye@aol.com](mailto:w4ye@aol.com). Virginia has five chapters currently: Northern Va., Tidewater, Shenandoah Valley, Charlottesville area, and Roanoke Valley area. K4IX, Bus of Norfolk reports that his dear friend of many years, "Nap" Perry, W4DHZ, is now a "Silent Key." Nap was a very fine CW operator. His code was sent on an old Vibroplex "bug." He was lightning fast and accurate and his call was known all over the world. He was at the top of the DX ladder, the Va. DXCC listing of countries confirmed. He was an official card checker for the DXCC Award program. When he served as an Assist. EC for Norfolk, he helped install VHF antennas on Schools that were designated as Emergency Shelters. In earlier years, Nap worked with Norfolk City officials setting up an Emergency Com Center at the Center Theater building and was the leader of that Civil Defense team. Although I knew him for only a short period, I will always miss the stories Nap told at the "bragging session" we have at the Va DXCC meetings. They were always interesting to say the least. Nap was also a member of the Tidewater QCWA chapter. 73 de AF4CD. Tlc: W3BBO 189, K4MTX 166, W44DOX 154, KR4MU 154, K4YVX 122, N4ABM 92, WB4ZNB 74, W4ACB 62, W4UQ 59, W4YE 30, KD4FUN 30, AF4CD 24, KOIBS 23, WB4UC 21, W4TY 12, K4IX 11, W4JLS 9, W4MWC 6, KB4CAU 6, K4JM 4, N4FNT 2, KE4PAP 2, W4IN 2.

**WEST VIRGINIA:** SM, O.N. (Olie) Rinehart, WD8W— Just glanced over last month article and was attempted to copy and paste it here. On the air, by e-mail, by telephone the main topic of conversation in Amateur Radio seems to be restructuring and what to do with it. As I indicated last month, the thing to do is to accept it and get some positive benefits out of it. The definite need for "Elmiring" or tutoring on proper and adequate on-the-air procedures it a top-notch priority, and I strongly recommend that this be done by the local clubs. Just too many and too much for one-to-one. Please advise,



# MFJ tunable super DSP filter

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

U.S. Patent D374,010  
MFJ-784B

**\$249<sup>95</sup>**

**NEW!**



MFJ's *tunable* super DSP filter automatically eliminates heterodynes, reduces noise and interference *simultaneously* on SSB, AM, CW, packet, AMTOR, PACTOR, RTTY, SSTV, WeFAX, FAX, weak signal VHF, EME, satellite.

You get MFJ's *tunable* FIR linear phase filters that minimize ringing, prevent data errors and have "brick wall" filter response with up to 57dB attenuation 75 Hz away.

Only MFJ gives you 5 *tunable* DSP filters. You can *tune* each lowpass, highpass, notch, and bandpass filter including optimized SSB and CW filters. You can *vary* the bandwidth to pinpoint and eliminate interference.

Only MFJ gives you 5 *factory* pre-set filters and 10 *programmable* pre-set filters that you can *customize*. Instantly remove QRM with a turn of a switch!

MFJ's *automatic notch* filter searches for and eliminates *multiple* heterodynes.

You also get MFJ's advanced *adaptive noise reduction*. It silences background noise and QRN so much that SSB signals sound like FM.

The *automatic notch* and *adaptive noise reduction* can be used with *all* relevant *tunable* pre-set filters.

*Automatic gain control* (AGC) keeps audio level constant during signal fade.

### Tunable bandpass filters

Narrow band signals like CW and RTTY jump out of QRM when you switch in MFJ's exclusive *tunable* FIR bandpass filters.

You can tune the center frequency from 300 to 3400 Hz, and vary the bandwidth from 30 Hz to 2100 Hz -- from super-tight CW filters to wide razor-sharp Data filters.

You can use two *tunable* filters together. For example, tune one to mark, one to space and set bandwidth tight for a super sharp RTTY filter.

### Tunable highpass/lowpass filters

You can tune the lower cutoff frequency 200 to 2200 Hz and the upper cutoff frequency 1400 to

3400 Hz. This lets you create *custom* filters for Voice, Data and other modes.

Signals just 75 Hz away literally disappear -- they are reduced 57 dB!

### Automatic notch filter

MFJ's automatic notch filter searches for and eliminates *multiple* heterodynes in milli-seconds. It's so fast, that even *interfering* CW and RTTY signals can also be eliminated.

You can *selectively* remove unwanted tones using the two *manually tunable* notch filters -- an MFJ exclusive. Knock out unwanted CW stations while you're on CW.

### Adaptive Noise Reduction

Noise reduction works in all filter modes and on all random noise -- white noise, static, impulse, ignition noise, power line noise, hiss.

The LMS algorithm gives you up to 20 dB of noise reduction. Noise reduction is adjustable to prevent signal distortion.

### 15 pre-set filters -- factory set or you custom program

You can select from 15 *pre-set* filters. Use for SSB, AM, CW, packet, AMTOR, PACTOR, RTTY, SSTV, WeFAX, FAX or any mode.

If you don't like our pre-set filters, you can program your own -- an MFJ exclusive! Save center frequency/bandwidth, lowpass/highpass cutoffs, auto/manual notch, noise reduction -- all filter settings -- in 10 *programmable* filters.

### Plus more . . .

A push-button bypasses your filter -- lets you hear the *entire* unfiltered signal.

2 1/2 watt amplifier, volume control, input

level control, speaker jack, PTT sense line, line level output. 9 1/2 x 2 1/2 x 6 inches.

Plugs between your transceiver or receiver and external speaker or headphones. Use 12 VDC or 110 VAC with MFJ-1315, \$14.95.

Cable Pack, MFJ-5184, \$7.95, includes receiver cable, DC cable, 2 open-end TNC cables.

### New Features

MFJ's exclusive *tunable Spotting Tone*™ -- accurately tunes even the narrowest CW filter.

MFJ's exclusive *Adaptive Tuning*™ -- tuning rate automatically becomes finer as you narrow bandwidth -- makes narrow filters easy-to-use.

MFJ's exclusive *FilterTalk*™ -- sends precise filter settings in Morse code.

Has automatic notch with *variable* aggressiveness, new quieter 2 1/2 watt audio amplifier, new speaker switch keeps phones always active.

Manual and automatic notch can be used together. Noise reduction, automatic notch and *tunable* manual notch can be used when a *custom* filter you saved in memory is selected.

You get an accurate easy-to-use input level indicator, improved manual notch in the CW mode, adjustable line level output, more Mark-Space frequencies and baud rates for data filters and auto-matic bypass during transmit for monitoring CW sidetone, voice or data by sensing the PTT line.

### Firmware Upgrade

For MFJ-784, order MFJ-55, \$29.95. Gives you most features of the MFJ-784B.

## NEW! 60 dB Null wipes out noise and interference

MFJ-1026  
**\$179<sup>95</sup>**



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

Eliminate all types of noise-- severe power line noise from arcing transformers and insulators, fluorescent lamps, light dimmers, touch controlled lamps, computers, TV birdies,

lightning crashes from distant thunderstorms, electric drills, motors, industrial processes . . .

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

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

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

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

at a push of a button.

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

RF sense T/R switch automatically bypasses your transceiver when you transmit. Adjustable delay time. Uses 12 VDC or 110 VAC with MFJ-1312B, \$14.95. 6 1/2 x 1 1/2 x 6 1/4 inches.

**MFJ-1025, \$159.95.** Like MFJ-1026 less built-in active antenna, use external antenna.

### Add DSP to any Multimode



MFJ-781  
**\$129<sup>95</sup>**

Add "brick wall" DSP filtering to any TNC or multi-mode data controller.

Copy signals buried in noise and QRM.

Under severe QRM, DSP greatly improves copy

of Packet, AMTOR, PACTOR, GTOR, Clover, RTTY, SSTV, WeFAX, FAX, CW -- nearly any digital mode. Automatic gain control, ON/OFF/Bypass switch. Plugs between transceiver and multi-mode. Uses 10-16 VDC or 110 VAC with MFJ-1312B, \$14.95. 4 1/2 x 2 1/2 x 5 in.

### DSP for your MFJ-1278/B

MFJ-780  
**\$99<sup>95</sup>**



Plug a MFJ-780 "brick wall" DSP filter into your MFJ-1278/B multi-mode and you won't believe your eyes when you see solid copy from signals completely buried in QRM! MFJ-1278/B *automatically* selects the correct DSP filter for Packet, AMTOR, Pactor, RTTY, ASCII, FAX, Color SSTV, Navtex or CW.

Plug in a MFJ-780 and copy signals that other multi-modes can't. Some soldering needed.

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Jim, WD8MKS, or me, if your club would like any printed materials and such. The other facet of the restructuring that is really coming forward nationwide, is the excellent time for public relations through informing the public of what and why we are, and that the FCC is making the amateur license more accessible. The national trend for increased exam activity is definitely established, and there are adequate guidelines being provided by the VECs. Most VEs are up to date on how your license or your exams will be affected, and I am sure they will be glad to advise you. Don't forget to register for the Universal License System (ULS) with your TIN or social security number. Tfc: KA8WNO 427, W8WWF 107, WD8DHC 101, KC8CON 59, N8OYY 12. PSHR WD8DHC 138, KA8WNO 118; WVFN 1367/89/31 KC8CON; WVMN 386/22/31 N8OYY/WD8V; WYNE 131/71/31 W8WWF; WVN L 152/49/31 W8WWF; DIGITAL 132 K8MHR.

### ROCKY MOUNTAIN DIVISION

**COLORADO:** SM, Tim Armagost, WB0TUB—ASM: Jeff Ryan, N0WPA. SEC: Mike Morgan, N5LPZ. STM: Mike Stansberry, K0TER. ACC: Ron Deutsch, NK0P. PIC: Erik Dyce, W0ERX. OOC: Karen Schultz, KA0CDN & Glenn Schultz, W0IJR. SGL: Mark Baker, KG0PA. TC: Bob Armstrong, AE0B. BM: Jerry Cassidy, N0MYE. Tim and I had the pleasure of attending the annual meeting of BCARES. Great group of folks. Outgoing EC Pat Lambert, W0IPL, presented an award to Vicki Schneider, NOXCX for "Significant Contribution and Achievements". Congrats to her and thanks for volunteering and donating so many hours to public service. The Boy Scout Freezeoree is an annual mid-winter camp-out at the US Air Force Academy attended by over 3,000 scouts from around the state and several troops from out of state as well. Area ham groups led by the Pikes Peak Radio Amateur Assn and the Mountain Amateur Radio Club provided several stations for the scouts to observe and participate in our hobby. Well done to all involved. A bill introduced in the Colorado state assembly would have outlawed the use of ham radio while mobile. The measure was aimed at cell phone users but ham radio got swept along. Many hams wrote letters to their state legislators and Wes Wilson, W0HBZ, Mike Manes, W5VSI, and Sid White, K4ARM were invited to testify in front of the committee considering the bill. In the end, the committee decided to "postpone indefinitely" any action on the legislation effectively killing it. If you have items for this column, e-mail them to me at [n0wpa@arrl.net](mailto:n0wpa@arrl.net). 73, de N0WPA. NTS traffic: AD0A 150, K0TER 58, N0UOD 30. CAWN: W0WPD 822, W0GGP 552, W0LVI 526, AA0ZR 464, N0NMP 448, K10ND 386, W0NCD 377, N0DKK 354, K0HBZ 321, N0JUS 257, W0BOVET 201.

