



QST

Official Journal of

ARRL

The national association
for AMATEUR RADIO

March 2000

devoted entirely to

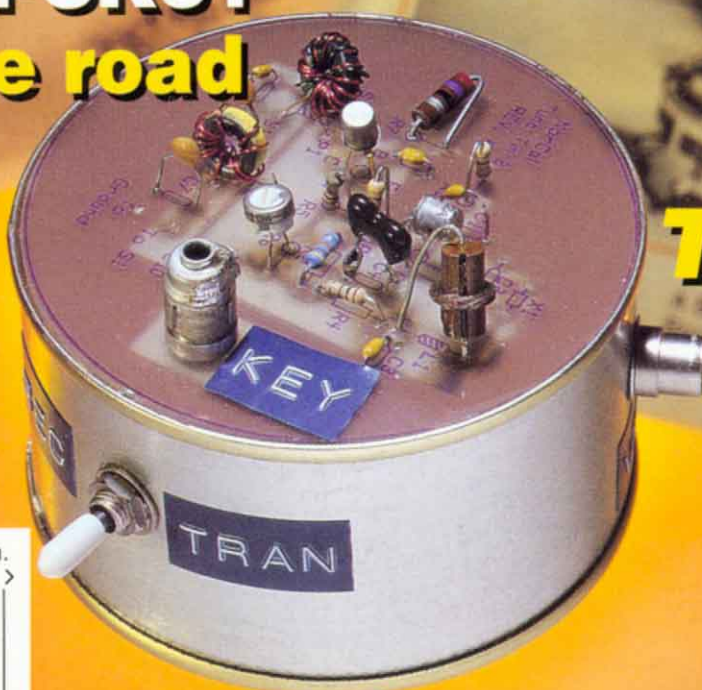
AMATEUR RADIO

QST reviews

• **Elecraft K2 HF QRP transceiver kit**

Build a 10-meter QRP transmitter

Take PSK31 on the road



The Tuna Tin 2:

Reviving a QRP Classic!

\$4.99 U.S. \$6.99 Can.



ICOM IC-756PRO

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

32
BIT

Filter indicators located at the top of the TFT display give you a quick look at the filter status. You can also see what filter you have selected and the mode you are using, and watch what changes are made with the PBT.



It's easy to customize the screen's look by changing colors, fonts, brightness, contrast, and more from this easy to access menu. You may also choose to enter your call sign, which, when chosen, results in the displaying of your call on screen each time the rig is powered up.

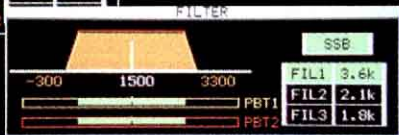


A digital voice recorder has 4 slots for RX and TX, each 15 seconds long—a good chunk of time to run a contest with.

Copy RTTY DX or catch ARRL bulletins without firing up your computer. A dual auto peak filter and tuning indicator make it easy.



Visual indicators of filter selections let you tweak the band pass for optimum performance.



Choose from 31 steps of 100Hz between 3600–600Hz and 10 steps of 50Hz between 500–50Hz.

	SSB	CW	RTTY	AM	FM
FAST	0.1	0.1	0.1	3.0	0.1
MID	2.0	0.5	0.5	5.0	---
SLOW	6.0	1.2	1.2	7.0	---

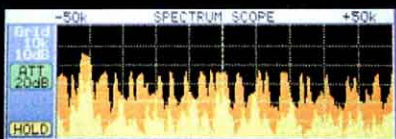
(sec)

If the AGC is too fast or too slow, a quick setting change can make it just right.

	SSB	CW	RTTY	AM	FM
FAST	0.5	0.1	0.1	3.0	0.1
MID	2.0	0.5	0.5	5.0	---
SLOW	6.0	1.2	1.2	7.0	---

(sec)

Different settings for different modes eliminate adjustments when hopping around the band.



The lighter orange area shown is the active spectrum. The darker orange is a max hold display history.

A real time band scope lets you select from one of four attenuator levels – signals under S5 can't hide from this rig.



THE GREATEST THING TO HIT HF SINCE...

This is no simple upgrade of ICOM's classic IC-756. The new IC-756PRO sets a new standard in ham radio design and construction. At the heart of the 'PRO' is a 32-bit (not 16-bit) floating point DSP



EASY TO USE, EASY ON THE EYES The 'PRO's

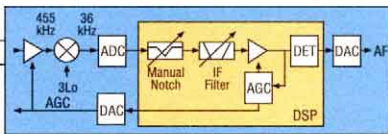
SPECIFICATIONS

All specifications and features are subject to change without notice or obligation

- Transmit: All Amateur HF, 6 Meters
- Receive: 0.03 – 60 MHz
- Receive System: Triple Conversion Superheterodyne
- Mode: USB, LSB, CW, RTTY, AM, FM
- Power: 5–100W (5–40W AM), continuously adjustable
- Power Supply Requirement: 13.8VDC, 23A
- Memory Channels: 101 Total Including 99 regular and 2 scan edges

- Frequency Stability: Less than ± 0.5 ppm
- Antenna Connector: SO-239 x 2 and phono (RCA; 50 Ω)
- Selectivity:
 - SSB, RTTY (BW: 2.4kHz) . More than 2.4kHz/-6dB
 - Less than 2.8 kHz/-60dB
 - CW (BW: 500Hz) More than 500Hz/-6dB
 - Less than 700Hz/-60dB
 - AM (BW: 6kHz) More than 6.0Hz/-6dB
 - Less than 15.0Hz/-60dB
 - FM (BW: 15kHz) More than 12.0Hz/-6dB
 - Less than 20.0Hz/-60dB
- Size (approx): 13.4(W) x 4.4(H) x 11.2(D) in. 340(W) x 111(H) x 285(D) mm.
- Weight (approx): 21 lb / 9.6 kg

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

unit that operates at an unrivaled processing speed.

THE DX ADVANTAGE YOU'VE WANTED

Faster processing means finer incoming signal sampling, and finer sampling means clearer, crisper reception...with almost no background noise.

YOU'LL NEVER BUY ANOTHER FILTER

The IC-756PRO features 41 built-in, front panel selectable levels of DSP filtering. There's no additional filters or high stability crystal oscillators to buy, because none are needed. It's like going from Zero-to-Con-

testing in seconds flat. Our filters are the sharpest—more selective than any crystal or mechanical filters. The selectivity lets you pull out the weak signals like never before.

CDs VS VINYL ALBUMS

Remember the first time you heard CD sound quality in a headphone? The 'PRO's audio quality will knock your socks off. You've got to hear this rig to believe it.



FREE Collectable World Clock

Our first 1000 owners will receive a custom clock that'll look great in any shack or den.



Whether you prefer voice, visual, CW or data, the IC-756PRO offers the details and performance capable of topping the contest charts. Contact your ICOM dealer today, or call for a free brochure by mail.

425-450-6088



front panel is well laid out and easy to use. View the TFT LCD display wide angles, day or night. This handsome rig will look great in any home or shack.

FEATURES

- **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
- **5" TFT Color LCD**
 - Wide viewing angle, more information
 - Adjustable colors and settings
- **8 Channel Digital Voice Memory**
 - 4 each, transmit and receive
 - 15 second message max per channel
- **Digital Twin Pass Band Tuning**

- **Built-In Auto Antenna Tuner**
- **Dual Watch**
- **100% Duty Cycle**
- **Continually Adjustable AGC**
 - Even remembers your favorite settings
- **Triple Band Stacking Register**
- **Built-In Memory / Electronic Keyer**
- **Analog AND Digital Metering**
- **Independent RIT / ΔXT Control**
- **VOX • Noise Blanker**
- **CW Keyer Jacks, Front and Rear**
- **50 Frequency CTCSS Tone Encoder**
- **10 Character Memory Note Pad**
- **Voice Synthesizer (optional)**

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Universal Charger & Conditioner for versatile charging for nearly all of your battery packs



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- Auto 4.8V to 12V detection.
- Negative delta V driven **microprocessor** plus temperature probe.
- For **home and vehicle use.**
- **Car adapter included.**



MH-C888

Universal Drop-in Charger & Conditioner for convenient charging

- Support both NiCD and NiMH battery packs from 4.8V to 12V auto detection.
- **Drop-in design.**
- Informative **digital LCD.**
- **Universal** design using unique and convenient to install cup.
- FLEX negative pulse **extends battery life.**
- 1 & 3 cycle **conditioning.**
- PowerShare feature allow **hassle-free banking.**

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Ultra high capacity, memory free NiMH battery packs available in a wide selection

- Ultra high capacity
- **No memory** effect.
- Maha's legendary **quality.**
- Environmental friendly.
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- Full one-year limited warranty.
- **Great selections.**



MH-PB-39
1050mAh 9.6v For
Kenwood TH-G71A /
D7



MH-C204F

Rechargeable Consumer AA NiMH battery cells plus intelligent rapid charger & conditioner

- Maha Rechargeable Consumer AA NiMH battery cells have a **ultra high capacity of 1350mAh** 1.24V. Great for handheld radios, FRS, backups, digital cameras, radio controlled toys, etc.
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NEW IC-R75 HF RECEIVER

Cutting edge technology for today's serious DX'er, yet easy & affordable for a casual listener.

**SAVE \$100
FREE DSP**

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



SAVE \$50

On the IC-PCR100. Limited time offer. See your dealer for details.

IC-PCR100 A little different look, a little fewer features, a little lower price. Enjoy wide band 0.01 – 1300 MHz* reception on AM, FM and WFM. Outstanding performance. Designed for Windows® 95 or 98. Download the full version software today: <www.icomamerica.com>



Computer not included.



ICOM
www.icomamerica.com

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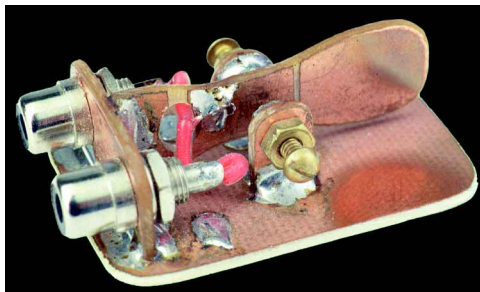
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Our Cover

Published originally in the May 1976 QST, The Tuna Tin 2 transmitter by the late Doug DeMaw, W1FB, is now considered an Amateur Radio classic. With the current surge of interest in QRP, the Tuna Tin has made a remarkable comeback. Read the story behind this popular transmitter—then build one of your own!

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Ship wt. 13 lbs.



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Model 291 - 200 watt Antenna Tuner (4 lbs.)	\$ 89.00
Model 701 - Hand Microphone (1 lb.)	\$ 24.00
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...Into the Light!



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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 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!

HAM RADIO'S FIRST "PLUG AND PLAY" HT

The ADI AT-600 comes pre-programmed with over 100 channels including popular ham radio repeater pairs and receive only frequencies including marine, fire, police, aircraft, and business. These frequencies were picked by author and instructor **Gordon West, WB6NOA**, himself! Wherever you live, you should find these frequencies to be quite active! **Your AT-600 will "play" right out of the box**, without any programming! With 200 memory channels, the AT-600 has plenty of memory for your own local frequencies as well!

AT-600HP Dual Bander 2M / 70CM Handheld

TX range: 144-148, 430-450 MHz • RX range: 108-174 MHz (including AM air band), 400-470 MHz, plus 830-985 MHz (cellular blocked) • MARS and CAP capable (permits are required) • simultaneous VHF/UHF receive • single band, or full duplex operation • cross band repeat • separate volume and squelch controls for each band • six-character alphanumeric display • 200 memories store any offset or tone • CTCSS encode / decode / tone scan • 10 DTMF auto dialer memories • DTMF paging • Auto Power Off • battery save • 5 Watts out with supplied battery (HP version only) • PC programmable • on-the-air cloning • Large backlit keypad and display • Battery voltage meter function • Small! 4.25" (H) x 2" (W) x 1.5" (D) excluding battery pack

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THE AMERICAN RADIO RELAY LEAGUE INC



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"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.

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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 followup 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*

QST

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If all else fails, send e-mail to

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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!

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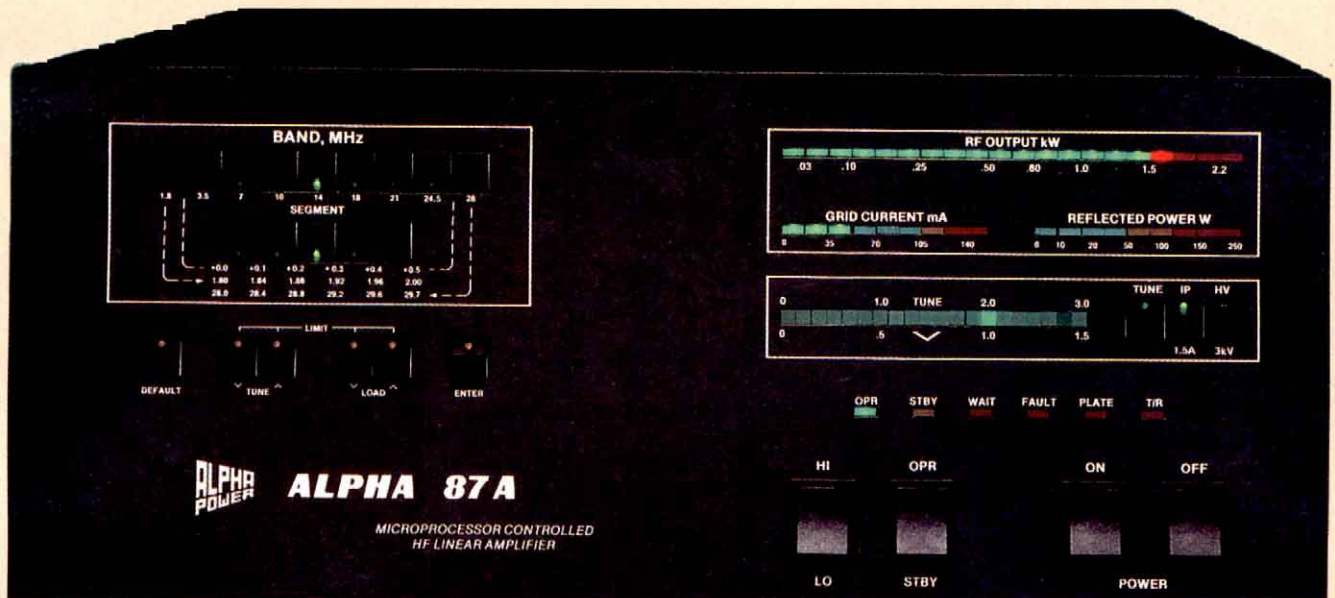
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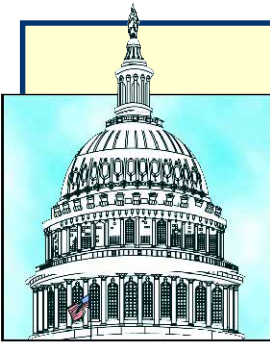
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DC Currents



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.

Nine States Propose Bans on Cell Phone Use while Driving

Would amateur mobile operation be affected by bills in nine state legislatures proposing to ban the use of a cellular telephone while operating a motor vehicle? In at least two states (Arizona and Colorado) it might be, although it's too early in the year to determine just what chance those bills have of passing, and if passed, whether the courts would interpret the prohibitions to include Amateur Radio.

At least 17 bills were introduced last year in response to concerns about the rising number of accidents involving motorists distracted by using cellular phones. So far, no state legislature has pushed one all the way through to the governor's desk, but there were at least two bans enacted in municipalities. According to news reports, Hilltown, Pennsylvania passed a prohibition after a driver using a cell phone ran a stop sign and killed a two-year-old girl in the resulting accident. The bill was modeled after an ordinance passed earlier by the Cleveland suburb of Brooklyn, Ohio. The City Council of Aspen, Colorado has also discussed a ban. The New York State Taxi and Limousine Commission has banned taxi drivers from using phones while driving passengers. *De facto* bans exist in at least eight countries, including Switzerland, Spain, Australia (Victoria and New South Wales), Israel, Italy, Singapore, France and Sweden. However, some of these rules have more to do with "both hands on the wheel at all times" than with specific bans on cell phone operation.

While such bills have been introduced regularly since at least 1995, the possibility of backlash from the approximately 140 million cell phone subscribers tends to dampen lawmaker enthusiasm. Even so, the cellular industry seems to sense certain straws in the wind and is hedging its bets by focussing on "safe" use of cellular in automobiles (i.e. pull over to talk), and may well use the issue to promote "hands free" phones. If there is any hard-nosed lobbying going on, it's confined to the back rooms so far.

Are such hills needed? A number of empirical studies have suggested that there may be a link between cell phone usage by drivers and motor vehicle accidents, but few have

concluded that the solution is legislative restriction. A California Highway Patrol report, for example, determined, among other things, that "enacting more laws may not discourage some drivers from using their cellular telephones while driving, just as laws do not deter some drivers from speeding or engaging in other unsafe driving practices." A report by The National Highway Traffic Safety Administration stated that driving while using a cell phone probably is hazardous, but wouldn't speculate how great the risk was, nor what other mitigating factors might be involved. The report encouraged better data collection, more "hands free" phones and increased driver safety education through government and industry. That seems to be the direction the industry is taking as well.

If any of these bills are going to pass, there will be a number of issues to be sorted

out by state legislators. For example, how much of the problem is caused by inattentive driving rather than the use of a particular device? And, with such vast numbers of cellular and PCS subscribers, will the new law be essentially unenforceable? Might there be potential conflicts between local, state and federal policies of the sort that have sprung up over commercial antenna and tower siting? Finally, just what would these bills ban? Mobile ham radio? Dashboard radio receivers? Aftermarket equipment? Use of radio dispatch by delivery trucks, cabs and other commercial radio users?

As with other new areas of telecommunications law, while enthusiasm is high, momentum may be a bit slow as wellintentioned law makers try to determine whether the solution to an apparent growing problem can better be addressed by education, legislation or technology.

Excerpts, Legislative Proposals Banning Cell Phone Use While Driving

Arizona SB.1017
A person shall not operate a motor vehicle on a highway while using...a cellular telephone...a computer...headphones or earphones, excluding hearing aid or other devices for improving the hearing of the person...any other electronic device that is not installed by the manufacturer and that is not essential to the operation of the motor vehicle...

Colorado HB.1156
..."mobile communications device" means a cellular telephone, citizen's band radio, or other device that enables a person in a motor vehicle to transmit and receive audio signals...no person shall use a mobile communication device while operating a motor vehicle unless the device is specifically designed to allow hands-free operation...

Kentucky Res.966 and HB.172
No person shall operate a moving motor vehicle while simultaneously utilizing a cellular or other mobile telephone for the transmission or receipt of voice communication...

Maryland HB.43
A driver of a motor vehicle that is in motion may not operate a telephone that is held by the driver while in use...

Missouri HB.1184
No person shall operate any moving motor vehicle on any highway, street or road while operating a cellular or digital mobile telephone...

New Hampshire HB.1273
No person shall use any type of cellular telephone while actively driving a motor vehicle on a public way. This limitation shall not prevent persons from using programmable telephones built into motor vehicles, if they are of the variety that do not require hand-held operation

New Jersey SB.480, SB.408
Text not available

New York AB.4361
It shall be unlawful for any person to operate upon a public highway...a motor vehicle while the operator is using a cellular hand-held phone...nothing contained herein shall interfere with the use of a Citizen's Band Radio or the use of speaker phones which are voice activated and do not require the use of hands

Pennsylvania HB.2112
No driver shall operate a moving vehicle on a highway of this Commonwealth...while using a cellular telephone...

Senate Commerce Chairman and Presidential Candidate in the Crossfire

• Senator John McCain, presidential hopeful and chairman of the Senate Commerce Committee, received a first-hand taste of the old political maxim “no good deed goes unpunished” when it was revealed that he had written a letter to the FCC urging prompt action on a TV station licensing matter that had been pending for more than two years. Many Congressional observers believe it proper to write these “letters of inquiry” insofar as they do not attempt to influence the outcome on behalf of a particular party. McCain’s letter read in part: “The delay that has already occurred appears incompatible with the responsible execution of the Commission’s statutory duties, and further delay would be unacceptable. Please be advised, therefore, that consistent with this Committee’s oversight responsibilities I respectfully request the Commission to act on these applications...”

But, McCain’s critics jumped on the letter when it was revealed that the Senator had accepted a campaign contribution from one of the parties in the case. Readers of this column may recall that, as chairman of the committee that has oversight over the FCC, McCain has been a persistent and often vociferous critic of the Commission-

particularly for its inability to process the mountain of cases it once had outstanding. Ultimately, the media-savvy McCain released hundreds of letters to reporters to demonstrate that his actions were standard operating procedure.

David Farber Appointed FCC’s Chief Technologist

◆ The big buzz in Washington telecommunications circles these days is “broadband.” (See the February 2000 “DC Currents”.) While the phrase refers primarily to Internet access through wired networks, as Internet access becomes more common in cellular and PCS it may eventually span both the wired and wireless worlds, including Amateur Radio.

Hired to lead the Federal Communications Commission’s charge into broadband-land is David J. Farber, the Alfred Fitler Moore Professor of Telecommunication Systems at the University of Pennsylvania, who has been named the FCC’s Chief Technologist. At Penn Farber is director of both the Center for Communications & Information Science & Policy and the Laboratory for Distributed Systems. At the Laboratory he leads research in ultrahigh speed networking, the design of innovative distributed computer architecture, and distributed collaboration methodology.

An FCC news release quotes William E. Kennard, chairman of the FCC, saying, “The

FCC, and, indeed, the entire country, are very fortunate to have the services of such a distinguished, world-class technology expert as Dave Farber at this time, as the FCC continues to tackle the complicated and increasingly technical issues involved in ensuring universal broadband access.”

Farber and his ideas have been publicized in *Wired*, *People* and other publications. A “cyber activist”, he has long maintained an influential mailing list on network and Internet issues called *Interesting People*. He plans to continue maintaining his own Web site at <http://www.cis.upenn.edu/~farber/>.

Farber replaces Stagg Newman, who leaves the Commission to join the consulting firm of McKinsey & Company.

HR.783 Headed Back Into Arena for Round Two

◆ As we went to press, Congress was just getting back to business after the long year-end break. As a result, we were unable to obtain the names of new cosponsors who might have signed on in the interim (see p. 16, January 2000 *QST* for a list that is up to date through December 31, 1999). The second session of the 106th Congress is scheduled to adjourn in October, so the ARRL will return to Capitol Hill throughout the spring, summer and early fall to continue pushing the bill forward. Watch “DC Currents” next time for an updated list of cosponsors and news about the expected introduction of Senate companion legislation.

Media Hits

• Although Y2K is now being touted as the biggest non-event of the century, the Amateur Radio preparedness angle scored big in media outlets throughout the country. Here is a small sampling of the many, many “media hits” we’ve heard about:

• The *Hartford Courant* did a well-written, high profile story on ARRL Y2K activities the day before New Year’s Eve that prompted many other media inquiries. The story featured Anne West, K1STM, Nina Armstrong, WB1DJL, Hilda Sullivan, KB1EHY, Darrow Loucks, WA1D, Mark Bonadies, NS1T, Harry Abernathy, N1JTL and Ted Ferreira, WA1NXC.

• The *Courant* story “went national” when it was picked up and distributed by the Associated Press. The story was also picked up by local CBS affiliate WFSB-TV and FOX-TV, both of which interviewed staff at ARRL Headquarters. The FOX story also interviewed Connecticut ARES representative Don Izzo, N1HAX. In addition, Headquarters staff were interviewed by the *Arizona Republic*, *The New Britain (Connecticut) Herald*, ABC Nightline, National Public Radio and CNN.

• A lengthy segment at the close of the January 1 NBC Nightly News touched briefly on the history of Amateur Radio and some of the emergencies in which ham radio operators have played a role. ARRL Media Relations Manager Jennifer Hagy, N1TDY, worked with NBC producer Alan Kaul, W6RCL, in placing the story. Thanks also go to PRC member Jeff Reinhardt, AA6JR, and Kid’s Day founder Larry “Tree” Tyree, N6TR, who were interviewed on camera.

• The *Oregonian* featured ARRL Section Manager Bill Sawders, K7ZM, Craig Marquette, KC7YOC and others from the Portland area. Marquette is shown standing by the Northeast EVAC Incident Response vehicle.

• The *Daily Oklahoman* mentions the efforts of Ron Sonheim, KA5RVM, Ken Runyon AA0O of Yukon and others who were ready to help out in disasters in Oklahoma.

• The *Deseret News* of Salt Lake City, Utah interviewed Joel Neal, KC7UBP, local ARES coordinator.

• The *Courier Post* of Cherry Hill, New Jersey featured Matthew Call, N2TXV and Harold Vickery, WA2ZMU setting up a ham station at the Gloucester City Fire Department in preparation for Y2K.

• *Westword* of Denver, Colorado featured Erik Dyce, W0ERX and Tim Armagost, WB0TUB preparing in the emergency center in the Denver City County Building.

• Mike Harvey, KB8UXX, is shown with his handheld in a Y2K article in the St Marys, Ohio *Evening Leader*.

• The *Standard Observer* of Greensburg, Pennsylvania mentioned local ham Sam Sarraf, KE3PO, of Latrobe who said, “When there are no other communications available, we’re that resource...”

• ARRL Public Information Officer Clyde Mitchell, KG4ETU, reports that local hams were featured in the Myrtle Beach, South Carolina *Sun News*, on WPDE-TV and WBTW-TV. Also included in the coverage were Matt McGuire, KF4AIT, and Jennifer Smith, KF4AHI.

• The Ft. Worth *Star Telegram* noted that hams weren’t just “hamming it up” over the Y2K weekend. The article featured Ullis and Jan Hair, W5WKH and K5EGB, and Lamar Pounds, KA5NGG.

• ARRL has retained a public relations firm and has a public relations program in place to promote the implications of the FCC’s new license restructuring initiative to the general public. The fact that the *Report & Order* has triggered so much discussion within the Amateur Radio community seems to point to a healthy and feisty Amateur Service, a point of possible news media interest.

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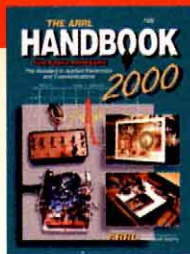
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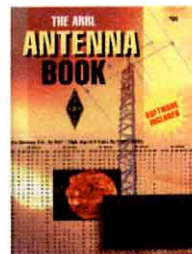
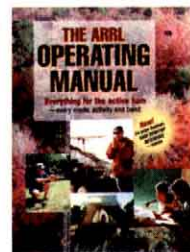
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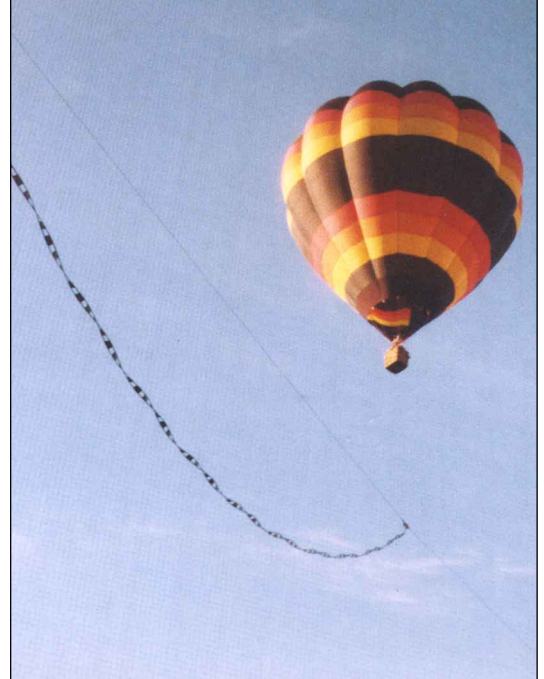


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Canoe mobile in the wilderness. John, KL7JR, used a Yaesu FT-747GX transceiver and an Outbacker antenna to make more than 300 contacts last fall from Bridge Lake, British Columbia, as KL7USI/VE7, a special-event operation for the Canadian Islands Awards program.



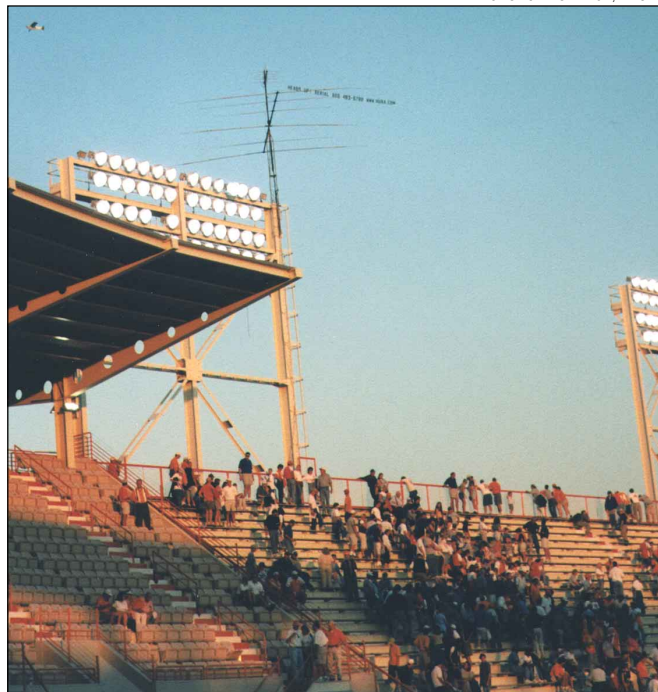
“While you were on vacation...” Don Steele, W1NFG, is lucky to have a neighbor who is willing to keep an eye on his antennas when Don traveling. One day his neighbor was horrified to see a hot-air balloon descending rapidly toward Don’s G5RV antenna. Fearing the worst she grabbed her camera and prepared to document the collision. Fortunately, the pilot saw the antenna and applied a quick burst of flame to boost the balloon to a safe altitude.



Talk about a rugged antenna mount! Lewis, W7JCV (left), crafted this motor home antenna mount with the skilled use of a welding torch. Not only is the mount strong enough to keep his tall whip antenna in place (right), it is also removable.

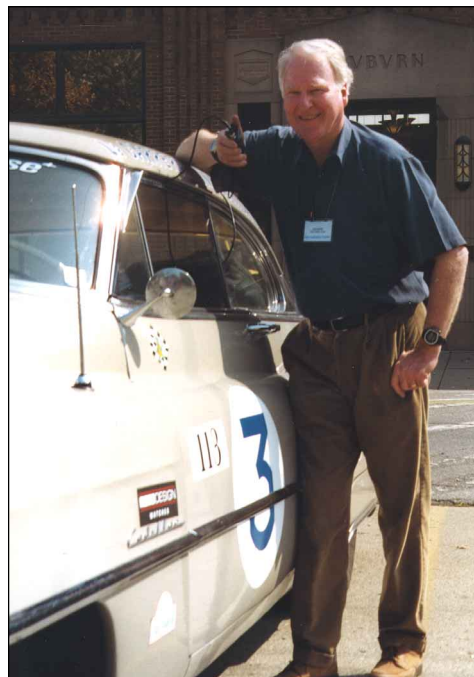


Two watts and a whip. Peter, N6ZE, was possibly one of the most unusual Rover stations in the 1999 ARRL September VHF QSO Party. He didn't allow a cross-country trip to interfere with his contest plans. He picked up a few grids during the drive from his office in California to the nearby airport. A layover in Salt Lake City provided an opportunity to pick up one more grid. At his destination (Atlanta, Georgia), Peter netted 21 contacts, 4 states and 6 grids from his 23rd-floor hotel room!



Looking for a decent place to install an HF beam antenna? How about on a football stadium? The TH7DX beam belongs to the University of Tennessee Amateur Radio Club, W4EAL, and it finds the perfect perch at the top of Neyland Stadium in Knoxville, Tennessee.

Gentlemen, start your engines. Ron, W6DFT (right), drove a 1950 Cadillac from New York City to Redondo Beach, California last September during a recreation of the "Cannonball Runs" of the 1970s. Ron used his ICOM T-22A and a 1/4-wavelength mag-mount antenna along the way. Twenty-five antique autos like Ron's (below) made the coast-to-coast dash to celebrate the record-setting runs of Earle G. "Cannonball" Baker who averaged 51.5 hours over the route in the '20s and '30s.





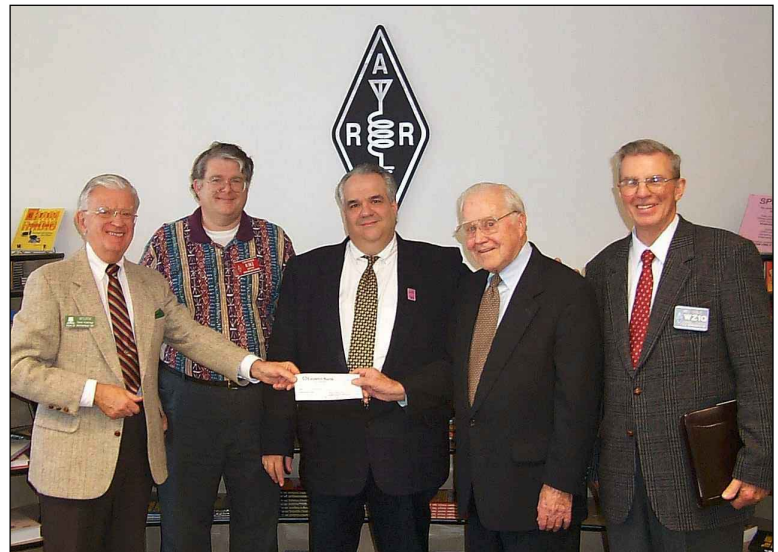
Domenico, I8CVS, vowed that he would be ready when the Phase 3D satellite reached orbit. We'd say he succeeded! You won't need an antenna farm like this to work the Phase 3D "supersat" when it is launched later this year, but Domenico's enthusiasm is impressive.



Happy birthday! Jeff, WA8SAJ, is an avid Collins collector. For his 49th birthday last October 22nd, his wife presented him with a very special cake. The "classic confection" was waiting in Jeff's station when he arrived home from work. According to Jeff his wife spent much of the day carefully duplicating the Collins logo in frosting.



A lot has changed in 100 years. Rich, KG2PU (left), and John, K2RXR (right), were among the operators at the W2GSA Marconi special event station last year. The operation was held at the Twin Lights lighthouse in Atlantic Highlands, New Jersey, to commemorate the 100th anniversary of the first practical use of wireless in the United States. In 1899 Marconi set up a station at the lighthouse to receive reports from radio-equipped ships that were observing the New York Yacht Race.



A major scholarship contribution. The Federation of Eastern Massachusetts Amateur Radio Associations, sponsors of the biannual New England ARRL conventions at Boxboro, Massachusetts, recently added an additional \$28,500 to the FEMARA Scholarships at the ARRL Foundation, bringing the total funds invested to well over \$100,000. Each year several scholarships are awarded to New England hams attending college and trade schools through the ARRL Foundation and the FEMARA endowment. Making the presentation at ARRL headquarters were (left to right): Eugene H. Hastings, W1VRK, FEMARA treasurer; Tom Frenaye, K1KI, ARRL New England Director; Tony Penta, W1ABC, FEMARA convention chair; Ed Metzger, W9PRN, president of the ARRL Foundation; and Melrose Cole, WZ1Q, ticket chairman of the ARRL conventions at Boxboro. The next ARRL New England Division convention at Boxboro will be August 26-27, 2000.



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 (VU/UU/VU), Enhanced Smart Search™ 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™ CTCSS/DCS, optional ADMS-2E programming software, and is 1200/9600 Baud Packet compatible.



FT-290R

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.

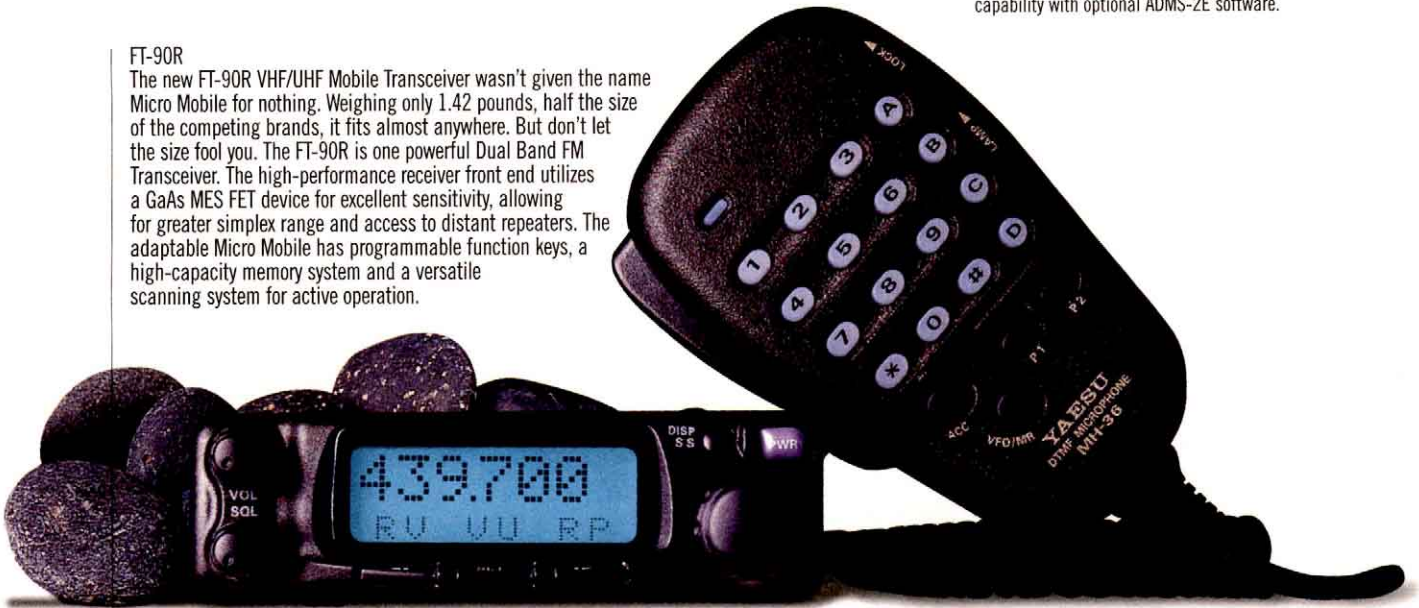


FT-2600M

This heavy-duty VHF FM Mobile is encased in a durable aluminum die-cast chassis/heat-sink 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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Life is an adventure. So whether you're on expedition or vacation, you will probably encounter some rough going along the way. And when you do, you'll be glad that your mobile transceiver is a Yaesu. With units small enough to install almost anywhere and rugged enough to achieve military approval for shock and vibration, Yaesu is the obvious choice for dependability. Its exceptionally clear signal and wide dynamic range tame even the most crowded bands, and provide outstanding protection from intermodulation in urban areas. Learn more about Yaesu products on the web at www.yaesu.com

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FT-1000MP
The radio of choice for world-class contest operators, the FT-1000MP provides 100 Watts of power, Enhanced DSP™ Dual In-band Receive, Cascaded IF filters, General Coverage RX, and 160-10 M TX. (DC-only version also available.)



FT-920
The FT-920 HF/6M Transceiver is designed for today's active Ham. It features high-speed DSP in all modes, 127 memory channels, AFSK or FSK Digital operation, new-technology MOSFET PA finals, high-speed Automatic Antenna Tuner, and high-resolution LCD display.



FT-1000D
Truly an elite-class HF masterpiece, the 200 Watt FT-1000D provides Dual Receive (in-band or cross-band), Cascaded IF Filters, extraordinary Dynamic Range, DDS, high-speed Automatic Antenna Tuner, and 100 memory channels.



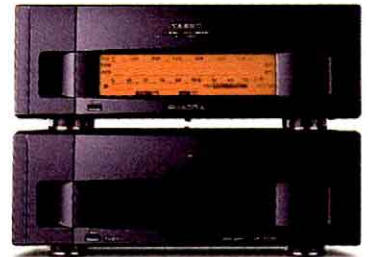
FT-100
This ultra-compact HF/VHF/UHF 100 Watt Transceiver provides SSB, CW, AM, FM and AFSK coverage of the HF, 6M, 2M and 70 CM bands. Features include 300 memory channels, built-in Electronic Memory Keyer, DSP, IF Shift, IF Noise Blanker, and CTCSS/DCS.



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.



FT-600
This compact 100 Watt HF Transceiver offers the utmost in operating simplicity. The MIL-STD rated FT-600 covers the 160-10M Amateur bands with General Coverage Receive, 100 memory channels, Direct Keypad Frequency Entry, and a front-mounted speaker.



VL-1000/VP-1000
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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RESTRUCTURING—REACTIONS

◆ As I look at FCC's license restructuring *Report and Order*, what strikes me is the great freedom that the FCC has given the amateur community to decide its own fate. Clearly the FCC feels that demonstrated expertise in Morse code is not a prerequisite to full operating privileges. But what do they feel *should* be a prerequisite? They aren't telling us—leaving that for us to decide for ourselves.

The FCC has said only that there must be a specific number of questions for each exam, and also a minimum number of correct answers. Previously, the FCC had specified the makeup of the questions in the exam by requiring a specific number of questions in each category. That requirement has now been eliminated. So, who decides the makeup of the exam questions? The VECs do. And who agrees on the questions in the pool that the exam is drawn from? Again, the VECs.

We, as Amateur Radio operators, working through the VECs, now have broad latitude to determine what the knowledge criteria for operating privileges should be. We should use this new freedom wisely—*Steve Auyer, N2TKX, Liverpool, New York*

◆ The more things change, the more they stay the same. I was reading through some old *QST*s recently. In the January 1960 issue, amidst the exciting news that we had kept our frequencies in the just concluded Geneva conference, and that our ranks had swelled to over 200,000, there was this gem from WA2BMB in the correspondence column:

"We have all heard the screams about how crowded our bands are. More and more frequencies are given to the broadcasting field. The whole cause is that it is quite easy for anyone to get an Amateur Radio license. What I would suggest is taking away the Novice license. This will probably cut the number of oncoming amateurs by better than 95%. I would [also] suggest cutting the code speed required to pass a General to about 10 WPM. In due time our bands will again be at peace and all of us can pursue our hobby without struggle."

Well, it took 40 years, but the FCC has followed WA2BMB's tongue-in-cheek (I think!) suggestions. Time will tell if this is the last desperate death rattle for Amateur Radio, or the heralding of a fresh start for the 2000s. I hope it's the latter. I'm not opposed to the changes, but I'm just not sure they'll be enough to counter the threats to our fre-

quencies and the technological changes that threaten to make us irrelevant.—*Brian Wood, W0DZ, Loveland, Colorado*

◆ I have never written to a magazine before, but I couldn't keep quiet this time. I considered writing a response to "CW Frustration" in the December 1999 *QST*. I was going to extend words of encouragement to continue to practice the code. I just got my Amateur Extra ticket in December 1999 after 2 years of practice, practice and more practice. Then, before I could get a letter into the mail and not even 2 weeks after my upgrade, the FCC issued its restructuring *Report and Order*. A 5-WPM maximum CW testing speed? What a joke!

Am I extremely disappointed? You bet. Do I feel slapped in the face? You bet. As far as I can see, Amateur Radio has just been turned into CB radio. Is this how the ARRL is looking out for the hobby? I have enjoyed radios and electronics for many years and the code presented a challenge. I believe this move will have more hams leaving the hobby than entering.—*Larry Gump, KE6LG, Covina, California*

◆ When the *Report and Order* was handed down by the FCC on December 30, 1999, I knew this is a great day for Amateur Radio! I could not have asked for anything better. It is almost precisely what I have campaigned for to save ham radio.

Actually, I suggested two grades of license, Beginner and Advanced. Adding Extra is okay with me. Reducing the Morse requirement to the ITU minimum of 5 words per minute will end the controversy—eventually. The old timers can stew in their juices over this "dumbing down" issue, which it is not, and the others who have viewed code as the door that blocked their entry to full enfranchisement can finally have their day. Anyone can pass a 5 WPM test. It just means that you know the Morse alphabet, nothing more.

Now we who teach the classes and give the VE testing can say that the franchise of HF operation is open to all and get this hobby back to what it was when getting a license was the easy part.—*Rich Davidson, K9RD, Lake Forest, Illinois*

◆ I have been licensed since 1967 when I was 16, and I currently hold a Technician Plus ticket. I have wanted a General license for 33 years and have never been able to earn it because I can't copy Morse beyond about 12 WPM. I have tried classes, listened to tapes for months on end, worked

live QSOs on the Novice bands day after day and still can't pass the code test. Over the years I lost interest and rarely operated.

I've listened to the HF bands from time to time and I've found that they are filled with profanity, racism, intolerance and mean-spirited behavior—all courtesy of hams who managed to pass the Morse test requirement at 13 WPM and higher. You wizards of code, Holders of the Sacred Trust and Defenders of the Old Order, haven't kept the Infidels at the gate, they now dwell among you! The plain truth is that your sacred code hurdle didn't work.

License restructuring is a reality. Get over it! I intend to dust off my HF rig, refurbish my antennas and get ready for April 15 when I qualify for a General ticket! That ticket is not a gift to me, it is a gift to our hobby. I'm going to study for an Amateur Extra as soon as the new question pool is available.

My interest in Amateur Radio has been reignited, and I'm sure I'm not the only one. It's time for the Old Guard to step aside. Let's see what some new blood will do to make our hobby better than ever.—*Sam Sachs, WB3JYL, East Windsor, New Jersey*

KIDNAPPED BY QRP

◆ I am relatively new to ham radio. In March 1999 I was licensed as a Technician, and upgraded in May to Technician Plus. Like most hams, I started looking for a specialty that would be both challenging and rewarding.

I began by working AMRAD-OSCAR 27, the FM repeater satellite. Fun as it was, I knew that I wanted to expand my horizons to HF. I soon decided that I needed to purchase an HF transceiver.

My friends suggested that conduct my radio hunt at the 1999 Fort Tuthill hamfest, just up the interstate from Phoenix. I did a Web search and found a site that had Fort Tuthill information. The site was sponsored by NorCal, a club devoted to low-power QRP hamming. The idea of communicating on HF with only a few watts was intriguing! As I explored the NorCal site I learned that Dave Benson, NN1G, of Small Wonder Labs, would be at the hamfest with his DSW-40 transceiver. After a quick visit to Dave's site, I decided that if I didn't purchase a full-featured rig, a QRP radio might make an interesting alternative. It was a lot less expensive to boot!

The fateful weekend arrived and I headed to Fort Tuthill with my checkbook in one pocket and a credit card in the other. After 15 minutes of shopping I decided that I re-

ally didn't want to spend the kind of money that a whiz-bang radio required. What to do?

I strolled past the Arizona ScQRPions' booth (another very active QRP group) and inquired as to the whereabouts of Dave Benson. Bertie Hightower, N7XJW, said that Dave hadn't arrived yet. Sensing the presence of a newbie, Bertie went on to tell me about the ScQRPions and QRP in general. She also provided information about the QRP-L e-mail list and recommended that I join it. A whole new world was opening for me!

By the time I located Dave Benson, I was psyched. I purchased a DSW-40 kit on the spot. The radio went together with only one minor problem, which I was able to diagnose and correct with a little assistance from Dave. Making long-distance contacts with only a couple of watts was pure excitement!

After finishing the DSW-40 I realized that I enjoyed building my own radios. I immediately developed a voracious appetite for small projects. It was as though I was reliving my engineering days at Auburn, except that this was much more enjoyable than most of my EE labs! I soon completed an Emtech ZM-2 tuner, an Oak Hills Research wattmeter and a small signal generator. Not only were the projects fun, each one left me with an enormous sense of accomplishment.

My operating skills left a lot to be desired, but I was determined to improve. Fortunately, the QRPers have a solution. Doc Lindsey, KOEVZ, has put together a Novice/Technician Plus HF "foxhunt" for us newbies. We simply post a note to the QRP-L reflector and let others know when we'll be on the air.

My first evening as the fox began on an embarrassing note. At the appointed hour and on the advertised frequency, I called "CQ Fox." To my surprise, at least five stations replied. I was so nervous that I instantly froze! For eight minutes I simply sat there, starting at the radio in total confusion. Finally, one operator managed to coax me out of my "fox-hole" and engaged me in the proper exchange of information. Within a short period I had worked eight other "hounds" and my nervousness had eased significantly.

What's next? Besides working more satellites (I'm eagerly awaiting Phase 3D), I'll keep looking for more QRP kits to build. The excitement hasn't left Amateur Radio. On the contrary, it is alive and well—if you know where to look!—*Gerry Elam, K1LRO/7, Phoenix, Arizona*

HEROES

♦ After reading the interesting editorial "Amateur Radio Heroes" in the December 1999 *QST*, I would like to nominate my hero: W0CVG—Nep Nepple, who I heard on my crystal set in the mid 1950s. Listening to his QSOs inspired me to get my ham license and pursue a career in electronics.

The interesting part of this story is that I never met Nep, although I eventually did locate his house in Colorado Springs, about a mile from mine. As a 10 year-old boy I never had enough nerve to go up to the door and knock, so he never knew of his influence on me and I never thanked him until now: Thanks Nep.

If you think your actions on the air do not influence anyone else, think again. You never know who might be listening!—*Ted Allison, NONKG, Colorado Springs, Colorado*

♦ One of my Amateur Radio heroes became a Silent Key last this past December: Paul Wilson, W4HHK. He had battled pneumonia in the late summer, then suffered a massive heart attack in October. He was recovering in the hospital when the final heart attack took his life.


Paul was a tireless supporter of activity above 50 MHz. Last summer I went on a microwave DXpedition and was pleased to work Paul on 10 GHz, giving him three new states and four new grids, completing his VUCC. Even with his frail health Paul was conquering new bands. Before his hospitalization he was active on 24 GHz and was about to get on 47 GHz.

Paul's life should inspire every amateur to strive for new experiences, regardless of age or health. Paul was a gentleman and a powerful example for me. I will miss him.—*Joel M. Harrison, W5ZN, ARRL Vice President, Judsonia, Arkansas*

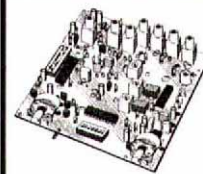
♦ The December 1999 editorial asked for more nominations for Amateur Radio heroes. Here are two of mine.

E. O. Seiler, W2EB, ex 8PK. "Yoe" was a pioneer ham, first licensed in the spark era. He was a cutting edge experimenter who played with 5 and 2.5 meters in the mid '30s when these were considered esoteric bands. He also helped introduce the amateur world to SSB in the late '40s. Most notably, he invented the Seiler Oscillator, first published in *QST* in December 1941. While he originally regarded his design as a variation on the Colpitts, the Seiler Oscillator has since been recognized as a unique invention.

Another somewhat unsung hero is Clarence Tuska, co-founder of the ARRL. While the greater share of the credit rightfully goes to Hiram Percy Maxim, it was Tuska's initial assistance that inspired Maxim and helped him get the League going. Tuska was also one of the few hams who was active during World War II as organizer and chief instructor at the Army's radio training school at Ellington Field, Texas.

There are doubtlessly thousands of names deserving honorable mention for their contributions. It's one of the benefits of a hobby that encourages experimentation and innovation. May it ever be so.—*John S. Ward, KE2ST, East Bloomfield, New York* 

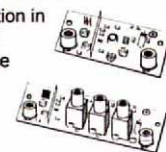
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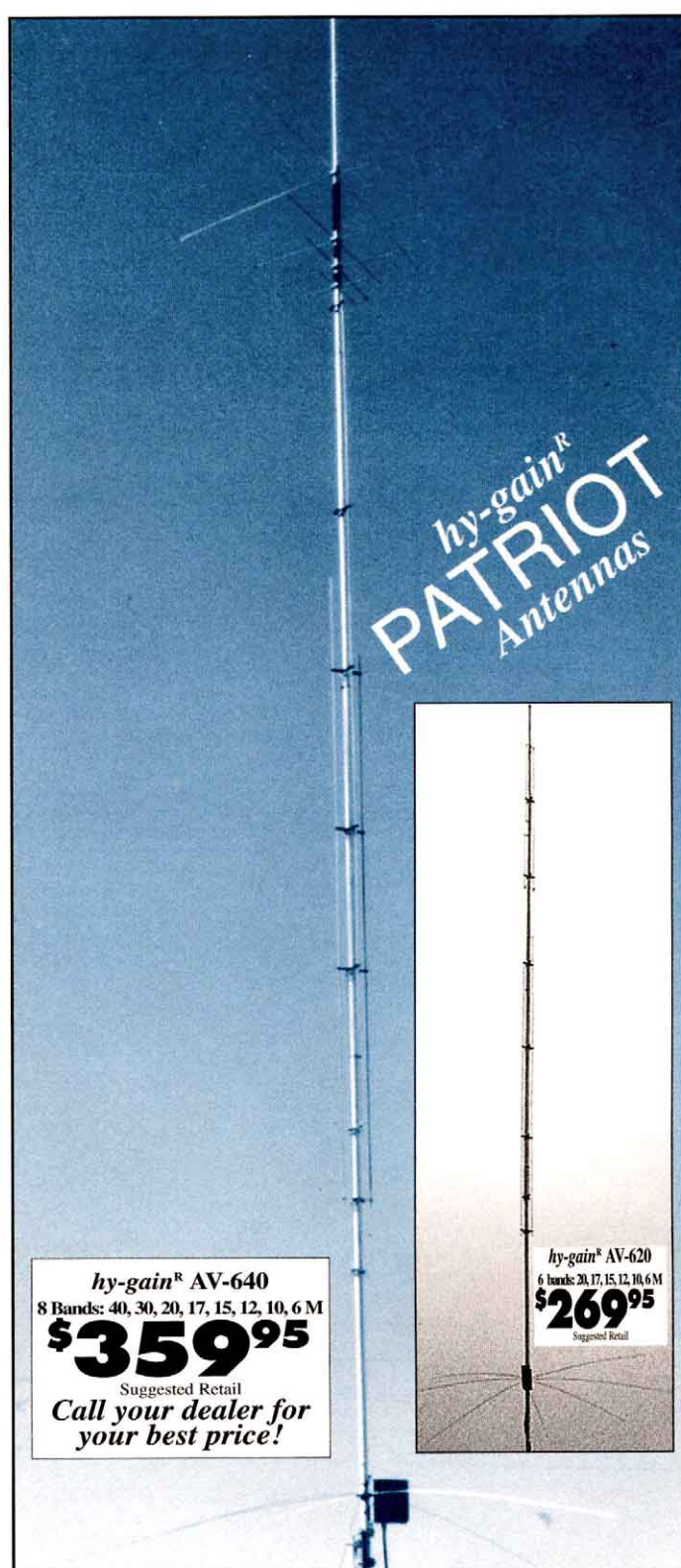
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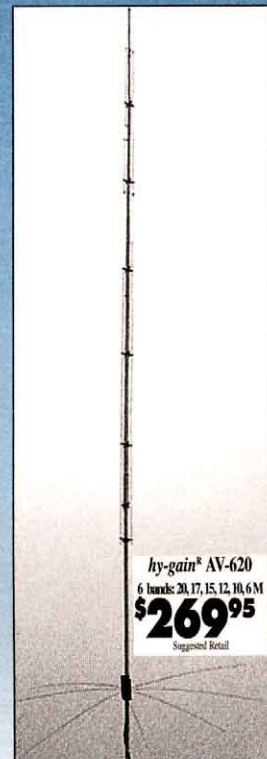
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Suggested Retail

Specifications	AV-620	AV-640
Bands covered (meters)	6, 10, 12, 15, 17, 20	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

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- Provision for optional Collins mechanical filters
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Cross-Country QRP

Imagine riding a bicycle built for two through the picturesque country vistas of France and Holland. Add a few quaint sidewalk cafes and unending historical and artistic relevance and you have the trip of a lifetime...almost. What's missing? A one-pound QRP mini station, of course!



CMC bikers at a cafe in Provence.

“PA/N0BF DE ZS3JDR 599 CFM” zipped through my headphones at 35 words per minute. I had broken through the pileup to South Africa with 1 W and a wire dangling from my apartment window in Rotterdam. A warm glow of accomplishment spread from head to toe. The decision to take a compact QRP station along on my bicycle vacation through France and Holland had been the right one.

When my girlfriend, Jeannie, and I began planning the one-month vacation (riding our tandem cycle through parts of southern France and Holland), I decided to pack a ham rig that was small, lightweight and easy to set up and operate. The NN1G 30-meter QRP CW transceiver I'd built four years ago for my first trip to Holland would do nicely.

The NN1G circuit board was mounted inside a 2x3.5x6-inch plastic box with battery holders and a touch key. To operate the key I held the rig in my left hand (making sure my fingers touched the bottom metal plate) and tapped a bolt on the plastic box with my right index finger!

The only external devices required for operation are headphones and a 30-meter dipole antenna. The antenna was made from 24-gauge wire and was fed with 10 feet of RG-174 mini coax to minimize weight and bulk. The antenna was stored on a nylon spool by wrapping the antenna around the outside and tucking the coax inside the hole. The entire station, minus batteries, weighed only a pound (AA batteries are readily available in Europe).

Planning and Preparation

I was preparing to apply for a temporary license, previously a bureaucratic nightmare, when the CEPT announcement appeared in *QST*. The article described how the reciprocal licensing agreement between the United States and many foreign countries, including France and Holland, had eliminated the need for a temporary license. The ARRL Web site explained how to operate in CEPT countries. I simply packed my ham license, a copy of “Amateur Service Operation in CEPT Countries,” and a passport.

Our plan was to spend the first two weeks participating in an organized trip beginning in France and ending in Holland. Thirty-two other riders would participate in the ride, which was sponsored by the Colorado Mountain Club (CMC). Jeannie and I would stay in Rotterdam for an additional two weeks after the other club members returned home.

A Week in Provence

Traveling through “Van Gogh” country in Provence was inspirational as we rode through the fields of flowers that Vincent painted more than 100 years ago. Riding from Tarascon, we stopped for coffee in Saint Remy, where Vincent painted “Starry Night,” his most famous painting. We pedaled on to Arles, where we spent two nights and visited the Café La Nuit that Vincent had captured on canvas. I recognized it immediately from his impressionist painting.

Our days were filled with 35-mile bike rides and historical exploration. Evenings included dining together, drinking wine, telling stories and singing songs until we couldn't keep our eyes open. Operating ham radio in the midst of all the activities had to be quick and easy.

I found some time to operate the NN1G in Uzès before going to bed. I installed nine AA batteries I'd purchased in the small town for 15 francs (five dollars) and hung the antenna from our second-story room. It was 10 PM, so there wasn't time to install the dipole in a conventional manner. Instead, I put the dipole up in about five minutes by tossing the hot dipole leg out the window so it hung next to the outside wall and draping the grounded leg around the room (over pictures, mirrors and light fixtures). To my surprise the little rig came to life with signals from all over Europe—some with exotic call signs!

I answered DL8VL's CQ as F/N0BF. Klaus, in Dresden, answered me with a 549 signal report. John, GW0UWM/QRP, called me from Cardiff, Wales, with a solid 599 5-W signal from his MFJ rig. He gave me a 569 with QSB. He signed 72 after a five-minute QSO when the noise got worse. Klaus, DL8MTG, in Lehre, called me with a 529 report. He was looking for DX, so he QSY'd after I gave him a 599 report.

Bill, G2FDF, gave me a 559 RST after I answered his CQ. We chatted for 30 minutes. Bill was running an FT-1000 into a doublet vee from Oswestry, England. “100 km west of Birmingham on road A5 and 32

km due south of Chester” was his reply to my question, “Where’s Oswestry?” He suggested that we come to England and spend the night at his house. He explained how he frequently came to the US to visit his daughter in California. I finally signed with Bill at midnight after drowsiness set in. I was pleased with my first night on the air.

Onward Through Holland

After a week in France our CMC group rode the high-speed train to Holland where we bicycled through intensely colored fields of tulips. Van Gogh must have seen these same fields when he was growing up and learning how to paint. The experience made me think of the similarity between the art of communicating with sound (to send CW messages) and the art of communicating with color (to paint pictures).

Jeannie and I spent the last two weeks in an apartment in Rotterdam after the other CMC people returned to Colorado. Again, setting up my mini QRP station took only a few minutes. The antenna configuration was similar to the one I used in France—but now I was on the 11th floor!

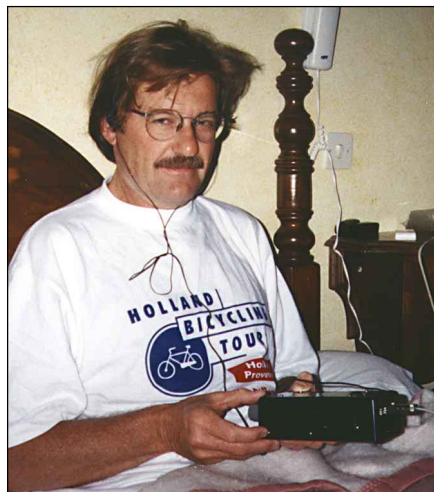
During the next three days the antenna worked flawlessly. Karel, OK1CBD, gave me a 539 report from Beroun, Czech Republic. Dorothy, M0AXC, gave me a 579 report from Dorset, England. She asked questions about our day trips to Gouda, Delft and the North Sea. She signed with a “bon voyage” after a 20-minute QSO with armchair copy. OH0/OK1XDF/P, on Aland Island near Finland, and ZS3JDR, from South Africa, gave me 599 signal reports. They were both popular DX stations so I had to use considerable patience calling between pileups to work them. Jose, EA7AIN, gave me a 559 RST from Malaga, Spain. Jose was my first Saturday morning QSO. All of the previous QSOs had been in the evening.

The little rig’s side tone sounded raspy on Saturday evening and the strength of the incoming signals had dropped, suggesting an antenna problem. The wire hanging over the handrail was only 10 feet long after I pulled it up! Someone in an apartment below had apparently snipped the wire from his balcony.

I modified the antenna by using the metal handrail on the balcony as a counterpoise to replace the cut dipole leg. The remaining dipole leg was moved from inside of the apartment, connected to the center coaxial conductor and tossed over the handrail. The coaxial shield was connected directly to the handrail with an alligator clip. I minimized the possibility of a second cutting by casting the antenna wire off the balcony before each operating session and gathering the wire into a coil when I was finished. The process felt a bit



Jeannie and me riding tandem in Holland.



My sleepy QSO with G2FDF.

like fishing for QSOs.

My first catch with the “handrail” antenna was Dan, F5IQJ, in southeastern France, who gave me a signal report of 549. He didn’t speak English but understood that he was copying a 1-W signal from Rotterdam. He gave up trying to understand the details of the bicycle vacation and signed off with a 72. My second catch was DX station HG4I in Hungary, who gave me a 599 report. Breaking through the pileup showed me that the “handrail” was really getting out.

On May 13, every store in Holland shut down for “Ascension Day,” celebrating Christ’s final ascent into heaven. I worked

two stations with special call signs that coincided with the celebration. IQ3AC in Italy gave me a 599 RST and asked me to QSL via IK3GES. 9A770N in Croatia gave me a 599 RST and asked me to QSL via 9A1PAB. Both stations were drawing pileups. I’ve sent QSLs to each operator in an attempt to understand the connection to Ascension Day and the reason for its popularity.

My final contact was with Tom, EI1AJ/ QRP, from Dublin, Ireland. He gave me a 329 RST and I gave him a 559 RST for his 5-W signal. His cheerful “cheerio” was the last message logged in my journal.

Take Your Radio Along

Integrating QRP into the vacation had been more successful than expected. My total setup and operating time (including repairing the cut antenna) had been only four hours. I had worked 14 stations in 12 countries from Finland to South Africa as we bicycled through France and Holland. In addition, two of the stations were QRP.

Taking ham radio hadn’t interfered with our trip. In fact, making new friends and learning about their culture enhanced it. Next time you plan a trip outside the country, consider including ham radio. Reciprocal licensing and the availability of lightweight QRP equipment make it easy to engineer your own “cross-country QRP” adventure.

You can contact the author at 850 Leyden St, Denver, CO 80220; n0bf@juno.com.

DXing With NATO

Deployed to Bosnia-Herzegovina as part of NATO's multinational Stabilization FORce (SFOR), an American ham in uniform sets up a portable station there and meets a fellow soldier/ham who had the same idea! Both discover the adventure, excitement and reward of operating in a challenging and unique environment.

When the shock of the news that my California National Guard unit would be activated and deployed to Bosnia began to dissipate, my mind drifted to thoughts of what it might be like to operate HF from that troubled part of the world. Our seven-month tour would have us in the Balkans through the dead of winter, so it seemed like the ability to work the world from that snowy, foggy region might provide a welcome touch of home and a little exotic adventure.

A quick check of the ARRL Web site revealed that reciprocal operating agreements existed between the US and Bosnia. An e-mail to Bosnia's Directorate of Telecommunications brought an almost immediate positive response along with specific instructions on how I could get my temporary Bosnian license. I mailed off the required materials and in two short weeks my special Bosnian ticket arrived, complete with a summary of my operating privileges, which precisely matched my FCC Advanced-Class certificate. I'd be T9/N6TST.

The Theater

My unit handles MEDEVAC duties and flies UH-60A Black Hawk helicopters. With regular overseas deployments becoming a fact of life for American soldiers, the services have turned to Reserve and National Guard units to ease the workload on troops in the active forces. Ostensibly, our unit, with its 10 Black Hawks, would be sent to Eagle Base, a large Soviet-built airstrip located in Tuzla, in the American Sector of the Multi-National Division, North (MND[N]), in the northeastern corner of Bosnia-Herzegovina.

We were told that our unit could be sent elsewhere, so I decided to pack my HF gear



Here I am posing next to a sign stack no overseas military base would be complete without. My Windom antenna was suspended from the left side of the observation tower behind me.



T9/KC5YOR operated his TenTec Delta II transceiver out of his quarters, feeding his roof-mounted dipole with 450- Ω ladder line.

so it would be ready for my wife to ship once we'd settled in. Thankfully, APO parcel service between the States and Bosnia is fast and dependable. Now that Internet access is so universal—and that's surely the case for the military in Bosnia—most everyday personal mail is electronic.

My station would consist of my Kenwood TS-440SAT transceiver, powered by a Kenwood PS-30 supply, which can easily be switched to run on the 50-Hz, 220 V ac power used throughout Bosnia. My antenna was a 132-foot Windom with a resonant 97-foot feed line (which would later prove to be problematic). I also took my Heil headset, complete with a homemade PTT button I'd wired in (this turned out to be a *very* good idea).

Arriving in the region in late August, we found the living situation at Eagle Base a little chaotic. All the tents, including the ones in which we stayed, were being replaced with permanent buildings in a construction blitz that was supposed to be completed by mid-December. It'd be nearly impossible to set up an antenna right away because we had no idea when we might move to our "new" quarters.

So, I did what I've always done when deployed overseas—scrounge! Rooting through the mountain of "materiel" that always accompanies base construction, I came across a handy cache of stackable five-foot fiberglass mast sections originally used to support camouflage netting. They'd make perfect antenna support poles. I carefully bundled them and tucked them safely out of sight.

One morning while I sat on first-up standby, a Major from our Combat Support Hospital walked into Flight Operations looking for the MEDEVAC pilot who was also a ham radio operator. He was Steve Flaherty, KC5YOR, a doctor who had



My improvised ham shack in MEDEVAC Flight Operations at Camp McGovern, northern Bosnia-Herzegovina. I always volunteered for phone watch on "first-up" since I could operate while people were eating or sleeping and I wouldn't disturb them.

shipped out with his Ten-Tec Delta II transceiver.

Steve and I talked about our ham radio plans. Although he'd been licensed for 17 years, he'd been off the air for the last 14. Now upgraded from Novice to Tech Plus, he was interested in getting on the air again, especially on HF. Anxious to operate in such an interesting place, he got his Bosnian license and packed his rig and a simple dipole for 10 meters.

So as T9/N6TST and T9/KC5YOR, Steve and I formed the Tuzla Amateur Radio Society.

With our new quarters still under construction, Steve decided he'd put his dipole atop the newly completed single-story hospital building. Feeding his antenna with 450-ohm ladder line via an MFJ tuner, Steve began operating in October. Interference was an immediate problem, however, as his signal was getting into the telephone lines. Despite our best efforts, we couldn't mitigate the problem. Steve decided to wait until our new quarters were complete—only a few weeks away—before continuing his radio pursuits.

In the meantime I visited the local communications unit to see how modern military communicators enjoy their HF experiences. What I found was depressing. Their state-of-the-art Collins rig stood idle. "Nobody knows how to run it," I was told, "and when we had a guy who knew about it, we couldn't get the antenna to work."

The most practical HF application in the Balkan theater is short-range Near-Vertical Incidence Skywave (NVIS). The idea is to fill the countless gaps as troops work their way into the multitude of tiny valleys and radio-shadowed sites throughout the country. But with precious few soldiers trained in this delicate aspect of communication and numerous

retransmission sites dotting the hilltops, HF has been eclipsed by the standard 30-88 MHz tactical VHF FM SINGCARS (SINgle Channel Ground and Airborne Radio System) transceivers. Despite its amply encountered limitations and shortcomings, this line-of-sight system handles most comms in this mountainous land.

It didn't take me long to determine that the NVIS antenna was insufficiently grounded (*very important*). We consulted the real-time HF propagation links I'd put on my Web site (<http://www.ridgenet.net/~n6tst>) to choose the best of their allocated frequencies for any particular time of day. We soon made comm checks with other stations more than 100 miles away. This relatively simple success impressed the communications unit commander and he asked if I might brief his troops on setting up antennas, HF propagation and determining the most effective frequencies. This was no problem and I found my audiences quite attentive.

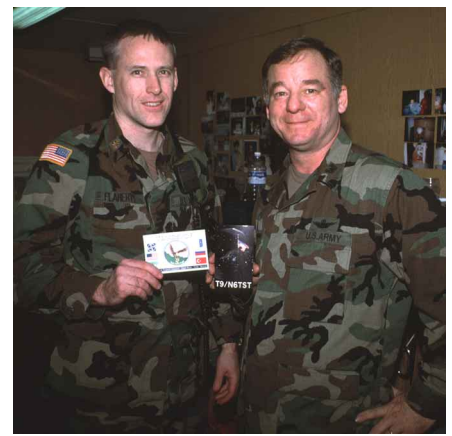
Suitably appreciative, my communicator colleagues turned me loose with their HF rig and I began checking things out. Europe's popular ham bands are 80, 20, 17, 15, 12 and 10 meters but, as anywhere, choosing the best bands depends on conditions. On good days, early morning brought signals from Siberia, Australia and Southeast Asia. During the day, paths to all of Europe were hot, as were routes into Africa and the mid-East. The polar "window" to the US doesn't open up until mid-afternoon (Bosnia is UTC +1) and closes a few hours after local sunset. I couldn't wait until I could get my antenna up! I e-mailed my wife to ship the gear. I had it in a week.

Whoops, New QTH!

Suddenly, my assignment changed. One morning, I found myself heading north, bag and baggage, to a small, heavily armed outpost near where the Serbian, Bosnian and Croatian borders converge. Here we kept two aircraft and crews standing by for emergency missions as the region's already volatile political environment grew increasingly unstable. I'd be there "until further notice," so I tossed my boxed up station into the back of the aircraft.

Steve and I exchanged e-mail as time passed and snow fell. The new quarters were open for business. They consisted of long, single-story buildings with low-pitched roofs. Steve had mounted his dipole along the crest about 20 feet off the ground. With no phones or other equipment around to "interfere with," he was able to easily operate from his room, working 10-meter stations all over Europe, Africa, South America and Indonesia.

He'd established himself as a MARS



Major (Dr) Steve Flaherty, T9/KC5YOR, and the author, both charter members of the Tuzla Amateur Radio Society, show off their special Bosnia QSLs at the end of a successful and rewarding experience operating overseas.

affiliate (AEM5USM) and, via stations AEM1USA in Germany and AAR3HG in Maine, Steve was passing messages through the MARS web site. As Christmas approached he made phone patches for GIs. It stirred my interest and, at my remote duty station, I began unpacking and getting things ready.

At our outpost, our tiny Flight Operations group had its own tactical FM antenna mounted on a guyed 30-foot mast standing atop the huge bunker adjacent to the building. About 200 feet away stood a 40-foot observation tower bristling with antennas. I decided to mount my 132-foot Windom using appropriate lengths of parachute cord to position it horizontally between the two anchor points.

On Christmas Day and the following morning, I worked in the cold and snow to suspend my wire antenna about 30 feet above the ground while keeping the ends sufficiently clear of existing antennas. I routed my coax to the rig inside the Flight Ops building.

I hooked everything up and almost immediately snagged a station in Germany on 20 meters. My T9 prefix, a suitably rare catch throughout Europe, produced the first of what would become the most amazing series of pileups I'd ever experienced. I say "amazing" because for the first time I was the center of attention!

My first day exploded into activity, and the next several weren't far behind. Propagation on every band was excellent, taking my attention-grabbing call sign as far as India and Norway, all over the Russian Republics, and through a polar window to the eastern US. At night, 80 meters opened, keeping most of Europe in the "my oyster" category.

It was a ham's dream, sitting on MEDEVAC standby for 24 hours a day, with the rig going, my laptop to log my contacts and a headset to keep it all from driving my fellow crewmembers crazy.

Actually, it *did* drive them crazy. I seemed quite frenzied handling pileups while they tried to watch videotaped movies. I also found, ala Steve, that my signal was getting into things, too. And there were good reasons for it.

First, with the proverbial paucity of telephone lines and plethora of users, everyone and his buddy had wired himself his own extension/antenna, selecting from the rich choice of phones and 24-gauge, four-conductor extension cables in our tiny PX. Second, people did the same thing with their miniature amplified speaker systems they'd set up for personal stereos and computers. Their high-impedance, solid-state front-ends made great semi-modulators.

Third, Windom antennas need efficient RF grounds to prevent feed line radiation. To keep the buildings at our outpost from sinking into the perpetual sea of mud they sit atop (except when it freezes), Army Engineers and Navy Seabees began with a layer of coarse gravel more than six feet deep. Despite the best ground rod and all the pounding in the world, I'd still have a hard time working my way down to real earth.

Between the spider web of jury-rigged telephone lines, high-impedance speaker leads and a less-than-ideal RF ground, more than the ionosphere got hot from my signals. A few steps ahead of the lynch mob, I decided to restrict my operating windows to times when people were flying, eating or sleeping.

But even then things weren't perfect. On our tiny base, the Armed Forces Radio and Television System (AFRTS) operated a one-watt transmitter to relay its satellite-delivered programs across the few hundred feet to the Dining FACility (DFAC), where some TVs were set up. With that meager signal, the AGC on those TVs was wide open. When I pumped out my 100 W on 80 meters, my crewmembers told me about the herringbone patterns and the faint, strange-sounding audio. Fortunately, they were the only guys to recognize the telltale signs!

Time passed and conditions fluctuated. Even with my neighbor-friendly operating arrangements I still had time to make plenty of interesting contacts: a nice QSO to Sweden on 10-meter FM; Rabat, Morocco, on 12 meters; the Orkney Islands off Scotland; every country in western Europe; and about as many of the new Russian Republics as I could identify.

An interesting 80-meter QSO occurred during the first week of January 1999, just



T9/N6TST used his nighttime flash photo of the first-up MEDEVAC aircraft on the hospital standby helipad during the season's first snowstorm as his Bosnia QSL.

after a NATO Special Operations team had tried to arrest a Serbian ex-general as a PIFWC (Person Indicted For War Crimes, pronounced "pif-wik"). He'd resisted, trying to run down the team in his car and died in a hail of bullets. That night, a station in Novi Sad, Serbia, came back to my CQ and we talked awhile.

From my call sign he knew who I was and where I was, but although he was quite emotional about the global politics involved, he made it clear that he didn't have any personal animosities toward me. He went out of his way to thank me for being such a caring visitor and having the interest to reach out and meet people as I had. I was truly impressed and came away feeling I'd experienced one of Amateur Radio's greatest rewards.

As unexpectedly as it began, my hinterlands tour ended. Late in January I got word that I'd return to Tuzla, so I dismantled my station. Because Steve had already mounted his antenna on top of our building and we'd be shipping out soon, I decided to pack my station away and send it home.

All told, I'd logged 113 contacts compared to Steve's 125 (not including the more than 100 messages he'd passed for MARS). We'd both had a wonderful time and neither of us in any way regretted bringing our radio gear. We also made special QSL cards to commemorate the experience. I'm still sending mine out as I

receive cards via the QSL Bureau.

Things have Simplified

If you're in the military and a tour in Bosnia looms in your future, taking your rig can be a fascinating and easily exercised option. Shipping via the APO system is excellent and speedy, and operating in Bosnia-Herzegovina is easier than ever since that country became a signatory to the recently adopted CEPT agreement.¹

All the HF amateur bands except 40 meters are usable in a region that has no shortage of folks eager to make contacts with a T9 station. Because your Bosnian privileges allow it, operating on VHF and UHF is also an option, although repeaters are almost non-existent. One particularly nice aspect for me was my rig's general-coverage receiver. My large antenna gave me excellent SWL and broadcast AM reception.

Now that I'm home, I look back on my ham radio activities in Bosnia as a definite high point. For US soldiers, NATO bases in Bosnia remain essentially sealed compounds. Most folks are seldom, if ever, permitted to venture beyond the wire. But radio enabled me to reach over the fence and make many friends in the neighborhood and halfway around the world.

KC5YOR, now Trauma Director at Brooke Army Medical Center at Fort Sam Houston, shares my feelings about this. If we're deployed overseas in the future, we'll put our stations near the top of our packing lists.

If all the activity and continuous base construction in the Balkans is any indication, our involvement in that part of the world appears measurable in years now, rather than months. If there's a silver lining, it has to be that if you're headed to Tuzla, you can drop me a line and I'll let you know where I stashed those mast sections.

¹Since June of 1999, the FCC has become a participant in the European Conference of Postal and Telecommunications Administrations (CEPT) radio-amateur license agreement. It allows US Amateurs to travel to and operate from several European countries without seeking a special license or permit. Essentially, what you need to bring to Bosnia is: (1) your original US license; (2) proof of US citizenship (a passport or military ID); and (3) a copy of the FCC's June 7, 1999, Public Notice (this document contains its information in English, French and German), which details what US Amateurs need to consider and bring with them when traveling to CEPT countries.

More information on the CEPT Agreement is available from the ARRL Web site at: <http://www.arrl.org/field/regulations/io/index.html#cept>.

You can contact the author at 840 W. Springer Ave, Ridgecrest, CA 93555; n6tst@ridgenet.net. All photos by the author.

Q5T-

By Charlie Cheney, K1LDZ



The QRSer: A CW Operating Aid

Here's how you can put solid-state brakes on too-fast CW!

I admit it—I like CW! In fact, most of my operating time is spent on CW, and I've put a lot of effort into increasing my copying speed. Even so, there are times when a call sign or contest exchange is sent too fast for easy copy. In a contest, milliseconds add up, providing an incentive for the big guns to crank their keying speeds to stratospheric levels when sending CQ. As often as not, the call sign has an unfamiliar prefix that makes it even harder to decipher. Consider copying a call like "HH5SH" at 50 WPM and you'll see what I mean!