**NEW MEXICO:** SM, Joe T. Knight, W5PDY—ASM: K5BIS & N5ART. SEC: K6YEJ. STM: N7IOM. NMs: WA5UNNO & W5UWY. TC: W8GY. ACC: N5ART. New Mexico Roadrunner Net handled 117 msgs with 1189 checkins. New Mexico Breakfast Club handled 244 msgs with 1113 checkins. Yucca Net handled 28 msgs with 814 checkins. Caravan Club Net handled 11 msgs with 76 checkins. SCAT Net handled 26 msgs with 527 checkins. Four Corners Net handled 26 msgs with 300 checkins. GARS Net handled 3 msgs with 295 checkins. Rusty's Net handled 93 msgs with 673 checkins. Valencia Co Net handled 11 msgs with 45 checkins. We survived the January Tailgate with real thanks to K5TEE and his crew. We had over 300 at the event even if the weather started off at 23 degrees! The hot coffee and the breakfast burritos provided some warmth. Good to see such a good turnout, but at times some of us were bundled up so that you couldn't tell who you were talking to. We thank Rick from Rad-Com for driving all the way from Lubbock, TX. There were people from Farmington, Grants, Clovis, Socorro, Santa Fe, Ojo Sarco, and many other places, even Arizona! Our next tailgate event will be April 29 at St Pauls United Methodist Church at approximately Moon and Constitution NE. The Mesilla Valley (Las Cruces) "Bean and Chili Feed" usually follows that, and I assume that would be Sunday April 30 in Las Cruces. Very sorry to report the passing of N5JOG of Alamogordo and W5MDG of Roswell. They will certainly be missed. Best 73, W5PDY.

**UTAH:** SM, Mel Parkes, N5UVP—We were all saddened to hear about two of the hams in our state who became Silent Keys. Wilbur J. C. "Bill" Fahey, K7FY, passed away 24 Jan, and Orren W. Walker, Jr., W7LYC, who passed away 13 Feb. Both these hams have contributed much to amateur radio in our state and will be missed by many. Our thoughts and condolences go out to their families and relatives. I have been very impressed at all the upgrade activity and wish to congratulate those who have upgraded. Check out the Utah Hamfest 2000 Web page at <http://www.utahhamfest.org> and register early. 73, N5UVP.

**WYOMING:** SM, Bob Williams, N7LKH—The Wyoming Section is being asked again to provide com support for the March of Dimes Walkathon. It must be because we do such a good job. This year it will be on 29 April at Casper, Cheyenne, Cody, Evanston, Jackson, Laramie, Lusk, Rawlins, Riverton, Rock Springs, Wheatland and Worland. It will be on 6 May at Sheridan. As in the past, the local ECs will be contacted by the local Walkathon Coordinator to work out the detailed plan and timing, and they will seek support from the local club members. We have been able to staff the task very effectively in the past and it is to be hoped it will only be better this time. In the future we also have the 2000 Tour de Wyoming Bicycle Tour 16-21 July involving Jackson, Pinedale, Farson, Lander, Shoshone and Thermopolis. The exact routing is not yet known but it will be available for review and discussion at the Hamfest in Casper over Memorial Day weekend. We will be seeking com support people for each lap of the Tour. Your SM and ACC expect to participate 17-21 July on return from the Glacier Hamfest. Tfc: NN7H 243. PSHR: NN7H 179.

### SOUTHEASTERN DIVISION

**ALABAMA:** SM, Bill Cleveland, KR4TZ—The license restructuring takes effect on April 15, and I look forward to the increased activity on our HF bands. Please check in to the Alabama Day Net on 3965 kHz daily at 10:00 AM, the Alabama Traffic Net Mike on 3965 kHz daily at 6:30 PM and

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<b>Graphic and alphanumeric - serial interface</b> <table border="1"> <thead> <tr> <th>Size</th> <th>Mfr</th> <th>Price</th> <th>Size</th> <th>Mfr</th> <th>Price</th> </tr> </thead> <tbody> <tr> <td>640x480 (b.l.)</td> <td>Epson</td> <td>\$20.00</td> <td>320x240</td> <td>Epson</td> <td>\$25.00</td> </tr> <tr> <td>640x400 (b.l.)</td> <td>Panasonic</td> <td>\$15.00</td> <td>256x128</td> <td>Epson</td> <td>\$20.00</td> </tr> <tr> <td>640x200</td> <td>Toshiba</td> <td>\$15.00</td> <td>240x128 (b.l.)</td> <td>Optrex</td> <td>\$20.00</td> </tr> <tr> <td>480x128 (b.l.)</td> <td>ALPS</td> <td>\$10.00</td> <td>240x64</td> <td>Epson</td> <td>\$15.00</td> </tr> <tr> <td>480x128</td> <td>Hitachi</td> <td>\$10.00</td> <td>240x64 (b.l.)</td> <td>Epson</td> <td>\$25.00</td> </tr> <tr> <td></td> <td></td> <td></td> <td>160x128</td> <td>Optrex</td> <td>\$15.00</td> </tr> </tbody> </table>		Size	Mfr	Price	Size	Mfr	Price	640x480 (b.l.)	Epson	\$20.00	320x240	Epson	\$25.00	640x400 (b.l.)	Panasonic	\$15.00	256x128	Epson	\$20.00	640x200	Toshiba	\$15.00	240x128 (b.l.)	Optrex	\$20.00	480x128 (b.l.)	ALPS	\$10.00	240x64	Epson	\$15.00	480x128	Hitachi	\$10.00	240x64 (b.l.)	Epson	\$25.00				160x128	Optrex	\$15.00	<b>SONY Miniature Color LCD Display (LCX005BKB) \$29.00</b> 1.8 cm (0.7 inch) unit LCX009AKB 827 x 228V \$29.00 <b>CELL SITE TRANSCEIVER \$29.00 2 for \$49.00</b> These transceivers were designed for operation in an AMPS (Advanced Mobile Phone Service) cell site. The 20 MHz bandwidth of the transceiver allows it to operate on all 666 channels allocated. The transmit channels are 870.030-889.980 MHz with the receive channels 451MHz below those frequencies. A digital synthesizer is utilized to generate the selected frequency. Each unit contains two independent receivers to demodulate voice and data with a Receive Signal Strength Indicator (RSSI) circuit to select the one with the best signal strength. The transmitter provides a 1.5 watt insulated signal to drive an external power amplifier. Channel selection is accomplished with a 10-bit binary input via a connector on the back panel. Other interface requirements for operation are 26 VDC (unregulated) and an 18,990 MHz reference frequency for the digital synthesizer. The units contain independent boards for receivers, exciter, synthesizer, tunable front end and interface assembly (which includes power supplies and voltage-controlled oscillator) Service manual, schematics and circuit descriptions included.	
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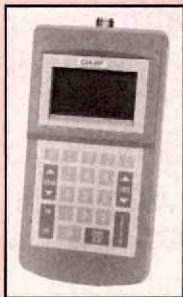
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Sunday mornings at 8:00 AM, and the Alabama Emergency Net on 3965 kHz on Tuesdays at 7:30 PM. Alabama hams are always on 3965 kHz, and you will usually hear some friendly rag chewing every evening after the nets. If you would like to use CW, please check out the Alabama Training Net on 3714 kHz daily at 6:00 PM and the Alabama Section Net on 3575 kHz daily at 7:00 PM and again at 10:00 PM. CW is alive and well in Alabama, and I hope you will take advantage of our CW nets. On April 15, the Franklin County ARC will have its Sand Mountain Hamfest at the Albertville Recreational Center in Albertville, AL. The hamfest opens its doors at 8:00 AM and admission is \$5.00. Talk-in is available on 147.20+ and 145.11-. For more information check out the club's web-site at [www.qsl.net/mcarr-al](http://www.qsl.net/mcarr-al) or call Buddy Smith, KC4URL at 256-593-2516. On April 29, the Bankhead ARC will have its hamfest at H. A. Alexander Park in Moulton, AL. Hours are 9:00 AM to 4:00 PM and admission is \$3.00. Talk-in is available on 53.17, 146.96 and 442.425. License exams will begin promptly at 9:15 AM. For more information check out the club's Web-site at [www.n4idx.org](http://www.n4idx.org) or call Rex Free, KN4CI at 256-905-0822 or Ed Weatherford, K54B, at 256-974-0436. There is always something going on in our section, so please check out our Web site at [www.qsl.net/al-arri](http://www.qsl.net/al-arri) for more up-to-date news and information. 73, Bill Cleveland KR4TZ.

**GEORGIA:** SM, Sandy Donahue, W4RU—ASM/South Ga: Marshall Thigpen, W4IS, ASM/Legal: Jim Altman, W4UCQ. SEC: Tom Rogers, KR4OL. STM: Jim Hanna, AF4NS. SGL: Charles Griffin, WB4UVV. BM: Eddie Kosobucki, K4JNL. ACC: Bob Lear, K4SZ. OOC: Mike Swiderski, K4HBI. TC: Fred Runkle, K4KAZ. PIC: Matt Cook, KG4CAA. I start off this month's news on a sad note. A lot of good people are slipping away from us. Recently we lost Chad Burris, K4UN, Liburn. Chad was active in the Alford Memorial Radio Club. He is missed by club members and the rest of us. The 4th annual Southeastern VHF Conference is April 14-15 at the Marriott Hotel Northwest at Windy Hill Rd., Marietta. Two days of technical forums, a swap shop, exhibits, an auction, and plenty of camaraderie topped off by a gala banquet featuring Joel Harrison, N5ZM, 1st Vice president of the ARRL. Noted VHF-ers from around the country will attend. This is a must conference for those interested in weak-signal VHF and UHF. Check-out the Website [www.svhfs.org/svhfs](http://www.svhfs.org/svhfs) for more details. The January ice storms on two successive weekends did more than make the run-up to Super Bowl more interesting. ARES was put to the test providing weather information for the NWS office in Peachtree City. The storm forced a postponement of the GARS techfest until middle March. The Statesboro ARS will sponsor its annual hamfest on May 20. The Atlanta Hamfest is June 2-3. The Albany fest is week later June 9-10. Spring is on the way. Really! All that ice will be a bad memory to tell your great grand kids about the winter of aught aught. 73, Sandy, Tfc Jan: WB4GGS 160, K1FF 105, AF4NS 80, WU4C 60, N4QX 54, KA4HHE 40, K4BEH 35, K4WKT 20, K4JNL 8, K4BAI 5, W4RU 4.

**NORTHERN FLORIDA:** SM, Rudy Hubbard, W4PUP—ASM-E CENTRAL: AC4PF. ASM-WPAN: KO4TT. ASM-APRS: WY80. ACC: WA4B. BM: N4GMU. OOC: AF4EW. PIC: KF4HFC. SEC: WA4NDA. SGL: KC4N. STM: WX4H. TC: KO4TT. PACKET: N4GMU. All Club newsletters are reporting how well everything went in the Y2K event and seemed well pleased of Clubs participation. Several of you have reported gratitude and appreciation to your people for their time and efforts. The Governor, the Mayors of several cities, disaster agencies, and the State Dept of Emergency Communication have reported their appreciation for the Amateur Radio operators participation. While it is impossible for me to say thanks to each of you, your efforts are greatly appreciated. It is a pleasure to be part of a team that works together for the benefit of amateur radio in serving the general public. The Orlando HamCation is now history, and trust everyone enjoyed seeing friends, and making new ones. The UWF Club in Pensacola conducted a hamfest in Pensacola and was considered a great success. Members of FFARA Club in Pensacola assisted in this event. Another example of our people working as a team. The vendors seemed pleased with the attendance and suggested more vendors could attend if the date was changed to permit their stopping by in Pensacola on to other Fests. The DOF is presently considering using ARES Amateur Radio operators during major fires. Hopefully, details will be finalized in the near future. Listen on the NFA Net for information as things progress. FCC announcement on restructuring of licenses has created a need for clubs and other VEs in giving exams. The attendance at exams is increasing as a result of the restructuring. 73 de Rudy, Tfc: WX4H 2274, NR2F 569, KE4DNO 333, AF4PU 236, KE4PRB 154, AD4DO 105, WD4IO 97, K1JPG 95, N9MM 94, WSMEN 71, AF4GF 66, W4KX 65, WB2FGL 60, KF4NFP 59, KF4TM 51, K8KV/4 42, K4JTD 32, KB4DCR 27, K4JHS 27, WD4JNM 27, WB2IMO 26, N4ORZ 26, WD4IO 26, AB4PG 14, WA4EYU W8IM 9, WX4J 8, WX4J 7, KE4LTS 4, WD4LIF 2, KG4EZO 2.

**PUERTO RICO:** SM, Victor Madera, KP4PQ— Se me ha asignado la tarea de reemplazar a nuestro SM anterior debido a su renuncia. Espero reorganizar nuestro equipo de trabajo para la Sección de Puerto Rico pronto con la ayuda de ustedes. La Liga Puertorriqueña de Radio-aficionados eligió su nueva directiva para el 2001 y tuvo como invitado de honor en su Asamblea Anual a Riley Hollingsworth de la FCC quien presentó una interesante charla sobre cumplimiento. El PRARRL anunció que continuará su programa de "CW Certification" y comenzó clases en la UPR para Technician y telegrafía a 5 Wpm. Información por el 789-4998. El PRDXC celebra reuniones los segundos lunes de mes en la UPR a las 7PM. Todos bienvenidos. Se pueden comunicar conmigo via email a [kp4pq@arrl.org](mailto:kp4pq@arrl.org).

**SOUTHERN FLORIDA:** SM, Phyllisan West, KA4FZI—SFL Section cabinet members joined me at the "Welcome Booth" of the Miami Hamboree in Feb. We responded to comments and questions from hundreds of new, prospective, and seasoned hams. WB9SHT's working stations and 4 CW keyers were a great drawing card. Thirty section appointees gave up lunch to attend the Saturday noon workshop where cabinet members led small groups in goal setting for 2000 and beyond. Martin Co. EC, Ed Petzolt, K1LNC, was presented a plaque acknowledging him as recipient of the International

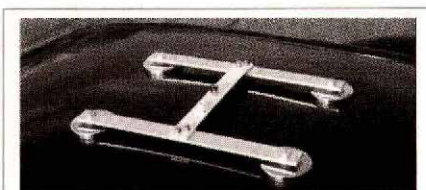
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0550G	5-10	375	59	15/0.7	HPA	503
0552G	25-40	375	54	15/0.7	HPA	463
<b>144 MHz</b>						
1403G	1-5	10-50	6	15/0.7	LPA	160
1405G	1-2	100	14	15/0.7	Standard	291
1410G	5-10	160-200	28	15/0.7	Standard	323
1412G	25-45	160-200	22	15/0.7	Standard	283
1450G	5-10	350+	56	15/0.7	HPA	563
1452G	10-25	350+	50	15/0.7	HPA	516
<b>220 MHz</b>						
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2212G	25-45	130	16	14/0.8	Standard	313
2250G	5-10	225	40	14/0.8	HPA	574
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4410G	10	100	19	12/1.2	Standard	362
4412G	15-30	100	19	12/1.2	Standard	352
4448G	1-5	75-100	25	12/1.2	HPA	423
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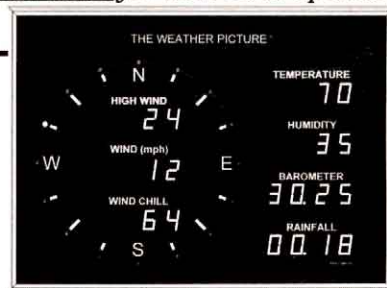
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Humanitarian Award. He is credited with saving the lives of 4 missionaries held hostage by gunmen in Guatemala. He was the only link between them, US authorities, and Guatemalan authorities for 7 hours, while a rescue by Guatemalan military and police forces was arranged. Congratulations, Ed. You have set a superior public service example for all hams! WA4AW, ACC, reports all incumbents (W4SS, KG4U, WD4IUD, W4NAV) were reelected for the WPB ARC. New officers for the Jupiter-Tequesta Rptr group are KE4PPI, KE4THT, and KD4QHI. WPBARC and the new Wellington RC will operate jointly on Field Day, while the Boca ARA and FAUARC plan to join forces on the FAU campus. Clubs and PIOs: Please send your news to PIC, W4STB, and ACC, WA4AW, to be shared with the section. The newly appointed OOC, RL Caron, K4GP, has started organizing his team. His years of experience as an OO in CA and here will be a bonus, and working with his NFL counterpart should benefit solving HF problems concerning all of FL. Keep checking our Section Web page at [www.sflarrl.org](http://www.sflarrl.org) as it continues to grow a little each week. Traffic by KJAN: WA9VND 766, W7AMM 349, KC4ZHF 288, KA4FZ1 262, KB4WBY 248, KD4GR 211, KJ4N 176, KD4HG 151, K4FQU 135, W4DL 129, KE4IF 126, WB4PAM 118, WA4CSQ 90, WA4EIC 84, W8SZU 63, AA4BN 55, KE4IDG 47, KT4XK 40, KE4UOF 33, KC4CHW 25, KE4WBI 22, W6VIF 18, K4OVC 9, W4WYR 7, W3J1 5, AF4NR 4, 73 de KA4FZ1.

**VIRGIN ISLANDS:** SM, John Ellis, NP2B, St Croix—ASM: Draw, NP2E, St Thomas. ASM: Mal, NP2L, St John. SEC: Vic, WP2F, St Croix. PIC: Lou, KV4JC, St Croix. ACC: Debbie, NP2DJ, St Thomas. NM: Bob, VP2VI/WODX, Tortola. Sorry to have to report the passing of Frank, NP2I, January 15 (the day of the St Croix ARC party). Services were held at Holy Trinity Lutheran Church with Reverend Bob Wakefield (KV4IH) officiating. Frank was the ARRL contact VE for St Croix and CW op extraordinaire. He will be sorely missed. St John ARC will again participate in the "Tough One" race from Cruz Bay to Coral Bay on 2/26. Operators will be placed approximately every mile of the 7-mile course to report any problems. This annual event becomes more and more popular and record participation is expected this year. CW op, Jim, W0NB, sports a brand new call KP2L. Team Ritty (KP2N, NP2E, NP2W, et. al) in St Thomas expects to operate this weekend (Feb 12). Lou, KV4JC, now has parts to put damaged beam back together, NP2EF, NP2B, plus others to try to raise it next weekend. That's it for this month, 73, John, NP2B.

**WEST CENTRAL FLORIDA:** SM, Dave Armbrust, AE4MR ae4mr@arri.org WCF Section Web Page at: <http://www.wcfarrl.org> ASM K2SEC, ASM-Web KR4YL, SEC KE4MPQ, TC KT4WX, BM KE4WU, OOC W3BL, STM AB4XK, PIC WA4ATF, SGL KC4N, ACC AC4MK. Join me in welcoming the following new cabinet members: Assistant ACC, John Sproat, W4JS and ASM-Legal Affairs, Biff Crain, K4LAW. Biff will work closely with LGL in the section. **Restructuring:** I have scheduled a special midnight paperwork only session at 12:01 am April 15<sup>th</sup> at RT Systems in Brandon. Session results will be sent Fed Ex to insure that it beats the anticipated rush. W3BL asks: Have you done your RF Safety evaluation? Use the RF Safety calculator accessible from the WCF Section Web Page at <http://www.wcfarrl.org> to make sure you are in compliance. **Public Service Events:** Please send a hand. 4/1 Juvenile Diabetes Foundation - Pinellas, 4/8 MS Walk - Pinellas, Hillsborough, Sarasota and Polk. 4/29 March of Dimes - Pinellas, Hillsborough, Sarasota. **Florida QSO Party:** 4/29-30 info [wd4hz@arri.net](mailto:wd4hz@arri.net) or [www.qsl.net/fqp](http://www.qsl.net/fqp) The WCF First Contract, 9 county, 9 day, Special Event was a huge success in kicking off the new section. The logs show thousands of contacts, more on this later. Tlc by AB4XK: K4SCL 288, AB4XK 203, AD4IH 87, K4RBR 56, W4AUN 38, KT4PM 32, KT4TD 17, KE4VA12, KF4KSN 11, K4LKL 5, KG4DUF 4, 73, Dave, AE4MR.

**SOUTHWESTERN DIVISION**

**ARIZONA:** SM, Clifford Hauser, KD6XH—I hope you have had the opportunity to read and understand the changes to the license structure that will take place on 15 April 2000. Overall, I think it is a good change and will improve Amateur Radio as a whole. Many have formed an opinion on this matter, and I hope you also shared your ideas with the FCC. My trip to "ZX0A" land was a great success. We made over 70,000 different contacts from Myanmar (Burma) during the 4 weeks on the air. I really enjoyed myself and have started putting together a slide show presentation of this trip. Let me know if your club is interested. Tucson people used their skills to help during the "Climb A Mountain" event on February 11th. Phoenix has the Bike ride to Parker coming soon that needs many people. Don't forget the DeVry hamfest on 15 April 2000. Also during this same weekend is the DX convention at Visalia. It has been rumored that Rileyk Hollingsworth, K4ZDH, will be a speaker at the ARRL Southwest Convention in Phoenix. The year 2000 Southwest Division Convention will be held at the Ramada Inn in Scottsdale on 6-8 October. The Glendale hamfest was a great success and Mark Kessler did a great job of coordinating this event. Due to my being out of country for most of January and February, I have been out of touch with a lot of club activity. Keep sending me your club newsletters because this is the only way I can keep track of what is happening throughout the state. If you tried to contact me by telephone or by e-mail during my extended vacation and did not get a reply, send it again. My e-mail overloaded the computer memory and some of my messages got lost. Hobart (Bart) Paine, K7CC, has been a member of the ARRL for over 50 years. Congratulations for your support to both Amateur Radio and the ARRL. 73, Clifford Hauser, KD6XH. Net: ATEN 1060 QNI, 5T QTC, 31 sess. Tlc: K7VVC 654, W7EP 27.