The polite request to "PSE QRS" works wonders during a normal "ragchew," but who wants to slow down a good operator when they're in the middle of a good run or working a pile-up? Sure, I can listen on frequency until I get all the information I need, then make my contact and move on, but that takes time and success is not guaranteed.

The Past and Present

In the days of reel-to-reel tape recorders, the problem was easily handled: Just record the exchange at 7½ inches per second and replay it at 3¾ inches per second. Now, an indecipherable 50-WPM transmission is reduced to a manageable 25 WPM. But most tape recorders available today have only a single recording and playback speed.

Fortunately, technology comes to the rescue. Solid-state audio-recording devices, widely used in answering machines and memo recorders, are the basis of the voice keyers so common in phone contests. Why couldn't such a device be used to capture a few seconds of received audio at one speed and play it back at a slower speed? Replaying the captured segment at a lower speed would make it much easier to recognize a call sign or other transmission. A few sec-

onds is long enough to record an entire contest exchange. That's how the QRSer was born.

The circuit is based on a device made by Information Storage Devices, the ISD1110P.¹ This chip requires only a handful of external components to record and play back 10 seconds of voice-quality sound. The recording is not continuous, as with a tape recorder. Rather, the sound is sampled at a rate determined by either an internal or external clock. The samples are stored and reconstructed into an audio signal during playback. Samples are stored as *analog* levels, and the resolution of the storage and retrieval of the sampled waveform is equivalent to that of an 8-bit ADC.

The trick in the QRSer is to use different clock frequencies for record and playback. With the ISD1110P, an internal clock running at 819.2 kHz normally controls sampling. This results in a sampling rate of 6.4 kHz. But the internal clock can be overridden by an external one. Suppose the chip is driven at 800 kHz while the data is sampled, but at 400 kHz for playback. Now it will take 20 seconds to play back the information that was recorded in 10 seconds—just what we did with the tape recorder!

If the design team at Information Storage Devices ever sees this, they'll probably emit a collective groan. The sampling frequency controls the ISD1110P filter passband—normally 2.6 kHz—optimized for voice recordings over ordinary telephone lines. The pitch of the reproduced sound is reduced by the same proportion as the clock frequency. Halving the clock frequency cuts the digital-filter bandwidth and the filter's center frequency in half, but obviously cannot affect the rejection properties of the internal analog filter. ISD does not recommend changing the clock speed between

record and playback because the quality of the reproduced sound is degraded somewhat, but for CW reproduction, the fidelity is quite good. It might take some practice to get used to copying CW at a lower pitch than normal, though.

Longevity

One of the drawbacks to tape recording is that the tape eventually wears out. The ISD1110 is all solid state, but like other nonvolatile memory devices, it, too, has a finite life expectancy. The specified life of the memory cells is 100,000 write cycles. For a 10-second chip, this translates to about 275 hours. This is a lot of operating time, and some chips in this family can be used as an "infinite tape loop," so that the last 10 seconds of received audio is always available for review. I didn't like this approach. It would be too easy to leave the device running and exceed the IC's write-cycle specification. Instead, the QRSer uses momentary-contact switches to select the record and playback functions. It is easy enough to know when to start recording and playback always starts at the beginning of the recorded message.

Circuit Description

Refer to [Figure 1](#). Power is derived from your station's 13.8-V supply; most stations today have one or more such supplies available. Voltage regulator U1 provides 5 V for the logic chip and the ISD1110. I used a 1.5-A regulator, which is loafing at the maximum drain for this unit, because the idea of regulator failure putting 13.8 V on the recorder chip was unappealing. U1 needs no heat sink. D1 ensures that accidentally reversing the power leads won't damage anything.

The circuit provided by the ISD1110 application note requires little modification for this purpose. All of U2's address lines are grounded, so recording and playback

¹Notes appear on [page 36](#).

always start at the beginning of memory. The audio preamp intended for microphone-level signals is not used.² Instead audio is fed to U2's **ANA_IN** pin from the **LINE OUT** connection of my Kenwood SP-31 speaker. This signal is not affected

by plugging headphones into the speaker front panel and has plenty of amplitude to drive the recorder chip. Because the unit is powered by the station power supply, both sides of the audio input are capacitively coupled across the speaker to avoid ground-

ing issues. R2 sets the input level.

The signal amplitude applied to the analog input of U2 must be kept below 50 mV peak to peak. Two comparators set the audio level at nearly maximum. As shown in Figure 1, the negative input of U4C is held

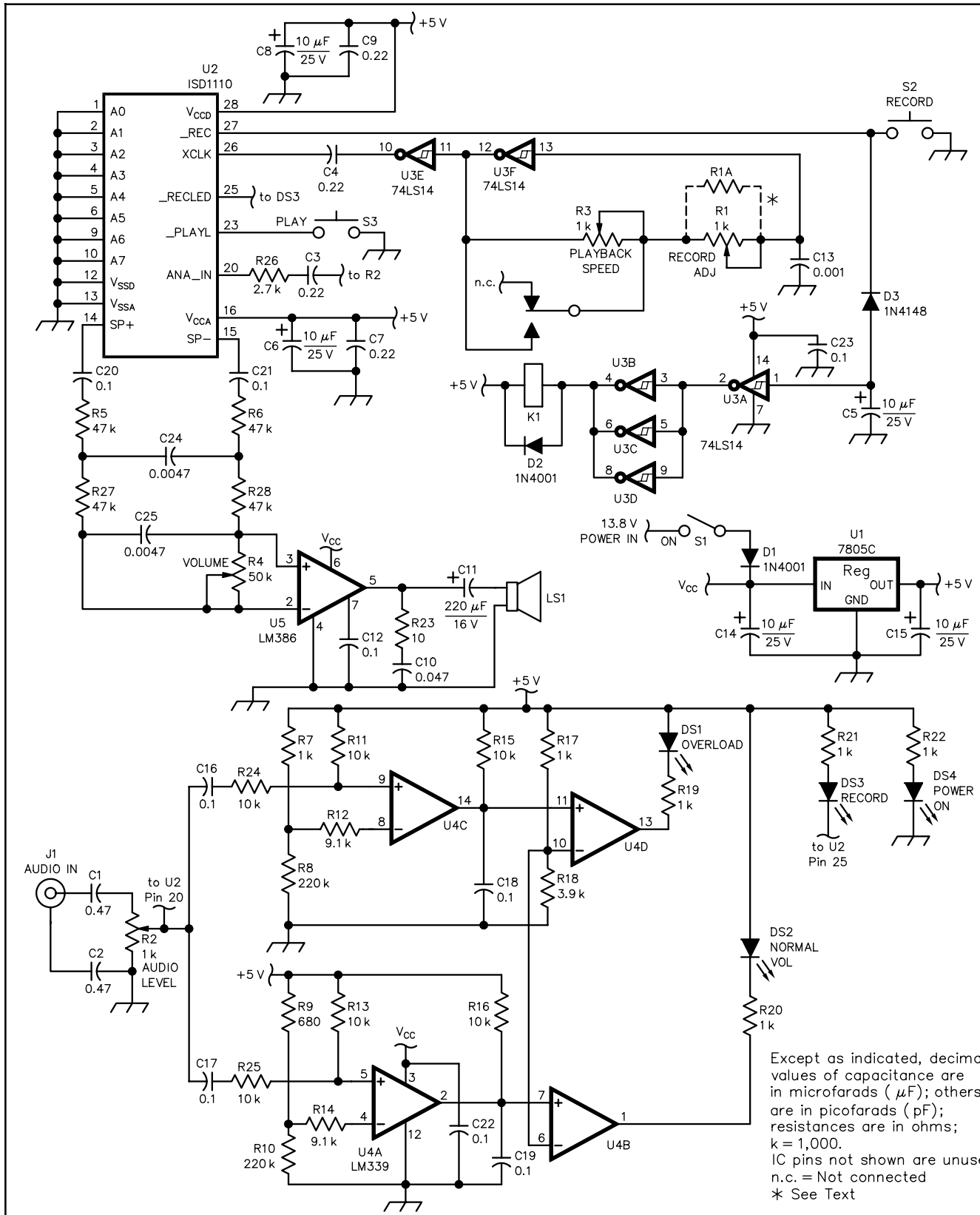


Figure 1

at about 25 mV below the 5-V supply, while the positive input is the sum of the supply voltage (5 V) and half the audio level. As long as this sum is higher than the voltage at U4C's negative input, the output transistor in U4C is turned off and C18 charges to 5 V through R15. This places the positive input of U4D at 5 V. The negative input of U4D is at 4 V, so the **OVERLOAD** LED (DS1) is not lit.

When a negative peak of the input signal exceeds -50 mV, the output transistor of U4C turns on, rapidly discharging C18. U4C turns off again after the signal peak, but C18 can only recharge through R15 because the LM339 outputs are open collectors. Until the voltage across C18 exceeds 4 V, the output of U4D is at ground

potential and DS1 is lit. The time constant of R27 and C19 is 1 ms, so for signals above a couple of hundred Hertz, the LED stays on constantly until the peaks no longer drop below -50 mV. A similar comparator with the trip point set at about 15 mV controls the **NORMAL VOLUME** indicator, DS2. Because the LM339 has rather high bias voltage and current, the exact switch points may vary by several percent from the design values, but the comparator works well enough for this purpose. U2's analog-input impedance is about 3 k Ω , so the audio input to U2 is half the attenuated signal level (ie, 30 mV peak to peak at the threshold for lighting DS3, and 50 mV at the threshold for DS2). If an oscilloscope is available to set the signal level, this part of the circuit can be eliminated, but there is a certain appeal for some of us in watching the LED flash in sync with incoming CW.

A sound bite is recorded by pressing S2. The **RECORD** LED (DS3) lights while recording. When the record memory is full, DS3 extinguishes and the chip automatically goes into power-down mode. In addition to activating the recorder chip, S2 provides a discharge path for C5, grounding the input to U3A. This causes U3A's output to go high, energizing K1. K1's contacts bypass the **PLAYBACK SPEED** pot, R3. This makes oscillator U3F run at a speed determined by the time constant of C13 and R1. Recording can be stopped at any time by releasing S2. When the switch is released, C5 charges through the internal pull-up resistor in U3A. This holds K1 closed until the internal debounce circuit on the ISD1110 **RECORD** pin has timed out. If this isn't done, the clock might switch to its lower speed before recording stops, causing an abrupt and unwanted pitch change at the end of the recorded message. D3 prevents C5 from holding pin 27 of U2 low.

Trim pot R1 (**RECORD ADJ**) allows closely matching the record speed to U2's internal clock. It appears that when S2 opens, U2 ignores the external clock for a few milliseconds before recording ceases. This produces an effect similar to allowing the external clock to change frequency during recording (ie, a short but noticeable pitch change). This is a blessing in disguise since it provides an easy way to set the record clock to the design frequency of the ISD1110 (more on this later). This optimizes signal quality while recording. The exact resistance needed across U3F to give the required clock frequency depends on the tolerance of C13 and the internal pullup at U3 pin 13. In my prototypes, this resistance is about 750 Ω . The FAR PC board³ provides pads for adding a fixed-value resistor (R1A) in parallel with R1. Using an 820- Ω resistor at R1A and a 10-k Ω trim pot for R1 makes adjustment of R1 less sensitive.

Pressing S3 plays back the recorded mes-

sage. Because K1 is not energized, the time constant of C13 and the series combination of R1 and **PLAYBACK SPEED** pot, R3, determine the oscillator speed. R3 allows adjusting the playback speed from the recording speed down to less than half the recording speed.

U2's audio output is designed to deliver a mere 22 mW to a 16- Ω speaker and does not provide any means of controlling the playback volume. Because the output tones of interest are going to be at the low end of the speech spectrum and the efficiency of small speakers is poor, more audio power is needed to deliver a good listening level. Audio output is provided by U5, the ubiquitous LM386. For optimum signal-to-noise ratio, U5 is driven by the speaker outputs using a balanced circuit; R4 is the **VOLUME** control. U2's speaker outputs are isolated from the LM386 at dc, so U5 can be powered from the higher, unregulated supply voltage. Be sure to use an LM386N-4, designed for a maximum supply voltage of 18 V. If you use an LM386N-1, power it from the 5-V regulated source. This increases U5's power output over that available if its supply voltage were limited to 5 V.

The audio output of U2 contains a noise component at 1/160 of the clock frequency. Normally, this frequency is above the filter passband at about 5 kHz. However, reducing the clock speed by a factor of two moves the noise into the passband of U2's output filter. R5, R6, R27, R28, C24 and C25 remove this noise component and clean the reproduced sound.

Building the QRSer

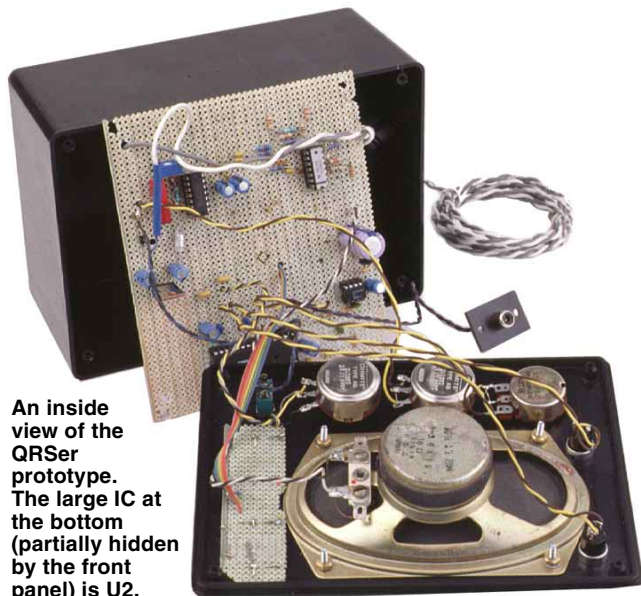
A PC board for this project is available from Far Circuits (see [Note 3](#)). A semi-kit including U1 through U5, sockets for U2 through U5, K1, and the PC board is available from me.⁴ All other components are available from Digi-Key. Most parts can also be obtained from RadioShack, but the ISD1110 and 74LS14 are special-order items. To save a few bucks, the best place to find switches, pots and hardware is in your junk box or that of a friend.

There's nothing tricky about building the QRSer. Prototypes I assembled on perfboard work well. Point-to-point wiring of this project is less work than it might initially appear—most of U2's 28 pins are either unconnected or grounded (U2 pins not shown in [Figure 1](#) must be left floating.). It's important to provide separate power leads to the digital and analog power pins of U2, and to bypass these leads to ground as close to the IC as possible using a 10- μ F electrolytic capacitor and a 0.1- μ F ceramic capacitor. If this is not done, the recorded sound suffers from noise. The 74LS14 and LM339 power pins are bypassed at their sockets with 0.1- μ F ceramic capacitors.

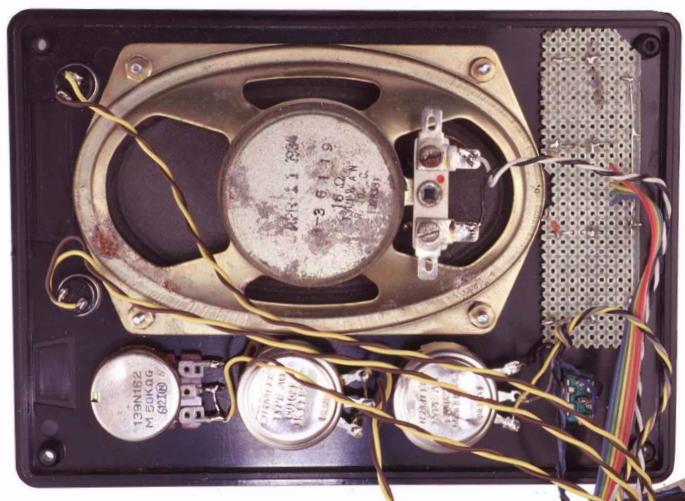
My prototype is built in a 5 \times 7 \times 3-inch (HWD) RadioShack project box (RS 270-

Figure 1—Schematic of the QRSer. Unless otherwise specified, resistors are 1/4 W, 5% tolerance carbon-composition or film units. DK part numbers in parentheses are from Digi-Key Corp, 701 Brooks Ave S, Thief River Falls, MN 56701-0677; tel 800-344-4539, 218-681-6674, fax 218-681-3380; <http://www.digikey.com>. Equivalent parts can be substituted; n.c. indicates no connection.

C1, C2—0.47 μ F monolithic
C3, C4, C7, C9—0.22 μ F monolithic
C5, C6, C8, C14, C15—10 μ F, 25 V electrolytic
C10—0.047 μ F ceramic
C11—220 μ F, 16 V electrolytic
C12, C16-C23—0.1 μ F ceramic
C13—1000 pF polystyrene
C24, C25—0.0047 μ F ceramic
D1, D2—1N4001 50-PIV, 1-A diode (DK 1N4001MSCT)
D3—1N4148 (DK 1N4148MSCT)
DS1, DS3—Yellow LED (DK HLMP-1719QT)
DS2—Red LED (DK HLMP-1700QT)
DS4—Green LED (DK HLMP-1790QT)
J1—Phono jack
K1—SPST miniature relay, 5-V dc coil (DK HE206)
LS1—8 or 16- Ω loudspeaker, 3-inch minimum diameter (DK P10187); see text.
R1—1 k Ω or 10 k Ω trim pot; see text.
R1A—820 Ω ; see text
R2—1-k Ω linear- or audio-taper potentiometer
R3—1-k Ω linear-taper potentiometer
R4—50-k Ω to 500-k Ω linear- or audio-taper potentiometer
S1—SPST toggle switch
S2, S3—Normally open push-button switch, panel mount
U1—UA7805KC 5-V, 1.5-A positive-voltage regulator (DK 296-1974-5)
U2—ISD1110P ChipCorder (DK ISD1110P)
U3—74LS14N hex Schmitt-triggered inverter (DK 296-1643-5)
U4—LM339 quad comparator (DK 293-1393-5)
U5—LM386N-4 audio amplifier (DK LM386N-4)
Misc: PC board (see [Notes 3 and 4](#)), enclosure, hardware



An inside view of the QRSer prototype. The large IC at the bottom (partially hidden by the front panel) is U2.



The back side of the front panel. Most of the panel is occupied by the oval speaker. A strip of perfboard (right) holds the four LEDs. Across the bottom are the three pots and toggle switch. The RECORD and PLAY pushbuttons are to the left.

1807). The speaker and controls occupy most of the space. This enclosure provides enough room for a 3x5-inch oval speaker firing through the front panel. Because the playback frequency is reduced by the same ratio as the CW speed, it's best to use a fairly large speaker and enclosure. A 2-inch speaker I tried first did a very poor job of reproducing the 300-Hz output tone resulting from the halved 600-Hz CW tone I normally use.

Good things come in small packages, but be careful about trying to stuff the QRSer into a small enclosure. The reed relay is very sensitive to magnetic fields. If it is too close to the speaker magnet, the relay may be held closed even when the coil isn't energized. If your project works perfectly until you put it into the box, this is one place to look! Although I've not experienced any problems with prototypes without D2, adding the diode across the relay coil to dampen the inductive kick when the relay is deenergized is a good idea. You'll have to place D2 on the foil side of the PC board.

Another way to package the QRSer is to build it into an existing speaker enclosure and use a relay actuated by S3 to switch the speaker between audio from the rig and the output of the LM386. This makes it unnecessary to turn down the receiver volume in order to hear the recording. Both sides of the speaker should be switched using a DPDT relay to avoid grounding problems. Be sure to install a diode across the coil of the added relay.

The only adjustment required before putting the QRSer into operation is to set R1 so that the frequency of U3F matches that of the internal clock in U2. If a frequency meter is available, measure the frequency at pin 10 of U3 and adjust R1 to set it at about 820 kHz. Otherwise, your "piano-tuning

skills" will come in handy for this procedure. Supply a constant audible signal to the audio input. Hold S2 closed momentarily then release it. Press S3 and keep it pressed until the recorded message ends. Unless you got lucky and the frequency match is perfect, the reproduced sound will be steady until the end of the recorded tone, then will shift up or down. Moving R1 one way moves the shift higher in frequency; moving it the other way shifts it lower in frequency. Repeat the RECORD/PLAY cycle adjusting R1 each time until the frequency shift at the end of playback disappears.

Operation

Using the QRSer is easy. Connect a suitable signal source to the audio input and apply power. I use twisted-pair pigtailed that pass through a grommet-protected hole in the rear of the enclosure, but you may prefer to install jacks and use cables. If the audio-input source is unbalanced, the high side must be connected to C1 and the grounded side to C2. Unless the signal source is of very low amplitude, it should be possible to adjust the INPUT LEVEL control so that DS2 lights to the dits and dahs of incoming CW. DS3 should not light except, perhaps, on noise peaks. If an oscilloscope is available, use it to check the signal level at pin 20 of U2. The peak-to-peak signal amplitude should not exceed 50 mV.

Press the RECORD pushbutton to record up to 10 seconds of audio. Press PLAY and adjust the PLAYBACK SPEED. The recorded message can be replayed as many times as desired by releasing the PLAY switch and pressing it again; the message will always start at the beginning of the 10-second interval.

Acknowledgements

I want to express my thanks to my dad, W1BSO, for getting me involved with

Amateur Radio more years ago than I like to remember.

Notes

¹Information Storage Devices, 2727 North First St, San Jose, CA 95134; tel 800-677-0769, fax 408-544-1789; <http://www.isd.com/>.

²This input has a maximum signal-input level of 20 mV peak to peak and its gain is controlled by a fast-attack/slow-decay AGC. However, I found that recordings were noticeably noisier when the input level was reduced much below its maximum value. Because I planned to take audio input from across an 8- Ω speaker, it would be necessary to attenuate the signal considerably to bring it below 20 mV. There isn't much sense in attenuating a signal just to amplify it again. The FAR PC board brings preamp pins 16-18 to pads for the builder who wishes to modify the present design to accommodate very low level audio inputs.

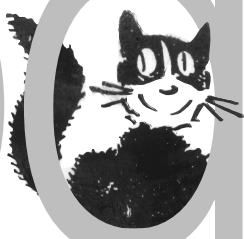
³PC boards for this project are available from FAR Circuits, 18N640 Field Ct, Dundee, IL 60118-9269; tel 847-836-9148 (voice and fax). Price: \$7.50 plus \$1.50 shipping for up to four boards. Visa and MasterCard accepted with a \$3 service charge.

⁴A semi-kit consisting of all semiconductors, sockets for U2-U5, K1, and a PC board is \$23 postpaid; \$15.50 postpaid without the PC board (see Note 3). Contact Charlie Cheney, K1LDZ, 319 Highland St, Northbridge, MA 01534; charliec@iee.org. Price: \$27.50

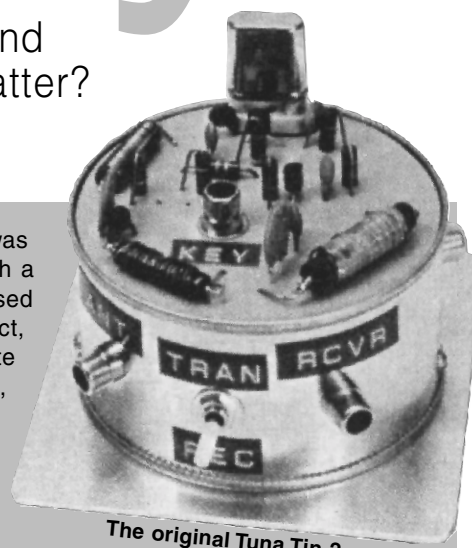
Charlie Cheney, K1LDZ, was first licensed as KN1LDZ in 1959. He's held an Extra class license since 1992. He's interested in restoring and operating vintage (tube type) ham gear, and in building homebrew equipment. For DXing and contests, however, he's "not averse to using more modern equipment." His favorite mode is CW (including mobile). Charlie holds a BS from Boston College and an MS from the University of Chicago. He works as the principal software engineer for QuadTech Inc (formerly GenRad Instruments) writing firmware for electronic test equipment. You can contact Charlie at 319 Highland St, Northbridge, MA 01534; charliec@iee.org.



Today The Tuna Tin 2



Ham radio lost its kick? Go QRP with this weekend project! Worked All States with a 40-meter half-watter? **You betcha!**



The original Tuna Tin 2

In the 1970s, the late Doug DeMaw, W1CER/W1FB, ARRL Technical Editor, was one of several Headquarters staff who published homebrew projects, many with a QRP twist. One of those was a simple, two-transistor 40-meter transmitter that used a tuna can as the chassis. Dubbed the “Tuna Tin 2,” it was a popular project, introducing many hams to homebrewing and QRP. A series of events, some quite amazing, have come together to keep the magic alive—the original Tuna Tin 2, built in the ARRL Lab, is still on the air and articles, Web pages and kits are available for this famous rig. Some have dubbed the Tuna Tin 2 revival as “Tuna Tin 2 mania”—an apt term to describe the fun that people are still having with this simple little weekend project.

This article has been edited from the original, written by DeMaw and published in the May 1976 QST. You can download a copy in Adobe PDF format from the ARRL Members-Only Web site at: <http://www.arrl.org/members-only/extra/features/1999/0615/1/tt2.pdf>. Some of the original parts are no longer available, so modern components have been substituted, using values that were featured in a column in QRP with W6TOY on the ARRL Web Extra. I think that Doug would have been pleased to see just how popular that little rig still is, almost a quarter century after he first designed it and built it in the ARRL Lab.— Ed Hare, W1RFI, ARRL Laboratory Supervisor

Workshop weekenders, take heart. Not all building projects are complex, time consuming and costly. The TunaTin 2 is meant as a short-term, gotogether-easy assembly for the ham with a yen to tinker. Inspiration for this item came during a food shopping assignment. While staring at all of the metal food containers, recollections of those days when amateurs prided themselves for utilizing cake and bread tins as chassis came to the fore. Lots of good equipment was built on make-do foundations, and it didn't look ugly. But during recent years a trend has developed toward commercial gear with its status appeal, and the workshop activities of many have become the lesser part of amateur

radio. While the 1-kW rigs keep the watt-hour meters recording at high speed, the soldering irons grow colder and more corroded.

A tuna fish can for a chassis? Why not? After a few hours of construction, 350 milliwatts of RF were being directed toward the antenna, and QSOs were taking place.

Maybe you've developed a jaded appetite for operating (but not for tuna). The workshop offers a trail to adventure and achievement, and perhaps that's the elixir you've been needing. Well, Merlin the Magician and Charlie the Tuna would probably commend you if they could, for they'd know you were back to the part of amateur radio that once this whole game

was about—creativity and learning!

Parts Rundown

Of course, a tunafish can is not essential as a foundation unit for this QRP rig. Any 6½-ounce food container will be okay. For that matter, a sardine can may be used by those who prefer a rectangular format. Anyone for a Sardine-2? Or, how about a “Pineapple Pair?” Most 6½-ounce cans measure 3¼ inches in OD, so that's the mark to shoot for. Be sure to eat, or at least remove the contents before starting your project!

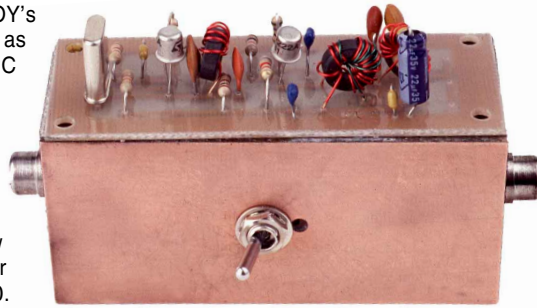
Although the original project used all RadioShack parts, some of the parts are no longer stocked. The 2N2222A transistor is

Kits and Boards

While the original Tuna Tin 2 can be built from scratch, surprisingly, printed-circuit boards and kits are still available.

The September 16, 1999 *QRP with W6TOY* column in the *ARRLWeb Extra* featured a modern version of the Tuna Tin 2¹. FAR Circuits can supply the printed circuit for W6TOY's version (not built on a tuna tin) as well as the original design PC board.²

Those who want to buy everything all in one place can buy a complete kit, including PC board from the NJ-QRP Club³. Send a check for \$12 postpaid to George Heron, N2APB, New Jersey QRP Club, 2419 Feather Mae Ct, Forest Hill, MD 21050. Doug Hendricks, K16DS also designed a version of the Tuna Tin 2, for the Northern California QRP Club (NorCal)⁴.



JOE BOTTIGLIERI, AA1GW
W6TOY's version of the Tuna Tin 2 design—without the tuna can.

¹See: <http://www.arrl.org/members-only/extra/features/1999/09/16/1/>.

² FAR Circuits, 18N640 Field Ct, Dundee, IL 60118-9269, tel 847-836-9148; <http://www.cl.ais.net/farcir/>

³NJ-QRP Club, contact: George Heron, N2APB, 2419 Feather Mae Ct, Forest Hill, MD 21050; n2apb@amsat.org; <http://www.njqrp.org/>. NJ-QRP has a section of their Web site devoted to the Tuna Tin 2 revival. See <http://www.njqrp.org/tuna/tuna.html>.

⁴Northern California-QRP Club (NorCal), 3241 Eastwood Rd, Sacramento, CA 95821; tel 916-487-3580; jparker@fix.net; <http://www.fix.net/NorCal.html>. Like the NJ-QRP Club, NorCal also has a Tuna Tin 2 revival page at: <http://www.fix.net/~jparker/norcal/tunatin2/tunatin.htm>.

widely available. The original coils have been replaced with inductors wound on toroidal cores. Printed circuit boards are available from several sources and the NJ QRP Club is offering a complete kit of parts. (See the sidebar "Kits and Boards".)

The tiny send-receive toggle switch is a mite expensive. The builder may want to substitute a low-cost miniature slide switch in its place. A small bag of phono jacks was purchased also, as those connectors are entirely adequate for low-power RF work.

Finding a crystal socket may be a minor problem, although many of the companies that sell crystals can also supply sockets (you can locate a number of crystal manufacturers and distributors on the ARRL TISFIND database at <http://www.arrl.org/tis/tisfind.html>). Fundamental crystals are used in the transmitter, cut for a 30-pF load capacitance. Surplus FT-243 crystals will work fine, too, provided the appropriate socket is used. If only one operating frequency will be used, the crystal can be soldered to the circuit board permanently. Estimated maximum cost for this project, exclusive of the crystal, power supply and tunafish, is under \$20. The cost estimate is based on brand new components throughout, inclusive of the

The Tuna Tin 2 on the Road

Those who've read our on-line publication, the *ARRLWeb Extra*, probably saw the article that appeared in the June 15th edition titled "The Tuna Tin 2 Revival." This article told an incredible tale of how the original Tuna Tin 2 was lost from the ARRL Lab and was found years later in a box of junk under a flea market table in Boxboro, Massachusetts. The Tuna Tin 2 was refurbished by Bruce Muscolino, W6TOY, and put back on the air by me on June 4, 1999. Since that time, over 400 hams have had the pleasure of working the original Tuna Tin 2, some using their own Tuna Tin 2 rigs built in the 70s (or built anew from the available kits).

California Dreamin'

After making about a hundred contacts from home, I was asked to attend an IEEE meeting in Long Beach, California. My sister, Bev, lives in the area, so I planned a week-long visit. I tossed the Tuna Tin 2 and a G5RV into my suitcase, hoping to give a few West Coast hams a chance to make a contact with the original.

After all the hugs and kisses, I explained to my sister what I was up to. She grinned, remembering the wild days of my youth, climbing trees to string wires all over our property, back when I was WN1CYF. As I looked over the site, though, I was not too hopeful; about the best I thought I could do would be to try a random wire around the balcony, maybe risking a run over to a small tree or two. I looked roofward and sighed, "Gee, it would be nice to get an antenna up on the roof." She made a quick call to Debbie, the building manager and close friend, who winced painfully and said, "Don't fall off!" and, in a classic Schultz accent, "I know nothing!"

We took the G5RV up to the emergency roof access, walked boldly out, and I proceeded to string the antenna up while Bev stood guard. I got the antenna up, dropped the feedline past the upstairs apartment balcony and hoped for the best.

Sure enough, the "antenna police" were on alert—the tenant right below us heard the noise and wondered what was going on. Just as we got back to the apartment, the phone rang; it was Debbie. She told us of the complaint, told us the excuse she gave and wished us luck.

With Bev watching with great interest, I hooked up the Heath HW-8 I used as a receiver, hooked up the Tuna Tin 2, the code key and

antenna tuner, and gave the band a fast listen. Signals were booming in. On June 19, I worked my first contact with the Tuna Tin 2 from the West Coast, W6PRL/QRP. Every evening, after a day of offshore fishing, Bev and I expected to find that the antenna police had confiscated the wire, but somehow, it stayed up the whole week. By the end of the week, 45 new stations were in the Tuna Tin 2 log!

Among the Monsoons and ScQRPions

I was then asked if I would be willing to attend the ARRL Arizona State Convention at Ft Tuthill. That is an annual pilgrimage for many a QRP'er; how lucky could I get? I agreed, but warned the ARRL Division Director that I might spend a bit more time away from the ARRL booth than usual. In the meantime, I casually asked Joe Garcia, NU1Q, the W1AW station manager, if he could arrange for W1AW/7/QRP to be used at the convention. After some consultation with Dave Sumner, a new QRP "first" was in the works. In the meantime, the Arizona ScQRPions¹, an Arizona QRP club, asked me if I would give a presentation at the QRP forum they sponsor at Ft Tuthill every year. I agreed, but with one condition—they had to be willing to host W1AW/7/QRP at their booth. I would have loved to be a fly on the wall as that e-mail was read!

A great time was had by all, but W1AW/7/QRP did not go off without a hitch. An operator error (mine) damaged the receiver (the binaural receiver, designed by Rick Campbell). The local QRPers came through, though, and several receivers were made available to the operation to finish the day. Even worse, later in the day, it looked like all was lost! During a quick test of the Tuna Tin 2, one of the resistors emitted a puff of smoke, and the power went to 0 W. I had just blown up the original Tuna Tin 2!

I did a quick troubleshooting job and identified that the output transistor had short-circuited. Special thanks go to Niel Skousen, WA7SSA, who dug into his portable junkbox. (Niel is a real ham's ham! How many hams do you know who bring their junkbox to a hamfest?) He quickly located a 2N2222A. I handed him the Tuna Tin 2 and asked him if he would mind installing it. After that W1AW/7/QRP was back on the air.

After the convention, using a borrowed receiver, I took the Tuna Tin 2 on a whirlwind tour of Arizona, although I only got to operate two

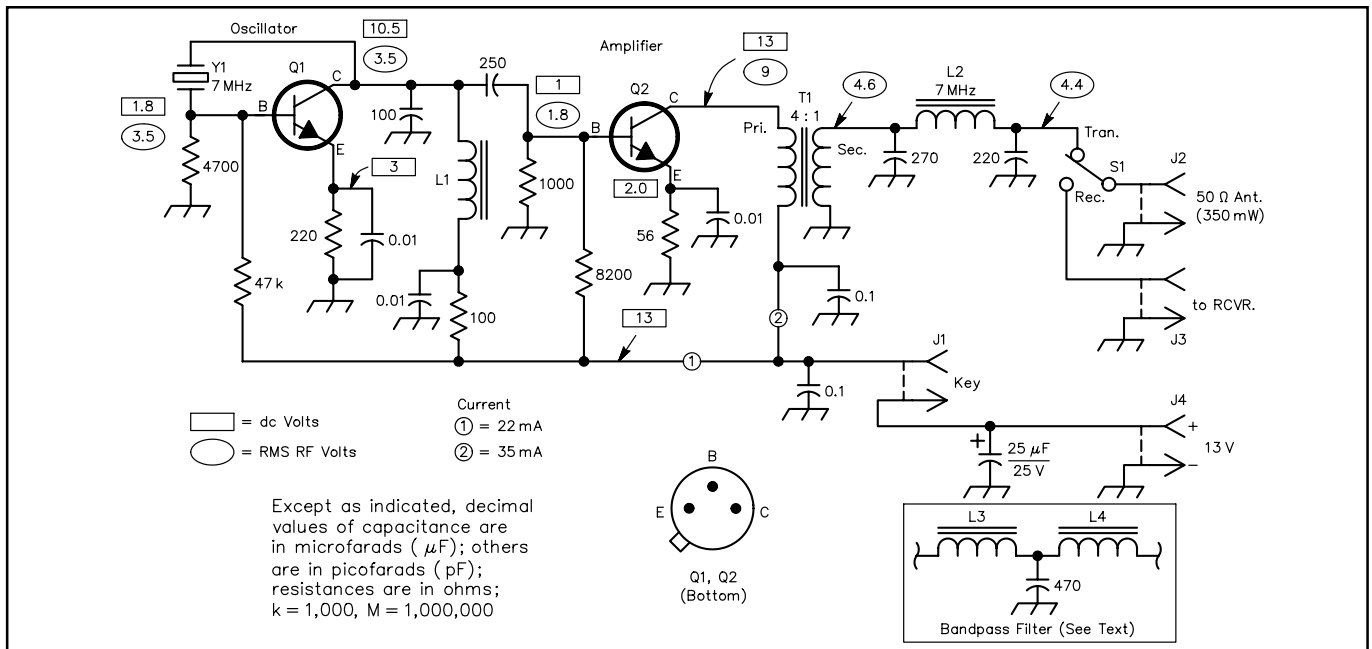


Figure 1—Schematic of the Tuna Tin 2 QRP rig. Note that the polarized capacitor shown in the schematic is an electrolytic.

J1—Single-hole-mount phono jack. Must be insulated from ground. Mounts on printed circuit board.

J2, J3, J4—Single-hole-mount phono jack. Mount on tuna tin chassis.

L1—22 μ H molded inductor

L2—19 turns of #26 wire on a T-37-2 toroidal core

L3, L4—21 turns of #24 wire on a T-37-6 toroidal core

Q1, Q2—2N2222A or equivalent NPN transistor.

S1—Antenna changeover switch. Miniature SPDT (see text).

T1—4:1 broadband transformer. 16 turns of #26 wire on the primary, 8 turns of #26 wire on the secondary, on an FT-37-43 toroidal core.

Y1—Fundamental crystal, 7 MHz.

nights from a campsite in Williams. I had brought along my DK9SQ² 33-foot portable fiberglass mast, so my antenna went up and down quickly. (Let me tell you, this is one great product. I literally put up my 40 meter inverted V in 5 minutes, 33 feet in the air. Taking it down was even faster.) It was monsoon season in Arizona and it rained each night. Despite the downpours, I doggedly squeezed in operating time in between thunderstorms, and added a few new ones to the log.

Hanging Out in the Park

Just two weeks later, I was off to Golden, Colorado for the Colorado State Convention (during which I got to show off the Tuna Tin 2 to the Colorado QRP Club³) and the trusty Tuna Tin 2 and portable mast came along with me. I scoped out the hotel area—no good. The noise level from the high-tension lines was just too high. The convention was held in a small park, so after the confab ended I walked a mile back to the hotel, loaded up the Tuna Tin 2, batteries, key, antenna and mast, and trekked back to the park. Fifteen minutes later, the antenna was standing proud and tall, and I made my first CQ. A security guard stopped by, and fearing the worst, I explained what I was doing. “Okay,” she said, and drove away. A few minutes later I had a nice surprise—Rod Cerkoney, NORC, showed up to operate with me!

The Tuna Tin 2 came back home, and I got it ready for the QRP Extravaganza Weekend (my name for it) on Halloween, with the QRP-ARCI/ARRL “Black Cat” party and the NorCal Zombie Shuffle operating event. You can read that tale in Rich Arland’s “QRP Power” column in this issue.

Are We Having Fun Yet?

Did I have fun? Do you need to ask? I guess I was just in the right place at the right time, and have been privileged to be the center of all this Tuna Tin 2 activity. What is important to me, though, is that the magic that DeMaw created in the ARRL Lab still lives. It has, in fact, it has taken on a life of its own.

The Tuna Tin 2 will be on the air on 40 meters a lot over the rest of the winter, spring and summer. You’ll hear it from W1RFI, from W1AW, and possibly some other station locations. I do have one more “special event” in the works, but I am sworn to secrecy. The Tuna Tin 2 will play a part in it. I won’t tell you what call it will use, but I will say that you will

know it when you hear it. And when you do, you will know that the magic is still alive.

I hope that lots of hams build some of the various Tuna Tin 2 replicas, and that they get a chance to work the original. I will do my best to keep it on the air. I am sure that Doug DeMaw would approve.—*W1RFI*

¹See the Arizona ScQRPions site on the Web at: <http://www.extremezone.com/~ki7mn/sqrp.htm>.

²The DK9SQ mast is available for \$99 plus \$5 shipping and handling from Kanga US, 3521 Spring Lake Dr, Findlay, OH 45840; tel 419-423-4604; kanga@bright.net; <http://www.bright.net/~kanga/kanga/>.

³Colorado QRP Club, PO Box 371883, Denver CO 80237-1883; rschneid@ix.netcom.com; <http://www.cqc.org/>.

Ed Hare, W1RFI, operating the TT2 from his sister's apartment in Los Angeles.



TT2 Performance

Keying quality with this rig was good with several kinds of crystals tried. There was no sign of chirp. Without shaping, the keying is fairly hard (good for weak-signal work), but there were no objectionable clicks heard in the station receiver. There is a temptation among some QRP experimenters to settle for a one-transistor oscillator type of rig. For academic purposes, that kind of circuit is great. But, for on-the-air use, it's better to have at least two transistors. This isolates the oscillator from the antenna, thereby reducing harmonic radiation. Furthermore, the efficiency of oscillators is considerably lower than that of an amplifier. Many of the "yoopy" QRP CW signals on our bands are products of one-transistor crystal oscillators. Signal quality should be good, regardless of the power level used.

The voltages shown in Figure 1 will be helpful in troubleshooting this rig. All dc measurements were made with a VTVM. The RF voltages were measured with an RF probe and a VTVM. The values may vary somewhat, depending on the exact characteristics of the transistors chosen. The points marked 1 and 2 (in circles) can be opened to permit insertion of a dc milliammeter. This will be useful in determining the dc input power level for each stage. Power output can be checked by means of an RF probe from J2 to ground. Measurements should be made with a 51- or 56- Ω resistor as a dummy load. For 350 mW of output, there should be $4.4 V_{rms}$ across the 56- Ω resistor.

Operating voltage for the transmitter can be obtained from nine Penlite cells connected in series (13.5 volts). For greater power reserve one can use size C or D cells wired in series. A small ac-operated 12- or 13-V regulated dc supply is suitable also, especially for home-station work.—W1FB

[Although this rig met all the Part 97 serious emission requirements when built in 1976, additional filtering is needed to meet today's rules. A bandpass filter for 40 meters is shown as an inset in Figure 1. It can be installed between S1 and the antenna jack.—W1RFI]

left-over parts from the assortments. Depending on how shrewd he is at the bargaining game, a flea-market denizen can probably put this unit together for a few bucks.

Circuit Details

A look at Figure 1 will indicate that there's nobody at home, so to speak, in the two-stage circuit. A Pierce type of crystal oscillator is used at Q1. Its output tickles the base of Q2 (lightly) with a few mW of drive power, causing Q2 to develop approximately 450 mW of dc input power as it is driven into the Class C mode. Power output was measured as 350 mW ($1/3$ W), indicating an amplifier efficiency of 70%.

The collector circuit of Q1 is not tuned to resonance at 40 meters. L1 acts as an RF

choke, and the 100-pF capacitor from the collector to ground is for feedback purposes only. Resonance is actually just below the 80-meter band. The choke value is not critical and could be as high in inductance as 1 mH, although the lower values will aid stability.

The collector impedance of Q2 is approximately 250 Ω at the power level specified. Therefore, T1 is used to step the value down to around 60 Ω (4:1 transformation) so that the pi network will contain practical values of L and C. The pi network is designed for low Q (loaded Q of 1) to assure ample bandwidth on 40 meters. This will eliminate the need for tuning controls. Since a pi network is a low-pass filter, harmonic energy is low at the transmitter output. The pi network is

designed to transform 60 to 50 Ω .

L1 is a 22- μ H molded inductor. L2 is made with 19 turns of #26 wire on a T-37-2 core. Final adjustment of this coil (L2) is done with the transmitter operating into a 50- Ω load. The coil turns are moved closer together or farther apart until maximum output is noted. The wire is then cemented in place by means of hobby glue or Q dope

T1 is made with 16 turns of #26 wire on the primary, 8 turns of #26 wire on the secondary, on an FT-37-43 ferrite core. This is good material for making broadband transformers, as very few wire turns are required for a specified amount of inductance, and the Q of the winding will be low (desirable).


Increased power can be had by making the emitter resistor of Q2 smaller in value. However, the collector current will rise if the resistor is decreased in value, and the transistor just might "go out for lunch," permanently, if too much collector current is allowed to flow. The current can be increased to 50 mA without need to worry, and this will elevate the power output to roughly 400 mW.

Construction Notes

The PC board can be cut to circular form by means of a nibbling tool or coping saw. It should be made so it just clears the inner diameter of the lip that crowns the container. The can is prepared by cutting the closed end so that $1/8$ inch of metal remains all the way around the rim. This will provide a shelf for the circuit board to rest on. After checkout is completed, the board can be soldered to the shelf at four points to hold it in place. The opposite end of the can is open.

Summary Comments

Skeptics may chortle with scorn and amusement at the pioneer outlook of QRP enthusiasts. Their lack of familiarity with low-power operating may be the basis for their disdain. Those who have worked at micropower levels know that Worked All States is possible on 40 meters with less than a watt of RF energy. From the writer's location in Connecticut, all call areas of the USA have been worked at the $1/4$ -W power plateau. It was done with only a 40-meter coax-fed dipole, sloping to ground at approximately 45° from a steel tower. Signal reports ranged from RST 449 to RST 589, depending on conditions. Of course, there were many RST 599 reports too, but they were the exception rather than the rule. The first QSO with this rig came when A1, K4DAS, of Miami answered the writer's "CQ" at 2320 UTC on 7014 kHz. An RST 569 was received, and a 20-minute ragchew ensued. The copy at K4DAS was "solid."

If you've never tried QRP before, the first step is easy. Just contact the QRP Amateur Radio Club International (QRP-ARCI), 848 Valbrook Court, Lilburn, GA 30047-4280; <http://www.qrparci.org/>. 

Fishy Excitement at the Meriden ARC

Renewed interest in the Tuna Tin 2 transceiver prompted the Meriden (Connecticut) Amateur Radio Club to build these classics as a club project. Bob Stephens, KB1CIW and Jamie Toole, N1RU secured components for 20 kits. Tim Mik, WY1U, supplied 20 cat food cans, cleaned and stripped of labels. (We had to assume that each can had, in fact, contained tuna flavor cat food. We didn't want to stray too far from the original design!) Tim also brought along his original Tuna Tin 2, which he had built as a newly licensed teenager over 20 years ago.

Several of the more experienced members were quite helpful in assisting those less knowledgeable in the arcane arts of schematic reading and toroid winding. Counting the number of turns, especially on the transformer, is not quite the simple task that it seems at first. Other tips on soldering and building in general were freely passed on from the veterans.

Honors for the first contact went to MARC president Bill Wawrzezniak, W1KKF. After finishing his rig, he brought it home, connected an antenna and almost immediately made contact with a California ham. With his new Tuna Tin 2, WY1U worked Ed Hare, W1RFI, operating the W1AW special event at ARRL HQ on Halloween. Most of the other kits were completed and put on the air over the next several weeks.

Building the Tuna Tin 2 is a terrific activity for any club. It can be completed in one or two evenings. The circuit is simple enough to provide an excellent springboard for education in electronic and RF theory without getting bogged down in too many esoteric topics. Building the kit is a great way to learn or sharpen construction skills. And, of course, there's no substitute for the pride and satisfaction of telling the station at the other end of the QSO, "RIG HR IS HMBRW TT2".—John Bee, N1GNV, QST Advertising Manager



CATS BY GIL, W1CJD

A Simple Meter Tester

Before you buy that used meter you're eyeing, use this tester to ensure it works properly!

Meters are often an important part of a wide variety of electronic construction projects, including power supplies, transmitters, receivers and test equipment. The majority of meter movements available are of the D'Arsonval type.¹ Occasionally one may see a few RF (thermocouple) movements and some movements similar to those once used as ammeters in older automobiles.² At most hamfests and antique-radio swap meets, I usually spot D'Arsonval-movement meters for sale at reasonable prices. Before I buy them, though, I subject those in which I'm interested to a few basic tests to verify they're in satisfactory electrical and mechanical condition.

Electrical tests ensure that the meter movement's armature winding isn't damaged and that the meter indicates its rated amount of dc current with reasonable accuracy. These tests also verify that the meter needle deflects freely across the meter scale without sticking. A simple mechanical test (described later) ensures that the meter's armature/needle assembly is reasonably well balanced.

A Compact Tester

Electrical tests of a meter can be carried out rapidly with the small, portable tester shown in Figure 1. This tester can evaluate meter movements with full-scale dc current ratings of 20 μ A through 100 mA and dc voltmeters with a full-scale rating of 5 V. Finally, a current-limited continuity test mode is included for checking vacuum-tube heaters (or filaments) as well as filter chokes (inductors), headphones and more.

Refer to Figure 1. The tester is powered by a 9-V alkaline battery connected to a regulator IC, U1. S2 positions 1 through 5 provide five different dc-current levels for evaluating dc microammeters and dc milliammeters. For example, with S2 in position 3, a meter with a 1-mA full-scale rating can be checked. Such a meter move-



JOE BOTTIGLIERI, AA1GW

ment would have an internal resistance of roughly 75 Ω . The 5-V source and current-limiting resistors R5 and R6 provide approximately 1 mA to this meter. For each of the first five positions of RANGE switch S2, a meter-protection diode, D1, is switched across the terminals of the meter movement under test. Position 6 of S2 enables you to choose either the 5-V TEST or CONTINUITY mode, depending on whether MODE switch S3's contacts are closed or open, respectively. The continuity-test indicator is a red LED, DS1, which draws roughly 10 mA when the test leads are shorted together. This low current will not harm fragile items such as 1.4-V-filament vacuum tubes. When the tester is not in use, place S2 in position 1 (20 μ A) and S3 in the CONTINUITY position. This minimizes current drain on the 9-V battery if S1 (TEST) is inadvertently pressed.³

To check the *mechanical* balance of a D'Arsonval movement's armature/needle assembly, I recommend the following procedure: Place the meter on a flat surface in

a horizontal position, face up. If necessary, use a small screwdriver to adjust the mechanical-zero screw to position the tip of the needle at the zero-reference mark on the meter scale. Next, place the meter in an upright position and visually recheck the position of the indicator needle. Repeat this test while rotating the meter 90° clockwise, 180° clockwise, and finally, 270° clockwise. If the meter needle remains near the zero-reference mark for all five orientations of the meter housing, the needle/armature assembly is well balanced and the meter is probably of high quality. If the meter movement fails this test, it might still be suitable for use in a piece of stationary electronics gear.

If, in the course of these various tests, the meter needle rubs against the meter scale or against the faceplate, the problem may or may not be easy to correct. If practical, remove the meter housing and try gently bending the tip end of the needle away from the meter scale (or away from the faceplate). If the meter needle sticks and

¹Notes appear on page 42.

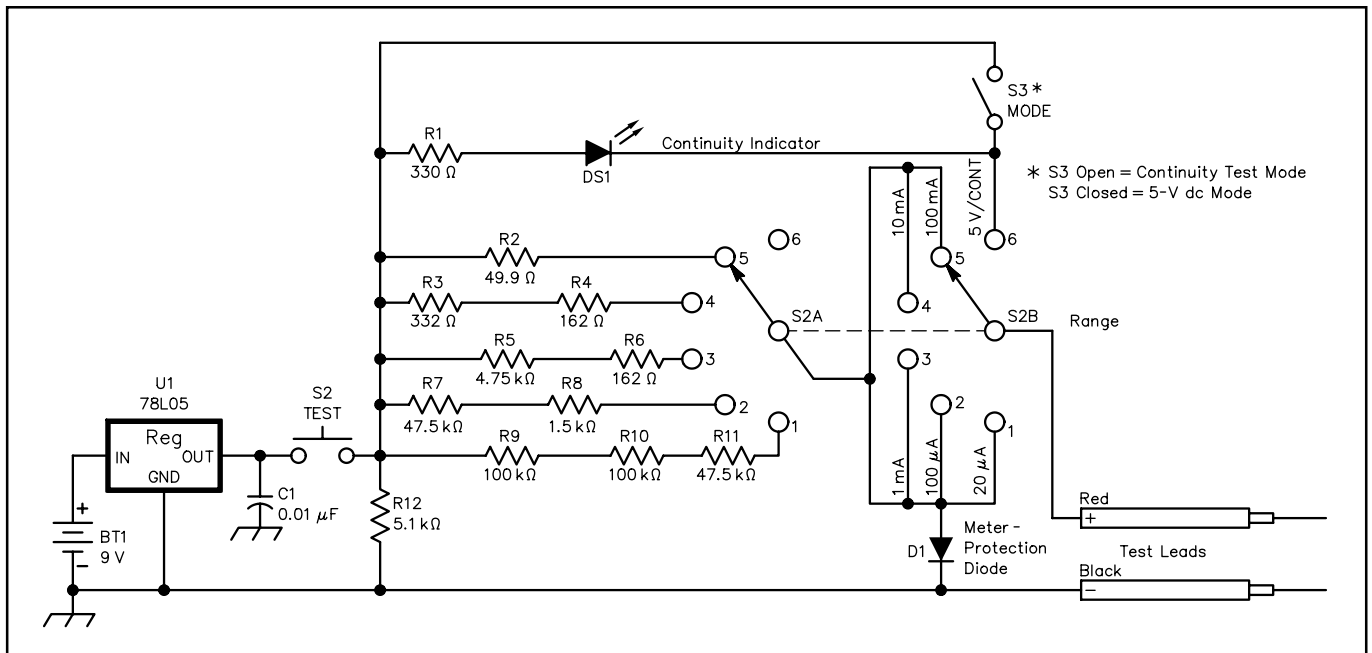


Figure 1—Schematic of the meter-movement tester. Unless otherwise specified, resistors are 1/4-W, 1%-tolerance metal-film units. For part numbers in parentheses, RS=RadioShack; CC=Concord Components, PO Box 65, Concord, NE 68728; tel 800-871-1749, fax 402-584-2615; MasterCard and Visa charge cards accepted. Equivalent parts can be substituted.

BT1—9-V alkaline battery
 D1—1N4001 (CC #1N4001; RS 276-1101)
 DS1—Red LED (CC #LED3R)
 R1—330 Ω, 5% tolerance carbon composition (CC #CC 1/4-W, 330 Ω)
 R2-R11—1% tolerance metal-film (CC #MF 1/4 W + value, eg, R2 = #MF 1/4 W 49.9)

R12—5.1 kΩ, 5% tolerance carbon composition (CC #CC 1/4 W, 5.1 kΩ)
 S1—Momentary-contact pushbutton (RS 275-1547)
 S2—DP6T rotary switch (RS 275-1386)
 S3—SPST slide switch (RS 275-406)

U1—78L05 5-V, 100-mA, or 7805 5-V 1-A positive voltage regulator (CC #7805T; RS 276-1770)
 Misc: 1×2×6-inch (HWD) enclosure (RS 270-1804), PC board or perfboard, hardware

refuses to move at some point along the meter scale, but the needle isn't rubbing against anything, try loosening the meter armature-pivot screw a fraction of a turn.

Some permanent magnets in old D'Arsonval meter movements become weaker with time. This may or may not be relevant, depending on the intended use of the meter. I have usually been able to modify meter multiplier (or shunt) resistors to compensate for this.

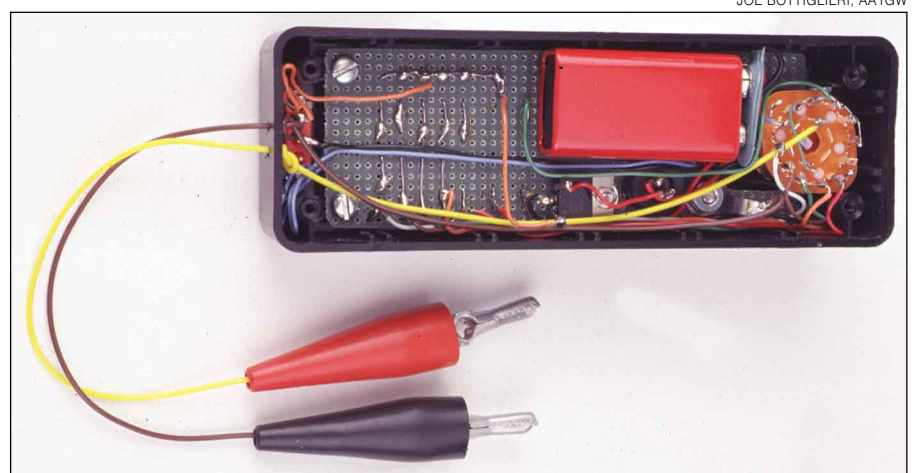
My D'Arsonval meter tester is housed in a small plastic box. All components except S1, S2, S3 and DS1, the LED, are mounted on a piece of perfboard as shown in the photograph.⁴ The resistor leads pass through holes in the perfboard and connect as shown in Figure 1. These soldered connections are visible in the photograph; the resistors themselves are hidden from view beneath the perfboard.

Summary

I have used this D'Arsonval meter tester for several years. It's paid for itself many times over by identifying defective meter movements and antique vacuum tubes with open-circuit filaments.

Notes

¹Test Procedures and Projects, *The 2000 ARRL Handbook for Radio Amateurs*, Chapter 26.



An inside view of the simple tester.

²These are likely *moving-vane* meters, recognizable by the jerky movement of the meter needle. Moving-vane meters are still being produced. For a description of this meter movement, see By Goodman, W1DX, Ed., *The Radio Amateurs Handbook*, (Newington: ARRL, 1963) p 514.—Ed.

³Because the quiescent current drain of a 78L05 will kill a 9-V alkaline battery in about a week, connect the battery only when needed; or use a LM2936 in lieu of the 78L05.—Ed.

⁴A PC board is available from FAR Circuits, 18N640 Field Ct, Dundee, IL 60118-9269, tel 847-836-9148 (voice and fax). Price: \$4 plus \$1.50 shipping for up to four boards.

Visa and MasterCard accepted with a \$3 service charge; www.ci.ais.net/farcir.

Wayne Stanley, W4RDG, was first licensed in 1950 while at radio station WREL in Lexington, Virginia. Wayne holds a BE degree in electrical engineering from Yale University and is retired from Bell Telephone Laboratories (now part of Lucent Technologies) where he was a member of the technical staff. Wayne enjoys building electronic test equipment and repairing antique radios. You can contact Wayne at PO Box 10308, Winston-Salem, NC 27108; thestanleys@mindspring.com.

A Simple 10-Meter QRP Transmitter

Take advantage of this 10-meter/QRP combo to get more miles per watt!

Now that the sunspots are back, 10 meters has again become a QRP paradise! Worldwide DX can be easily worked with this “homebrew” QRP transmitter and a simple antenna. It uses only 23 electronic parts, yet puts out nearly 4 W of good-sounding CW on 10 meters.

Circuit Description

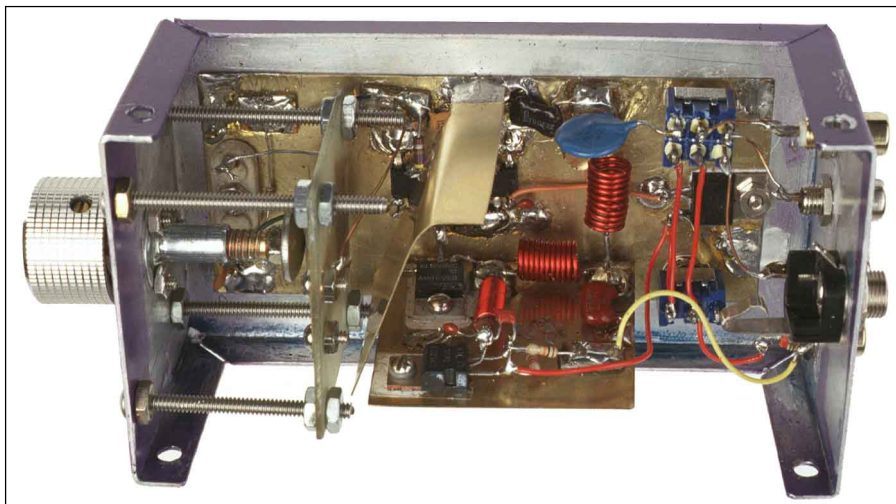
The circuit uses a 74AC240 octal inverter logic IC as a combination oscillator and driver.¹ One inverter is configured as a classical Pierce crystal oscillator. R1 improves oscillator start-up and C3 “rubberizes” the crystal, allowing a degree of frequency change. To prevent chirp, the oscillator runs continuously during transmission. Four of the 74AC240’s inverters are wired in parallel to make a very simple driver.

An inexpensive VN88AF power MOSFET is used as a keyed final amplifier. On 10 meters, this device is much easier to drive than the more-popular IRF510 used in many lower-frequency transmitters. A TIP115 keying transistor and a 7805 5-V regulator complete the lineup.²

To keep things simple, I use a TR switch to switch the antenna and mute the receiver. I mute my homebrew receiver by removing power from the audio stage. Other receivers may require a different arrangement. The **SPOT** switch, S2, allows frequency adjustment without causing interference.

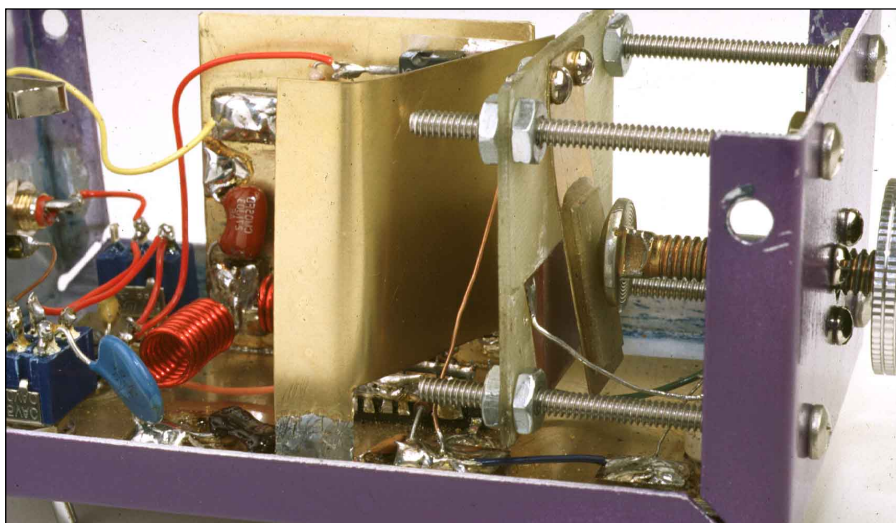
Special Parts

The oscillator *will not operate properly with overtone crystals* that are commonly used above 25 MHz. Use a *fundamental-mode* crystal with a 20-pF load capacitance; the vendor should acknowledge that this type has been shipped. With the crystal specified to operate with a 20-pF load capacitance, the minimum transmitter frequency will correspond to the value marked on the crystal can. The crystal’s maximum frequency will be about 17 kHz higher. A



PHOTOS BY JOE BOTTIGLIERI, AA1GW

This inside view of the 10-meter QRP transmitter shows hobby-shop brass put to good use. To the left is the homemade tuning capacitor, C3 of Figure 1. An angled brass shield cuts across the IC (U1 of Figure 1) that lies legs up on a piece of sheet brass; the shield separates the tuning capacitor from the rest of the transmitter. Mounted on the vertical brass strip in the background are Q1 (top) and Q2 (bottom). L1, L2 and L3 are at right angles to each other. Voltage regulator U2 lies between S1 (foreground) and S2 near the rear of the enclosure. Small pieces of PC board, glued to the sheet brass, provide for component-lead isolation and interconnection.



A close-up view of the homemade tuning capacitor, C3 of Figure 1. The 1/4-20 carriage bolt passes through the front-panel-mounted T nut and is capped with a tuning knob. The bolt’s head rests against a piece of piece of Fiberglas PC-board material (sans copper) epoxied to a flexible flap of brass acting as the rotor plate of C3. A small section of copper foil on the Fiberglas board behind the flap is C3’s stator plate (see Figure 2). The short length of bare wire from C3’s stator connects directly to one pin of the crystal socket.

¹Notes appear on page 46.

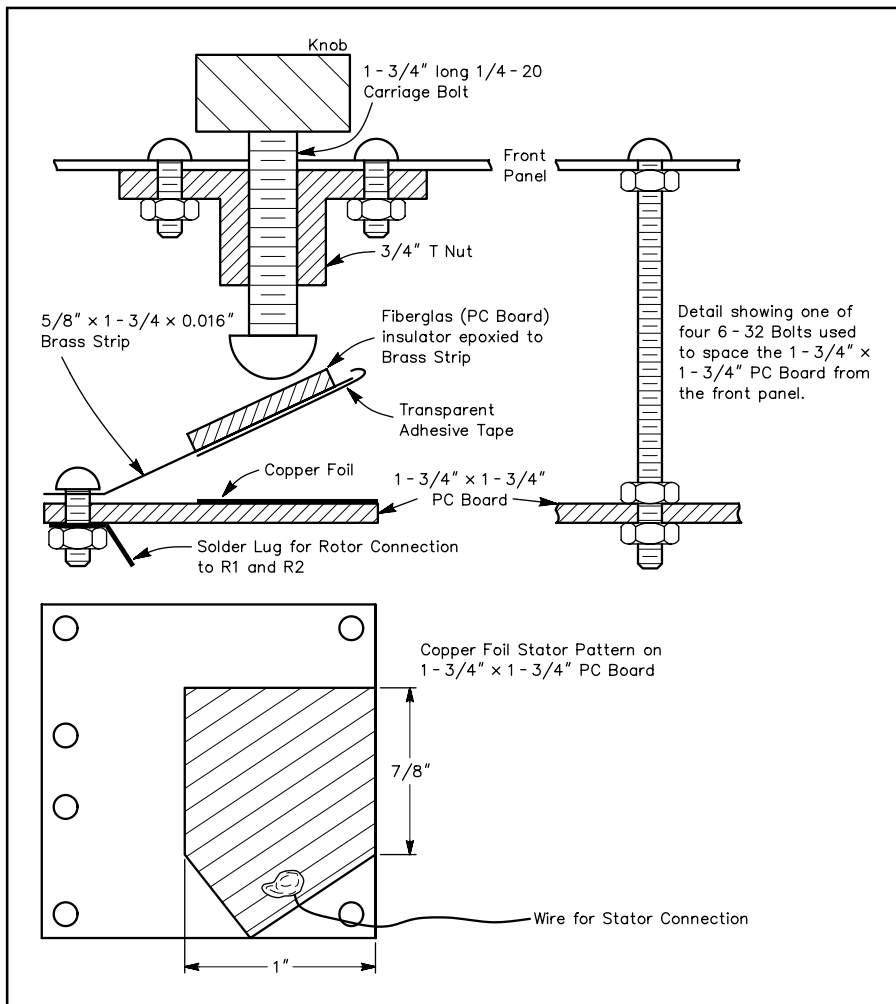


Figure 2—Mechanical assembly of C3; see text and accompanying photographs.

5/4-inch aluminum box (Radio Shack 270-238) used to house the transmitter.

Holes drilled in the top surface of the aluminum box align with matching holes in the ground plane keeping the ground-plane in contact with the aluminum box for efficient heat flow and good grounding. The homebrew capacitor is mounted on the front lip of the box; the input and output connectors are mounted on the box's rear lip.

U1, the 74AC240, is mounted "dead bug" style (ie, on its back with its legs pointing up). This minimizes several very critical lead lengths. The pin-10 ground lead and the leads of the bypass capacitor at pin 20 must be as short as possible. U1's unused pins (3, 5 and 7) are folded onto the IC's belly; the grounded pins (1, 10, 13, 15, 17 and 19) are bent downward and soldered to the ground plane. Pins 2, 4, 6, 8 and 9 are strapped together, as are pins 12, 14, 16 and 18.

Satisfactory heat-sinking is obtained by bolting Q1, Q2 and U2 to the brass groundplane. Because the tabs of Q1 and Q2 are not at ground potential, mica insu-

lators and nylon shoulder washers (RadioShack 276-1373, TO-220 mounting hardware) are needed. Because the mica insulator forms part of the capacitance used in the output filter, using a different heat-sinking technique will require output-circuit component-value changes.⁶ The 7805 voltage regulator, U2, does not require a mica insulator.

Most of the components are wired point-to-point. Five 3/8x3/8-inch pieces of PC-board material epoxied to the groundplane act as solder lands for the coils, one end of R4, and the junction of R1, R2, C2, and C3. The coils are mounted at right angles to each other to minimize coupling.

Power Supply

Although this transmitter can be powered by a standard 13.8-V supply, best performance requires 24 V. The simple, well-filtered (but unregulated) supply shown in Figure 3 is ideal. Physically separate the power supply from the transmitter to prevent pin 11 of U1 from picking up 60-Hz hum.



Here's another view of C3, this time from the top.



On the rear panel of the 10-meter transmitter, four phono jacks provide connection to the power supply (PWR), receiver (RCVR PWR and RCVR ANT) and the station antenna (ANT). A 1/4-inch KEY jack is beneath the phono connectors. The receiver/transmit (R/T) and SPOT toggle switches are at the rear of the top panel, with the crystal socket toward the enclosure's front.



Ready to go for 10-meter QRP!

Troubleshooting

This transmitter is easy to troubleshoot. It draws roughly 60 mA key up and 200 to 300 mA (depending on the supply voltage) with the key down. Check that the 7805 output is +5 V and that the collector voltage of Q1 (the TIP115) rises to about 1 V less than the supply when the key is closed. I measured 3.7 W of RF output with a 24-V

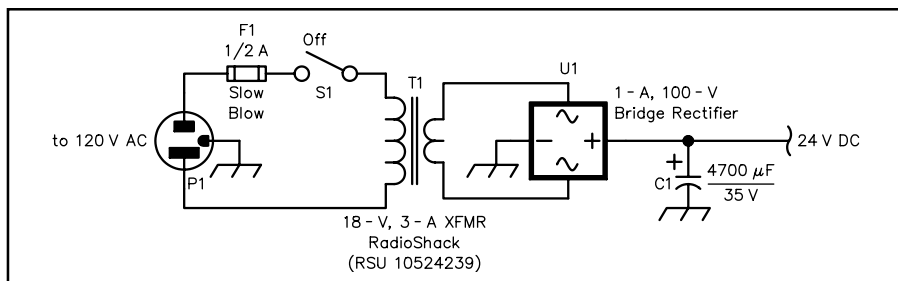


Figure 3—A simple 24-V dc power supply for the transmitter.

C1—4700-µF, 35-V electrolytic capacitor (RS 272-1022)

F1—0.5-A slow-blow fuse (RS 270-1018)

S1—SPST toggle

T1—Transformer, 120-V pri; 18-V, 3-A sec (RSU 10524239)

U1—1-A, 100-PIV bridge rectifier (RS 276-1171 [4 A])

Misc: Enclosure, hardware, fuse holder

supply and 1.5 W with a 13.8-V supply.

Initially, I detected a slight chirp at the high end of the tuning range. This was caused by stray capacitive coupling from the output circuit (Q2, the coils, filter capacitors and TR switch) to the junction of the tuning capacitor and the crystal. A grounded 2×2-inch brass shield between the output circuitry and the tuning capacitor eliminates the chirp.

C11 aids measurably in reducing backwave.⁷ Without C11, the backwave is about 40 dB down during key up. By con-

necting an 8-pF capacitor (C11) between the MOSFET gate and the ungrounded end of C7, the backwave is suppressed another 13 dB, to 53 dB down.

The MOSFET final amplifier operates as a symmetrical square-wave current source. This results in very low even-order harmonics. With a 24-V supply, the second harmonic measures -58 dBc.

Results

This transmitter was fun to build and even *more* fun to operate! The first 10 con-

tacts I had while using this transmitter and a roof-mounted groundplane antenna nabbed these prefixes: three LUs, two Ws, ZL, T22 (Tuvalu), VK, VE and FG. I'm pleased!

Notes

¹Lew Smith, N7KSB, "An Experimental 1/2-Watt CW Transmitter," *Hints and Kinks*, QST, Nov 1994, p 84.

²Lew Smith, N7KSB, "An Easy-to-Build, 15-Watt Transmitter," *Hambrew Magazine*, Spring 1994, pp 9-13.

³Most DX seems to be in the pirate-free window between 28,008 and 28,030 kHz.

⁴I used brass packaged by K&S Engineering and sold by hardware and hobby stores.

⁵No PC board is available for this project.

⁶Stray capacitance at the MOSFET drain is estimated at 90 pF and is mostly related to the heat-sink insulator and the MOSFET output capacitance.

⁷Backwave is key-up low-level RF output caused by an oscillator signal feeding through a keyed, unneutralized amplifier.

Lew Smith, N7KSB, was first licensed in 1947 at age 12. After receiving a BSEE and MSEE from MIT in 1959, he spent 33 years designing analog and analog-to-digital circuits. Lew is now retired and enjoys hiking and paragliding in addition to ham radio. He likes to chase CW DX with a variety of homebrew rigs. You can contact Lew Smith, N7KSB, 4176 N Soldier Trail, Tucson, AZ 85749. QST

GOING ONCE, GOING TWICE...

SOLICITATION FOR PRODUCT REVIEW EQUIPMENT BIDS

◇ [In order to present the most objective reviews, ARRL purchases equipment off the shelf from dealers. ARRL receives no remuneration from anyone involved with the sale or manufacture of items presented in the Product Review or New Products columns.—Ed.]

The ARRL-purchased Product Review equipment listed below is for sale to the highest bidder. Prices quoted are minimum acceptable bids, and are discounted from the purchase prices. All equipment is sold without warranty.

Astron SS-30M Switching Power Supply (see "Product Review," January 2000 *QST*). Minimum bid: \$115.

ICOM IC-R75 Communications Receiver (see "Product Review," January 2000 *QST*). Minimum bid: \$530.

ICOM PS-85 Switching Power Supply (see "Product Review," January 2000 *QST*). Minimum bid: \$180.

Kenwood CS-4125 20 MHz Dual Trace Oscilloscope (see "Product Review," December 1999 *QST*). Minimum bid: \$260.

Kenwood PS-40 Switching Power Supply (see "Product Review," January 2000 *QST*). Minimum bid: \$145.

Kenwood VC-H1 Interactive Visual Communicator S/N 00100076 (see "Product Review," December 1998 *QST*). Minimum bid: \$275.

MFJ MFJ-4225MV Switching Power Supply (see "Product Review," January 2000 *QST*). Minimum bid: \$95.

Samlex SEC 1223 Switching Power Supply (see "Product Review," January 2000 *QST*). Minimum bid: \$90.

Yaesu FP-1023 Switching Power Supply (see "Product Review," January 2000 *QST*). Minimum bid: \$125.

Yaesu FT-2600M VHF FM Mobile Transceiver (see "Product Review," December 1999 *QST*). Minimum bid: \$145.

Sealed bids must be submitted by mail and must be postmarked on or before April 1, 2000. Bids postmarked after the closing date will not be considered. Bids will be opened seven days after the closing postmark date. In the case of equal high bids, the high bid bearing the earliest postmark will be declared the successful bidder.

In your bid, clearly identify the item you are bidding on, using the manufacturer's name and model number, or other identification number, if specified. Each item requires a separate bid and envelope. Shipping charges will be paid by ARRL. Please include a daytime telephone number. The successful bidder will be advised by telephone or by mail. Once notified, confirmation from the successful bidder of intent to purchase the item must be made within two weeks. No response within this period will be interpreted as an indication of the winning bidder's refusal to complete the transaction. The next highest bidder will then have the option of purchasing the item. No other notifications will be made, and no information will be given to

anyone other than successful bidders regarding final price or identity of the successful bidder. If you include a self-addressed, stamped postcard with your bid and you are not the high bidder on that item, we will return the postcard to you when the unit has been shipped to the successful bidder.

Please send bids to Bob Boucher, Product Review Bids, ARRL, 225 Main St, Newington, CT 06111-1494. Next Going Once, Going Twice...

NEW PRODUCTS

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For additional information contact the publisher, McGraw-Hill, 11 West St, New York, NY 10011; tel 800-262-4455; fax 614-759-3644; <http://www.mcgraw-hill.com/>. \$54.95. QST

Next New Product

Local Ham Stores and the Global Economy

Although the business of Amateur Radio is quite different than that of mass-market retailers, radio has weathered its own wave of mergers, acquisitions and extinctions. And through it all, independent, service-oriented, local ham stores are still in the game. In fact, the dealers profiled here are optimistic about ham radio's ever-changing future.

Unless you've been living a sequestered life on the Mongolian Steppes, or in a Brazilian rain forest, you've no doubt seen a lot of changes in Amateur Radio—and in the business of Amateur Radio—during the last decade. There were numerous regulatory and technological changes that dramatically changed the scope of our hobby.

The year 1991 brought us a wave of codeless Technician ops who, in their own way, have managed to steer the hobby in several new directions. And who can fathom the effects of the FCC's recent Amateur Radio restructuring? We won't know too much until a few years down the road.

Technology has also had its influence. Just as tube radios went out of style in the '70s, gear made from discrete components was replaced by surface-mount integration and miniaturization in the '80s and '90s. Accordingly, prices fell sharply. In 1990, a decent, mid-grade transceiver might have cost \$2500. Today's equivalent, featuring increased performance, new technologies and a dramatically smaller footprint, sells for about \$1100. One thing's for sure—ham radio equipment and accessories have never been more affordable (in real, inflation-adjusted or even imaginary dollars).

During the past 15 years or so, dealer profit margins went from about 22% to 5-10%, making it a lot more difficult for radio retailers to survive and prosper—especially local independent shops. More than a few left the business during that period.

Retailing in general has changed thanks to low-cost telecommunications, the internet, “globalized” markets, monolithic superstores, super malls with built-in amusement parks, the proliferation of credit cards and more. Customers tend to be more price conscious (even to the point of being “price mercenaries,” the modern equivalent of people who used to merely

be “penny wise and pound foolish!).

The newest trend involves “virtual stores” that have an internet Web site on the front end and a nameless, faceless warehouse on the other (some even do without the warehouse, relying on the manufacturers and distributors to handle warehousing and shipping).

Business is business, of course, and mer-

“Candy Stores”

I got into ham radio in 1969 in Orange County, California. Our local “candy store” was Henry Radio in Anaheim. You couldn't miss it—you just headed north on Harbor Blvd toward Disneyland and kept an eye out for the antenna farm on top of the Henry store.

Back then it was still a smallish operation, but the three Henry brothers had set up stores in Anaheim and Los Angeles, California and Butler, Missouri. They sold everything for hams and you could browse the aisles of used equipment for hours or play with the latest demo equipment. You could get advice, put a rig on lay-away and order the most hard-to-find parts—especially towers!