**LOS ANGELES:** SM, Phineas J. Icenbise, Jr., W6BF—Progress is often measured by changes. All changes are not always positive though. We are still free to try and amend the changes that we don't like. In the macro sense, most changes have represented progress, even when we disagreed with the direction or magnitude. Our new FCC rules and tests, in my thinking, do not represent, very much progress, but we are still free to try and change them. There are many more upgrades and more equipment sales. The question of the Internet taking over Ham Radio for the younger generation has been discussed at length. New young hams



# M<sup>2</sup>

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COD's Welcome



and computers both represent progress and new technology, so go for both. You almost need computer experience just to get a job these days. The GPS and APRS capability is impressive even to the most ardent technologist. - The ARRL, Public Service Honor Roll, is one form of showing our appreciation to people like Barry, AD6HR, who reports a message total of 102 for January 2000. It was my pleasure to speak to the Long Beach Club at their annual election bash. Disaster preparedness and ARES was the theme for the Long Beach meeting. Nate, K6OSC, and many of the 123 Long Beach operators of the Queen Mary radio station (W6RO) were present. K6YMJ, Hank, is our SEC (Section Emergency Coordinator), and he always needs help. Joe, W6UPN, is our OOC, and Joe is ready to help with your questions and problems. Al, W6UBM, our ASM, is always available for telephone and RFI questions. Al represents more than 45 years of outstanding experience in the Telephone industry. Our Los Angeles Section Web site is up and running at [www.qsl.net/arrlswlax](http://www.qsl.net/arrlswlax). If you need more or different information on our Web site, send me an e-mail with your suggestion. Our deepest sympathy is out to Archie, W6LPJ, our, 6th District QSL Manager. Archie's wife Rosemary, KF6EKP, became a Silent Key last month. Rosemary was a great friend and hard worker for the "QSL Bureau" and the "Los Angeles Area Council of Amateur Radio Clubs." Rosemary will be greatly missed by her hundreds of good friends in the Los Angeles area. The Section Managers' net meets every Sunday, at 8 AM on 3965 kHz. Visitors are welcome. Fried tries to bring us the latest information from Headquarters. The So CAL DX Club has a new president Jim, N6KZ, and a new secretary, Herb, KG6OK, [kg6ok@packbell.net](mailto:kg6ok@packbell.net). Vy 73, de W6BFF, Phineas

**ORANGE:** SM, Joe Brown, W6UBQ—Y2K reports indicate over 300 Amateur Radio Operators in the Orange Section indulged in this project. In the event of communication failures or if supplement comm channels were needed, the Amateur Radio Service was available. This exposure to the public and government is needed by the Service. Public Relations and League membership are now listed as high priority action in the Section. Mike Unfried has been appointed ASM. His goal will be to bring new people into the service (hobby), recruit hams for public service, explain the wondrous services of the ARRL and sign them up. Good luck, WB9MJQ, Huntington Beach RACES & Boeing Aerospace established and signed an agreement that permits Boeing emergency operators to pass priority radio traffic between Boeing and the City EOC via HBRACES. From the Modulator. There is a difference in standards for routing messages between the services, and an effort to reorganize the format is underway. From N6IIE/AAR9CR. From the 220 SMA The Amateur license restructuring order released by the FCC clearly indicates the direction the Commission is going as far as self-regulation is concerned. Despite recent comments by some FCC staff to the contrary, I believe that management of our bands will become more and more our responsibility. Are we, the Amateur community, ready for this task? de Jim, K6IYK. Southern Calif DX Club officers for the year 2000 are Pres Jim N6KZ, VP Chuck KR6C, SEC Herb, KG6OK, Tres Skip KJ6Y. From The Inland Empire Council of Amateur Radio Organizations, Fred, W6TKV, after 2 years of exemplary service decided not to run for another term. For the year 2000, the Chairman is Don, KD6UVT, of the Riverside Co ARA. Vice is Gary, KD6OLT, of the Desert R.A.T.S. Sec/Tres Jim, AD6CW, of the Lake Perris QRP. Judy, W6YBS, is holding down the 2001 SWD Convention Chair. Traffic: W6OZ 162, K06RZ 112, KC6SKK 96, N6GIW 39. DIGITAL: W6OZ NTS BS254, N6GIW Mailbox 240. PSHR: W6OZ 162, K06RZ 112, KC6SKK 96. SCN/V NET: 31 SESSIONS, QNI 232, QTC 87.

**SAN DIEGO:** SM, Tuck Miller, K6ZEC, 619-475-7333—How time flies. I am now starting my second term as your Section Manager, and I do thank you for the opportunity to work with you in this great service of ours. I love being able to meet each and everyone of you. Former Section Manager Harry Hodges, W6YOO, fell and broke his hip in the middle of February while chasing the family's dog. Knowing Harry, by the time he reads this, he will be back up and running. Even though it has been some time since the mishap, if this is the first you have heard of it, why not send him a card at his *Callbook* address, or even send him an e-mail at [w6yoo@arri.org](mailto:w6yoo@arri.org). I am sure he would really appreciate the gesture. Time is drawing nigh for the International DX convention to be held in Visalia, Ca., April 14-16, 2000. Then in May, we will be at the ARRL National-Dayton Hamvention. A lot of travel in the next few months. In fact, I will be in my hometown of Danville, IL during the week of May 22. Hope to see many of my home town friends while there. Well, have you passed your upgrade yet? I was lucky enough to pass my Extra theory, so just waiting till April 15th for it to become effective. Attendance at exams sessions have nearly tripled over the last few weeks, and because of that, walk ins will not be allowed for the time being. Please call 465-EXAM to find out the team captain for the site you want, and then give them a call to make a reservation. Good to have Jack Dobbs WB6AXW back home. Tic: KT6A 458, KD6YJB 190, WA6ODQ 168, WA6IJK 1. PSHR: KT6A 138, WA6ODQ 138, KD6YJB 111.

**SANTA BARBARA:** SM & STM, Rob Griffin, K6YR, 805-543-3346 & [k6yr@arri.org](mailto:k6yr@arri.org)—SEC: Jack Hunter, KD6HHG ([kd6hhg@arri.net](mailto:kd6hhg@arri.net)). ACC: Michael Atmore, KE6DKU ([jatmore@telis.org](mailto:jatmore@telis.org)). OOC: Howard Coleman, W6HQA ([w6hqa@packbell.net](mailto:w6hqa@packbell.net)). PIC: Jeff Reinhardt, AA6JR ([jreinhr@ix.netcom.com](mailto:jreinhr@ix.netcom.com)). TC: Warren Glenn, KM6RZ, ([wglennr@ix.netcom.com](mailto:wglennr@ix.netcom.com)). ASM-Ventura, Don Milbury, W6YN ([w6yn@juno.com](mailto:w6yn@juno.com)). ASM-Internet, Jack Bankson, AD6AD ([jackbankson@jps.net](mailto:jackbankson@jps.net)); DECS: Santa Barb-Dave Lamb, WA6BRW ([dlamb@silcom.com](mailto:dlamb@silcom.com)); SLO-Bill Peice, KE6FKS ([ke6fks@arri.net](mailto:ke6fks@arri.net)); Ventura-Dave Gilmore, AA6VH ([aa6vh@arri.net](mailto:aa6vh@arri.net)). Congrats to Y2K SBARC Officers: N6ZJK, Prexy; KF6DI, ExVP; VPs KE6WGO, K6HOZ, WA6MBZ & WA6VNN; Secy, KF6YGI; Tres, KD6BIV; & Dirs, AD6EZ, N6OLT, WA6IDZ, KF6LDC & KE6HTS. The SBARC "key-Klix" newsletter sparkles under Editor-in-Chief, Terri, KF6DZK! New License Restructuring will increase importance of our Amateur Auxiliary Program. Consider joining the OO ranks and help the Amateur Radio Service be more "self-enforcing!" SB Sec Web: [www.qsl.net/arrlswlax](http://www.qsl.net/arrlswlax). Join in our Section traffic nets: SCN slow speed NTS Net, M-F, at 1915 local on 3598 kHz & SCN/SB at 2100 local on 147,000+ (131.8), 224.90- (131.8) & 448.875- (100). PSHR/Tic: K6YR 168/222, KF6OIF 132/101, KE6MIW 99/74, KM6RZ -/20 & KF6UMU 108/2. That's 30, Rob, K6YR.

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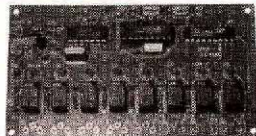
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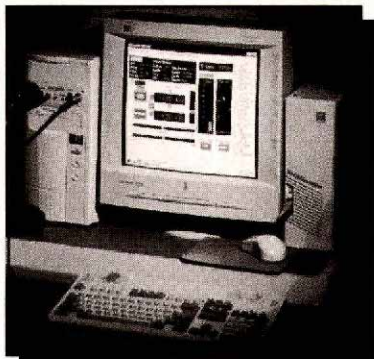
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## WEST GULF DIVISION

**NORTH TEXAS:** SM, Don Mathis, KB5YAM—STM: KC5OZT. SGL: N5GAR. OOC: WB5UDA. ACC: WN5PFI. ASMs: KX5K, K5RE, KK5QA, KK5NA, N5JZ, KB5LWZ, KD5HIS, AD5X, W5GPO. Visit the section Web page at (<http://www.isic.net/net/nTEXAS.html>) for the most current information. If you would like to be on the Section Newsletter mailing, send me an e-mail: [dmathis@isic.net](mailto:dmathis@isic.net). I have several on the e-mail listing that are bouncing back to me. If you are not receiving any of these please refresh your address for me. Tom Mobley, KD5AC, and Jeff Fant, N5OLF, are doing something about the shortage of young hams. The two Colin County Community College professors have gotten grants and corporate sponsorships to license public school students and teachers. The first phase of their program culminates in a Summer Technology Camp that includes licensing and foxhunting and other competitive games. Each student that becomes licensed gets to take home a new Kenwood TH-D7A! They need your help in teaching classes, elmering and generally helping out. More info at their Web site at <http://jws.ccccd.edu/tmobley/camp.htm>. John Fullingim, WN5PFI, ACC, will be the section liaison to this group. We had 3 traffic handlers make BPL this month, N5JZ, KB5WEE, and N7DXH. N5JZ has completed 12 straight months of BPL. SAR for January N5JZ 569, KB5WEE 279, KC5OZT 268, N7DXH 219, K5AO 157, WA5I 147, K5MXQ 118, KC5VLW 102, PY2CGB/W5. 73, KB5TCH 68, W5AYX 53, AC5Z 16, AC5PO 5, KD5AHW 4, KB5YAM 4, KC5SMC 4. 73, Don, KB5YAM.

**OKLAHOMA:** SM, Charlie Calhoun, K5TTT—ASMs: N6CL, W6CL. SEC: W5ZTN. ACC: KB5BOB. PIC: WA9AFM. OOC: K5WG. SGL: W5NZS. STM: K5KX. Well, Green Country was a great success and the new facilities were impressive. I hope everyone enjoyed it, and found what they were looking for. Enjoyed seeing everyone and meeting many new folks. The buzz now is license restructuring, which will go into effect shortly after this is published. I am entertaining invitations to club meetings to discuss this and any other League-related topics you may be interested in. Just drop me a line, and we'll see if we can fit it into the schedule. The Arbuckle Amateur Radio Klub has a new wide area repeater on top of Arbuckle Mountain, 147.150 with a PL of 131.8 for more info check out their Web page at <http://www.brightok.net/hamradio>. Many of the VEC groups in the state have reported large increases in attendance at their test sessions. Check the Section Web site for more information and dates on test sessions in your area. Next month is the big Dayton Hamvention. I hope to see many of you there. The Choctaw ARC was presented with a very nice letter from the Executive Director of the Mid-DeI Food Pantry for their contributions over the Christmas holiday. Rather than having a gift exchange, they decided to pool their resources to help provide for the hungry. This is very commendable, and I applaud their efforts! I still send out occasional e-mails to the section, and would like to have your e-mail address for my section list, so forward it to me if you can. <http://www.busprod.com/k5ttt> 73. Charlie. Tfc: N5IKN 712, KF5A 478, K5GBN 457, WB5NKC 353, K5KXL 118, K15LQ 113, WASIMO 97, WA5OUV 83, KE5JE 80, K5HEZ 56, KK5GY 55, WB5NKD 53, KM5VA 48, W5REC 30.