Of course, any trip to Henry would also include a quick stop at the Heathkit store on a side street just beyond Disneyland. It kept strange hours, but the mystique of building my own rig was in my blood. I started out with an HR-10B receiver—which I messed up—that had to go to Heathkit to get straightened out.

I didn't really have any money for a transmitter, so I decided to build a one-tube transmitter from a *Popular Electronics* project. The local TV repair store (Marvav Electronics in Costa Mesa) had all of the parts. I was on the air with a major chirp.

I prowled the surplus yards for electronic devices of all kinds. Military equipment was the most attractive because it was so well made. I became very good at salvaging parts, and my junk box grew with each new acquisition. I even made a trek to San Diego to visit the Swan Radio factory at the suggestion of a radio acquaintance who found a complete radio in the trash!

A few years later, Ham Radio Outlet came along (also in Anaheim, just a few blocks from Henry). It was a small store at first; a real hole-in-the-wall. It was another resource, but Henry Radio had enveloped its next-door neighbor and had become radio heaven!

HRO has since become a superstore, and Heathkit died with a whimper some years ago. Starting a family and a business prompted me to sell my entire station in the '80s, but now that I'm living north of Boston I just picked up a RadioShack HTX-10 to play with. Now where did I pack that tuner...and where the heck is my local radio store?—*Dan Azlin, KE6PO*

chandisers are free to develop “selling solutions” that meet a variety of present and future needs. But for better or worse, these merchandising trends tend to stratify consumers into two groups: price-conscious shoppers who always seek the best deal, and service-oriented shoppers who prefer a steady, reassuring relationship with the seller.

Each has its advantages and disadvantages, and we as hams are free to buy from vendors of our choosing. For the purposes of this article, however, coming just after the beginning of Amateur Radio’s second century, we talked with three independent ham radio dealers to get a feel for how things look from their perspective. After all, it’s clear that we will always have a ham radio superstore or two, but the fate of the smaller independent shops isn’t as certain.

Because of space limitations I couldn’t contact every independent shop, so let me apologize to those I’ve missed (there are more than a few). And let me also apologize for my own preconceptions. I had assumed that most independent dealers would be struggling and “close to the edge.” Although I suspect that is the case for some, the dealers I interviewed for this article were optimistic and enthusiastic about the future.

So, without further ado, let’s check with these dealers and learn a bit about their operations, their aspirations and their unique offerings. Unabashedly, for this article at least, the spotlight is on the independents. In particular, I selected three

stores that I’ve frequented during my ham career.

Lentini Communications

Tucked away on a side street in the north end of downtown Newington, Connecticut (yes, *the* Newington, Connecticut), Lentini Communications is a family owned radio shop that features a broad line of ham, SWL, scanner, CB, FRS, and marine radios, antennas and accessories. Founded by the father of Lentini Communications president Alex Lentini in the mid ‘50s, the company started as a humble TV repair shop before branching out into commercial two-way and marine radios.

“We moved to our present building in 1976,” said Alex, “and we really got our momentum from the CB boom from 1975 to 1985. It wasn’t until 1988 or so that we really started carrying the ham radio and shortwave listening products that we sell today.” Alex, N1EBU, was first licensed in 1985.

Although Lentini Communications draws local customers from all over New England (and more than a few visitors to ARRL HQ, which is located about a mile to the north), the store branched out in the late ‘80s, installed an 800 line and began selling radios and scanners via ads in ham and SWL magazines.

“I don’t know if that was necessarily a make or break move,” said Alex, “but I’m a realist. Lentini Communications has survived by taking advantage of new markets as they emerge, and by maintaining a di-

verse product line that still includes commercial two-way, scanners, CBs and even marine radios.”

Like most independents, Lentini strives for superior customer service. When a customer stops by to pick up a mobile antenna, for example, Lentini staffers might bring out five or six antennas and various mounts to really show the customer exactly where and how a mobile antenna might be mounted to a specific vehicle. And when the choice is made, the antenna can be tuned and installed on the spot.

“You can’t get that kind of personalized service from a catalog,” says Alex. “We prefer to give our customers that ‘hands on’ experience in choosing radios, parts and accessories.”

During my years at ARRL HQ (88-94) I visited “Lentini’s,” as the locals know it, on many occasions. I clearly remember the cordial atmosphere, the rack of used radios and the service tech that actually repaired modern rigs. And although the company doesn’t handle warranty service, that tech is still there (maybe it’s a different person) handling routine repairs and upgrades.

And when I needed to photograph a certain radio or use a special radio as a photographic prop, a quick trip to Lentini’s usually saved the day. Who knows how many radios that showed up in *QST* actually came from a box at the ham store down the street?

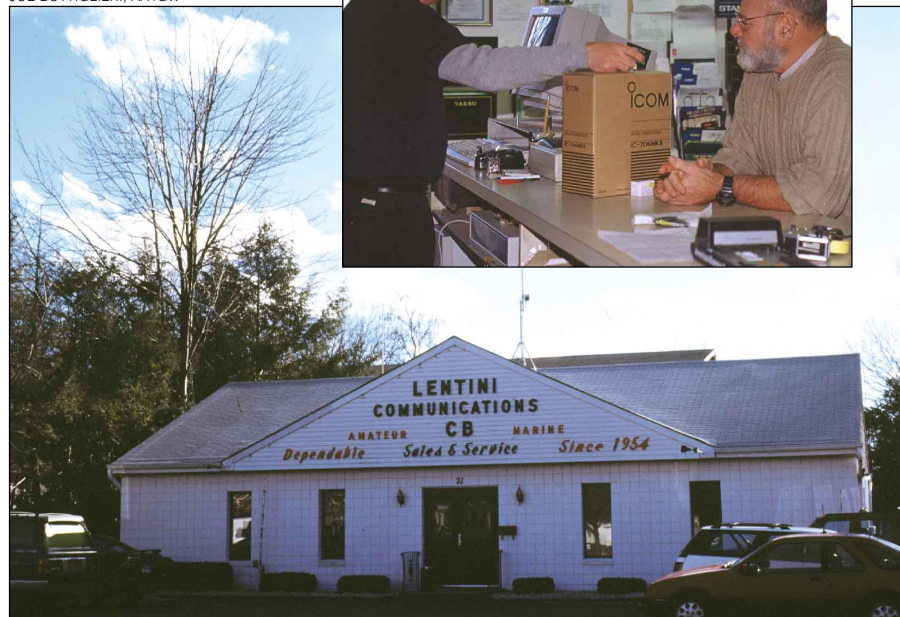
You can contact Lentini Communications, 21 Garfield St, Newington, CT 06111, at 800-666-0908, or you can point your Web browser to <http://www.lentini-comm.com/>.

Alex Lentini, N1EBU (left), wraps up a sale.

JOE BOTTIGLIERI, AA1GW



JOE BOTTIGLIERI, AA1GW



Lentini Communications in downtown Newington, Connecticut

Burghardt Amateur Center

A mainstay in the upper Midwest since its founding way back in 1937, Burghardt Amateur Center, affectionately known as “Burghardt’s,” is a hometown ham store that’s grown an impressive reputation for customer service—and grown to an impressive size.

There’s hardly an active ham in the upper Midwest that hasn’t made at least one pilgrimage to the Watertown, South Dakota, ham store. Upon arrival, visitors discover that Burghardt’s, perennially thought of as a friendly little ham store on the prairie, is actually a friendly sales and service powerhouse on the prairie!

With five full-time service technicians providing warranty service for all major brands, an on-site engineering department and more than \$100,000 in lovingly refurbished *used radios* in stock, Burghardt’s has certainly outgrown its beginnings, however humble.

According to company President Jim Smith, W0MJY, regardless of its present bustle, Burghardt’s success was built one customer at a time with lavish attention to service, service and service. As a bench-



Burghardt HQ in Watertown, South Dakota.



Burghardt president Jim Smith, W0MJY.

mark, the company's typical turnaround time on repairs is between five and 10 days.

"We must take care of what we sell," says Jim, "and we must take care of every single customer—even if we occasionally lose money in the process of making things right."

The company's devotion to customer service was instilled by founder Stan Burghardt, W0IT. After several unsuccessful "retirements," Stan, now 90, comes to work every business day.

You can reach Stan, Jim and the rest of the Burghardt's staff at 710 10th St SW, Watertown, SD 57201; tel 800-927-4261. The company Web site is at <http://www.burghardt-amateur.com>. Trade-ins are welcomed and encouraged.

Radio City

Located in a northern suburb and serving the twin cities of Minneapolis and St. Paul, Radio City carries a wide variety of ham, SWL and hobbyist equipment, books and accessories, including an excellent selection of used gear at reasonable Midwest prices.

Proprietors Dan, KB0XC, and Maline Fish run a customer friendly shop that includes two service techs (in-house warranty repairs on major brands) and a couple of twists. One is the shop's inventory of telescopes and astronomy stuff. The other is the store's tight focus on local sales.

"The astronomy stuff makes up about 20% of our sales and balances some of our seasonal variations, and our loyal local customer base does the rest," says Dan.

The two like to keep mail order sales limited to about 20% of the store's sales volume. "Beyond that," says Dan, "we can't provide the kind of service we'd like to our local customers." In addition, Dan and Maline find that astronomy and ham radio are quite compatible and have many cross-over benefits.

After nearly 20 years in the electronics business, Dan is especially thankful for a local customer base that he considers "extra loyal." Maybe it's a Minnesota thing... Whatever the reason, even during these somewhat trying, transitional times in the amateur world, Radio City is shifting more of its focus toward local sales and service. "For us," Dan says, "it's the right thing to do."

Like Burghardt's, Radio City encourages trades and has a bunch of clean used gear on hand at all times. This was definitely to my advantage about a year ago. I made my first trek there on a cold winter day, and as I walked a slow circuit of the store's new offerings, I was delighted to find a large selection of used radios and accessories.

Sitting near the right side of the upper shelf was a radio that—as a longtime QRP op—was near and dear to my heart: a mint

Kenwood TS-130V. In English, that's the low-power version of Kenwood's TS-130. Common in Japan but rare in the states, this one was sparkling clean and priced way below its ultimate "QRP enthusiast value."

Without hesitation I reached for my "mad money" and purchased the radio (and a hunk of 450-ohm open-wire line) straight away. Ask anyone who knows me and they'll tell you how rare an event that was!

I used that perky little Kenwood for almost a year until someone made me an offer I couldn't refuse—an offer on the high side of the previously mentioned "QRP enthusiast value." The funny thing was, when he sold it to me, Dan predicted the radio's eventual fate. Oh well, I guess it's time for a return trip to Radio City!

You can contact Radio City at 800-426-2891, 612-786-4475, or you can point your Web browser to <http://www.radioinc.com>.

A Look to the Future


All of the ham radio retailers I talked to were optimistic about the future, each in their own way. All cited the timeliness of diversification as a hedge against lean times, and all were hoping for the best regarding the FCC's recent Amateur Radio restructuring.

A few sore spots emerged, however.

Dan Fish sees a need for better behavior, more Elmering, increased acceptance of ham radio's need to change and adapt among existing hams, and a shot in the arm for Amateur Radio camaraderie in general.

Jim Smith sees a critical need for the federal government to put "some definitive teeth" into the fight against the unreasonable local restriction of ham antennas and towers in urban and heavily zoned/restricted areas. As Jim points out, these zoning nightmares are spreading from urban to rural areas at an alarming pace. He says it recently took concerted action to head off just such a zoning disaster in sleepy Watertown, South Dakota—Burghardt Amateur Center's home turf.

Let's welcome change. Let's embrace the Internet. And let's greet the new century with gusto. Whatever changes are in store, if these radio sellers are any indication, we'll have hometown, independent radio stores for years to come.

You can contact the author at 16928 Grove St, Little Falls, MN 56345; kirk@cloudnet.com. 

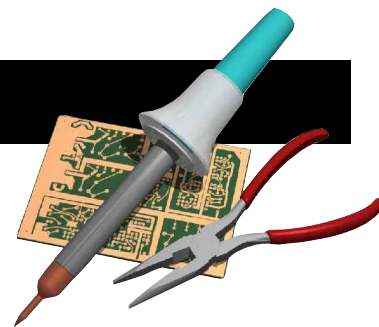


Dan Fish, KB0XC, puts the finishing touches on an Amateur Radio license classroom at Radio City.



Radio City co-owner Maline Fish and Josh, one of their service technicians.





The Doctor is IN

QI have a remote-controlled antenna tuner installed at the feed point of a vertical antenna in my back yard. Although the system works pretty well most of the time, the tuner will occasionally “open” (switch to a direct connection to the antenna) for no apparent reason. This seems to only happen on particular bands. Do you know of a cure?

A Since the problem occurs only when you operate on certain bands, I suspect that RF is getting into the tuner control lines. If RF finds its way into the lines, it could easily wreak havoc with the tuner’s microprocessor circuitry and cause it to exhibit strange behavior, such as switching to the direct-connect mode.

If you can obtain enough slack in the control lines where they enter the tuner, wrap them several times through an FT-43 or FT-77 ferrite core. This may sufficiently suppress the RF at the tuner.

Update: Thanks Doc! I used an FT-43 core and that did the trick. I just wrapped about 10 turns through the core and now the tuner behaves itself.

QI live in western Montana and I was told that I could use the “Evergreen Intertie” to talk to hams all over the northwest with just my H-T. That sounds great, but what is the Evergreen Intertie?

AThe Evergreen Intertie is a linked repeater system that covers much of the Pacific Northwest. The Intertie is composed of about 24 VHF and UHF repeaters. Each repeater is connected to a backbone made up of both radio and non-radio links. One backbone connects northwest Oregon to Seattle, while another connects Seattle to points east. The system configuration changes constantly as repeaters are added or removed. See Figure 1.

In a linked repeater network you can indeed use an H-T to span substantial distances. DTMF (TouchTone) codes are often used to access the system. That’s how you go about linking your signal to distant points. These DTMF codes are usually provided by the clubs that maintain the various parts of the network, so it is a good idea to seek out a participating club and join. You’ll find more information about the Evergreen Intertie on the Web at <http://www.lloydio.com/evergreen.html>.

QMy station computer makes a terrible noise when I first turn it on. It is a loud screeching and grinding sound. It stops after about 2 or 3 minutes, but I notice that it can reappear on winter days when the temperature in the shack dips below 50°. I suspect the power supply fan, but I’m not sure. Any ideas?

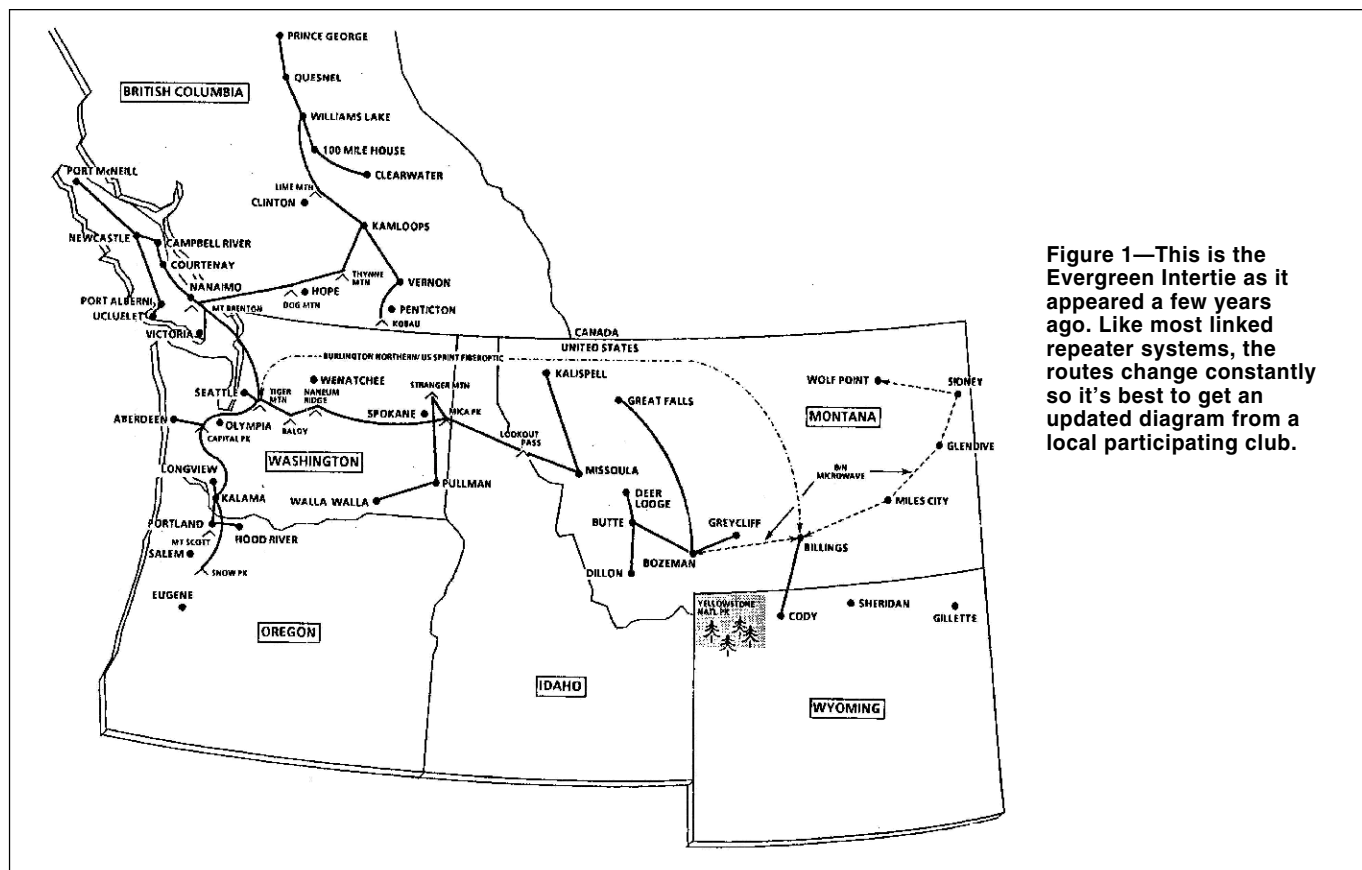


Figure 1—This is the Evergreen Intertie as it appeared a few years ago. Like most linked repeater systems, the routes change constantly so it’s best to get an updated diagram from a local participating club.

A A defective bearing in the power supply fan is usually the cause of the noise you've described. There may also be a tiny fan on your CPU, but it is usually silent.

Not only is the fan noise annoying, it is a harbinger of danger for your computer. Some computer manufacturers cut corners by installing low-cost power supplies. These power supplies are assembled with the cheapest components possible, including poor-quality cooling fans. The Doc's suggestion is that you replace your power supply as soon as possible. Don't wait for the fan to fail outright. The supply could overheat and break down catastrophically, sending a voltage surge directly into the motherboard and other components. You can pick up a good-quality 250-W supply for about \$50, and they are relatively easy to install.

Q W. J. Stanley, W4RDG, asks, "My friends and I have been trying to apply crackle-finish paint to aluminum and steel panels, but with unsatisfactory results. Do you know of any method for producing a high-quality crackle-paint finish that does not require the use of expensive equipment?"

A Getting a good crackle finish is a two-step process with an interesting twist:

(1) Spray with metal with a thin coating of zinc chromate primer. Apply the yellowish primer in an almost transparent layer and allow it to dry for at least an hour.

(2) Buy or borrow an infrared heat lamp for the next step. Spray on the crackle-finish paint, following the instructions on the can. Position the lamp about 2 feet from the painted surface and apply heat for 2 to 3 minutes. The paint should start to crinkle right before your eyes. Be careful not to overheat the metal, though.

This technique takes some practice to perfect. I'd suggest that you experiment on metal scraps until you get the hang of it.

Q At a recent estate sale I picked up a Daiwa CNA-2002 automatic antenna tuner. Unfortunately, there was no documentation whatsoever. Can you tell me anything about this unit?

A Daiwa manufactured the CNA-2002 in the early '80s. It is the higher-powered cousin of the CNA-1001, which was reviewed in the November 1981 *QST*.

These units were among the first automatic HF antenna tuners designed for amateur use. The CNA-2002's tuning function was limited, though. You had to select the band manually, then apply 10 W or less while briefly pressing the **TUNE** button on the front panel. When the button was pressed, the control circuitry in the CNA-2002 would activate a dc motor and a system of gears to rotate two small variable capacitors. The SWR sensing circuits would trigger when the SWR dipped below about 2:1, abruptly stopping the motor. At that point you could accept settings the tuner "found" for you, or use the **FINE TUNING** control to reduce the SWR even further. The idea was to diminish the tedium of operating an antenna tuner.

The CNA-2002 was rated for 1.5 kW, but that was a PEP rating, not continuous power. The small, encapsulated variable capacitors had a tendency to arc at 100% duty cycle power levels greater than 500 W.

Q Trey, WL7BG, asks, "What kind of simplex range would an average 2-meter mobile enjoy in a mountainous area like south central Alaska?"

A That is a difficult question to answer because it depends on the nature of the terrain, which can change from moment to moment as you drive. Keep in mind that 2 meters is, for FM applications, a line-of-sight band. Barring atmospheric conditions, or reflections, if you are in a deep valley surrounded on mountains, you'll be limited to communicating within the immediate area of the valley—period. If you are in a long, straight valley you could realize a range of 10 to 20 miles depending on the antenna location of the other station. Of course, if you're on

top of a ridge or mountain, you could enjoy distances up to a hundred miles or more.

Q I know that the ARRL Contest Branch is checking logs very carefully these days. My question, however, is what happens when I work someone in a contest and that person doesn't turn in a log? Will the log checkers throw out that contact?

A No. The contacts in your log are only matched against contacts in logs actually received. The Contest Branch is well aware of the fact that many hams participate in contests, yet do not turn in logs. For example, Sweepstakes is an excellent contest if you are hunting for new states to complete your Worked All States award. You could probably work all 50 states during Sweepstakes by just pouncing on the stations you need—and never turning in a log after the contest.

On the other hand, if your contest log contains a high number of contacts with stations that apparently did not turn in logs, it might raise a red flag. The Contest Branch may opt to "spot check" your log. This would involve contacting some of the stations to verify that they really worked you.


Q Brian, KA7KUZ, asks, "I am going to tour Australia. I know they use 220-V systems and all of my ham gear is 110 V. Do you know if the Australians also use 60 Hz for their ac mains? I can switch my rigs to run on 220 V, but I'm concerned about the frequency."

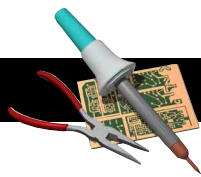
A Australia uses 220 V at 50 Hz. The 50-Hz power should not be a problem. Your power supplies may run a little hotter, but not dangerously so. And if you have difficulty converting your gear to 220 V, there are transformers available that will step 220 V down to 110 V. They are available from 50 to several hundred watts.

Q My friend and I picked up an ancient General Electric "Prog" line FM mobile transceiver that we are going to convert to 2 meters and use as a base rig. Although the radio apparently operates on 12 V, it is full of vacuum tubes. I assume that it must convert the 12 V to higher voltages in some fashion, but that would involve changing the 12 V dc to ac before it could be stepped up by a transformer. We don't have a schematic diagram yet, so I am mystified about how the transceiver manages this trick. Can you enlighten us?

A The GE rigs, and quite a few other mobile radios of that era, relied on ingenious devices called *vibrators*. A vibrator is essentially an electromechanical switch. The switch opens and closes many times per second, making and breaking the 12-V dc line. By doing so, the vibrator creates pulsating dc with a voltage that rises and falls rapidly. This isn't ac, but it is close enough to be fed to the primary winding of a transformer. The transformer responds to the pulsating dc just as it does with ac. As the dc voltage rises and falls, alternately expanding and collapsing electromagnetic fields form around the primary and induce higher voltages in the secondary windings, depending on the winding ratio, of course. Just pass the pulsating secondary voltage through a rectifier and filter and you have (drum roll, please) high-voltage dc for your vacuum tubes.

Vibrators tended to wear out (they also made quite a racket!), so they were designed to be easily replaceable. Look for a metal cylinder a few inches high and about an inch across. You'll probably find that you can easily remove the vibrator from its chassis socket. The trick is finding a replacement if you need one. Fortunately, you can find so-called "solid state vibrators" (the switching is done with transistors) at Antique Electronic Supply on the Web at: <http://www.tubesandmore.com/>.

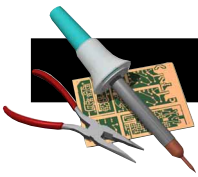
Do you have a question or a problem? Ask the doctor! Send your questions (no telephone calls, please) to: "The Doctor," ARRL, 225 Main St, Newington, CT 06111; doctor@arrrl.org. 



THE HELP DESK

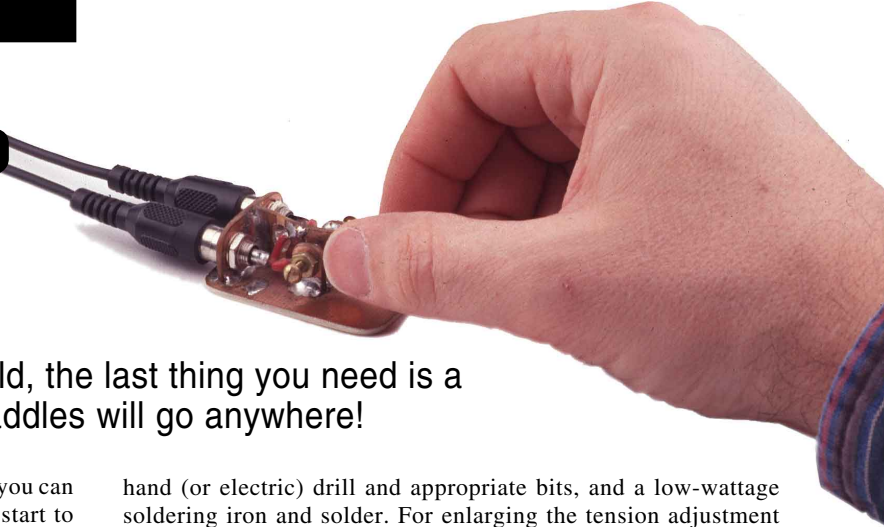
Schematic Symbols

<p>RESISTORS</p> <p>FIXED: VARIABLE: PHOTO: </p> <p>ADJUSTABLE: TAPPED: THERMISTOR: </p>			<p>CAPACITORS</p> <p>FIXED: NON-POLARIZED: SPLIT-STATOR: </p> <p>ELECTROLYTIC: VARIABLE: FEED-THROUGH: </p>			<p>INDUCTORS</p> <p>AIR-CORE: IRON-CORE: FERRITE-BEAD: </p> <p>ADJUSTABLE: OR: TAPPED: </p> <p>PHASING: </p> <p>METERS</p> <p> * = V, mV, A, mA, μA</p>			
<p>WIRING</p> <p>CONDUCTORS NOT JOINED: CONDUCTORS JOINED: SHIELDED WIRE OR COAXIAL CABLE: </p> <p>TERMINAL: ADDRESS OR DATA BUS: MULTIPLE CONDUCTOR CABLE: </p>			<p>SWITCHES</p> <p>SPST: SPDT: NORMALLY OPEN: </p> <p>TOGGLE: NORMALLY CLOSED: </p> <p>MULTIPOINT: MOMENTARY: THERMAL: </p>			<p>BATTERIES</p> <p>SINGLE CELL: MULTI CELL: </p> <p>GROUNDS</p> <p>CHASSIS: EARTH: A-ANALOG D-DIGITAL: </p>			
<p>DIODES (D#)</p> <p>LED (DS#): VOLTAGE VARIABLE CAPACITOR: THYRISTOR (SCR): </p> <p>DIODE/RECTIFIER: BRIDGE RECTIFIER: (U#)</p> <p>ZENER: SCHOTTKY: TUNNEL: TRIAC: (T)</p>				<p>TRANSFORMERS</p> <p>AIR CORE: ADJUSTABLE INDUCTANCE: ADJUSTABLE COUPLING: </p> <p>WITH CORE: WITH LINK: </p> <p>3-PIN CERAMIC RESONATOR: </p>			<p>MISCELLANEOUS</p> <p>ANTENNA: FUSE: </p> <p>QUARTZ CRYSTAL: HAND KEY: </p> <p>MOTOR: ASSEMBLY OR MODULE (OTHER THAN IC): (Z)</p>		
<p>TRANSISTORS</p> <p>PNP: P-CHANNEL: P-CHANNEL: P-CHANNEL: P-CHANNEL: P-CHANNEL: </p> <p>NPN: N-CHANNEL: N-CHANNEL: N-CHANNEL: N-CHANNEL: N-CHANNEL: </p> <p>BIPOLAR: UJT: JUNCTION FET: SINGLE-GATE: DUAL-GATE: SINGLE-GATE: </p> <p>DEPLETION MODE MOSFET: ENHANCEMENT MODE MOSFET: </p>						<p>LOGIC (U#)</p> <p>AND: NAND: </p> <p>OR: NOR: </p> <p>XOR: INVERT: </p> <p>SCHMITT: OTHER: </p>			
<p>RELAYS</p> <p>SPST: SPDT: DPDT: </p> <p>THERMAL: </p>			<p>INTEGRATED CIRCUITS (U#)</p> <p>GENERAL AMPLIFIER: OTHER: </p> <p>OP AMP: </p>			<p>CONNECTORS</p> <p>COMMON CONNECTIONS: LABEL: </p> <p>PHONE JACK: PHONE PLUG: </p> <p>CONTACTS: MALE: FEMALE: </p> <p>COAXIAL CONNECTORS: FEMALE: MALE: </p> <p>MULTIPLE, MOVABLE: MULTIPLE, FIXED: </p> <p>240 V FEMALE: GROUND: </p> <p>FEMALE: MALE: CHASSIS-MOUNT: </p> <p>HOT 120 V: NEUT: GND: </p>			
<p>TUBES (V#)</p> <p>TRIODE: PENTODE: CRT: </p> <p>INCANDESCENT LAMPS: NEON (AC) LAMPS: </p>			<p>TUBE ELEMENTS</p> <p>ANODE: HEATER OR FILAMENT: </p> <p>GRID: GAS FILLED: </p> <p>CATHODE: COLD CATHODE: </p> <p>DEFLECTION PLATES: </p>						



By Wayne McFee, NB6M

The NB6M QRP Paddles



When you're operating QRP in the field, the last thing you need is a cumbersome key. These Lilliputian paddles will go anywhere!

The best part about these tiny CW paddles is that you can make them yourself in just a couple of hours, start to finish. They are made from readily available materials, and cost almost nothing to build.

All you need are some scraps of double-sided PC board material, a piece of single-sided PC board material for the base (measuring $1\frac{7}{16} \times 2$ inches), two optional phono jacks, two short pieces of hookup wire, four 4-40 brass nuts, and two 4-40 $\times \frac{1}{2}$ -inch long steel screws. One more 4-40 steel screw, one inch long, is used to position the adjustment screw supports for soldering, and is then put back in the junk box.

The base could be made out of double-sided PC board, if you want. The phono jacks are optional, because you could very well just solder the wires of the connecting three wire cable directly to the paddle set, which is what I did when I made my first one.

Let's Get Started

The tools you will need for this project are: a hack saw (just the blade will do), a file for rounding and smoothing edges, a small

hand (or electric) drill and appropriate bits, and a low-wattage soldering iron and solder. For enlarging the tension adjustment hole in the paddle, you can use a tapered reamer (available from RadioShack) or a small rat-tail file.

Using the Figure 1 and the accompanying photographs as guides, first cut out and shape the five parts made from PC board material. It will be far easier to drill the holes for phono jacks in the rear frame, the initial hole for tension adjustment in the paddle, and the holes for adjustment screws *before* cutting the relatively small pieces from the board. First, outline their shapes in the material, drill the appropriate holes, and then cut the pieces from the board. Now use the file to round corners and smooth the edges of the pieces.

I soldered one 4-40 brass nut to one side of each of the adjustment screw supports, in order to provide the threads for the screws to fit into. You could simply drill and tap (with a 4-40 tap available at any hardware store) the PC board material and use just the lock nuts. However, in the interest of strength and durability, I recommend soldering a nut to each support.

Note that the copper foil is cut in two places on each side of the

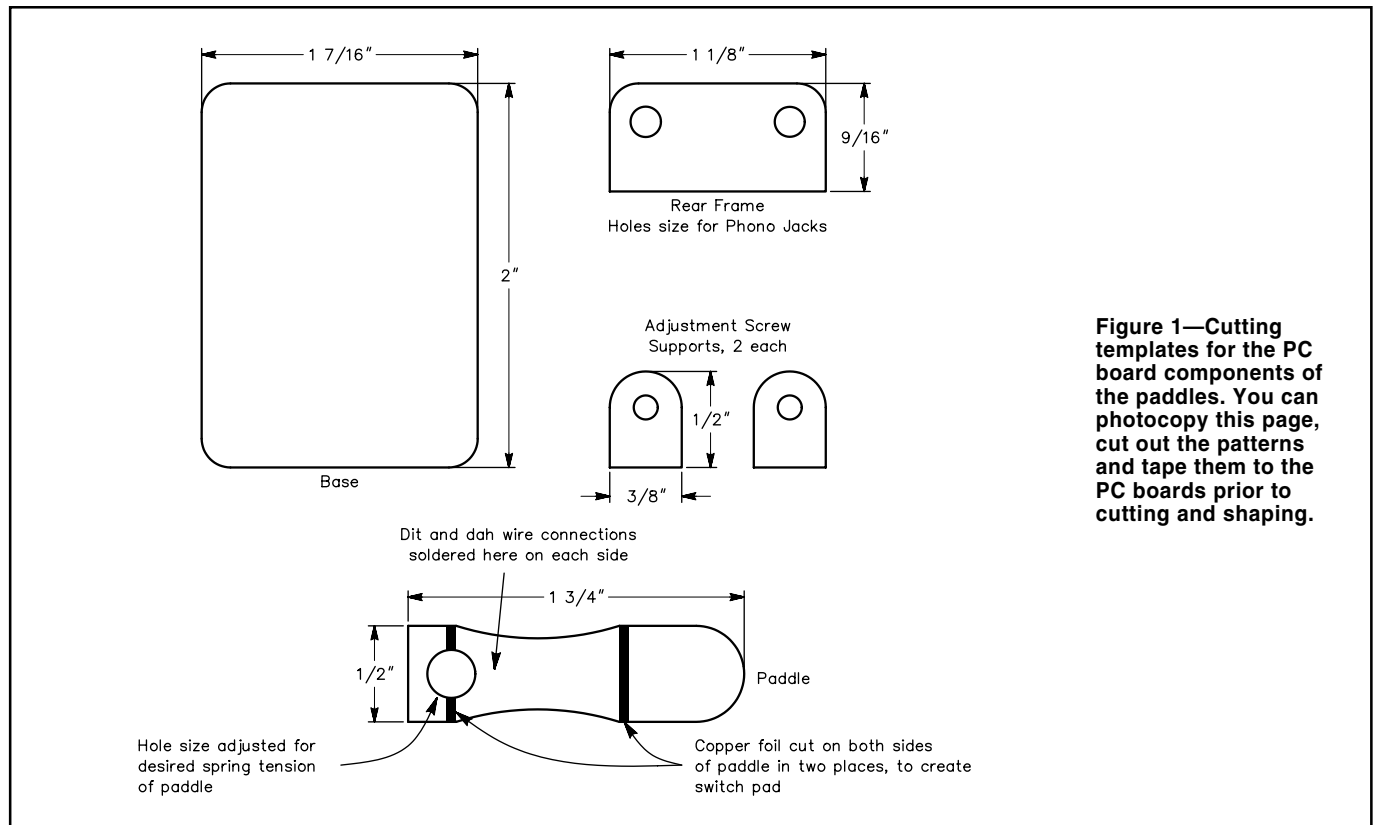


Figure 1—Cutting templates for the PC board components of the paddles. You can photocopy this page, cut out the patterns and tape them to the PC boards prior to cutting and shaping.

paddle. This can be done with either the edge of a small file or with a hacksaw. Cut just enough to be sure you have separated the copper foil nicely. What you are doing is creating the switch contact pads for the *dit* and *dah* sides of the paddle. It is necessary to cut the foil in two places on each side of the paddle, as shown in the drawings, so that static electricity and other stray electrical currents from your skin won't cause erratic keying.

The tension adjustment hole in the paddle is enlarged (thereby removing material from the paddle itself) to provide whatever spring tension you desire. This is done before the phono jacks and connecting wires to the switch pads are installed, and *after* the paddle set itself is soldered together and the adjustment screws are installed and adjusted for whatever switch gap feels good to you. So, initially, cut about a 1/8-inch hole.

Assemble the Paddles

First, set the rear frame in place, centered and about a quarter inch in from one end of the base, and tack solder one lower edge of the rear frame to the base. Check visually for proper placement and make sure that the rear frame is perpendicular to the base. Heat the solder tack, move the rear frame as necessary with a finger, and let the solder tack cool. Then tack the other side before running a bead of solder all along each lower side of the rear frame.

When you are running a bead of solder between two surfaces which are at 90° angles, the trick is to prop the unit up so that the two surfaces form a V, with the apex at the bottom and the two sides about 45° from the vertical. This way, the melted solder will run along both sides of the joint, and form a strong, nice-looking connection.

Next, solder one 4-40 nut to one side of each adjustment screw support. The trick to doing this is to screw the nut onto a screw, put the end of the screw through the hole in the support, rest the support in a horizontal position, heat the nut and its adjoining copper foil, and wick the solder underneath the nut. Once the nut has been soldered in place, and the unit has cooled, simply unscrew the screw from the nut, and do the same operation on the other support.

Position the two adjustment screw supports on the paddle base and solder them into place. The trick to positioning them is to screw the one-inch long 4-40 brass screw through both supports, leaving about 3/8 inch between the two soldered-on nuts, which should be on the inside of each support, facing each other. Use the paddle as a guide to how far away from the rear frame to position the supports. The front edge of the supports should be about even with the foil cuts separating the finger-contact portions of the paddle from the switch pads. The far end of the paddle, with the tension hole in it, will butt up against the rear frame, and *after* the adjustment screw supports are soldered in place and the one-inch screw removed, it will be installed permanently.

The adjustment screw supports should be soldered along both lower sides of each support. Again, tack solder one side, then the other, and then run a bead of solder along the lower edge of each. This will ensure that they don't move during the soldering process.

Next, remove the one inch screw from the adjustment screw supports, install the two lock nuts, one on each screw, running the lock nuts right up to the screw heads, and screw the adjustment screws into their respective supports. Leave enough space between the two to fit the paddle between them.

Place the paddle in position between the two adjustment screws and butted up against the rear frame. The lower edge of the paddle should be at least 1/16-inch above the surface of the base.

Finger tighten the two adjustment screws against the paddle, which will hold the paddle pretty well in position while you then tack solder each side of the paddle against the rear frame. Run a bead of solder along the edge of each side of the paddle where it butts against the rear frame.

Now loosen the two adjustment screws slightly and adjust them for whatever switch gap feels good to you. Tighten the lock nuts to maintain that gap.



Top view of the NB6M paddles.



Side view. Notice how the copper foil has been cut to create a switch pad.

Before installing the two phono jacks and the two short pieces of hookup wire that connect from the center of each to their respective switch pads, open up the tension adjustment hole as desired. Remove material a little at a time until you have whatever paddle spring tension feels good to you. Remember that you can always remove more material. It is hard to put it back.

When you have the paddle spring tension set to your liking, install the two phono jacks and solder the two short pieces of hookup wire to the center connections of each and to their respective switch pads. Remember to leave a small amount of slack in each wire so that the paddle can move easily.

Hooking It Up

You will need a three wire cable (or two shielded audio cables with a stereo miniature phone plug installed on one end and two phono plugs on the other) to run from the paddle set to your keyer or rig. For my own installation I used a pair of shielded audio cables. I cut the phono plugs from one end of each and installed a stereo miniature phone plug, soldering the shield of each audio cable to the ground connection of the plug—one center wire to the ring connection and one to the tip connection of the plug.

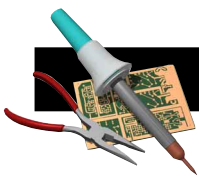
Before you install the stereo plug, cut several short (3/16 inch) lengths of the outer insulation from some scrap RG-58 or 59 (or RG-8X or whatever you have) and slip these over the two audio cables, spacing them about every three inches. These make great cable ties and they look good with black audio cables.

That's all there is to it! You now have a portable, small, lightweight and, best of all, *cheap* set of paddles.

Operation

I operate my paddles by holding the set in the palm of one hand and working them with the thumb and forefinger of the other. Alternatively, you could hold the paddle set down on a tabletop with your middle finger placed over the junction of paddle and rear frame, and the tip of your forefinger placed next to the adjustment screw support on the near side of the paddle base. This leaves plenty of room to operate the paddle with the thumb and forefinger of the other hand.

Enjoy!



By Timothy P. Hulick, W9QQ

PSK31 on the Road!

Forget your RTTY gear the last time you cruised cross-country? Thanks to the incredible weak-signal performance of PSK31—and a few choice macros—you can take it with you!

I learned to enjoy mobile DXing as a kid in the '50s. My parents' 1955 Oldsmobile 98 made the perfect shack on wheels. That's way back when there really wasn't any equipment specifically designed for mobile work. Mobile equipment should be small, lightweight and dc-powered. That technology hadn't yet been born, and big and heavy was the name of the game.

The bigger it was, the heavier it was, the better it was. That was the image of the proverbial mobile rock crusher. A high-voltage power supply with a 12-V dc input was nearly impossible to find or build because the solid-state devices necessary to support the design of something like that just didn't exist.

The predecessor of the modern high-voltage switching power supply was the WW II surplus dynamotor. They were abundant in those days and rather inexpensive. One dynamotor easily provided the 800 V necessary to run a 100-W power amplifier—but not without the occasional dead battery if the QSO dragged on too long (5-10 minutes if the engine was turned off).

If I remember correctly, the 12-V current drain was somewhere between 20 and 30 A, plus the motor start-up current required each time the PTT button was pressed. As a teenager I lost my driving privileges more than once because of unexplained dead batteries. "What dead battery? I didn't do it!"

Full-carrier AM wasn't effective in busting pileups from the car—at least not in the dynamotor era! On hot summer days, idling the engine was out of the question. That brought along its own set of problems. Reliving the glory days of HF mobiling is fun, but I'm glad that dynamotors are ancient history. Mobile DXing has changed dramatically.

A Mobile Tradition

I've always had an HF rig in the car, especially after it really became practical. Heath's line of compact monoband rigs, debuting in the '60s and early '70s, were just what the hobby ordered. I just *had* to have one for each of the bands on which they were available (80, 40 and 20 meters). I even coaxed the 80-meter version onto 15 meters because my main objective was to "work DX from the car." It was my ultimate challenge.

The modifications were productive and I worked a lot of DX on 15 and 20 meters. But because the rigs were monobanders, changing bands meant changing transceivers! Even worse, there was no way to fight the incredible level of ignition noise that tended to plague mobile ops in those days. Noise blankers weren't exactly stock items.

My trusty dynamotor was replaced with a Heath solid-state switching supply that was far more efficient. I never did end up with a dead battery while using Heathkit's model HP-13. I still have the thing. It works fine, although I gave the transceivers away years ago.

In the mid-1970s, along came the Atlas 210X. *That* was the



The author pulls over at a promising location, switches on his transceiver, opens his laptop computer and works PSK31.

first real all-solid-state rig designed for 12 V. It didn't need a high-voltage supply of *any* kind. It was truly the predecessor to today's ultra-compact mobile rigs. It was small, lightweight and great for HF SSB on the move. The best DX I worked with that little rig was a ZS6 in the spring of 1983 on 15 meters.

Today I use a Kenwood TS-440S with a center-loaded whip antenna and have managed to confirm 143 countries since I started counting in the early '80s. Working DX has become commonplace, especially on 15 meters (the antenna is noticeably more efficient there).

PSK31 on the Go

I've heard that old-timers such as W6AM used to operate CW while mobile on California's freeways, but somehow that never appealed to me. I'm not sure I could drive the car, interpret CW and chew gum at the same time.

Operating PSK31 under the same conditions is no better, but during stopovers on long trips, or at least during an overnight stay, PSK31 is just the ticket to great operating opportunities away from home. There are several reasons why. PSK31 is an excellent low-power mode, and a laptop computer with a suitable sound system is the only additional hardware needed.

I was introduced to PSK31 in February of 1999 when I worked HB9BRJ on Baudot. Markus said that a new BPSK/QPSK mode was catching on in Europe. Now, BPSK and QPSK aren't entirely new, but they were new to Amateur Radio, and G3PLX (PSK31's

creator) was providing free PSK31 software on his Web site.

In February and March there were a few European stations to work around 14.070 MHz, but since the article written by *QST* Managing Editor Steve Ford, WB8IMY, appeared in the May 1999 issue, there has been an explosion of activity in all parts of the world.

Amazingly, within PSK31's tiny 3-kHz window near 14.070 MHz, there's room for non-interfering QSOs every 65 Hz or so because of the mode's extremely narrow bandwidth requirements.

Think about this: For transmission bandwidths this narrow, using a 100-Hz receive filter (easy using PSK31) provides a 13.2 dB advantage over an equivalent 2.1-kHz SSB system, assuming that all other factors are equal. In other words, to the same antenna, running 50 W on PSK31 is like running 2000 W on SSB (to produce the same signal-to-noise ratio at the other end of the QSO!). PSK31 is a great way to solve many of the dead battery, power output and antenna problems associated with the HF mobiling of yesteryear.

I was planning to take a short business trip in my '97 Sedan DeVille. The journey would take me from my home in southeastern Pennsylvania to New England and back, a round trip of about 1100 miles. Leaving on Tuesday and returning on Friday (June 9-12, 1999) would provide overnight stops in Lewiston, Maine; Bedford, Massachusetts; and New Milford, Connecticut.

This was a great opportunity to try PSK31 on the road. SSB DXing would keep me company as I drove during the daytime, while PSK31 was on tap for the evening's entertainment. Sleep would fit in there somewhere, depending on band conditions.

Chasing PSK31 DX from a motel parking lot at midnight seemed like an exotic and mysterious thing to do—as long as I didn't get arrested under suspicion of something or another. To prepare for my semi-clandestine digital QSOs, I loaded my laptop with the appropriate software and made a set of connecting cables for my TS-440S.

Everything tested fine and I was ready to assault 14.070 MHz with a whopping big signal from Lewiston, Maine, on the evening of June 9. And what a time I had!

It was easy to work DX in the 20-meter PSK31 window while running 20 to 50 W to my mobile antenna. The first evening, from 2030 local to about midnight, I had 20-minute ragchews with OM6DS, UR5FGW, PY2GIG, K9DN and G3NYY.

During the evening of June 10, from Bedford, Massachusetts, from 2100 local to just after midnight, I had solid 20-minute QSOs with F5TBA, G3NYY, F8RZ and IK1SOW.

During the last evening, from New Milford, Connecticut, I had solid QSOs with OK2LE, WB0CFF, UT4UO, DL7NK, G3NYY, ON6TS and A92GE. Signal reports were generally in the 579 range, while I was giving out 599s.

The only QSO that wasn't at least 20 minutes long was with A92GE. He was working stations contest style. Because signals only a few hertz away just go unnoticed, most calls were answered on the first try. All contacts were made using BPSK. QPSK, an alternative PSK31 modulation technique, offers a slightly lower signal-to-noise ratio and is generally not as popular.

Many veteran PSK31 operators say they've experienced Q5 contacts with others whose signals fade so low that they're no longer audible. I also experienced this. It's a strange feeling to be working the noise and the noise types back!

I never tried PSK31 on any other bands during my short trip. Fifteen meters would have been dead at night, and 40 meters was just too noisy. Fifteen meters doesn't seem to be used much for PSK31. Perhaps it's just a matter of time until it catches on.

Plan Your First Mobile PSK31 Operation

If you want to try PSK31 from a mobile or portable environment, start things off by reading Steve Ford's May 1999 article in

QST. Make a few QSOs from your home station before venturing into the wilds.

Download and install WD5GNR's excellent "front end" software. It lets you create macros and sports a handy "type-ahead" capability. It's available free from <http://www.al-williams.com/wd5gnr/pskgnr.htm>. Learn how to use it in conjunction with G3PLX's basic PSK31 software (available at <http://bipt106.bi.edu.es/psk31.html>).

When making your first contacts from home, ask for waterfall reports. On the lower left part of your computer screen you'll see the top-to-bottom time component of the received signal's spectral display. This display is known as the "waterfall." Ideally, only two parallel white lines should be visible. Over-modulation is indicated by a duplicate set of parallel lines for each set of over-modulated sidebands. If you are over-modulating your transmit signal, reduce power to get rid of the extra sidebands.

If you're already setup for PSK31 at home, you know that a set of audio cables is required to connect your laptop's sound card output to your transceiver to complete the installation. To make things easier on the road, make the audio cables ahead of time. You'll need one to connect the auxiliary audio output of your mobile transceiver to the line or microphone input of your laptop's sound card. This isn't rocket science, but the connections must be made correctly. Use good quality shielded cable.

You'll need another length of the same type of audio cable to connect the line or speaker output of your computer to the auxiliary or microphone input of your transceiver. It's a good idea to wrap a turn of colored plastic tape around each end of a particular cable. Choose a different color for the other cable and put a small square of colored tape (appropriate colors) near the appropriate jacks on the transceiver and the laptop computer so there is no doubt where each cable should be connected.

At the transceiver end, plan to use a connector that has a shell that's large enough to accommodate a pair of 1/4-W resistors (inside the connector). The need for a resistive attenuator is detailed in the PSK31 software help file. You'll probably need an attenuator in each cable.

One of the most common mistakes made by PSK31 newcomers is setting the transmit audio level too high. Setting the level correctly is especially important from a mobile perspective because you don't want to put any of your precious power into useless sidebands. Over-modulation only results in a raspy sounding signal that can sprout as many as five sets of "extra" sidebands (one set is sufficient). Don't create a QRM machine!

Using the "front end" software is helpful during fixed station operation and, in my opinion, a necessity when operating PSK31 mobile. You should take the time to download it and set up meaningful macros to help your QSOs progress as smoothly as possible, especially if you're not a whiz-bang typist.

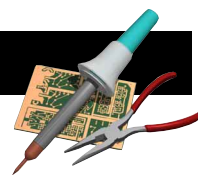
Resist the temptation to call CQ or CQ DX. Take advice from the old-timers when they say "listen, listen and listen some more." You are the little guy here, but you will, nevertheless, work everything that you hear.

Don't forget to put "/m" after your call sign in the PSK31 setup box and to change your QTH in the appropriate macro as you progress through your trip.

If possible, park at high spots that are clear of chain link fences, buildings and other signal-gobbling junk. PSK31 mobile is indeed a different experience. You may even be a celebrity by signing /m on teletype, but this just adds to the experience and the excitement of an already exciting mode.

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Leatherman Pocket Survival Tool

Reviewed by Rod Peterson, K4QG

Do you remember the Scout motto? In case you've forgotten, it's "Be prepared." Even though my Scouting days are well behind me, there are things I learned while associated with them that are part of how I live my life. Being prepared is one of them. That's why my garage is like a tool museum; I'm prepared to put the right tool on any task that arises. Sometimes, however, you're in a place where work needs to be done, and it's not your garage.



When I open a door and the knob is loose, I'd like a screwdriver handy to be able to fix it. When my wife wants to make tuna sandwiches and we can't find the utensils (just moved in), I'm her savior if I have a can opener. When she breaks a nail while we're on the highway and doesn't have an emery board, having a file handy makes me a hero. Or, when I'm at Field Day and we need pliers, I won't have to go home if I have some with me.

All of these "saving graces" are possible if you are prepared. And it's so easy to be when you have a Leatherman model TSS100A "Pocket Survival Tool." Having been exposed to multipurpose tools at a young age, I was quickly disenchanted with them when they turned out to be just a lot of different knives (and a spoon). When I first saw a Leatherman and opened it up to a *useful* pair of pliers, I knew I would never be without one. I bought it on the spot and have had it with me ever since.

There are several things that set the Leatherman apart from

previous tools. One is the construction. It is a superior grade of stainless steel. That means little chance of rusting. At one time "stainless steel" in a multipurpose tool of this type meant an inferior edge to the knife, but I've been amazed at how the Leatherman has held up. It turns out they use several different grades of stainless in the tool. Another difference is in the features. Sure, it has an awl and a screwdriver but, how about a Phillips screwdriver? Now *that's* useful. Or a file that's not just an emery board? Or a ruler? And the pliers; complete with a cutting edge.

Not Just a Gimmick

My first impression was that this isn't just a gimmicky gadget, but something really worthwhile. In the years that I've had it, my impression has been confirmed. Now, I wouldn't want to assemble a computer desk with a Leatherman. The handle isn't comfortable enough for long, complicated jobs. It is really designed to be an exigency tool; something that will get the job done when you don't have access to your regular tool supply. (If you can't find a use at Field Day for your Leatherman, you aren't even trying.) And no self-respecting DXpedition should leave port without several. I can't count how many times my Leatherman has saved my bacon while dangling high on a tower and searching for the exact tool I needed—and didn't have—at the time.

For the ham who has everything, the Leatherman is a great gift idea (you'll want it on your own gift list, especially if the family is tired of buying you radio stuff). There are different models, mostly with a greater variety of tools, but the TSS100A is my favorite. This model costs about \$40 (depending on where you buy it) and has a 25-year guarantee. Check out their Web site at <http://www.leatherman.com>. You'll find the Leatherman at hardware stores and home centers throughout the country.

Contrary to what you might think, this is not a tool used in the leather trade. The man who invented it is Tim Leatherman. Who'd have thought?

Manufacturer: Leatherman Tool Group, PO Box 20595, Portland, OR 97294-0595; tel 800-847-8665.



[Next Short Takes](#)

Steve Ford, WB8IMY ♦ QST Managing Editor

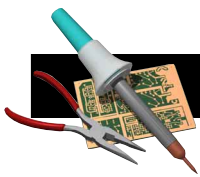
STRAYS

\$1000 FOR FREQUENCY DEFENSE!

◊ The Garden State Amateur Radio Association presented a check for \$1000 to Frank Fallon, N2FF, ARRL Hudson Division director, as a contribution to the ARRL campaign for "The Fund for the Defense of Amateur Radio Frequencies." The ceremony took place on December 15, 1999 at Lanes Hall in Fort Monmouth, New Jersey during the club's holiday dinner. Director Fallon thanked Mario Selitti, N2PVP, Association President and those present and pointed out, "This is a unique gift to this important fund. I hope other clubs will follow GSARA's example." The contribution was proposed by Jack Keating, WA2FVL, the Association's watchdog on frequency legislation and was approved by the membership at the November 24th meeting. From left to right: Lou Russo, W2HAM, GSARA treasurer; Bob Curci, N2XR, GSARA vice president; Mario Selitti, N2PVP, GSARA president; Frank Fallon, N2FF, ARRL Hudson Division director.

[Next Stray](#)





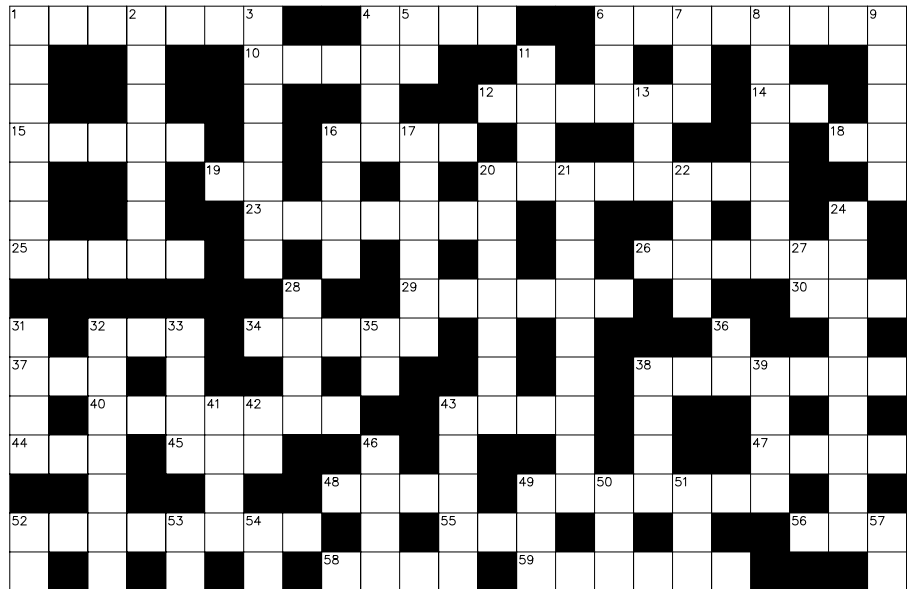
By H. Ward Silver, N0AX

Test Your Knowledge!

Powerful stuff—a crossword of power and the circuitry associated with it.

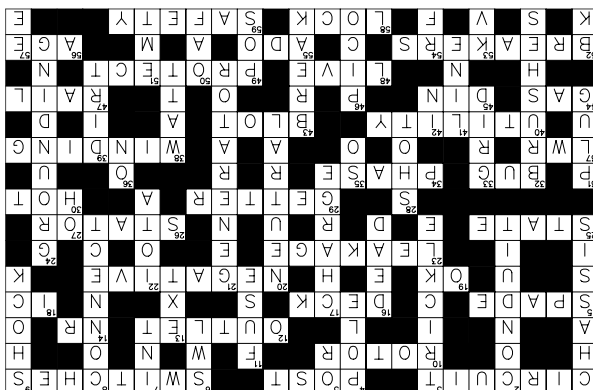
Across

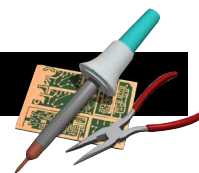
1. Short _____
4. Binding _____ (type of connector)
6. Devices that can open and close circuits (plural)
10. Part of a motor that rotates
12. ac wall _____
14. North America (abbreviation)
15. Type of lug
16. Switch panel, or stack of cards
18. Alternating current (abbreviation)
19. Checked out; good
20. Below ground
23. Unwanted current flow
25. Condition of a circuit
26. Part of a motor that is stationary
29. Tube element that collects gaseous impurities
30. Black wire is _____
32. Problem with a circuit
34. Single or triple _____
37. Lower (abbreviation)
38. Motor component that forms inductance
40. Supplier of power
43. Stain
44. Generator fuel
45. Loud noise
47. Another name for circuit power supply voltage
48. Energized circuit
49. Function of a fuse
52. These devices open circuits
55. Much about nothing
56. Old
58. Hold in one state
59. This always comes first



Down

1. Structure for mounting components, used for ground
2. Carries ac wiring
3. Slow charge
4. Single-_____, single-throw
5. Opposite of AND
6. Short-_____ listener (abbreviation)
7. Internal (abbreviation)
8. Attach to a circuit
9. Painful experience with electricity
11. Protective component
13. External (abbreviation)
16. De-energized circuit
17. Restore energy to a battery
20. Return circuit for ac power
21. Supplies energy by itself
22. Small piece is one _____
24. This must be properly done for safety
27. Overhead (abbreviation)
28. Worn-out
31. Male connector
32. Commutating contacts
33. System of ac power distribution
35. Single-operator (abbreviation)
36. Opposite of OFF
38. Powered
39. Soil; gets into contacts and causes trouble
41. Term for ac utility connection
42. Opposite of out
43. Open a circuit
46. Between nano and femto
49. Above ground (abbreviation)
50. Clumsy technician
51. Type of conduit (abbreviation)
52. Break (abbreviation)
53. Unit of high voltage (abbreviation)
54. Radio Frequency (abbreviation)
57. Electrical Engineer (abbreviation)





MFJ Super Menu Driven Memory Keyer Model MFJ-493

Here's a nifty little CW keyer for all occasions: casual contacts, contests, code practice, and specialized applications, such as a beacon IDer. The MFJ-493 also accommodates all styles of operators, from those who prefer to send "bug" style to those who use iambic or non-iambic paddles and those who prefer keyboard CW.

A compact unit, the MFJ-493 directly interfaces with a keyer paddle, a standard AT-style keyboard, or a PC running any basic terminal program. In fact, you can hook it up to all three and switch off from one to the other, if you like.

The MFJ-493 includes eight 4000-character memories—not quite enough for *War and Peace* but certainly ample for even the most long-winded.

Memories are in two banks of four, accessed via four pushbuttons within a row of seven that dominates the front panel.

The front panel includes rotary **SPEED** and **VOLUME** controls plus a **PWR** on/off button. The speed control's range is set in a menu.

Features include auto-incrementing serial numbers, timed pauses up to almost 100 minutes, and the ability to loop, link or insert messages. MFJ says the keyer's speed ranges from 5 to 100 WPM, and weighting is variable from 5% to 95%. The MFJ-493 will key just about any radio alive—even older grid-blocked keying models and negative or positive keying lines.

The MFJ-493 delivers sidetone through a top-firing speaker. A rear-panel 3.5-mm jack lets you reroute this audio to an external speaker.

The rear panel also includes the other interconnection points. There's a coaxial power jack—the unit requires 12 V dc. A **REMOTE** connector accommodates an optional remote control head—seven buttons to access menu, memories, and functions. The **KEY** jack accepts a 3.5-mm stereo plug. Paddle sense is reversible. **KEYING OUTPUT** is via an **RCA** jack. The **KEYBOARD IN** connector accepts a standardized five-pin DIN plug, not the smaller plug showing up on newer computer keyboards. A **SERIAL PORT** enables connection to a PC.

On the Air with the MFJ-493

The first handy thing to know when getting acquainted with the MFJ-493 is how to reset the unit (hold down the **MENU** button while powering up). We needed to do this more than once when stumbling across some command combinations the keyer did not like.

The MFJ-493 offers considerable operational latitude, especially when you hook it to a PC, so it's a good idea to actually read the *Instruction Manual* before forging too far ahead.

Paddle Mode

The paddle part was easy—plug in your paddle and you're good to go. The MFJ-493 sends very pleasant-sounding CW.

Programming memories from the paddle takes a little getting used to. As you input your message, the keyer prompts you at each word break by inserting a "W." If you goof up, just send an eight-dit error character. The keyer erases the previous word, then plays the word before it to let you know where you left off. If you get clumsy and the keyer doesn't recognize a character, it sends eight dits and ignores the character.

In any case, the playback always sounded a lot better than what we'd sent to create the message.

Keyboard Mode

Right off the bat we ran into trouble while attempting to hook up a keyboard. It took three AT keyboards before we got one the



MFJ-493 could live with. MFJ does offer an optional keyboard of its own, the MFJ-551.

Once an acceptable keyboard is plugged in, all you have to do is type. There's an 80-character type-ahead buffer. In this mode the MFJ-493 lets you access memories simply by pressing the appropriate keyboard **F** key. The **F10** key enters the speed set mode. Need to tune? Press **F11**. Press the **ESC** key to exit.

Prosigns are sent using a combination of **SHIFT** and number keys.

PC Terminal Mode

Connected to a PC running a terminal program is where the MFJ-493 exhibits the highest level of flexibility and programmability. The MFJ-493 also can be a bit temperamental. When attempting to record a new message over an old one, for example, sometimes *gradieu* from an old message remained.

The *Instruction Manual* tells how to upload text message files, call one message from another, edit messages in memory, decrement numbers, queue messages, set timers and do other neat stuff.

One terrific aspect of PC terminal operation is that the CW sent is echoed to the screen. In addition, "on-line" help is available.

A downside: playing a message in the terminal mode requires typing a command in brackets: "[command]." Being able to hit the appropriate keyboard **F** key to access memories would be a whole lot more convenient.


Code Practice with the MFJ-493

Code practice modes include "Random Code," "FCC Exam Simulator" and "QSO Simulator." The random mode (cipher groups) is challenging and worked flawlessly. The "FCC Exam Simulator" was helpful and could provide worthwhile practice for testing.

The "QSO Simulator" was a tad more problematic. Once we got it to work, it was a bit like having a conversation with an individual who did not speak the same language, and a couple of times we could not get the keyer to echo our CW reply.

The Verdict?

With the MFJ-493, 100% push-button CW QSOs are within your grasp. The box does just about everything but copy the code for you. It can be a bit cranky, but it offers manifold memory features and lots of flexibility.

Manufacturer: MFJ Enterprises Inc, PO Box 494, Mississippi State, MS 39762; 601-323-5869; mjf@mfjenterprises.com; <http://www.mfjenterprises.com>. Suggested retail price: MFJ-493 Super Menu Drive Keyer, \$140; MFJ-551 keyboard, \$40; MFJ-79 Remote Control, \$20; MFJ-1315 ac adapter, \$15; MFJ-5409/5425 serial cable, \$13. 

HINTS & KINKS

A SIMPLE ANTENNA FLIPPER

◇ Make your Field Day or portable setup *faster* and *safer* with an inexpensive homebrew Antenna Flipper. One of my responsibilities as Field Day chairperson is to ensure the safety of participants and visitors at the site. After 30 years of Field Day operations, countless portable and rover expeditions, I became aware of a serious problem in partially elevating a tower to attach a beam antenna.

The Problem

The towers are propped up with stepladders or various other devices to facilitate attaching the beam to the mast. A lot of time is spent atop the props adjusting the level, tightening the U-bolts, installing feed lines etc. At tear down, the procedure is reversed. This part of the operation is great for action photos in *QST* (eg, June 1999, page 21), but it opens the door for accidents and possible damage to the antenna. Not only that, it takes too much time. There is a much safer and faster way to do it.

The Solution

You and your crew can keep your feet on the ground by building this simple hinge, which I dub the FD Antenna Flipper (see Figure 1). All antenna preparations and attachments are done at ground level. That way, more people can work on the setup at the same time. Sounds too good to be true?

How it Works

The hinge is made of two parts (see Figure 2). One is attached



Figure 1—Author N9KS with the FD Antenna Flipper ready for elevation.

to the mast and the other to the antenna boom plate. The two are joined with a bolt that is the hinge pin. As the tower is raised, the hinge closes, permitting the antenna to remain horizontal through the lift. The boom plate comes to rest on top of the mast end and

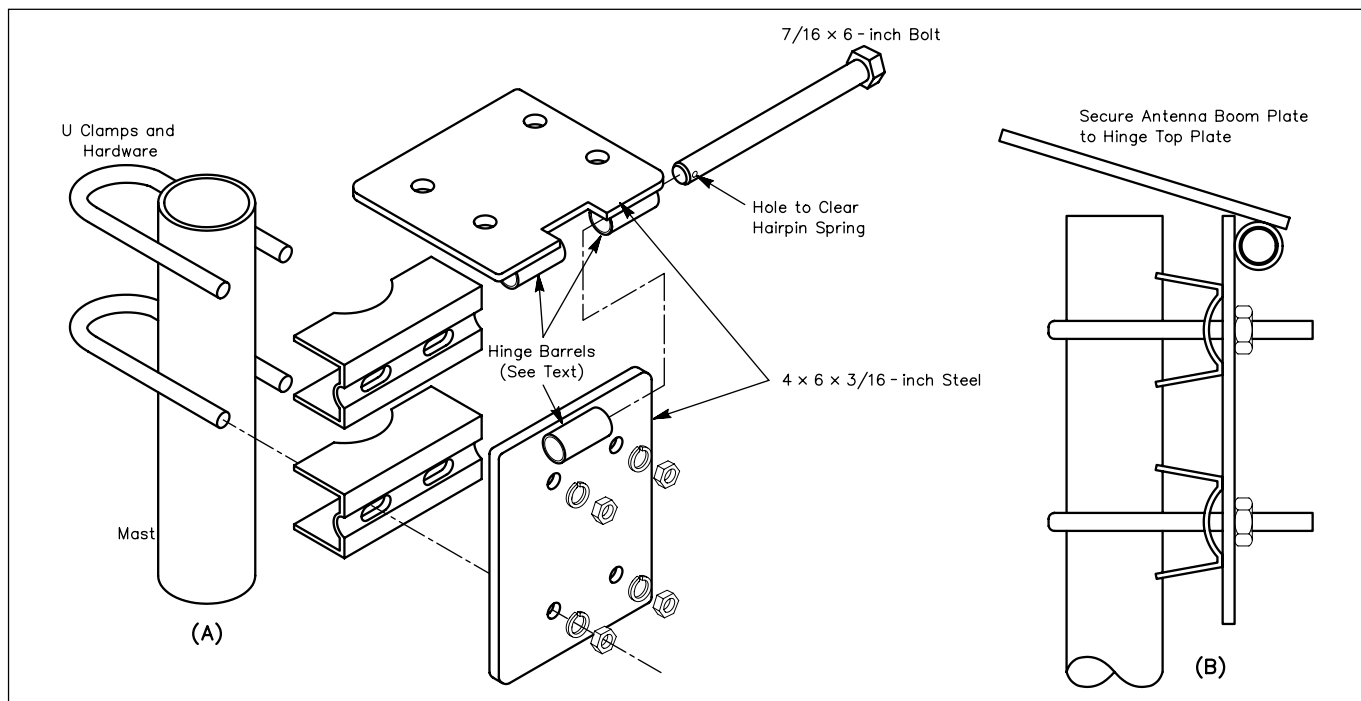


Figure 2—FD Antenna Flipper construction details. See text.

2— $3/16 \times 4 \times 6$ -inch flat steel (Notch long side of one piece to clear center hinge barrel. See Figure 2.)
1— $7/16 \times 6$ -inch bolt drilled to accept spring clip at threaded end
1—hairpin spring clip

1—6-inch long black gas pipe nipple, $1/2$ -inch ID cut into three $1 1/2$ -inch long parts
2—U-clamps to fit mast

the weight of the antenna keeps the elements horizontal. When the tower is lowered, it is very easy for helpers to grasp the element ends and guide the antenna back to the horizontal position (as the hinge opens) for disassembly. No ladder work or props are required, and in a matter of minutes, the antenna is disconnected from the mast.

The Hardware

The Field Day Flipper is made with two pieces of $4 \times 6 \times \frac{3}{16}$ -inch-thick flat steel and the hinge barrels are made of $\frac{1}{2}$ -inch ID black gas pipe cut to $1\frac{1}{2}$ -inch lengths. The pipe pieces are deburred inside with a $\frac{1}{2}$ -inch drill to easily fit a $\frac{7}{16}$ -inch bolt. A notch on one plate gives clearance to the mating hinge. The pipe pieces are welded to the plates. Each flat piece is drilled to match the U-bolts on the mast and the antenna.¹ If your antenna is used only for Field Day, the parts can be left in place. The dimensions given here were used and tested with a TA-33 Jr tribander at 40 feet. Larger antennas call for more barrel sections and heavier-gauge plates.

The Cost

For less than \$25, you can set up faster and put those step-ladders and other shaky props away. Let gravity do the work for you. Start the new millennium safely and make Field Day 2000 the best one ever.—*Ken Secora, N9KS, W333 S4222 Connemara Dr, Dousman, WI 53118-9798; ksecora@ticon.net*

SOLAR-POWER TIPS

◇ I've been running things from solar power for years—my shack, Field Day site, RV, campsites and so on. Many of these are mobile systems, from pocket-size QRP solar panels with 1.2 Ah batteries to a typical Field Day system with a couple hundred watts of solar panels and 400 Ah of batteries. In my shack and my RV, controllers (Trace C40s) are used for “set it and forget it” ease, but at portable sites I keep it really simple and use nothing but a voltmeter.

Battery Charging

When you attach a solar module to a battery and check the system voltage, the voltage usually approximates that of the battery. Most good solar modules are rated 17.5 V (or more) and have open-circuit voltages of around 22 V. When they're connected to a reasonably sized battery (say 2 Ah, or more, of battery per watt of solar panel) it takes a long time for the battery voltage to reach harmful levels. Check the specifications on the battery and radio, but up to 15 V is usually fine and sometimes necessary. If you are using the system to concurrently power your equipment, you'll probably never see a voltage that high. If you do, just disconnect the solar module for a while.

If the modules come with a diode, you can leave that in place and not worry about discharging at night. If there's no diode, just disconnect the modules when there's no sun on them. Remember, however, that they do work (but at reduced current) even on cloudy days.

Storage Batteries

Car batteries are not good storage devices for solar systems. They are designed to deliver large amounts of current for short periods and then recharge immediately. A good solar storage battery (deep-cycle battery) is designed to deliver a relatively small amount of current for a long period and be discharged somewhat before being recharged. Neither battery will last long in the wrong environment.

¹Templates for the author's version are available from the ARRL Web site. You can download this package from <http://www.arrrl.org/files/qex/>. Look for 0003N9KS.ZIP.

If you want to put together a 14 V system, a reasonable battery pair would be the Trojan T-500 (8 V, 190 A) and T-890 (6 V, 165 A). Keep the ampere-hour ratings of the batteries equal if possible, so you don't cook the smaller battery while the larger one is still charging. Keep an eye on the electrolyte levels in these mismatched systems, and select your solar modules for high voltage ratings so they are likely to charge the 14-V battery under most (cloudy) conditions.

Solar Modules

Solar-module output voltage varies with temperature, as do battery characteristics. A typical temperature coefficient would be around -0.38% per °C from a 25°C nominal cell temperature: On a very hot day, your 18-V module could struggle to charge a 12-V battery.² Remember you need about 15 V for a good charge, more to equalize, and there are diode and cabling losses to consider (which are significant in a 12-V system). What about using 16-V modules on a 14-V system? Forget about it. That voltage won't even do a good job on a 12-V system under all conditions.

Good solar modules are generally made up of 36 cells in a 12-cell series/parallel combination; they put out between 17.5 and 19 V. There are also 30-cell modules that put out between 15 and 16 V. These were designed for use without a controller. If an appropriately sized battery is used with these 16-V systems, it usually won't overcharge. No guarantees; on a cold, bright day the module voltage output can be high and the battery capacity low. That combination makes an overcharge likely. On the other hand, the module voltage on a hot day will probably be insufficient to charge the battery well.

Some amorphous thin-film modules don't appear to have “cells” at all. Just look at the “operating” or “rated” voltages to see how much electrical pressure you have available. If you measure module voltage, do so under load. Open-circuit voltages don't tell you much and are almost always over 20 V.—*JC Smith, KOHPS, 1249 Dewing Ln, Walnut Creek, CA 94595; kohps@amsat.org*


EASY PROJECT LABELS

◇ I've used Clear Laser Labels by Avery to make panel labels for my projects. This lets me use the graphics capabilities of my laser printer. I use Avery #5664 ($3\frac{1}{8}$ by $4\frac{1}{4}$ inches, but any size would work.)

Follow the supplied directions for setting up the printer. Only run the labels through the printer once. I've had them peel off the backing and stick in the printer, which is then very difficult to clean. Trim the labels to size while they're still attached to the backing. I recommend a paper cutter for nice straight cuts. Once they're trimmed to size, carefully separate the label from the backing and apply it to the panel. I use a Popsicle stick to burnish the bubbles out, but be careful not to scratch the printing off of the label!—*Dan Hinz, W6LSN, 1738 Manitou Ct, San Jose, CA 95120; w6lsn@arrrl.net*

²I would not be surprised to find a module temperature (not ambient air) of 65°C on the right (wrong?) day. Consider a 16-V module (some of which only put out 15.5 V or less). At 65°C it will have an output voltage of 13.57 V (even at 45°C, it still only has 14.78 V). That's if the module output was actually 16 V in the first place. Now, throw in losses for the diode and cables (most people use cables that are way too small) and you can't even charge your HT.

[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.—Ed.]

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@arrrl.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. 

2000 Annual Meeting of the ARRL Board of Directors

“New Leadership, New Programs for a New Millennium”

Elvis wasn't in the building, but the ARRL Board of Directors wouldn't have noticed if he were. Chaired for the last time by ARRL President Rod Stafford, W6ROD, the meeting of the League's leaders took place in the city made famous by Elvis Presley—Memphis, Tennessee, January 21-22, 2000. Much has happened both in Amateur Radio and in America since the Board's last meeting six months prior in Rocky Hill, Connecticut. Not only was the first meeting of the new millennium occurring, but a landmark *Report and Order* (FCC 99-412) had been released by the FCC just before the New Year and sent the Ham Radio world into a flurry of activity. The ARRL's leaders were not caught by surprise by the FCC action, although the R&O in some respects fell short of the restructuring plan proposed by the ARRL in 1998. In addition to the FCC bombshell, the Board's agenda included its bi-annual officer elections and a whole slate of committee reports, project proposals, and Board resolutions that created an intoxicating atmosphere of tense, yet upbeat anticipation of what might come out of this historic meeting.

Officers Elected; Vice Directors Move to the “Inner Square”

After five years of exemplary Presidential service to the League, Rod Stafford, W6ROD, did not seek re-election and was succeeded by Jim Haynie, W5JBP of Dallas, Texas. Jim, a League official for 12 years and a ham for 27 years, previously served as a Vice President and on two separate occasions as Director of the West Gulf Division. Rod didn't go far away from the League family (although his travel agent might think differently!) as he was elected to the office of International Affairs Vice President, taking over duties from longtime League official Larry Price, W4RA who was elected President of the IARU in 1999 (see [Sidebar](#), and [Minutes 8](#) and [12](#)).

Jim Haynie's right hand man for the next two years will be Joel Harrison, W5ZN, 40,

President Jim Haynie, W5JBP

NEWINGTON, CT, Jan 21, 2000—Jim D. Haynie, W5JBP, of Dallas, Texas, is the new president of the ARRL. The ARRL Board of Directors elected Haynie January 21 shortly after convening in Memphis, Tennessee. Haynie, 56, was the ARRL West Gulf Division Director. He succeeds Rod Stafford, W6ROD, to become the League's 13th president. The term of office is two years, and like all Board officer positions, it is an unpaid, volunteer endeavor.

Calling the recently announced FCC restructuring plan “a positive thing,” Haynie said his presidency will focus on the future of Amateur Radio, and he suggested amateurs take the opportunity to regroup. “Now that restructuring is behind us, I think it's time for all amateurs—League members and nonmembers alike—to pull together to see what we can do to make our hobby a thriving and vibrant hobby.”

The President-elect pledged to work with the Board, his fellow officers, and with all amateurs to bring respect to Amateur Radio and to enhance its stature here and abroad. “I think it's time the League started changing,” he said. “I think there's a lot we can do.” While not offering specific programs at this point, Haynie said he favors even greater promotion of Amateur Radio, especially among youth and in schools. He also said he'd like to see programs to rekindle interest and activity among current licensees. “The best interest for Amateur Radio as a whole is where the League Board of Directors stand, and it's certainly where I stand,” he said.