**SOUTH TEXAS:** SM, E. Ray Taylor, N5NAV—ASMs: NR5ED, N5WSW, W5GKH, K5DG, N5LYG, WA5UZB, KK5CA, WA5TUM, KB5AWM, WA5JYK, K5PFE, K5PNV, and K5SBU. STM: W5GKH. SEC: K5DG. ACC: N5WSW. PIC: KA5WSS. TC: KJ5YN. BM: W5KLV. OOC: W5JAM. SGL: K5PNV. We're looking forward for the April showers, we need the rain. Also awaiting the QST April fools article. It always comes in handy. I want to take this opportunity to congratulate Jim Haynie, W5JBP, as he assumes his new position as President of ARRL. Coy Day, N5OK, has now moved into the West Gulf Director's position, with Dr David Woolweaver, K5RAV, as Vice Director. Your work has just begun. I wish you the very best for the years to come. We had a tornado touch down in downtown Angleton, TX on February 7. There was some damage to the Court House and a few cars. No one was hurt. We are getting ready for hurricane season here. I have really been enjoying the newsletters from the clubs. Coy Day and myself will meet with the Austin Repeater Organization on March 7 to explain the benefits of becoming an ARRL Affiliated Club. I might point out, there is nothing but benefits, and your club has a lot to gain, by becoming affiliated with the League. If your club is not affiliated, let us know so we can have material sent to you. I would think that would be one of the first things one would check into after forming a club. Clubs will really have a job after April 15 getting all the newcomers involved in HF. I've heard a lot of comments on the new license restructuring. Most have been with a negative slant, because of the code change. Let's all get together with a positive attitude and lead the new hams into the proper way to conduct themselves on HF and in the hobby. The clubs have an important role to play in this. Teach them the art of emergency communications, DXing, and how to build and maintain their own equipment. Above all, don't look down on them, because they didn't have to go through the testing that we went through. There is nothing that can be done to change the FCC ruling. Let's continue the year 2000 without bickering between clubs, nets, and amateurs in general. This is a hobby, and let's learn to get along with each other, and enjoy the hobby. Have a good month. God Bless. Tfc: W5SEG 610, KA5KLU 332, NR5ED 162, W5TUK 158, W5KLV 117, W5GKH 72, N5OUJ 49, K0YNN 38, N5NAV 33, K5UCQ 16, W5OYY 6, N5JUU1. (Nov) W5ZX 53.

**WEST TEXAS:** SM, Charlie Royall, WB5T. 915-944-0469. [WB5T@arrl.org](mailto:WB5T@arrl.org)—ASMs: Cley, K5TRW; Ron, KB5HGM; Jerome, K5IS; Fred, W6VPI; Sandy, W5MVJ. SEC: Alex, N5LRH. OOC: John, K0SD. OBM: Frank, N5WT. New officers for Big Spring ARC: Pres., Irene LeMarr, N5JZM; Secy, Alan Nichols, KC5NHV; Treas, Lee Reed, KC5NHV; Events Coord, Jose Gonzales, KB5GXW. Traffic report in 62 sessions, QTC 530, QTR 1164 minutes. WTX rep 74% by KF5NI and KM5FQ. New DXCC rules now permit QSL card checkers; one per section appointment by SM. Lubbock has once again licensed more new amateurs than all of the rest of the section combined. Hamfest in Abilene will be held May 6th and 7th, with the ARRL Forum at 9:30 AM. Hope to see many of you there! 73 de Charlie, WB5T.

# WARNING!

## Save your life or an injury

Base plates, flat roof mounts, hinged bases, hinged sections, etc., are not intended to support the weight of a single man. Accidents have occurred because individuals assume situations are safe when they are not.

Installation and dismantling of towers is dangerous and temporary steel guys of sufficient strength and size should be used at all times when individuals are climbing towers during all types of installations or dismantlings. Temporary steel guys should be used on the first 10' of a tower during erection or dismantling. Dismantling can even be more dangerous since the condition of the tower, guys, anchors and/or roof in many cases is unknown.

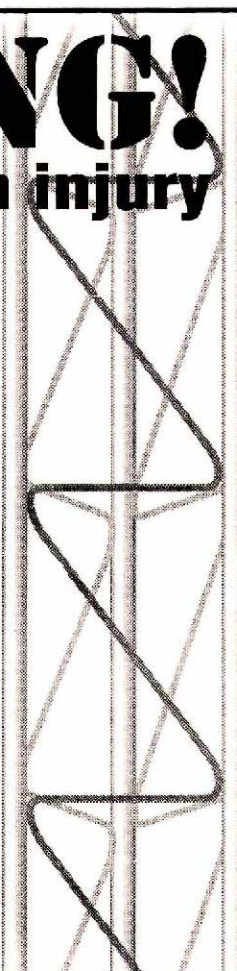
The dismantling of some towers should be done with the use of a crane in order to minimize the possibility of member, guy, anchor or base failures. Used towers are not as inexpensive as you may think if you are injured or killed.

Get professional, experienced help and read your Rohn catalog or other tower manufacturers' catalogs before erecting or dismantling any tower. A consultation with your local professional tower erector would be very inexpensive insurance.

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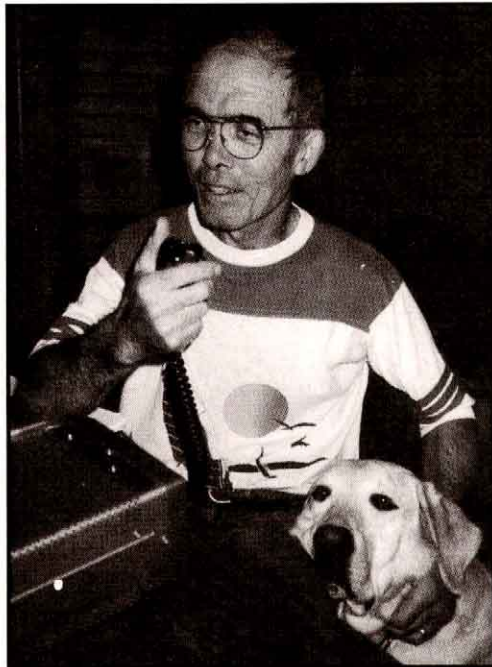
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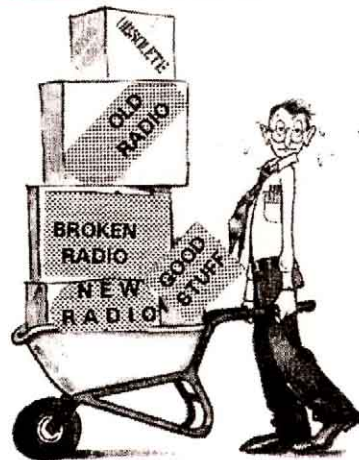
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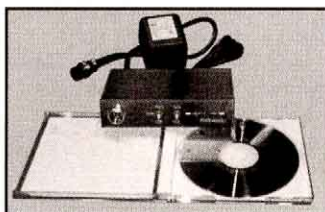
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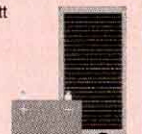
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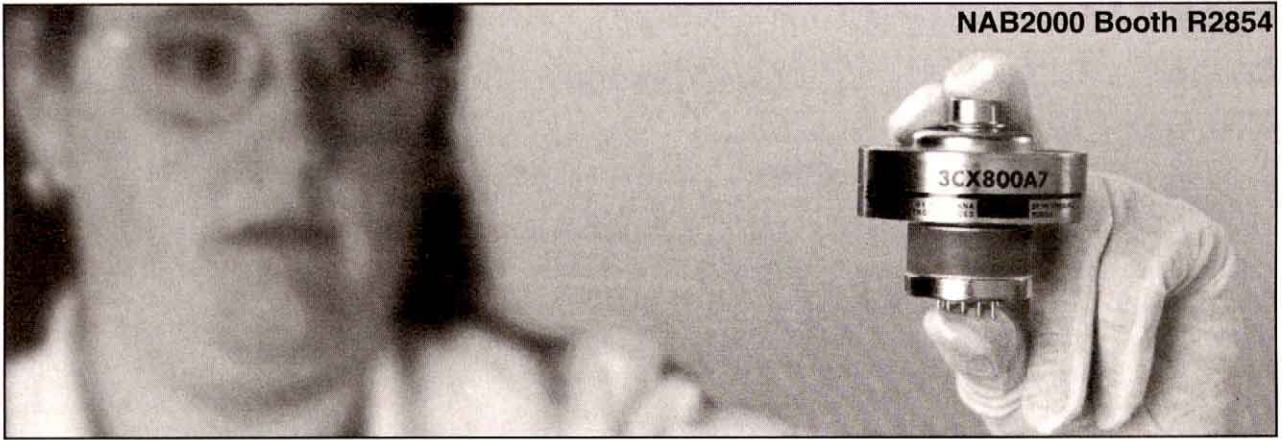
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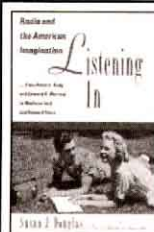
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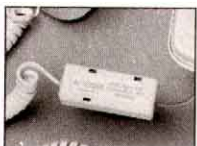
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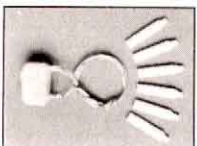


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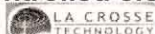
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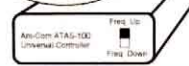
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### Table of Contents

#### Introduction

About the Authors  
Note to the Reader

#### Chapter 1: History of Wireless Communications and the New Millennium

#### Chapter Two: Amateur Radio-Insight and Philosophy .....

#### Chapter Three: Hobbies Within a Hobby .....

Long Distance (DX) Global Communications .....

VHF/UHF Frequency Modulation (FM) Repeater Operations .....

Amateur Radio Contest Operations .....

#### Chapter Four: Video Script .....

#### Chapter Five: Basic Electronics .....

Basic Electron Theory .....

The History of Semiconductors .....

Transistors .....

Integrated Circuits .....

Memory Devices .....

Microcontroller and Microprocessors .....

#### Chapter Six: Propagation and the Amateur Bands .....

#### Chapter Seven: Antennas, "Doing It Right" .....

#### Chapter Eight: Transceivers and Modulation .....

#### Chapter Nine: Resource Guide .....

#### Chapter Ten: Thoughts and Reflections .....

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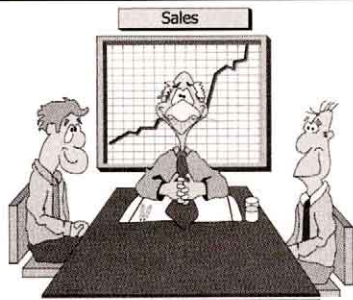
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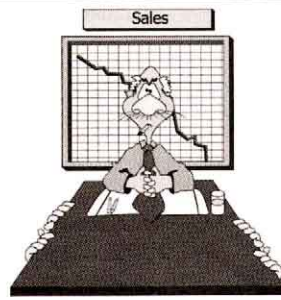
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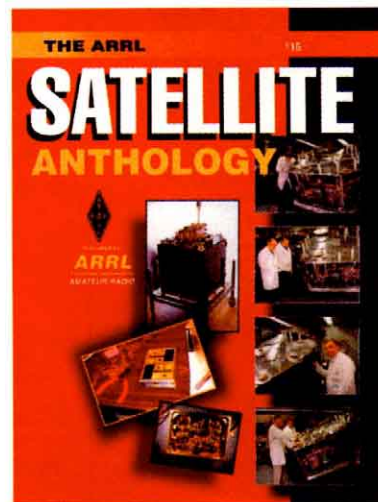
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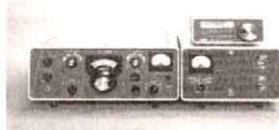
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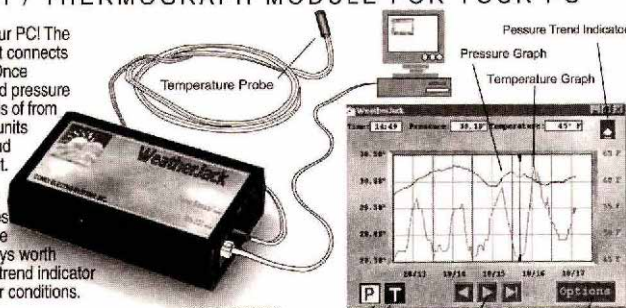
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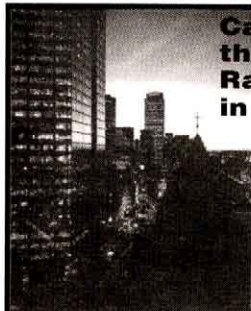
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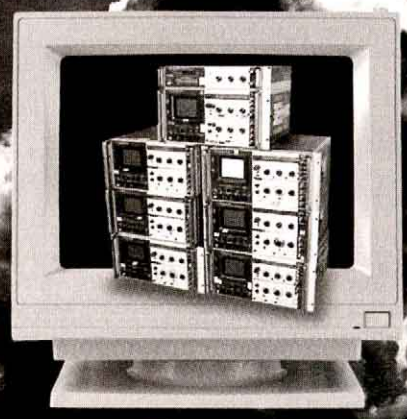
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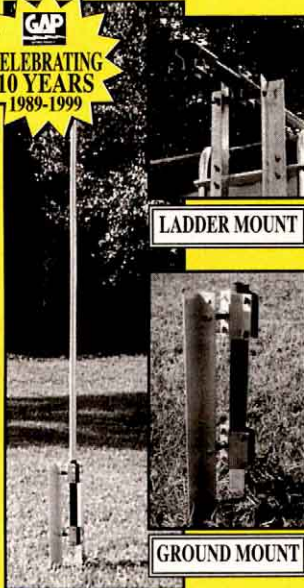


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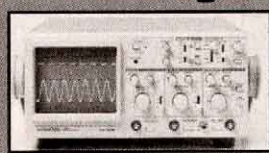
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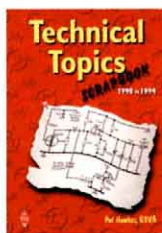
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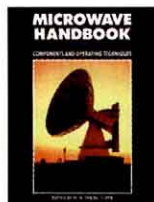
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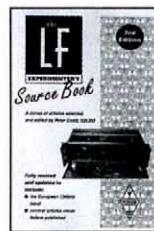
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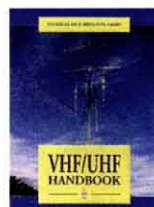


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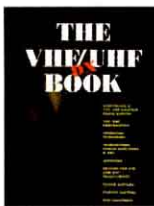
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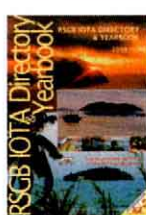


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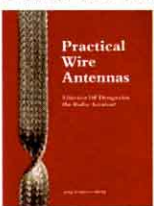


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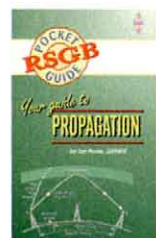
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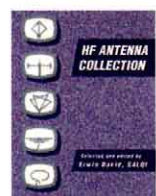
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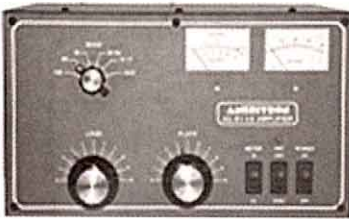
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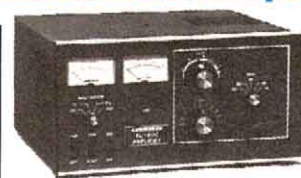
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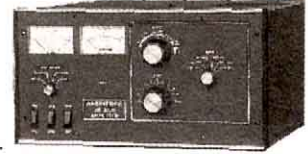
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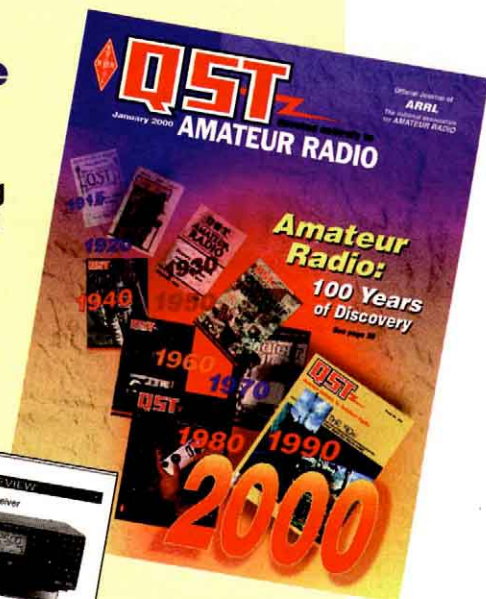
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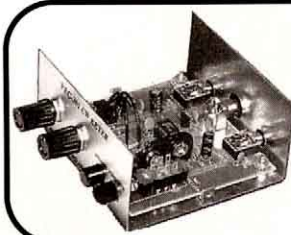
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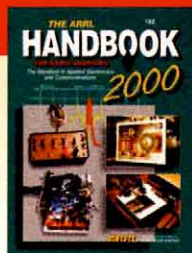
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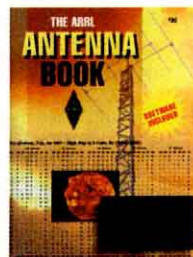
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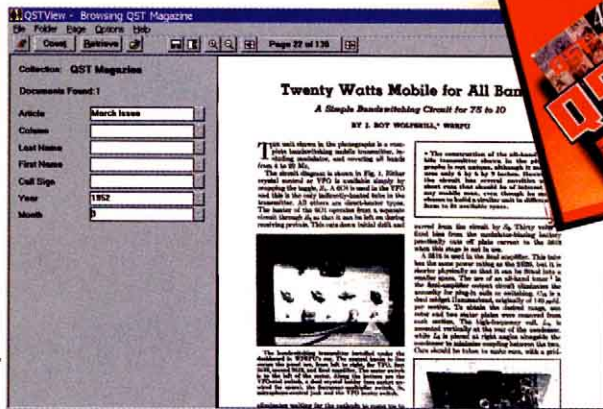
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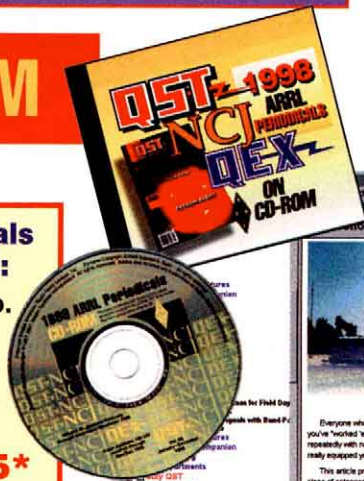
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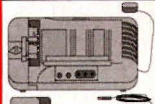
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- ADI Communications: 8
- Advanced Battery Systems, Inc: 124
- Advanced Receiver Research: 157
- Advanced Specialties: 162
- AEA division of TEMPO RESEARCH CORP: 138
- Alinco Electronics, Inc: 11
- All Electronics Corp: 140
- Alpha Delta Communications: 13, 118, 153
- Amateur & Advanced: 162
- Amateur Electronic Supply LLC: 159, 161, 163, 165
- Am-Com: 151
- American Radio Relay League: 14, 18, 117, 120, 122, 126, 134, 138, 146, 149, 151, 156, 157, 159, 164, 166
- Ameritron: 167
- Antique Electronic Supply: 143
- Antique Radio Classified: 143
- AOR: 157
- Arceron Zeit: 130
- ARRL Publications BOOKCASE: 171, 172
- Associated Radio Communication: 145
- Austin Amateur Radio Supply: 119
- Autek Research: 130
- Better RF Co., The: 152
- Bilal Co: 157
- Buckmaster Publishing: 116, 139
- Burghardt Amateur Supply, Inc: 152
- Butternut Manufacturing Co: 160
- CABLE X-PERTS: 121
- Kangaroo Tabor: 142
- Champion Radio Products: 120
- Chaverim International: 132
- Circuit Specialists, Inc: 143
- Code Quick: 132
- Com Dac: 162
- Communication Concepts Inc.: 123
- Communications Products: 126
- Communications Specialist Inc: 134
- Computer International: 122
- Conex Electro Systems: 158
- Courage Handi Ham System: 146
- Creative Services Software, Inc: 122
- Cubex Company Inc: 143
- DATAMATRIX: 152, 154
- Davis RF Co.: 143
- Dayton Hamvention: 158
- Denver Amateur Radio Supply: 128
- Digital Communications Inc: 116
- Directive Systems: 140
- Elecraft: 159
- EQF Software: 136
- E-Z Hang, Inc: 143
- Fair Radio Sales Co Inc.: 137
- Gap Antenna Products Inc: 162, 164
- Geo Tool: 143
- Glen Martin Engineering: 148
- HAM-COM 2000: 136
- Ham Contact, The: 124, 147
- Ham Radio Outlet: 110, 111, 112, 113, 114
- Ham Station: 142
- Hamtronics Inc: 25
- Heil Sound: 116
- High Sierra Antennas: 120
- Hi-Res Communications Inc: 137, 139
- Hy-Gain: 26
- ICOM America, Inc: Cover II, 1, 3
- Idiom Press: 143
- IIX Equipment Ltd.: 143, 152
- International Antenna Corp: 140
- International Crystal Mfg, Co: 138, 157
- Intuitive Circuits LLC: 142
- Jade Products: 157
- Jun's Electronics: 155
- K2AW's "Silicon Alley": 145
- Kachina Communications Inc: 144
- K-Com: 149
- Kenwood USA Corp: Cover IV,
- KJI Electronics: 162
- KK7TV Communications: 148
- LDG Electronics: 149
- Lentini Communications: 119
- Levy/Latham Global, LLC: 162
- Lewallen, Roy W., W7EL: 120
- M & S Computer Products Inc: 148
- M2 Enterprises: 141
- Maha Communications & Elec.: 2
- Metal & Cable Corp: 138
- MFJ Enterprises: 125, 127, 129, 131, 133, 135
- Micro Computer Concepts: 151
- Mirage: 115
- Mr. NiCd: 174
- Multi-Band Antennas: 142
- N4XM XMatch Antenna Tuner: 148
- NEMAL: 123
- North Olmstead A.R.D.: 162
- ONV Safety Belt Co.: 134
- Pactor: 122
- Palomar Engineers: 138
- Patcom Corporation: 117
- Logic: 150
- PC Electronics: 120
- Peet Bros Co.: 139
- Personal Database Applications: 150
- Premier Communications: 8
- Print Products International: 164
- PROLOG: 152, 154
- QRO Technologies, Inc: 123
- QSLs By W4MPY: 132
- QSLs by WX9X: 152
- Quantics: 134
- R & L Electronics: 170
- Radio Bookstore: 140
- Radio City: 119
- Radio Club Of J.H.S. 22 NYC: 146
- Radio Depot: 162
- Radio Era Archives: 140
- Radio Works: 145
- Raibeam: 132
- Rapidan Data Systems: 145
- Rederring Embroidery: 122
- RF Parts Co: 149
- Rochester Hamfest: 126
- Rohn: 144
- Ross Distributing Co: 150
- Radiofrequency Safety International: 146
- Sea Pac Ham Convention: 141
- SGC: 154
- SPI-RO Mfg, Inc.: 147
- SSB Electronics: 152
- Stealth Antenna: 151
- Svetlana Electron Devices: 148
- Tennadyne Corp: 128
- Ten-Tec Inc: 6, 7, 143
- TE Systems: 139
- Texas Towers: 175, 176
- TGM Communications: 150
- Tigertronics: 128
- Timeline: 137
- Times Microwave Systems: 17
- Timewave Technology Inc.: 120
- TJ Antenna: 146
- Tower \* Jack: 142
- Traffie Technology: 150
- Universal Radio, Inc: 119
- University of Texas at Dallas: 123
- US Tower: 156
- Vectronics: 169
- Vi-Con, Inc: 154
- VIS: 126
- W & W Manufacturing Co: 139
- W2IHY Keyer: 151
- W5YI: 136, 138, 148
- W7FG Vintage Manuals: 137
- W9INN Antennas: 151
- Warren Greigore & Associates: 151
- West Mountain Radio: 147
- Wheeler Applied Research Lab: 132
- Wolverine Power Systems: 123
- Yaesu U.S.A.: Cover III, 22, 23
- Yost & Co., E.H.: 174