A ham for 27 years and an ARRL Board member for 12 years, Haynie says Amateur Radio is his “escape” from the world of industry and commerce. An Advanced class licensee, Haynie has been a manufacturer's representative in the metals business for 30 years and runs his own firm in Dallas. He chaired the ARRL Board Administration and Finance Committee in 1999—*Rick Lindquist, N1RL*



With the election of several Directors as Officers, three Vice Directors become Directors: (l-r) West Gulf Division Director Coy Day, N5OK; Atlantic Division Director Bernie Fuller, N3EFN; and Roanoke Division Director Dennis Bodson, W4PWF.

who was elected First Vice President. Joel is a very active ham who will be serving on several committees as well as continuing with his outstanding VHF/UHF work. The other two newly minted Vice Presidents are Kay Craigie, WT3P, of Paoli, PA, and John Kanode, N4MM, of Boyce, VA (see [Minutes 9, 10, 11](#)). Kay, who has served

the last four years as Director of the Atlantic Division and is very active on the air, joins President Haynie's team as the first female officer in League history! She will serve on the Volunteer Resources Committee and the Enforcement Task Force. John Kanode, a top DXer and operator, has served the ARRL Roanoke Division for the

last 19 years—11 years as Director and eight as Vice Director. John will continue to serve on the Membership Services Committee. Hugh Turnbull, W3ABC, arguably one of the most well-known of America's Amateurs, was elected to the post of Honorary Vice President after 20 years of service to the League (see [Minute 17](#)). Born in 1916, and still an avid operator, he is a licensed Professional Engineer who retired from the Naval Reserves as a Lieutenant

Summary of Major Board Actions

Minute	Purpose	Disposition
Elections		
8-16	Officers	Elected
17	Honorary Vice President Turnbull	Elected
18	Executive Committee	Elected
19	Foundation Directors	Elected
62	Director Emeritus Olson	Elected
Organizational		
37	2000/2001 Plan and World Wide Web Site Initiative	Approved
38	ARRL Internet/Web Privacy Policy	Approved
59	Cover Plaque Award selection	Amended
63	Review of relationship between FCC and ARRL	President
69	Limited/temporary access to ARRL Members Only Web site for new licensees	Staff study
71	ARRL Historical Committee	Approved
74	Memorandum of Understanding with National Association of Radio and Telecommunications Engineers, Inc.	Approved
ARRL Programs		
33	Club 2000 Achievement Awards Program	Approved
65	ARRL Certification Program	Approved
70	A-1 Operator Program improvement	MSC study
Awards		
32	International Humanitarian Award Ed Petzolt, K1LNC	Conveyed
64	1999 Bill Leonard, W2SKE, Professional Media Award, Jeff Holland, Monroe, NC <i>Enquirer Journal</i>	Conveyed
Operating		
30	DXCC Card Checking Program	Approved
73	Examine power limits for QRP SSB operation	MSC study
International		
58	The ARRL vote to admit Association des Radio Amateurs de Nouvelle Caledonie to IARU	Approved
Regulatory		
61	The ARRL to file comments opposing waiver for auxiliary operation in the 144-148 MHz band	Approved
67	File petition for partial reconsideration of FCC restructuring	Approved
72	File application with FCC to become a club/military call sign administrator	Approved
Technical		
76	Interference from Phonex products on 3,525 kHz	RFI Task Group Study



The Midwest Division leadership team: Director Wade Walstrom, W0EJ (r) and Vice Director Bruce Frahm, K0BJ. Wade began his first term as Director in January 2000.



Jim Maxwell, W6CF, was elected Pacific Division Director last fall, after serving as Vice Director for six years.



ARRL's new slate of Vice Presidents (l-r): Third Vice President John Kanode, N4MM; Second Vice President Kay Craigie, WT3P; and First Vice President Joel Harrison, W5ZN



Rod Stafford, W6ROD (r), assumed the position of International Affairs Vice President from Larry Price, W4RA. W4RA was elected IARU President in 1999.



The Board welcomed three new Vice Directors who were elected last Fall to terms beginning in January 2000: (l-r) Pacific Division Vice Director Bob Vallio, W6RGG; Dakota Division Vice Director Twila Greenheck, N0JPH; and Great Lakes Vice Director Gary Johnston, K14LA.

Commander (including service in WWII). Hugh also worked for the FCC, Voice of America, and NASA. A man of great wisdom and fairness, Hugh is truly an icon of the Amateur Service and will no doubt actively follow the League's activities as he enters his 68th year of hamming.

One of the traditions of ARRL Board meetings is the physical layout of the meeting room—a "hollow square." The seating arrangement in the meetings has the Directors sitting in 15 chairs arranged around three sides of the "inner square," with the officers seated along the fourth. Each Vice Director sits directly behind his/her Director in what is basically an "outer horseshoe." After the Presidential and Vice Presidential elections, the Vice Directors from the Divisions that "lost" their Directors get to move forward to the inner square! In 2000, new Directors via this route are Coy Day, N5OK, who will replace President Haynie at the table from the West Gulf Division; Dennis Bodson, W4PWF, who takes over for Vice President Kanode; and Bernie Fuller, N3EFN, who takes the Director's mike from Vice President Craigie. Three other new Directors at the meeting, Jim Maxwell, W6CF, from the Pacific Division, Jay Bellows, K0QB, from the Dakota Division, and George Race, WB8BGY, from the Great Lakes Division, are old hands at ARRL Board meetings, each having just served as Vice Directors (and George as Past Director) before being elected Director in the Fall 1999 elections. A special event at the 2000 annual meeting was the election of Tod Olson, K0TO, to the position of Director Emeritus after serving the League for 20 years in many capacities—most recently as the Director of the Dakota Division (see [Minute 62](#)).

Attending the meeting for their first times as a result of the Fall 1999 elections

were Director Wade Walstrom, W0EJ from the Midwest Division; Vice Director Twila Greenheck, N0JPH, from the Dakota Division; Vice Director Bob Vallio, W6RGG, from the Pacific Division; and Gary Johnston, K14LA, from the Great Lakes Division.

In all, seven of the 15 ARRL Directors at the conclusion of the Memphis meeting had not been Directors at the end of 1999.

The ARRL Certification Program

One of the key initiatives envisioned in Executive Vice President Sumner's report to the July 1999 meeting of the Board was a voluntary certification program to encourage amateurs to develop their skills beyond the minimum required to pass FCC examinations. After the FCC restructuring decision hit the streets, the ARRL Board realized that there was an immediate need to put the program into place.

At Minute 65 the Board voted unanimously to establish the ARRL Certification Program. Member participation in defining the program will be emphasized; the standards for certification will be set by the amateur community. Startup funding will come from the Exceptional Merit Stipend established by a generous bequest from Ethel M. Smith, K4LMB, and the program is dedicated to her memory. The Board authorized the hiring of a full-time manager to coordinate the program, which should become self-supporting over time.

ARRL World Wide Web Site Initiative

Departing First Vice President Steve Mendelsohn, W2ML, stressed it often at this meeting and at previous gatherings: "The League's Web site is ARRL's face to the entire world. The possible audience is over 100 million people." He also added, "Many others have reached the same con-



Enjoying a quiet moment are Delta Division Vice Director Henry Leggette, WD4Q (l) and Hugh Turnbull, W3ABC. Hugh was elected Honorary Vice President at the meeting, in recognition of his many years of service to ARRL. The meeting was held in Henry's home town of Memphis, and several area radio clubs graciously hosted a reception for Board members at the close of the meeting.

clusion and now realize that our site is a powerful tool. It's time to bring that tool to bear on many of the League's processes." The Board heeded this advice and authorized funding to add staff to improve the League's Web site with the goal of making it the focal point for radio on the Web.

New Committees


The 2000 Annual Meeting debuted the ARRL Historical Committee. Chaired by Tom Frenaye, K1KI, the committee will work to develop a plan for storage of historical artifacts and archival material related to Amateur Radio, and to explore means for future public access (see [Minute 71](#)).

Awards

Ed Petzolt, K1LNC, won the International Humanitarian Award for 1999, for providing communications throughout a hostage situation in Guatemala. Handling phone patches and maintaining a link between a missionary station in Guatemala, and U.S. authorities in the U.S. and Guatemala, Mr. Petzolt was deemed directly responsible for saving the lives of those four hostages (see [Minute 32](#)).

Jeff Holland, staff writer for the Monroe, NC, *Enquirer Journal*, received the 1999 Bill Leonard, W2SKE, Professional Media Award for his story "Ham Radio Enthusiasts Believe Hobby Will Continue to Cast its Magic Spell" (see [Minute 66](#)).

Don't Stop Here...

Many items are discussed, motioned, passed, resolved, and explained at the ARRL Board meetings. Please read the pages that follow for the whole story of the 2000 Annual Meeting. The table "[Summary of Major Board Actions](#)" will help you navigate through them. 

MOVED & SECONDED

2000 Annual Meeting of the ARRL Board of Directors January 21-22, 2000

Summary Agenda

1. Roll Call
2. Moment of Silence
3. Consideration of the Agenda for the meeting
4. Approval of the Minutes of the 1999 Second Meeting
5. Election of Officers
6. Election of Executive Committee
7. Reports by the Officers
8. Receive Reports and consider recommendations of the committees
9. Directors' motions

1. Pursuant to due notice, the Board of Directors of the American Radio Relay League, Inc., met in annual session at the Memphis Marriott East Hotel, in Memphis, Tennessee, on Friday, January 21, and Saturday, January 22, 2000. The meeting was called to order at 8:36 AM CST, January 21, with President Rodney J. Stafford, W6ROD, in the Chair and the following Directors present: Kay C. Craigie, WT3P, Atlantic Division; Edmond A. Metzger, W9PRN, Central Division; Jay Bellows, K0QB, Dakota Division; Rick Roderick, K5UR, Delta Division; George Race, WB8BGY, Great Lakes Division; Frank Fallon, N2FF, Hudson Division; Wade Walstrom, W0EJ, Midwest Division; Tom Frenaye, K1KI, New England Division; Greg Milnes, W7OZ, Northwestern Division; James Maxwell, W6CF, Pacific Division; John C. Kanode, N4MM, Roanoke Division; Walt Stinson, W0CP, Rocky Mountain Division; Frank M. Butler, W4RH, Southeastern Division; Fried Heyn, WA6WZO, Southwestern Division; Jim Haynie, W5JBP, West Gulf Division

Also present without vote were Stephen A. Mendelsohn, W2ML, First Vice President; Joel M. Harrison, W5ZN, Vice President; Hugh A. Turnbull, W3ABC, Vice President; Larry E. Price, W4RA, International Affairs Vice President; James McCobb, W1LLU, Treasurer; David Sumner, K1ZZ, Executive Vice President and Secretary. Chief Financial Officer Barry J. Shelley, N1VXY, was present in his capacity as an officer of the Corporation.

Also in attendance at the invitation of the Board as observers were the following Vice Directors: Bernie Fuller, N3EFN, Atlantic Division; Howard Huntington, K9KM, Central Division; Twila Greenheck, NOJPH, Dakota Division; Henry Leggette, WD4Q, Delta Division; Gary Johnston, K14LA, Great Lakes Division; J.P. Kleinhaus, W2XX, Hudson Division; Bruce Frahm, K0BJ, Midwest Division; James Fenstermaker, K9JF, Northwestern Division; Robert Vallio, W6RGG, Pacific Division; C. Dennis Bodson, W4PWF, Roanoke Division; Marshall A. Quiat, AG0X, Rocky Mountain Division; Evelyn Gauzens, W4WYR, Southeastern Division; Art Goddard, W6XD, Southwestern Division; and Coy Day, N5OK, West Gulf Division. Also present were General Counsel Christopher D. Imlay, W3KD; Publications Manager Mark Wilson, K1RO; Membership Services Manager Bill Kenamer, K5FUV; Field and Educational Services Manager Rosalie White, WA1STO; Technical Relations Manager Paul Rinaldo, W4RI; Legislative and Public Affairs Manager Steve Mansfield, N1MZA; and Special Assistant to the Executive Vice President David Patton, NT1N. Present as a guest of the Board was Radio Amateurs of Canada (RAC) President Ken Oelke, VE6AFO.

2. The assembly observed a moment of silence in recollection of Radio Amateurs who have passed away since the previous Board meeting, especially Eugene Aber, K7NII; William A. "Bill" Adams, W6BA; Lemuel H. Allen Jr, W7JMH; Jack Andersen, N7DHX; D.G. "Arv" Arvidson, K0DIA; Kenneth Bale, W7VCB; Ray Bishop, KB7HNQ; Douglas A. Blakeslee, N1RM; Thomas Buckner Jr, WB7RFL; Alfred Burke, W3VR; Harold S. Burns, W1KVX; Arturo Carou,

LU1AHC; Robert A. Cerasuolo, W6IJZ; Charles G. Compton, W0AF; Martin Cordes, KL7IR; Lawrence Cullom, W6CRP; William Deatherage, WA7SCN; Dan Dietz, WM6M; James L. Dionne, K1MEM; Alan M. Dorhoffer, K2EEK; Colin C. Dumbrille, VE7NN/VP9C; James Eckersley Jr, K2IXE; Lorraine Evans, KA1KQY; Quinn C. Farabee, N5OWQ; Raymond J. Feeley, K1CSB; Robert R. Funck, KB5GQ; Anthony Grebenc, W7HEC; John Griffin, KL7AMH; Frederick Oliver Hammond, VE3HC; Tim Hannasch, N0PQH; Charles J. "Chod" Harris, WB2CHO; King Hassan II, CN8MH; Robert Hecksher Sr, W4CYU; Michael D. Heimlich, N5AJW; Myron "Mike" Hexter, W9FKC; Ruby Hoskin, W7QME; Russell Husted, WA7SQU; Ozzie Jaeger, W6AD; David Johnson, W7HV; Joseph Johnston, K3VXU; Richard L. Johnston, WA4KUB; Percy Kassner, WA7PRD; Hiram L. "Hi" Kennicott, W9RBD; Frank Koval, W8RSW; Win Kratz, KB0KK; Paul Letsinger, W6SYL; William Long, W3EIV; James Masterson, W7PSO; Martha McGranahan; Polly M. McNutt, W8UOI; Alan Merrill, W1FYR; Ed Moory, W5BDR; Rebecca B. Nathanson, K8NFP; Jerry Nichols, W7AXN; Ernest W. Pappenfus, K6EZ; Robert A. Payne, K1BFG; Hayward "Nap" Perry, W4DHZ; Earle E. Pollock, WA6OSQ; Barkley Poorman, W7MMW; Dale Repp, W0IZ; Charles Robinson, W4WTX; Leslie Schmarder, WA2AEA; Clarence "Steve" Schultz, W0CHJ; Jean Shepherd, K2ORS; Richard Skinner, W7MSP; Francis Sloat, W7AHK; Helen Tanner, K6GJJ; John Tanner, K6EJF; James Titus, W7BOO; Oscar Morales Tur, CO2OM; G. "Sulu" Venkatesalu, VU2GV/A22GV; Julio Vera-Cruz, D44BC; Tom Wagner, W7KCA; Ken Weber, K7CLL; Rosemary Willis, KF6EKP; John Wilson, WA3CQT; Paul M. Wilson, W4HHK; and Dave Winter, W2AUF.

3. On motion of Mr. Kanode, seconded by Mr. Metzger, it was VOTED to approve the agenda for the meeting.

4. On motion of Mr. Haynie, seconded by Mr. Heyn, the Minutes of the 1999 Second Meeting were ADOPTED.

5. Mr. Oelke conveyed the greetings of the Radio Amateurs of Canada, Inc., and thanked the Board for its continuing support. He noted that the RAC's upcoming Board meeting in Cornwall, ON, will include invitations to ARRL and IARU officers.

6. Mr. Metzger conveyed the greetings of the ARRL Foundation, and reported that the Foundation enjoyed an excellent year while surpassing the \$2 million mark in assets, and noted the kick-off of new scholarship programs.

7. At this point President Stafford introduced several new members of the Assembly, and new Directors and Vice Directors from the just concluded election including Mr. Bellows and Ms. Greenheck from the Dakota Division, Mr. Race and Mr. Johnston from the Great Lakes Division, Mr. Walstrom from the Midwest Division, and Mr. Maxwell and Mr. Vallio from the Pacific Division.

8. Following the introductions, the Chair appointed Mr. Wilson, Ms. White, and Mr. Patton as Tellers. The Chair opened nominations for the office of President. Mr. Heyn nominated Mr. Haynie. Mr. Race nominated Mr. Mendelsohn. On motion of Mr. Frenaye, seconded by Mr. Kanode, it was VOTED to close nominations. The Tellers found 9 votes for Mr. Haynie and 6 votes for Mr. Mendelsohn, whereupon the Chair declared Mr. Haynie elected as President. (Applause).

9. The Chair opened nominations for the office of First Vice President. Mr. Haynie nominated Mr. Harrison. On motion of Mr. Fallon, seconded by Mr. Kanode, it was VOTED to close nominations. The Chair declared Mr. Harrison elected as First Vice President. (Applause).

10. The Chair opened nominations for the office of an additional Vice President. Mr. Kanode nominated Mrs. Craigie. Mr. Frenaye nominated Mr. Fallon. Mr. Stinson nominated Mr. Quiat.

Upon motion of Mr. Butler, seconded by Mr. Kanode, it was VOTED to close nominations. The Tellers found 8 votes for Mrs. Craigie, 4 votes for Mr. Fallon, and 3 votes for Mr. Quiat, whereupon the Chair declared Mrs. Craigie elected as an additional Vice President. (Applause).

11. The Chair opened nominations for the office of an additional Vice President. Mrs. Craigie nominated Mr. Kanode. Mr. Stinson nominated Mr. Quiat. Mr. Frenaye nominated Mr. Fallon. On motion of Mr. Butler, seconded by Mr. Race, it was VOTED to close nominations. The Tellers found 9 votes for Mr. Kanode, 3 votes for Mr. Quiat, and 3 votes for Mr. Fallon, whereupon the Chair declared Mr. Kanode elected as an additional Vice President. (Applause).

12. Mr. Mendelsohn took the Chair and opened nominations for the office of International Affairs Vice President. Mr. Butler nominated Mr. Price. Mr. Price declined the nomination citing his present post as President of IARU and his voluntary commitment to the IARU Administrative Council that he would not serve as an officer of either a Member Society or Regional organization at the same time. Thereupon, Mr. Haynie nominated Mr. Stafford. On motion of Mr. Race, seconded by Mr. Kanode, it was VOTED to close nominations. Mr. Stafford was declared elected as International Affairs Vice President. (Applause). Mr. Stafford returned to the Chair.

13. The Chair opened nominations for the office of Treasurer. Mr. Metzger nominated Mr. McCobb. On motion of Mr. Haynie, seconded by Mr. Butler, it was VOTED to close nominations, whereupon the Chair declared Mr. McCobb elected as Treasurer. (Applause).

14. The Chair opened nominations for the office of Secretary. Mrs. Craigie nominated Mr. Sumner. On motion of Mr. Heyn, seconded by Mr. Race, it was VOTED to close nominations, whereupon the Chair declared Mr. Sumner elected as Secretary. (Applause).

15. The Chair opened nominations for the office of Executive Vice President. Mr. Kanode nominated Mr. Sumner. On motion of Mr. Butler, seconded by Mr. Walstrom, it was VOTED to close nominations, whereupon the Chair declared Mr. Sumner elected as Executive Vice President. (Applause).

16. The Chair opened nominations for the office of Chief Financial Officer. Mr. Haynie nominated Mr. Shelley. On motion of Mr. Metzger, seconded by Mr. Frenaye, it was VOTED to close nominations, whereupon the Chair declared Mr. Shelley elected as Chief Financial Officer. (Applause).

17. The Chair opened nominations for Honorary Vice President. On motion of Mrs. Craigie, seconded by Mr. Kanode, it was unanimously VOTED that the following resolution is adopted.

WHEREAS, Hugh A. Turnbull, W3ABC, has served the American Radio Relay League, Inc., for twenty years as Vice Director (1980-82), Director (1982-1996), and Vice President (1996-2000); and

WHEREAS, he has served the League diligently in his home Division, as a member of many Board committees including the Executive Committee, and as a member of the ARRL delegation to two IARU Region 2 conferences; and

WHEREAS, his leadership and devotion to duty have earned both the respect of the Board and the admiration of the membership; and

WHEREAS, since becoming a Radio Amateur in 1932, he has endeavored always to live by the Amateur's Code;

NOW, THEREFORE, BE IT RESOLVED that in recognition of his outstanding contributions to the League and Amateur Radio, the Board of Directors of the ARRL hereby elects Hugh A. Turnbull, W3ABC, to the position of Honorary Vice President, this 21st day of January, 2000.

Mr. Turnbull was given a standing ovation.

The Board was in recess from 9:24 AM until 9:50 AM.

18. The Chair opened nominations for Director members of the Executive Committee for one-year terms. Mr. Roderick nominated Mr. Fallon. Mrs.

Craigie nominated Mr. Butler. Mr. Bellows nominated Mr. Heyn. Mr. Fallon nominated Mr. Frenaye. On motion of Mr. Kanode, seconded by Mr. Roderick, it was VOTED to close nominations, whereupon the Chair declared Mr. Fallon, Mr. Butler, Mr. Heyn, and Mr. Frenaye elected as Executive Committee members. (Applause).

19. At this time Mr. Metzger was invited to offer nominations for Directors of the ARRL Foundation. Mr. Metzger yielded to Mr. Bellows. Mr. Bellows nominated Mr. Frenaye, Mr. Tom Comstock, N5TC, and Mr. Roger Franke, K9AYK, for three-year terms. Mr. Kanode requested the floor and announced his resignation as a Director of the Foundation in view of his election as a Vice President of the ARRL and the fact that a majority of the Directors of the Foundation must be Directors of the ARRL. Whereupon, Mr. Race nominated Mr. Bellows to complete the balance of Mr. Kanode's term. On motion of Mr. Stinson, seconded by Mrs. Craigie, it was VOTED that nominations are closed and Messrs. Frenaye, Comstock, Franke, and Bellows are elected as Directors of the ARRL Foundation. (Applause)

20. At this point, the officers reported on their activities during the second half of 1999. President Stafford began his report with his comments regarding the FCC's recently released Amateur Radio Restructuring Report & Order, FCC 99-412. The President also stressed the organizational importance of updating the strategic plan. First Vice President Mendelsohn's report covered his concerns over the need for better membership recruiting as well as the vital importance of the ARRL's World Wide Web presence. Vice President Harrison reviewed his work with the Central States VHF Society and the need to revisit band planning efforts. Vice President Turnbull reported on his work with several committees and is concerned that the growing number of Amateurs is not reflected in the ARRL membership rolls. International Affairs Vice President Price outlined the framework of International Telecommunication Union and described how the ITU has changed to reflect modern communications with the result that private telecommunications entities have greater influence than in the past. Mr. Price also outlined preparations for the upcoming WRC 2000 in Istanbul. Vice President Harrison assumed the Chair from 11:20 AM until 11:40 AM at which time the assembly recessed for lunch followed by a group photo session.

21. The Chair reconvened the meeting at 1:32 PM with all persons hereinbefore mentioned present, whereupon Mr. Price continued with his report. He described the status of the anticipated review of the international radio regulations that govern the amateur and amateur-satellite services, the United Nations Pactor system, UN special event station 4U0G in Geneva, and a possible call sign assignment for the International Space Station, and offered a short treatise on the UN administration of East Timor. The Board was in recess from 2:40 to 3:03 PM.

22. Mr. McCobb, as Treasurer, reported on stock market activity and the allocation and performance of the investment portfolio over the last year. He also reported on the sale of equity securities on which significant gains have been realized, and the use of some of the proceeds to fund operations within the organization; and the need to declare losses on two investments.

23. Chief Financial Officer Shelley referred to his extensive written report, and addressed the League's financial position and the continued ability of the League to "hold its own."

24. At 3:25 PM, First Vice President Mendelsohn assumed the Chair and yielded the floor to Executive Vice President Sumner who began his report with a brief analysis of the FCC's recently released Amateur Radio Restructuring R&O. Mr. Sumner related that while the ARRL's proposal to the FCC was not adopted as fully as the Board would have preferred, the fact that thousands of Amateurs are now studying intensely to upgrade should be considered a positive occurrence. Mr. Sumner described why he takes exception to the term "dumbing down" which has been often used to describe the FCC's action. Among other things he cited the fact that the written examinations for the two license classes eliminated

by the FCC, the Novice and the Extra Class, had the highest pass rates. Mr. Stafford returned to the Chair at 3:31 PM. Mr. Sumner's report then shifted to the League's ongoing study of the possibility of incorporating electronic QSLing and confirmation into the present and future awards programs. At 3:58 PM First Vice President Mendelsohn again assumed the Chair. The Board was in recess from 4:10 until 4:30 PM at which time Mr. Sumner addressed other topics in his report including VEC issues, auxiliary operation with regard to Kenwood Corporation's "Sky Command" system, and an excellent example of good Amateur Radio exposure with the Alan Kaul, W6RCL-created and NBC-produced television piece that appeared on NBC Nightly News and featured ARRL members Jeff Reinhardt, AA6JR, Steven Reinhardt, K6SJR, and Tree Tyree, N6TR. Mr. Stafford returned to the Chair at 4:40 PM. Mr. Sumner completed his report with a brief discussion of the 2000 ARRL National Convention to be held in conjunction with the Dayton Hamvention, and a description of his proposal to implement an ARRL Certification Program to continue the ARRL's long tradition of providing training and learning opportunities.

25. First Vice President Mendelsohn rose to a point of personal privilege, at which time he delivered his departing comments with recommendations for future ARRL consideration and action, and recapped his fond memories of 17 years of service. (Standing ovation). The Board then recessed from 5:57 PM until 8:32 AM on January 22, 2000, reconvening with all persons hereinbefore mentioned, except Mr. Mendelsohn.

26. General Counsel Imlay supplemented his written report with a review of the relationship between the ARRL and the FCC; the present situation regarding the 2300-2305 MHz band; legal requirements for petitions for reconsideration of FCC rulemakings; low power FM broadcast stations; and PRB-1 enhancement. During the course of discussion the Board was in recess from 9:48 AM until 10:04 AM.

27. Mr. Mansfield, Manager of Legislative and Public Affairs, supplemented his written report with comments on the progress of H.R. 783, the Amateur Radio Spectrum Protection Act of 1999; vehicular cellular phone use and possible legislation against such; and methods and recommendations to assist ARRL officers interact with elected officials.

28. Mr. Rinaldo, Technical Relations Manager, proceeded to report on spectrum management issues; a productive trip to Bangalore, India to participate in the ITU-R Task Group 1/5 on Unwanted Emissions; Telecom 99 in Geneva; and preparation of the ITU's Disaster Communications Handbook.

29. Mr. Roderick, as Chairman, presented the report of the Membership Services Committee. He noted that the MSC agrees with the DX Advisory Committee's recommendation of no changes to the DXCC Yearbook. He also discussed the present backlog of DXCC applications—which is no worse than last year at this time, and the impending move to replace the DXCC Field Representative program with a different program that utilizes "Card Checkers" who are selected by DX clubs and Section Managers.

30. On Mr. Roderick's motion, seconded by Mr. Kanode, it was VOTED that the current DXCC Field Representative program be terminated effective March 31, 2000, with thanks to all DXCC Field Representatives who participated, and replaced with the enhanced DXCC Card Checking program effective April 1, 2000.

31. Mr. Milnes, as Chairman, presented the report of the Volunteer Resources Committee including a recommendation for the International Humanitarian Award.

32. On motion of Mr. Butler, seconded by Mr. Heyn, the following resolution was ADOPTED unanimously:

WHEREAS, Ed Petzolt, K1LNC answered a radio call for help from a missionary in Central America; and

WHEREAS, he used his home Amateur Radio station to provide communications for a life-threatening situation caused when heavily armed gunmen kidnapped four missionaries from the jungles of Northern Guatemala; and

WHEREAS, he established and maintained contact with a missionary-Ham who had escaped; and

WHEREAS, for the next seven hours, Ed Petzolt was the only link between the hostages and the outside world; and

WHEREAS, he used Amateur Radio to handle innumerable phone patches between the missionary and U.S. authorities in the U.S. and Guatemala; and

WHEREAS, through Ed Petzolt, the U.S. Embassy's security officer was able to obtain the coordinates and request assistance from the Guatemalan military and police forces; and

WHEREAS, Ed Petzolt was said to be directly responsible for saving the four hostages; and

WHEREAS, the U.S. Embassy security officer cited Ed Petzolt, K1LNC, as the "real hero" of this crisis,

NOW, THEREBY, BE IT RESOLVED that in view of the nominations tendered by Joe Shenette, K1WPO, John Clews, KD4EC, and Bud Palmer, KC4LCD, the International Humanitarian Award is hereby conferred upon Ed Petzolt, K1LNC, for his tireless efforts to aid hostages seized in the jungles of Central America.

BE IT SO RESOLVED, by the ARRL Board of Directors convened in annual session, January 22, 2000.

33. On motion of Mr. Race, seconded by Mr. Butler, it was unanimously VOTED that the Board authorizes a Club 2000 Achievement Awards Program to reward the accomplishments of ARRL Affiliated Clubs. Implementation will be contingent upon award funding by the ARRL Foundation.

34. On motion of Mr. Butler, seconded by Mr. Heyn, the Board unanimously VOTED to allow VHF/UHF specialty clubs to appoint Awards Managers for the VUCC program only. Mr. Harrison assumed the Chair at 11:20 AM.

35. Mr. Haynie, as Chairman, presented the written report of the Administration and Finance Committee and cautioned that new programs will have to find new funding. The League needs to supplement standard income streams using grant money, therefore the organization will need to hire someone with grant writing expertise. A new telephone system that includes voice mail is necessary at Headquarters. Mr. Haynie also related the Committee's observation that advertising revenue for 1999 was down; that the employees' pension plan needs improvement; and that World Wide Web site enhancement is also necessary.

36. Mr. Stinson discussed the Web site initiative and the report written by Mr. Jon Bloom, KE3Z that included estimates of the funding necessary to fulfill such an initiative.

37. On motion of Mr. Stinson, seconded by Mr. Frenaye, it was VOTED that the ARRL 2000/2001 Plan, as amended to include the ARRL Web Site Initiative, is approved.

38. On motion of Mr. Frenaye, seconded by Mr. Stinson, it was unanimously VOTED that the following Internet/Web privacy policy is approved:

PRIVACY POLICY. The ARRL's use of the Internet and the World Wide Web facilitates the operation of ARRL for the benefit of the membership. Members are best served when information they and others supply via the Web site is kept strictly confidential. It is therefore the policy of the ARRL that no user-supplied individual information shall be divulged to any third party without the user having explicitly authorized such use. In particular:

(A) User names, addresses (including email addresses) and other personal information shall not be supplied to any third party with the following exception: Lists of ARRL member names and postal mailing addresses (but not email addresses) may be supplied to third parties. Each member will be given the opportunity to opt out of such mailings when submitting a membership application (new or renewal). A member may opt out of such mailings at any time by contacting the ARRL Circulation Department.

(B) No use of supplied email addresses will be made unless the user opts in to the specified use, and the user may change these options at any time via the Web site. Exceptions: Transactions initi-

ated by the user, such as catalog orders or submission of a contest log, may result in a direct email response limited to the topic of that transaction. In addition, ARRL may contact individuals from time to time on a one-to-one basis concerning ARRL membership status or organizational policies.

(C) No information about individual use of the Web site (tracking information) will be supplied to any third party. Aggregate information (e.g., counts) may be supplied.

(D) No third party tracking system (e.g., tracking banner ads) will be allowed to operate on the Web site.

Descriptions of the use of collected information will be made available on the Web site. This information will be readily available and of sufficient detail to make clear how ARRL is using personal information, whether collected explicitly in submitted forms or implicitly via "cookies" or machine addresses.

39. On motion of Mr. Frenaye, seconded by Mr. Stinson, it was VOTED that the following over-budget expenses for 1999 are approved: Enforcement Task Force, \$605, and Officers, \$9,929. Mr. Stafford returned to the Chair at 11:47 AM.

40. On motion of Mr. Haynie, seconded by Mr. Kanode, it was VOTED at 11:54 AM that the Board sit as a Committee of the Whole for the purpose of discussing personnel matters. The General Counsel and staff were excused. At 12:30 PM the Committee of the Whole arose and reported to the Board. On motion of Mr. Kanode, seconded by Mr. Stinson, it was VOTED that the report of the Committee of the Whole is adopted. The Board was in recess for lunch from 12:30 until 1:21 PM.

41. At this point, Mr. Haynie announced the committee appointments as follows: *Administration and Finance*: Directors Stinson, Chairman; Metzger, Bellows, Fuller, Vice Director Goddard, Vice President Harrison, and Treasurer McCobb. *Membership Services*: Directors Roderick, Chairman; Frenaye, Day, Walstrom, Heyn, Vice Director Leggette, and Vice President Kanode. *Volunteer Resources*: Directors Race, Chairman; Milnes, Maxwell, Bodson, Fallon, Vice Director Gauzens and Vice President Craigie. *Election*: Directors Butler, Chairman; Race, and Day. *Enforcement*: Vice Presidents Harrison, Chairman; Stafford, Craigie, Directors Heyn, Bellows, Fallon, General Counsel Imlay, and Field and Educational Services Manager White. *Industry Advisory Council*: Director Stinson, Chairman; and Vice Director Goddard. *RFI Task Group*: Director Bodson, Chairman; and Lab Supervisor Ed Hare, WIRFI. *Public Relations*: Dave Bell, W6AQ, Chairman; President Haynie, and Vice Director Kleinhaus. *RF Safety*: Vice Director Huntington, liaison. *SAREX/ARISS*: Vice President Harrison, liaison. *Technology Task Force*: Vice President Harrison, Chairman; Directors Maxwell, Frenaye, and Technical Relations Manager Rinaldo. *President's Roundtable*: Director Fuller, liaison.

42. Mr. Metzger, as Chairman, presented the report of the Election Committee. The committee oversaw the ballot counting for the terms of office for Director and Vice Director that began on January 1, 2000.

43. Mr. Stafford presented the Executive Committee report and yielded to Mr. Heyn, who opened discussion regarding a proposed amendment to Article 11 of the Articles of Association. No action was taken.

44. Vice President Harrison, as Chairman, presented the written report and discussion regarding the Enforcement Task Force. FCC enforcement is working well, and according to the FCC's Riley Hollingsworth, the ARRL is responsible for creating the increase in enforcement—which will continue into the foreseeable future. Mr. Hollingsworth will be invited to a future Board meeting to discuss enforcement activity.

45. Mr. Harrison yielded the floor to Ms. White to deliver the report of the SAREX Working Group. The Group is presently concentrating on equipping the International Space Station with NASA providing \$140,000 for equipment testing.

46. Mr. Harrison then presented the Interim Report of the Technology Task Force on behalf of the Chairman, First Vice President Mendelsohn. The Task Force's Technology Working Group, chaired by Mr. Rich Moseson, W2VU, received

over 150 proposals regarding new technology for Amateur Radio in the 21st century. The proposals fell into nearly 30 different topic areas with the majority found in (1) high-speed digital; (2) digital/digitized audio; (3) RF LANS/WANS; and (4) "Ham Internet."

47. Vice President Turnbull, as Chairman, presented the written report of the RFI Task Group. The group believes that the increase in FCC enforcement may provide some relief, if handled carefully, from various unintentional radiators such as power distribution systems, neon signs, welding operations, and cable modems. In the case of radiation from modems, there has been modest improvement where they were part of the carrier's installation. In those cases where the devices are individually owned, they are hard to trace and user cooperation can be expected to be very difficult to achieve.

48. Mr. Maxwell, as Board liaison, reported on activities of the RF Safety Committee, chaired by Dr. Greg Lapin, N9GL. The committee is making an effort to locate and rewrite obsolete RF safety-related text in ARRL publications. The group also had a lively discussion regarding a "news story" on ABC television's 20-20 television newsmagazine that pertained to RF safety and the use of cellular phones. The program included interviews of experts who really were not experts in the field of RF safety, and overall left the committee members convinced that the show was an excellent example of sensationalist journalism lacking any scientific basis.

49. Mr. Kleinhaus delivered the Public Relations Committee report for which he is the Board liaison. The committee is satisfied with the hiring of a professional PR firm to handle the restructuring news.

50. Mr. Stinson, as Chairman, reported on the activities of the Industry Advisory Council. Mr. Paul Middleton, KD6NUH, of Kenwood, has joined the committee. The Japan Amateur Industry Association (JAIA) has agreed to share its existing standards with the IAC. The U.S. market is now the largest market for Amateur Radio products in the world, so JAIA is quite receptive to ideas emanating from IAC and ARRL concerning ways to further stimulate the market in the U.S., including technology, interconnection, and software standards.

51. Mr. Fuller presented the report from the President's Roundtable for which he is Board Liaison. The group is concentrating on fund raising and development activities and recommends that the ARRL add a qualified development officer/capability to the staff. Additionally the Roundtable members developed a proposal to create a one-page brochure for insertion into shortwave, scanner and family radio service equipment packaging. The brochure should briefly explain Amateur Radio/licensing and provide information on ARRL membership.

52. Vice President Harrison reported on the Contest Advisory Committee's activities as submitted by its Chairman, Lew Sayre, W7EW. The major issue involved the possibilities for changing the exchange in the ARRL International DX Contest. No changes were recommended.

53. The Board was in recess from 2:36 PM until 3:00 PM, at which time Mr. Kanode reported on the activities of the DX Advisory Committee. The status of Macau (XX9) is as of the meeting undetermined, as is East Timor. If China receives a call sign block from the ITU for use in Macau it will remain as a DXCC country. The DXCC Yearbook will not have a format change. The Chesterfield Islands DXCC qualifications issue has been sent to the DXAC for review.

54. President Stafford presented the report of the ARRL ARDF Coordinator, Joe Moell, K0OV. Later this year the ARDF World Championships will be held in Nanjing, China, and the ARRL is expected to receive a formal invitation to send a team to this event.

55. Mr. Bellows reported on the creation of, and activities of, the Ad Hoc Antenna Case Assistance Committee. This committee was formed by President Stafford at the December 4, 1999 Executive Committee meeting in Irving, TX. Directors Fallon, Bellows, and General Counsel Imlay were appointed. Since April 1983 the ARRL has not funded individual antenna cases. The Executive

Committee found good reason to depart from this policy with regard to an appeal to the 11th Circuit U.S. Court of Appeals in *Persin v. Seminole County, Florida*. This was largely due to the main issue in this case and its timing, and the ability to take advantage of some useful language in the otherwise disappointing FCC order denying PRB-1 clarification. The Ad Hoc Committee was formed to review the policy and to decide whether to recommend changes. The committee's preliminary conclusion is that it may be time to begin funding a small number of cases in Federal Courts of Appeal. The committee will further refine its recommendations for a final report at a later time.

56. Mr. Roderick announced to the assembly that representatives of seven local radio clubs had invited Board meeting attendees to join them for an informal gathering after the close of the meeting.

57. At 3:19 PM the Board next moved to consider Directors' motions.

58. On motion of Mr. Butler, seconded by Mr. Kanode, the Board VOTED unanimously to instruct the Secretary to cast an affirmative vote on IARU Proposal 231, concerning the admission to membership of Association des Radio-Amateurs de Nouvelle-Caledonie.

59. On motion of Mr. Heyn, seconded by Mr. Butler, the Board VOTED unanimously to amend Standing Order 114 to read: "A monthly award consisting of the cover from *QST*, properly mounted and engraved, shall be made to the person or persons contributing the best article for the particular issue as determined by membership response. The Executive Vice President is to assess membership response primarily by survey on the ARRL Members Only Web site or similar means."

60. On motion of Mr. Haynie, seconded by Mr. Heyn, the Board VOTED unanimously to authorize Ms. Rosalie A. White to sign checks on behalf of the Executive Vice President.

61. On motion of Mrs. Craigie, seconded by Mr. Bellows, the Board VOTED to instruct the Executive Vice President to file comments consistent with longstanding ARRL policy, opposing a waiver requested by Kenwood Communications Corp. that would permit auxiliary operation in the 144-148 MHz band by users of Kenwood's Sky Command System.

62. On motion of Mr. Bellows, seconded by Mr. Fallon, the Board voted unanimously to ADOPT the following resolution:

WHEREAS, Tod Olson, KOTO has served the ARRL and the Dakota Division with distinction and honor as ARRL Dakota Division Vice Director from 1976 to 1982 and as ARRL Dakota Division Director from 1982 to 1986 and from 1994 to 2000;

AND WHEREAS, in addition to his service as a Division Director, he has served, with distinction, 4 years as International Affairs Vice President;

AND WHEREAS during the course of his 20 years of service on the Board he has been a member of numerous ad hoc committees, every standing committee and has been Chair of the Administration and Finance Committee on two occasions;

AND WHEREAS, his ideas and efforts were instrumental in many of the ARRL's most successful activities during his tenure on the Board, including the electronic publication of League materials and the Members Only Web page;

AND WHEREAS throughout his superior service on the ARRL Board of Directors, Tod Olson has maintained the highest standard of honor, integrity and devotion to the ARRL and Amateur Radio;

NOW THEREFORE in recognition of his many contributions and years of dedication and service the Board of Directors of the American Radio Relay League hereby elects Tod Olson, KOTO, as Director Emeritus this 22nd day of January, 2000. (Applause).

63. On motion of Mr. Roderick, seconded by Mr. Race, the Board VOTED unanimously that the President review the current relationship between the ARRL and the FCC, and provide the Board of Directors at the July, 2000, Board of Directors meeting, with a report on that relationship. The report should include: recommendations for any changes in strategy or policies; a review of the recent FCC Report and Order regarding license restructuring and action to take in response to the FCC Report and Order; and a feasibility study on the addition of ARRL personnel in Washington

D.C., with the specific responsibility for Washington D.C., relations.

64. Mr. Fallon rose to a point of personal privilege to note the generous contribution of \$1,000 from the Garden State Amateur Radio Association to the ARRL Fund for the Defense of Amateur Radio Frequencies.

65. On motion of Mr. Maxwell, seconded by Mr. Kanode, the Board VOTED unanimously that the ARRL Certification Program is established.

Emphasis shall be given to member participation in the program definition phase.

The ARRL certification program is dedicated to the memory of Ethel M. Smith, K4LMB, and shall be funded initially through the Ethel M. Smith Exceptional Merit Stipend.

The Executive Vice President is authorized to increase staffing by one person for the purpose of hiring one fulltime manager/coordinator to support this effort.

66. On motion of Mr. Kanode, seconded by Mr. Fallon, the Board VOTED unanimously to present the 1999 Bill Leonard, W2SKE, Professional Media Award to Mr. Jeff Holland of the Monroe, NC *Enquirer Journal* for his story "Ham Radio Enthusiasts Believe Hobby Will Continue to Cast its Magic Spell."

67. On motion of Mr. Stinson, seconded by Mr. Heyn, the Board VOTED unanimously to file a petition asking for partial reconsideration of the FCC license restructuring decisions requesting the FCC to: (1) Maintain records that indicate whether a Technician class licensee has passed a Morse code exam and is qualified for Novice/Technician Plus HF privileges; and (2) Stipulate that any amateur who provides proof of having passed a FCC-recognized Morse code exam prior to April 15, 2000 shall be entitled to credit for the Morse code exam element.

68. On motion of Mrs. Craigie, seconded by Mr. Butler, the Board VOTED unanimously to approve the following events as ARRL conventions: Georgia Section Convention at the Atlanta Hamfest, June 2-3, 2000; and the Maryland State Convention at the Baltimore ARC Hamfest, March 31-April 1, 2001.

69. On motion of Mr. Bellows, seconded by Mr. Race, the Board VOTED unanimously to ADOPT the following resolution:

WHEREAS, the ARRL has, for many years, mailed new Amateurs invitations to join the ARRL including materials and brochures showing the benefits of League membership;

AND WHEREAS, the ARRL Members Only Web Page has been one of the most popular membership benefits among new Technician and Technician Plus Amateurs who are League members;

AND WHEREAS, the exposure to the

WebExtra web page for a limited period may help to convince new Amateurs of the value of ARRL membership;

NOW THEREFORE, the staff is directed to study the feasibility and benefit of offering limited and temporary access to the ARRL Members Only Web Page as part of the ARRL mailings to new licensees.

70. On motion of Mr. Roderick, seconded by Mr. Maxwell, the Board VOTED unanimously that the Membership Services Committee, with the aid of the Membership Services Department, shall develop a program for increasing knowledge of, and interest in, the A-1 Operator's program. Special attention should be paid to a program that would be attractive and useful to Technician class operators.

71. On motion of Mr. Maxwell, seconded by Mr. Heyn, the Board VOTED unanimously to create the ARRL Historical Committee. The purpose of this committee is to develop a plan for storage of historical artifacts and archival material related to Amateur Radio, and to explore means for future public access and display of such material. A preliminary report shall be submitted to the Board at the July 2000 meeting, with the final report submitted for the Annual Meeting in January 2001. Mr. Haynie announced that the committee would consist of Directors Frenaye, Chairman; Maxwell, Legislative and Public Affairs Manager Mansfield, and a yet-to-be-named member from outside the Board.

72. On motion of Mr. Kanode, seconded by Mr. Milnes, the Board VOTED unanimously that the ARRL shall file an application with the FCC to become a club and military recreation station call sign administrator.

73. On motion of Mr. Stinson, seconded by Mr. Butler, the Board VOTED unanimously that the Membership Services Committee is requested to examine the power limits for SSB operation in the QRP entry category and adjust the rules as deemed appropriate.

74. On motion of Mr. Frenaye, seconded by Mr. Walstrom, the Board VOTED unanimously to ADOPT the following resolution:

WHEREAS, the ARRL and the National Association of Radio and Telecommunications Engineers, Inc. (NARTE) share the common objective of furthering technical investigation and advancement of knowledge in modern telecommunications, and

WHEREAS, a Memorandum of Understanding between the two organizations has been proposed in the furtherance of a mutually beneficial relationship,

NOW, THEREFORE, be it

RESOLVED by the Board of Directors of the ARRL, in meeting assembled, this 22nd day of January, 2000, that the President of the ARRL is hereby authorized to sign the Memorandum of Understanding with NARTE.

1. On motion of Mr. Mendelsohn, the minutes of the December 4, 1999, Executive Committee meeting were approved in the form in which they had been distributed.

2. The committee reviewed a report from the Secretary on a petition to move Pasco County from the Northern Florida Section to the West Central Florida Section. The petition was found to be in order. On motion of Mrs. Craigie, the committee voted to recommend to the Board that the Secretary be instructed to send ballots to the full ARRL members in Pasco County in order to determine their opinion on the question and to report the results to the Board.

3. Mr. Sumner reported that Puerto Rico Section Manager Raul Escobar, KP4ZZ, had not submitted Section News columns for the past four months. Despite repeated attempts, the Field and Educational Services Manager has been unable to contact him. He is apparently unable to fulfill his responsibilities as Section Manager. Mr. Butler confirmed that Mr. Escobar appears to be inactive in managing the affairs of the ARRL field organization in Puerto Rico. On motion of Mr. Fallon, it appearing to be in the best interests of the ARRL to do so, the committee voted that the office of Section Manager for Puerto Rico is declared vacant. In accordance with the rules and regulations of the ARRL Field Organization, the Field and Educational Services Manager will appoint a replacement to serve out the remainder of the term of office.

4. Mr. Sumner reported that reports on the frequency limits for auxiliary operation and on plans

Mr. Harrison assumed the Chair at 4:15 pm.

75. On motion of Mr. Kanode, seconded by Mr. Heyn, the adoption of the following resolution:

WHEREAS, the ARRL petitioned (RM-8737) the FCC to make greater use of spread spectrum (SS) technologies, and

WHEREAS, the FCC, in response to the ARRL petition, adopted a Report and Order (WT 97-12) that removed the restrictions in the Amateur Radio Service that limit the SS emission types (e.g., spreading codes) that amateurs may transmit, and

WHEREAS, the FCC believes that the changes identified in the Report and Order will allow Amateur Radio Service licensees to experiment with additional SS emission types, allow Amateur Radio operators to develop innovations and improvements to communications products and develop new communications technologies, facilitate the ability of the Amateur Radio Service to contribute to the development of SS communications by allowing amateur stations to transmit and experiment with SS technologies currently used in consumer and commercial products, and promote more efficient use of spectrum allocated to the Amateur Radio Service,

RESOLVED, that the ARRL Board directs the Executive Vice President and the General Counsel to file a petition at the appropriate time with the FCC to permit Spread Spectrum emissions in the 219-220 MHz band.

But, after discussion, the motion was LOST.

76. On motion of Mr. Stinson, seconded by Mr. Fallon, the Board VOTED unanimously that the matter of interference to Amateur stations from Phonex products radiating on approximately 3,525 kHz is referred to the RFI Task Group who shall report to the Board at the next meeting.

77. President Stafford returned to the Chair at 5:00 PM.

78. On motion of Mr. Haynie, seconded by the entire assembly, it was VOTED to recognize and thank Mr. Mendelsohn for his long years of dedicated service to the ARRL, and to thank staff.

79. On further motion of Mr. Haynie, seconded by the entire assembly, it was unanimously VOTED to thank staff, especially Lisa Kustosik, KA1UFZ, for their hard work to ensure the success of this function. (Applause).

80. There being no further business, following informal comments of those present the Board adjourned *sine die* at 5:27 PM. (Time in session as a Board: 13 hours, 8 minutes; as a Committee of the Whole: 36 minutes; direct authorizations, \$10,534). Respectfully submitted,

David Sumner, K1ZZ
Secretary

for National Convention 2000 in Dayton had been completed as requested by the committee at its December 4 meeting.

5. On motion of Mr. Heyn, the following Category 1 clubs were declared affiliated:

Four State Amateur Radio Club, Joplin, MO
Museum of Science and Industry Amateur Radio Club, Tampa, FL

Texas Adventist Emergency Communication, Cleburne, TX

The ARRL now has the following numbers of active affiliated clubs: Category 1, 1816; Category 2, 19; Category 3, 129; Category 4, 15; Total, 1979.

6. On motion of Mr. Fallon, the holding of the following ARRL conventions in the year 2000 was approved or their earlier approval by mail vote was ratified:

Maine State, March 24-25, Lewiston, ME
Southeastern VHF Conference, April 14-15, Atlanta, GA

Montana State, July 14-16, East Glacier, MT
South Texas Section, July 28-29, Austin, TX
Arizona State, July 28-30, Flagstaff (Ft. Tuthill), AZ

New England Division, August 26-27, Boxboro, MA

There being no further business, the meeting was adjourned at 9:08 PM.

Respectfully submitted,

David Sumner, K1ZZ
Secretary



MINUTES OF EXECUTIVE COMMITTEE Number 462 Memphis, Tennessee January 20, 2000

Agenda

1. Approval of minutes of December 4, 1999, Executive Committee meeting
2. Consideration of report on petition to move Pasco County from Northern Florida to West Central Florida Section
3. Section Manager issues
4. Status of reports requested by Executive Committee
5. Affiliation of clubs
6. Approval of conventions
7. Other business

Pursuant to due notice, the Executive Committee of the American Radio Relay League, Inc., met at 8:41 PM Thursday, January 20, 2000, at the Memphis Marriott Hotel, Memphis, Tennessee. Present were the following committee members: President Rodney Stafford, W6ROD, in the Chair; First Vice President Stephen A. Mendelsohn, W2ML; Executive Vice President David Sumner, K1ZZ; and Directors Kay Craigie, WT3P, Frank Fallon, N2FF, and Fried Heyn, WA6WZO. Also present were other ARRL officers, directors, and vice directors, including Southeastern Division Director Frank Butler, W4RH, as well as Field and Educational Services Manager Rosalie A. White, WA1STO, and General Counsel Christopher D. Imlay, W3KD.

Elecraft K2 HF Transceiver Kit

Reviewed by Larry Wolfgang, WR1B
Senior Assistant Technical Editor

Okay, let's start out with a show of hands. How many of you have built a Heathkit? That's what I thought. Practically everyone who has been a ham for more than 20 years has assembled at least one of those classics—and the rest of you have had to listen to our reminisce about it. With detailed step-by-step instructions, you didn't have to be an engineer or even a practiced technician to successfully complete a Heathkit.

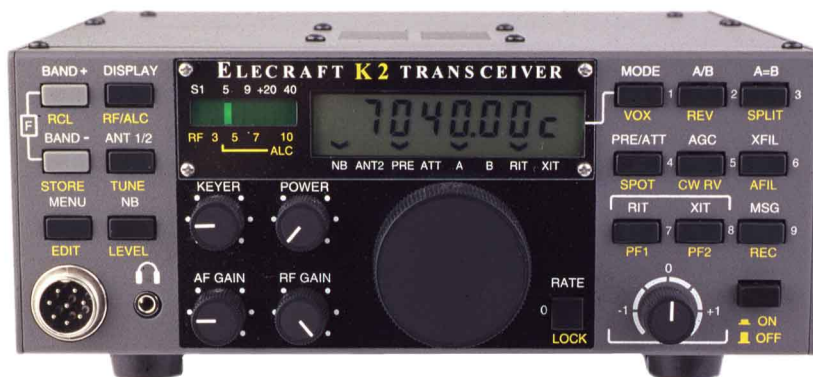
As an ever-increasing number of features were added to commercially built electronic equipment, and as the circuitry became more miniaturized and complex, it became harder and harder for Heathkit home-built products to compete with the automated assembly lines of the big electronics manufacturers. With diminishing cost savings, and a growing level of compromise in features, fewer and fewer people were building Heathkits.

I wish I had a nickel for every time I've heard someone lament that "No one can build their own gear anymore." A lot of hams are missing out on the fun of building in spite of the number of reliable mail-order parts suppliers and the numerous small companies that currently offer kits.

No More Whining

Are you one of those who mourn the demise of Heath's Amateur Radio products line—or have you just been looking for that next suitable construction project? No matter. Roll up your sleeves and warm up your soldering irons, because Elecraft (that's pronounced like a combination of "elegant craft") has eliminated your reason for complaining.

With the first prototype shown at the Dayton Hamvention in 1998, the Elecraft K2 has been under development for several years. Wayne Burdick, N6KR, has designed several kit radios for the Northern California QRP Club over the years. In fact, Bob Dyer, KD6VIO, formed Wilderness Radio to distribute several of Wayne's kits. (The NORCAL/Wilderness Sierra project has been described in *The ARRL Handbook* for several years.) So when Wayne Burdick and Eric Swartz, WA6HHQ, teamed up to form Elecraft, everyone knew the result would be a fine radio!



The QRP community has always been a hotbed of activity for building and modifying gear. QRP operators work plenty of DX, operate contests and generally have fun ragchewing with other hams. Whether they choose 5 W or less than 1 W, these hams still find plenty of contacts and have tons of fun! While the K2 is not "just" a QRP transceiver, its roots are clearly there.

When the basic Elecraft K2 kit is completed, the result is a well-appointed CW transceiver that covers 80 through 10 meters and provides an adjustable power output level that ranges from hard-core QRP levels up to about 12 W. A memory keyer is even included! You can add an optional SSB adapter, a 160-meter module, a two-stage noise blanker, and/or an automatic antenna tuner for even more radio. Install the internal 2.9 Ah battery option and grab an antenna, key and/or microphone and you'll have a very compact, portable, self-contained system that is ready to go almost anywhere.

Elecraft plans to eventually offer an RF amplifier option for those who just have to have more power. A computer interface option is also on the way. Other options that are currently "in the works" include an Antenna Switch/SWR Bridge, an Audio

Filter for CW and a Transverter Interface. No telling what else might transpire when Wayne and Eric put their heads together.

Building a Kit Radio

Let's start out with some kit building basics. ALWAYS follow the directions. Take an inventory of the parts before you start stuffing the circuit boards. This will help you become familiar with everything in the kit and will make it easier to locate any special hardware or components during the assembly process. This will also allow you to spot any missing parts, so that you can contact the manufacturer for replacements before you reach that step in the assembly process.

I spent nearly three hours inventorying this kit. There were no missing pieces.

You will need a clean, well-lit work area, a grounded, temperature-controlled soldering iron and a few basic tools—such as needle-nose pliers, close trimming wire cutters and an assortment of screwdrivers. An antistatic mat or grounded wrist strap is important for safe handling of static-sensitive transistors and ICs. Elecraft suggests that you use Kester 2% silver solder to build your kit. The solder is not included.

A digital multimeter is always a handy piece of basic test equipment. If your meter also measures capacitance, so much the better. This can be very useful for verifying component values before installation. Of course, the more and better your complement of test equipment, the easier it will be to align and—if necessary—troubleshoot the radio later, but a fully equipped test bench is not a requirement. In fact, during the course of the assembly, the

BOTTOM LINE

The Elecraft K2 represents a remarkable advance in the level of sophistication and performance available in a build-it-yourself format. While assembly will require some proficiency with basic electronics assembly techniques, with Internet access, valuable assistance can be as close as your keyboard.

Table 1

Elecraft K2, serial number 00495

Manufacturer's Claimed Specifications

Frequency coverage: Receive and transmit, 3.5-4; 7-7.3; 10-10.2; 14-14.5; 18-18.2; 21-21.6; 24.8-25; 28-28.8 MHz.^{1, 2}

Modes of operation: USB, LSB, CW.

Power requirement: 8.5-15 V dc, receive, 0.25 A (no signal); transmit, 2.0 A, at 13.8 V.

Size (hwd): 3.4×7.9×9.9 inches; weight, 3.3 lb. With optional internal battery, 5.75 lb.

Receiver

SSB/CW sensitivity: preamp off, -130 dBm; preamp on, -135 dBm.

Blocking dynamic range: preamp off, 133 dB; preamp on, 125 dB.

Two-tone, third-order IMD dynamic range: preamp off, 96 dB; preamp on, 97 dB.

Third-order input intercept point: Not specified.

Second-order intercept point: preamp off and on, +70 dBm.

S-meter sensitivity: Not specified.

Receiver audio output: 2 W into 4 Ω, THD not specified.

IF/audio response: Not specified.

IF rejection: Not specified.

Image rejection: Not specified.

Transmitter

Power output: SSB, CW, 0.1-10 W.

Spurious-signal and harmonic suppression: 40 dB.

SSB carrier suppression: 40 dB or greater.

Undesired sideband suppression: Not specified.

Third-order intermodulation distortion (IMD) products:

CW keyer speed range: 9 to 50 WPM.

CW keying characteristics: Not specified.

Transmit-receive turnaround time (PTT release to 50% audio output): Not specified.

Receive-transmit turnaround time ("tx delay"): Not specified.

Composite transmitted noise: Not specified

Measured in the ARRL Lab

Receive, 2.9-4.1, 6.5-7.3, 10-10.5, 13.2-14.7, 17.1-22; 23.2-30.4 MHz; transmit, as specified.

As specified.

Receive, 0.3 A (maximum volume, no signal);³ transmit, 2.5 A (maximum), tested at 13.8 V.

Receiver Dynamic Testing

Noise floor (MDS), 700 Hz filter:⁴

	<i>Preamp off</i>	<i>Preamp on</i>
3.5 MHz	-133 dBm	-137 dBm
14 MHz	-131 dBm	-138 dBm

Blocking dynamic range (700-Hz IF filter):

	<i>Preamp off</i>	<i>Preamp on</i>
3.5 MHz	136 dB	127 dB
14 MHz	136 dB	128 dB

Two-tone, third-order IMD dynamic range (700-Hz IF filter):

	<i>Preamp off</i>	<i>Preamp on</i>
3.5 MHz	100 dB	95 dB
14 MHz	97 dB	98 dB

	<i>Preamp off</i>	<i>Preamp on</i>
3.5 MHz	+20.9 dBm	+5.1 dBm
14 MHz	+21.6 dBm	+6.9 dBm

14 MHz, preamp off, +75 dBm; preamp on, +76 dBm.

S9 signal at 14 MHz: preamp off, 115 μV; preamp on, 19 μV.

2 W at 0.6% THD into 4 Ω.

Range at -6 dB points, (bandwidth):⁵

CW-N: 625-1000 Hz (375 Hz)

CW-W: 211-1471 Hz (1260 Hz)

USB: 370-2222 Hz (1852 Hz)

LSB: 526-2000 Hz (1474 Hz)

Preamp off, 89 dB.

Preamp on, 74 dB.

Transmitter Dynamic Testing

SSB, typically 1-10 W; CW, typically 0.1-12 W.

44 dB. Meets FCC requirements for spectral purity.

51 dB.

>56 dB.

See [Figure 1](#).

9 to 41 WPM.

See [Figure 3](#).

S9 signal, 35 ms. Unit is suitable for use on AMTOR.

SSB, 23 ms.

See [Figure 2](#).

All dynamic range measurements are taken at the ARRL Lab standard spacing of 20 kHz.

¹Plus 1.8-2 MHz with 160-meter option.

²Receive range extends beyond the transmit range but performance there is not specified.

³Special settings for battery-powered operation can be engaged that reduce the receive current requirement to 153 mA.

⁴Refer to the IF/audio response data for the actual filter bandwidth.

⁵Filter passband ranges are adjustable (see text).

partially built K2 acts as a voltmeter, ammeter, frequency counter and wattmeter!

Let's Get Started

The K2 arrives neatly packed inside a small cardboard box. Inside you will find plastic bags labeled with the corresponding circuit board names: "Control," "Front Panel," "RF" and one bag with assorted hardware labeled "Misc." None of the

components are surface-mount. The cabinet panels, display, speaker and main tuning knob are wrapped in kraft paper to protect them from scratches or other damage.

The *Owner's Manual* is a 162-page spiral-bound document. The detailed assembly and alignment instructions are definitely reminiscent of the legendary Heath manuals. There is currently a short list of manual errata, with clear instructions about

the required changes in the text. A separate sheet lists a few important precautions.

Some builders have reported completing their basic K2s in about 35 hours—I prefer to work at a more relaxed pace. If you simply stuff components on the boards and solder them in, you will learn little about the circuit and even less about electronics. By locating the components on the schematic diagram and tracing the circuit

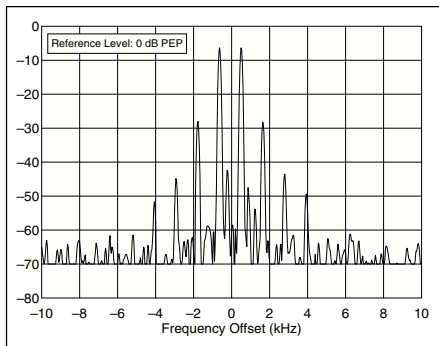


Figure 1—Worst-case spectral display of the Elecraft K2 transmitter during two-tone intermodulation distortion (IMD) testing. The worst-case third-order product is approximately 29 dB below PEP output, and the worst-case fifth-order product is down approximately 44 dB. The transmitter was being operated at 10 W PEP output at 28.350 MHz.

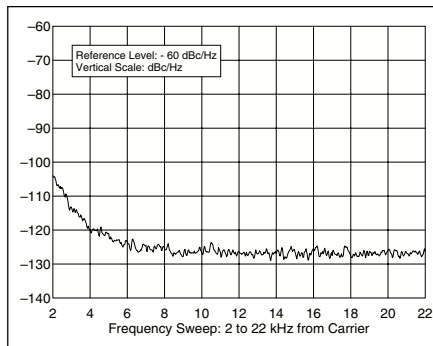


Figure 2—Worst-case spectral display of the Elecraft K2 transmitter output during composite-noise testing. Power output is 10 W at 3.52 MHz. The carrier, off the left edge of the plot, is not shown. This plot shows composite transmitted noise 2 to 22 kHz from the carrier.

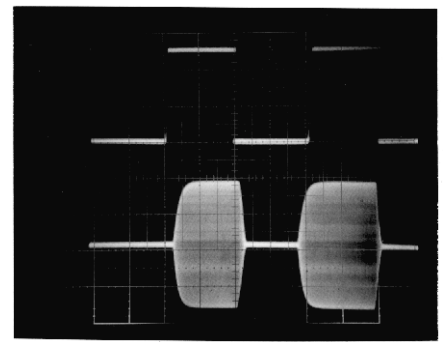


Figure 3—CW Keying waveform for the Elecraft K2 showing the first two dits in full-break-in (QSK) mode using external keying. Equivalent keying speed is 60 WPM. The upper trace is the actual key closure; the lower trace is the RF envelope. Horizontal divisions are 10 ms. The transceiver was being operated at 10 W output at 14.2 MHz.

as you go, you can actually begin to understand how all these pieces come together to make a radio. Altogether, we spent close to 60 hours building the review radio, including the SSB adapter and noise blander options.

Assembly begins with the control board and the front panel (display) board. A photograph of the completed control board appears in [Figure 5](#). Once these are finished, you are instructed to add a few components to the main board—the RF board—and then take some preliminary resistance measurements. Some of the enclosure panels are assembled and the RF board is temporarily installed. The display board and the front panel board are then plugged into the RF board in preparation for some initial power-on tests.

Wait. Did that say “plug in” these boards? Yes, that’s right. There are virtually no wiring harnesses or point-to-point wiring in the K2. All the connections between the subassembly circuit boards are accomplished with mating multipin connectors. Elegant!

Once I had reached this point I plugged in the power supply cable and—with fingers firmly crossed—pushed the ON button. ELECrAft popped up in the display, shortly followed by 7100.0! Success! It worked. Now to run through the first round of alignments... But wait. The buttons didn’t seem to be responding properly. I pressed a few buttons, held the **LOCK** button, then pressed it again to return to normal VFO operation. Now everything seemed fine—but there must be something that’s not quite right. Now what? It was 10 PM, and I wanted to work on it a bit longer. I sure couldn’t call Elecraft at that hour...

Enter the Internet

Regis—I’ve decided to use one of my

“lifelines.” There’s a K2 e-mail reflector with lots of other builders on line. I wondered if anyone else had run into this problem. I fired off a quick message to the reflector and waited for a response.

I received a quick reply from Tom Hammond, NOSS. Tom is one of the “Field Testers” who built one of the first 100 K2 kits and provided lots of feedback and suggestions to Wayne and Eric. Tom told me to check the solder connections on the pushbuttons. A few other replies came in from builders who hadn’t run into this type of problem, but they encouraged me to make a more thorough visual inspection. It was getting late; I closed up shop for the night.

The following day I decided to give Wayne a call. He helped me narrow it down to the **A=B** and **RIT** switches. Wayne explained that two of the switch posts feed a signal through from one portion of the circuit board to another, and he believed that that was the source of my problem.

After reheating the posts and flowing on a bit more solder, the problem was solved.

It is certainly possible to build a K2 without Internet access, but there is a wealth of information available there. In fact, this may be one of Elecraft’s most valuable assets. Many questions are answered by individuals who encountered similar problems. In addition, there are discussions about circuit modifications and updates from Elecraft.

The technical support from Elecraft is excellent. Wayne and Eric monitor the reflector, and if they see a question that wasn’t answered satisfactorily they will soon fire off a note with the corrections or clarifications. Of course for real tough problems, e-mail sent directly to Elecraft or a phone call to their technical support line is sure to get you the help you need. What other manufacturer lets you communicate directly with the design team?

Just monitoring the reflector can be



Figure 4—The three main circuit boards and their corresponding parts bags. At this stage I had completed the control board and was working on the display board.

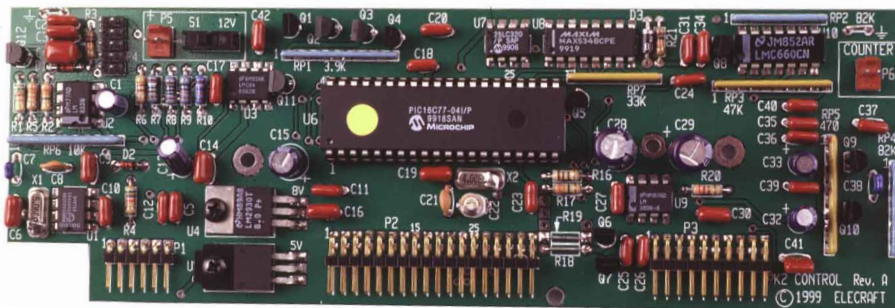


Figure 5—A closer look at the completed control board. The glass epoxy boards have plated through holes and the component identifications and locations are clearly silk-screened on the boards.

quite informative. Someone mentioned that they really missed not having a dimple on the main tuning knob. Someone else noticed that the knob on their Yaesu FT-100 was about the same size. Subsequent postings indicated that the parts sales staff at Yaesu quickly learned that all these knobs were being ordered for Elecraft K2 radios—not Yaesu FT-100s. Within two days they had sold out their entire stock of replacements!

In another posting, a European builder circulated a question regarding degraded receiver performance after installing the noise blanker option. After several questions about measurements and hearing from a few others who had noticed a similar effect, Wayne and Eric went to work tracking down the problem. Their response? A change in the design of the noise blanker and an upgrade kit for the earlier version.

The optional noise blanker that we received with our initial K2 shipment several months ago was the “original” version. With it installed, our lab tests revealed reduced intermodulation distortion dynamic range and blocking dynamic range and a degraded third-order intercept point—even with the noise blanker deactivated. Elecraft provided us with the upgrade. [Table 1](#) reflects the performance that we measured with the latest version of the noise blanker installed.

If you have Internet access, once you’ve

ordered your kit, I highly recommend that you subscribe to the reflector. Send an e-mail to majordomo@qth.net with **subscribe elecraft** in the body of the message. You can also view the list archives at <http://www.elecraft.com>.

Back to Building

After completing the first-stage alignment and testing, the boards are removed from the partially completed enclosure and the remainder of the components are installed on the RF board. Most of your efforts will be in assembling the receiver section. Here you will wind your first toroidal inductors and transformers. The K2 contains a total of 14 toroidal inductors and six toroidal transformers. In addition, there is one transformer wound on a binocular core.

Because time was running short to complete this review for this special QRP issue, once I’d finished up the receiver section, I turned the kit over to Zack Lau, W1VT, for completion of the transmitter section and the final alignment. Zack reported no major difficulties, except that I had installed RFC3 in L16’s spot and vice versa. This caused some problems with the receiver on 40 and 80 meters. Once Zack located and corrected my error, everything was fine. In my defense, the label for RFC3 is directly between the locations for these

two inductors. Don’t let this happen to you! Be careful to identify the correct location for *every* part before you install it, and recheck before soldering.

Alignment and Testing

The alignment steps involve adjusting a few tuned inductors and variable capacitors to set the voltage controlled oscillator and the various tuned circuits. The control software performs a procedure to linearize the VFO operation across the tuning range. You also adjust the crystal filter settings and the BFO settings for each mode and band.

The filter scheme is especially interesting. Most commercial transceivers come with a “stock” filter for sideband and a narrower filter for CW operation. In addition to these there is usually room to add one or two additional optional filters. The K2 uses a scheme of diode switching and software control to provide four crystal filter settings for each mode. These are adjustable, so you can tailor the bandwidths to suit your operating style. The factory default settings for CW are 1.5 kHz and 700, 400 and 100 Hz.

You also set up four filter bandwidths for SSB reception. The defaults are 2.2, 2.0, 1.8 and 1.6 kHz. (You can still receive SSB, RTTY and the data modes even with a basic “CW Only” K2).

If you should decide to add the SSB adapter, there is yet another filter—optimized for SSB operation at about 2.3 kHz. In that case, filter 1 is optimized for SSB transmit and filter 2 is optimized for SSB receive. Filter 3 can be set as a narrow bandwidth SSB filter. The default is 1.6 kHz. Filter 4 can even be set at a narrower bandwidth—useful for the data modes.

Some builders have reported confusion about the procedures for aligning the filters and BFO settings. When we followed the steps in the *Owner’s Manual* we came close, but the settings were not “perfect.” There have been several discussions about this on the e-mail reflector, including postings about programs to download that will allow you to use your computer’s sound card as an audio spectrum analyzer. Elecraft has indicated that they will be changing some of the procedures in the manual.

The K2’s control software includes extensive diagnostics. If you turn on the radio and the display shows “LOW BATT,” the software is telling you that the battery or power supply voltage is too low, a display of “HI-CUR” on transmit indicates that the user-programmable current level was exceeded, and so on. Troubleshooting charts are provided. This could be especially helpful if you run into difficulties getting the radio working initially.

How Did It Do in the Lab?

The technical performance of radios comes out during lab testing. Usually, the transmit IMD and receiver dynamic range results separate the toys from the big boys. Usually!

On SSB, this radio is clean. As seen in [Figure 1](#), the high-order intermodulation products are quite good. The CW keying is nice, too, as shown in [Figure 3](#). No key clicks from this baby!

But where the K2 really shines is in its receiver performance. On average, transceivers positioned in the upper tiers of the popular HF product lines (in the \$2000 to \$3500 price class) exhibit blocking dynamic range measurements somewhere in the vicinity of 130 dB and a two-tone, third-order dynamic range near 95 dB. The K2’s receiver performance compares very favorably to that of the samples of the high-end radios we’ve recently examined, turning in impressive 136/97 dB figures for these parameters.

The fact that a radio in this price class—and a home-built one at that—can stand proudly in such company is a remarkable accomplishment. This is the first-generation radio that Elecraft has produced. I can’t wait to see the next one!—*Ed Hare, W1RFI/QRP, ARRL Laboratory Supervisor*



Figure 6—An internal view with the top cover removed. The display and control board plug into the RF board along its front edge. Note the almost total absence of point-to-point wiring. The rear apron is pre-punched for a wide variety of available and proposed optional accessories.

A Few Circuit Details

The K2 uses a modular design that allows flexibility and opportunities for future expansion. The display board provides the user interface, including the display and all the controls. The control board contains the main microprocessor, the dc control signal circuits, the AGC circuit and the audio amplifier. The RF board serves as a “motherboard” for these two boards and any optional boards. In addition to all the RF circuitry, this board contains the I/O controller and the latching relays that select the operating band.

The receiver is a single-conversion superheterodyne that employs double-tuned band-pass filters for each band. It uses a down-conversion scheme with an IF of 4.915 MHz. The individual band-pass filters provide superior IMD performance when compared to up-converting designs that often use a single low-pass filter to remove image products. Because the BFO is microprocessor controlled, its frequency is reset for USB and LSB reception as well as CW on either side of the carrier.

In transmit, the signal flow reverses, with the output signal going through the band-pass and low-pass filters. The RF amplifier can produce over 10 W and is designed to provide good immunity to high SWR. PIN-diode T-R switching results in silent QSK operation.

The microprocessor firmware controls just about every aspect of the K2’s operation. There are many routines that run behind the scenes. For example, the PLL reference oscillator is linearized on each band by an auto-calibration routine. The results of this routine are stored in EEPROM tables for use each time you turn on the radio. The firmware also supports features like built-in test equipment, a memory keyer, dual VFOs with split operation and frequency and band stacking memories. Provisions are included for a

variety of optional modules, such as the SSB adapter, the noise blanker, the automatic antenna tuner and so on. With just 8 kilobytes of memory in the PIC 16C77 microcontroller, it’s readily apparent that the control program code has been highly optimized!

The I/O controller is a coprocessor IC. The SSB adapter board carries its own coprocessor, as do some of the other optional modules. This has several effects. It simplifies the primary control circuitry and allows the accessory coprocessors to “go to sleep” when they aren’t needed, saving valuable current for battery operation. It also reduces the amount of digital noise on the RF board that might cause receiver interference.

Speaking of saving battery current, several other power saving features are worth mention. The S meter/RF output meter LED bargraph can be set to bar, dot or off. The LCD display backlighting can be turned off. With the LCD set for nighttime operation, the LED bargraph brightness is reduced slightly and when the LCD is set for daytime operation the LED bargraph is brighter to make it easier to see. Latching relays are used for all filter, VCO and option switching, so there is no relay current drain during normal operation. By careful power management, the total receive current requirement can be as low as about 150 mA. This is an order of magnitude lower than typical HF transceivers.

The K2 uses a PLL synthesizer IC and a wide-range, band-switched voltage controlled oscillator. A 12-bit DAC gives the fine-tuning steps on the VCO, which is the PLL reference oscillator. Three DPDT latching relays select one of eight VCO ranges for the synthesizer.

A 5-pole variable bandwidth crystal filter is used in front of the IF stage. (With the SSB adapter, a separate fixed filter is

switched in.) This filter is optimized for narrow bandwidths of about 200 to 500 Hz, but it can be adjusted wider or narrower if desired. A second two-pole crystal filter follows the IF amplifier. This filter can also be tuned, but over a smaller bandwidth range. The AGC signal is derived from the IF amp output using an auxiliary low frequency IF of about 150 kHz.

The Finished Product

The completed K2 is an HF transceiver with many of the features that we have come to expect on the ready-built commercial rigs. The small-sized front panel has a nice ergonomic design that allows my big clumsy fingers to find the right controls without knocking all the other settings out of whack. The well-thought-out layout results in very intuitive operation.

The main tuning knob, in the center of the front panel, enjoys plenty of space around its perimeter. Four control knobs to the left side of the front panel adjust the keyer speed, the output power, the audio gain and the RF gain. One knob to the right of the main tuning knob controls transmit and receive incremental tuning.

The rest of the control operations are handled by push-buttons. Each button serves two purposes—one when you tap it briefly and another when you hold it in for a second. Labels above and below each button indicate these functions.

With these buttons you can step up or down through the bands, directly punch in frequencies, store and recall memories (ten memories are available), select the mode, choose VOX or PTT operation, switch between VFO A and B, equalize the VFO settings, select split frequency operation, reverse the transmit/receive frequencies momentarily and automatically scan for CW signals over a programmable frequency range. You can also activate the preamplifier and RF attenuator, select the fast or slow AGC (and even turn the AGC off!), cycle through the filter options and enable RIT and/or XIT. The **SPOT** key turns on the sidetone oscillator during receive so that you can match the received tone of a CW signal to your sidetone oscillator to ensure that you are tuned to zero beat. **CW RV** lets you listen on the opposite side of a signal.

The **MSG/REC** button provides access to the 9 message memories in the built-in electronic keyer. Hold this button to begin the memory record, then tap a number button and send the message you would like to store. When you pause for more than a few seconds (or if you tap the **MSG/REC** button again) recording stops. You play the memory contents by tapping **MSG/REC** and then the appropriate number button. Messages can also be repeated at a programmable interval.

Like most transceivers these days, the K2 uses a series of menu options to control other less-used functions. For example, by tapping the **MENU** button and then turning the tuning knob until “ST L” is shown, you can adjust the sidetone level. Dial up “ST P” and you can adjust the sidetone/receive offset pitch. The “INP” setting allows you to select either a straight key or the normal or reversed input from paddles, and “IAB” selects either Iambic A or Iambic B type keying. Iambic A is similar to Curtis Iambic A mode; Iambic B is similar to Super CMOS Keyer III mode.

You adjust the keyer speed by turning the **KEYER** knob. When you do, the display changes to show the speed in words per minute. The keyer speed adjusts between about 9 and 40 WPM. A second after you stop adjusting the keyer speed, the display changes back to show the operating frequency. Turning the **POWER** knob also brings up a display of the approximate output power setting. If you hold the **TUNE** button to activate this feature, the power measuring circuit displays the output power.

If you decide to install the SSB feature, you can configure the front panel microphone 8-pin mike connector to match those of several of the common commercial manufacturers. Pin-out tables are provided to make this easy. Both the microphone gain and the level of SSB processing can be varied in menu settings. VOX operation is also included.