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RMKII, Roof Mount Kit .....	\$139
STR1I, Roof Radial Kit .....	\$109
TBR160S, 160m Kit .....	\$109

More Bencher/Butternut-call

## COMET ANTENNAS

GP15, 6m/2m/70cm Vertical ...	\$149
GP6, 2m/70cm Vertical .....	\$149
GP9, 2m/70cm Vertical .....	\$179
B10NMO, 2m/70cm Mobile .....	\$36
B20NMO, 2m/70cm Mobile .....	\$49
SBB2NMO, 2m/70cm Mobile .....	\$39
SBB5NMO, 2m/70cm Mobile .....	\$49
SBB7NMO, 2m/70cm Mobile .....	\$75
Z750, 2m/70cm Mobile .....	\$55
Z780, 2m/70cm Mobile .....	\$69

Much more Comet in stock-call

## DIAMOND ANTENNAS

D130J/DPGH62 .....	\$79/139
F22A/F23A .....	\$89/119
NR72BNMO/NR73BNMO .....	\$39/54
NR770HBNMO/NR770RA .....	\$55/49
X200A/X300A .....	\$129/159
X500HNA/700HNA .....	\$229/369
X510MA/510NA .....	\$189/189
X50A/V2000A .....	\$99/149
CR627B/SG2000HD .....	\$99/79
SG7500NMO/SG7900A .....	\$75/112

More Diamond antennas in stock

## GAP ANTENNAS

Please Call for Delivery Info

Challenger DX .....	\$259
Challenger Counterpoise .....	\$25
Challenger Guy Kit .....	\$14
Eagle DX .....	\$269
Eagle Guy Kit .....	\$22
Titan DX .....	\$299
Titan Guy Kit .....	\$22
Voyager DX .....	\$389
Voyager Counterpoise .....	\$49
Voyager Guy Kit .....	\$38

## CUSHCRAFT ANTENNAS

X7/X9 .....	\$569/819
XM240 .....	\$599
R6000/R7000 .....	\$269/369
A50-3S/5S/6S .....	\$89/139/219
AR2/ARX2B .....	\$45/65
AR270/AR270B .....	\$69/99
ARX270U/ARX270N .....	\$219/219
13B2/17B2/26B2 .....	\$119/199/329
719B/729B .....	\$115/179
A270-6S/A270-10S .....	\$59/79

Please call for more Cushcraft items

## M2 VHF/UHF ANTENNAS

### 144-148 MHz

2M4/7/9 .....	\$80/99/109
2M12/2M5WL .....	\$145/179
2M5-44XP, 2m/70cm .....	\$149

### 420-450 MHz

420-450-5/420-450-11 .....	\$119/84
432-9WL/432-13WL .....	\$159/209
440-18/440-21ATV .....	\$109/129

### Satellite Antennas

2MCP14/2MCP22 .....	\$155/209
436CP30/436CP42UG .....	\$209/249

## M2 ANTENNAS

### 50-54 MHz

6M5/6M7 .....	\$189/269
6M2WLC/6M2.5WLC .....	\$399/529

### 10/12/15/17/20m HF

10M4DX, 4 El. 10m .....	\$379
12M4DX, 4 El. 12m .....	\$379
15M4DX, 4 El. 15m .....	\$419
17M3DX, 3 El. 17m .....	\$379
20M4DX, 4 El. 20m .....	\$499

More M2 models in stock-please call

## MFJ ANTENNAS

259B Antenna Analyzer .....	\$219
1798, 80-2m Vertical .....	\$239
1796, 40/20/15/10/6/2m Vert. ....	\$179
1793, 80/40/20m Vertical .....	\$159
1792, 80/40m Vertical .....	\$145
1788, 40-15m Loop .....	\$399
1786, 30-10m Loop .....	\$349
1780, 14-30 MHz Loop .....	\$229
1768, 2m/70cm Beam .....	\$65
1762, 3 Element 6m Beam .....	\$65

Big MFJ inventory-please call

## LAKEVIEW HAMSTICKS

9106 .... 6m	9115 ... 15m	9130 ... 30m
9110 ... 10m	9117 ... 17m	9140 ... 40m
9112 ... 12m	9120 ... 20m	9175 ... 75m

All handle 600W, 7' approximate length, 2:1 typical VSWR ... \$24.95

## HUSTLER ANTENNAS

4BTV/5BTV/6BTV .....	\$129/169/189
G6-270R, 2m/70cm Vertical .....	\$149
G6-144B/G7-144B .....	\$109/159

Hustler Resonators in stock-call

## FORCE 12-MULTIBAND

C3 10/12/15/17/20m, 7el .....	\$519
C3S 10/12/15/17/20m, 6 el .....	\$459
C3SS 10/12/15/17/20m, 6 el .....	\$449
C4 10/12/15/17/20/40m, 8 el .....	\$660
C4S 10/12/15/17/20/40m, 7 el .....	\$569
C4SXL 10/12/15/17/20/40m, 8 el .....	\$839
C4XL 10/12/15/17/20/40m, 9 el .....	\$929
C19XR 10/15/20m, 11 el .....	\$849
C31XR 10/15/20m, 14 el .....	\$1119
C36XR 10/15/20/40m 13 el .....	\$1449

Please call for more Force 12 items

## FORCE 12-MONOBAND

EF410 10m, 4 element .....	\$249
EF415 15m, 4 element .....	\$379
EF420 20m, 4 element .....	\$499
EF240 40m, 2 element .....	\$539
MAG810 10m, 8 element .....	\$619
MAG615 15m, 6element .....	\$719
MAG520 20m, 5 element .....	\$869
MAG620 20m, 6 element .....	\$1119
MAG340 40m, 3 element .....	\$899
MAG280B 80m, 2 element .....	\$1829

Please call for more Force 12 items

## GLEN MARTIN ENGINEERING

### Hazer Elevators for 25G

H2, Aluminum Hazer, 12 sq ft .....	\$359
H3, Aluminum Hazer, 8 sq ft .....	\$269
H4, HD Steel Hazer, 16 sq ft .....	\$339

### Aluminum Roof Towers

RT424, 4 Foot, 6 sq ft .....	\$159
RT832, 8 Foot, 8 sq ft .....	\$229
RT936, 9 Foot, 18 sq ft .....	\$389
RT1832, 17 Foot, 12 sq ft .....	\$499

Please call for Glen Martin info

## COAX CABLE

RG-213/U, (#8267 Equiv.) .....	\$36/ft
RG-8X, Mini RG-8 Foam .....	\$19/ft
RG-213/U Jumpers .....	Please Call
RG-8X Jumpers .....	Please Call

Please call for more coax/connectors

## TIMES MICROWAVE LMR® COAX

LMR-400 .....	\$59/ft
LMR-400 Ultraflex .....	\$89/ft
LMR-600 .....	\$1.19/ft
LMR600 Ultraflex .....	\$1.95/ft

## ANTENNA ROTATORS

M2 OR-2800P .....	\$1095
Yaesu G-450A .....	\$239
Yaesu G-800S/SDX .....	\$319/399
Yaesu G-1000SDX .....	\$479
Yaesu G-2800SDX .....	\$1069
Yaesu G-550/G-5500 .....	\$289/499

## ROTATOR CABLE

R51 (#20)/R52 (#18) .....	\$.22/.32/ft
R61 (#20)/R62 (#18) .....	\$.28/32/ft.
R81/82/83/84 .....	\$.25/.39/.52/.85/ft

## US TOWER

MA40/MA550 .....	\$659/1055
MA770/MA850 .....	\$2359/3649
TMM433SS/HD .....	\$1139/1379
TMM541SS .....	\$1499
TX438/TX455 .....	\$1069/1319
TX472/TX489 .....	\$2649/4599
HDX538/HDX555 .....	\$1379/1919
HDX572 .....	\$4139

Please call for help selecting a US Tower for your needs. Shipped factory direct to save you money!

## ROHN TOWER

25G/45G/55G .....	\$79/179/229
AS25G/AS455G .....	\$39/89
GA25GD/45/55 .....	\$68/89/115
GAR30/GAS604 .....	\$35/24
SB25G/45/55 .....	\$39/89/109
TB3/TB4 .....	\$85/99
HBX32/HBX40 .....	\$349/439
HBX48/HBX56 .....	\$589/699
HDBX40/HDBX48 .....	\$549/699
BXB5/6/7/8 .....	\$39/49/59/59

Please call for more Rohn prices

## UNIVERSAL ALUMINUM TOWERS

4-40/50/60' .....	\$519/739/1049
7-50/60/70' .....	\$939/1369/1789
9-40/50/60' .....	\$729/1049/1469
12-30/40' .....	\$559/869
15-40/50' .....	\$969/1399
23-30/40' .....	\$859/1289
35-30/40' .....	\$979/1509

Bold in part number shows wind-load capacity. Please call for more Universal models. All are shipped factory direct to save you money!

## TOWER HARDWARE

3/8"EE / EJ Turnbuckle .....	\$10/11
1/2"x9"EE / EJ Turnbuckle .....	\$15/16
1/2"x12"EE / EJ Turnbuckle .....	\$17/18
3/16" / 1/4" Preformed Grips .....	\$4/5

Please call for more hardware items

## HIGH CARBON STEEL MASTS

5 FT x .12" / .18" .....	\$35/59
10 FT x .12" / .18" .....	\$65/110
15 FT x .12" / 17 FT x .18" .....	\$95/180
20 FT x .12" / .18" .....	\$120/199
12 FT x .25" / 24 FT x .25" .....	\$189/359

## PHILLYSTRAN GUY CABLE

HPTG1200I .....	\$39/ft
HPTG2100I .....	\$52/ft
PLP2738 Big Grip (2100) .....	\$5.50
HPTG4000I .....	\$7.9/ft
PLP2739 Big Grip (4000) .....	\$7.65
HPTG6700I .....	\$1.15/ft
PLP2755 Big Grip (6700) .....	\$10.95
HPTG11200 .....	\$1.55/ft
PLP2558 Big Grip (11200) .....	\$16.50

Please call for more info or help selecting the Phillystran size you need.

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SATURDAY HOURS:  
9AM-1PM CST

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# HUGE ICOM DEALS ★ HUGE YAESU DEALS



## IC-775 DSP ... New Lower Price!

The Icom IC-775DSP is a competition class HF transceiver featuring 200 watt RF output, digital signal processing, automatic antenna tuner, true dual RX, CW memory keyer, CTCSS tone encode, twin pass band tuning, dual antenna inputs, 101 memory channels, built-in power supply, and much more. Supplied with AC power cord.

## PW-1 ... New Lower Price!

The Icom PW-1 is a 1000 watt solid state linear amplifier for HF and 6m operation, featuring a high power automatic antenna tuner, built-in power supply, and a removable front control panel, and more.



## IC-746 ... Icom Special!

The Icom IC-746 is an all mode transceiver covering HF/6m/2m. The radio features digital signal processing, 100 watt RF output on all bands, twin PBT, a 4.9" multifunction LCD display with band scope, automatic antenna tuner, and more. Supplied with a hand mic and DC power cord.

## IC-756PRO ... New!

The Icom IC-756 PRO is an all mode HF/6m transceiver featuring DSP, automatic antenna tuner, 100 watts RF output, digital twin PBT, a 5" multifunction LCD display with band scope function, and more. Supplied with hand mic and DC power cord.



## FT-1000MP ... In Stock!

The Yaesu FT-1000MP is a competition class HF transceiver featuring advanced DSP, automatic antenna tuner, built-in power supply, RS-232 interface, and more!

## FT-1000 / FT-1000D ... In Stock!

The FT-1000 is a competition class HF transceiver featuring true dual RX, automatic antenna tuner, 200 watts RF output, and a huge bank of crystal IF filters.

## Quadra System ... Lower Price!

Solid state amplifier featuring 1 kW output, high power antenna tuner, and more!



## FT-847 ... Yaesu Special!

The Yaesu FT-847 is an all mode transceiver covering HF/6m/2m/70cm! The radio is perfect for satellite operation, and features digital signal processing, built-in RS-232 interface, tone encode/decode, and more. Supplied with an up/down microphone and DC power cord.

## FT-920 ... Yaesu Special!

The Yaesu FT-920 is an all mode HF/6m transceiver featuring digital signal processing, automatic antenna tuner, CW memory keyer, CTCSS tone encode/decode, 127 memories, and more. Supplied with up/down hand mic and DC power cord.



## IC-706MK2G ... Icom Special!

The Icom IC-706MK2G is a compact HF/6m/2m/70cm all mode transceiver with digital signal processing, automatic repeater offset, built-in CW keyer, built-in CTCSS tone encode/decode/scan, 107 memory channels and more. A detachable front panel offers convenient mounting, even in compact vehicles.

## IC-707 ... Entry Level Price!

The Icom IC-707 is an all mode HF transceiver featuring a front panel mounted speaker, AGC, 20 dB attenuator, 32 memory channels, multiple scanning modes, noise blanker, RIT, and more.



## IC-2800H ... Icom Special!

The Icom IC-2800H is a 2m/70cm dual band mobile FM transceiver with a 3" color TFT display. The radio features a separate control face, video input, bandscope display, 9600 bps Packet jack, CTCSS tone encode/decode/scan, 232 memories, cross band duplex, and more. With DTMF hand mic, mounting brackets, and power cord.

## IC-821H ... In Stock

The Icom IC-821H is an all mode 2m/70cm dual band transceiver. Great for satellite use, the radio offers dual RX, dual frequency display, tone encode, and more.



## FT-90R ... New!

New ultra-compact 2m/70cm dual band mobile transceiver with detachable control panel, and huge extended RX range.

## FT-2600M ... New Lower Price!

Rugged 2m mobile with intermod-proof receiver, big display, and an illuminated DTMF mic. Built to MIL-STD 810.

## FT-8100 ... New Lower Price!

Great 2m/70cm dual band mobile, 45/35 Watts, removable front panel, and more!



## FT-100 ... Yaesu Special!

The Yaesu FT-100 is an ultra-compact all mode transceiver for HF/6m/2m/70cm operation. The radio features a removable control panel, digital signal processing, CW memory keyer, built-in RS-232 interface, tone encode, 200 memory channels, VOX, and more. Supplied with a DTMF hand mic, DC power cord and mounting bracket.

## FT-840 ... New Lower Price!

The Yaesu FT-840 is an all mode HF transceiver with 100 watt output, optional FM unit.



## IC-W32A ... New Lower Price!

## IC-Q7A ... Icom Special!

## IC-T7H ... Icom Special!

## IC-T8A-16 ... Icom Special!

## IC-T81A ... New QuadBand HT!

## IC-T2H ... Amazing Low Price!



## IC-207H ... Icom Special!

The Icom IC-207H is a 2m/70cm dual band mobile transceiver featuring CTCSS tone encode/decode, 182 memory channels, removable front control panel, and more. Supplied with a back-lit DTMF hand mic, mounting bracket, and a DC power cord.

## IC-2100H ... Great Low Price!

The Icom IC-2100H is a rugged 2m mobile transceiver featuring CTCSS tone encode/decode/scan, DTMF paging/squelch, 113 memory channels, switchable display color, multiple scan modes and more. Supplied with a back-lit DTMF hand mic, mounting bracket, and a DC power cord.



## G-2800SDX ... \$1069

Heavy duty antenna rotator handles 34 sq. ft. of antenna load, and features 450° rotation, preset and variable speed.

## G-1000SDX ... \$479

## G-800S/SDX ... \$319/399

## G-450A ... \$239

## G-5500 ... \$499

## G-550 ... \$289



## VX-5R ... Now In Stock!

Tiny 6m/2m/70cm triband HT, with CTCSS tone encode/decode/scan, high capacity Lithium-Ion battery pack, extended RX with AM/FM and FW Wide modes, and more.

## FT-50RD ... New Lower Price!

## VX-1R ... Yaesu Special!

WEEKDAY HOURS:  
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**FT-50RD**  
This durable, multi-featured 5 Watt Dual Bander is manufactured to rigid MIL-810 standards. Featuring wideband frequency coverage,\* CTCSS/DCS operation, Dual Watch, 112 memory channels, and Digital Voice Storage.



**FT-51R**  
This full-featured 5 Watt Dual-Band Handheld includes dual receive, 120 memory channels (80 if Alphanumeric), Auto Tone Search, Spectra Scope, and VV, U/U and V/U operation.



**VX-1R**  
The pocket-sized VX-1R is small in size only. Featuring Smart Search,<sup>™</sup> DCS/CTCSS, Dual Watch, ARTS,<sup>™</sup> wide-band coverage (76–999\* MHz plus AM BC). The VX-1R provides 291 memory channels, and puts out 1/2 Watt (1 Watt w/optional E-DC-15 DC Adapter).

\* Cellular Blocked



**FT-11R**  
This compact 2M Handheld features 150 memory channels (75 if Alphanumeric), 10-memory DTMF Autodialer, Automatic Battery Saver (TX/RX), backlit Keypad, and are available in 1.5 Watt and 5 Watt versions.



**FT-23/33R**  
These ultra-compact, 5 Watt VHF FM Handhelds feature rugged die-cast aluminum cases, 10 memory channels, optional CTCSS, and multiple scan modes. The FT-23R (2M) and the FT-33R (222 MHz) are easy to operate, and give outstanding performance.



**FT-411E**  
The affordable FT-411E is compact and durable. This 5 Watt VHF FM Handheld features a die-cast case, 40 memory channels, 10 DTMF memories, built-in VOX, CTCSS, and multiple scan modes.



**FT-10/40R**  
These single-band handhelds are manufactured to MIL STD 810 specifications, featuring either 30 or 99 memories, CTCSS/DCS operation, Dual Watch, and are available in 2.5 Watt or 5 Watt versions, with four keypad options.



**VR-500**  
This miniature Handheld Receiver provides FM, AM, SSB and CW reception on 100 kHz–1300 MHz, with 1091 memory channels, Smart Search,<sup>™</sup> versatile Dot Matrix display, Band Scope, and Dual Watch.



**VX-5R**  
Although Yaesu's newest Tri-Band Handheld Transceiver is the world's smallest, it offers the performance of a full-size unit. The VX-5R operates on the 50 MHz, 144 MHz and 430 MHz bands with 5 Watts of power output, along with ultra-wide receive coverage of the VHF and UHF spectrum, plus AM medium- and short-wave broadcast reception. The VX-5R is military rated, so its durable, lightweight design allows you to take it anywhere. It is equally suited to walking through the concrete jungle as it is to forging the raging rivers of a real one. Along with a temperature display, the optional barometer pressure sensor unit gives a read-out of barometric pressure and altitude.

# TOUGH GUYS.

When you're small, you get picked on. Isn't that how it goes? Well not in Yaesu territory, because not only do we design compact handhelds for efficiency, but we give these clever little guys plenty of muscle. Yaesu handheld transceivers have earned the bragging rights for being the smallest handhelds with the most durable water resistant casings ever created. And packed inside the brawn are engineering accomplishments in performance that are unmatched in the industry. Our high-tech handheld transceivers provide clean power output on the VHF and UHF bands and offer revolutionary features that allows these tough guys to continually outperform the competition. Learn more about Yaesu products on the web at [www.yaesu.com](http://www.yaesu.com)

**YAESU**...leading the way.

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# An APRS® transceiver built for tomorrow's communication needs with advanced features available today

**NEW!**



## TM-D700A DATA COMMUNICATOR 144/440MHz FM Dual Bander

Conspicuous with its extra-large amber & black display, Kenwood's new TM-D700A is fully equipped to make the most of the exciting opportunities offered by SSTV, GPS and APRS® (the Automatic Packet/Position Reporting System that is rapidly gaining popularity worldwide), and other innovative features. This mobile transceiver with built-in TNC offers a wide range of data communications options, including simple packet operation using the AX.25 protocol. You can also send and receive SSTV images using Kenwood's VC-H1. Ham radio is truly entering a new era.

### APRS® (Automatic Packet/Position Reporting System)

- ▶ **Position/directional data**  
With an NMEA-0183 compatible GPS receiver you can transmit position data for automatic calculation of distance, current speed and heading. Last 4 digits can be masked for position ambiguity. Manual input of latitude/longitude is also possible.
- ▶ **Versatile messaging**  
Transmission of position data can be accompanied by a choice of programmable status text (up to 28 characters), position comments (15 settings), icons and bulletins. For added messaging flexibility, individual alpha messages (up to 64 characters) can also be sent.
- ▶ **Station list**  
Store received APRS® data in up to 40 station reports.
- ▶ **Grid square locator**  
Position data is displayed on the grid square locator for visible reference.

- ▶ **BCON TX interval**  
(0.2/0.5/1/2/3/5/10/20/30 min.)
- ▶ **Packet path selection for Digipeat**
- ▶ **Weather station & PHG data reception**
- ▶ **Digipeat station and DIGI function capability**
- ▶ **Auto Message Reply**
- ▶ **Audible APRS® message receive (call sign) notification (requires VS-3)**
- ▶ **Waypoint position data output**



### FEATURES

- ▶ Full Dual-band operation: VHF x VHF/VHF x UHF/UHF x UHF
- ▶ Wide-band receive: 118-524, 800-1300 MHz (excluding cellular blocked + frequencies)
- ▶ Detached panel (extension cable and panel holder supplied) with extra-large (188 x 54 dots) backlit LCD and multifunction key display (reversible)
- ▶ Improved key operation announcement with optional VS-3 voice synthesizer
- ▶ Built-in 1200/9600bps TNC compliant with AX.25 protocol and KISS mode
- ▶ Simplified packet monitoring
- ▶ SSTV functions with Fast FM for transmission of images in just 14 secs (approx.) and dual receive for voice and image transmissions (two frequencies simultaneously)
- ▶ 200 memory channels with 8-character memory name input
- ▶ Up to 10 programmable memory scan banks
- ▶ Easy-to-use menu system similar to the TH-D7A
- ▶ Built-in DCS (Digital Code Squelch) and CTCSS encode and decode
- ▶ CTCSS tone frequency scan
- ▶ DCS code scan
- ▶ 9600bps PC-based packet communications for chat, BBS

- ▶ DX packet cluster monitoring
- ▶ Cross-band repeater
- ▶ Wireless remote controller
- ▶ 1750Hz tone burst
- ▶ D-sub 9 pin terminal (for PCs)
- ▶ GPS input terminal (NMEA-0183)
- ▶ Visual band scope
- ▶ Mute function
- ▶ Memory control program available via Internet access
- ▶ New backlit microphone with alphanumeric message input.



### Example A: with GPS receiver & laptop



### Example B: with VC-H1



ISO 9001  
JQA-1205

Communications Equipment Division  
Kenwood Corporation  
ISO9001 Certification

**KENWOOD**  
Amateur Radio Products Group

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