Operating Impressions

Anytime I begin to operate a new radio I feel a certain excitement. There is the thrill of checking out the features on the newest equipment, along with the knowledge that what gets reported in a *QST* Product Review will help readers decide if this radio suits their needs. There is also a certain amount of trepidation that I will miss some feature or overlook some shortcoming, and that my omissions will mislead someone. I normally spend time carefully reading the operating manual, and spend a LOT of time listening to the receiver before I try transmitting.

With the K2, however, I just wanted to get on the air and make contacts! Here is a radio that I built almost entirely with my own hands. For a ham, there is no anticipation sweeter than that of making the first contact using something you assembled—an antenna, a station or a transceiver. You feel as if you installed a little piece of your heart and soul during the assembly process.

It was the Saturday morning of the Michigan QRP Contest. I rolled the power back to just under 5 W and went searching

for activity on 40 meters. In a few minutes I had Maine, Maryland and Michigan in the log. Since this was a QRP contest, I guess those contestors were listening for weak stations, but this was much easier than I expected.

I decided to load the exchange in one of the keyer memories. The nine memories each have 153 bytes of storage, which is equivalent to about 100 to 150 Morse characters.

Later that day I tuned across a small pileup on 20 meters. Martti, OG2R was running stations from Finland. Several of the stations he worked told him about their amplifiers and antenna farms. Would the K2 and my tri-bander be able to make it? I had my doubts, but I cranked the power up to 10 W and tried a couple of calls anyway. On the third call he asked for “the station ending in Bravo!” Maybe there is something to this “K2 mojo” thing they are always referring to on the e-mail reflector.

During the week I checked into the 3905 Century Club net on 75 meters. The SSB receive audio was crisp and clear. I found it very easy to tune in stations for clear voice reception. While awaiting my turn to transmit on the net, a station in Ohio called Josephine, VE7JMC, in British Columbia. I was hearing her weak signals with some difficulty—about a 3 × 3. The station in Ohio could not copy his 3 × 3 report from Josephine, even though he announced that he was running 1 kW. No contact. When it came my turn to transmit, I decided to try VE7JMC. I sent Josephine a 3 × 3 report. When I copied my 2 × 2 report from her, I was grinning from ear to ear. Several other stations called me on their turn—they wanted my QRP contact!

I also checked into the Radio Amateur Society of Norwich (Connecticut) 10-meter net. Most of these local operators know my real voice, so I thought they would be a good source of transmit audio reports. They all reported good sounding transmit audio.

A Few Minor Complaints

Surely there must be some shortcomings to the K2 operation? I found a few points where I might wish for something different.

The RIT/XIT frequency control does not have a center detent or other convenient way to zero the frequency. You have to adjust the knob so the frequency display shows no change when you toggle between RIT on and off. RIT clear would be a handy feature, especially for contest operation.

If you hit the AGC button the display shows either “FAST” or “SLOW,” and toggles between these two indications even when the AGC is turned off. It took me a while to notice that there is a flashing

decimal point to the right of the last digit on the display when the AGC is deactivated.

While there is a considerable amount of frequency coverage outside of the ham bands, true “general coverage” receive is not included.

The main tuning knob on the review unit exhibits a very slight eccentricity. I may need to adjust the tension or spacing between the cabinet front and the knob. Repositioning the knob a quarter or half turn on the shaft may reduce this effect or eliminate it altogether.

I don’t consider any of these nits major problems.

Conclusion

The Elecraft K2 is probably not a good choice for a “first kit,” but several first-time builders have successfully completed it. Without some component handling and soldering skills though, you could easily damage a circuit board or make some other costly mistake. If you do decide to tackle this as a first kit, work carefully!

The camaraderie of the individuals participating in the e-mail reflector, the information available on Elecraft’s Web site and the level of technical support provided by the company all combine to form a recipe for success.

Once you’ve completed the kit, you’ll end up with a modern amateur transceiver that possesses a good variety of the most desirable bells and whistles and exhibits an overall level of performance that compares very favorably with factory-built transceivers that cost several times as much (see the sidebar on page 72).

Should the time come to make a repair or to try a circuit modification to further improve the performance, you’ll have the confidence to remove the covers, study the schematic diagram, and give it a go. You may not understand all of the design details nor know why a certain component was used in a particular location, but you assembled this radio yourself, and that can make it a little easier dive in.

I would like to thank Zack Lau, W1VT, for his help completing the kit. Thanks also to Mike Tracy, KC1SX, for his help with the lab testing and to Joe Bottiglieri, AA1GW; Rick Lindquist, N1RL; and Jean Wolfgang, WB3IOS, for their assistance with this review.

Manufacturer: Elecraft, Box 69, Aptos, CA 95001; 831-662-8345; fax 831-662-0830; <http://www.elecraft.com/>.

Price: K2 Kit (CW), \$549; SSB Option, \$79; Noise Blanker, \$35; 160-meter/2nd receive antenna input, \$29; Internal 2.9 Ah battery, \$79; Internal automatic antenna tuner, \$139.

The Alinco DJ-V5TH Dual-Band FM Hand-Held Transceiver

Reviewed by Joe Bottiglieri, AA1GW
Assistant Technical Editor

Alinco's latest product offering for the dual-band hand-held market, the DJ-V5T, has been taking a bit of ribbing for mimicking the physical design cues of Yaesu's FT-50RD, ICOM's IC-T8A or Kenwood's TH-G71A. These H-Ts are relatively short, husky little handfuls that use "clamshell" type construction—the battery packs attach to the back side of the chassis. But hold on a minute here... perhaps Alinco should be the company credited with *starting* this trend. Their DJ-F1T was one of the first H-Ts to sport this configuration—way back near the dawn of the last decade!

Highlights and Features

The DJ-V5T is a "one band at a time" VHF/UHF transceiver. As is the case with most of the similarly positioned dual-band H-Ts offered by their competitors, dual simultaneous receive and full duplex crossband operation is not supported. If these capabilities are important to you, you'll find them in Alinco's top-of-the-line hand-held transceiver—the DJ-G5T.

Some of the DJ-V5T's most notable features include 200 memory channels with six-character alphanumeric tagging, separate VHF and UHF call channel memories, priority watch, independent CTCSS encode and decode frequencies, tone burst, DTMF paging, autodial memories, wire cloning and a good variety of scanning arrangements. For this review we purchased the "H" version—this particular package comes with a 9.6 V 600 mAh NiCd battery pack.

Unlike most of the presently available H-Ts, the current version of the DJ-V5T does not come with expanded receive coverage outside of the amateur bands. While the FM broadcast band (76 to 108 MHz WFM) is included, reception of AM aircraft, NOAA weather radio, VHF marine, public service and commercial radio frequencies is not supported. To its credit, the entire 420 to 450 MHz range is covered. Alinco has recently released some good news concerning this lack of receive frequency agility. I'll fill you in on the details later.

A Jump Start

The 'V5 bucks the current trend towards the use of multiple menus for basic control operations—and this makes working the radio seem very intuitive. Once I had the transceiver unpacked and the battery charged, a careful look at the legends printed above the buttons and a few minutes spent poking the various keys and twiddling the knobs and I was up and running—without ever having to refer to the

Instruction Manual.

While I'll admit that I have a bit of an unfair advantage (I've had the opportunity to play around with more than my share of H-Ts over the years), I'm confident that anyone with a good basic understanding of repeater operation should be able to easily duplicate this feat.

A note for first time buyers of amateur FM equipment: if "repeater offset" and "CTCSS encode" are unfamiliar terms, do yourself a favor and find an Elmer to help you over the first few hurdles!

The manuals included with most of the current VHF/UHF gear will not provide detailed information on the fundamentals of repeater operation. You wouldn't rely on an automobile owner's manual for basic driver instruction—would you?

Possible sources for help range from local hams and radio clubs to Internet reflectors and discussion groups. You can also find excellent explanations and useful tips on an incredible range of Amateur Radio operating topics—including FM repeater and simplex operation—in *The ARRL Operating Manual* (ARRL order #6141) and *Ham Radio Made Easy* (ARRL order #5374).

The *Instruction Manual* that's packed with the transceiver is well organized. The instructions are clearly explained and nearly every section includes helpful diagrams. Alinco also supplies a complete and legible schematic.

Control Arrangements

The 'V5's rotary encoder and volume control are a dual concentric knob set located on the left side of the top panel. The main knob controls the encoder; volume adjustments are made using the lower ring. These knobs are large, easy to grip and slightly tapered. Speaker/microphone jacks and a female SMA antenna connector are also positioned on the top panel.

The squelch can be set to one of six levels by pressing and holding a **MONI/SQL** button and dialing through the choices with the encoder.

A large LCD window is located on the upper portion of the front panel. It displays black segments on a gray background. The frequency digits and the icons that appear in the display are large enough for very easy viewing. A side mounted **LAMP** button will activate backlighting for both the display and the DTMF pad. Backlighting can be set to automatically switch off a few seconds after the last keystroke or to remain on until manually deactivated.

The middle section of the front panel includes a column of three oval-shaped buttons—**POWER**, **FUNC/LOCK** and **BAND/**

SET. To the right of these is a large speaker grill. A red/green transmit/busy LED indicator is positioned just above the grill.

The lower portion of the front panel contains the typical four-row four-column DTMF pad. Each of these keys has multiple assignments. The primary operations are printed in white lettering to the left of the buttons, the secondary operations—accessed by first pressing the **FUNC/LOCK** button—are printed in orange just above. All of the legends are easy to read and generally logically titled—**PO** for power output level, **T SQL** for CTCSS settings, **RPT** for repeater offset frequency and direction and so on.

There's only one menu—the "set" menu. This contains just six items—keypad beep, bell paging, auto power off, battery save, DTMF autodial transmit delay time and a "split" setting.

While the other operations in this menu are self-explanatory, the split feature is unique. When activated, split allows you to use a memory frequency for transmitting and the VFO frequency for receiving. This arrangement can be used for crossband half-duplex operation—AO-27 satellite communications is one example.

Operating Impressions and the Lab Numbers

As I mentioned earlier, operating the DJ-V5T seems pretty straightforward.

BOTTOM LINE

The Alinco DJ-V5TH dual-band H-T squeezes respectable performance and a nice selection of features into a compact, rugged looking chassis.



Table 2**Alinco DJ-V5TH, serial number T000670****Manufacturer's Specifications**

Frequency Coverage: Receive, 76-108 MHz (WFM), 144-148 MHz, 420-450 MHz; transmit, 144-148 MHz, 420-450 MHz.

Power requirements: 4.0-15.0 V dc; receive, 0.22 A; transmit, 1.6 A (maximum, high power).

Receiver

Sensitivity: 12 dB SINAD, VHF, 0.16 μ V; UHF, 0.18 μ V; WFM, 1.0 μ V.

Two-tone, third-order IMD dynamic range: Not specified.

Two-tone, second-order IMD dynamic range: Not specified.

Adjacent-channel rejection: Not specified.

Spurious response: 60 dB.

Squelch sensitivity: Not specified.

Audio output: 500 mW at 10% THD into 8 Ω .

Transmitter

Power Output: (H / L1 / L2), 6 / 1 / 0.5 W.

Spurious signal and harmonic suppression: 60 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): 3.8x2.3x1.6 inches; weight, 11.8 ounces.

Measured in ARRL Lab

Receive and transmit, as specified.

Receive, 0.21 A (maximum volume, no signal); transmit, 1.4 A, tested at 13.8 V.

Receiver Dynamic Testing

FM, 12 dB SINAD, VHF, 0.14 μ V; UHF, 0.16 μ V; WFM, 100 MHz, 0.74 μ V.

20 kHz offset from 146 MHz, 52 dB,
10 MHz offset from 146 MHz, 81 dB;
20 kHz offset from 440 MHz, 51 dB,
10 MHz offset from 440 MHz, 69 dB.

VHF, 69 dB.

20 kHz offset from 146 MHz, 55 dB;
20 kHz offset from 440 MHz, 53 dB.

IF rejection, VHF, 96 dB; UHF, 143 dB;
image rejection, VHF, 97 dB; UHF, 60 dB.

At threshold, VHF, 0.14 μ V; UHF, 0.16 μ V.

633 mW at 10% THD into 8 Ω .

Transmitter Dynamic Testing

146 MHz, 4.0 / 0.6 / 0.3 W; 440 MHz,
3.4 / 0.6 / 0.3 W with EBP-46N battery pack;
146 MHz, 5.5 / 1.1 / 0.4 W; 440 MHz,
5.6 / 1.1 / 0.5 W with 13.8 V dc.

VHF, 65 dB; UHF, 60 dB. Meets FCC requirements.

Squelch on, S9 signal, VHF, 172 ms; UHF, 168 ms.

VHF, 450 ms; UHF, 540 ms.

Nearly all of the control settings you'll typically need to program and use this radio can be easily located using just the keypad labels. You won't find yourself constantly scrolling through hidden menus searching for the particular setting you need to vary.

The receive audio—for both FM amateur reception and WFM FM broadcast band reception—is excellent. The level and quality of the audio is remarkable. I often found myself using the radio for listening to FM music and news broadcasts at my desk at work. Overall, the audio is more than loud and crisp enough for hand-held and mobile operations, and should be plenty adequate for even the noisiest public service applications.

The transmit audio was typically described as "communications quality." The low frequencies in your voice are somewhat attenuated. There is a two-level mike gain control. The "HI" setting seemed to work best for my voice level—but I know of a few particularly enthusiastic operators on our local repeater that could definitely benefit from the "LOW" microphone gain setting.

If you look over the lab data presented in Table 2 and compare these figures to the numbers that we measured on the other one band at a time dual-band H-Ts we've looked at recently, you'll find that the performance of the DJ-V5T stacks up very well to the competition.

It scores near the top of this class for amateur band receive sensitivity. The VHF two-tone third-order IMD dynamic range at 10 MHz offset also came in at the high end of the range. Couple this with decent IF and image rejection numbers and a very respectable adjacent channel rejection figure, and the DJ-V5T proves that it has what it takes to live up to Alinco's reputation for radios that will perform well even in tough RF environments.

The DJ-V5, with the snap on belt clip attached, is nearly 2 inches deep. As with a number of these clamshell-style radios, this can make right-handed operation challenging. Even with my fairly large hands, it is a bit of a stretch to hold the unit comfortably in my right palm and still be able to reach the PTT button with the tip of my index or middle finger. Left-handed use seems much easier—my thumb naturally lands in the proper position to operate the PPT, MONI/SQL and LAMP buttons, and even the POWER, FUNC/LOCK and BAND/SET buttons on the left side of the front panel are in easy left thumb range.

The volume control could use a bit more drag in its action (or perhaps a slight reduction in its diameter)—I often found myself inadvertently changing the volume setting while turning the rotary encoder. With the level of audio this radio is capable of, it can sure cause a scene when the

squelch breaks with the volume cranked up all the way!

Imminent Improvements


Alinco recently began advertising an improved version of this transceiver—and this will be great news for the scanner buffs among us. The new version will provide a vastly expanded receive range right out of the box (no surgery required)—an impressive 76 to 999 MHz range (yes folks, the cellular phone frequencies will be excluded)—and will also include the AM receive mode for those who enjoy aircraft band listening.

Alinco is offering this new version in a choice of two colors—either the traditional black plastic enclosure or a new "see through" shell. The plastic used in this one has a slight blue tint to it.

It looks like Apple Computers and the pager manufacturers may have started a bit of a design trend here... Is the ham radio market ready for such a stylin' transceiver? I guess we'll just have to wait and see.

Manufacturer: USA Alinco Branch, 438 Amapola Ave, Suite 130, Torrance, CA 90501; 310-618-8616; fax 310-618-8758; <http://www.alinco.com>.

Manufacturer's suggested retail price: \$350. Typical current street price: \$280.

Bid solicitations for Product Review equipment appear on page 46. 

Questions, Comments, Confusion Follow in Restructuring's Wake

Questions, comments, and some confusion have been the order of the day in the weeks since December 30, when the FCC finally dropped the other shoe on Amateur Radio restructuring. At least in the short term, the FCC's momentous action—reducing the number of license classes to three and establishing 5 WPM as the sole Morse code examination element—has polarized the Amateur Radio community.

Brisk demand for study materials—especially General and Amateur Extra class license manuals—suggests many amateurs plan to hit the books in the coming weeks, some hoping to beat the April 15, 2000, implementation date for the new system. Current Amateur Radio study materials remain valid at least until the new rules become effective.

After April 15, 2000, the FCC will only issue Technician, General, and Amateur Extra class licenses. Novice and Advanced licensees will retain current operating privileges and may renew indefinitely. The current “no-code” Tech license will continue to be available, and Technicians who also pass the 5 WPM Morse code exam will gain current Tech Plus HF privileges.

The ARRL plans to file a *Petition for Partial Reconsideration* on two points in the FCC's restructuring *Report and Order*. The League wants the FCC to keep records that indicate whether a Technician class licensee has passed a Morse code exam and is qualified for Novice/Technician Plus HF privileges. The League also wants the FCC to stipulate that any ham providing proof of having passed an FCC-recognized Morse code exam prior to April 15, 2000, is entitled to Element 1 (5 WPM Morse code) examination credit.

No one loses any privileges under the FCC's new plan, and, with one limited exception, no licensee is in a position to automatically gain any privileges when April 15 rolls around. The FCC took no action to reallocate any amateur bands, but it hinted that it might revisit the issue at some point in the future.

“This is the best news I have heard since bread and butter!” exclaimed Jimmy Stewart, WD9FHY, who said he's been trying unsuccessfully for years to boost his code proficiency. Others were not nearly as charitable, asserting that the revised requirements represented more “dumbing down” that would hasten the demise of

Amateur Radio and open the bands to “riff-raff” and “CB types.”

The reduced Morse code requirement hit a nerve with some hams who felt it “devalued” their upper-class licenses. The reaction of Allen Blacker, W9ALB, was apt and to the point: His e-mail message spelled out “Boooooo” in Morse characters. Others, however, felt the new code requirement minimized an unnecessary obstacle.

A somewhat ambivalent Paul Elliott, N3GPU, saw opportunity in the new system, as reflected in his comments posted on eHam.net. “We need to welcome—and mentor—the people who will come into ham radio and move up the ranks under the new system,” he said. “We have to take responsibility for building quality into the Amateur Service. We cannot expect the FCC or ARRL to do it.”

By and large, comments to ARRL Headquarters have been upbeat. In the weeks since the FCC's December 30 announcement HQ staff members have been bombarded with questions from enthusiastic hams wanting to know whether to upgrade now or wait for the new system or about other details of the new licensing requirements.

A revised Amateur Radio question pool for the three surviving license classes was expected to be released on or around February 1 by the National Council of Volunteer Examiner Coordinators' Question Pool Committee. The QPC has been meeting by telephone and via e-mail

to put together workable question pools in time for the April 15 implementation date.

The new licensing plan created a lone and limited upgrade for those who now hold or have held a Technician license or a *Certificate of Successful Completion of Examination* (CSCE) before March 21, 1987. Those individuals may claim credit for a General class license under the new system. Affected individuals will have to apply through a Volunteer Examiner test session, providing documentary proof of having completed the requirements for a Technician license prior to March 21, 1987.

The FCC has said to send requests to verify a pre-March 21, 1987, Technician license in writing to FCC, 1270 Fairfield Rd, Attn: Amateur Section, Gettysburg, PA 17325. Requests must include name, address, telephone number, date of birth, call sign issued at that time, and date of Technician license grant. “These requests must be researched on microfiche, so they will be very time-consuming,” an FCC spokesperson said, adding that no one should expect an overnight response. Applicants also may contact the FCC contractor ITS Inc (visit <http://www.itsdocs.com/>). For a fee, ITS will research prior FCC licensing records and should be able to provide necessary documentary proof.

“Questions” continued on [page 79](#).



RICK LINDQUIST, N1RL

ARRL HQ staff member Lisa Kustosik, KA1UFZ, gets some help from her junior op, Adam, 11, on New Year's Eve at Hiram Percy Maxim Memorial Station W1AW. Several members of the ARRL Headquarters family who volunteered for “Y2K watch” enjoyed an evening of casual operating from W1AW on several modes and bands. Appropriately, some 2000 contacts were logged—including a few dozen for Straight Key Night. At the appropriate hour, operating activity halted just long enough to toast in the new year. Adam says that spending New Year's Eve at W1AW, watching (and helping) mom and her colleagues operate, and getting a QSL card for working W1AW from home have piqued his interest in Amateur Radio. He's now studying to get his own ticket.

FCC News

ENHANCED AMATEUR ENFORCEMENT ENTERS A NEW YEAR

As the new year got under way, FCC Special Counsel for Amateur Radio Enforcement Riley Hollingsworth hinted he might have to shed his nice-guy image and start breaking bad on hardcore offenders. Hollingsworth explained that poor or lax FCC enforcement in the past led him to be more forgiving of rulebreakers during his first full calendar year in the enforcement chair. Now, those who persist in operating outside of the stated basis and purpose of Amateur Radio "are beginning to try our patience," he said. "I can't say we're going to be as compassionate this year."

Hollingsworth said he expected to continue his focus on incursions into the 10-meter band by unlicensed operators, especially as propagation improves, and on equipment certification issues. "We're very concerned about the illegal equipment we see for sale at hamfests," he said.

Overall, however, malicious interference remains "the basic problem," as he put it. "We're going to use the High-Frequency Direction Finding Center at Laurel [Maryland] more this year" to track down rulebreakers, he said. In addition, Hollingsworth now has enhanced monitoring tools at his Gettysburg office, allowing him access to the HFDF Center's 14 antenna fields plus VHF-UHF monitoring "pods" that can be moved around as necessary. "We have dial-in capabilities to all of our antenna fields and to the pods, so we can cover HF, UHF, and VHF anywhere in the country, right here from the Gettysburg office," he explained.

"It's a force multiplier, so to speak," Hollingsworth said of the new capabilities.

Hollingsworth also says he's upbeat about the future of ham radio and the FCC's Amateur Radio restructuring plan announced December 30. "I think that it's a good idea to simplify things a little bit as far as the number of license classes," he said, referring to the new three-tier system.

Hollingsworth said he believes Amateur Radio needs more young blood to keep it going in the future, and he thinks the new licensing system might help in that regard. He declined, however, to comment further on the specific policies and rules the FCC's Wireless Telecommunications Bureau laid down in its *Report and Order*, saying it would not be appropriate.

• **FCC seeks call sign administrators:** On March 1, 2000, the FCC will begin accepting requests from organizations interested in processing applications for Amateur Radio club and military recreation station call signs. "We will accept the services of any organization meeting the requirements of Section 4(g)(3)(B) of the Communications Act," an FCC *Public Notice* explained. The FCC adopted an *Report and Order* October 21, 1998, that established the use of volunteer organizations for this purpose. An organization wanting to be designated a Club Station Call Sign Administrator must be an Amateur Radio organization; have tax-exempt status under Section 501(c)(3) of the Internal Revenue Code of 1986; provide voluntary, uncompensated and unreimbursed administrator service; be able to submit information to the FCC in an electronic batch file; and retain application information for at least 15 months and make it available to the FCC upon request. Interested organizations must file requests with the FCC, Wireless Telecommunications Bureau, Public Safety and Private Wireless Division, 445 Twelfth St SW, Room 4-C330, Washington, DC 20554, ATTN: Club Station Call Sign Administrator. Qualified organizations that successfully complete a pilot autogrant batch filing project will be authorized as Club Station Call Sign Administrators. The FCC will announce names and addresses of Club Station Call Sign Administrators once they have been selected. For more information, contact William T. Cross, 202-418-0680, bcross@fcc.gov.—*FCC Public Notice*

• **FCC shifts license color:** The ARRL has learned that the FCC's Gettysburg office has begun issuing new Amateur Radio license documents on blue paper instead of the beige stock that hams have become accustomed to for many years. Wireless Telecommunications Bureau personnel say the new licenses are printed on whatever color "safety paper" stock they have available. "Our policy/procedure is to print all licenses on safety paper, so they can be easily identified as our official documents, but we don't have a requirement as to the color," an FCC spokesperson told the ARRL, adding that the last shipment received was blue. The change apparently has nothing to do with the recently announced FCC license restructuring.

Amateur Enforcement News

As a recent batch of FCC correspondence reveals, malicious interference cases continue to comprise the bulk of amateur enforcement issues facing FCC Special Counsel for Amateur Radio Riley Hollingsworth. Recent allegations of deliberate and malicious interference have involved both HF and VHF/UHF operation. Here's a sampling:

• On December 30, 1999, the FCC wrote Amateur Extra licensee Frederick J. Roll, NU5M, enclosing a tape recording it said was of a November 13, 1999, QSO between NU5M and KC1ZQ on 14.313 MHz that allegedly included harassing behavior. Hollingsworth said the tape was made by the FCC's High-Frequency Direction Finding Center in Columbia, Maryland. The FCC requested that Roll provide a full explanation of the transmissions and said his response would be used to determine what action the FCC would take in the matter. The FCC also set aside a recent vanity call sign grant to Roll, pending the outcome of the case.

• The FCC put Amateur Extra licensee Arthur Visser, W9ART, on notice December 30 that it intends to designate his license for revocation if it learns of additional allegations of malicious interference by the licensee. The FCC says it's received "numerous complaints regarding malicious interference and jamming" apparently originating from Visser's station on 3.950 MHz, most recently on Christmas Eve. The FCC had issued Visser a *Warning Notice* January 8, 1999, regarding similar allegations. Hollingsworth told the ARRL January 6, 2000, that he and Visser had been in touch by telephone "in an effort to resolve the issues" that led to the FCC letter.

• The FCC wrote General licensee Jeffrey J. Pipenur, WA8IKW, in late December, setting aside his license renewal, granted last October 19. Hollingsworth told Pipenur that the FCC had monitoring evidence indicating that the licensee has "deliberately and maliciously interfered with radio operations of other amateur licensees on 3.865 MHz" last April 13 and 14 and last November 21. The FCC also has sent Pipenur tape recordings of his April 1999 transmissions and requested his response. "This matter will have to be resolved before we can make a decision on your renewal application," Hollingsworth told the licensee.

• The FCC has received renewed allegations of VHF repeater interference in connection with Anthony J. Barben Jr, N2WNF, of Brooklyn, New York. Hollingsworth has told the ARRL. In June 1997, Barben consented to a 15-month license suspension as part of an FCC effort to resolve a rash of interference cases in the New York City-Long Island area. The suspension followed accusations of willful and malicious interference, using obscene or indecent language and failure to identify. On December 28, 1999, the FCC requested that Barben retake his Technician class Amateur Radio examination under the supervision of FCC personnel by January 30, 2000.

• Repeater interference cases involved two stations in California. The FCC sent Advanced licensee Jensen W. Woods, AH6MX, a *Warning Notice* for alleged interference with the KC6OKA repeater system in the LA area. Another *Warning Notice* went out to Technician licensee Gary R. Dent, KE6JUV, for alleged interference to an ATV repeater.

"Questions" continued from page 77.

QRZ.com has placed a copy of the March 1993 edition of the *QRZ Ham Radio CDROM Ver 1* on line for public access that might prove helpful. This collection contains listings of more than 195,000 licenses issued between 1983 and 1987. Call sign and name searches are available. Visit <http://www.qrz.com/search1993.html>.

Frequently Asked Questions on restructuring and other information remain available on ARRLWeb, <http://www.arrl.org/>.

ARRL ASKS FCC TO RETHINK PARTS OF PRB-1 PETITION DENIAL

The ARRL wants the FCC to declare that its limited federal preemption policy known as PRB-1 applies to amateurs who live in areas governed by deed restrictions, covenants, CC&Rs, or condominium regulations just as it does to hams regulated solely by local zoning laws. In a *Petition for Reconsideration*, the League has formally asked the FCC to rethink its November dismissal of a 1996 ARRL *Petition for Rule Making*. That petition called on the Commission to expand and clarify the limited federal preemption known as PRB-1.

In November, the FCC said PRB-1 excludes restrictive covenants in private contracts as "outside the reach of our limited preemption," although it strongly encouraged associations of homeowners and private contracting parties to "follow the principle of reasonable accommodation" with respect to Amateur Radio. But the FCC drew the line at proposing specific rule changes to bring private restrictive covenants under the umbrella of PRB-1.

In asking the FCC to rethink its November *Order*, the League said the FCC's disclaimer "is no longer a valid premise" and no longer accurately reflects FCC jurisdiction over private land use regulations. Since the advent of PRB-1 in 1985, the ARRL pointed out, the FCC has made it clear that it has Congressional authority to prohibit restrictive covenants that could keep property owners and even renters from installing antennas to receive TV, satellite and similar signals. The League asserted the same principle applies to Amateur Radio, in which the FCC has said it has a "strong federal interest."

The League called on the FCC to clarify that PRB-1 applies to private land use regulations, leaving hams free to negotiate reasonable accommodation provisions with local homeowners' associations just as they do now with governmental land use regulators.

The League also asked the FCC to provide some relief from "prohibitive and excessive fees" that localities might impose

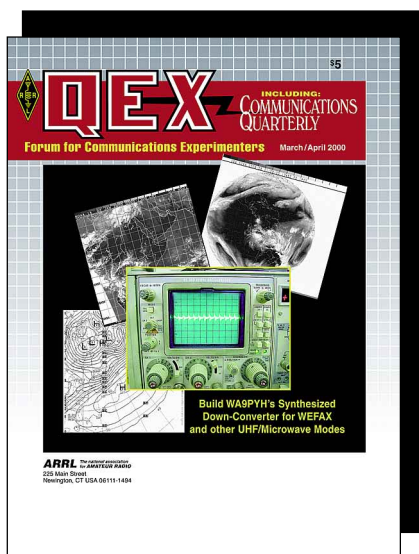
on amateurs for permits and fees. The ARRL said that such costs can be "the functional equivalent of a prohibition of amateur communications" and asked the FCC to state that "excessive costs associated with land use approvals fail the 'reasonable accommodation' and 'minimum practicable restriction' tests of PRB-1."

A copy of the ARRL's *Petition for Reconsideration* is available on *ARRLWeb*.

ARRL PURCHASES COMMUNICATIONS QUARTERLY

The ARRL has purchased the Amateur Radio technical journal *Communications Quarterly* from CQ Communications and will merge the publication with the League's technical journal *QEX*. The change becomes effective for subscribers starting with the *March/April issue of QEX*. The new combined publication initially will serve a joint readership of more than 7000. The magazine will bear the legend, "*QEX*, including *Communications Quarterly*."

ARRL Executive Vice President Dave Sumner, K1ZZ, said the League is pleased to have the opportunity to demonstrate its ongoing commitment to technical excellence in Amateur Radio through the combined publication. "Merging *Communications Quarterly* into *QEX* provides a rare synergistic opportunity to turn two good publications into one that's even better," he said.



The purchase arrangement followed extensive discussions with *Communications Quarterly* publisher Dick Ross, K2MGA. Conversations about the viability of *Communications Quarterly* and of *QEX* as standalone magazines—combined with the League's commitment to maintaining a publication devoted to technical and experimental topics—resulted in an ARRL offer to purchase *Communications Quarterly*. Ross called the deal "a win-win

situation." The purchase price was not disclosed.

Published for the past nine years under the editorship of Terry Northup Littlefield, KA1STC, *Communications Quarterly* has billed itself as "the philosophical successor of *Ham Radio* magazine." Littlefield was *Ham Radio*'s editor when CQ Communications purchased the magazine in 1990, incorporating the general-interest portion of the magazine's content into *CQ* and launching *Communications Quarterly* as a venue for more highly technical material. Ross said he regrets that neither *CQ* nor the League has an opening for Littlefield, who is exploring new opportunities. "We're going to miss her," Ross said.

QEX Editor Doug Smith, KF6DX, will continue at the helm of the combined publication. Smith called the pairing of *Communications Quarterly* and *QEX* "a logical economic move" that ensures the availability of a top-quality technical forum for experimenters. Smith invited technical articles as well as specific suggestions for articles or topics to be covered in future editions of the magazine. Submit articles or suggestions to Doug Smith, KF6DX, kf6dx@arrl.org; *QEX/Communications Quarterly*, ARRL, 225 Main St, Newington, CT 06111.

Current *Communications Quarterly* subscribers will receive the combined *QEX/Communications Quarterly* every other month, and subscriptions will be extended according to a formula spelled out in a letter to subscribers. A subscription to the new, combined *QEX/Communications Quarterly* is \$34, discounted to \$22 for ARRL members. Direct subscription questions to Circulation Department, ARRL, circulation@arrl.org; 860-594-0355.

KENWOOD SEEKS FCC RULING ON "SKY COMMAND"

Kenwood Communications Corporation has asked the FCC either to declare that its "Sky Command" system complies with Commission rules or to waive applicable sections of the rules to make it legal.

The "Sky Command" system, which Kenwood has been marketing for about two years, lets the user control a fixed HF station via a pair of dual-band transceivers. 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 SkyCommand transceiver to the operator's transceiver. Sky Command's VHF link also includes a Morse code ID.

The ARRL has declined to permit Kenwood to advertise its "Sky Command" system in *QST*, maintaining that the sys-

tem is not legal to use as it's configured. The League says that 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 petition for a declaratory ruling or waiver filed November 4, Kenwood claims that the Sky Command VHF transmission link "should be viewed as merely providing third party communications" and not as part of an auxiliary link.

"Kenwood is confident that the Sky

Command System fully complies with the remote control, telecommand, and auxiliary station provisions of Sections 97.109(c), 97.213, and 97.201," the manufacturer told the FCC. Kenwood wants the FCC to confirm in a declaratory ruling that the Sky Command System complies with those rules. But, Kenwood said, if the FCC does not concur, then Kenwood requests a "blanket waiver" of those rules for amateurs using Sky Command.

Kenwood also asked for either a declaratory ruling or a blanket waiver with respect to Section 97.111, which covers

authorized transmissions.

The manufacturer says the VHF link complies with the rules because it only carries audio from the HF station receiver, is not involved with telecommand of the remote station, and is under the supervision of the control operator.

At its meeting January 21-22, the ARRL ordered that comments be filed with the FCC "consistent with longstanding policy, opposing a waiver requested by Kenwood Communications Corp that would permit auxiliary operation in the 144-148 MHz band."

News in Brief:

• **ARRL officials congratulate new League section:** At the stroke of midnight January 15, ARRL Executive Vice President David Sumner, K1ZZ, was the first to offer his best wishes to the new ARRL West Central Florida Section. Sumner worked WCF special event station W4C on 40-meter CW from his home in Coventry, Connecticut, and sent the section leadership a 24-word radiogram of congratulations. Congratulatory messages were sent by Southeastern Division Director Frank Butler, W4RH, and Vice Director Evelyn Gauzens, W4WY, on 75 meters. The new section, the League's 71st, formally came into being January 15. A ribbon-cutting ceremony was held the same day at the Sarasota Hamfest to mark the occasion, with ARRL First Vice President Steve Mendelsohn, W2ML, on hand to do the honors. The new Section Manager is Dave Armbrust, AE4MR. The ceremony capped a year-long campaign to move Charlotte, DeSoto, Hardee, Highlands, Hillsborough, Manatee, Pinellas, Polk and Sarasota counties into their own ARRL section. The West Central Florida Section Web site is <http://www.wcfarrl.org>.

• **DARA accepting scholarship applications:** The Dayton Amateur Radio Association is accepting requests for applications for the DARA Scholarship Awards. DARA has awarded numerous \$2000 scholarships to assist young amateurs. Applicants must be graduating high school seniors and hold a Amateur Radio license. All completed applications will be considered. Requests for applications, accompanied by an SASE, go to DARA Scholarships, 45 Cinnamon Ct, Springboro, OH 45066. Completed applications must be postmarked before June 1, 2000.—*Stanley R. Kuck, NY8F*

• **Mississippi telephone RFI case tabled:** A Mississippi ham arrested for interfering with his neighbors' telephones is off the hook. ARRL member Bennie Stewart, KJ6TY, of Meridian, was arrested and charged September 10 after a neighbor filed a complaint with the Lauderdale County Justice Court. Stewart was charged under a Mississippi law making it illegal to "intentionally obstruct, injure, break or destroy, or in any manner interrupt any telegraph or telephone line or communication thereon between any two points." At the request of the County Attorney the court has ordered the case to be placed in its "inactive files." Stewart's attorney, Felicia Perkins of Jackson, says the action essentially ends the case against her client. "For all practical purposes, it's in a box somewhere, and it's going to sit there unless Congress changes the laws," she said. If he'd been convicted, the 61-year-old Stewart—who's confined to a wheelchair and says he has limited physical abilities—faced a fine of up to \$500, six months in jail, or both. Perkins asked the Justice Court to throw out the complaint on the grounds that only the FCC had jurisdiction. The December 28, 1999, *Order* sending the criminal action to

the inactive files maintained that the Justice Court "does have jurisdiction over the subject criminal matters, but that the state court's jurisdiction has been preempted by federal law."

• **Teacher survey yields new insights:** Teachers responding to an ARRL survey are upbeat about ham radio and say it still has youth appeal. Many also suggest that involvement with a local club is an important part of a young amateur's first steps. ARRL Field and Educational Services last fall polled 30 specially selected active teachers and instructors about their Amateur Radio instructional efforts and experiences. The questionnaire—compiled and distributed by Field & Educational Services Correspondent Dan Miller, K3UFG—specifically asked for details about what made an Amateur Radio program successful with students—the hits and misses. The overwhelming majority of those responding expressed optimism about the future of ham radio and its special attraction for young people. All teachers surveyed agreed that getting someone licensed was only the beginning. While they felt that it was their responsibility to prepare students to get on the air, involvement with a local club was seen to be of equal importance since a club can offer support, guidance, and answers to questions. Miller agrees. "Membership in a club allows us to learn and develop our interests, while serving the community in which we live," he said.

• **Alfred S. Burke, W3VR, SK:** ARRL International Humanitarian Award laureate Alfred S. "Al" Burke, W3VR, of Seminole, Florida, died January 10, 2000. He was 93 and had been an ARRL member for more than 50 years. In January 1998, the ARRL Board of Directors presented Al Burke and his late wife, Mae, W3CUL, with the 1997 ARRL International Humanitarian Award. The Burkes were cited for their lifetime of public service of traffic handling "and for their unique dedication to this facet of Amateur Radio." Al Burke started handling message traffic by ham radio before the start of World War II. He also was a *QST* contributor. Mae Burke died in November 1997. The Board also cited both Burkes for serving as traffic handling mentors to others.—*thanks to Kay Craigie, WT3P*

• **Lemuel H. Allen Jr, W7JMH, SK:** Former Idaho Section Manager Lem Allen, W7JMH, of Boise died January 8. He was 81. An ARRL member for 50 years, Allen had served two terms as Idaho Section Communications Manager (as the position was then called) from October 1978 until April 1982, and as Section Manager from May 1984 until September 1986.

• **QST Cover Plaque Award:** The winner of the *QST* Cover Plaque Award for December was Robert R. Brown, NM7M, for his article "Bubbles in the Ozone Layer." Congratulations, Bob!

QST

Clipperton Island

Clipperton Island was discovered in 1705 and named after English pirate John Clipperton. Rumors have it that Clipperton used the Pacific island as his base and hid some of his treasure there.

Claims and counterclaims to Clipperton raged through the years. Mexico declared that Clipperton was Mexican territory because Spanish navigators had allegedly discovered the island first (naming it Passion Island). In 1855 the French laid claim to the island, with the United States protesting. Mexico forcibly occupied Clipperton by establishing a military outpost in 1897.

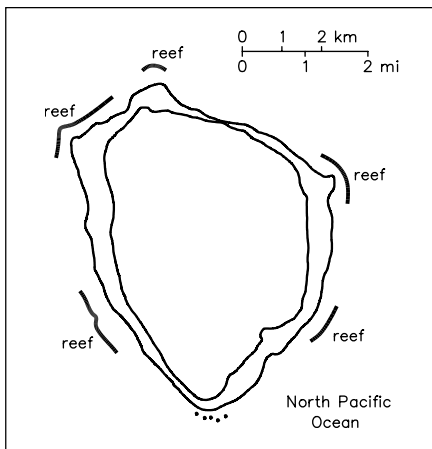
The dispute between France and Mexico continued into the 1920s. At this point the Vatican was called upon to arbitrate. With the agreement of Mexico and France, the Vatican appointed the King of Italy, Viktor Emanuel II, to make the final call. In 1930, after a year of deliberation, he made his decision and awarded Clipperton Island to France. The French in turn had French Polynesia administer the island, but not as a part of that territory.

US President Franklin D. Roosevelt visited the island twice during World War II. There was a top-secret weather station on Clipperton (which was code-named "Island X"). FDR was convinced that the island could be key to winning the war—so much so that he authorized an airfield and seaplane base to be built there. When the French found out about the American occupation they were furious.

In 1998 NASA built a \$2 million tracking facility on Clipperton. It was only used for a few months and is now abandoned.

Finding information about Clipperton is not easy. (Glenn Johnson, W0GJ, tells of a book called *Clipperton: A History of the Island the World Forgot* by Jimmy Skaggs.) The "specifications" are fairly brief. Clipperton Island is located at 10° 17' North, 109° 13' West, and is approximately 670 miles southwest of Mexico. It's uninhabited except for the crabs and birds. Clipperton's most striking feature is its freshwater lagoon, measuring between 2-3 miles in diameter. The highest point on the island is Clipperton Rock at a mere 70 feet.

Getting to the island is difficult. Assuming you can find transport, you'll have to anchor some distance from the shore and travel the rest of the way by Zodiac or dinghy. If you fall into the water, you'd better be a fast swimmer. Sharks prowl the shores of Clipperton in large numbers.



Clipperton Island is set in saltwater, but encircles a freshwater lagoon.

March 2000 Clipperton Island DXpedition Operating Frequencies

Band	Frequency (kHz)		
	SSB	CW	RTTY
6	50115	50115	—
10	28475	28025	—
12	24945	24895	—
15	21295	21025	21080
17	18145	18075	—
20	14195	14025	14080
30	—	10106	—
40	7065	7005	—
80	3795	3505	—
160	—	1827	—

Amateur Radio History

The father of DXpeditioning, Bob Denniston, VP2VI/W0DX (ex W0NWX), was the first to lead a team to this remote island in 1954. His FO8AJ crew also included Leo Olney, W0NUC, and Gene O'Leary, W0VDQ. The team was only active for 18 hours and netted 1108 QSOs to the Deserving. Equipment included two Hallicrafters SX-88 receivers, two HT-20 transmitters and a HT-18 VFO.

DXpeditioner Danny Weil, VP2VB, was next to hit the island in 1956 as FO8AN. Two years later the San Diego DX Club visited Clipperton as FO8AT. It was another 20 years before the next Amateur Radio DXpedition took place and Clipperton was then #1 on several most-wanted countries lists. This operation took place in March 1978 with a mostly French and Swiss team, along with a few Americans, using multiple calls (FO0XA-FO0XH). The multioperator, multitransmitter, multidollar DXpedition



The *Shogun* is scheduled to leave San Diego for Clipperton on February 23 and return March 15.

made 29,000 QSOs. (After this operation the French DXers established the Clipperton DX Club, and they've been supporting major DXpeditions ever since.)

The next operation was undertaken by a multinational group signing FO0XX in April 1985, making about 31,000 QSOs during their stay. The following year the American portion of the FO0XX group returned to Clipperton, making 16,500 QSOs.

In September 1986 three Frenchmen teamed up with a scientific expedition and made 3653 QSOs as FO0XA in just 45 hours. The last operation on Clipperton Island was the March 1992 effort by FO0CI that netted 48,000 QSOs.

Clipperton 2000

John Kennon, N7CQQ (ex KA7CQQ), has announced that a multinational team will join him for a trip to Clipperton in 2000. The team will include Willy, HB9AHL; Koji, JK7TKE; Bob, K4UEE; Michael, N6MZ; Mike, N9NS; Jim, N9TK; Mark, ON4WW; Doug, VE5RA; and James, 9V1YC. Three of the operators have been to the island before. This experienced team plans to leave San Diego, California on February 23, arriving at Clipperton February 29. If all goes as planned, they should be on the air by March 1. The operation is scheduled to end on March 8.

The group will set up two sites (CW and SSB) consisting of three stations at each. Plans are to operate on 6 through 160 meters, CW, SSB, RTTY and satellite.

Clipperton has slowly been moving up the ARRL Most-Wanted list. After the 1992 operation the ARRL's Most Wanted list ranked Clipperton as # 97. Since then it's been # 97, 100, 92, 86 and finally 57 in 1998. If you have never worked this island and are just a casual DXer, this is your

chance to do it. It may be several years before there is another trip to this remote spot.

For more information on the DXpedition and the expected on-line logs, check out the 2000 DXpedition to Clipperton Island Web page at <http://www.qsl.net/clipperton2000/>.

Sponsors

The Clipperton 2000 operation won't be cheap. The cost of the boat (the *Shogun*) is \$75,000. Each operator is kicking in \$5,000. To date the sponsors for this operation include NCDXF, GDXF, the DX Lover's Foundation, Hal Communications and many other individuals. The American Radio Relay League has granted the Clipperton 2000 DXpedition a Colvin Award. Lloyd Colvin, W6KG (SK), past President of the YASME Foundation, funded this esteemed award. Each year the ARRL administers this honor in the form of \$5000 to projects that help promote international goodwill in DXing.

CHOD HARRIS, VP2ML/WB2CHO

December 8, 1999 brought sad news to the DX world. That was when we all learned of the passing of Chod Harris, VP2ML/WB2CHO. My first contact with Chod was in March 1981 when he was on Easter Island as WA1SQB/CE0. He was there working with the Earthwatch Society excavating around those gigantic statues that you see in many Easter Island photos. While on the island Chod operated the ARRL DX SSB Contest along with Jim, W4PRO, and Dave, W4GSM. Jim remembers Chod helping to move some of the DXpedition antennas over to Father Dave's, CE0AE, station. Jim recalls: "Chod was very competent technically, and lots of fun to be around." Chod also operated the CQ WW WPX SSB Contest in 1989 as T32T from Christmas Island, and I have that QSL on the wall. My first actual eyeball QSO wasn't until after I started *The Daily DX* at the Dayton Hamvention in 1997. Chod kept me in the loop with what was going on in the DX world and was a big supporter of my efforts. I enjoyed teasing him about the old pictures he ran in his CQ DX column. Over the last few years he was always seen with camera in hand, trying to update his photo collection.

CQ Magazine lost three true-blue DXers in 1999: Alan, K2EEK, in July; Jim, K1MEM in October; and Chod, VP2ML/WB2CHO in December. My condolences to Chod's wife Jean and their dog, "Dog X-ray." Rest in peace, Chod.



TOM ROSCOE, K8CX

The late Charles J. "Chod" Harris, VP2ML/WB2CHO



A QSL card from the February 1993 IOTA (OC-176) DXpedition to the Chesterfield Islands. The operators were Eddy, FK8CR; Guy, FK8DH; Jose, FK8FS; and Eric, FK8GM. They made 3833 QSOs.

THAILAND—NEW IOTA

The Radio Amateur Society of Thailand (RAST) wishes to announce a special DXpedition to a new Thailand IOTA Island Group, and participation in the RSGB IOTA Millennium Competition, to celebrate the Year 2000.

A "first-time" operation is planned for the Malay Peninsula South East Group (including Kra Maeo, Nu etc) for March 2000. The Islands are uninhabited and located off the coast of the southern Thai provinces of Sonkhla and Nakhon Si Thammarat, in the South China Sea. They are about 1000 km south of Bangkok, and close to the northern Malaysia border.

The operation is being scheduled for March 2000, so contacts qualify for "premium" (bonus) points in the RSGB IOTA Millennium Competition.

An initial survey and analysis by E21AOY, G3NOM, HS1CKC, HS9CA, HS9DP, HS9FV and HS0GBI, has indicated that access by sea to all of the islands in the group is difficult for various reasons, and further survey work will be needed to find the best plan.

CHESTERFIELD ISLANDS—A POSSIBLE NEW ONE?

In the December *QST* "Amateur Radio World" column (page 75) there was a small note mentioning the fact that New Caledonia had applied for admission into the International Amateur Radio Union (IARU). The vote will be completed on March 22, 2000. If approval is granted, the newest member would be the Association de Radio Amateurs de Nouvelle Calédonie (ARANC).

New Caledonia is a French overseas territory including New Caledonia, Ile des Pines, Loyalty Islands and several other islet groups. In 1999 France and New Caledonia agreed on a "shared sovereignty" arrangement that would last another 15 to 20 years.

New Caledonia has about 130 Amateur Radio operators, of which approximately 20 or so are active on HF. Eric Esposito, FK8GM, says, "In 1999 the ARANC had 32 members with 25 being licensed Amateur Radio operators." The ARANC has been running the FK QSL bureau for many years.

You might ask yourself, "Where is Bernie going with this? New Caledonia (FK) is already a DXCC entity." Bear with me and you'll see!

New Caledonia is more than 350 kilometers from its parent country (France), making it a *Geographic Separation Entity*. New Caledonia does not meet the *Political Entity* criteria, though. In order to be a *Political Entity* it must meet one of the following criteria: (1) Be a member of the United Nations; (2) have it's own assigned call sign prefix block by the

International Telecommunication Union (ITU); or (3) have its own separate IARU Member Society. New Caledonia is not a member of the UN or the IARU. Although it does have a prefix of FK, that has been assigned by France.

If membership in the IARU were granted to New Caledonia, this would make it a *Political Entity*, which could then open the door for a new DXCC Entity—the Chesterfield Islands.

Here's how it works: The 11-islet chain that makes up the Chesterfield Islands could not qualify for DXCC Entity status in the past because they were not far enough away from New Caledonia to meet the minimum separation-distance requirement. Under New Caledonia's current status as a *Geographic Separation Entity*, the Chesterfields must be 800 kilometers away to be considered as a separate DXCC country. They are only 543 kilometers distant.

But...

If New Caledonia becomes a *Political Entity*, it's a new ballgame. The required separation distance shrinks to only 350 kilometers. In that scenario the Chesterfields would qualify as a separate DXCC Entity.

In December 1999 the ARANC announced an IOTA DXpedition to the Chesterfield Islands (OC-176) in March 2000. The group, headed up by Eric Esposito, FK8GM, plans to be on the island a few days before the expected positive IARU membership vote. Keep an eye on your favorite DX bulletin for the latest news on the Chesterfield Islands!

MISCELLANEOUS

Bob, K3BYV/PZ5DX, writes to remind everyone that he is the only QSL manager for PZ5CM, PZ5DX and PZ5JR. This includes any guest operations. Cards should be sent either to the W3 QSL bureau, or direct to Bob's *Callbook* address.

Mark your calendars now for the Visalia International DX Convention, which runs from April 14th to 16th. The Southern California DX Club (SCDXC) will sponsor this year's event. Details at press time were still being worked out. For more information about this DX gathering, send e-mail to visalia@scdxc.org, or visit the 2000 International DX Convention Web page at <http://www.scdxc.org/dxconv2000.html>. Becky, N3OSH, and I both plan to be there.

WRAP UP

Thanks this month go to FK8GM, G3NOM, K5FUV, K7SO, K8CX, N6RT, N7CQQ, N7NG and W4PRO. Keep those letters, pictures and newsletters coming. Until next month, see you in the pileups!—Bernie, W3UR

Q5T-

Northern Florida Was Y2K Ready

On New Year's Eve, while celebrants sipped Bollinger and otherwise reveled across the state of Florida (and everywhere else, of course), northern Florida ARES personnel skipped the celebrations and instead sat with emergency management officials at various county EOCs. They were ready for just about anything. This observer spent the late evening monitoring net activity on 3950 kHz, the recognized northern Florida ARES 75-meter frequency. There, the EOC operators checked in and provided reports to the state EOC at Tallahassee, which was also activated for the mission at hand.

Although the Y2K bug didn't bite systems in the state, the net operated impressively, supported by dedicated ARES members and state emergency management officials who have stood behind Amateur Radio as a communication asset. John Fleming, WD4FFX, of the state EOC, later told Section Manager Rudy Hubbard, WA4PUP, and Section Emergency Coordinator Nils Millerlgren, WA4NDA, that the amateur Y2K net was excellent and well-staffed. This bodes well for the northern Florida ARES role in future emergency communication support.

The Northern Florida ARES Net meets daily at 9:00 AM local time on 3950 kHz, with Jim Giles, K4VRT, serving as net manager. Join us!—*Rick Palm, K1CE, Flagler County ARES, Palm Coast, Florida*

HAMS HELP ON FIERY FOURTH

*By Jerry Boyd, K6BZ
Section Emergency Coordinator
Sacramento Valley Section*

It was Friday afternoon and the beginning of a long Fourth of July weekend. Suddenly, northern California became the center of a substantial fire fighting and Amateur Radio effort. A Bureau of Land Management control fire in southeastern Trinity County was fanned out of control by unexpected winds. The fire near the town of Lewiston ultimately burned thousands of acres, destroyed dozens of homes, caused millions of dollars in damage and forced the evacuation of hundreds.

The California Division of Forestry and Fire Protection (CDF) assumed responsibility for combating the rapidly spreading blaze. As it had done in the past, CDF called for amateur radio operators from the Shasta and Trinity County ARES units to assist. Shasta EC Eric Cassano, KC6KZX, and Assistant EC Sue Elsemore, W6SUE assigned amateurs to staff the CDF Command Center in Redding. Two-meter voice and packet equipment had been permanently installed at CDF several years ago for use in such situations. Amateurs were

also scheduled, if needed, to "shadow" CDF Fire Information Officers in the field.

While the Trinity County fire was still out of control, another large blaze broke out along Interstate 5 at the northern limits of the City of Redding. This fire threatened numerous structures and also forced evacuations. It brought holiday traffic on busy I-5 to a halt.

As the weekend wore on, another large wildland fire erupted in the foothills just west of Redding. In this case the fire occurred at about 2:15 AM. It became necessary to contact residents in a very rural area, most of whom were asleep, and order them to evacuate. While that fire and the Lewiston fire were still occupying both firefighters and amateurs, still another blaze occurred at Whiskeytown Lake near the border of Shasta and Trinity Counties. This blaze occurred when a petroleum tank truck exploded setting hillsides adjacent to the roadway ablaze. On Monday, July 5, a series of four arson fires in the west Redding area kept fire fighting personnel and hams even busier than they had been previously.

This flurry of fire activity caused a response of over 1000 firefighters from throughout California and Oregon. Some traveled over 600 miles from their home base to the fire scenes. Hundreds of pieces of fire fighting apparatus including bulldozers were used as were 10 helicopters and 11 tanker aircraft.

Given the number of simultaneous fires, their size, and the remote and almost inaccessible areas involved, it was a tribute to the fire fighting and Amateur Radio efforts that more structures were not lost, that there were no deaths, and very few injuries. Credit goes to the 30 Amateur Radio operators from Shasta County and Trinity County ARES who pro-

vided valuable service: KD6DUX, N6RNL, W6DEE, KD6DG, KE6FJN, KQ6YW, W6BYT, KO6JT, W6LEE, AB6JA, K6VVY, N6BYM, KX6Q, W6SUE, KD6GBU, KE6KMD, WO6P, W7RAY, N6HDC, KI6GR, WD6FHX, W6HOR, N6NOT, K6BZJ, WA6BXN, KD6GCS, WD6AIA, K6BZ, KC6KZX and KQ6YX.

TEXAS SKYWARN TEAM WINS WEATHER AWARD

The Fort Worth (Texas) Amateur Radio SKYWARN Team was awarded the National Weather Association's Walter J. Bennett Public Service Award. A presentation was held at the NWA Awards Banquet Wednesday evening, October 20, in Biloxi, Mississippi.

The award is presented to an individual or organization directly assisting the meteorological community in providing weather-related information to the public. Individuals and organizations in the meteorological profession are ineligible for this award. The award was based on the extra effort, hard work, and self-sacrificing attitude demonstrated by the past and present members over the past 25 years.

The team operates out of the Fort Worth National Weather Service Forecast Office using up to five VHF, two UHF and one VHF APRS stations to provide the NWS meteorologists with field reports during severe weather. With the support of numerous repeater and link operators in the area, the group has expanded coverage from the surrounding counties to more than 30 counties in northern Texas. The services of the team are possible only with the excellent support and cooperation by the NWS, emergency management



At the National Weather Association's Awards Banquet (Left to right): team member Greg Story, KB5YRK; team co-leader Mike Heskett, WB5QLD; and NWA President Dr. Jim Moore.

officials and the hundreds of trained spotters providing the "ground truths."

In a November 27, 1999, letter of commendation to the team, the National Weather Association cited one example of the team's service: "A measure of your great success was demonstrated on the evening of April 26, 1994, when an F4 tornado tore through the heart of Lancaster, Texas (population 26,000). Spotter reports were crucial to the warning process, and could not have been as effective had not the amateurs efficiently relayed that information to the forecasters. The SKYWARN team has also been strong contributors in cases of flash floods, winter storms, and during periods of communications loss of the NWS office. Your SKYWARN team has also invested their own resources such as radios, modems, duplexers and antennas. They have driven through raging storms to get to the office and have had their personal vehicles damaged by large hail while on volunteer duty, all without monetary compensation."

TENNESSEE AMATEURS HONORED

The Tennessee Emergency Management Agency (TEMA) has honored a group of Amateur Radio operators for providing invaluable assistance during the January 1999 tornado strike at Clarksville, Tennessee. TEMA Director John White presented a framed certificate signed by Governor Don Sundquist to the Clarksville Amateur Transmitting Society (CATS) emergency services group in early November. Accepting the award were CATS Disaster Team Leaders Hank Koebler Jr, N3ORX; Albert Furlow, KA1FFO, and club President Jerome Warburton, KB0OTW, as well as team members Jack Byrd, AA4TA, and Hank Koebler III, KF4UXR. White said when disaster strikes and knocks out communications, "You turn to dedicated people like the members of this group." He said some 90 hams put in some 1200 hours of volunteer service in a nine-day period, making it possible for first responders, volunteer organizations like the Red Cross and victims to communicate with each other. Amateur Radio was the only reliable means of communication for the first 12 hours or so after the tornado struck. Members staffed the Montgomery County EOC for the first 72 hours and shadowed responders. In addition, CATS members assisted in storm cleanup and aided the Red Cross in damage assessments.—*thanks Jerome Warburton, KB0OTW and TEMA for this report*

ARES AND RACES TOGETHER IN SANTA BARBARA

The Santa Barbara Section comprises three counties (Ventura, Santa Barbara, and San Luis Obispo) with each serving as an ARES/RACES District. The Section is widely varied in topography and demographics, presenting some unique communication challenges. Emergency communicators are faced with problems of mountains and distance to provide communication for localized winter flooding, summer forest and grass land fires, and the always threatening earthquake.

In all three Districts (counties) ARES and RACES function together. They not only co-exist, they are fully integrated and thrive. Each county has designated the ARES DEC as the head of RACES and he/she has effective control of the field operations for RACES with

supervision from the county. Each county has either executed a Memorandum of Understanding with ARES to perform RACES duties, or has designated the ARES structure and personnel as the RACES structure and personnel when RACES is activated. Each county and many of the cities encourage and support both ARES and RACES activities. They include ARES/RACES as integral parts of their disaster plans.

Why such sharing? The answers are simple yet compelling: necessity and attitude. When personnel and other resources are limited, you have to share. To survive, you have to cooperate. If you are a rural county or a county with evolving needs, you have to go to an established resource and use it. If you are a struggling ARES group, you don't have the luxury of competing with another group for limited resources.

A dozen years ago, the ARES group in San Luis Obispo county was struggling and RACES essentially did not exist. A nuclear power plant necessitated special emergency plans and provided extra funds and incentives for having the local Amateur Radio community involved. Several dedicated amateurs formed a coordinating group. With the county staff, they pulled various resources together. County Emergency Plans were written, rewritten, or modified to include Amateur Radio and give operators a bigger role. The amateurs established standard operating procedures and the ARES group was revitalized. The county reviewed the ARES structure and concluded that this structure was also the best for RACES.

The system, as it now exists, is the product of this initial excellent work, along with fine-tuning to the procedures and expansion of technical resources. General countywide membership meetings are held nine times a year and the support group meets monthly to address logistical needs. County staff is consulted and contacted as needed and often attend meetings to lend support and assist with the work. County sponsored exercises are held at least once a year and ARES/RACES exercises are held as often as possible.

The ARES and RACES written procedures are combined with support materials to make up an *Operations Manual*. Emergency communication centers have been established in key locations throughout the county along with portable equipment pre-staged and held by Emergency Coordinators or Assistant Emergency Coordinators. Several repeaters are maintained by the county, or by individuals who are members of, or who strongly support, ARES. ARES remains active constantly. RACES is activated when needed. A typical incident will have a request for ARES support from the Red Cross and/or the Salvation Army with RACES being activated by the county as needed to support governmental agencies.

The above demonstrates what can happen if everyone cooperates. This is not theory. It is a system that has worked well for years. Nothing special beyond a firm commitment to make it happen was needed.

Unfortunately, we have seen in other parts of the country reluctance to combine ARES and RACES, thereby splitting personnel resources, splitting technical resources, duplicating efforts, and confusing the public and served agencies. To be successful with amateur emergency communication activity, I sin-

cerely feel that if we check our egos at the door, and emphasize cooperation and coordination, we stand the best chance of helping people when they really need it. That is the case in Santa Barbara.—*R. Jack Hunter, KD6HHG, Santa Barbara ARES Section Emergency Coordinator*

A NOVEL CONCEPT?

Recently, the Arizona State Department of Emergency Services conducted a preparedness drill. I operated a crossband repeater, set up in the Town Council chambers at Town Hall. I was in communication with Gila County Office of Emergency Management through a county RACES repeater about 72 miles away, across mountainous terrain.


I used my pickup truck's mobile unit (an Alinco transceiver in crossband mode), parked on a plate supporting a 25-foot mast with a beam antenna. Inside town hall I used a handheld unit, with external mike and 4-inch external speaker, so all present could hear the traffic. The link to my truck was on UHF, and from the truck's unit to the repeater the link was on VHF.

While waiting for traffic, it occurred to me that this concept should be used more often in emergency communication. One vehicle with crossband capability can support several handhelds within a geographic area and communication to a distant repeater can be accomplished with each handheld.

I e-mailed a description of this approach to the Red Cross Communications Coordinator in the aftermath of the Oklahoma tornado, when the disaster crews were going into destroyed subdivisions. They would not permit vehicles, except official Red Cross units, so many were on foot using handhelds. The problem was that these handhelds could not reach the repeater in Oklahoma City.

The Red Cross told me that my suggestion was implemented and worked extremely well. The technology is here—we need to apply it as much as possible to these increasingly occurring disaster situations.—*Chuck Heron, KD7BWG, Gila County ARES and RACES*

CREDIT WHERE CREDIT IS DUE

January *QST's* **Public Service** column carried a photo of Hurricane Floyd's flood waters nearly covering a Bound Brook, New Jersey street sign, but credit wasn't given for area hams' relief efforts. Pat Howard, K2PAT, reported, "While all regular and cellular phones in Bergen County were down for days, hams provided a channel from county American Red Cross chapters to the lead Princeton chapter." (Most chapters have installed, thanks to a government grant, a 2-meter rig pre-programmed for hams to carry out the New Jersey Red Cross Plan.) Kip Burnett, KB2EGI, Mercer County Emergency Coordinator stated: "Volunteers did a wonderful job, and club support of ARES was terrific." —*Rosalie White, WA1STO* 



The ARRL Web Extra for Members Only
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Dr. Ernest K. Smith, N6HQB—VHF Pioneer

N6HQB may not be a familiar call, yet Ernie Smith is truly one of the pioneers of VHF. Indeed, he can be justly called the father of sporadic-E studies.

Ernie's career began in the early 1950s, when he completed the first comprehensive study of the worldwide occurrence of sporadic E while a graduate student at Cornell University. Radio amateurs had stumbled upon sporadic E in the late 1930s on the old 5-meter band, but it had attracted little professional interest until after WW2. More than anyone else, Ernie Smith opened the door to professional studies of this perplexing phenomenon.

Ernie parlayed his 1956 doctoral dissertation into a career of sporadic-E investigation. In subsequent years, Ernie published numerous articles in the most prestigious journals in the field (including *Radio Science* and the *IRE Transactions on Antennas and Propagation*), in conference proceedings and books he edited and in publications of the National Bureau of Standards and its successors. His research is still cited among the basic works of sporadic-E propagation. Indeed, much of what we know about this still intriguing phenomenon can be traced back to the pioneering work of Ernie Smith.

China

Ernie was born in Peking during 1922 and lived just outside the city walls on the campuses of Tsinghua and Yenching Universities, where his father was professor of English. His maternal grandparents, missionaries of the American Board of Foreign Missions, survived the 1900 Boxer Rebellion and the Siege of Peking with their children. Ernie grew up speaking Chinese and English while attending the Peking American School.

Ernie's interest in radio was sparked at an early age when his father gave him a 1920s-vintage five-tube battery operated radio. He was 14 years old when he first subscribed to *QST* and began building his own equipment, including a modern superheterodyne receiver with 6C6 and 6D6 tubes and a transmitter using the new 6L6 tubes in a push-pull circuit. Ernie was soon on the air with his own made-up call (XE2ES) and spent a lot of time in the Peking radio stores.

His familiarity with radio and the Peking radio suppliers soon led him into a great adventure. The Japanese occupied Peking soon after the Sino-Japanese War broke out during the summer of 1937. The famed Chinese Eighth Route Army was assigned



Ernest K. Smith, N6HQB, at the July 1999 Central States VHF Society Conference.

to hold the mountains around the city, thus completing its isolation from the rest of the world. During the occupation, Michael Lindsay (later Lord Lindsay, but then an Oxford Don on temporary assignment to Yenching University) visited the Eighth Route Army and offered to help organize a radio network. Lindsay asked Ernie to buy supplies from the Japanese-controlled radio stores. Members of the secret network then smuggled the radio parts past the city walls in bales of hay packed on camels. This was great sport, but Ernie's parents were not pleased when they found out.

College in the US and World War II

As war raged in Europe and China, Ernie left Peking for the United States to attend college. He sailed from Japan to Seattle in June 1940 on the *Heian Maru* and then traveled by train to the East Coast, where he attended Swarthmore beginning in September. During his first summer at Swarthmore, Ernie worked for Dana Bailey in the Cosmic Ray laboratory of Dr. Serge Korff and the following summer for Korff at New York University. Ernie graduated with a degree in physics in February 1944.

Ernie was immediately drafted into the

US Army, but Korff and Bailey arranged for him to join the Signal Corps' Ionospheric Utilization Unit, where they had been working. Ernie participated in making ionospheric propagation predictions for the US island-hopping forces as they moved across the Pacific. He was discharged as a staff sergeant after the war ended.

Ernie then joined the Mutual Broadcasting System as Assistant Radio Engineer and left four years later with the imposing title of Chief Plans and Allocations Engineer. During that period of explosive growth in radio and television broadcasting, more than 350 stations had joined the Mutual network. Ernie had gained a good deal of practical experience, but he felt restless and decided to go back to university.

Pioneering Work on Sporadic E

In the fall of 1949, he started graduate studies in electrical engineering at Cornell and attached himself to Professor Henry Booker, who directed his master's thesis. Booker told Ernie, "the two big problems in ionospheric propagation right now are spread F and sporadic E. Take your pick." Ernie opted for sporadic E and started analyzing more than 450 reports of long-distance television reception Booker had obtained from Hugo Gernsback, editor of *Radio Electronics* magazine. "These are mostly sporadic E," Booker said, "see if you can prove it."

Ernie did just that by analyzing the path distances and midpoints with ionosonde data, perhaps the first time the new phenomenon of TV DX was linked so clearly to E-layer refraction. The resulting thesis was accepted in June 1951 and subsequently served as the basis of two publications in 1952 and 1953. These were among the earliest systematic descriptions of sporadic E.

Ernie briefly joined the Central Radio Propagation Laboratory of the National Bureau of Standards at Boulder, Colorado, in June 1951, but took a leave of absence little more than a year later to continue graduate studies at Cornell. By summer 1954, he completed his classwork and returned to Boulder to continue research on his doctoral dissertation. "The Worldwide Occurrence of Sporadic E" was accepted in June 1956 and published a year later by the National Bureau of Standards.

Few dissertations have made such a lasting impression as "The Worldwide Occurrence of Sporadic E." It established the major descriptive characteristics of spo-

This Month

March 19 Good EME conditions
March 21 Transequatorial propagation peaks \pm 2 weeks

radic-E appearance that are still cited and accepted today. These include the three geographic zones (auroral, temperate and equatorial), the daily and seasonal appearances of sporadic E, and the unexpected variations across longitude, all so familiar to radio amateurs nearly 50 years later.

A Long Career

By 1957, Ernie had launched his career as the sporadic-E expert and found himself in demand all over the world as a speaker, consultant and researcher. The intense interest in the ionosphere during the International Geophysical Year (1957-1959) gave a huge boost to sporadic-E studies. Ernie managed the US program on sporadic E during IGY and participated in advanced studies using vertical-incidence ionospheric sounders (ionosondes) and even Amateur Radio reports.

Ernie had risen to the rank of Division Chief at the National Bureau of Standards in 1960. During the years that followed, he held several important positions, including one on the reorganization team that created the National Oceanic and Atmospheric Administration at the end of the decade. He moved between management and research positions during this period, including an eight-month stint as Associate of the Harvard College Observatory. This grueling pace ended in a brief retirement in 1976.

Ernie subsequently joined the Jet Propulsion Laboratory in Pasadena, California, where he remained until his second retirement in 1987. It was during this late period that Ernie became a licensed radio amateur with a new identity as N6HQK, although he admits he has never been on the air. From Pasadena, Ernie and his wife, Mary Standish Smith, moved back to Boulder. He has continued to keep up with the field as an Adjunct Professor at the University of Colorado and as associate editor for the IEEE *Antennas and Propagation Magazine*.

Ernie Smith gave a wonderful presentation of his life's work before the July 1999 Central States VHF Conference in Cedar Rapids, Iowa. His 40-page contributions to the conference proceedings are filled with excerpts from his important studies and provide a single-source synopsis of what is known about the behavior of sporadic E.¹ Indeed, much of what we still know about sporadic E can be traced to Ernie Smith's pioneering work.

ON THE BANDS

Activity was relatively slow this past December. Despite heightened expectations

¹Order #7458. ARRL publications are available from your local ARRL dealer or directly from the ARRL. See the ARRL Bookcase elsewhere in this issue or check out the full ARRL publications line at <http://www.arrl.org/catalog>.

and a solar flux that exceeded 200 for several days around mid-month, there was little progress in 6-meter DXing. The usual sporadic-E openings, the Gxeminids meteor shower and a bit of tropospheric ducting round out the month's offerings. Dates and times are all UTC.

Six Meter DX

December 12 and 13 were probably the high points of 6-meter DXing, ironically led by widespread openings to Alaska and Hawaii. Other common paths were lackluster. Many thanks to all who provided reports, including K1SG, WB2AMU, KB2YVC, K4KAE, W4WRL, N7DB, W7GJ, KB8YKR, N9BJG, N0LL, N0VSB, N0XKS, VE2PIJ, VE7AGG, XE2EED, YV4DDK and the *Internet Six News*, not separately mentioned in the summaries.

Alaska

The opening to Alaska on December 12 must have been the most exciting event of the month for US operators, based on the number of reports from that day. Kevin Forster, NL7Z (BP51), thought the hour-and-a-half opening to the US after 2100 was the best since 1981. Kevin ran off 143 quick contacts in all call areas, save New England. K1SIX (FN43) heard Kevin briefly, but not long enough to make it a two-way. KL7FZ, KL7FH, KL7CDG, KL7IKV, KL7CC (all BP51) and KL7NO (BP54) also worked widely throughout the Midwest and adjacent regions. Several of the same Alaskans were back into the Midwest the next day and again on the 17th.

Cherie Hammond, KL7IKV, made more than a dozen southerly skewed scatter contacts into Japan between 2348 and 0012 on December 3-4. The Japanese stations peaked around 230°, well south of the direct path, while the Japanese were beamed 60 to 120°, also south of their direct heading. Signals ranged from in the noise to 559, with a slightly watery quality.

Hawaii and the Pacific

December 13 was also a great day for many US stations to work Hawaii and New Zealand. K6YK reported Hawaiians as early as 1800. Howard Sine, WB4WXE (EM74) in Georgia, worked WH6O and KH7R just after 1830, as NH6YK and K6MIO/KH6 were running US stations from Virginia to California. Several US stations completed their 6-meter worked all states during these two days, including Gary Flynn, KE8FD (EM89). Gary found KL7CC and other Alaskans on the 12th and K6MIO/KH6 on the 13th.

Stations as widely separated as K1SIX (FN43) and K9HMB (EN61) heard ZL3SIX/b as early as 1800 on the 13th, but the first ZL contacts were not made for another hour, at least. W7XU/0 (EN13) reported ZL3AAU around 1915, WB4WXE worked ZL3GS at 2039, and W5UWB found three ZL stations between 2130 and 2145.

Mike Foubister, ZL3TIC, reported contacts throughout the W5, 6 and 7 call areas that day, in addition to XE. Bob McQuarrie, ZL3TY, provided a larger view of what New Zealanders worked during the first three weeks of December. Bob logged VK, JA, HL, 3D2AG, KH6, W, XE and HP stations. This is a considerably shorter list than for November!

Central and South America

Despite poor conditions elsewhere, stations in all areas of the US (save perhaps the West Coast) continued to make DX contacts south of the border. Among the catches reported on December 4, 6, 8, 10, 11 and 13 were 3F3XUG (Panama), 8P9JO (Barbados), FM/KU9C (Martinique), HC1MP, HC2FG, HC5K, HC8GR, HK3YH, HP2CWB, P49T (Aruba), PY7ZZ, TI5BX, VP2MDD (Montserrat), XE1BEF, XE1D and YV4DDK.

Jon Jones (N0JK when he is at home in Kansas) operated 8P9JO (GK03) from December 8 to 13, running just 30 W and a three-element Yagi at 20 feet. Jon reported contacts with CX, LU and PY each afternoon and found HC1MD on the eighth. Jon's best run into the states and Canada came on December 13, beginning with VE1ZZ at 1316. During the next two hours, he ran 240 contacts, mostly into W1, 2, 3, 4 and 8 call areas. After a brief interlude, the band opened up again at 1530 for another hour, mostly to W5, 8, 9 and 0. Jon's best DX was N5JHV (DM62) at 5250 km and N0KQY (DM98) at about 4950 km.

Europe and Africa

East Coast stations struggled to eke out European contacts each morning from December 18 to 22. The solar flux was above 200 during this period, but signals were still generally weak and inconsistent. Canadian Maritime and New England stations made the bulk of their contacts via CW with the DXCC countries of the United Kingdom, but they reported only a few scattered QSOs with CT, EH, F, EI, ON, OZ, LA, HB, I and DL stations.

Some relatively unusual contacts brought hope to the Midwest. Don Karvonen, K8MFO (EN90) in Ohio, heard IW5-something around 1430 on December 18, but could not make out the complete call. (It was probably IW5BMC, who worked VE1YX about that time.) Don continued to listen and was rewarded with a quick 59 SSB contact with SV1DH! None of the East Coast gang apparently heard the Greek station. MM0AMW heard K8MMM (EN91) briefly on the 19th, but he faded quickly. KE8FD (EM89), also in Ohio, did make a lone contact with MM0AMW around 1535 on December 21.

With one notable exception, US stations reported very little out of Africa during the month. The exception was a December 4 contact at 1616 between K5SW in Oklahoma with 3C5I in Equatorial Guinea, on the west coast of Africa. Well done! It often happens that the midsection of the US has a better shot at Africa than the East Coast.

Sporadic E

The minor winter E-skip season appeared as expected. Short-duration, single-hop 6-meter openings occurred somewhere across the US on December 5, 6, 7, 9, 13, 14, 19, 21, 24 and 27, according to reports received from WB2AMU, AJ4Y, K6YK, N0LL and others. Ed Rodriguez, WP4O, notes 6-meter sporadic-E from Puerto Rico to Florida on December 28 and 29. Ed also heard HI3/OE5EBO during this period.

The Geminids

The small number of reports suggests that the December 13-14 Geminids did not inspire much excitement this year. Paul Besimer, KC8LGL, completed with K9KMW in southern Florida on the morning of December 11.

EME Annals

EME (moonbounce) standings are compiled each January 1 for publication in March *QST*. To ensure that the standings reflect recent activity, information must be submitted within the previous two years. Stations dropped for lack of recent reports will be reinstated with a current update. You don't have to work additional stations to remain in the standings, but please confirm your continued interest at least every two years by sending a report. You can obtain an EME Annals report form by sending a self-addressed, stamped envelope to: World Above 50 MHz, ARRL, 225 Main St, Newington, CT 06111. Reports can also be submitted by e-mail to standings@arrl.org.

Call Sign	Initials	US States	DXCC	Call Sign	Initials	US States	DXCC	Call Sign	Initials	US States	DXCC	Call Sign	Initials	US States	DXCC	Call Sign	Initials	US States	DXCC																																																																				
6 meters (50 to 54 MHz)				70 cm (420 to 450 MHz)				13 cm (2300 to 2310, 2390 to 2450 MHz)				33 cm (902 to 928 MHz)				23 cm (1240 to 1300 MHz)				9 cm (3300 to 3500 MHz)				5 cm (5650 to 5925 MHz)				3 cm (10 to 10.5 GHz)																																																											
K6QXY	30	10	12	N7EIJ	127	39	25	AL7OB	43	15	12	VE6TA	66	18	22	OE9XXI	51	11	19	W5UN	2453	50	154	KB3PD	66	27	18	IK5OQL	43	—	—	I2COR	251	—	40	W5LUA	9	6	2	AF1T	7	6	1	OE9ERC	206	28	36	W5LUA	176	30	37	SM4IVE	165	37	—	SM1KIR	164	25	37	K2UYH	161	34	28	WD5AGO	151	28	35	ZS6AXT	149	—	31	EA6ADW	147	24	31	W7CNK	2	2	1	W7CNK	2	2	1				
W6JKV	19	7	9	AL7FS	119	49	11	IK5OQL	43	—	—	I2COR	251	—	40	W5LUA	9	6	2	AF1T	7	6	1	OE9ERC	206	28	36	W5LUA	176	30	37	SM4IVE	165	37	—	SM1KIR	164	25	37	K2UYH	161	34	28	WD5AGO	151	28	35	ZS6AXT	149	—	31	EA6ADW	147	24	31	W7CNK	2	2	1	W7CNK	2	2	1																								
W7HAH	15	6	5	KV6J	108	27	17	JH1EFA	42	5	8	AL7OB	43	15	12	VE6TA	66	18	22	OE9XXI	51	11	19	W5UN	2453	50	154	KB3PD	66	27	18	IK5OQL	43	—	—	I2COR	251	—	40	W5LUA	9	6	2	AF1T	7	6	1	OE9ERC	206	28	36	W5LUA	176	30	37	SM4IVE	165	37	—	SM1KIR	164	25	37	K2UYH	161	34	28	WD5AGO	151	28	35	ZS6AXT	149	—	31	EA6ADW	147	24	31	W7CNK	2	2	1	W7CNK	2	2	1
W7FN	14	4	4	DL5DTA	108	17	24	KN6M/5	40	18	8	W4OP	61	13	22	OE9XXI	51	11	19	W5UN	2453	50	154	KB3PD	66	27	18	IK5OQL	43	—	—	I2COR	251	—	40	W5LUA	9	6	2	AF1T	7	6	1	OE9ERC	206	28	36	W5LUA	176	30	37	SM4IVE	165	37	—	SM1KIR	164	25	37	K2UYH	161	34	28	WD5AGO	151	28	35	ZS6AXT	149	—	31	EA6ADW	147	24	31	W7CNK	2	2	1	W7CNK	2	2	1				
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VE1ALQ	12	2	9	K6AWC	107	47	24	UA4API	33	—	—	OH2DG	56	—	—	OE9XXI	51	11	19	W5UN	2453	50	154	KB3PD	66	27	18	IK5OQL	43	—	—	I2COR	251	—	40	W5LUA	9	6	2	AF1T	7	6	1	OE9ERC	206	28	36	W5LUA	176	30	37	SM4IVE	165	37	—	SM1KIR	164	25	37	K2UYH	161	34	28	WD5AGO	151	28	35	ZS6AXT	149	—	31	EA6ADW	147	24	31	W7CNK	2	2	1	W7CNK	2	2	1				
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K0FF	4	2	2	W5UWB	100	36	29	WA8WZG	30	13	11	K3HOZ	54	—	—	OE9XXI	51	11	19	W5UN	2453	50	154	KB3PD	66	27	18	IK5OQL	43	—	—	I2COR	251	—	40	W5LUA	9	6	2	AF1T	7	6	1	OE9ERC	206	28	36	W5LUA	176	30	37	SM4IVE	165	37	—	SM1KIR	164	25	37	K2UYH	161	34	28	WD5AGO	151	28	35	ZS6AXT	149	—	31	EA6ADW	147	24	31	W7CNK	2	2	1	W7CNK	2	2	1				
WA6PEV	2	1	2	K3VGX	100	16	26	W7KDTW	26	—	—	W0RAP	53	16	17	OE9XXI	51	11	19	W5UN	2453	50	154	KB3PD	66	27	18	IK5OQL	43	—	—	I2COR	251	—	40	W5LUA	9	6	2	AF1T	7	6	1	OE9ERC	206	28	36	W5LUA	176	30	37	SM4IVE	165	37	—	SM1KIR	164	25	37	K2UYH	161	34	28	WD5AGO	151	28	35	ZS6AXT	149	—	31	EA6ADW	147	24	31	W7CNK	2	2	1	W7CNK	2	2	1				
				K2LME	95	42	27	W3DTPV	24	—	—	W4OFS	46	13	15	OE9XXI	51	11	19	W5UN	2453	50	154	KB3PD	66	27	18	IK5OQL	43	—	—	I2COR	251	—	40	W5LUA	9	6	2	AF1T	7	6	1	OE9ERC	206	28	36	W5LUA	176	30	37	SM4IVE	165	37	—	SM1KIR	164	25	37	K2UYH	161	34	28	WD5AGO	151	28	35	ZS6AXT	149	—	31	EA6ADW	147	24	31	W7CNK	2	2	1	W7CNK	2	2	1				
				KJ7F	85	26	22	WB2VVV	24	—	—	NL7F	42	11	15	OE9XXI	51	11	19	W5UN	2453	50	154	KB3PD	66	27	18	IK5OQL	43	—	—	I2COR	251	—	40	W5LUA	9	6	2	AF1T	7	6	1	OE9ERC	206	28	36	W5LUA	176	30	37	SM4IVE	165	37	—	SM1KIR	164	25	37	K2UYH	161	34	28	WD5AGO	151	28	35	ZS6AXT	149	—	31	EA6ADW	147	24	31	W7CNK	2	2	1	W7CNK	2	2	1				
				VE3AX	83	22	24	WB7U	22	13	8	WA8WZG	38	10	24	OE9XXI	51	11	19	W5UN	2453	50	154	KB3PD	66	27	18	IK5OQL	43	—	—	I2COR	251	—	40	W5LUA	9	6	2	AF1T	7	6	1	OE9ERC	206	28	36	W5LUA	176	30	37	SM4IVE	165	37	—	SM1KIR	164	25	37	K2UYH	161	34	28	WD5AGO	151	28	35	ZS6AXT	149	—	31	EA6ADW	147	24	31	W7CNK	2	2	1	W7CNK	2	2	1				
				K2UYH	72	16	—	OK1KIR	342	44	62	KB3PD	32	15	8	OE9XXI	51	11	19	W5UN	2453	50	154	KB3PD	66	27	18	IK5OQL	43	—	—	I2COR	251	—	40	W5LUA	9	6	2	AF1T	7	6	1	OE9ERC	206	28	36	W5LUA	176	30	37	SM4IVE	165	37	—	SM1KIR	164	25	37	K2UYH	161	34	28	WD5AGO	151	28	35	ZS6AXT	149	—	31	EA6ADW	147	24	31	W7CNK	2	2	1	W7CNK	2	2	1				
				KB3PD	66	27	18	G3LTF	334	47	55	KORZ	3	2	2	OE9XXI	51	11	19	W5UN	2453	50	154	KB3PD	66	27	18	IK5OQL	43	—	—	I2COR	251	—	40	W5LUA	9	6	2	AF1T	7	6	1	OE9ERC	206	28	36	W5LUA	176	30	37	SM4IVE	165	37	—	SM1KIR	164	25	37	K2UYH	161	34	28	WD5AGO	151	28	35	ZS6AXT	149	—	31	EA6ADW	147	24	31	W7CNK	2	2	1	W7CNK	2	2	1				
				K7YVZ	66	23	18	KD4LT	330	38	47	W0RAP	3	2	2	OE9XXI	51	11	19	W5UN	2453	50	154	KB3PD	66	27	18	IK5OQL	43	—	—	I2COR	251	—	40	W5LUA	9	6	2	AF1T	7	6	1	OE9ERC	206	28	36	W5LUA	176	30	37	SM4IVE	165	37	—	SM1KIR	164	25	37	K2UYH	161	34	28	WD5AGO	151	28	35	ZS6AXT	149	—	31	EA6ADW	147	24	31	W7CNK	2	2	1	W7CNK	2	2	1				
				KA2KQM	63	19	15	DL9NDD	321	38	47	W0RAP	3	2	2	OE9XXI	51	11	19	W5UN	2453	50	154	KB3PD	66	27	18	IK5OQL	43	—	—	I2COR	251	—	40	W5LUA	9	6	2	AF1T	7	6	1	OE9ERC	206	28	36	W5LUA	176	30	37	SM4IVE	165	37	—	SM1KIR	164	25	37	K2UYH	161	34	28	WD5AGO	151	28	35	ZS6AXT	149	—	31	EA6ADW	147	24	31	W7CNK	2	2	1	W7CNK	2	2	1				
				W1JR	62	25	20	SM3AKW	310	35	50	W0RAP	3	2	2	OE9XXI	51	11	19	W5UN	2453	50	154	KB3PD	66	27	18	IK5OQL	43	—	—	I2COR	251	—	40	W5LUA	9	6	2	AF1T	7	6	1	OE9ERC	206	28	36	W5LUA	176	30	37	SM4IVE	165	37	—	SM1KIR	164	25	37	K2UYH	161	34	28	WD5AGO	151	28	35	ZS6AXT	149	—	31	EA6ADW	147	24	31	W7CNK	2	2	1	W7CNK	2	2	1				
				W3SZ	61	15	23	JA9BOH	292	42	47	W0RAP	3	2	2	OE9XXI	51	11	19	W5UN	2453	50	154	KB3PD	66	27	18	IK5OQL	43	—	—	I2COR	251	—	40	W5LUA	9	6	2	AF1T	7	6	1	OE9ERC	206	28	36	W5LUA	176	30	37	SM4IVE	165	37	—	SM1KIR	164	25	37	K2UYH	161	34	28	WD5AGO	151	28	35	ZS6AXT	149	—	31	EA6ADW	147	24	31	W7CNK	2	2	1	W7CNK	2	2	1				
				K1UHF	59	43	22	W1ZX	289	47	41	W0RAP	3	2	2	OE9XXI	51	11	19	W5UN	2453	50	154	KB3PD	66	27	18	IK5OQL	43	—	—	I2COR	251	—	40	W5LUA	9	6	2	AF1T	7	6	1	OE9ERC	206	28	36	W5LUA	176	30	37	SM4IVE	165	37	—	SM1KIR	164	25	37																												

“Winter’s Almost Gone. . .”

The cold winter wind is still singing through the antennas in many areas. The 80 and 160-meter bands still offer static-free DX opportunities. You may even be suffering from a bit of cabin fever. It’s hard to believe, but vacation season is just around the corner. Are you ready for vacation? Of course you are. But is your mobile setup?

An Ounce of Prevention

When I was a self-employed auto mechanic, late spring and early summer were my busiest times. Prudent travelers know it’s good vacation insurance to check and service their autos before hitting the road for a couple of weeks. Prudent hams will want to do the same for their mobile rigs and antennas. Winter temperature swings, damp air, road salt and the usual bumps and jolts can leave your rig just a few miles from going QRT. While being suddenly without your radio(s) won’t necessarily spoil your trip, if you become lost or an emergency occurs, you’ll be glad your radio works.

Begin by inspecting all mechanical connections. Use tools to actually check rig and antenna fasteners for tightness (don’t trust your fingers). If you didn’t install lock-washers initially, this is a good time to add them. Better yet, where bolt/nut combinations are employed, substitute locking nuts. These are available at most fastener supply houses under the trade names Nylok and Stover, to name a couple.

Electrical connections are a favorite snack for old Murphy. Someone once said there are only two connection types, the failed and the failing. I doubt that, but check all your connections anyway. Power connections to the battery are especially vulnerable. The natural venting of corrosive battery vapors can quickly erode bare copper and form an insulating crud on terminals. While the hood is up, check the fuse holders. Better to find if fuses are seized in their holders now rather than after one has blown. Once you’ve cleaned the gunk off all the connections, apply a liberal coat of conductive anti-seize and give Murphy a big thumbs-down. If you used crimp connectors on power or antenna leads, take a few minutes to solder the wire to the terminal. I carry crimp butt splices for emergency repairs, but that’s the only time I like to use them since they can’t be soldered. It’s much better to solder the splice and use heat shrink tubing. Check that all coax connectors are screwed tightly together and that they are properly soldered. The cable on my

new diplexer pulled completely out of the PL259 connector. The connector was soldered, but the cable wasn’t!

Although it should be included as part of your auto’s inspection, verify that the charging system is maintaining voltage in the 13.8-14.5-V range. Your rig will thank you.

Finally, use your SWR meter to check all rigs and antennas (on all bands). Increased reflected power can be an early warning of imminent loading coil/resonator failure, bad connections or simply the need to re-tune.

Radio First Aid

Even the best-prepared ham can experience radio troubles while traveling. Usually, the problems are insignificant, but being in unfamiliar territory can make repairs difficult. To mimic a home-court advantage, I put together a radio first aid kit I call my “Traveling Ham’s Survival Kit”. Housed in a plastic hand toolbox, it contains a number of things I’ve found essential for maximum traveling enjoyment. Your needs may be different, especially if you operate portable. But, this partial list will give you a foundation from which to build.

Basic items: Screwdrivers, Allen wrenches (for antenna set screws), pliers, electrical tape, connectors, appropriate fuses, an assortment of hookup wire and a DVM.

Soldering iron and solder: Carry a 12-V iron and you don’t have to wait until you get to the hotel to do your repair.

Rig manuals: A real lifesaver when your dual-band rig becomes accidentally configured to transmit only on the weather channel.

ARRL Repeater Directory: One of the handiest items you’ll ever take with you. It might also help you obtain assistance if you forgot the above item.

Spare H-T battery and charger: Be sure to store the battery with a protective cap to prevent accidental discharge. Take along a cigar lighter charging cord to allow charging the battery on the go.

Handheld frequency counter: Ever wanted to monitor Mickey and Minnie on their H-Ts when you’re visiting Disney World? Locate the mouse channel with your counter and you can eavesdrop with your wideband- receive H-T. Also handy for verifying transmitter operation when no one answers your CQ.

From The Mailbag

I’ve received lots of great feedback

about the new column. Many readers have questions pertaining to various aspects of mobile/portable installations and operation. Several of these topics will be covered in future columns. In the meantime, check the “Info-Box” for some sources of mobile/portable tips and instructions.

About that photo. . .

I’ve received a few e-mails voicing concern about the photo used in the January edition of “Radios to Go”. Although I didn’t choose the shot (it was a file photo), I did review the press-ready page and failed to note some serious safety problems with that setup. The location of the HF radio and the means of retention are, at best, suited only for casual, occasional use when no front-seat passenger is present. Jeff, AC4HF, assured me that he no longer employs that setup, and that his current mobile installation is both safe and *secure*.

Let me stress that *all* mobile installations should emphasize safety as the main priority. Don’t compromise the safety of your passengers or yourself by mounting a rig in a difficult-to-operate or hazardous location.

QRZ?

Contact me if you’d like to share info on the following topics:

- Successful operation from autos in which the manufacturer advises against the use of radio transmitters.
- Equipment preparation and deployment as a member of an Amateur Radio emergency response team.
- Links to interesting and informative Web pages about mobile/portable ham radio.

Info-Box

News you can use!

<http://www.arrl.org>: Visit the ARRL Web site index to locate information about reciprocal operating, mobile operation and other items of interest.

<http://www.k2bj.com>: Brian’s site is dedicated to the mobile ham. Lots of good info. You can post schedules, too.

Your Mobile Companion: In this ARRL book I answer many of the common questions about rig and antenna selection and installation, as well as showing you how to find and fix RFI problems. You can order it on line at <http://www.arrl.org/catalog/>.



WinLink 2000: A Worldwide HF BBS

Remember the good old days, when you chose the best bulletin board system (BBS) in your neighborhood to serve as your "home BBS?" All your radio mail would be addressed to you at your home BBS (**you@yourhomebbs**) and when you wanted to read your radio mail, you connected to your home BBS.

Problem was that when you were out of town, on the road and out of range of your home BBS, you could not get your radio mail. Unless your home BBS provided a landline dial-in service and you were somewhere where you could dial-in, you had to wait until you got home before you could receive your radio mail.

The times have changed and today, there is an HF BBS service that allows you to pick up your mail anywhere in the world. The system is called *WinLink 2000* and it has a backbone network on the Internet, which allows all participating *WinLink* mailbox operation (MBO) stations to share their message databases. Therefore, a user can connect to any participating *WinLink* MBO in the world to send or retrieve mail—doing away with the necessity of having a home BBS.

WinLink 2000 is a *Windows* application that permits messages to be transferred automatically between remote Amateur Radio stations and the Internet. "Remote" is defined here as not having landline access. Therefore, *WinLink 2000* provides Internet e-mail access for maritime, recreational-vehicle and other remotely located Amateur Radio operators, enabling those traveling to maintain contact with family and friends, regardless of their location.

WinLink 2000 is the latest addition to the *WinLink* suite of programs that permit PACTOR and PACTOR II Amateur Radio stations to use the Internet for the transfer of messages that comply with the existing third party traffic rules. In the August 1996 installment of this column, I wrote about how *APLink*, a DOS AMTOR application, had evolved into *WinLink*. Three and one-half years later, I am writing how Jim Corenmen, KE6RK; Hans Kessler, N8PGR; Rick Muething, KN6KB; Victor Poor, W5SMM and Steve Waterman, K4CJX, are taking *WinLink* into the 21st century as *WinLink 2000*.

WinLink 2000 is a BBS that provides for HF-to-HF and HF-to-VHF text message transfer as well as HF/VHF-to-Internet

K4CJX's *WinLink 2000* Web page (<http://winlink.org/k4cjsx/>) is the source for everything you want to know about the software and more.

e-mail transfer. It uses PACTOR I and PACTOR II for semi-automatic HF operation. The *WinLink 2000* software scans the HF amateur bands continuously. Scanning takes approximately 1.2 seconds per frequency, with 8 to 21 frequencies to scan depending on propagation and time of day. When the software detects a station trying to connect with it, it parks on that frequency to send and receive traffic with that station.

From the system operator's point of view, *WinLink 2000*'s modularity permits a Sysop to run any one mailbox on different computers. For example, all control modules may run on a computer in the Sysop's shack, while some or all TNC port controllers operate miles away at any remote location with Internet access.

From the user's standpoint, accessing a *WinLink 2000* MBO is the same as accessing a *WinLink* MBO. You need not use special software. Whatever you use for PACTOR or PACTOR II will do the job. There is software available that makes the mailing process easier, however, like *AirMail*. Just connect to the *WinLink* station of your choice and you are off and running! Note that not all *WinLink* stations have implemented the Internet connection.

Here is a very boring, but very useful list of frequencies used by the K4CJX *WinLink 2000* MBO. Center frequencies: 3618.9, 3620.9, 3621.9, 7070.4, 7072.4, 7073.9, 7075.9, 7076.9, 10121.9, 10122.9, 10123.9, 10125.9, 10126.9, 14064.9, 14065.9,

14069.9, 14071.9, 14072.9, 14073.9 and 14076.9 kHz. For LSB, call 2.1 kHz above the center frequency, for USB 1.9 kHz below.

Support for *WinLink 2000* is available at winlink.org/k4cjsx/, where you can find a downloadable version of *AirMail* that is compatible with *WinLink 2000*, as well as a lot more information regarding the system.

APRS Redux

I often mention APRS in this column and whenever I do, readers ask me "What is APRS?" To answer those questions, I have written a new book *APRS: Tracks, Maps and Mobiles*, which should be available from the ARRL and your favorite ham radio dealer by the time you read this.¹

Also, available from your favorite ham radio dealer is a new dual-band (144 and 440 MHz) mobile transceiver from Kenwood (the TM-D700A), which, like the TH-D7A handheld introduced a year earlier, has a built-in TNC and APRS software. Unlike the handheld, the mobile APRS radio can digipeat. The radio has been the main topic of conversation on the TAPR hot technology APRS (HTAPRS) e-mail list for a month now, as owners are making new discoveries about the radio every day. (To subscribe to HTAPRS, go to <http://www.tapr.org/>.)

¹ARRL Order #7741, ARRL publications are available from your local ARRL dealer, or directly from the ARRL. See the [ARRL Bookcase](#) elsewhere in this issue, or check out the ARRL Web site at <http://www.arrl.org/catalog>. **Q57-**

Of Tuna Tins, Black Cats and Zombies...

It was a "dark and stormy night...." Not really. It was a *beautiful* Connecticut evening with the ambient temperature around 50°. Pleasantly mild for a Halloween weekend in New England. The large, golden harvest half-moon was sitting just above the VHF/UHF antenna stack as we walked across the ARRL Headquarters parking lot, pushing an equipment cart loaded with QRP gear toward the rear entrance of W1AW, the Hiram Percy Maxim Memorial Station.

Ed Hare, W1RFI, "Head Lab Rat", his able-bodied assistant Mike "Igor" Tracy, KC1SX, and I were on a mission. It was about 2330 (local time) on October 29, 1999. We had packed up the original Tuna Tin-2 transmitter built by Doug DeMaw, W1FB in 1974 along with some other gear and were about to activate W1AW during the NorCal Zombie Shuffle, which was currently in progress. This was to be followed over the remainder of the weekend by the Black Cat/Tuna Tin-2 Operating Event, where QRPers were encouraged to build and use updated copies of the famous TT-2 transmitter.

The Evening Hunt

Our little group entered the station just as the Friday bulletin transmissions were wrapping up. Ed went to work setting up the original DeMaw TT-2 with the Ten-Tec Omni-VI as the receiver in Studio 1. Studio 2 became the 20-meter Tuna Tin-2 station and Studio 3 took care of 30 meters. It was deemed early on that 80 meters would be almost useless, so we didn't plan on any 80-meter operation.

Prior to moving over to W1AW we had tried some 40 meter QSOs during the Zombie Shuffle (CQ BOO!) from W1INF, the ARRL club station in the Headquarters building itself, using the W1AW callsign. Ed managed to work about 10 Qs and I followed with eight. Once we got set up at W1AW, the first thing we noticed was the tremendous noise level on 40 meters. Ah, yes...2000 of our closest European friends working the CQ WW DX test. Such is life. Despite the cacophony of noise on 40, I did manage several Qs with some stalwart Zombies, including Grand Zombie # 004, Paul Harden, NA5N himself!

Saturday

By 11 AM Saturday morning I was conscious and ready to get back to W1AW. Joe Bottiglieri, AA1GW, picked me up at a local restaurant and we drove back to HQ. Shortly after arriving I was back on the original Tuna



The author ensconced in W1AW Studio 1 with the Tuna Tin II.



Ed "Head Lab Rat" Hare, W1RFI.

Tin-2 making QRP contacts on 40 meters. Band conditions were excellent and the little milliwatt transmitter worked flawlessly, allowing many QRPers to have the experience of working a rig steeped in history.

Around noon, Joel Malman, K1QM, arrived to lend a hand. He brought his keyboard and interface unit. This was the first time I'd had a chance to use one of these devices and found that I liked keyboarding CW. Since I am a touch typist I can rapidly load up a buffer and, while the rig is being keyed by the keyboard interface, I can complete the log entries. This greatly speeds up the QSO/logging duties.

Joel settled in on 20 meters and after about an hour came out of Studio 2 happily complaining about the pile up he was creating on 14060 kHz! Remember, we were operating from "Ham Radio Mecca" so it must have been

a combination of the location and the Halloween season that was responsible for all the insane action on the QRP frequencies.


Shortly after noon, Dave Benson, NN1G, came over to the station. It's always good to visit with Dave. The outcome of his visit was a Small Wonders Lab DSW-40 transceiver kit that I had wanted to purchase. Having seen the prototype in February, I had been lusting after one of these kits for several months. Luckily Dave had a spare kit available and I bought it on the spot.

Unfortunately competition with European phone stations on 40 meters caused Ed to shut down that station about 8 PM. Joel and I were taking turns on 20 meters. When Joel was on 20 I worked 30 meters and managed a few QSOs despite the S-9 noise level.

The highlight of Saturday evening occurred when I heard Jim Larsen, AL7FS, in Alaska calling me on 20 meters. It had been a couple of hours since we had changed batteries on the 20-meter Tuna Tin-2, so our output was down a bit. I completed the QSO with Jim, netting Alaska, and then noticed that our 3-element 20-meter monoband beam was pointed 90 degrees away from Alaska! I had worked Jim with the beam broadside to him. Ed measured the power output of the TT-2 and confirmed it was about 300 mW! Is QRP up to the task? You tell me!

A special "thank you" to Larry Wolfgang, WR1B, and his wife Jean, WB3IOS, and Rick Lindquist, N1RL, for making this trip to Newington a great experience for me and my family.

QRP WebSurf

Our Web destination this month is the New Jersey QRP Club's terrific site. The main reason I am directing you to this site is to plug the second annual Atlanticon QRP gathering at the Ramada Inn in Glenn Mills, Pennsylvania (near Philadelphia) on March 24 and 25. Atlanticon is *the* QRP event on the East Coast. Guest speakers include Chuck Adams, K7QQ, Dave Benson, NN1G, Joe Everhart, N2CX and Gary Diana, N2JGU. There is a \$10 registration fee. All the details are available on the NJ QRP Club's Web site at: <http://www.njqrp.org>. For those of you who are "Web challenged", contact George Heron, N2APB, at 2419 Feather Mae Court, Forest Hill, MD 21050 for details. Rooms at the Ramada Inn are \$79 + tax per evening. Contact the Ramada at 610-358-1700 to make reservations. 

From the Mailbag...

Throughout the year I receive quite a few personal e-mail messages (not too many printed letters these days) asking various questions about amateur satellites. I'd like to share some of these questions and answers with you this month, although I'll withhold the names and call signs to preserve a modicum of privacy.

Q: I hear SSB CQs on RS-13 and I attempt to answer, but the stations often seem to ignore me. Why?

RS-13's 15-meter uplink encompasses the lower end of the 15-meter phone band. So, many of the signals you hear are from stations who are unaware of the fact that they are being relayed via satellite! When in doubt, only answer stations that are calling "CQ RS-13." Many amateurs call in this fashion to avoid confusion.

Q: Now that Dove-OSCAR 17 is silent, is there another satellite signal I can use to test my 2.4-GHz gear in preparation for Phase 3D?

Yes—UoSAT-OSCAR 11 has a weak signal on 2401.5 MHz. It is an excellent beacon for receive testing.

Q: Whatever became of POSAT-OSCAR 28?

The satellite itself is alive and well. You can copy its 9600-baud FSK data signal on 435.075 MHz. The Portuguese POSAT was intended to open for at least partial Amateur Radio use as a packet store-and-forward satellite, but that never happened. There is some controversy swirling around POSAT and other satellites that use Amateur Radio frequencies, yet are never opened for amateur access.

Q: Can you obtain Keplerian elements on the Web?

You can indeed. Just go to the AMSAT Web site at <http://www.amsat.org>. You can even receive Keps automatically by e-mail. Go to <http://www.amsat.org/amsat/listserv/lists.html> on the Web for more information.

Q: Can I use omnidirectional antennas in my attic to work the Fuji-OSCAR satellites?

You can—and I have—but you may find the results disappointing. Compensating for the Doppler shift on the 70-cm downlinks keeps you busy enough. Add the frequent fades as the satellite moves through the antenna pattern and you'll be driven to distraction. Omni antennas are fine for RS-13, but I prefer directional antennas for the Fujis.

Q: Does anyone still make the old OSCARLOCATORs?

No. That method of manual satellite tracking was great in its day, and it was a fine teaching tool. Computers and satellite software, however, have long since relegated OSCARLOCATORs to the satellite history books.

Q: Is RS-15 still alive?

Barely. The satellite has a damaged power system and just limps along these days. What little activity exists tends to be found around 29.380 MHz (downlink).

Q: The whole "Mode" thing confuses me. Why do we need to talk about satellite frequencies in terms of "Modes"?

Because once you get the hang of the various mode designations, it makes communication (and conversation) much easier.

For example, which is simpler?

(1) "RS-13 listens on 15 meters and 2 meters and retransmits both uplink passbands on 10 meters."

(2) "RS-13 operates in Mode KA."

See what I mean? Sometimes a little shorthand jargon is useful. Here is a quick, but not comprehensive, summary of satellite uplink/downlink modes in use today...

Mode K: 15 meters up, 10 meters down

Mode KA: 15 and 2 meters up, 10 meters down

Mode A: 2 meters up, 10 meters down

Mode B: 70 cm up, 2 meters down


Mode JA: 2 meters up, 70 cm down (analog)

Mode JD: 2 meters up, 70 cm down (digital)

Q: Do you know of any satellite tracking software that will run under Linux?

Yes. Try *Predict* by John Magliacane, KD2BD. You'll find it on the Web at <http://www.njin.net/~magliaco/predict.html>.

Q: Is it possible to use amateur satellites as Automatic Position Reporting System (APRS) relays?

The APRS community has been working on this idea for several years. When this column was written OSCARs 16, 19 and 26 were occasionally digipeating APRS packets. The system devised by Bob Bruninga, WB4APR, is known as *TrakNet*. Bob's hope is that TrakNet will "...eventually provide hundreds of mobile operators an essential channel for emergency or priority traffic using nothing but their normal 2-meter FM mobile radio and a laptop sound card or a \$3 modified normal packet TAPR-2 TNC. Communications can consist of any viable UI packet or APRS status/position reporting packets digipeated by the satellite to a few nationwide downlink sites. These sites would forward the packets on existing HF and VHF networks and the worldwide APRServe Internet system." You can learn more by visiting the APRS site on the Web at: <http://web.usna.navy.mil/~bruninga/traknet.html>. 

Flash! Three New Satellites in Orbit!

On January 27, 2000 at 0303 UTC, a hybrid Minuteman/Pegasus rocket carrying JAWSAT, ASUSat and OPAL (the "mothership" for StenSat) blasted off from Vandenberg Air Force Base. Thirty minutes later the tracking station at McMurdo, Antarctica confirmed that the payloads had reached orbit. Early telemetry reports indicated that all three vehicles were functioning nominally. The OPAL satellite was scheduled to deploy the StenSat *picosat* during the weekend of January 29-30.

None of the satellites had received their OSCAR designations at presstime. JAWSAT and ASUSat will eventually provide packet store-and-forward functions, and all three birds have the capability to function as FM voice repeaters. Assuming that all goes as planned, look for the StenSat 2-meter/70-cm repeater to be active by the time you receive this issue. The StenSat uplink frequency is 145.84 MHz with a downlink on 436.625 MHz.

OLD RADIO

OLD RADIO PROFILE: A 1934 Clough-Brengle, model 4581 transmitter.

Every collector dreams of finding a rare radio. The rarest is the "one of a kind." This month's feature radio is truly "one of a kind."

The project started when Ron Lawrence, KC4YOY, bought his first vintage transmitter from the estate of his good friend, and a long time ham, Bob Van Sleen, W4AGO. "I had been admiring Bob's Clough-Brengle transmitter for a long time." Ron said, "And when his widow asked our club to help dispose of his collection I knew which piece I wanted."

This transmitter is apparently a pretty rare bird. Ron has spent a lot of time searching for information about it. He found there are a lot of advertisements for Clough-Brengle test equipment in the 1930's magazines, but not one mention of a Clough-Brengle transmitter.

One of the best opinions Ron has heard was from AWA Museum Curator Ed Gable, K2MP. Gable thinks that it might have been built to bid on a government contract that didn't get approved, and that this might be the only one there is. Ron doesn't really know, but if anyone out there does, he would sure love to hear from you.

Soon after getting the transmitter home Ron decided that he needed a vintage receiver to go with it. Since most hams back then built their own transmitters, he figured that whoever had that transmitter would have had the best receiver they could buy. Another good friend and long time ham, Tom Boone W4COC, was asked, "What was the best receiver in 1934?" His answer, "Why, an HRO, of course."

Ron will be displaying this transmitter at the CC-AWA Spring Meet, on March 23-25 at the Sheraton Airport Plaza Hotel, I-85 at Exit 33 on the Billy Graham Parkway, Charlotte, North Carolina. This is a good radio show if you are interested in collecting and learning about old radios. There are forums, equipment contests, a flea market and an auction. For additional meet information, please visit <http://www.cc-awa.org/index.html> on the Web, or e-mail Ron at kc4yoy@trellis.net. Ron is President of the CC-AWA.

For additional information about this transmitter and to see other photos of Ron's collection, please visit my Web page at <http://www.eht.com/oldradio/arrl/index.html>.

Collector Profile: Ron Lawrence, KC4YOY

Ron's hobby of radio collecting began in 1969 when he was in high school. His best friend talked him into changing plans from taking a course in machine shop to taking electronics. He was told there was a new electronics teacher coming next year. Ron had played around with CB radio for some time and was sort of interested, but didn't know what he was getting into.

Rick Bilbro, K4KAV, was the new electronics teacher. He was just out of the Army and this was his first teaching job. Almost instantly they became friends, a friendship that has now lasted over 30 years. Rick tried and tried to get him started in ham radio back then but it wouldn't be until 1991 that Ron would finally get around to getting his ticket.

Rick brought some back issues of *Popular Electronics* into the class. In the July 1969 issue there was an article titled "Whatever Happened to Atwater Kent." This was the first time he really knew anything about early radio and was fascinated. The next spring his mother took him to something new in their area, a "flea market". There he spotted a radio and recognized it from the article in *Popular Electronics*: an Atwater Kent model 20. Looking inside he found the tubes were missing, but there was a real nice pair of Western Electric headphones with it. The price tag read \$15.

Looking in his wallet he found only \$10. He rushed to his mother and asked to borrow \$5 so he could buy the radio. She said there was no way she would give him \$5 to buy an old junk radio and that if he really wanted it he should try and haggle the man down to \$10. "It worked." Ron said, "and I was ruined." A newspaper columnist who later wrote an article about his collection said, "from innocent beginnings do dark obsessions grow".

"Boy, was he right." Ron said. "I still have that first Atwater Kent and that issue of *Popular Electronics*. They have a place of honor in my collection that now contains nearly 500 radios plus several thousand other pieces including tubes, speakers, headphones, vintage magazines and books on early radio."

Since becoming a ham in 1991, Ron is more and more interested in the history of Amateur Radio. "There are a lot hams out there that have no idea what kinds of radios came before their pocket sized HTs." Ron said, "To help them learn, I have set myself a task of assembling representative amateur stations to show the development of ham radio through the years."



K2TQN's Old Radio Museum Schedule for March 2000.

The first display for this year will be on March 25-26, at the ARRL Maryland State Convention, the Greater Baltimore Hamboree

& Computerfest, at Timonium, Maryland (<http://www.gbhc.org/index.html>). Look for my big 28-foot white museum with a flat-wire antenna in the main flea market area. Please stop in and say hello. **Q5T-**

AT THE FOUNDATION

Springing with New Ideas?

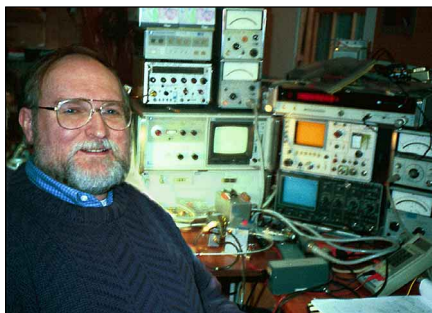
Readers have told us they're happy with new *QST* features. If something has caught your fancy and inspired you to try something new, that's great! We'd like to share a few new ideas you might want to try out this coming Spring or Summer:

Make Mine Microwaves!

Want a challenge that utilizes uncrowded frequencies, requires stamina and patience, and will invite loads of questions from curious onlookers? Want to join the ranks of modern-day pioneers whose radio frontiers extend to microwave and beyond? Then you're ready to learn about Amateur Radio microwave operating. Several excellent Web sites will give you details and tell you how to get started. Leave ordinary operating to others and visit:

<http://www.wa1mba.org/>

<http://www.geocities.com/SiliconValley/Vista/7012/ghz.htm>



TOM WILLIAMS, WA1MBA

Tom Williams, WA1MBA, is legendary among microwave enthusiasts for trying ever-higher frequencies.

<http://www.arrl.org/tis/info/microwave.html>

http://www.tiac.net/users/wade/10g_home.htm

<http://www.rac.ca/microwave.htm>

You can even qualify for ARRL Technical Awards for your pioneering efforts.

Check out: <http://www.arrl.org/w1aw/1999-arlb020.html>

Take A Hike!

You've discovered QRP, it's portable, and the great outdoors beckons. With the daypack stuffed with gear, antenna wire, and munchies, it's time to head out for the high overlook. Make a promise to yourself that this season you'll get outside and operate. You'll be amazed what a little height and propagation will do for your signal—and your spirit. Hamming is *fun* and ought to be enjoyed where fun happens n-a-t-u-r-a-l-l-y. Your kids know the score. Don't wait 'till Field Day to get the gang outdoors and calling "CQ."

You can support innovation in Amateur Radio by making a tax-deductible contribution today to: The ARRL Foundation, Inc, 225 Main St, Newington, CT 06111.

Contributor's Corner

We wish to thank the following for their generous contributions to:

The Victor C. Clark Youth Incentive Fund

Tom Frenaye, K1KI, in fond memory of Jim Dionne, K1MEM

Richard L. Scott, W8FDN, in fond memory of Vic Clark, W4KFC

The Gryphon Fund (Connecticut)
Gary and Barbara Donshik

The Jesse Bieberman Meritorious Membership Fund

Steel City ARC, Inc. (Pennsylvania) in fond memory of

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The Dr. James L. Lawson Memorial Scholarship Fund

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The Paul & Helen L. Grauer Scholarship Fund

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The Chicago FM Club Scholarship Fund

Chicago FM Club (Illinois)

The New England FEMARA Scholarship Fund

FEMARA – Boxboro Convention

The General Fund

Gerald and Suzanne Knecht

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Andrew Family Foundation (Illinois)

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W9FKC

L. Dennis Shapiro, W1UF, in fond memory of James Dionne,

K1MEM.

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Scazillo, KN1X

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Randall D. Dunning, KC5QHH

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San Francisco HRC (California), in fond memory of

George P. Delich, WA6IZB

Charles W. Clifford, Jr., W6QMY, in fond memory of

Homer C. Ford, W6GBB, and Fred W. Rollyson,

WB6CNO

As received and acknowledged during the months of

November and December, 1999.



Mary E. Lau, N7IAL ♦ Secretary, ARRL Foundation, Inc

STRAYS

EI ACTIVITY DAYS

◇ The Irish Radio Transmitters Society (IRTS) has declared the St Patrick's 2000 celebration as "EI Activity Days." The activity period will begin at 0000 UTC March 17 and end at 2359 UTC March 19.

The object is to work as many Irish counties as possible. All contacts count toward the Worked EI Counties Award. The WEIC award, issued by IRTS, is available to licensed amateurs worldwide who have worked EI or EJ stations located in at least 20 of the

26 counties of Ireland. There are additional endorsements available for working all 26 counties and for individual bands and all-mode contacts.

American amateurs can obtain detailed information on the WEIC award and membership in the IRTS by sending a self-addressed, stamped envelope to Joe Duffin, W2ORA/EI8GT, 4 Central Ave, Mooretown, NJ 08057.

AN UNUSUAL SX-28

◇ The Hallicrafters SX-28 SuperSkyrider receiver normally featured a black front panel. Apparently some SX-28s were produced with white or silver front panels. W8OZA owns one and knows of only two other amateurs



who also own these rare rigs. If you have any information about this version of the SX-28, please contact Russell Sievert, W8OZA, 1411 Lonsdale Rd, Columbus, OH 43232; tel 614-866-2406.

[Next Stray](#)

COMING CONVENTIONS

NORTH CAROLINA SECTION CONVENTION

March 11-12, Charlotte

The North Carolina Section Convention, sponsored by the Mecklenburg ARS, will be held at the Merchandise Mart, 2500 E Independence Blvd; S on I-77 to Exit 11, E on Brookshire Freeway to Exit 28, S on Independence Blvd. Doors are open Saturday 9 AM to 5 PM, Sunday 9 AM to 2 PM. Features include 500 flea market tables, 120 dealer booths, forums, VE sessions. Talk-in on 145.29. Admission is \$6 in advance, \$8 at the door. Tables are \$22. Contact Tom Hunt, KA3VVJ, 16007 Wynfield Creek Parkway, Huntersville, NC 28078, 704-948-7373; hamfest@w4bfb.org; <http://www.w4bfb.org>.

WEST TEXAS SECTION CONVENTION

March 18-19, Midland

The West Texas Section Convention, sponsored by the Midland ARC, will be held at the Midland County Exhibit Building, Service Rd; 1/2 mile E of Fairgrounds and old Hwy 80 (also called Front St or Business 20); westbound on I-20, Exit 144; eastbound on I-20, Exit 143. Doors are open Saturday 8 AM to 5 PM, Sunday 8 AM to 2 PM. Features include huge indoor flea market, dealers, tailgating, T-hunts, ARRL forum, VE sessions (Saturday, 1 PM), refreshments. *TI*: 146.76, 145.13 (88.5 Hz), 147.3, 147.28, 224.94, 444.2. Admission is \$7 in advance, \$8 at the door. Tables are \$12 each (for the first 4), \$17 (for each additional table over 4). Contact Beverley Harwood, KC5BNT, 6100 SCR 1169, Midland, TX 79706, 915-686-1841; shamrock@apex2000.net; <http://www.w5qgg.org>.

MAINE STATE CONVENTION

March 24-25, Lewiston

The Maine State Convention ("Andy" Hamfest and Computer Fair), sponsored by the Androscoggin ARC, will be held at the Ramada Conference Center, 490 Pleasant St; take Exit 13 off Maine Tnpk to traffic light, take first left after light. Doors are open Friday 7-9 PM, Saturday 8 AM to 2 PM. Features include exhibitors, vendors, flea market, new and used radio and electronic gear, computers, forums, VE sessions (Saturday, registration 10 AM, exams at noon). Talk-in on 146.61. Admission is free Friday evening, \$5 on Saturday. Tables are \$10 (includes 1 admission); additional

February 26
Vermont State, Milton*

March 10-11
Nebraska State, Norfolk*

April 14-15
Southeastern VHF Conference, Atlanta, GA

April 14-16
International DX, Visalia, CA

April 30
Delaware State, New Castle

May 5-6
Louisiana State, Baton Rouge

* See February *QST* for details.

tables are \$6 each. Contact Ivan Lazure, N1OXA, 115 Old Lisbon Rd, Lewiston, ME 04240, 207-784-0350; n1oxa@arrl.net; <http://www.mainearrl.org/convent.htm>.

WEST GULF DIVISION CONVENTION

March 24-25, Tulsa, OK

The West Gulf Division Convention, sponsored by the Green Country Hamfest Association, will be held at the Tulsa Technology Center, Riverside Campus, 801 E 91st St. Doors are open Friday 5-9 PM, Saturday 8 AM to 5 PM. Features include flea market, dealer booths (\$50), forums, VE sessions (Saturday, 1 PM), free parking, R. L. Jones Airport next door (fly-ins welcomed). Talk-in on 145.11, 443.85. Admission is \$6 in advance, \$8 at the door. Tables are \$8 in advance, \$10 at the door. Contact Merlin Griffin, WB5OSM, Box 470132, Tulsa, OK 74147-0132, 918-622-2277; megriffin@ionet.net; <http://www.greencountryhamfest.org>.

MARYLAND STATE CONVENTION

March 25-26, Timonium

The Maryland State Convention (Greater Baltimore Hamboree and Computerfest), sponsored by the Baltimore ARC, will be held at the Maryland State Fairgrounds, York Rd; Exit 16-A off I-83 N. Doors are open Saturday 8 AM to 5 PM, Sunday 8 AM to 4 PM. Features include giant indoor electronics flea market, vendors, major manufactur-

ers, commercial exhibitors, outdoor tailgating, forums, display of K2TQN's "Old Radio Museum", VE sessions, refreshments. Talk-in on 146.67. Admission is \$5 per day, \$8 for the weekend. Contact Sharon Dobsen, N3QQC, Box 95, Timonium, MD 21094, 410-HAM-FEST or 800-HAM-FEST; n3qqc@amsat.org; <http://www.gbhc.org>.

NORTH CAROLINA STATE CONVENTION

April 9, Raleigh

The North Carolina State Convention, sponsored by the Raleigh ARS, will be held at the North Carolina State Fairgrounds, Jim Graham Building, 1025 Blue Ridge Blvd; I-440, Hillsborough St Exit W. Doors are open 8 AM to 4 PM. Features include flea market, forums (ARRL, MARS, ARES, NTS, APRS), forum by Riley Hollingsworth, K4ZDH (FCC Special Counsel for AR Enforcement), VE sessions (11 AM), Saturday night welcoming party, Wouff Hong ceremony. Talk-in on 146.64. Admission is \$5 in advance, \$6 at the door. Tables are \$14 in advance (preregister by Apr 2), \$15 at the door. Contact Chuck Littlewood, K4HF, 2005 Quail Ridge Rd, Raleigh, NC 27609, 919-872-6555, k4hf@arrl.net; <http://www.rars.org>.

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-**

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 **March 1** to be listed in the **May** 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.)

†**Arizona (Scottsdale)**—Mar 11, 6 AM. *Spr*: Scottsdale ARC. Scottsdale Community College, South Parking Lot, 9000 E Chaparral; interchange of 101 N and Chaparral Rd. VE sessions. *TI*: 147.18. *Adm*: \$2. Tables: \$5. Roger Cahoon,

†ARRL Hamfest

KB7ZWI, 8501 E Edward Ave, Scottsdale, AZ 85250, 480-948-1824, fax 602-943-7651; wmgaceco@msn.com.

†**Arkansas (Fort Smith)**—Apr 8; set up Friday eve; public Saturday 8 AM to 4 PM. *Spr*: Fort Smith Area ARC. Columbus Acres, intersection of US Hwy 71 S and Brooken Hill Dr. Flea market, "ArkieCon" (largest QRP gathering between Dallas and Dayton), dealers, VE sessions, homebrew and kit building contest, overnight RV parking (within hamfest walking distance), refreshments. *TI*: 146.94. *Adm*: \$5, children free. Tables: \$15 (includes 1 admission). Win Dooley, WB5KOM, 501-785-5313, wb5kom@amsat.org; <http://www.qsl.net/lsaarc>.

†**Arkansas (Jonesboro)**—Mar 18; set up 6 AM; public 8 AM. *Spr*: Jonesboro ARC. Craighead County Fairgrounds. Flea Market, dealers, vendors, free parking, refreshments. *TI*: 146.61. *Adm*: \$5. Tables: \$12 (includes 1 chair; limited electricity; first-come, first-served). Dennis Smith, NE4O, 870-935-5351 (after 6 PM).

California (Linda)—Mar 11. Ron Murdock, W6KJ, 530-674-8533.

California (Redding)—Mar 4. Jim Bremer, KE6OUA, 530-222-8001.

†**Colorado (Castle Rock)**—Mar 11; set up 6:30 AM; public 8 AM. *Spr*: Denver Radio League. Douglas County Fairgrounds, 210 E Fairgrounds Dr; I-25 to Exit 181, proceed 1 mile E to Fairgrounds, Kirk Hall Building. Swapmeet, vendors, VE sessions (10 AM), demos, forums. *TI*: 146.88, 146.52. *Adm*: \$4. Tables: \$10. Chris Kregel, KB0YRZ, 2950 S Bannock, Englewood, CO 80110, 303-789-4736, kb0yrz@yahoo.com.

Colorado (Longmont)—Apr 1. Fred Pilz, KB0UUD, 303-678-5830.

†**Connecticut (Pomfret)**—Mar 18, 8 AM to noon. *Spr*: Eastern Connecticut ARA. Pomfret Community School, corner of Rtes 169 and 101; 4 miles W of Rte 395. Flea market, VE sessions (limited spaces available, must preregister). *TI*: 147.225

(156.7 Hz), 146.52. *Adm.*: \$2. Tables: \$10 (includes 1 admission). Paul Rollinson, KELL1, 182 Wrights Crossing Rd, Pomfret Center, CT 06259, 860-928-2456; PaulRollinson@worldnet.att.net.

†**Connecticut (Southington)**—**Apr 2**, 9 AM to 1 PM. *Spr.*: Southington ARA. Southington High School, Pleasant St; take Exit 32 off I-84 to Rte 10, go S for 1 mile, take left on Flanders St, HS is 1/2 mile on right. Flea market, vendors, tailgating (\$10), annual spring ARES meeting, CSMA meeting. *TI*: 145.49, 224.8, 444.25 (77 Hz). *Adm.*: \$5. Tables: 6-ft advance \$12, door \$15. Chet Bacon, KA1ILH, c/o SARA, Box 873, Southington, CT 06489, 860-628-9346; chet@chetbacon.com; <http://www.chetbacon.com/sara.html>.

†**Connecticut (Waterford)**—**Apr 1**; set up 9 AM; public 10 AM. *Spr.*: Radio Amateur Society of Norwich (RASON). Waterford Senior Center, on Rte 85; from Hartford take Rte 2 S to Rte 11 to Rte 85 S; from the shoreline take Rte 95 to Rte 85 N. Ham Radio Auction (bring your gear to sell; 10% commission to RASON), free parking. *TI*: 146.73. *Adm.*: Free. Tony Griggs, AA1JN, 860-859-0162; <http://www.rason.org>.

†**Florida (Englewood)**—**Mar 11**, 8 AM to 1 PM. *Spr.*: Englewood ARS. Tringali Community Center, Rte 776, East Englewood, near the intersection of Spinnaker Rd. VE sessions. *TI*: 146.7. *Adm.*: advance \$3, door \$4. Ken Anderson, W4JQT, 998 Bay Vista Blvd, Englewood, FL 34223, 941-475-3172; kba@ewol.com.

†**Florida (Sebring)**—**Mar 11**, 8 AM to 5 PM. *Spr.*: Highlands County ARC. Sebring Civic Center, 100 SW Lakeview Dr; US 27 to Sebring to Lake Jackson; Lakeview Dr circles Lake Jackson, follow signs. Tailgating (\$5, admission included), VE sessions, refreshments. *TI*: 147.045. *Adm.*: \$3. Tables: \$10 (includes 1 admission). Keith Myers, KF4YIA, 211 Jay Ave, Sebring, FL 33872, 863-471-2495, kmyers@strato.net; <http://www.strato.net/~hamradio/>.

†**Florida (Stuart)**—**Mar 18**. *Spr.*: Martin County ARA. Martin County Fairgrounds, 2016 S Dixie Hwy, S of Monterey Rd, follow signs. *TI*: 147.06. *Adm.*: Free. Romund Madson, KS4KM, 1841 SE Hanby Ave, Port St Lucie, FL 34952; 561-337-1841.

†**Georgia (Marietta)**—**Mar 18**; set up Friday 1-6:30 PM, Saturday 6:30-8:30 AM; public 8:30 AM to 3 PM. *Spr.*: Kennehoochee ARC. Jim Miller Park; from I-75 at Windy Hill Rd, go W for approximately 5 miles to Austell Rd, take left and go 1/4 miles to Callaway Rd, take right onto Callaway Rd, go 3/4 mile, hamfest on right. VE sessions (First United Methodist Church, 9 AM), free parking. *TI*: 146.88. *Adm.*: \$5, under 12 free with adult. Tables: 8-ft \$20 (inside A or B buildings), outside uncovered space \$10, outside covered space \$15; electricity \$10 per vendor. Charles Golsen, N4TZM, 5580 Lake Forrest Dr, Atlanta, GA 30342, 404-252-3303 (before 9 PM EST), cgolsen@atlanta.com; <http://qsl.asti.com/hootch/KAR.com.html>.

†**Illinois (Grayslake)**—**Mar 26**. Jacob Fishman, KF9ZF, 847-291-4160.

†**Indiana (Columbus)**—**Mar 25**. Marion Winterberg, WD9HTN, 812-342-4670.

†**Indiana (Michigan City)**—**Mar 25**. Ron Stahoviak, N9TPC, 219-325-9089.

†**Louisiana (Rayne)**—**Mar 11-12**; set up Friday noon to 5 PM; public Saturday 8 AM to 4 PM, Sunday 8 AM to noon. *Spr.*: Acadiana ARA. Rayne Civic Center, approximately 15 miles W of Lafayette on I-10; take Exit 87 (Hwy 35 S), go S to first traffic light, turn right, go 2 blocks, turn right on Gossen and go to end of road. VE sessions. *TI*: 147.03, 146.82. *Adm.*: advance \$3, door \$4. Nolen Griffith, K5ARH, 123 Normandy Rd, Lafayette, LA 70503, 337-989-9039, k5dpg@arrl.net; <http://www.acadian.net/w5ddl/>.

†**Maine (Lewiston)**—**Mar 24-25**. Maine State Convention. See "Coming Conventions."

†**Maryland (Timonium)**—**Mar 25-26**. Maryland State Convention. See "Coming Conventions."

†**Massachusetts (Framingham)**—**Mar 26**; set up 7:30 AM; public 9 AM to 1 PM. *Spr.*: Framingham ARA. Framingham High School, Mass Pike to Exit 13, Rte 30 W to Rte 126 N, 1.3 miles to "A" Street.

Flea market, radio equipment, computers, commercial vendors. ARRL info, VE sessions (Ed Weiss, WINXC, 508-881-2301), refreshments. *TI*: 147.15. *Adm.*: \$3. Tables: advance \$10, door \$14. Beverly Lees, N1LOO, c/o FARA, Box 3005, Framingham, MA 01705; 508-626-2012.

†**Massachusetts (Uxbridge)**—**Mar 19**, 8:30 AM to 3:30 PM. *Spr.*: Central Massachusetts Public Safety Association. Serendipity Hall, 515 Douglas St; from Providence take Rte 146 N to Rte 16; from Worcester take Rte 146 S to Rte 16; from Boston take Mass Pike to Rte 146 S. Flea market, new and used equipment, vendors. *Adm.*: \$1. Tables: 8-ft advance \$15, door \$20. Michael Baril, N1PSE, Box 72, Uxbridge, MA 01569-0072, 508-278-3477, info@cmpsa.org; <http://www.cmpsa.org>.

†**Massachusetts (Westfield)**—**Mar 12**; set up 7 AM; public 9 AM to 2 PM. *Spr.*: Mount Tom Amateur Repeater Assn. Our Lady of the Blessed Sacrament Parish Center, 127 Holyoke Rd; take Mass Pike to Exit 3, take right onto Rte 202/10 S, proceed through traffic light, go 300 ft, take left onto Holyoke Rd, proceed 1/4 mile, site on right. Amateur Radio and Electronics flea market, tailgating (\$5), vendors, VE sessions, commercial license exams (10 AM), plenty of parking, handicapped accessible, handicapped parking, refreshments. *TI*: 146.94. *Adm.*: \$4, under 12 free. Tables: \$15. Cindy Loiero, K1ISS, 27 Deepwoods Dr, Westfield, MA 01085, 413-568-1175, kissn1fi@javanet.com; <http://www.mtara.org>.

†**Massachusetts (Westford)**—**Feb 20**. Tammy DeGray, 978-371-0512.

†**Michigan (Marshall)**—**Mar 18**. Wes Chaney, N8BDM, 616-979-3433.

†**Minnesota (Rochester)**—**Apr 8**, 8 AM to 1:30 PM. *Spr.*: Rochester ARC. Graham Arena, 16th St and 3rd Ave SE. Ham Radio adventure area, VE sessions. *TI*: 146.82. *Adm.*: advance \$6, door \$7. Tables: flea market \$15, commercial \$25. John Scott, N0HZN, 4552 5th St NW, Rochester, MN 55901, 507-285-6522, n0hzn@aol.com; <http://members.aol.com/rarchams>.

†**Missouri (Kansas City)**—**Mar 11**; set up 6 AM; public 8 AM to 3 PM. *Spr.*: Ararat AR Shrine Club. Ararat Shrine Temple, 5100 Ararat Dr; I-435 E, exit Eastwood Trafficway, 2 blocks N on Ararat Dr. Flea market, commercial vendors, ham equipment, antiques, computer hardware and software, homebrew items, accessories, special guest Bob Heil, K9EID ("see and hear" program), seminars and tech discussions, exhibits, VE sessions, handicapped accessible, free parking, refreshments. *TI*: 145.13. *Adm.*: advance 3 for \$5, door \$3 each. Tables: flea market \$15, commercial \$35-\$45 (reserve in advance). Steve Dowdy, WJ0L, 12411 Olive St, Kansas City, MO 64146, 816-941-3392 (phone or fax), sdowdy@qni.com; <http://www.hambash.com>.

†**Missouri (Lebanon)**—**Apr 1**; set up 6:30 AM; public 8 AM to noon. *Spr.*: Lebanon ARC. National Guard Armory, 301 W Fremont Rd; I-44, Exit 129, S on Hwy 5 approximately 2 miles to S end of airport, turn right on Fremont Rd. Vendors, VE sessions (9:30 AM, preregistration preferred; Bud Loar, KOMLH, HCR 16, Box 769, Lebanon, MO 65536, 417-588-5856), refreshments. *TI*: 145.47. *Adm.*: \$3. Tables: advance \$8 (must be received by Mar 15; make checks payable to Lebanon ARC), door \$10 (includes 1 admission). Micki Jensen, KCOEEX, 14225 Highway 64, Lebanon, MO 65536, 417-588-2335; mjensen@llion.org or mjensen@advertisnet.com.

†**New Hampshire (Londonderry)**—**Mar 11**. Paul Gifford, K1LL, 603-883-3308.

†**New Hampshire (Twin Mountain)**—**Apr 8**, 8 AM to 2 PM. *Spr.*: North Country ARC and Littleton ARK. Twin Mountain Town Hall, 500 yards W of the intersection of Rtes 3 and 302. Amateur Radio and Computer Flea Market, VE sessions. *TI*: 145.43 (114.8 Hz). *Adm.*: \$2. Tables: \$5 for 8-ft space, bring your own tables. Richard Force, WB1ASL, 12 Cottage St, Lancaster, NH 03584, 603-788-4428, wb1asl@arrl.net; <http://www.qsl.net/k1ncr>.

†**New Jersey (Clinton Twp)**—**Mar 18**. *Spr.*: Cherryville Repeater Assn. North Hunterdon Regional High School, Rte 31 (Annandale); Exit 15 off I-78, S on Rte 31, 1/2 mile to high school on right. VE sessions, handicapped accessible, free

parking, refreshments. *TI*: 147.375. Tables: \$15 (must be reserved in advance). Marty Grozinski, W2CG, 6 Kirkbride Rd, Flemington, NJ 08822, 908-788-2644 or 908-788-4080, w2cg@arrl.net; <http://www.w2cra@qsl.net>.

†**New Jersey (Iselin)**—**Feb 26**. Jerry Arose, KK2J, 732-721-1046. (Auction)

†**New Jersey (West Orange)**—**Apr 1**; set up 7 AM; public 8:30 AM to 1 PM. *Spr.*: Irvington-Roseland ARC. West Orange High School, 600 Pleasant Valley Way; Exit 7 off Interstate Rte 280. Commercial vendors, computers, electronics, VE sessions, free parking, refreshments. *TI*: 146.415 (85.4 Hz), 224.48, 447.875 (156.7 Hz), 146.52. *Adm.*: \$5, nonham spouses and under 12 free with regular admission. Tables: advance \$12 (first table), \$9 (each additional); door \$15 (first table), \$12 (each additional). Jim Howe, N2TDI, 5 Iroquois Ave, Lake Hiawatha, NJ 07034, 973-402-6066; jimm2tdi@att.net.

†**North Carolina (Charlotte)**—**Mar 11-12**, North Carolina Section Convention. See "Coming Conventions."

†**North Carolina (Kinston)**—**Apr 2**; set up Saturday 4-9 PM (overnight security provided), Sunday 6 AM; public 8 AM to 3 PM. *Spr.*: Down East Hamfest Association. Lenoir County Fairgrounds, Fairgrounds Rd; Hwys 11 and 55 S of Kinston, approximately 1 mile S of US Hwy 70E. Tailgating, VE sessions, free parking, refreshments. *TI*: 146.685. *Adm.*: advance \$4, door \$5. Tables: 8-ft \$10 (electricity \$5). Doug Burt, W4OFO, Box 1778, Kinston, NC 28503; 252-524-5724 (after 6 PM).

†**North Carolina (Raleigh)**—**Apr 9**, North Carolina State Convention. See "Coming Conventions."

†**North Dakota (West Fargo)**—**Mar 11**, 8 AM to 3 PM. *Spr.*: Red River Radio Amateurs. Red River Valley Fairgrounds Agriculture Building, off Westman Ave, E of I-94. Flea market, commercial vendors (\$25), seminars, VE sessions. *TI*: 146.76. *Adm.*: advance \$5, door \$6. Tables: 8-ft advance \$8, door \$10. Kent Olson, KAOLDG, 7702 Forest River Rd, Fargo, ND 58104-8004, 701-298-0956, kolson@means.net; <http://www.rrraa.org/>.

†**Ohio (Coalton)**—**Mar 25**, 8 AM to 1 PM. *Spr.*: Jackson County ARC. James A. Rhodes Community Center, State Rte 93, between Jackson and Wellston; from US 35 go N on Rte 93 for 4 miles, building on right. VE sessions (10 AM, all classes, walk-ins accepted), refreshments. *TI*: 146.79. *Adm.*: \$5. Tables: \$5. Edgar Dempsey, KD8XL, 110 Morton St, Jackson, OH 45640-1335, 740-286-3239; kd8xl@juno.com.

†**Ohio (Madison)**—**Mar 26**, 8 AM to 2 PM. *Spr.*: Lake County ARA. Madison High School, North Ridge Rd; I-90 to Rte 528, go N to Rte 84 or Rte 20, turn left to Burns Rd, follow signs to High School. Hamfest/Computerfest; flea market; vendors; new and used Amateur Radio, computer, and assorted electronic equipment; forums; VE sessions; paved parking, refreshments. *TI*: 147.21. *Adm.*: \$5. Tables: 6-ft \$8, 8-ft \$10. Roxanne, 440-257-0024; tbrown@ncweb.com.

†**Ohio (Maumee/Toledo)**—**Mar 19**; set up Saturday 3:30-7:30 PM, Sunday 5:30-8 AM; public 8 AM to 2 PM. *Spr.*: Toledo Mobile Radio Assn. Lucas County Recreation Center, 2901 Key St; S of Heatherdowns and N of Anthony Wayne (Rte 24). Free parking, handicapped parking. *TI*: 147.27, 442.85. *Adm.*: \$6. Tables: regular \$20, wall \$25 (to order tables send application form and SASE to TMRA Hamfest, Box 273, Toledo, OH 43697-0273 by Mar 5). Paul Hanslik, N8XDB, 419-243-3836; <http://www.tmrhamradio.org>.

†**Oklahoma (Elk City)**—**Mar 4**, 8 AM to 5 PM. *Spr.*: West Central Oklahoma ARC. Community Civic Center, on old Hwy 66; I-40, Exit 41, 1 mile W of the junction of Hwys 66 and 34. VE sessions. *TI*: 146.76. *Adm.*: advance \$5, door \$8. Tables: \$5. Earl Bottom, N5NEB, Rte 1, Box 62A, Hammon, OK 73650, 580-821-0633; n5neb@logixnet.net.

†**Oklahoma (Lawton)**—**Apr 8**, set up Friday 6-9 PM, Saturday 6:30 AM; public 8 AM. *Spr.*: Lawton Ft Sill ARC. Comanche County Fairgrounds. Hamfest/Computer Fair, forums, demonstrations, VE sessions. *TI*: 146.91. *Adm.*: advance

\$5 (before Apr 1), door \$7. Tables: advance \$10 (first), \$8 (all others); door \$15. Bob Morford, KA5YED, 1415 NW 33rd St, Lawton, OK 73505, 580-355-6120; bmorford@rli.net.

†**Oklahoma (Mooreland)—Mar 31-Apr 1**; Friday 5-10 PM, Saturday 8 AM to 3 PM. *Spr*: Tri State AR Group. Mooreland Fair Barn; from junction of US 412 and Hwy 50, go 7 blocks N, turn left, go 2 blocks W. National Weather Service (weather spotting training), VE sessions. *TI*: 147.36 (88.5 Hz), 146.52. *Adm*: \$3. Tables: Free (first-come, first-served basis). Jay Kruckenberg, K5GUD, Rte 2, Box 31, Mooreland, OK 73852, 580-994-2751; redcarpet@pdi.net.

Oklahoma (Tulsa)—Mar 24-25, West Gulf Division Convention. See “[Coming Conventions](#).”

†**Pennsylvania (Monroeville)—Apr 9**; set up 6 AM; public 8 AM to 3 PM. *Spr*: Two Rivers ARC. Monzo’s Palace Inn, US Rte 22 and State Rte 48; from E or W take PA Turnpike (I-76) to Exit 6 (Monroeville), take Business 22 ramp, turn left at traffic light, go 200 feet, Palace Inn on left; from N or S take PA Turnpike Rte 48 to Monroeville, Palace Inn is at intersection of Rtes 22 and 48. Vendors, forums, meetings. *TI*: 146.73, 147.12. *Adm*: \$5, under 12 free when accompanied by adult. Tables: \$20. Michael Kowalcheck, KV3L, Box 225, Greenock, PA 15047-0225, 412-751-9657, w3oc@nb.net; <http://www.qsl.net/w3oc>.

†**Pennsylvania (York)—Mar 12**; set up 6 AM; public 8 AM. *Spr*: Keystone VHF Club. York County Area Vocational Technical School, 2300 S Queen St; I-83 to Exit 6, S to first light, left into school. Vendors, tailgating, VE sessions (preregister, Virginia Moore, N3LZS, 717-252-1694). *TI*: 146.97. *Adm*: \$5, under 12 free. Tables: \$20. Dick Goodman, WA3USG, c/o Keystone VHF Club, Box 7462, York, PA 17404, 717-697-2353 or 717-697-2490, yorkfest@aol.com; <http://members.aol.com/yorkfest>.

†**Tennessee (Clinton)—Apr 8**, 9 AM to 4 PM. *Spr*: Oakridge ARC. Old National Guard Armory, Charles G. Seivers Blvd and Nave St. Tailgating, free paved parking. *TI*: 146.88, 146.97. *Adm*: \$5. Tables: \$8. David Bower, K4PZT, 512 Elkmont Rd,

Knoxville, TN 37922, 865-690-8360, d.bower@ieee.org; <http://www.korrnet.org/orarc>.

Tennessee (Knoxville)—Mar 4. Paul Baird, K3PB, 865-986-9562.

Tennessee (Tullahoma)—Mar 25. Ian Haynes, AB4SW, 931-649-5187.

†**Texas (Brenham)—Apr 1**, 7:30 AM to noon. *Spr*: Brenham ARC. Washington County Fairgrounds, 1305 E Horton; just N of the intersection of E Horton and Hwy 105. Swapmeet. *TI*: 147.26. *Adm*: Free. Tables: \$5. Dan Lakenmacher, N5UNU, 10312 Hwy 36 N, Brenham, TX 77833, 409-836-8739; lindan@phoenix.net.

Texas (Midland)—Mar 18-19, West Texas Section Convention. See “[Coming Conventions](#).”

†**Washington (Puyallup)—Mar 11**. *Spr*: Mike and Key ARC. Pavilion Exhibition Hall, Western Washington Fairgrounds; 14th Ave SW exit from SR 512, NE corner of Fairgrounds. Club info, vendors, VE sessions, free parking, overnight self-contained RVs, refreshments. *TI*: 146.82 (103.5 Hz), 146.58. *Adm*: \$6. Tables: \$22. Michael Dinkelman, N7WA, 22222 148th Ave SE, Kent, WA 98042, 425-867-4797 (days), 253-631-3756 (eves); mwdink@eskimo.com.

†**Washington (Spokane)—Apr 8**; set up Friday 8 AM to 2 PM; public Saturday 9 AM to 5 PM. *Spr*: Lilac City ARC and Lilac City Chapter 10-10 Int. Spokane Community College, 1810 N Greene St; I-90 Exit 283B, go 1½ miles N. VE sessions. *TI*: 147.32, 146.52. *Adm*: advance \$5, door \$6. Warren Kelsey, KJ7BB, 1405 S Crestline, Spokane, WA 99203-3648; 509-534-8443.

†**West Virginia (Beckley)—Mar 25**, 9 AM to 3 PM. *Spr*: Plateau ARA and Black Diamond RC. Raleigh County Armory, 200 Armory Dr; follow I-77 to I-64E, proceed E to Exit 124, take Rte 19N to Armory Dr. VE sessions, handicapped accessible, overnight camping with full hookups. *TI*: 146.79, 145.37. *Adm*: \$5. Tables: \$5 (without power), \$15 (with power). Jim Martin, KC8JSZ, 323 Woodbridge Rd, Oak Hill, WV 25901, 304-465-1428, w373@inetone.net; <http://members.spreec.com/sip1/plateau>.

†**West Virginia (Charleston)—Mar 18**, 9 AM to

3 PM. *Spr*: Charleston Area Hamfest and Computer Show. National Guard Armory, 1707 Coonskin Dr; take Greenbrier Exit off I-64/77 towards airport, veer right past airport exit, at traffic light turn left on Coonskin Dr, Armory is ¾ mile on left. VE sessions. *TI*: 145.35, 146.52. *Adm*: \$5. Tables: \$5. Jimmie Hewlett, WD8MKS, Box 916, St Albans, WV 25177-0916, 304-768-1142; fax 394-768-9788.

†**Wisconsin (Jefferson)—Mar 19**; set up 7 AM; public 8 AM to 2 PM. *Spr*: Tri-County ARC. Jefferson County Fairgrounds Activity Center, Hwy 18 W. Vendors, VE sessions, refreshments. *TI*: 145.49. *Adm*: \$4. Tables: \$6 (8-ft). John Greene, N9PGY, 413 S Main St, Fort Atkinson, WI 53538, 920-563-8740 eves, fax 920-563-9551; tricityarc@globaldialog.com.

†**Wisconsin (Milwaukee)—Apr 7-8**; Friday 2-7 PM, Saturday 9 AM to 3:30 PM. *Spr*: Amateur Electronic Supply. AES Headquarters, 5710 W Good Hope Rd. Over 35 major manufacturers displays, forums, VE sessions, refreshments. *TI*: 146.85. *Adm*: Free. Ray Grenier, K9KHW, 414-358-4088, rayk9khw@aol.com; <http://www.aesham.com>.

†**Wisconsin (Stoughton)—Apr 9**, 8 AM to 2 PM. *Spr*: MARA and Madison Area Repeater Assn. Mandt Center, 400 Mandt Parkway; exit I-90/39 at Hwy 51 W, left on 4th St, left on Mandt Pkwy. VE sessions, free parking. *TI*: 147.15. *Adm*: advance \$4, door \$5. Tables: 6-ft, advance \$10, door \$12; 8-ft, advance \$12, door \$14 (electrical connection \$10). Paul Toussaint, N9VWH, Box 8890, Madison, WI 53708-8890, 608-245-8890; n9vwh@arrl.net.

Wisconsin (Waukesha)—Mar 12. John Breecher, N9NWN, 414-835-7035.

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@arrl.org.



STRAYS

CLUBS LEADING THE WAY!

◇ The Billerica (Massachusetts) Amateur Radio Society has introduced a program to



develop kit-building skills, enthusiasm and leadership. Using school facilities, they set up a “production line” (complete with helpful Elmers) to guide students as they build their regenerative receiver projects.

The ARRL is about to introduce the Club 2000 Achievement Award to recognize active, involved clubs. (See Minute 33 in “Moved and Seconded” in this issue.) If your club puts on license classes, group projects such as the one shown here, or any other “outreach” activities, this award is for you! Watch future issues of *QST* and check the ARRLWeb Extra (<http://www.arrl.org/members-only/>) for more information as it becomes available.

QST CONGRATULATES AA5MN

◇ Dr Fred F. Ciarochi, AA5MN, has been elected president of the Dallas County (Texas) Medical Society. The Dallas County Medical Society is the fourth largest medical society in the country with a membership of nearly 6000 physicians. Licensed since 1957, Dr Ciarochi is an active member of the Southwest Dallas County ARC.

WANTED: MANUALS

◇ I'm looking for manuals for the Labrotech TO-55 oscilloscope and G. K. Corporation VHF spectrum analyzer. Darrell Mintzmyer,

KA0BRW, PO Box 195, Norton, KS 67654-0195; mintzdd@ruraltel.net.

BUS ANALYZER FROM KENWOOD

◇ Kenwood Test & Measuring Instruments introduces their new IEEE1394 bus analyzer—the LA-1394CX.

The LA-1394CX allows monitoring of the IEEE 1394 interface and the transmission of various types of packets. It features a display function, which permits the user to display a received packet after analyzing. The LA-1394CX is useful not only for developing semiconductors, but also for debugging the hardware and software of IEEE1394 equipment.

Additional capabilities include a high speed bus data storage engine and fire-trigger detectors which assist in the configuration of an optimum circuit block combination. The device enables detection of various types of trigger signals, receives bus traffic data at up to 400 Mb/s and also features a copy paste function for captured data. Windows application software is included.

Prices start at \$25,000. For more information contact Print Products International, 8931 Brookville Rd, Silver Spring, MD 20910; tel 800-638-2020; fax 800-545-0058; <http://www.prodintl.com>.

Next Stray **QST** March 2000 97

SILENT KEYS

It is with deep regret that we record the passing of these amateurs.

W1BDV, James P. Saunders, York Beach, ME
ND1D, Thomas J. Reynolds, Islesboro, ME
AA1ER, Edward J. Donohue, Windsor Locks, CT
*WA1GSB, Charles T. Marshall, Roslindale, MA
K1JJJ, Alderico Fruzzetti, Bridgewater, MA
W1KVM, Albin Sheputa, Thompson, CT
*K1MEM, James Dionne, Sudbury, MA
KA1QGF, Benjamin N. Estra, Stratford, CT
W1WUZ, John Sabo, Southport, CT
N2CJT, James C. Davis, Fitchburg, MA
KD2CR, Leonard J. Kravitz, Woodbury Heights, NJ
W2DNN, Samuel C. Macy, Elgin, IL
WA2FVF, Theodore F. Bollen, Flushing, NY
W2GZ, Leonard L. Furman, Deltona, FL
W2PDT, Lisle A. Snow, Lyons, NY
K2QEZ, George Bernstein, Tamarac, FL
WB2RNS, Colin C. Corke, Albion, NY
NW2T, David E. Schwitek, Springwater, NY
AI2W, Ed Dombert, Hartsville, NY
K3AJQ, Herman A. Christen, Pittsburgh, PA
KG3C, John J. Scull, Moscow, PA
N3CUS, Stanley A. Greenstein, Bryn Mawr, PA
WA3EBA, Richard D. Donnelly, Clarks Mills, PA
N3IYJ, Frank S. Marshall, College Park, MD
K3KLI, George E. Stockdill, Brookville, PA
W3KYW, Bruce R. Wood, Warren, PA
W3LQD, Leo C. Kelley, Altoona, PA
N3MVH, Bernice M. Hampson, Emmitsburg, MD
N3XT, Thomas E. Moyers, Woodbridge, VA
K3WV, William A. Vogan, Owings, MD
WA3ZFM, John A. Valentic, Campbelltown, PA
W4ADO, Otis K. Wolfe, Rose Hill, VA
KE4BYK, Ottis P. Gray, Tuscaloosa, AL
KS4CT, Peter J. Codones, Haines City, FL
WA4EKM, Alfred A. Hook, Pompano Beach, FL
W4FCC, George R. Alsobrook, Memphis, TN
*K4GFP, William C. Johnston, Oakton, VA
*KB4GI, Carlos H. Purtee, Jackson, TN
W4HHK, Paul M. Wilson, Collierville, TN
W4HTG, Elmer G. Davis, Lexington, NC
WA4JDB, Gene W. Starr, Palm Bay, FL
K4KQE, Howard G. Dodd, Haleyville, AL
W4MJW, Roy J. Dickson, Winston Salem, NC
K4MVB, Mary E. Blocher, Highland Heights, KY
WA4OJU, R. E. Crocker, Charlotte, NC
K4PYA, Crosby Sparks, Winchester, KY
N4RZJ, Philip D. Brown, Fairhope, AL
W4SXZ, Gerard T. Becknell, Forest City, NC
*K4TI, Donald P. Huddler, Columbus, IN
W5AYQ, Charles B. Perdue, Biloxi Ms, MS
K5BSY, Cecil E. Cooper, Houston, TX

K5ERW, Marjorie A. Larison, Kingsbury, TX
KB5FDV, Amet Deniz Tor, Corpus Christi, TX
KF5JU, M. Scott Tipton, Dallas, TX
*KB5JY, Charles B. Martin, Los Alamos, NM
W5LFS, Arthur A. Harban, Bartlesville, OK
W5LHX, Amos Peters, Taylor, TX
*W5LWS, James P. Allen, Natchez, MS
KA5MNT, Clarence E. Smith, Richton, MS
KF5NT, Paul E. Osborn, Palestine, TX
N5OWQ, Quinn C. Farabee, Fredericksburg, TX
ND5W, R. C. Arens, Oklahoma City, OK
KC5YJV, Michael Glover, Diboll, TX
KD6AEP, Jean Edmondson, Willits, CA
W6ARJ, William R. Mattison, Auburn, CA
W6BFF, John L. Willette, Stockton, CA
N6BQ, Walter A. Hopkins, San Jose, CA
WB6GRY, Nicholas J. Pardi, Apple Valley, CA
NH6IB, Willard M. Eller, Wailuku, HI
WA6JIX, Bob G. McMullen, Lancaster, CA
W6KZJ, Laurence A. Daily, San Carlos, CA
W6LZI, Harry J. Moulin, Lafayette, CA
WM6M, Daniel G. Dietz, Scotts Valley, CA
WB6PJJ, Lavonne C. Scanlon, Modesto, CA
*KJ6QQ, Hugh C. Foster, Grants Pass, OR
WA6SUO, William O. Allen, Citrus Heights, CA
WB6UAL, William H. Livingston, Diamond Springs, CA
K6UE, Horton C. Williams, Othello, WA
K7AAG, Alex Muir, Edmonds, WA
W7BLI, Ralph W. Ivie, Kimberly, ID
W7CMO, Norman S. Moberg, Puyallup, WA
W7CSG, Harold W. Barth, Spokane, WA
KA7DCX, Joseph E. Jenks, Tacoma, WA
KA7FEE, John R. MacKenzie, Portland, OR
*K7FE, Frank A. Exum, Denver, CO
KB7FMP, Victor W. Jones, Sumner, WA
W7FOO, Edward A. Harbidge, Mountlake Terrace, WA
KA7HWK, Harry W. Edwards, Everson, WA
W7ITP, Wayne Spoonemore, Dayton, WA
W7KBH, George E. Gierke, Seattle, WA
KC7KPI, Edward F. Stone, Rochester, WA
W7LRB, Chet McCoy, McMinnville, OR
W7LZM, John W. Karr, Bellevue, WA
W7OZH, Lawrence R. Schumacher, Bozeman, MT
W7QS, Luis Torres, Fircrest, WA
W7RMV, William H. Evans, Careywood, ID
KA7RNK, Peter A. Boving, Yakima, WA
N07S, Monte L. Porter, Centralia, WA
W7VM, Roy T. Bucy, Des Moines, WA
WB8DNE, Hiram W. Brewer, Sebring, FL
K8JXF, Donald M. Covert, Chagrin Falls, OH
K8KAM, Lois E. Rhodes, Troy, OH
K8KDO, Mildred M. Chapin, Oberlin, OH

WD8OFL, David A. Lahiff, Adnover, OH
W8TEB, Virgil J. Junker, Dayton, OH
WA8VSY, Thomas R. Weiss, Norton, OH
W8VXG, Lyle E. Handlon, Rollin, MI
KD8XU, Harold K. Kidd, Robson, WV
W8ZKX, Charles E. Rogers, Akron, OH
KA9DJT, Julio R. Gonzalez, Milwaukee, WI
W9DMO, N. Scotty Mullikin, Franklin, IN
N9GWS, Charles H. Apfelstadt, Evansville, IN
KA9ISH, Malcolm R. Holland, Upland, IN
W9KXX, Robert L. Streeter, Hendersonville, NC
WA9KNK, Billy J. McCollum, Milwaukee, WI
WB9KZH, Merrill A. Lewis, Oshkosh, WI
W9MPP, Charles Kindt, Beaver Dam, WI
WA9MVX, Richard W. Alexander, Muncie, IN
*W9NU, John W. Page, Bradenton, FL
WA9PAZ, Brayton V. Danner, Lincoln, IL
W9PWI, Richard E. Rice, East Alton, IL
AA9SN, Robert E. Jacobson, Skokie, IL
K0AIE, Albert H. Gull, Edgemont, SD
WOAXT, Roger E. Sawyer, Mason City, IA
W0DYC, Julien J. Meyer, Benson, MN
WA0FUH, Sam J. Beck, Johnston, IA
W0IJJ, John J. Hoefler, Shawnee Mission, KS
W0OQK, Richard W. Shaw, Kansas City, MO
WA0QJK, Edwin E. Woerner, Lincoln, NE
AA0QQ, Merle C. Skinner, Logan, NM
GI3ILV, James Thompson, Craigavon, Northern Ireland,
PA0KSB, K. Spaargaren, Amstelveen, Netherlands
SP9ZD, Henryk Cichon, Katowice, Poland
*VE3HC, Fred O. Hammond, Guelph, ON, Canada
*VP9C, Colin C. Dumbrille, Smith's Parish, Bermuda

*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

HCA SHORTWAVE DX ACHIEVEMENT CERTIFICATE

♦ If you have a vintage tube receiver, and listen to commercial international shortwave stations, here is your chance to earn a beautiful certificate. You can get one for receiving, and confirming, 50, 100, 150 or 200+ countries. The SWL adventure runs until April of 2001. Applicants may use half of their existing shortwave QSL cards or letters toward the total. The other half must be accumulated since January 1, 2000. There is a special solid-state class for those who wish to use modern receivers. Details are available at the Hallicrafters Collectors Association Web site: <http://www.hallicrafters.org>.

Special boat anchor surprises will be

awarded for the most unusual QSL, the most colorful, the youngest and oldest participants and the most unusual listening post. Contact Duane Fischer, W8DBF, for further information at: dfischer@tir.com.

BOY'S LIFE RADIO CLUB

♦ I'm looking for information and artifacts concerning the Boy's Life Radio Club, popular in the late '50s and early '60s. Contact Brian Cieslak via e-mail at AE9K@arrrl.net.

FREE SOFTWARE FOR THE ARRL INTERNATIONAL DX CONTEST BY N3FJP

♦ N3FJP's *International DX Contest Logging Program 1.0* is designed for US and Canadian amateurs. The software will check for duplicates, including partials, and write the Cabrillo summary file. The software is free and available for downloading on the Web at: [http://](http://members.aol.com/snkddavis/page1.html)

members.aol.com/snkddavis/page1.html.

I would like to get in touch with...

♦...Amateur Radio operators who are also amateur astronomers. Xue-Jun Zhang, BD2CR, PO Box 80, Fangxiao, Daqing, 163161 China.

♦...anyone who might wish to Elmer a prospective Sudanese ham via e-mail. Nader Ali Omer, naderomer@yahoo.com.

♦...any amateurs who served aboard the USS *Shangri-La*, CV, CVA, CVS-38, any time between 1944-1971. Please contact Bob Hayner, N2UDO, at n2udo@arrrl.net.

WANTED: WILKINSON AUTOPATCH INFO

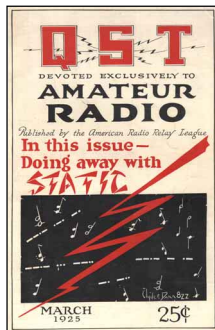
♦ I am looking for a schematic and other information for a Wilkinson Electronics WERAP-200 autopatch. Please e-mail Jim Bremer, KE6OUA, at ke6oua@aol.com.

Next Stray

75, 50 AND 25 YEARS AGO

March 1925

◇ The cover by Clyde Darr, 8ZZ, announces the issue's important article, "In this issue—Doing away with STATIC," with a red lightning bolt coursing through Morse characters. The editorial, "Avoiding Trouble," again addresses the problem of hams causing interference to broadcast listeners, and urges cooperation from both sides.



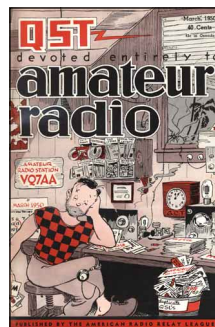
"Daylight Radio Communication Wins!" reports that "20-meter daylight work surpasses results with longer waves at night"—exciting news, indeed! The contacts were the result of good engineering and long-term experimental work, rather than just lucky happenstance. Part II of "The McCaa Anti-Static Devices," by S. Kruse, presents construction details on the device, following last month's theoretical presentation. Herbert Metcalf reports on "The New Magnavox Tube," which was specifically designed to operate efficiently from 20 to 600 meters. "New Regulations for Transmitting Stations" reviews the new rules that went into effect on January 5, 1925, following the Third National Radio Conference. It reports that hams still using spark transmitters "...should abandon their use as early as possible."

A. L. Budlong presents "Notes on Reflexing Receivers," and discusses the performance of those regenerative sets. "6TS and 2MU First Across on 40 Meters" reports the record-setting contact between Brooklyn and Santa Monica, with a diagram of 2MU's 50 foot flattop strung between masts on two side-by-side apartment buildings, a 38 foot downlead, and a double-cage counterpoise below the flattop. E. F. Andrews and

E. A. Beane report on a new rf amplifier, "The Deresnadyne." "A Tuned Audio Transformer" is described, with a sharp peak centered on 2 kc, to help the CW op. "Learning the Code by Listening" describes "a long-wave tuner for the broadcast listener."

March 1950

◇ Gil's cover cartoon shows a bedraggled and bewhiskered VQ7AA at the end of the ARRL International DX Contest (see the February cover for the "before" view). The editorial publishes the "A.R.R.L. Comments on Amended F.C.C. Proposals" that addressed the proposed rules for the forthcoming Amateur Extra, Novice and Technician class licenses.



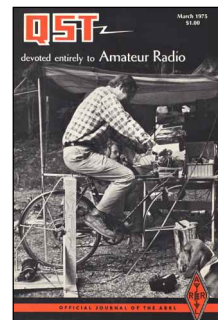
The HQ staff is prominent in QST this month: Don Mix, W1TS, presents a detailed how-to article on "A Beginner's Four-Tube superhet Receiver." George Grammer, W1DF, publishes Part II of "Eliminating TV with Low-Pass Filters." George Hart, W1NJM, writes about the "Simulated Emergency Test—1949." Vern Chambers does a review of circuits or "Crystal-Controlled Oscillators." Ed Tilton, W1HDQ, tells about the transmitter rf section in Part II of "A 2-Meter Station for the Novice."

A photo in "Strays" shows Tex Beneke—well-known tenor sax player, vocalist, and now leader of the Glenn Miller Band, who recently passed his ham exam to become W2CKD. Henry Cross, W1OOP, discusses "Adjusting Antenna Coupling in V.H.F. Receivers" to provide lower noise figures. A photo in "How's DX?" shows the neat

station of W2WMV/C9 (featuring all military equipment) that made a big noise from Manchuria for a while on 10 and 20 meters.

March 1975

◇ The cover shows one ham yacking on a rig while a second ham pedals a bicycle-driven generator furiously to provide dc power for the station. An onlooking beagle is not impressed. The editorial, "Membership Opinion Assessment," announces that members will soon receive a four-page questionnaire to determine the membership's position on the FCC's restructuring proposals. In "A Message from the President," Harry Dannals, W2TUK, discusses the pressure from the Electronic Industries Association to take part of the amateur 220-MHz band and give it to the Class E Citizens Band service.



Edward Meade, K1AGB, discusses "Using the Double Balanced Mixer in VHF Converters." Glen Carlson, W6KVD, tells about "Offset Tuning and Keying Modifications for the HW-101." Doug DeMaw, W1CER/ZF1ST, and Bill Martinek, W8JUY/ZF1WM, tell about their "QRP Shakedown—Cayman Style!" Also on the subject of QRP, Peter Bertini, K1ZJH, brings us Part II of "A State-of-the-Art QRP Transceiver for 50 MHz." George Steber, WB9LVI, presents Part I of "SSTV to Fast-Scan Converter." In the cover article, Edward Yadinski, W2DNZ, tells about "Emergency Electrical Energy via Man Power." The beagle has, by this time, fallen asleep.—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
Visiting Operator Time (12 PM - 1 PM closed for lunch)								
7 AM-1 PM	8 AM-2 PM	9 AM-3 PM	10 AM-4 PM	Fast Code	Slow Code	Fast Code	Slow Code	Fast Code
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 ⁴⁵ PM	7 ⁴⁵ PM	8 ⁴⁵ PM	9 ⁴⁵ 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^{1/2}, 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 by W6OWP, with K6YR as an alternate. 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.

CONTEST CORRAL

Feedback

In the **1999 ARRL UHF Contest results, N6DN** should be shown as a single-op rover from the Pacific division.

The **1999 Field Day** operation of the Radio Amateur Society of Norwich (Connecticut), **N1NW**, should have been listed in the 3A category with total score of 3,028 points. **WA3NNA** operated as class 1B with a score of 1260 points in the EPA section.

In the **1999 June VHF QSO Party, VE7XF**, operating as **VE4AKX**, should have been listed in the Manitoba section. The call sign of **WAIUOL** was improperly reported as **WAIUOZ**. Also see corrected Rover scores elsewhere in this issue.

WIAW Qualifying Runs are 10 PM EST Monday, March 6, and 7 PM EST Tuesday, March 21. The **K6YR West Coast Qualifying Run** will be at 9 PM PDT on Wednesday, March 1. Check the [WIAW schedule](#) for details.

March

4-5

ARRL International DX Contest, phone, see your December 1999 *QST*, page 99.

11-12

QCWA QSO Party, sponsored by Quarter Century Wireless Assn, from 1900Z Mar 11 until 1900Z Mar 12 (the second QCWA QSO Party of the year takes place 1800Z Sep 16 until 1800Z Sep 17). CW, phone, or mixed-mode. Work stations on each of 15 possible "bands": 160, 80, 40, 20, 15, 10 meters CW and phone; 6 meters; 2 meters; 1.35 meters; 70 cm & up. Work stations in your own QCWA chapter only once. No crossband or repeater QSOs. QCWA members exchange call signs, the last two digits of the year first licensed, chapter number ("AL" if not a member of a chapter). Nonmembers exchange call signs, the last two digits of the year first licensed, and the state, province or country. Scoring: 1 pt per phone QSO, 2 pts per CW QSO. Count 1 multiplier for each QCWA chapter, plus each non-member state/province/country. Contacts with HQ station W2MM count as 3 multipliers per "band." Awards. All logs must be received no later than 1 month after contest. Send logs to: Dick Newsome WOHXL, 2924 North 48th Street, Omaha, NE 68104-3726; <http://www.teleport.com/~qcwa/qsoparty.htm>.

Wisconsin QSO Party, sponsored by the West Allis RAC, 1800Z Mar 12 until 0100Z Mar 13. CW and phone. 80 40 20 15 10 6 2 meters. Work stations once/mode/band, no repeater QSOs. Single op/multi-single/multi-multi, fixed/mobile/Novice/Tech. WI stations send county; others send state/province/DXCC country. CW—3.550 3.705 7.050 7.125 14.050 and 15/10/6/2 meters; phone—3.890 7.230 14.290 21.350 28.400 and 6/2 meters. Score 1 pt/phone, 2 pts/CW QSO. Final score is QSO pts WI counties (max 72); WI stations score QSO pts WI counties + states/provinces. WI mobiles/portables add 500 bonus points for each county where they make 12 or more QSOs. Mobile operators may not sit on a county line to operate. Awards. Send logs by Mar 31 to West Allis RAC, PO Box 1072, Milwaukee, WI 53201; <http://www.warac.org/>.

World Wide Locator Contest, sponsored by the Czech Contest Club and the OK DX Club, 0000Z Mar 11 to 2400Z Mar 12. CW, phone and mixed-mode. Single op, high power and low power. Multi op; single transmitter and two transmitter. Packet spotting not allowed for any single op. Exchange RST and WWL (grid square). Points are based on computed distance between centers of locators (short path), every 500 km = 1 point; 3.5 MHz × 2, 1.8 MHz × 3. Multipliers are the first two characters of WWL field on each band regardless of mode.

Total score is total points × total multipliers. Electronic logs only (ASCII format). Awards. Send by logs by May 15 to Karel Karmasin OK2FD, Gen. Svobody 636, 674 01 Trebic, Czech Republic; ok2fd@contesting.com; <http://www.okdxc.cz/>

14-15

CLARA and Family HF Contest, phone and CW, sponsored by the Canadian Ladies ARA, from 1700Z Mar 14 until 1700Z Mar 15. 80 40 20 15 10 meters Work stations once per band/mode. Cross-mode contacts count as phone for both stations. Single ops only. Exchange RS(T), state/province/DXCC country, and status as CLARA member or nonmember. Multipliers are Canadian provinces and DXCC countries. Score 5 pts for CLARA-member-to-CLARA member contacts; 2 pts for YL-nonmember-to-CLARA-member and OM-to-CLARA-member contacts; 2 pts per QSO with CLARA family members; 3 pts per QSO with non-CLARA YLs; 1 pt per QSO w/OMs. Awards. Send logs by April 24 to Audrey Hughes VE1PK, 28 Carriageway Court, PO Box 134, Wolfville, NS B0P 1X0, Canada.

18-20

Alaska QSO Party, sponsored by the South Central ARC, from 0000Z Mar 18 to 2400Z Mar 19. Work AK stations only (AK stations work everyone). Exchange RS(T) and state/province/DXCC country (AK stations send city). Score 1 pt/phone, 2 pts/CW, digital or SSTV QSO. 160, 80 and satellite QSOs count double. 1.835 3.700 3.785 7.035 7.135 7.235 14.035 14.245 21.135 21.335 28.135 28.335. Final score is QSO pts × AK cities worked (AK stations use states/provinces/DXCC countries). Awards. Send logs by June 30 to South Central ARC, c/o Jim Wiley KL7CC, 8023 E 11th Ct, Anchorage, AK 99504; <http://www.servcom.com/worcester/scrc.htm>.

Virginia QSO Party, sponsored by the Sterling Park ARC, 1800Z Mar 18 to 0200Z Mar 20. Single operator, mobile, club, single-multi and multi-multi. Work stations once per band/mode, mobiles as they cross county lines. VA stations work everyone, others work VA stations only. Exchange serial number and state/province/DXCC country (VA stations send county). CW—1.805 and 50 kHz up; phone—1.845 3.860 7.260 14.260 21.360 28.360; Novice/Tech—10 kHz up and 28.360; VHF/UHF—50.125 147.48 223.50 446.00. No repeater or cross-mode QSOs. Score 1 pt/phone, 2 pts/CW, and 3 pts/VA mobile QSO. Final score is QSO pts VA counties (max 95); VA stations use VA counties/states/provinces/DXCC countries for multiplier. VA mobiles add 100 bonus pts for each VA county from which they make a QSO. Club competition. Awards. Send logs by Apr 15 to Virginia QSO Party, Call Box 599, Sterling, VA 20167; <http://www.qsl.net/sterling/>.

Ohio Winter QSO Party, sponsored by the Cuyahoga Falls ARC, 0001Z Mar 18 to 2359Z Mar 19, 160 80 40 20 15 10 6 2 meters. Single op, multiop, QRP, low power (100W or less) and high power. Stations outside of Ohio work only Ohio stations. Stations in Ohio work everyone. Exchange QSO number and state/province/country (OH stations send RST and county). Work stations once per band/mode. Count 2 pts for each phone QSO, 3 pts for each CW QSO. Multipliers are Ohio counties. Score is total QSO points × total multipliers. Send logs by May 1 to Ohio Winter QSO Party, c/o Cuyahoga Falls ARC, Inc., PO Box 614, Cuyahoga Falls, OH 44262; <http://www.fcarg.org/>.

Bermuda Contest, sponsored by the Radio Society of Bermuda, 0001Z Mar 18 to 2400Z Mar 19. Operate no more than 24 hours; off periods must be 2 hours or more. Single op only, 80 40 20 15 10 meters. Phone and CW, no crossband or crossmode QSOs. Exchange RS(T). Work stations once per

band and mode. Score 5 pts/QSO. Multiply QSO points from all bands DXCC/WAE countries per band. Then multiply by number of VP9 contacts per band for final score. Awards. Logs must be received by 11 am June 1 by Contest Committee, Radio Society of Bermuda, Box HM275, Hamilton, Bermuda HM AX. See the Radio Society of Bermuda Web site at http://www.bermuda-shorts.com/rsb/rules_1.htm.

25-26

CQ WW WPX Contest, phone, sponsored by *CQ Magazine*, from 0000Z Mar 25 until 2400Z Mar 26 (CW is May 27-28). Single ops operate no more than 36 hours, off periods must be 60 min or more. Classes: single op single/all band, high, low (< 100 W), QRP (< 5 W) or assisted; multi-single (10-minute rule); multi-multi; rookie; tribander and single element; and band restricted. Send RS(T) and serial number. Score 3 pts/QSO w/different continents on 14-28 MHz and 6 pts/QSO w/different continents on 1.8-7 MHz; score 2 pts/QSO w/stations in North America on 14-28 MHz and 4 pts/QSO w/NA stations on 1.8-7 MHz. Stations in own country count one point. Multipliers are prefixes worked (ie, N8, KA1, HG73, JD1). Work stations once/band; prefixes count only once. Awards. Club competition. Send logs by May 10 (CW, July 10) to *CQ Magazine*, 25 Newbridge Rd, Hicksville NY 11801; n8bjq@erinet.com; <http://ourworld.compuserve.com/homepages/n8bjq/>

Q57-

STRAYS

LOOKING FOR AN EXAM?

◇ If you want to take an Amateur Radio exam, but don't know where to go, you can find out on the ARRLWeb at <http://www.arrl.org/arrlvec/examsearc.phtml>. At this handy site you can search for exam dates and times by state, ZIP code and even country (for US Amateur Radio exams offered overseas).

NEW PRODUCTS

2000 TV STATION GUIDE

◇ The Worldwide TV-FM DX Association announces the release of their *2000 Television Station Guide*.

The *Guide* was compiled by Doug Smith, W9WI, and includes entries for every television station and television station translator located in the US, Mexico and Canada.

The first section provides a listing of the stations numerically by channel number. Under each channel number the stations are further sorted alphabetically by state. The second section is in "Channel Map" format.

The 185-page guide is printed on 8½× 11 inch paper, 3-hole punched and in loose-leaf format.

Retail bookshelf price: \$23.95; hobby and technical price: \$19.95. For additional information on this publication or membership in the WTFDA, contact the Worldwide TV-FM DX Association, PO Box 501, Somersville, CT 06072; <http://www.anarc.org/wtfda/>.

Q57-

SPECIAL EVENTS

Port St. Lucie, FL: Port St. Lucie Amateur Radio Club, K4PSL, 0000Z **Mar 3** to 0000Z **Mar 19**, during New York Mets spring training in Port St. Lucie. 14.050 14.250 21.250 28.350. Certificate. Dr Maurice I. Sasson W2JAJ, 8598 Florence Dr, Port St. Lucie, FL 34952.

Ft. McCoy, FL: Ft. McCoy Amateur Radio Club, W4FRC, 1400 to 2100Z **Mar 4**, Ft. McCoy Amateur Radio Club Frontier Day Festival. 3.960 7.260 14.260 28.360. QSL. Ft. McCoy ARC-Frontier Day, PO Box 539, Ft. McCoy, FL 32134.

Nutley, NJ: Robert D. Grant United Labor Amateur Radio Association, N2UL, 1300Z **Mar 4** to 2400Z **Mar 5**, honoring father Jerzy Popieluszko, labor martyr and champion of the Polish people. 28.420 52.525. Certificate. RDGULARA, PO Box 716, Nutley, NJ 07110-0716.

Arlington Heights, IL: US EPA R5 ARC, KA9NLX, 1600 to 2200Z **Mar 7**, in recognition of the sacrifices made by Peace Corps volunteers. 7.283 14.325 21.375 3.955. Certificate. John Paskevich, 1423 N. Ridge Ave, Arlington Heights, IL 60004.

Beaver, PA: the Triple-A Amateur Radio Association, W3A, 1400Z **Mar 11** to 0200Z **Mar 12**, for the Beaver County bicentennial. 3.940, 7.240, 14.240 28.440. Certificate. TAARA, PO Box 85 Freedom, PA 15042.

Okeechobee, FL: Okeechobee Amateur Radio Club, KF4BPX, 1200Z **Mar 11** to 1900Z **Mar 12**, during the Speckled Perch Festival. 14.275 7.275 28.375 21.375. Certificate. Okeechobee Amateur

Radio Club, PO Box 368, Okeechobee, FL 34973-0368.

Robins Air Force Base, GA: Middle Georgia Radio Association, WR4MG, 1400 to 2000Z **Mar 11**, during the annual Young Astronauts' Day at the RAFB Museum of Aviation. 14.250 7.250 147.300. Certificate. MGRA, PO Box 7872, Warner Robins, GA 31095.

Macon, GA: Macon Amateur Radio Club, W4BKM, 1500 to 2200Z **Mar 18**, during the 18th Annual Cherry Blossom Festival. 7.235 14.240 21.335. Certificate. Macon ARC, PO Box 4862, Macon, GA 31208.

Murphysboro, IL: Saline County ARES/RACES, AA9TD, 1600 to 2200Z **Mar 18**, to commemorate the 75th anniversary of the tri-state tornado. 7.250, 14.250, 21.350, 28.350. Certificate. Saline County ESDA ARES/RACES, 10 E. Poplar St, Harrisburg, IL 62946.

New Kensington, PA: Skyview Radio Society, K3MJW, 1400Z **Mar 18** to 2300Z **Mar 19**, to celebrate the 40th anniversary of the Skyview Radio Society. 7.264 14.264 21.364 28.464. QSL. Robert Livrone, N3WAV, 116 Arizona Dr, New Kensington, PA 15068.


Mount Holly, NJ: National Weather Service, WX2PHI, 1500 to 2100Z **Mar 19**, promoting the beginning of Severe Weather Awareness Week. 7.273 14.273 28.373. Certificate. John Holmes, WX3TAZ, WX2PHI Special Event, 126A Worman Rd, Bath, PA 18014-9099.

Virginia Beach, VA: Virginia Beach Amateur

Radio Club, W4UG, 1700Z **Mar 25** to 1700Z **Mar 26**, for the 109th anniversary of the Norwegian Lady. 7.130 7.270 28.363 14.270. Certificate. VBARC, PO Box 62003, Virginia Beach, VA 23466.

Grayslake, IL: North Shore Radio Club, NS9RC, 1500 to 1900Z **Mar 16**, for the 20th anniversary of the North Shore Radio Club (and hamfest). 14.270 28.370 7.270. Certificate. North Shore Radio Club, Box 1066, Highland Park, IL 60035.

Certificates and QSL cards: To obtain a certificate from any of the special-event stations offering them, send your QSO information along with a 9x12 inch self-addressed, stamped envelope to address listed in the announcement. To receive a special event QSL card (when offered), be sure to include a self-addressed, stamped business envelope along with your QSL card and QSO information.

Special Events Announcements: For items to be listed in this column, you must be an Amateur Radio club, and use the ARRL Special Events Listing Form. Copies of this form are available via Internet (info@arrl.org), or for a SASE (send to Special Requests, ARRL, 225 Main St, Newington, CT 06111, and write "Special Requests Form" in the lower left-hand corner. You can also submit your special event information on-line at <http://www.arrl.org/contests/spevform.html>. Submissions must be received by ARRL HQ no later than the 1st of the second month preceding the publication date; ie, a special event listing for **Jan QST** would have to be received by **Nov 1**. 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. 

George Fremin III, K5TR ♦ 624 Lost Oak Trail, Johnson City, TX 78636 ♦ k5tr@arrl.org

NEW BOOKS

MICROCONTROLLER PROJECTS WITH BASIC STAMPS

By Al Williams, WD5GNR

Published by R&D Books (Miller-Freeman Inc.) 1601 W. 23rd Street, Suite 200, Lawrence KS 66046. Copyright 2000, 407 pages, paperback, 7 $\frac{3}{8}$ x9 $\frac{1}{4}$ inches, B&W illustrations. Includes CD with simulation code and data packages. ISBN 0-87930-587-8, \$44.95. Author's web site at <http://www.al-williams.com/awce.htm>. Available from the ARRL (order number 7865). See <http://www.arrl.org/catalog/>.

Reviewed by Paul Danzer, N111
ARRL Technical Advisor

♦ The first question is, of course, "What is a *basic stamp*?" To quote from one mail order supplier, Marlin P. Jones (800-652-6733) it "is a single board micro controller." "BASIC programs are developed and (Tokenized) on your PC and are downloaded onto the on board EEPROM." In other words, it is a tiny computer, it runs a version of the BASIC programming language, and it stores the program in an internal memory. All in a few square inches!

The microcontroller, carrier board and various accessories are available from many sources, including Radio Shack (page 209 in their 2000 catalog). Marlin P. Jones carries the basic stamp and a clone from the Scott Edwards company, called *counterfeit* boards.

Have you ever thought "I could get my PC to do that—but I don't want to tie up a big PC just to do that little task."? Well, here is your chance to try that idea with a little PC. As the book demonstrates, setting up and program-

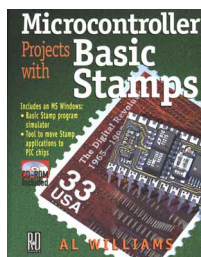
ming these devices is not difficult if you are comfortable with computers.

The book is actually quite a bit more than just that suggested by the title. The book includes the basic elements of an introduction to digital concepts and interfacing. You can apply most of the book's contents to PCs running BASIC, GWBASIC, QBASIC or any similar language.

One very nice feature is you will probably feel WD5GNR is talking to you, rather than you just reading a dry book. It does not assume any deep background to understand the material, and the first chapter is a very compact digital technology summary, starting with the idea of binary numbers and ranging up to the care and feeding of LEDs. Within a few pages, if you own a *basic stamp*, you can write a simple program. The introductory program must be run on an actual stamp and not on the simulation program supplied.


Chapter 2 is titled "The Nitty Gritty—A Stamp Reference." If you have ever written a simple program in any variety of BASIC, many of the commands will be familiar to you. Most people will skip this chapter—after all, how many people ever read a reference manual, end to end? But when you are ready to write your own program, that will be a different story!

Chapter 3, Digital I/O, Chapter 4, Analog Output and Chapter 5, Analog Input, discuss interfacing the *basic stamp* to the rest of the world. Basic circuits are included, as well as several interesting ideas. The ideas shown here also are directly applicable to interfacing a PC, with of course different input and output port values.



Later chapters include information on interfacing with an external EEPROM (the basic stamp has an internal EEPROM, but you may want to increase the amount of storage), RS-232 basics and several other topics. Projects include relay drivers, amplifier and telephone interfaces, interfacing with a serial DAC (digital to analog converter), a capacitance meter, CW Ider, a frequency counter, motor drivers, a CW keyer and various display interfaces. All in all, these chapters offer a considerable set of goodies to keep you busy.

The book includes a CD with a *basic stamp* simulation and an editor to write programs, as well as a pack of data. The simulator installs itself under *Windows 95/98* and the editor can be copied directly from the CD. Unfortunately, it is non-obvious where various elements are on the CD, and there is more than one *readme.txt* file. Be careful copying them, so they do not overwrite one another. The simulator and other data also are available at no charge from the author's Web site. RadioShack lists more information on their hardware on *Steve's Workbench* at their Web site (<http://www.radioshack.com>).

The author makes an interesting point—it is not difficult to design and build a tiny, useful microcontroller. Perhaps that is why there are so many keyer projects published. After all, once you know how to use these devices, you have to find an application for them! But maybe, you might want to apply the same ideas to interfacing a PC and have then advantages of more choice of I/O, higher speed and almost unlimited program storage. Of course, a PC project won't fit into your pocket! 

Next New Book

1999 ARRL September VHF QSO Party Results

VHF/UHF

means a lot of different things to different people. Many hams immediately think of using their FM H-Ts or mobile radios to chat away on the local FM repeater driving to and from work. Packet will come to the minds of many who enjoy digital operating. And for chasing DX above 50 MHz, of course, it's hard to beat CW or SSB.

All it takes is a good contest to bring the best of VHF and UHF together—regardless of mode or location. You may be running FM contacts while perched on a mountaintop, or honing your rover skills with a friend while travelling 65 MPH down the interstate highway. You might test your SSB or CW QRP savvy after hiking to the top of a ridge behind your house, or you may choose to enjoy the mode of your choice from the comfort of your own shack. In whatever way you choose to compete, a VHF contest allows you to experience new opportunities in this wonderful avocation we call Amateur Radio.

The ARRL September VHF QSO Party netted 606 entries, with over 900 operators, including the operators at the various full and limited multi-operator stations. New to this annual fall VHF/UHF challenge was the inclusion of an Affiliated Club compe-

dition. Fourteen clubs entered the medium or local club categories for 1999, a number that is certain to rise in September 2000.



The multi-operator W6TOI group was well prepared on the West Coast and racked up a Top Ten finish in their category.

Jeff, W2FU, with Chris, K2CS, sharing the duties, set a new overall scoring mark for Rover entries with a score of 220,175. Their effort stands as the Atlantic Division record as well. They were joined as new rover division record setters by N4OFA in the Delta division, N1MJD in New England division, NK4Q in the Southeastern division, N6TEB in the Southwestern division and AB5SS in the West Gulf division.

Four new division records were established in the single-operator category. Congratulations to new record holders K1RZ in the Atlantic division, KA1ZE in the New England division, N9VM in the Pacific division and K5IUA in the West Gulf division. Rounding out single-op division record setters were KQ6QW and VE7DXG who set QRP portable marks in the Southwestern division and Canada respectively.

Multioperator and limited multi-operator efforts were in abundance, and their operators accounted for approximately a third of the participation in the contest. The group efforts at K3MQH in the Atlantic division, N0UK in the Dakota division, K7VHF in the Northwestern division, and W6TOI in the Southwestern divisions all established new multioperator records for their divisions. New limited multioperator

Northeast Region (New England, Hudson and Atlantic Divisions; Maritime and Quebec Sections)			Southeast Region (Delta, Roanoke and Southeastern Divisions)			Central Region (Central and Great Lakes Divisions; Ontario Section)			Midwest Region (Dakota, Midwest, Rocky Mountain and West Gulf Divisions; Manitoba and Saskatchewan Sections)			West Coast Region (Pacific, Northwestern and Southwestern Divisions; Alberta, British Columbia and NWT/Yukon Sections)		
KA1ZE	359,324	S	K2UOP/8	89,376	S	WA8WZG	388,144	S	K5IUA	86,426	S	N6HKF	52,407	S
K1RZ	223,450	S	K4QI	62,860	S	N2BJ	134,720	S	W8CM	58,000	S	N9VM	51,450	S
WA2FGK	201,083	S	W4RX	44,408	S	K2YAZ	132,396	S	W3XO/5	37,584	S	N7STU	37,736	S
(K2LNS,op)			W4FRZ	12,540	Q	N8A (N8XA,op)	7,097	Q				VE7DXG	16,254	Q
K3VGX	10,608	Q			N9MYK	3,591	Q				KQ6QW	12,930	Q	
K1ZE	6,536	Q			N9LAG	636	Q				K6LMN	6,075	Q	
WB2AMU	1,900	Q						N0UK	119,579	M	W6TOI	96,942	M	
W2SZ/1	1,418,436	M	K8GP	1,108,905	M	W0UC	188,710	M	KK5IH	11,242	M	K7VHF	55,872	M
K3MQH	792,225	M	K4SZ	5,192	M	W9ICE	151,076	M	K0FF	6,890	M	N1VM	54,897	M
K1WHS	365,781	M						N0QJM	108,575	L	W2ODH/6	155,500	L	
K3YTL	384,033	L	W4IY	244,110	L	N8ZM	20,995	L	N5XU	12,864	L	W7AV	6,437	L
NC1I	286,029	L	AA4ZZ	171,125	L	N19E	17,536	L				WB7FJG	4,648	L
NS9E	231,080	L	W4NH	74,834	L	N8PVT	5,002	L						
W2FU	220,176	R	N4OFA	29,862	R	WB9SNR	103,240	R	AB5SS	63,745	R	N6TEB	75,864	R
N1MJD	143,256	R	NK4Q	9,928	R	N8KWX	64,962	R	W9FZ	26,523	R	N6DN	33,320	R
WA2IID	26,448	R	WBOQGH	1,440	R	K8WW	55,528	R	WB5VYE	23,180	R	WB7DHC	17,424	R

Top Ten

Single Operator	QRP Portable	Multioperator	Limited Multioperator	Rover
WA8WZG 388,144	VE7DXG 16,254	W2SZ/1 1,418,436	K3YTL 384,033	W2FU 220,176
KA1ZE 359,324	KQ6QW 12,930	K8GP 1,108,905	NC1I 286,029	N1MJD 143,256
K1RZ 223,450	W4FRZ 12,540	K3MQH 792,225	W4IY 244,110	WB9SNR 103,240
WA2FGK 201,083	K3VGX 10,608	K1WHS 365,781	NS9E 231,080	N6TEB 75,864
(K2LNS,op)	N8A 7,097	N2PA 233,260	AA4ZZ 171,125	N8KWX 64,962
N2BJ 134,720	(N8XA,op)	W0UC 188,710	W2ODH/6 155,500	AB5SS 63,745
K2YAZ 132,396	K1ZE 6,536	W9ICE 151,076	N2NK 128,478	K8WWW 55,528
K3DNE 122,430	K6LMN 6,075	N0UK 119,579	WB1GQR 121,032	VE3OIL 34,290
KE8FD 117,000	N9MYK 3,591	W6TOI 96,942	N0QJM 108,575	N6DN 33,320
K1UHF 113,875	KQ6EE 3,528	W2EA 79,866	K2BAR 103,620	N4OFA 29,862
K8TQK 106,894	WB2AMU 1,900			

QSO Leaders By Band

Single Operator/ QRP Portable		222 MHz		432 MHz		902 MHz		1296 MHz	
50 MHz		144 MHz		432 MHz		902 MHz		1296 MHz	
KA1ZE 257	K1UHF 318	WA8WZG 94	KE6GFF 159	WA8WZG 46	WA8WZG 46	KA1ZE 32	KA1ZE 42	KA1ZE 40	WA2FGK 34
W3EP 223	KA1ZE 269	KA1ZE 78	K1FO 154	KA1ZE 32	KA1ZE 32	KA1ZE 32	KA1ZE 32	KA1ZE 32	WA2FGK 34
K1RZ 198	K1RZ 250	K1UHF 74	WA8WZG 154	KA1ZE 105	KA1ZE 105	WA2FGK 32	WA2FGK 32	WA2FGK 32	(K2LNS,op)
W2YV 193	WA2FGK 249	N2BJ 74	KA1ZE 105	WA2FGK 32	WA2FGK 32	(K2LNS,op)	(K2LNS,op)	(K2LNS,op)	W2SJ 33
N1MIA 186	(K2LNS,op)	K1RZ 70	N2BJ 104	K1UHF 26	K1UHF 26				
	K3VGX -Q 221								
Multioperator		222 MHz		432 MHz		902 MHz		1296 MHz	
50 MHz		144 MHz		432 MHz		902 MHz		1296 MHz	
K8GP 607	K3MQH 736	W2SZ/1 192	W2SZ/1 307	W2SZ/1 96	W2SZ/1 96	W2SZ/1 57	W2SZ/1 124	W2SZ/1 75	
K3MQH 566	K3MQH 614	K3MQH 165	K3MQH 272	K8GP 57	K8GP 57	K8GP 26	K8GP 43	K8GP 40	
W2SZ/1 523	W2SZ/1 587	K8GP 151	K8GP 227	K3MQH 26	K3MQH 26	N2PA 25	K3MQH 43	K1WHS 40	
K3YTL -L 476	K3YTL -L 489	K3YTL -L 151	K3YTL -L 205	N2PA 25	N2PA 25	K1WHS 25	K1WHS 43	N1VM 34	
NC1I -L 438	NC1I -L 467	W2ODH/6 -L 137	NC1I -L 201	K1WHS 25	K1WHS 25				

-Q denotes QRP Portable
-L denotes Limited Multioperator

Multiplier Leaders By Band

Single Operator/QRP Portable		222 MHz		432 MHz		902 MHz		1296 MHz	
50 MHz		144 MHz		432 MHz		902 MHz		1296 MHz	
KA1ZE 74	K2YAZ 66	WA8WZG 38	KA1ZE 41	WA8WZG 28	WA8WZG 28	WA8WZG 22	WA8WZG 31	WA8WZG 25	
WB2WIH 69	KA1ZE 58	KA1ZE 38	WA8WZG 41	KA1ZE 22	KA1ZE 22	KA1ZE 17	KA1ZE 25	KA1ZE 17	
K5IUA 68	WA2FGK 57	WA2FGK 30	K4QI 34	WA2FGK 17	WA2FGK 17	WA2FGK 17	WA2FGK 17	WA2FGK 17	
W2YV 63	(K2LNS,op)	(K2LNS,op)	WA2FGK 34	(K2LNS,op)	(K2LNS,op)	(K2LNS,op)	(K2LNS,op)	(K2LNS,op)	
VE3KZ 57	KE8FD 56	K8TQK 29	(K2LNS,op)	K1RZ 15	K1RZ 15	K1RZ 15	K1RZ 17	K1RZ 17	
	K8MD 53	KE8FD 29	K1FO 34	KE8FD 15	KE8FD 15	KE8FD 15	K4QI 17	K4QI 17	
Multioperator		222 MHz		432 MHz		902 MHz		1296 MHz	
50 MHz		144 MHz		432 MHz		902 MHz		1296 MHz	
K8GP 116	K8GP 94	K8GP 52	K8GP 61	W2SZ/1 27	W2SZ/1 27	W2SZ/1 24	W2SZ/1 32	W2SZ/1 29	
N0QJM -L 98	K3MQH 76	K3MQH 51	K3MQH 51	K8GP 24	K8GP 24	K8GP 18	K8GP 29	K8GP 19	
K3MQH 88	N0UK 72	K3YTL -L 44	K3YTL -L 48	K1WHS 18	K1WHS 18	N2PA 15	K1WHS 19	N2PA 16	
W0UC 83	N0QJM -L 68	NS9E -L 43	W4IY -L 48	N2PA 15	N2PA 15	K3MQH 15	N2PA 16	K3MQH 15	
NS9E -L 83	W4IY -L 66	W4IY -L 42	W2SZ/1 46	K3MQH 15	K3MQH 15				

Q denotes QRP Portable
-L denotes Limited Multioperator

records were established by the crew of N0QJM in the Dakota division and the N2NK effort in the Hudson division.

The year 2000 running of the September VHF QSO party will be held September 9-11. Now is the time to plan your participation. Remember, in order for your club to participate in an Affiliated Club Competition event, it must be up-to-date with its records and documentation with the ARRL. Also, we must receive a minimum of three entries from eligible club members attributing their points to your club's effort. Finally, don't let your club secretary forget that they must submit a list of all eligible members (not a general club roster) to the Contest Branch within 30 days after the end of the contest. It will be helpful to review

the rules for Affiliated Club competitions in the General Rules for All ARRL Contest, which is printed annually in the November issue of *QST*. They may also be found online at the Contest Branch home page at <http://www.arrl.org/contests>.

As announced in the January *QST*, the VHF/UHF/Microwave page on the ARRLWeb is an excellent resource for expanding your technical expertise as well as finding information about "What's Available" in this challenging operating arena. An electronic "field trip" to <http://www.arrl.org/tis/info/uhf-mw.html> might prove to be one of your most valuable assets as you expand your activities in the highest frequency ranges.

One more rule reminder: effective

January 1, 2000 there are now separate High and Low power categories for regular single operator stations. This will allow even tighter competition in what remains one of the more popular VHF/UHF operating events on the ARRL calendar.

The impact of license restructuring on VHF/UHF contesting is likely to be minimal. Except for the Novice licensee that has limited privileges on these bands, every licensed amateur can operate with full VHF and UHF privileges. By the time the second full weekend in September rolls around for the last ARRL VHF contest of the twentieth century, all licensed hams will have an opportunity to make the September VHF QSO party the "last great bash" of the VHF year. See you on the air that weekend!

Affiliated Club Competition Results

Medium Club	
Potomac Valley RC	11 2,240,468
New England Weak Signal	14 1,003,530
Badger Contesters	26 406,912
Northern Lights RS	15 380,838
Rochester VHF Group	11 375,910
Local Club	
Murgas ARC	4 589,992
Downey ARC	3 175,764
Bergen Amateur RA	3 133,715
South Jersey RA	4 89,614
Rocky Mountain VHF Society	5 59,747
Mt. Airy VHF RC	4 34,389
ARA of Southwest Florida	4 30,974
Western States Weak Signal Society	4 16,335
Schenectady ARA	8 10,371



Parked along the Skyline Drive, overlooking the beautiful Shenandoah Valley in Virginia, N1MJ D used his rover time not only to place second in the overall standings in the category, but also to enjoy some of the most magnificent scenery in the country.

Scores

Each line score lists call sign, score, stations worked, multipliers, number of grids activated (if Rover), and bands (A= 50 MHz, B = 144 MHz, C = 222 MHz, D = 432 MHz, 9 = 902 MHz, E = 1296 MHz, F = 2304 MHz, G = 3456 MHz, H = 5760 MHz, I = 10 GHz, J = 24 GHz, K = 47 GHz, L = 75 GHz, M = 119 GHz, N = 142 GHz, O = 241 GHz, P = 300+ GHz). Section band win indicators are listed in boldface type.

1	Connecticut	KA1ZE 359,324 817 287 S ABCD9EFGH	KA1UH 113,875 631 125 S ABCD9E	K1FO 28,187 243 71 S ABD	N1NQD 16,554 183 62 S ABCD9E	W3EP 10,035 223 45 S A	W1NWE 4,536 95 36 S BCD	K1WVX 3,230 73 34 S ABCDE	NT1N 2,890 85 34 S AB	K1KI 2,040 100 20 S ABD	WA1GTP 405 27 15 S AB	N1SFE 220 22 10 S B	KE1LE 78 13 6 S AB	K1ZE 6,536 101 43 Q ABCDE	W1QK (+A11MY,K1XS,K1PHG,N1GS,N1ABY,W1JQ)	58,638 546 87 L ABCD	KB1H (+KB1DFB,N1XS)	10,530 222 45 L ABD	N1SAX (+KE1LI)	3,780 130 27 L ABD																						
	Eastern Massachusetts	K5MA 75,922 487 119 S ABCD	W1PM 35,640 280 88 S ABCDE	W1GHZ 31,185 270 77 S ABCD9E	N1GJ 12,155 151 55 S ABCD9E	WA1LBK 5,616 103 39 S ABCDE	W1DYJ 3,317 107 31 S AB	WA1ENO 2,226 106 21 S AB	K1VJ 1,428 50 21 S ABCD	N1FDX 1,395 93 15 S AB	N1VQR 1,173 60 17 S ABD	WA1OFR 800 34 20 S ABD	K1DAT 686 49 14 S AB	K1QM 240 20 12 S AB	W1XM (KB1DCA,KB1CGZ,W1GSL,KB1DOY,N1ZRN,KB9SDQ,ops)	26,460 324 63 M ABCDE	KA1EKR (+KA1CLX)	12,852 157 51 L BCD	K1SG (+AJ1E,N1DJB,K1MS,N1BNC)	11,327 200 47 L ABCD	N1OP (WB1GMA,K1BFD,WA1ZE,ops)	7,308 147 42 L ABD	KA1ALT 1,938 102 19 L AB																			
	Maine	W1XX 60,863 371 121 S ABCD9E	N1RW 19,764 193 81 S ABCD	N1DGF 9,457 148 49 S ABCD	W1REZ 1,984 62 32 S B	K1WHS (+K1DI,TOL,N2CEI,WB2ONA,N1LBI,W1MRQ,+logger)	365,781 940 249 M ABCD9EFGHIJ																																			
	New Hampshire	AF1T 51,813 324 101 S ABCD9EFHI	KU2A 47,000 310 100 S ABCD9EF	K2HZN 11,115 172 57 S ABD	AC1J 9,845 136 55 S ABCD	N1XOQ 3,780 103 35 S ABD	N1JHU 1,755 54 27 S ABCD	W1ZC 1,005 67 15 S B	W1OA 741 39 19 S AB																																	
	Rhode Island	KM1X 18,786 253 62 S ABD	KB8GZ 1,562 70 22 S ABD	W1CPC 351 25 13 S ABD																																						
	Vermont	KG1M 19,750 180 79 S ABCDE	W1AIM 19,210 174 85 S ABCD	K1LPS 8,400 122 56 S ABCD	4,042 94 43 S AB	N1JIF (+W1ECT,KD1PKA1UAG)	2,860 97 26 M ABCD	WB1GOR (W1SJ,N1ZUK,ops)	121,032 793 123 L ABCD																																	
	Western Massachusetts	WA1MBA 28,454 170 82 S BD9EFGHI	N1MHM 10,368 168 48 S ABCD	N1MIA 2,766 188 31 S ABD	N1FUS 4,150 131 25 S ABD	N1RSY 560 40 14 S B	W2SZ1 (K1DH,K1EP,K1IM,K2AD,K2TR,K2JB,KB2WJO,N1XS,N2BN,N2HPA,N2XRE,N2YCA,N2YZO,W1SZ,W1VE,W2ARQ,WA1ZMS,WA2AAU,WA2SPL,WA8UA,W2SB,WW2R,ops)	1,418,436 2098 369 M ABCD9EFGHIJKL	NC11 (+K1GX,K1QFE,N1DPM,N1MUW,NC1B,W1QA,WZ1V)	286,029 1234 183 L ABCD																																
	2	Eastern New York	W2FCA 32,966 194 106 S ABCD9EF	WG2E 20,550 260 75 S ABC	W3HHN 20,358 195 78 S ABCD9E	N2UZO 5,610 161 30 S ABCD	WM2Y 4,704 116 32 S ABCDE	W2IR (W2JHO,op)	3,111 135 17 S ABCD	N2VDI 2,800 89 28 S ABCD9	N2MS 2,240 53 32 S ABCD	KC2DZB 1,581 75 17 S ABD	W2KHQ 1,150 43 23 S ABDE	KG2H 779 41 19 S A	W2PR 720 51 10 S BCD	K2RI 616 39 11 S BCD	KC2DTJ 440 32 11 S ABD	AA2CW 245 29 7 S BCD	N2PEO 168 42 4 S B	KB2TSA 162 24 6 S ABD	NZ2BH 150 27 5 S BD	W2CCP 93 31 3 S B	WA2BAH 36 12 3 S B	KY2J 2,607 72 33 L ABD																		
	NYC-Long Island	WA2ZF 24,640 243 64 S ABCDE	N2DY 23,520 249 70 S ABCD	KB2WVG 10,241 184 49 S ABD	KF2XF 3,036 132 23 S B	WB2AMU 1,900 67 25 Q ABD																																				
	Northern New Jersey	WB2VV 66,125 351 115 S ABCD9EFGI	W1BQ 29,614 333 67 S ABCDE	K2KIB 25,764 249 76 S ABCD	K2SIX 9,196 173 44 S ABD	WB2CUT 4,048 176 23 S B	WB2TT 2,280 76 30 S ABD	K2YSY 1,875 75 25 S AB	K2MWW 605 24 11 S DE	WA2BKN 527 31 17 S AB	W2JEK 481 37 13 S AB	KC2AWX 240 20 12 S AB	N2NK (K2BM,N2WM,K2BJG,K2BYJ,KC2DLD,K2LHH,N2TTT,N2HMM,ops)	128,478 739 147 L ABCD	K2YH,WA2LXE,KO2OK,K2PJM,K2ANJ,NQ2T,KC2HL,KC2CLH,W2DGI,W1G,WK2M,K2ZB,W2MSK,KB2OCW,KC2B,K2BYJ,WB2HID,N2ZSE,ops)	103,620 763 110 L ABCD																										
	Northern New York	K3KYR 21,850 202 95 S ABD	WA2AEY 5,671 84 53 S ABD	N2WIG (+N2TJQ)	640 37 16 L ABD																																					
	South New Jersey	W2SJ 57,330 298 105 S ABCD9EFG	K1JT 15,423 244 53 S ABD	W2PDU 8,568 141 51 S ABD	KC2DPV 1,180 29 20 S ABD	N2JWQ 615 41 15 S B	N2MPU 481 37 13 S AB																																			
	Western New York	K2AN 42,784 261 112 S ABCD9E	N2JMH 23,490 174 90 S ABCD9EF	KB2SXC 17,150 199 20 S ABD	W2YX 6,120 120 51 S A	W6XR 4,144 112 37 S AB	N2WVK 3,154 83 38 S AB	W2WGL 2,964 61 39 S BD	KG2NI 2,780 115 20 S ABD	W2WPM 2,754 66 34 S ABC	WA2ZNC 1,026 43 18 S ABCD	N2TJD 742 45 14 S ABD	KV2X 495 33 15 S AB	KB2NFS 360 28 9 S BCD	KC2FFS 18 7 2 S BD	N2PA (N2JQR,N2KG,N2YB,ops)	233,260 659 214 M ABCD9EFGIJP	NO2O (+N2ULL)	49,532 275 116 M ABCD9EF	K2IWR (KB2FAF,KB2LUV,KB2NCW,K2ZNI,N2MRE,ops)	1,080 42 18 M ABCDE																					
	3	Delaware	W3OR 73,416 336 138 S ABCD9EF	WA3BZT 3,509 121 29 S B																																						
	Eastern Pennsylvania	WA2FGK (K2LNS,op)	201,083 622 211 S ABCD9EFG	N3NGE 73,375 349 125 S ABCD9EFG	K3GNC 52,208 316 104 S ABCD9E	AA3GN 40,290 252 85 S ABCD9EFGH	N3XEM 32,802 284 71 S ABCD9EF	W3RJW 28,512 163 88 S ABCD9EFGHI	N3XJX 18,157 204 67 S ABCD	W3SZ 16,256 163 64 S BDEF	W3KM 16,104 165 61 S ABCDEF	KB3IB 15,576 148 66 S ABCD9E	N3ADC 11,450 139 50 S ABCD9E	WA4GPM 10,850 112 62 S ABCDE	AA3RE 9,744 143 48 S ABCD9	WA3DR 9,071 109 47 S ABCD9EF	N3PLM 2,626 74 26 S ABCD9E	K3XF 2,528 59 32 S ABCDE	NA2T 2,106 80 26 S BD	NE3I 1,155 33 21 S ABCDE	W3POB 966 46 21 S AB	K3HR 936 52 18 S AB	K3DLA 814 31 22 S ABC	N3JNX 800 32 20 S ABD	WA3CSP 608 38 16 S A	N3OGF 576 31 18 S ABC	W3IIT 336 23 12 S ABCD	KE3TC 287 28 7 S BCD	W3UJ 286 26 11 S AB	KF3DI 270 25 10 S ABD	K3KEL 240 15 8 S D	W8J 9 3 3 Q B	K3VGX 10,608 221 48 Q B	W3HOA 675 45 15 Q B	K3MOH (+K3RA,K3MM,W2GG,N3EYB,W3EKT,A13M,W3SST,K3SUI,K3VQ)	792,225 1841 315 M ABCD9EFHIJ	W2EA (N2FY,N2SJCJ,N2XYZ,KC2AZT,W2ORA,KF2YX,K2WB,K2DKS,ops)	79,866 608 102 M ABCDE	WA3UGP (+K3YVY)	44,988 344 92 M ABCD9EFGHIJ	K3YTL (WA1HHN,K3MKZ,KA3EEO,KA3ZHT,KB3QL,KE3OA,N3EMF,N3PA,N3PBH,NERN,N3TDE,N3TKK,WB3FKQ,WB3FT,ops)	384,033 1321 229 L ABCD
	Maryland-DC	K1RZ 223,450 711 205 S ABCD9EFI	K3DNE 122,430 488 165 S ABCD9E	K3ZO 26,712 318 84 S AB	K3HCE 18,200 212 70 S ABD	N3II 11,864 216 54 S AB	N3KNI 7,191 112 51 S ABD	KA3TCC 6,210 114 45 S ABCD	N3ZT 4,719 142 33 S ABD	K3ROJ 2,366 82 26 S ABD	W6AXX 2,200 100 22 S B	N3VOP 1,092 45 21 S ABD	WA4PRR 1,026 46 19 S ABD	N3CDA 732 37 19 S ABD	W3GN 558 31 18 S AB	KF3DC 507 39 13 S AB	N2BTD 324 36 9 S AB	K3RKB 100 20 5 S B	W3IP (+KF3FT,WA3TJ,WG3R,W3N3L,K3MLA)	102,661 535 149 L ABCD																						
	Western Pennsylvania	AA3GM 4,370 65 46 S ABCD9E	W3HDH 720 40 18 S A	W3KJM 253 23 11 S A	WB0IWG 77 11 7 Q AB	W3YOZ (WR3Z,K4VV,KA3EJ,WX3B,ops)	39,022 297 109 L ABCD	K3MJW (KA3JWJ,KA3WSW,N3NOS,ops)	2,584 53 38 L ABD																																	
	4	Alabama	W4ZRZ 21,725 207 79 S ABCDE	N4Z 3,432 72 33 S ABCDE																																						
	Georgia	KD4HLG 18,078 194 69 S ABCDE	KD4K 6,644 114 44 S ABCD	K4KAZ 4,859 87 43 S ABCD9	NY4F 546 35 13 S ABD	AD4J 297 23 11 S ABD	K4SZ (+AE4GG)	5,192 90 44 M ABCDE	K4HUM (W4GCL,KG4CFP,KE4SLO,KE4KQB,KF4HQZ,KD4HLV,ops)	9,200 146 50 L ABD																																
	Kentucky	K4TO 13,629 134 77 S ABCD	W4FVQ 6,250 81 50 S ABCD9E	NB3B/4 1,012 40 23 S ABD																																						
	North Carolina	K4QI 62,860 336 140 S ABDE	W2YV 14,760 203 72 S ABC	W4VHH 14,129 115 71 S BDEFGI	W4DEX 11,868 114 69 S ABCDEFGI	N4AJF 2,812 68 37 S ABD	AA4ZZ (+K2SD,K4DX,W4VHF)	171,125 170 185 L ABCD	W4NH (K4EA,K4TW,KE4QL,KF4DZV,KI4M,KR4TG,N9KHC,NX4O,W4ATL,W4GFC,W4KXY,ops)	74,834 428 142 L ABCD																																
	Northern Florida	NX4E 6,867 92 63 S ABDE																																								
	South Carolina	N4UFP 5,220 95 45 S ABCD	K4AIR 1,200 38 24 S BD	W4KSC (+KC4DV)	10,164 116 66 L ABCD																																					
	Southern Florida	WB2WIH 26,136 262 88 S ABCD	9HYU 7,375 123 59 S ABD	KE4JZT 4,110 102 36 S ABD	AJ4 4,116 82 49 S ABD	KF4KSN 3,300 74 44 S ABD	KOVUM 1,976 53 26 S ABCD9EF	KF4FJ 700 43 14 S ABD	WB2IWC 527 28 17 S ABD	WA4OFS 288 18 12 S ABCD	N4AOE 171 18 9 S BD																															
	Tennessee	KD4HIK 6,300 112 45 S ABCD	W4ZUG 3,344 73 38 S ABD	AD4F 2,310 60 30 S ABCD	WS4Z 880 28 22 S ABDE	KA4OCHT 516 30 12 S ABDE	WU4W 493 27 17 S ABD	KD4LTR 252 28 7 S ABD	W2BEJ/4 28 28 1 S B																																	
	Virginia	W4RX 44,408 228 104 S ABCD9EF	N4CH 32,600 343 100 S ABCD9E	K4ZOO 29,008 212 98 S ABCDE	K4FTO 13,696 163 64 S ABCD	KC4B 2,494 86 29 S AB	AD4DG 1,104 31 24 S ABCD9	N4MM 1,032 43 24 S AB	K4FJW 732 44 18 S AB	KG4CGP 450 30 15 S AB	N3ZYU 161 23 7 S ABD	W4IY (W4NF,W4AD,N1TXI,W4CE,W4DC,K4RG,WA0DYJ,NL7TK,K5OF,op)	244,110 931 206 L ABCD																													
	5	Arkansas	W5HUQ 912 30 24 S ABCDE																																							
	Louisiana	N5MYH 7,620 109 60 S ABD	W5ART 2,800 70 35 S ABD	K5JMR 738 38 18 S BD	K5JRY 324 24 12 S ABD	W5AKB 322 23 14 S A	K5CZD 312 23 12 S ABD																																			

Mississippi				
N5YLS	2,516	55	37	S ABCD
KJ5RC	540	27	20	S AB

New Mexico				
NSXZM	2,262	63	26	S ABCDE
N9KUW	874	40	19	S ABD
W5VVZ	777	30	21	S ABD
KB5ZSK	423	30	9	S ABCDE

North Texas				
W8CM	58,000	343	116	S ABCDE
K9MK	10,788	121	62	S ABCDE
NSNJ	8,990	130	58	S ABD
K5LOW	8,568	130	56	S ABD
W5SXW	6,069	87	51	S ABCDE
K5CCT	3,780	84	45	S AB
KM5OL	918	43	17	S BCD
KC5ZZL	825	44	15	S BCD

Oklahoma				
W5VHF (K5SW,ops)	5,148	79	52	S ABCDE
K5HP	672	30	21	S ABD

South Texas				
K5IUA	86,426	382	158	S ABCD9EF
W3XOD/5	37,584	242	116	S ABCD9E
W5UWV	20,880	179	90	S ABCDE
KM5FRG	4,945	101	49	S AB
N5BA	3,913	62	43	S ABCD
AJ4F	574	41	14	S B
KC5YOV	560	31	10	S ABCDEHJ
K5GLX	250	21	10	S ABDE
N5XU (N3TNN,KM5FA,ops)	12,864	150	64	L ABCD

West Texas				
N5XYO	425	25	17	S AB
KK5SH (+K5KSK)	11,242	110	77	M ABCDE

6

East Bay				
W6OMF	19,338	202	66	S ABCDE
KF6YM	14,350	215	50	S ABCDE
KE6OR	1,005	64	15	S ABD
N1DDK	624	46	13	S ABD
KO6DI	364	26	7	S C

Los Angeles				
W6GGV	20,178	227	59	S ABCDE
KE6FCT	16,802	209	62	S ABCD
KD6RUH	13,061	253	37	S ABCD
KE6AXJ	4,068	138	19	S ABCD
N3WTK	3,860	160	20	S BD
KF6JUF	3,591	105	27	S ABD
K6EHA	2,500	81	20	S ABCDE
K6OUE	1,956	113	12	S BD
W6JHC	1,650	78	15	S ABCD
W6I6T	1,411	63	17	S ABCD
KODI/6	945	51	15	S ABD
N6JO	510	27	15	S ABCD
KO6GW	12,930	308	30	O ABCD
K6LMN	6,075	173	27	O ABCD
KQ6EE	3,528	133	18	O ABCD
WA9STI/6	1,692	66	18	O ABCD
K6AY	671	40	11	O BCD
W6TOI (KB6WKT,KE6HPZ,N6WJZ,AD6HT,ops)	96,942	617	107	M ABCD9EI
W6YRA (WA6AYI,AC6YV,KU6T,ops)	1,120	55	16	M ABD

Orange				
N6HKF	52,407	440	81	S ABCDE
K6TSK	36,281	338	73	S ABCDE
KF6HAM	7,584	125	48	S ABCD
K6IBY	6,880	116	40	S ABCD
KE6GFF	5,724	159	18	S D
KD6UIH	1,003	37	17	S ABCD
N6GMF	852	70	12	S ABD
KO6ILH	770	74	15	S ABD
KR6VV	270	21	9	S ABCD
KE6OCB	60	11	5	S BD
KE6GUC (+KF6WPK)	1,222	59	13	S BCD
K6FRG (KQ6BS,K6CCB,K6VW,ops)	250	50	5	L B
KF6ENB (+WA6JZO)	248	25	8	L BD

Pacific				
NH6YK	767	47	13	S ABD

Santa Barbara				
N6PI	4,266	102	27	S ABCD9E
KC6NBI	429	29	13	S ABD
W2ODH/6 (+N6FMJ,WA6DJS,W6PPT)	155,500	920	125	L ABCD

Santa Clara Valley				
N6JET	15,158	210	53	S ABCDE
W6GYD	7,200	164	32	S ABCDE
K7XX	2,490	83	30	S AB
AD6IV	2,420	77	22	S BD
KF6MXX	2,112	85	22	S ABD
KD6PAO	1,120	80	14	S B
KQ6OT	328	31	8	S BD
K8NTZ	128	4	2	S B
W1QT/6	528	32	16	O ABD
N1VM (KB6HRB,KC6UCN,ops)	54,897	416	87	M ABCD9E
AA6PA (+KF6WXP)	1,886	69	23	M ABD

San Diego				
K6IAH	462	37	11	S ABD
K6CYS (+KF6JBB,KE6NRO)	2,730	86	26	L ABCD

San Francisco				
WB9NJS	3,042	106	26	S ABD
WB8UPV	1,050	52	15	S ABD

San Joaquin Valley				
N9VM	51,450	335	98	S ABCD9E
N7STU	37,736	275	89	S ABCDEIP
K6VYK	3,300	91	30	S ABCD
N8VM	2,210	61	26	S ABCD9
N3VM (K6MI,op)	1,775	41	25	S ABCD9E
KF6DST	1,414	81	14	S BD

KD6IVL	340	27	10	S BD
KF6CNV	296	37	8	S B
WA6QYR	128	16	8	S B

Sacramento Valley				
WB6NTL	36,450	305	81	S ABCDE
N6KXB	28,934	255	74	S ABCDE
KC6ZWT	15,582	217	49	S BCD
W6YM	3,154	64	38	S ABCDE
W6JEX	2,052	57	27	S ABCD
KF6YL	649	59	11	S B
W6HDY (+KD6LBT)	442	26	17	L AB

7				
Arizona				
KE7NR	2,871	76	29	S ABCDE
WB7OHF	363	28	11	S ABCD
WA7VHF	350	28	10	O ABD

Eastern Washington				
K7CNYA	1,518	57	23	S ABD
W7JHS	980	39	20	S ABD
W7AW (+WA7TUE,AC7AJ,KC7ITP)	6,437	134	41	L ABCD

Idaho				
N7EJL	4,743	87	51	S ABD
WA6KLL	2,772	58	42	S ABD
KA7GUX	858	33	22	S ABD
KJ7TH	670	51	10	S ABD
KC7JL	621	27	23	O A
KK7AT	336	35	8	O ABD

Nevada				
K7ICW	5,085	87	45	S ABCDE
KO6CX	150	15	10	S AB

Oregon				
K7HBJ	546	32	13	S ABCDE
N7DE	494	31	13	S ABCD
N3CCW	451	41	11	S B
KK7E	189	27	7	S B
KA7EXM	200	20	7	O D
W7LT (KC7AOI,KC7BRJ,KC7PDI,K7RUN,ops)	1,632	86	17	L ABDE

Utah				
N7JA	2,808	69	27	S ABCD9E
KJ7FK	552	35	12	S ABD
N7MLD	275	21	11	S ABCD
W7DHH (+WB7R)	2,546	52	38	M ABDE

Western Washington				
KE7SW	26,838	223	71	S ABCD9EFGH
W3JPT	2,052	97	19	S ABD
KK7B	1,056	23	16	S ABCD9EFGHI
W7BA	504	33	12	S ABCD
K7VHF (AB7CS,K7JX,K7ND,KD7TS,N7EPD,ops)	55,872	344	97	M ABCD9EFGHI
WB7FJG (N4SL,KD7BZX,ops)	4,648	135	28	L ABD

8				
Michigan				
K2YAZ	132,396	422	204	S ABCD9EFGH
K8MD	68,016	344	156	S ABCD9E
KB8B	23,320	224	88	S ABD
K8KJ	17,302	180	82	S ABD
N4SC	7,645	108	55	S ABCD
WB8WNX	4,429	103	43	S A
KB8U	2,898	63	42	S ABD
N8ZVB	2,475	75	33	S AB
KC8DRK	144	28	4	S ABD
WA8YLZ	48	8	6	S A
N8PYT (+KC8ALA)	5,002	107	41	L ABD

Ohio				
WA8WZG	388,144	788	272	S ABCD9EFGHI
KE8FD	117,000	383	195	S ABCD9EF
K8TQK	106,894	362	194	S ABCD9EFG
WA8RJJ	72,696	294	156	S ABCD9EFGH
KC8CCD	21,021	181	91	S ABCD
KC8GSD	12,702	135	73	S ABCD
K8MF	6,608	92	59	S ABCD
N8JY	3,080	70	44	S AB
K8AB	2,184	57	28	S ABD
WA8RCN	1,800	72	25	S B
W1FEZ	1,316	40	28	S BD
W8DD	1,254	57	22	S AB
N8VEA	1,242	57	18	S ABD
KB8UJZ	774	43	18	S AB
N8GHZ	592	26	16	S ABCDE
KC8CFI	160	12	10	S BD
AF8C	13	13	1	S B
N8A (N8XA,op)	7,097	94	47	O ABCD9EI
N8LGP	615	41	15	O B
N8ZM (+N8IDS,KD8FO,KB8ZR)	20,995	201	85	L ABCD
W8VND (KC8KKC,N8XX,ops)	132	12	11	L AB

West Virginia				
K2UOP/8	89,376	393	147	S ABCD9EF
N8XUR	36,642	261	93	S ABCD9E
K8KJF	988	38	26	S AB
KB8P (K1TRA,K1TTR,K1HTV,K1ATB,W3ZZ,W4XP,K6LEW,K8ISK,ops)	1,108,905	1809	413	M ABCD9EFGHIJP

9				
Illinois				
N2BJ	134,720	580	160	S ABCD9E
WB9Z	61,312	395	128	S ABD
K9YR	24,750	256	75	S ABCD
N9TF	20,262	220	66	S ABCDE
W9IIX	17,487	200	67	S ABCD9E
W9VA	11,280	165	60	S ABCD
WA6TMJ	7,155	140	45	S ABD
AE9D	6,308	145	38	S BCD
N9WKV	3,010	84	35	S ABD
N9YLN	1,605	107	15	S B
N9MBK	1,400	10	14	S B
KA9FAJ	1,008	42	24	S B
KB9TQB	525	32	15	S ABD
N9MBR	209	19	11	S AB
N9LAG	636	40	12	O ABD

W9SZ	231	13	11	O BCD9E
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Indiana				
AA8T	7,552	106	59	S ABCD
K8LEE	7,301	149	49	S A
WA1MKE	4,606	80	47	S ABCD
KB9NKM	3,924	109	36	S B
K9RQ	2,686	66	34	S ABD
KB9MWA	1,012	37	23	S ABD
WB9DRB	1,008	36	24	S ABCD
W9ICE (WB9YCYZ,WB8ERB,N8NQG,N9QQY,K9YDO,N8JLZ,KE4OED,KG9OP,KA9BFM,KB9NWP,WA9JTL,ops)	151,076	510	211	M ABCD9E

Wisconsin				
W9GA	103,016	459	158	S ABCD9E
K9KL	40,284	274	108	S ABCDE
W9JN	24,057	201	99	S ABCD
KE9RY	15,066	199	62	S ABD
W9XT	11,343	164	57	S ABD
N9KS	11,020	170	58	S ABD
KA9JZW	7,776	122	54	S ABD
K9MAL	6,972	129	42	S ABCD
N9DZ	6,384	108	42	S ABCDE
W9PHJ	5,796	126	46	S AB
WA9LZM	5,160	103	43	S ABD
KB9Q	2,800	112	25	S AB
KBOLGB	2,738	74	37	S AB
N9NDP	2,002	77	26	S AB
KB9TLV	1,536	48	32	S AB
N9XRO	1,536	57	24	S ABC
W9YCV	1,357	46	23	S ABD
N9WWR	1,242	69	18	S B
WB9MZX	1,122	66	17	S AB
WA9PZV	1,037	61	17	S B
W9NVK	936	52	18	S B
N9JUH	720	34	18	S ABD
W9KHJ	688	43	16	S AB
KB9JAE	640	31	16	S ABD
N9UBS	630	28	21	S ABD
KB9PCU	612	34	18	S AB
N9LIA	609	28	21	S ABD
WB9VYP	525	33	15	S BD
N9OO	492	41	12	S B
K9OSH	448	27	14	S ABD
W9HRH	396	44	9	S AB
N9MYK	3,591	102	27	S ABDE
W9UOC (+W0OCHJ,K0JX,NOAKC)	188,710	621	226	M ABCD9EI
N9IE (+N9FJ,N9VA,K9SWXN)	17,536	235	64	L ABCD
N9NGH (+WB0KTI)	3,668	96	28	L ABCD
N9MXX (KB9LYL,op) (+KB9BKB)	2,375	90	25	L BCD

0				
Colorado				
N0VSB	21,200	188	80	S ABCDE
W6OAL	17,666	155	73	S ABCD9E
K0RZ				

1999 IARU HF World Championship Results

Remember the good old days of July 1999? Record setting temperatures were reported across the Northern Hemisphere that summer. Most of us were doing anything we could to escape the torrid heat. Meanwhile, residents of the Southern Hemisphere were gazing at the Southern Cross through the chill of another cold winter. Many longed

for the heat and fun of their summer, a full six months away.

If you were looking for heat, there was plenty available on airwaves. All you had to do was tune your radio through the amateur bands July 11 and 12 during the annual IARU HF World Championships. A record number of participants submitted over 1600 logs during what many people regard as one

of the best Amateur Radio competitions. Stations from 48 IARU zones and 103 DXCC entities participated in the 1999 running of the event. Torrid QSO rates were set by many stations while others longed for a couple of quiet kilohertz where they could settle in and start their own hot runs.

While high scores were abundant across the globe, only two world records were es-

Top World Scores Mixed Mode

Call	Score
KQ2M	2,651,587
CF3EJ	2,505,360
(VE3EJ,op)	
LY2BTA	2,156,040
OH1MM	2,153,984
DL1IAO	2,104,744
EA8/OH4NL	1,977,300
(OH2BYS,op)	
LU4FM	1,971,645
(LU9AY,op)	
RA3AUU/0	1,917,860
UA3RAR	1,794,960
S53R	1,781,781

Phone Only

Call	Score
3V8BB	3,158,230
(I4UFH,op)	
4X1IM	1,993,680
S50A	1,803,420
OH6RX	1,584,396
K5TR	1,572,896
(at W5KFT)	
RW4WR	1,544,098
WB9Z	1,448,568
KL7Y	1,447,686
(WA2GO,op)	
LU6ETB	1,399,032
VA7RR	1,291,419
(atVE7SZ)	

CW Only

Call	Score
K5ZD	2,254,464
ZW5B	1,970,484
(KD6WW,op)	
OH2U	1,937,218
(OH6EI,op)	
W4AN	1,930,260
LY6M	1,923,371
OH0Z	1,813,650
(OH1JT,op)	
RZ9UA	1,781,325
K5GN	1,669,008
(at W5KU)	
W7AT	1,631,616
(N6TR,op)	
SP7GIQ	1,629,824

Multioperator

Call	Score
R1MV	6,707,722
H20A	5,138,829
HG1S	4,042,467
P3A	3,611,406
RD3Q	3,051,731
RM6A	2,988,468
SQ6Z	2,983,428
HG6N	2,983,078
4M1X	2,935,500
IR4T	2,828,546

Top W/VE Scores Mixed Mode

Call	Score
KQ2M	2,651,587
CF3EJ	2,505,360
(VE3EJ,op)	
K3ZO	1,674,516
N9AG	1,552,557
(at N8NR)	
VE3OI	1,502,592
W3PP	1,464,408
(AA5B,op)	
K3CR	1,433,355
(KB3AFT,op)	
N3BB	1,344,352
W9RE	1,328,296
K5KG	1,325,456

Phone Only

Call	Score
K5TR	1,572,896
(at W5KFT)	
WB9Z	1,448,568
KL7Y	1,447,686
(WA2GO,op)	
VA7RR	1,291,419
(at VE7SZ)	
W7NN	1,277,888
KW8N	1,270,506
(N8VW,op)	
WS1A	896,487
VE1JX	821,142
(K6HNZ,op)	
N4UH	691,968
N3MKZ	618,198

CW Only

Call	Score
K5ZD	2,254,464
W4AN	1,930,260
K5GN	1,669,008
(at W5KU)	
W7AT	1,631,616
(N6TR,op)	
N2IC	1,601,751
W6EEN	1,564,260
(N6RT,op)	
N5DX	1,196,800
VE2IM	1,179,024
(UT4UZ,op)	
K6LL	1,177,512
VO1MP	1,153,350

Multioperator

Call	Score
WH7Q	1,800,172
K5MR	1,750,860
N1TB	1,665,138
WU4G	1,473,290
(at W4MYA)	
W6XR	1,341,207
W7RM	1,295,360
KX9X	1,091,832
N4GN	1,021,016
W4MR	1,019,130
W2AX/1	954,275

IARU Headquarters Stations

Totals indicate (left to right) final score, QSOs and multipliers.

DA0HQ (DF8XC, DG0OHC, DG1BDF, DH7WW, DJ7AA, DK1BT, DK3WW, DK4WA, DK7YY, DK8YY, DL1AOB, DL1AOQ, DL1ASA, DL1AUZ, DL1AWI, DL1DTL, DL1JDK, DL1VDL, DL2OBF, DL2OE, DL3ABL, DL3ALI, DL3APO, DL3DXX, DL3OI, DL3RMA, DL3TD, DL4ALB, DL4ALI, DL4CA, DL5ANT, DL5AOJ, DL5AWI, DL5AXX, DL5LYM, DL5MX, DL5XU, DL5YY, DL6MHW, DL6MYL, DL7AU, DL7BY, DL7IO, DL7IQ, DL7UBA, DL7URH, DL7UTM, DL7VRO, DL8AKA, DL8ALU, DL8AUA, DL8DYL, DL8WAA, DL9AWI, DL9DRA, ops)	17,565,975	17920	399
P40HQ (P43A, P43DJ, P43E, P43L, P43P, P43T, P43W, P49V, P40K, P40W, P40R, VV6OAT, K6RC, ops)	16,542,938	11868	289
OL9HQ (OK1ADM, OK1AU, OK1AEZ, OK1AWZ, OK1AXB, OK1CF, OK1CM, OK1CW, OK1DX, OK1FLM, OK1FUA, OK1GW, OK1JKT, OK1MD, OK1MR, OK1RI, OK1TA, OK1TC, OK1TN, OK1WF, OK2FD, OK2GG, OK2RZ, ops)	15,117,699	13049	381
HG3DX (HA1DLZ, HA1DRR, HA1RG, HA1XO, HA1XU, HA1ZN, HA1ZZ, HA1VQ, HA1WD, HA1YA, HA1YU, HA3DS, HA3GI, HA3GJ, HA3GO, HA3GQ, HA3KW, HA3LI, HA3LN, HA3MN, HA3MY, HA3RG, HA3UA, HA3UF, HA3UH, HA3UU, HA4WU, HA4YD, HA5CC, HA5CW, HA5FM, HA5GF, HA5IW, HA5JI, HA5LN, HA5LV, HA5MA, HA5ML, HA5MY, HA5OM, HA5WE, HA6GK, HA6WX, HA7RY, HA7VB, HA8BE, HA8EK, HA8FM, HA8FT, HA8FW, HA9PP, HA9RT, HA9RU, HA0DU, ops)	14,295,200	11042	400
H2Q (5B4WN, 5B4XF, 5B4MF, 5B4LP, 5B4AH, 5B4AFM, 5B4ADA, ops)	14,111,003	9965	311
PA6HQ (JK3GAD, PA9KT, PB7CW, PE9DX, PA3ALK, PA3BAG, PA3BSQ, PB0AIT, PA4LA, PB0AIU, PB4CC, PA1ZX, HA1AG, PA3EWP, PA3GOJ, PA3FQA, PA4EA, PA5AT, PA5ET, PA7FM, PA1AW, PA3CAL, PA3FZV, PA3EZL, PA3FDO, PA0RCT, PA4AO)	13,640,913	11059	351
TM0HQ (F5IN, F5FLN, F5ITK, F5SJP, F5TRO, F6IRA, F6BZQ, F5GGL, F5OZF, ER1WW, F4ARU, F1BLQ, F5EOT, F6BKI, F6HWU, F6FGZ, F5MZN, F5MUX, F1TGL, F6DZS, F6CTT, F6FVY, ops)	13,600,340	11704	340
OM9HQ (OM2IB, OM3BH, OM2FY, OM2DX, OM3EI, OM5ZW, OM5RW, OM5RM, OM3TZQ, OM5XX, OM5MZ, OM3LU, OM3FM, OM2RA, OM3NA, OM5DX, OM0WR, OM8AM, OM3DX, OM5CD, OM5NA, ops)	11,221,000	10012	350
NU1AW (K1KI, W1WEF, K1ZZ, K1CC, KA1ZD, KM1P, N1ND, N1RR, N1XS, NT1N, W1RM, K2KQ, ops)	10,058,994	8574	303
YR0HQ (YO3GOD, YO3ND, YO3FWC, YO3GJC, YO3GDA, YO3APJ, YO3FU, YO3CTK, YO3FRI, YO4NF, YO4ATW, YO4XF, YO4GDP, YO4CIS, YO4GAO, YO4FYQ, YO4AB, YO5TE, YO5AJR, YO5BLA, YO6AWR, YO7BUT, YO7APA, YO8AXP, YO8BPK, YO8BAM, YO8WW, YO8MF, YO8DDP, YO8CQC, YO9IGI, YO9FJW, YO9AGI, ops)	7,856,481	8977	337

W1AW/9 (W0AIH, KB9S, K0TG, K0OB, W4MS, K0XQ, NE9J, AF9T, K0AD, W9WI, WW0DX, KW4T, WR0DK, KT0R, AC0W, N0STL, N9STL, K9HUH, AE9D, K9BGL, KA9FOX, KU0J, N0IJ, K10F, KF0T, WD9HFT, W0UC, W0VB, VE4VW, ops)	6,507,020	8115	260
ER7A (ER5AA, ER5AL, ER1DA, ER1LW, ER5OK, ER5DX, ER3DX, UX3FW, UX0FF, UR5FD, UT3FM, UR5FAV, ops)	6,493,745	6286	317
SK3HQ (at SK3GW) SM3CER, SM3EVR, SM3OSM, SM3SGP, SM5AJV, SM5IMO, SM5TXT, SM0NSJ, SM0OEK, ops)	4,924,938	5217	263
IY2ARI (I2MQP, IK2HKT, IK2CIO, I2IFT, IK2WZV, IK2ANI, IK2PFL, IK2AHB, IK2GZU, IK2GSN, I2CZQ, IK2SAU, IK2YYS, ops)	3,961,680	5261	272
YL4HQ (YL1ZE, YL2GRN, YL2HA, YL2CR, YL2DZ, YL2PP, YL2UZ, YL2CI, YL2GD, YL2IP, YL3AD, YL2CF, YL2PQ, YL2RQ, ops)	2,849,868	3570	258
LX0RL (K4ZLE, DL6BCF, DL1EFD, LX2AJ, LX1TI, LX1CA, LX1RA, LX1KQ, ops)	2,084,719	2691	217
YU0HQ (4N7AA, YU7CB, YU7KM, YZ1AU, ops)	2,022,248	2998	226
ZT6Z (ZS6EZ, op)	1,662,500	1829	190
9V9HQ (9V1YC, 9V1BH, ops)	1,568,424	2402	156
EM5HQ (UR4LTX, UR5LCV, UR8LA, UR8LV, ops)	1,528,121	2326	199
S50HQ (S57AW, S51TA, ops)	1,429,050	2138	210
LZ99HQ (LZ1UQ, LZ1PM, LZ2HM, LZ1DP, LZ1MC, ops)	1,303,432	3068	166
GB3RS (G4JVG, G0WAT, G3WFM, G3PJT, ops)	1,278,464	2200	176
ES9A (ES4TG, ES5RY, ES5TV, ES7AGW, ES1LBK, ES4ABO, ES4BG, ES1TEB, ES1LBQ, ES2RR, ES5QX, ops)	623,424	1397	136
DX1HQ (DU1SAN, DU1MHX, DU1JXP, DU1SUN, DU1KIP, N1WLW, ops)	272,853	834	71
PY1AA (PY1KS, PY1NX, ops)	263,844	522	108
OE1XHQ (OE1JNB, OE1TKW, ops)	106,480	300	110
JT1T	16,124	152	29

N5XU (+KA5WSS,KM5FA,N3NTN)	390,104	894	124	D
K5BN (K5AAD,N5J,N5M,VW5XF,ops)	269,904	730	98	D
West Texas				
N5ZC	96,596	342	76	A
KE5OG	78,518	257	83	B
N5ZMP	5,859	53	31	B
AA5ZX	4,640	44	29	B
N5DO	635,222	1073	157	C

W9				
Illinois				
K9ZO	229,460	685	110	A
K19A	81,150	330	75	A
N9LYE	9,252	71	36	B
W9EBY	76,760	231	95	C
K9SD (+KW0A,KAOGGI,K19A)	822,848	1296	172	D

W0				
Colorado				
W0TMM	1,168,833	1704	167	A
K0COP	5,434	71	26	A
AB0GO	228	8	6	A
KGOZI	565,917	1202	121	B
K9MWM	156,880	423	106	B
KD0NB	155,346	407	102	B
K10NL	10,286	77	37	B
W0NF	9,835	78	35	B
N2IC	1,601,751	2051	199	C
KFOAD (+AE0Q)	49,635	251	45	D
KF4OD (+AE0Q)	47,608	244	44	D

Iowa				
W0ETC	389,625	842	125	B
W0PPP	9,315	106	27	B

Kansas				
W0UY	217,840	519	112	A
N0NB	61,977	233	73	A
W7KEU	38,916	140	69	B

Minnesota				
KFOUM	6,422	56	26	B
NA0N	412,454	910	119	C
W0HWF	53,061	207	69	C
WA0BNX	21,252	135	44	C

Missouri				
K10HC	76,577	264	73	A
K10MB	74,775	269	75	A
K00LU	50,115	176	65	A
KC0CWU	26,606	160	53	A
NB0BE	68,796	253	78	B
W0LW	66,202	268	79	B
W0DLS	44,268	195	68	B
K0DAT	40,596	145	68	B
K2HT	32,923	149	73	B

Nebraska				
W0UVC	99,528	237	104	B
KA0TKU	93,060	213	110	B

South Dakota				
W0DBMR	120,834	359	98	B
KFOFN (+W0DT,KB0SBC)	447,597	962	123	D

Zone 8				
W1				
Connecticut				
KQ2M	2,651,587	2651	227	A
W1XF	82,536	274	76	B
KB1H (K1EBY,op)	1,045,602	1677	153	C
W1QK	604,637	1233	121	C
N1MT	4,320	57	24	C

Eastern Massachusetts				
K1HT	132,525	351	95	A
W1AF (K3UOC,op)	4,316	48	26	A
K1AIUQ	139,514	517	79	B
W1BDB (WA10EZ,op)	25,476	111	66	B
W1ZT	909,384	1330	168	C
K1VUT	862,477	1321	161	C
K5MA	161,440	484	80	C
W1MK	154,208	525	79	C
N1TB (+N1UJ,V,N1KO,W1KM)	1,665,138	1997	191	D

Maine				
NY1S	179,712	485	104	C
KQ1V	41,878	259	51	C

New Hampshire				
WS1A	896,487	1402	151	B
WB1GEX	131,892	353	116	B
WA1ZYX	16,400	97	41	B
KB1DFG	1,020	85	12	B
WC1M	1,106,930	1772	145	C
KR1G	887,655	1257	177	C
K1WF	25,758	182	54	C
K1TD	70,934	275	58	D

Rhode Island				
K1PLX	322,044	573	141	B
K1SD	108,647	325	77	B
WA1MKS	43,354	205	53	B
AB1BX	36,630	260	55	C

Vermont				
AA1SU	230,850	609	114	A
K1HD	90,072	344	72	B
N1PEA	7,564	78	31	B
KK1C	2,268	33	18	B
W2AX/1 (+N2GA,K2DO)	954,275	1747	133	D

Western Massachusetts				
N6RFM	448,140	719	140	A
K5ZD	2,254,464	2348	228	C
W1TO	39,547	177	71	C
KX1X (+N1SR,K1TS,KE1Y,K1TTT)	744,720	1240	145	D

W2				
Eastern New York				
K2ZZ	101,124	278	106	A
N2LH	228,006	581	106	B
N1EU	667,450	976	175	C
K2SX	440,074	825	139	C
AA2DY	184,575	524	107	C
W2ZU	73,710	272	63	C
NA2M	45,298	160	71	C

NYC-Long Island				
N2UN	189,315	544	105	C
K2KV (+KS2G,WM2V)	647,094	1117	142	D

Northern New Jersey				
K5KG	1,325,456	1680	187	A
N9LE	212,636	538	106	A
W1GD	198,440	369	121	A
K2XR	1,007,248	1343	176	C
WA2VYA	412,936	722	142	C
W2EN	187,502	505	118	C
W2HCA	33,660	124	66	C
W2TO	11,760	86	35	C
AB2DE (NZKPB,KC2DZY,KC2AVE,ops)	322,966	740	119	D

Southern New Jersey				
W5KI	57,528	187	72	A
WA2LBT	32,520	102	60	A
W2UR (+AA2UK,W2PED,W2EYF)	306,582	955	222	B
WA2VQV	38,056	144	67	C
K2MK	10,952	90	37	C

Western New York				
N2UHI	20,650	115	50	A
W2WFA	63,640	202	86	B
KB2EQQ	23,445	138	45	B
N2LOQ	16,082	100	43	B
N2CU	282,964	638	109	C
KW2J	266,696	616	106	C
W2EZ	51,972	198	71	C
W6XR (+N2AU,KC2EAL)	1,341,207	1817	183	D

W3				
District of Columbia				
AJ3M	103,520	299	80	B

Delaware				
W3PP (AA5B,op)	1,464,408	1965	172	A
KF3BT	2,250	38	15	B

Eastern Pennsylvania				
W2TN	306,634	610	139	A
KG2FH	51,534	202	63	A
K3RCH	619,192	1130	123	B
K3OK	43,533	193	63	B
W3KLG (K3ND,op)	22,000	120	44	B
N3IKO	6,552	58	28	B
AA3B	1,112,445	1562	177	C
AA3TT	520,737	918	137	C
K3WV	83,430	362	54	C
K3PP	386,540	694	140	D

Maryland				
K3ZO	1,674,516	1981	188	A
AA3LE	77,714	282	91	A
KB3CBW	293,348	742	113	B
KF3BE	39,120	149	60	B
W3BCT	103,592	287	92	C
K3NCO	64,752	208	76	C
W3FQE	4,660	47	20	C
W3LJ	4,512	59	24	C
K3IXD	12,540	81	38	D

Western Pennsylvania				
K3CR (KB3AFT,op)	1,433,355	2114	165	A
AA3LX	108,717	303	93	A
N3EYA	7,350	66	30	B
N3ZGT	295	15	5	B
WB0IWG	272	10	8	B
KA3S	172,144	476	106	C
AA3GM	106,118	366	97	C
K3WVW	36,093	211	53	C
AD5J	24,418	107	58	C

W4				
Alabama				
K4AB	1,146,090	1820	165	A
K4GU	99,900	378	90	C
W4NTI	56,575	221	73	C
KS4YT	322,400	775	104	D

Georgia				
K4BAI	707,224	1241	146	A
K4PHE	32,691	137	51	B
W4AN	1,930,260	2237	212	C
AC4WO	163,562	425	98	C
N4DU	71,687	239	77	C

Kentucky				
K4IU	131,850	348	90	A
AA2GS	69,785	244	85	A
AK4U	1,326	30	13	B
K1AC	243,879	649	119	C
KG4BIG	54,277	293	61	C
KA4JMZ	40,512	171	64	C
N4XM	2,512	43	16	C
N4GN (+K4WW,N4OKX)	1,021,016	1356	184	D

North Carolina				
NX9T	52,780	207	65	A
N4UH	691,968	1080	159	B
KS4XG	554,976	947	144	B
W4YDU	33,670	144	65	B
W4JIK	581	19	7	B
KE4SQI	168	8	6	B
N4F	1,097,046	1510	177	C
K4PB	173,884	427	116	C
N4MO	138,160	448	80	C
K3KO	104,312	349	68	C
W4MR (AA4NC,K17WX,ops)	1,019,130	1611	161	D

Northern Florida				
N4AO (WC4E,op)	1,132,895	1885	155	C
KN4Y	43,380	252	60	C
WB4IHI	236,638	1003	73	C
K4VUD	633,789	1354	117	D

South Carolina				
N4IQ	220,890	638	111	A

Southern Florida				
W4OX	433,985	772	145	A
K4LO	366,913	501	163	A
N8PR	126,484	299	103	B
W1ENZ	35,112	166	56	B
K1PT	1,056,590	1633	166	C
A4BP	1,029,449	1743	157	C
AE4RO	617,868	1030	162	C
K1TO	343,845	670	135	C
W4ZW	278,616	780	104	C
WD4AHZ	237,900	615	100	C
WD4JNS	178,674	522	97	C
N4TO	44,991	136	77	C

Tennessee				
W0AO	274,045	652	115	A
NN4T	111,534	502	58	A
W4PA	60,300	351	61	A
AC4ZD	25,850	235	50	A
K4JNY	566,299	1025	157	B
NY4T	134,688	394	96	B
W4JH	38,808	140	63	B
K4OOO	21,264	126	48	B
KF4ZR	15,288	88	49	B
KE4QAR	10,535	79	43	B
W4OGG	5,852	50	28	B
KD4RHT	4,676	49	28	B
WD4PTJ	736	20	8	B
W4WFA	884,464	1487	149	C
K4RO	796,224	1498	143	C
W4NZ	347,392	752	118	C
K4WX	328,383	889	93	C
N4UW	29,640	123	60	C
N4KN	17,388	204	18	C

Virginia				
N3ZY	26,356	129	44	A
K4UVT	18,837	93	63	A
N4MM	230,976	407	144	B
KT3Y	1,146,273	1490	181	C
K5VQ	5,040	60	24	C
W4UG (+W4MYA) (+K4WMMS,W4MYA,WA4QDM,W4KY)	1,473,290	1913	182	D

W5				
Louisiana				
WSWJU	1,186,535	1763	167	A

Mississippi				
WSNO	43,722	194	63	B
K5MDX (WQ5L,W5UE,K5NY,ops)	666,135	1327	131	D

RW4AA	1,299,804	2121	172	A	UR3IWA (US1ITU,UX1L1,US2IES,URS5FB,YU61M,ops)	EA8AD	21,076	111	44	B	JR9NVB	50,220	295	60	A	Zone 46					
RW3GU	879,200	1333	200	A	U07J (UUAJMG,UBJ,K,UUOJM,ops)	EA8ASJ	385,462	1019	77	C	JR1LEV	48,369	175	69	A	Ghana					
RK6CZ	736,740	1187	180	A	EM4E (UR5ECW,UR5EDX,ops)	Zone 37	Tunisia	3,158,230	3238	205	B	JR1AB	48,060	189	60	A	9G5DX	15,314	103	31	B
UX1UA	731,310	1139	180	A	UR4MWU (UR4MEU,UR5MA,UR5MB,UR0MM,US5MAX,ops)	3V8BB (I4UFH,op)					JR2VU	40,827	178	67	A	Mali					
RA6AR	438,768	689	198	A	UY1M (UR3MP,UR9MM,UR5MTJ,UR7MF,US50,ops)	JG3NKP/1					JR2AB	36,036	156	63	A	TZ6DX (K4RB,op)	397,300	809	100	C	
RZ6AH	362,870	932	131	A	UR4MWN (UR5MQS,UX7MA,ops)	Morocco					JR3AAZ	17,520	88	60	A	Zone 50					
RV1CC	162,756	345	132	A	Latvia	CN8YR	10,115	73	35	C	JR4QDU	5,428	60	23	A	Philippines					
UA4AO	160,930	396	133	A	YL2MF	3,822	40	26	C	JR4WFC	1,664	25	16	A	DUI1CO	118,048	414	62	A		
UA3IKO	133,380	719	57	A	YL2GN	1,625,814	1805	246	C	JR5EYU	1,664	25	16	A	DUI1ODD	68,960	370	40	B		
UA3PLP	131,236	437	107	A	YL2GZ	486,984	771	197	C	JR5EYU	1,664	25	16	A	DUI1FZB	28,868	243	28	B		
RW3DY	96,520	239	85	A	YL2UZ	175,240	354	130	C	JR5EYU	1,664	25	16	A	DUI1ODX	257,925	569	95	C		
UA1TAN	89,420	239	85	A	YL2YU	129,600	375	108	C	JR5EYU	1,664	25	16	A	4F2WTW	97,584	439	48	C		
UA1OIZ	50,954	172	73	A	YL2PP	3,822	40	26	C	JR5EYU	1,664	25	16	A	DY1E (4F1EJ,UY1RAN,DUI1KQ,DU1OOP,DU1RSM,DY1FDD,DU1NUF,DY1KXF,DY1FL,ops)	191,016	562	72	D		
RX3DBG	32,016	156	69	A	Zone 30	Kyrgyzstan					JR5EYU	1,664	25	16	A	DX1FLR (DUI1LK,DU1DPE,DY1PBO,DU1HDG,DU1JFE,DU1OHR,ops)	162,558	511	66	D	
RV6ASU	23,688	128	56	A	EX2T	386,672	660	143	B	JR5EYU	1,664	25	16	A	DX1R1N (DU1LER,DU1LTD,DU1QYH,DU1MUD,DY1MDU,DY1PMK,DY1HOS,YU1UAV,DY1TYT,DY1ZLI,DY1MLM,ops)	6,045	102	39	D		
RX3DX	4,896	50	34	A	EX8MDA	168,672	732	56	B	JR5EYU	1,664	25	16	A	Zone 53						
UX3YCX	4,531	51	23	A	EXOY	30,131	23	29	B	JR5EYU	1,664	25	16	A	Maritime Mobile						
UA3BL	605,626	1022	181	B	Turkmenistan	EZ8CW	28,420	88	70	B	JR5EYU	1,664	25	16	A	UR3IDD/MM	68,632	438	46	A	
UA3LHL	204,678	453	137	B	European Russia						JR5EYU	1,664	25	16	A	Zone 54					
RX3DNC	189,840	483	110	B	RW4WR	1,544,098	1866	211	C	JR5EYU	1,664	25	16	A	West Malaysia						
UA4NC	178,224	395	141	B	RU4WE	401,922	769	162	C	JR5EYU	1,664	25	16	A	9M2TO	229,248	776	72	A		
UA3QOG	172,620	423	126	B	UA4WAN	46,104	196	68	C	JR5EYU	1,664	25	16	A	Singapore						
RV6BV	171,038	430	133	B	RU4HH	43,442	200	58	C	JR5EYU	1,664	25	16	A	9V1RH	30,622	126	61	B		
RW9AB/6	164,101	417	119	B	RK4WVA (UA4WA,UA4WKK,ops)	RZ4PZL (UA4PMM,UA4PNP,RA4PMW,ops)	452,037	785	159	D	JR5EYU	1,664	25	16	A	Indonesia					
RU3WT	102,520	304	110	B	Asiatic Russia						JR5EYU	1,664	25	16	A	YCLOW	4,536	39	27	A	
RK3TT	85,262	288	98	B	RI9C	1,225,785	1442	187	A	JR5EYU	1,664	25	16	A	YCOLBK	93,654	570	33	B		
UA4LDP	73,123	275	83	B	RA9AUH	108,040	362	73	A	JR5EYU	1,664	25	16	A	YB3OSE	58,092	264	47	B		
UA4HAK	51,222	229	81	B	RK9AC	48,276	311	36	A	JR5EYU	1,664	25	16	A	YBOAZ	17,490	120	30	B		
RU3AQX	47,450	190	73	B	RA9AC	1,053	20	13	A	JR5EYU	1,664	25	16	A	YB4JIM	69,290	250	65	C		
UA4ACP	46,028	180	74	B	RW9TZ	264,870	434	135	B	JR5EYU	1,664	25	16	A	Zone 55						
RV4AM	27,206	128	61	B	RX9ABE	166,600	353	119	B	JR5EYU	1,664	25	16	A	Australia						
UA4BZ	15,225	121	35	B	UA9ACJ	123,264	300	96	B	JR5EYU	1,664	25	16	A	VK4EMM	863,850	1208	150	A		
UA4LBK	14,508	111	39	B	RW9RF	34,996	153	52	B	JR5EYU	1,664	25	16	A	VK8AV	252,504	427	126	C		
RA3DGH	14,490	99	46	B	RW9SW	947,089	1146	179	C	JR5EYU	1,664	25	16	A	Zone 57						
RT3A	1,818,321	1924	205	C	RA9SO	710,307	975	169	C	JR5EYU	1,664	25	16	A	South Africa						
RA6LV	731,744	1140	208	C	UA9AA	426,105	627	153	C	JR5EYU	1,664	25	16	A	ZS1NF	34,430	133	55	A		
RV3LO	610,500	1031	185	C	UA9AOL	297,216	490	129	C	JR5EYU	1,664	25	16	A	ZS8HO	1,935	33	15	B		
UA3RS	502,686	947	162	C	UA9AB	261,450	495	126	C	JR5EYU	1,664	25	16	A	ZS5RON	5,654	61	22	C		
RU3AQY	454,116	840	164	C	RW9QA	194,962	347	86	C	JR5EYU	1,664	25	16	A	Zone 58						
UA4PA	406,080	715	160	C	UA9AC	167,900	345	115	C	JR5EYU	1,664	25	16	A	Australia						
RV6LTH	374,394	742	138	C	RU9CZ	150,255	357	105	C	JR5EYU	1,664	25	16	A	VK5GN	992,314	1267	167	A		
RW3FO	277,242	781	123	C	RA9AN	98,901	253	111	C	JR5EYU	1,664	25	16	A	VK5AM	108,360	553	40	B		
RK3AD	266,760	607	135	C	RA9MY	83,325	325	55	C	JR5EYU	1,664	25	16	A	VK2NN	94,325	274	79	B		
UA3TU	262,626	530	144	C	UA9LMO	70,960	375	40	C	JR5EYU	1,664	25	16	A	VK3G	10,388	38	26	B		
RZ6ZF	260,546	606	143	C	Kazakhstan						JR5EYU	1,664	25	16	A	VK2APK	785,708	1082	154	C	
RV4LC	257,520	486	148	C	UTLGL	1,185,768	1581	172	A	JR5EYU	1,664	25	16	A	Zone 61						
UA3RO	222,144	393	156	C	UP5P (UNSPR,op)						JR5EYU	1,664	25	16	A	Hawaii					
RV4LM	220,500	511	140	C	UN8LA (UL7026751,UN9LA,ops)						JR5EYU	1,664	25	16	A	KH6RS (NU6S,op)	1,180,872	1643	154	B	
RW3YA	217,350	471	150	C	UN9PQ	223,835	273	89	B	JR5EYU	1,664	25	16	A	KH6WE/EP	558,500	1316	125	B		
RA6LA	170,051	475	119	C	UP4L (UN7L2,op)	1,060,400	1312	176	C	JR5EYU	1,664	25	16	A	KH6FGK	403,120	1022	80	B		
RV3DAK	142,000	361	114	C	Zone 31	Asiatic Russia					JR5EYU	1,664	25	16	A	NH6T	76,558	183	101	B	
RA3XA	71,762	348	53	C	AS9YAB	325,024	638	112	A	JR5EYU	1,664	25	16	A	KH6GMP	59,904	261	48	B		
UA3VLO	70,400	192	100	C	RZ9HT	186,945	799	55	A	JR5EYU	1,664	25	16	A	WH7Z	23,142	132	38	B		
RN3AU	69,242	255	89	C	UA9ORQ	224,379	233	233	B	JR5EYU	1,664	25	16	A	WH7Q (KH6ND,N3A,NH6X,ops)	1,800,172	2361	163	D		
RU3FF	65,424	224	94	C	RX9UKF	11,934	87	34	B	JR5EYU	1,664	25	16	A	Zone 64						
RA3UAG	63,448	226	77	C	RZ9OU	1,781,325	1800	225	C	JR5EYU	1,664	25	16	A	Mariana Islands						
UA4OK	13,668	113	34	C	UA9AG	647,224	1092	136	C	JR5EYU	1,664	25	16	A	KH2N2NL	995,851	1514	157	C		
RD9Q (RW3C,RN3OQ,RW3QNZ,R3AOM,UA9CQ,R3OQ,ops)	3,051,731	3287	271	D	Kazakhstan						JR5EYU	1,664	25	16	A	Zone 65					
RM6A (RN6BN,RA6CM,RA6CO,RZ6AZ,RA6AX,RU6CZ,ops)	2,988,468	3266	252	D	UP6F (UN7FZ,op)						JR5EYU	1,664	25	16	A	Marshall Islands					
RW4LYL (RA4LW,RA4LZ,RN4LP,RW4LE,RU4H,UA4HTTU,UA4L,UA4RC,ops)	2,239,055	2819	245	D	UN7D	78,815	1433	55	B	JR5EYU	1,664	25	16	A	V73UX	265,422	609	93	B		
RN3D (RX3DCK,R3DFF,RN3AW,RV3BA,RZ3FA,ops)	1,061,216	1558	224	D	Zone 32	Asiatic Russia					JR5EYU	1,664	25	16	A	Zone 75					
RN4F (RK4FB,RK4FD,RA4FW,RW4FO,RW4FW,UA4FAR,UA4FPPS,UA4FCV,RW4FZ,UA4FMV,RA0QH/4,UA4-148-644,ops)	902,520	1567	184	D	AS9YAB	325,024	638	112	A	JR5EYU	1,664	25	16	A	Franz Josef Land						
RK3UWA (+RU3UT,RA3UM,UA3UCL)	649,440	1090	176	D	RZ9HT	186,945	799	55	A	JR5EYU	1,664	25	16	A	RX1OX	115,844	530	56	C		
RK3DZD (R3D-255,R3D-256,R3D-257,RV3DA,ops)	166,230	541	90	D	UA9ORQ	224,379	233	233	B	JR5EYU	1,664	25	16	A	Checklogs	SM7ATL, KQ6CV, N0AX, EW6TW, D5JNN, PY1CE, HA1CW, DL5JAN, SV8/SM7NWH, SV/SM7YUS, RK4NWW, VE3CDM, DL8ANI, UX2HX, SP0Q9007, SP9HZF, SP5FM, SP4GHL, Y02ARV, LA3BZ, RZ0SB, S05AS, S1AIFG, DL6RO, DL3ARF, DL1AZK, UA3ADK, DL6KVV, PA0UV, PY1TNT, UL1BW, DL6MDG, Y02CMI, CT1EFL, DLSMKF, DL1ARK, UA3XGM, RW3XA, DL6NEJ, DL5DDWW, VE3DNR, S07VH, RN8HM, YC5SKR, OJ0/SM0NJO, PY3FOX, Y09IF, DL6NEJ, SM0BXT, SP6AUI, JA1JLP, SV1JA, DL2HM, F8AKC, DL2AKA, PU3WPA, OH4LJL, DL2ANM, DKOABG, LZ1FI, F11-676, UA3UBT, PY2SY, SP7BDS, OH3TZ, OK1KCF, PU2TES, SP1BLE, UA0FEN, SPY6G, DL1TC, YV2FEQ, IQ7J, PY3CKO, SM5BUH, VU3DJ, DL2HWI, DL6LE, RA4UAT, SP8OUB, DL3DRN, D3WES, DM2XJ, SP7DTF, OK6L, F03OL, DL2AYJ, XE1GR, RN3AY, PT2CM, VE3KLM, EA3ALV, PY4MBJ, PY4WAS, UA0KY					
UKRAINE	468,712	884	164	A	UA9YAB	325,024	638	112	A	JR5EYU	1,664	25	16	A							
UT8IM	409,985	760	167	A	RZ9HT	186,945	799	55	A	JR5EYU	1,664	25	16	A							
UX8IX	333,621	583	171	A	UA9ORQ	224,379	233	233	B	JR5EYU	1,664	25	16	A							
UX5ZZ	240,810	636	115	A	RX9UKF	11,934	87	34	B	JR5EYU	1,664	25	16	A							
UT3RN	152,361	534	99	A	RZ9OU	1,781,325	1800	225	C	JR5EYU	1,664	25	16	A							
UYSTE	145,080	410	117	A	UA9AG	647,224	1092	136	C	JR5EYU	1,664	25	16	A							
URSVCW	119,520	439	130	B	Zone 33	Asiatic Russia					JR5EYU	1,664	25	16	A						
UR8MX	109,9																				

1999 ARRL 10 GHz and Up Cumulative Contest Results

I don't think the late singer John Denver knew about the challenges of operating in the ARRL 10 GHz and Up Cumulative contest, but his song *Rocky Mountain High* can certainly be used to describe the best efforts. WD4MUO, operating in the 10-GHz-only category, continued his prominence. After finishing third in 1997 and second last year, John staked his claim to the championship in winning the 1999 edition with a score of 44,625. He adds the 1999 crown to his last winning effort in 1996. Any contester in any event would be proud of that accom-

plishment. John's 315 distinct QSOs also broke his one-year old record of 267.

To find the champion of the 10 GHz and Up category, you must descend from the peaks of Rockies and travel to the crashing Pacific surf made famous by the Beach Boys. After scanning for the *California Girls*, use your spectrum analyzer to search for the signals of WA6CGR. Dave continued his string of excellent showings in this contest by taking top honors in the 10 GHz and Up category with a score of 27,965.

The top distance by a 10 GHz station was found between Kerry, N6IZW and Robin, WA6CDR, at 832 km. At 24 GHz, the top distance achieved was between Lloyd, NE8I and Jim, WB9SNR, at 180 km. Both of these distances fall a bit short of the existing records, (889 km on 10 GHz and 256 km on 24 GHz, each set in 1998), but they stand out among the many exceptional efforts turned in for this contest.

Participation was up somewhat in 1999, the first year in which slightly different operating time rules were in place. Stations are allowed to operate for 24 of the 30-hour contest period on each of the two contest weekends.

The challenges of operating at the microwave frequencies will once again be accepted by many testers during 2000 on the weekends of August 19 - 20 and September 16 - 17. In preparation for those weekends, you might wish to spend some time visiting the new Technical Information Service Web site devoted to UHF and microwave activity. The site at <http://www.arrl.org/tis/info/microwave.html>

www.arrl.org/tis/info/microwave.html contains articles, reference materials and information designed with an eye towards developing interest and activity on these highest frequencies at a reasonable expense to the average ham operator. You will also find links to other sites that may help you as you explore your operating privileges.

You don't have to be soaring in the Rockies a la John Denver, or chilling in sunny California with the Beach Boys to enjoy the contest. Why not try operating in the Motown environs of Detroit, or the country pleasures of Nashville? Maybe operate away the blues in New Orleans, or give it a "Pop" effort in Boston? Any way you pick it, try your hand with a "gold record" microwave effort!



Kerry Banke, N6IZW, is not demonstrating a new version of police radar. He is operating the W6OYJ 10-GHz station on Mt. San Miguel in grid DM12mq.



K4FED put up an excellent effort from his motor home at Clingman's Dome, in the Great Smoky Mountains National Park, on the North Carolina/Tennessee border.

Scores

Within each call area, scores are listed in descending order. Score lines indicate call sign, score, QSOs, number of different call signs worked, and best DX in kilometers (I = 10 GHz, J = 24 GHz, P = Light).

10 GHz Only

1	AFTT	16,896	92	37	405
	KB1VC	16,552	80	32	557
	W1GHZ	16,389	95	32	463
	W1AIM	13,879	85	27	274
	K1LPS	13,447	57	26	377
	KB1DXD	12,987	75	31	375
	W1VT	9,713	54	23	380
	K1MAP	8,828	59	26	272
	K1AE	8,535	52	20	238
	WA1MBA	8,379	57	25	353
	N1RWM	7,781	48	19	223
	N1SAI	5,926	30	17	280
	N1GJ	5,429	38	22	269
	WA1ECF	4,746	19	13	290
	WA1HOG	3,916	25	15	186
2	NY2Z	1,030	10	8	57
	WB2VVV	481	2	2	147
3	W3RJW	3,672	11	11	551
	KU3T	2,798	9	9	559
	KB3XG	855	3	2	301
4	W4DEX	3,547	17	7	248
	K4EFD	2,791	16	4	282
	WA4DFS	837	6	3	183
5	AA5C	1,046	7	4	254
	W5DBY	474	8	3	69
6	N6XQ	19,739	70	29	817
	KE6HPZ	12,318	89	22	540
	W6YLZ	12,245	62	27	492
	W6ASL	11,071	54	19	770
	N6LL	10,994	56	24	516
	KK6MK	9,306	70	16	358
	KC6UQH	9,302	65	28	266
	K6KCY	5,151	33	18	359
	K6VLM	3,251	21	15	184
	W6YX (A66FP, N2MJI, ops)	1,465	8	8	145
	K8BTO	307	3	3	3
7	KD7TS	595	10	3	78
0	WD4MUO/0	44,625	315	14	246
	W5VSI	14,479	113	7	245
	K0RZ	13,421	159	11	183
	K0OXU	5,180	47	8	207
	W0AUS	444	5	4	24
	WB0LJZ	440	5	4	24
	WA2VOI	383	6	3	24
	KCOP	232	3	2	24
	NONAS	104	1	1	4
VE	VE3EZF	3,550	37	11	177
	VE3OIK	2,566	20	9	223
	VE3NPB	910	9	6	81

10 GHz and Up

1	WB1FKF	13,701	90	27	269-I	99-J
	KA1OJ	7,787	49	24	241-I	99-J
	W1RIL	5,339	32	24	362-I	36-J
4	WASW	3,383	34	7	100-I	90-J
	K9RKH	1,862	21	5	100-I	90-J
5	W5LUA	3,260	42	18	272-I	160-J 1-P
	W5ZN	2,639	37	10	272-I	47-J
	N5QGH	505	5	5	1-I	1-J 1-P
	W5HN (W5DBY, N5QGH, ops)	386	5	3	47-I	
6	WA6CGR	27,965	104	30	510-I	139-J
	K6GZA	13,993	73	26	770-I	145-J
	W6OYJ	12,524	75	36	499-I	147-J
	AA6IW	11,513	75	22	420-I	145-J
	N6IZW	8,925	30	20	832-I	2-J
	WB6DNX	8,615	55	28	694-I	147-J
	WA6EXV	7,252	44	20	694-I	124-J
	WA6QYR	6,130	29	18	695-I	124-J
	WA6JBO	5,958	43	15	210-I	147-J
	KC6QHP	5,498	27	20	329-I	20-J
	WB6BKR	4,655	24	22	266-I	16-J
8	NE8I	3,450	25	13	265-I	180-J
	WA8WZG	3,279	19	10	321-I	16-J
	WA8HGX	2,011	21	8	117-I	91-J
9	WB9SNR	1,740	7	5	325-I	179-J
0	NOUGY	19,265	167	10	246-I	19-J
	W6HCC	707	8	2	120-J	
VE	VE3SMA	4,440	40	15	218-I	18-J

QST

Revised 1999 June VHF QSO Party Rover Scores

A data-reporting problem with the June 1999 ARRL VHF QSO Party resulted in an incorrect table being created for the rover cat-

egory scores printed in the **January 2000** issue of *QST*. The Top Ten Box and the rover scores in the Region Box were correct as printed in

the original article. We apologize for the error. The following are the corrected 1999 ARRL June VHF QSO Party rover scores:

Atlantic										
N3IQ (ND3F,WA3ZKR,ops)	302,341	801	169	R	12	ABCD9EFGHIJ				
W3EKT	141,702	804	113	R	4	ABCD9E				
K3QII (+W3IKE)	69,687	386	89	R	4	ABCD9EHIJ				
N3LJK (+K3YWY)	43,803	328	93	R	4	ABCD9E				
N2OPW (+KB2VGH)	18,207	135	53	R	10	ABCD9EFGHJP				
N1MU (+KC2DXZ)	14,337	152	59	R	7	ABCD9EFG				
K2OEQ	408	21	17	R	3	ABD				
Central										
WB9SNR	51,615	257	105	R	6	ABCD9EFGHI				
KF9US	27,872	254	61	R	6	ABCD9E				
K9JK	9,800	116	44	R	4	ABCD9E				
K9GEM (+KS9WI)	7,426	139	47	R	12	ABD				
N9KS	4,563	117	39	R	11	AB				
N19U	1,462	43	34	R	5	AB				
Dakota										
KF0UK	36,660	326	78	R	12	ABCDE				
WA2VOI	17,450	213	50	R	14	ABCD9EFGH				
W9FZ	8,400	132	42	R	5	ABCD9EF				
KB0RXR	36	9	4	R	2	A				
Delta										
WA4YRK	3,570	70	51	R	4	ABDE				
NT4L (KQ4TV,KB4IDC,ops)	1,702	45	37	R	9	ABD				
KD4NOQ (+N4LGY)	1,702	57	23	R	4	ABCD				
Great Lakes										
AB4CR (+W8ULC)	134,656	460	128	R	7	ABCD9EFGHIJ				
K8WW	72,736	447	102	R	9	ABCD9E				
N4STK	59,254	236	86	R	7	ABCD9EFGHIJ				
NE8I	15,024	121	48	R	4	ABCD9EFGHIJ				
AA4R	5,040	109	40	R	4	ABD				
Hudson										
N2GXH	20,250	172	54	R	6	ABCD9EFGHIKL				
N2MH	9,310	200	38	R	5	ABD				
N2OPJ (+KB2YZA)	658	39	14	R	3	ABD				
KF2XY	32	5	4	R	1	BD				
Midwest										
W0EEA (+N9KC)	19,295	149	85	R	9	ABCD9EJ				
KB0YFN (+KB0WPY)	1,680	47	35	R	4	ABC				
K0VSV	336	17	16	R	3	BD				
K5XY	20	4	5	R	2	B				
New England										
N1MJD	112,409	634	121	R	14	ABCD9EF				
N11SB (+N2ZVI)	16,200	147	50	R	6	ABCD9EFGHIJ				
KJ1K (+WB2VVQ)	15,147	190	46	R	5	ABCD9EFGH				
W1RH (+N1UVA)	9,936	160	44	R	2	ABCDE				
W1AIM/R	4,025	115	35	R	3	AB				
K1LPS	3,080	88	35	R	5	AB				
N1YR	182	9	7	R	0	B9EFG				
Northwestern										
AA7VT	22,540	299	49	R	5	ABCD9EGH				
WB7DHC	19,584	291	51	R	9	ABCDE				
N7CFO	17,608	219	62	R	7	ABCD				
KC7ULJ (+KB7UEP)	13,920	195	42	R	6	ABCD9E				
N7EPD	3,872	95	32	R	3	ABCD				
KF6LT	900	38	18	R	4	BCD				
Pacific										
KE6BZY	17,505	258	45	R	7	ABCDE				
KB0LL (+KC6UDS)	9,320	148	40	R	10	ABCD				
WHTQ (ND3A,op)	128	13	8	R	2	ABD				
Roanoke										
W4VHF (+K4MQG)	60,701	506	96	R	5	ABCD				
N4OFA (+KB4NVD)	44,411	369	89	R	9	ABCD9				
Rocky Mountain										
KC5YXB	12,036	169	68	R	4	ABD				
N3EUA	8,580	113	60	R	4	ABD9E				
N7VM	8,134	149	49	R	5	ABD				
K3OCY	1,292	38	31	R	3	AB				
KC7OUP	340	24	10	R	3	BD				
Southeastern										
NK4Q	11,620	117	83	R	3	ABD				
WB0QGH (+WB4HJG)	1,792	38	32	R	4	ABCDE				
W4OZK	1,062	50	18	R	4	BD				
WP4KOE	28	14	2	R	0	B				
Southwestern										
N6DN (+W6KK)	49,770	455	73	R	6	ABCDE				
AL1VE	24,544	201	104	R	29	ABD				
KF6FZZ (+KF6FZY)	15,050	235	43	R	6	ABCD				
KB6FYG (+KB6HVO)	11,816	183	56	R	0	BCD				
WB6JDH	9,982	277	23	R	4	BCDE				
AD6AF	3,519	147	17	R	4	ABD				
K0SMU	2,688	61	32	R	4	BCD				
KA6T	2,624	127	16	R	5	BC				
West Gulf										
W5DF (+AB5SS)	66,204	374	108	R	15	ABCD9EHIJ				
WB5VYE (+K5OT)	45,356	333	92	R	16	ABCDI				
K5LHF	27,978	238	104	R	2	BCD				
KB5VPR (+W5JDS)	17,040	170	71	R	9	ABCDE				
Canada										
VE3NPB (+VE3OIL)	55,483	328	113	R	8	ABCDEFGHI				
VE5OIK (+VE5SMA)	41,921	236	103	R	4	ABCD9EFGHI				
VE6ERW	1,512	43	28	R	8	ABD				

QST

NEW BOOKS

NIKOLA TESLA: GUIDED WEAPONS & COMPUTER TECHNOLOGY

By Leland I. Anderson

First edition, second printing. Copyright 1999 by Twenty First Century Books, PO Box 2001, Breckenridge, CO 80424; tel 970-453-9293; <http://www.tcfbooks.com/wholesale/>. Hardcover, 6 x 9 inches, 262 pages. \$31.95.

Reviewed by Steve Ford, WB8IMY
QST Managing Editor

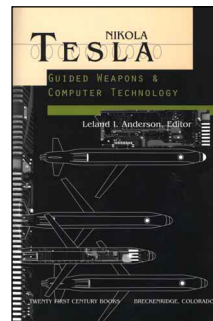
◊ *Nikola Tesla: Guided Weapons & Computer Technology* offers a unique insight into a man many consider to be one of the foremost inventive geniuses of the 20th century. Some believe, for example, that Tesla was the first to conduct experiments in what would later be known as radio—although Marconi is often credited in the history books as the “father of radio.” Whatever historical disputes may exist, nearly everyone recognizes Tesla’s brilliance. Like Leonardo da Vinci, Tesla pioneered technological concepts that would not come to fruition until well after his death. In Tesla’s case, however, the period between idea and reality was measured in decades rather than centuries.

It is important to emphasize that *Nikola Tesla: Guided Weapons & Computer Tech-*

nology is not a biography. Instead, the book focuses on groundbreaking ideas that Tesla was exploring in the late 1800s and early 1900s. One of these concerned Tesla’s “System of Signaling,” which involved several tuned circuits (each designed for a different frequency) and a receiving apparatus that would respond only when certain combinations of tuned circuits were activated by a transmitter. This is the fundamental concept behind such modern techniques as selective calling, radio remote control and, in a functional sense, the AND logic gate.

As it turned out, Reginald Fessenden had been working on a similar idea and had filed a patent at nearly the same time as Tesla. The US Patent Office investigated the apparent conflict and took depositions from Tesla and his associates in 1902. In *Nikola Tesla: Guided Weapons & Computer Technology* Leland Anderson reproduces the actual transcripts of the depositions. It is interesting to read Tesla’s own descriptions of his work, especially considering the fact that so little of his writing—and none of his early lectures—has survived.

Anderson also includes detailed information concerning Tesla’s work in remote control, including a number of drawings and photographs. Included in the collection is the small boat that Tesla operated by



wireless remote control in New York City’s Madison Square Garden in 1898-99.

In the appendix of *Nikola Tesla: Guided Weapons & Computer Technology* you’ll find reproductions of several Tesla patents. The patents were reproduced photographically from the original documents, so the type is small and difficult to read. They are fascinating nonetheless, especially Tesla’s 1905

patent titled “The Art of Transmitting Electrical Energy Through the Natural Mediums.”

Nikola Tesla: Guided Weapons & Computer Technology is a scholarly work; it isn’t intended for a nontechnical audience. When reading the depositions, for example, you must grapple with the technical terminology of the time. Here is Tesla’s description of a “tuned circuit:”

“The word ‘tuned’ is now adopted to designate a circuit having a period of its own which is the same as the period of oscillation impressed upon it, or which is, as the case may be, a harmonic of the same.”

This book is a rich resource for hardcore Tesla fans. No doubt they’ll want to add this work to their collections. Students of early radio history in general, or of Tesla in particular, will also find *Nikola Tesla: Guided Weapons & Computer Technology* to be a valuable reference.

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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
NCSS	Net Control Station
NM	Net Manager
NTS	National Traffic System
OBS	Official Bulletin Station
OES	Official Emergency Station
ORF	Official Relay Station
OO	Official Observer
OOO	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
VCE	Volunteer Consulting Engineer
VE	Volunteer Examiner

ATLANTIC DIVISION

DELAWARE: SM, Randall Carlson, WB0JXX—As you know the FCC has issued its Report and Order concerning the restructuring of Amateur Radio licenses, and will be effective April 15, 2000. Whether you agree with it or not, we all must reconcile to it and move forward. We must move away from the idea that the value of an Amateur is determined by the class of license they hold or the requirements they had to pass to get it. We must see that an Amateur's true value is determined by how they use their license and what they give to the hobby, to the community, and to themselves. We must move from a situation where regulatory requirements and privileges were used to motivate improvement to one where self-investigation and curiosity are the driving force behind incurring new skills and improving old ones. In the upcoming months, many hams will be exposed to new bands, new privileges and new modes. We must encourage them and teach them, so that we all get maximum enjoyment from the hobby. For those of you that love CW, consider the fact that because of these changes, its quite possible that more amateurs not less will have at least a minimum exposure to code. It's now up to you to take the next step to encourage your fellow amateurs to improve their skills, and keep the hobby viable. I am sure you are up to the task. It's amazing how much more fun something is when you want to do it rather than have to do it. 73, Randall.

EASTERN PENNSYLVANIA: SM, Allen R. Breiner, W3TI—SEC: Eric Olena, WB3FPL, ACC: Steve Maslin, N3ORG, OOC: Alan Maslin, N3EA, PIC: E. Max Peters, K16NJ, STM: Paul Craig, N3YSI, TC: Cully Phillips, N3HTZ, SGL: Allen Breiner, W3ZRO, ASMs: KB3CFV, N3YSI, WB2YGA, K3TX, N3KYZ, WB3FQY. After many years of faithful service, Harry Thomas, W3KOD, Mr Traffic of EPA, resigned as STM. Paul Craig, N3YSI, very active in section NTS, has accepted the STM appointment. Jim Antonacci, WA3EHD, manager for the Eastern Pennsylvania Emergency Phone and Traffic Net since 1981, resigned in order to take over the responsibilities as president for the National Federation of the Blind in Pennsylvania. Needless to say, we are grateful to each for their many years of service to the section and NTS. Bill, WY3K, resigned ASM due to his work schedule. KB3CFV volunteered and had been appointed ASM as replacement. The first Y2K cabinet meeting will be held on April 2. Amateurs with any items reference to EPA section policy, comment or ideas should send them to any of the above listed cabinet members. The FCC RM-9115 petition from ARRL regards to joining forces between RACES and ARES members has been denied. With the difficulty in getting volunteers for emergency service, Eric, WB3FPL, SEC and W3TI, SM, ask all ECs to continue with the present system of acknowledgment and cooperation between both groups. N3ORH has stepped down as SKYWARN coordinator for Chester Co and is replaced by KQ6TWO, assisted by N3ZRR and KB3CXD. Holmesburg ARC members did not paddle after George Washington across the Delaware this year, instead instituted a club project of fabricating a "poor man's paddle" for promulgation of CW. The University of Pennsylvania ARC repeater on Forkston Mt is up and running with excellent reports. After being destroyed by lightning, the Jonesstone Mt Repeater has been reactivated with the technical expertise of

K3FUT, K3EVQ, N3USY, W3EME, KB3VS, WB3FKQ and K3TOW. A recent issue of the Pennsylvania APCO bulletin featured an excellent article on ARES/RACES written by W3AG, former EC for Montgomery Co. Hamfest sessions are again in full swing and we hope to attend as many as possible. Don't forget June 10 for the second annual ARRL EPA Section Convention at Bloomsburg and stop by the big red SM banner and say hello. The annual Del-Lehi ARC special event station, WX3MAS, netted 346 QSOs due to efforts of N5ZXQ, KC3QO, KA3MOU, N3NGL, W04H, KB3DNA, KB3DFW, N3ULW, N3ZSR, N3SNZ, N3QZT, N2DH, W3BUD, KN3DZY, KE3NN, KB3BYU, KB3DXJ, N3YET, KE3AW, KA3JWE and K3YD. Tfc (Dec): W3KOD 651, W3IVS, N3YSI, W3IPX 148, W3JXK 106, W3HK 105, N3EFW 81, K3AEB 78, N3HR 68, W3UAQ 64, K3TX 61, W3BNR 41, WA3EHD 35, N3AO 30, N3AT 30, KB3BBR 25, K3CKO 20, KB3CKD 20, N3JSO 16, W3TI 15, W3NNL 13, KB3CEZ 12, N3AS 10, KA3LVP 9, W3TWV 9, K3ARR 4, W3ZQN 4, AD3X 3, KB3COV 2, W3DAB 2, N3KYZ 2, N3ZXE 1. Net reports: EPA 270, EPAEP&T 162, PTTN 166, HBSN 129, PFN 83, MARTN 28, SEPTN 23, EPAS 2, D4ARES 1, LCARES 1, MOES 1.

MARYLAND/DC: SM, Bill Howard, WB3V, wb3v@arrl.org—MDC Section Web homepage users.eroils.com/wb3v/mdc/ GARR EC K3JW reports 6 members, 4 sessions of the Garrett County ARES Net were held on 147.105 with liaison to MEPN and 2 Y2K related tests were conducted with on-site standby operators at the EOC and Garrett Memorial Hospital. Jerry, Bea and Lyman served as standby operators at the hospital. MONT EC K3XO reports Montgomery ARES operated a "Y2K Watch Net" using the new 146.955 repeater. Special thanks to K3CSX and W3CYQ who served as Net Control Ops, and thanks to all who participated. Montgomery ARES membership is now 61. WASH EC KD3JK reports 27 members. The WASH ARES/RACES Net and Four States Net meet Tuesdays on 146.940 and Thursdays on 147.090 at 1900 hours local time with liaison to MEPN. Ten net sessions had 71 check-ins. WASH ARES/RACES members provided support to the local Emergency Management Agency/Civil Defense, beginning the Y2K roll over with an early call up of the net which later transitioned into a RACES net. PRGE AEC W13N reports the PRGE EOC ARES/RACES radio room was staffed by N3KHK W13N KA3KJF and WA3RWP. WB3KXJ N3TKN, and N3JMK operated from the Cypress Street Rec Center, one of two shelters activated by the city. N3GXA and N3WSG operated from the other shelter at the Phelps Center on Montgomery St. W3YD and W3LML operated under the club call W3LRC from the disaster operations room at the Laurel Hospital. The following were on duty at the Doctor's Hospital: KD3JA and KB3EDH. KB3EBN and N3RLN operated from the Windsor Green substitution. N3ODK, and N3NCH operated from the Springhill Lake substitution. N3JWT and N3VG operated from the Greenbelt Main Police Station. HOWA RO WA1QAA reports that ARO K3EF and RO WA1QAA supported the Y2K transition period from the HOWA EOC. HOWA ARES/RACES members W1TRT K3NNI K3UOD KB3EAF KF3BO WA3WZX W3CCI W3GJN W4W0I W8AJR W8AAS, and N3ZJB checked in to the local net sessions held on the 147.135 repeater. 73 - Bill and with the nets: NET/NET MGR/QND/QTC/QNI: MSN/ KC3Y/31/51/319, MEPN/N3WKE/31/119/672, MDD/W3JK/62/353/787, MDD Top Brass K3JE 306, AA3GV 147, K3JL 153, BTN/AA3LN/31/67/411, SMN/KE3OX/no report, Tfc: K3K3F 1875, K3JE 612, AA3GV 165, W3YVQ 122, AA3SB 113, KB3AMO 79, WB4FDT 77, N3WKE 74, K04A 66, N3KGM 58, N3WV 56, N3DE 52, W3CB 49, KC3Y 44, WA1QAA 40, W3VK 28, N3ZKP 25, KD3JK 21, N3EGF/17, K3CSX 16, WA3GYV 9, W3FZT 7, WA3WRT 5, Jun, AA3GV 8, Jun, WB4FDT 110. PSHR: K33F 191, K3JE 152, W3YVQ 148, AA3GV 139, AA3SB 138, N3WKE 134, W3VK 130, W3CB 125, KB3AMO 122, N3WK 118, N3ZKP 114, KD3JK 104, K3CSX 101, K04A98, KC3Y 84, WA1QAA 79, Jun, AA3GV 126.

NORTHERN NEW JERSEY: SM, Chuck Orem, KD2AJ—Web: <http://www.northernnet.org/nyh.htm> ASMs: KD2AJ, WB2KLD, N2ZMS, WA2RLW, ACC: WZ2T, BM: KA2JKI, OOC: N2MX, PIC: N2SZK, SEC: KF2CG, STM: N2ZGN, TC: N2JKG. Congratulations to KB2LML for his upgrade to DEC for Clinton, Essex and Franklin Counties and also to KC2ALG for his appointment to EC for Clinton County. I can not say enough for the way our ARES/RACES groups turned out for the Y2K activations. St Lawrence, Clinton, Essex, Schoharie, Fulton, Montgomery were all covered by county RACES groups. Franklin County was covered by the Tri Lakes ARES group. I monitored most of the frequencies and it was just a great effort by all. There will be a NNYARA/CABINET meeting on the 4th of March in Schoharie County EOC. Hope to see many of you there. I would like to see more of you sending in Public Service Honor Role (PSHR) activity reports. CVARC Hamfest April 28 at Plattsburgh, NY. 73, KD2AJ.

SOUTHERN NEW JERSEY: SM, Jean Priestley, KA2YKN (@K2AA) e-mail: ka2ykn@arrl.org—ASM: W2BE, K2WB, W2OB, N2OO, SEC: N2SRO, STM: WB2UVB, ACC: KB2ADL, SGL: W2CAM, OOC: K2PSC, PIC: N2YA, TC: W2EKB, TS: W2PAU, W2BE, WB2MNF, KD4HZW, WB3JUB, N2QNX, N2XFM, WA2NBL, AA2BN. Waiting for the coveted test or are you coming off the walls because you had to and they don't? Yes, change is hard to deal with, but change keeps life from stagnating. I hope to see a great influx of good people into ham radio who would not be able to deal with the code but have much to offer. Try this: <http://www.qsl.net/ps7zz>. It will make you smile. I want to remind everyone to register in the ULS system. If you don't have e-mail, ask a friend or go to your library. It's important to not wait. With Y2fizzle out of the way, what are we going to talk about? Remember, just because Y2K is past, we still need to be "E" ready (emergency). March of Dimes and other agencies will be having walks for the spring. Net Manager QNI reports: NJPN 194 NJM 199 NJN/E 232 NJN/L 193 NJSN 139 SJVN 367. Tfc: WB2UVB 452, KB2RZT 382, WA2CUW 356, K2UL-4 202, AA2SV

126, K2UL 99, KA2CQX 59, N2VQA 42, N2WXF 39, W2AZ 37, WX2N 29, N2WFN 25, WA2JSJ 12, KB2YJD 10, N2ZMI 6, N2AYK 4, KB2VSR, KB2YBM, KC2ETU 1 each.

WESTERN NEW YORK: SM, William W. Thompson, W2MTA—This 231st column is my swan song as Western New York Section administrator for all you WNY folks since 1980. HAMFESTS 2000: May 6, ARRL National @ Dayton May 19-21, Atlantic Division @ Rochester June 2-4, Cortland June 10, NTS Traffic Handlers' Picnic July 29, Ithaca August 5, Lancaster August 13, Buffalo September 23, Elmira September 30. CLUB OFFICERS/DIRECTORS: Allegany HARC KW2J K3QBU N2WDS K2UOB; Binghamton Area WB2GHH N3VKM N2PQR N2NCB; DuBois W2GIV N2MKT W2TRW KB2UPO N2MFK K2MPE N2COJ N2JC; MOARC KC2CYD KC2CVO N2TSF KC2BHM/KC2AOA WB2CLK WB2RAD; Orleans N2LUV K2ZUT KB2RMO KA2BQF/KA2BCE; Skyline N2MRE KB2LUV KB2AED W2JYS KC2BCZ; Tompkins Co. KB2SGX KC2DYR KB2ETO N2MBN. APPOINTMENTS: (OO) W2EB. Silent Key reports: Waverly and ECARS will miss their secretary Ann, KA2ACF, and W2JVT; Elmira lost K2DNN and W2KJL; RARA lost W2ATX. (Dec.) BPL KA2GJV KA2ZNV KB2WII KF1L N2LTC W2MTA. DATALINK: KA2GJV RX36/TX18, N2LTC RX445/TX286, NY2V RX5/TX6. Be sure to register with FCC's Universal Licensing System (ULS) using FCC Form 606 if by mail, or via the internet with www.fcc.gov/wtb/uls. Use FCC Form 605 for all mail applications. FCC Forms are available at <http://www.fcc.gov/formpage.html> or [ftp://ftp.fcc.gov/pub/Forms/](http://ftp.fcc.gov/pub/Forms/) or by fax 202-418-0177 (request the index). The FCC Forms Distribution Center at 800-418-3676 will also accept orders. To obtain further information about the ULS, go to <http://www.fcc.gov/wtb/uls/browser.html> (see the section there called Getting Connected). Have Social Security Number handy when you're doing transactions with FCC, that's your ID Number (TIN).

Net	Time	QNI	QSP	QND	Net	Time	QNI	QSP	QND
EBN	0530	484	000	23	#STAR	1830	339	021	30
NYSEMO	0900	073	008	04	#WNB-E	1830	573	156	31
NYSCN	0930	017	008	04	#NYS-E	1900	367	244	31
#NYS-M	1000	208	106	31	OAMEN	1930	020	003	02
#WDM-N	1100	545	112	31	OCERN	2000	040	006	05
CHN 1100	228	048	31		TIGARDS	2000	019	004	04
#NYPHONE	1300	232	471	31	STTHN	2000	042	014	09
#NYPON	1700	348	269	31	BRVSN	2100	149	005	31
ESS	1800	391	104	31	#CNYTN	2115	366	107	31
NYSPTN	1800	375	051	31	#OCTEN-L	2130	627	310	31
#OCTEN-E	1830	1589	323	31	#WDM-L	2130	480	091	31
# Denotes NTS Net.									
					#NYS-L	2200	283	254	31

* Denotes Public Service Honor Roll. ARES (Nov.): OMEN 020-002-02, Traffic (Dec.): N2LTC*1512, KA2ZNV*682, W2MTA*591, KA2GJV*529, KF1L*524, WB2JH*420, NN2H*356, WB2QIX*275, KB2WII*253, W2FR*227, W2PIL*226, W2G*215, NY2V*142, K2GTS*133, K2G2*132, KB2VW*126, N2KPR*90, KA2DBD*85, AF2K*68, N2CCN*66, KC2EOT*66, AA2ED*61, N2WDS*53, N2JRS*38, KB2ETO*36, KB2UOZ*33, K2DN*23, W2LC*18, WA2UKX*17, NY2CO*13, W2RH 13. (Nov.) KB2UOZ 31. To all you Caesars out there, 73.

WESTERN PENNSYLVANIA: SM, Bill Edgar, N3LRL—ASM: N3MSE, ACC: open, ASM-ARES: WB3KGT, SEC: N3SRJ, ASM-Packet: KE3ED, ASM-Youth & Education: KE3EE, OOC: KB3A, PIC: W3CG, STM: N3WAV, TC: W3R4W, DEC-SO: KD3OH, DEC-N1: N3QCG, DEC-N2: KA3JVC, DEC-S1: KA3HUK, DEC-S2: N3BZW, DEC-Rapid Response: N3JHJ. Certainly glad to see that December 31st came and went safely and without any major incident. Hams got good press with the various news services wanting to talk to us to make sure that we would be there to provide backup communications if needed. We probably had more hams ready to help out their communities on one day than any other date. Thanks for volunteering your valuable time this past New Year's! You made Amateur Radio look good! As an aside, I'll bet we'll all find good bargains on generators later this year. Hi! The license class restructuring news is out on the street now. Probably THE most sweeping changes to the hobby. Regardless where we stand on the issue, pro or con, the decision has been made. The way I see it is that this is an opportunity for the amateur community. The time is opportune for clubs to offer upgrade license classes in code, the higher license classes theory and also for clubs to demonstrate the proper ways of operating on HF bands. I expect that we will see more participants in our various nets. If your club needs a topic for a club meeting, feel free to contact me for some ideas. There are some programs that I can present to clubs or to make available to clubs. Let me know early enough so that we get assure time within the schedule.

CENTRAL DIVISION

ILLINOIS: SM, Bruce Boston, KD9UL—SEC: W9QBH, ACC: N9KP, STM: K9CNP, PIC: N9EWA, TC: N9RF, OOC: KB9FBI, DEC-Central: N9FNP, DEC-S/W: KB9AIL. Thanks to all the Amateurs and ARES members who were ready and willing to provide assistance for potential Y2K problems. Reports from around the Section indicate a significant number of participants were on standby, and many groups made extensive plans in preparation for the event. Winnebago Co ARES EC N9OCW stated in his report, "Overall, it was a very successful mission and our ARES team performed as well as expected. While it was harder to get volunteers to staff the sub-stations than I expected, those that did help did an excellent job and we may find ourselves being used more in the future." In other section news, N9ALC received the 160 WAHM Award (Worked All Hamfesters Members) for working 160 members on two meters. The award, which

Continued on page 120.

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High-performance, low power TNC.
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- Wide receive 130-180 MHz
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- Full-sized, backlit keypad
- 5 watts RF output

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- 6 character alphanumeric display
- Crosband repeat • Auto repeater shift
- CTCSS enc./dec. • CTCSS tone scan



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- Gen Cov Rx 150kHz-30MHz
- Ham Band TX 160-10M
- CW filter + keyer optional
- Hand mic included • 13.8V DC



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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)



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- 100W 160-10 Mtrs • 100W 6M, Gencov. Rx
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40"/20"/17/15/10/6/2M/70cm
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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.

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Visual Communicator

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- Digital Filtering (no opt. filters req.)
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TM-D700A 2M/440 Dualband

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- SSB, CW, AM, FM, • 12V Gen. Cov. RX.
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- 3 display panel screens
- All Modes
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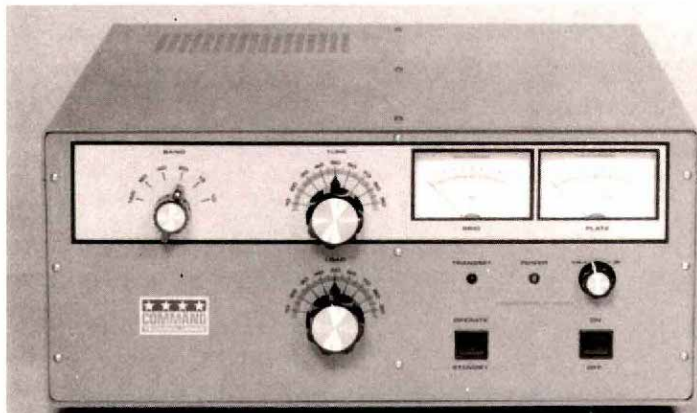


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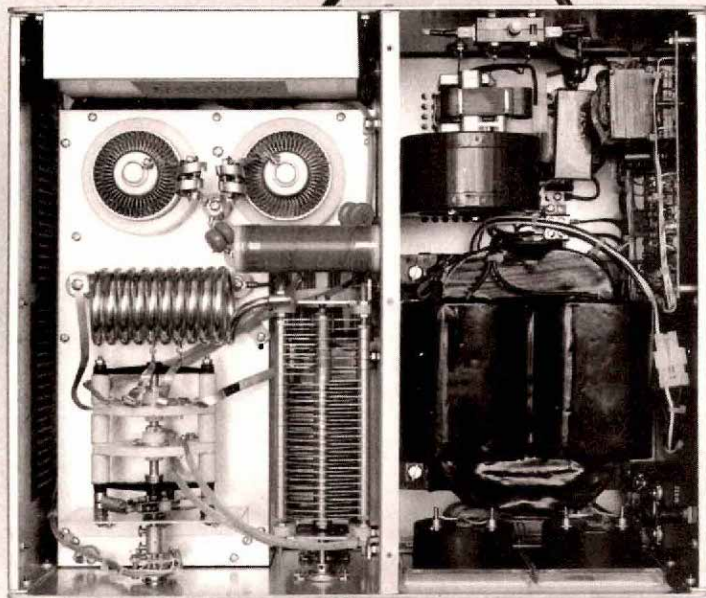
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has been around for some time, is a fun way for club members get to know one another by making contact with each other. There is no charge for the award, and any licensed Amateur can get one, even if they are not a member. All they have to do is keep a log of contacts with current Hamfesters members. An award is issued when they turn in their log with 10 contacts (5 contacts for those out of state, 3 contacts for those living outside the US) Those who make 100 WAHM contacts receive a plaque. Hamfesters officers for 2000 are Pres K9PB, VP NF9N, Sec WB9ZH, Trea WB9USF. Western Illinois ARC plans to hold their Field Day event at Quincy's Upper Moorman Park. New officers for the Schaumburg ARC are Pres N9SQT, VP W9ZJX, Sec WD8BDP, Trea KA9ZKR. The SRC newsletter contained a review of their public service work in 1999. Over 437 hours were devoted by 24 members on five scheduled events, as well as two additional events where SRC assisted other coordinating clubs. The group plans to help on at least six community events this year. The final tally for the 75th anniversary special event station has been announced by the Fox River Radio League. Twenty-four FRRL members made a total 1,003 contacts, working all 50 states and many countries. Egyptian RC officers for 2000 are Pres N9OQK, VP KB9OHJ, Sec K2KFW, Trea KB9AIL. To have your club activities mentioned in this column, be sure to put the Section Manager on your club's newsletter mailing list. One additional report on Y2K activity comes from Montgomery Co. ARES EC WA9RUM: We had our county covered for Y2K December 31 with 21 operators on alert. Our net control was in contact with three other counties; one having direct contact with the Illinois State Police. All went well until 12:00. At that time a sign fell off the wall that had been hanging there for a long time. An investigation determined that the scotch tape holding up the sign was NOT Y2K compliant. December traffic: K9CNP 151, W9HLX 113, WB9TVD 35, N9DT 33, NC9T 22, KA9IMX 19, W9FIF 7, WA9RUM 6. ISN Report de WB9TVD for 12/99, QNI-246, QTC-105, Sessions-31. W9VEY Memorial Net de K9AXS 6 with 200 check-ins.

INDIANA: SM: Peggy Coulter, W9JUU - SEC: K9ZBM. ASEC: WA9ZCE. STM: N9ZZD. OOC: KA9RNY. SGL: WA9VQO. TC: W9MWY. BM: KA9QWC. ACC: N9RG. Sympathy extended to the family and friends of Silent Key: 12/26, Forest C. Kientz, W9UCT, Fairmount. He will be missed. I have mentioned this Year award winner, for the IRCC State Amateur of the Year award. Send to me at address on page 12. Congrats to Wade Kingery, W9JGZ receiving the Indpls Radio Club Amateur of the Year award. In reading the Tippecanoe ARC Newsletter, I must say they had a Y2K problem. Every Y in the newsletter was changed to K. Real interesting four pages both sides of paper. Congrats to Kevin McNeely, KB9CRA, for being recognized as Grant Co AR Club's Amateur Radio Operator of the Year. The Clark Co ARC had a successful Special Event Station at Bethlehem, IN making around 188 contacts with 33 states and 2 countries, Chile and Canada. Reports are very slow coming into K9ZBM. The ECs need to make the activities report each month and now an annual report. We thank Gary Kletz, KB9DLZ, Porter Co. EC for reporting the ARES activities on the Public Service Report Form. ECs reporting this month were N9VXV, N9IOD, N9YNF, N9KQD, WA9DOL, WB9NCE, KG9LX, WB9UNL, K9DIY, KB9BBI, KB9OLZ, KB9NZE, N9SFW, K9GPS and N9ADS. If your EC isn't listed, tell him you want him to send in a report. NMs ITN/W9ZY, QIN/N9PF, ICN/K8LEN, WN/AB9AA, VHF/N9ZZD.

Net	Freq	Time/Daily/UTC	QNI	QTC	QTR	Sess
ITN	3910	1330/2130/2300	2850	501	1727	93
QIN	3656	1430/0000	139	40	377	32
ICN	3705	2315	148	39	545	31
IWN	3910	1310	2153	-	310	31
IWN VHF Bloomington			500	-	465	31
IWN VHF Kokomo			650	-	55	31
IWN VHF Northeast			1062	-	620	31
Hoosier VHF nets (12 nets)			748	48	1308	65

D9RN total QTC 226 in 62 sessions. IN represented by W9UEM, K9GBR, WB9QPA, KB9NPU, K9PUI and KA9UB9YRN total QTC 357 in 62 sessions. IN represented by K9PUI, K09D, AA9HN, N9PF, WB9UYU, WA9QCF and W9FC 9RN. Tfc: W9FC 419, K9PUI 130, K09D 128, W9ZY 103, WB9QPA 102, K9GBR 98, N9ZZD 75, WA9QCF 73, W9UEM 65, AB9AA 56, W9JUU 49, KB9BPU 38, N9PF 36, KA9EIV 35, N9WNH 34, K8LEN 29, K9RPZ 20, KA9QWC 20, W9BRW 18, AA9HN 11, W9EYH 9, WB9NCE 6, K9DIY 6, AB9A 4, KA9DIG 4, K9CUN 2, K9OUP 1.

WISCONSIN: SM: Don Michalski, W9IXG—SEC: WB9RQR. STM: K9LGU. ACC: KF9ZU. SGL: AD9X. OOC: W9RCW. PIC: K9ZZ. TC: K9GDF. ASM: K9UTQ, W9RCW, W9CBE. BM: WB9NRK. It is with deep regret that I inform you of the passing of Harvard Hamer, K9YHO. Harvard was a member and first president of Yellow Thunder ARC. KG9OZ has changed his call to K9LO. Wisconsin Valley Radio Association is considering having a special event station to commemorate the 150th birthday of Marathon County on April 1. BSSS will continue printed version of paper for 2 more years, minimum, along with Web version at www.bssss.org. Governor Thompson addressed Wisconsin hams on 40M from W.E.M. on December 16 to thank everyone for Y2K help. The Governor enjoyed the QSO with Stan Kaplan and other hams around the State. Photos and wave audio playback are available at <http://w9yt.wisc.edu/gov.html>. We thank everyone who helped during the Y2K event! Sam Rowe, KG9NG, has been appointed Assistant SEC and ARO for Wisconsin by Stan Kaplan. Congratulations to Sam! New HVARC president is Tom Lauraitis, KB9SJC. Foundation for Amateur Radio will give seventy three scholarships to hams going to college or tech school. Three Wisconsin clubs—WARAC, SMARC, & Ozaukee ARC have offered awards to FAR. We thank them! Apply to: FAR Scholarships, POB 831, Riverdale, MD 20738. Big Brothers Big Sisters would like hams to open their shack for one hour to a kid and their BBBS volunteer. This would be a perfect opportunity to demonstrate ham radio to youngsters without a full commitment to BBBS! I wish to establish a network of participating amateurs. Contact me, if interested in joining this worthy program. 73, Don, w9ixg@arrl.org. Tfc: K9JPS 1202, W9IHW 955, W9RCW 627, W9PPY 603, K9GU 466, N9TVT 417, W9CBE 218, K9FHI 190, K9LGU 142, WZ7V 141, W9WU 118, N9BDL 98, N9CK 96, KB9QPM 94, N9KHD 76, W9YCV 75, AG9G 64, KE9VU 54, KB9ROB 51, AA9BB 41, KG9B 38, KA9KLZ 37, K9HDF 36, W9BHL 29, KN9P 28, WB9ICH 25, KA9FVX 17, N9JY 9, K9UTQ 8, W9PVD.

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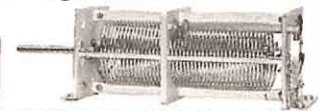


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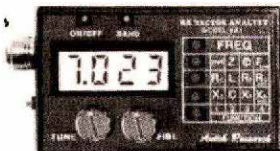
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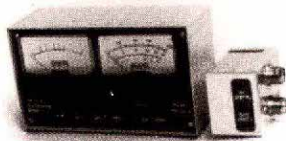
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DAKOTA DIVISION

MINNESOTA: SM, Randy "Max" Wendel, N0FKU—St Paul ARC held their annual auction on Jan 14. Stillwater ARC held their Xmas party on Jan 8 at QTH WAOKKE. Bloomington and Waseca held their party Jan 15. I'm sad to report SK Larry Evenson, KBORZZ, of Wannamingo the beginning of January. Larry was a member of the Hiawatha Valley ARC and also an ARES Assistant EC in Goodhue County. Larry was active with the club, ARES, and SKYWARN. He will be greatly missed. It's not too early to start putting Field Day in the back of our minds. Don't forget to mark on your calendar the Rochester Hamfest April 8 held again at the fairgrounds. Check out their GREAT Web site <http://www.members.aol.com/rarchams>. John Reed, K0KTY, does a very professional job on their Web site! I have been slowly putting some links on my Web site to other club sites. If you wish to be added to my list, please e-mail me your URL. My contact info is on p.12 of each QST, and you can find my web site at: <http://www.pclink.com/rwendel>. I have a page dedicated to communications links for various services and interests. 73 for this month of Randy Wendel, N0FKU. Tlc: W0GRW, WA0TFC, KA0AII, W0LAW, W7HH, K0PIZ, W0HPD, K9NU, W3FAF, K0WPK, KA0IZA, KBOAJI, W0WVU, W0OOI, W0DQUG, W7HHH, N0JP.

NORTH DAKOTA: SM, Bill Kurtti, W0CM—CDARC. Hamfest Feb 26 at St Mary's Grade School Bismarck Fargo Hamfest Mar 11, Dealers, Swap Tables, Meetings & much more, Peace Garden Hamfest July 9-11. Great place to visit with your friends at these Hamfests with dealers, swap tables & meetings planned also. Sorry to report that N0HOW is a Silent Key. I attended the Fargo & Bismarck Christmas parties. Gained 3 lbs in the process. Lots of fun with good food. Three of the Packet BBS's in our section are now Y2K compatible expect the others will be soon also. Dickinson Hams are starting new Ham classes. That's one of the things that it takes to keep a club going. Grand Forks Hams launched another balloon, but due to the heavy load it only got to 30,000 ft. Then the parachute failed to open damaging the cargo. Tlc: N0RDJ 7. Nets: Sess/ONI/QTC/Mgr: Goose River, 1895 kc 8:30 AM Sun 4/53/0/KE0XT; DATA, 3937 kc 6:30 PM daily/31/612/20. KE0XT; WX Nets, 3937 kc 8:30 AM 12:30 PM 56/1158/47 KE0XT. Storm Net, 3937 kc- continuous as needed during storms.

SOUTH DAKOTA: SM, R. L. Cory, W0YMB—The New Year's Eve QSO party was held as it has been for over 20 years. The result was 14 states and 63 checkins. We had a great time, but missed hearing many who are Silent Keys. There would have been more on, but the band was not open to California. It was also a Y2K emergency net, but as expected, there was no Y2K traffic. LARK at Watertown reported their 1999 Field Day score of 1850 which was an 18% increase over 1998. Big Hill ARC at Spearfish ended up in 25th place and Dakota Chapter 102 QCWA 174th place in Class 1A with 222 clubs reporting. In 2A, 587 clubs reporting Prairie Dog at Yankton received 378th place, Black Hills ARC 455th place, Huron ARC 598th place. In 4A, 152 clubs reported, Sioux Falls was 24th place. I regret to report wife of N101 passed away. Sioux Empire ARC at Sioux Falls has announced that they will have an Amateur Radio convention on Sept 30, 2000. More details later. Total traffic for Dec was 680.

DELTA DIVISION

ARKANSAS: SM, Roger Gray, N5QS, e-mail n5qs@arri.org - As I write this, more is going on than usual for the month. The new license structure has been announced and although I have heard some negative comments, most have been positive, and many Tech+ and Advanced operators are studying hard for the General and Extra upgrades. On the local scene, we won a major victory in Searcy this month. The city proposed wireless tower regulations that were not intended for amateur regulation, but could easily have been interpreted that way. Joel Harrison, W5ZN, addressed the planning commission about this problem (with an audience composed of over 50% hams) and they agreed unanimously to add wording to clearly exempt all amateur radio towers and other equipment from this ordinance. One other note, I have recently been asked about newsletters. I have decided not to have a newsletter in the near future due to the electronic distribution of the ARRL Letter and other e-mail lists available from the Internet at no cost to my Section Budget or the League. Everyone who has mentioned this has not known about these electronic newsletters, and has subscribed immediately and been very happy. I know that this does not cover everyone, but with the long lead time necessary I do not believe it justifies the cost for the few people it would serve. If you have Internet, check out the ARRL home page and the Arkansas Section home page (<http://www.ualr.edu/~ham2/>) for more information. I also want to thank the University of Arkansas at Little Rock for providing the web space for this page. Tlc (Dec): K7ZQR 86, K5BOC 67, AB5AU 53, KC5TMU 26, W9YCE 24, W5LRA 13, W5HDN 7, W5RXU 7, KA5MGL 6, AB5ZU 5, KK5QS 4, KC5UEW 4, W5SET 3.

LOUISIANA: SM, Lionel A "Al" Oubre, K5DPG, e-mail k5dpg@arri.org—Web Page: www.aisp.net/k5dpg. ASM: KB5CX, K5MC. ACC: KA5LJU. BM: K5ARH. SEC: N5MYH. OOC: WB5CXJ. STM: KG5GE. NM LTN: WB5ZED. NM LCW: W4DLZ. The wait is over. Our next Section Manager is Mickey Cox, K5MC, of West Monroe. The other candidate withdrew just before the ballots were to be printed. Mickey will take office April 1st. Thanks to Mickey for stepping forward and running. Bob Garner, W5NK, has been accepted as a member of the prestigious A-1 Ops Club. Bob is a regular on LTN, LCW and RN5 Cycle 4. Congratulations to the following hams for the recognition of their dedication to Amateur Radio: AARA, Chester Young, KC5TKT Wouff Hong Award; BRARC George Gelpi, K5RG1; The BR Award, The Stan Preston Award, Wayne Gordon, K5EOA; CenLaARC Charles Cook, W5HO; The Pioneer Award SWLaARC Kirby Comeaux, K15EE, Ham of the Year; Blaine Augustine, K5SALA, Top Gun Award; Club officers for 2000: BRARC Pr: KC5ZZ, VP K5AIA, Sec KB5TIQ, Tr N5ADP, CenLaARC Pr: KC5RCG, VP W5LD, Sec W5LRH, Tr N5VTN, SWLaARC Pr: KC5FGO, VP W5BNDX, Sec KD5EHL, Tr KB5RXXS. Upcoming hamfests AARA-Rayne March 11-12, Baton Rouge May 5-6. Shreveport July 22. Go out and support your area hamfest events. Reports for December LTN QNI 362 QTC 72 in 31 Sessions. LCW QNI 132 QTC 17 in 25 Sessions... LA Rep 100 % by WB5ZED, K5IQZ, K5WOD, W5BKM, W5CDX, N0KWA, W5LHL, K5DPG, PSHR: K5WOD 73, K5MC 107, KG5GE 115, K5IQZ 118, K5DPG 141, W5CDX

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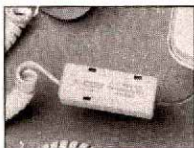
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154, WB5ZED 232, Tfc: K5WOD 4, NOKWA 4, K5DPG 30, KG5GE 41, K5IQZ 77, K5MC 112, W5CDX 186, WB5ZED 387.

MISSISSIPPI: SM, Malcolm Keown, W5XX—Some 200 plus Mississippi Hams were ready for the Y2K Rollover. The MSPN activated at 2300 local on New Year's Eve along with the PBRA, MAEN, HAEN, CAEN, DARAN, and the Jackson and Stone Co ARES/RACES nets. Although there were no emergency communications requirements, it was a great "On-the-Air" New Year's Eve Party! Congratulations to W5EPW who was honored by the MSU Electrical Engineering Dept. for his contributions to education. The Vicksburg ARC again provided communications for the Annual Christmas Parade and the Jackson ARC also helped out with public service communications by supporting the Habitat for Humanity's "Thanksgiving Walk for Homes." Meridian ARES Members successfully assisted in the search for an elderly Alzheimer's patient. Regret to report the passing of KB5PB, a long time member of the MSPN. EC Reports: KK5BY, KD5CKP, WB5OCD, N5XGI. Net Reports: MSPN 31/3056/85, MTN 31/199/124, MSN 31/1032/12, PBRA 31/987/11, Jackson Co ARES/RACES 31/534/51, MSSN 23/127/4, Hancock Co ARES 13/143/3, MAEN 7/107/0, JARCEN 5/105/0, MLEN 4/80/1, MBHN 4/27/0, Stone Co ARES 4/41/0, Lowndes Co ARC 4/57/0. PSHR: N5JCG 152, KB5W 150, N5XGI 146, K5DMC 128, K5VV 123, KM5DT 121, W5XX 120, KD5P 118. Traffic: KB5W 688, K5DMC 122, KM5DT 70, N5XGI 65, N5JCG 62, K5VV 43, KD5P 23, W5XX 6.

TENNESSEE: SM, O. D. Keaton, WA4GLS—ACC: WA4GLS. ASM: WB4DYJ. PIC: KE4CES. OOC: AD4LO. SEC: WD4JJ. 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 able to publish a CW Net Bulletin just before the December holidays. The CW net meets M-S on 3636 kHz at 7:00 PM with the following NCSs: M—Jim N4PU; T—Milo WB4DYJ; W—Amy 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—vacant; Th—Milo, WB4DYJ; F—Paul W4NPL; S—Jan KF4GQN. All interested are welcome to participate in the net activities. DARC 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 and special events, Ken K4DIT—Dir of publications, Ben KU4AW-past pres, Bill WA4MUM-repeater trustee, Joan KN4PM-VE liaison. Notice that the pres and vp are YLs. DARC had 2 winners of "The Ham of the Year Award." They were: Joan KN4PM and Tommy KD4TJO. "The Newcomer of the Year Award" went to Freddy, KF4ZGJ, and the "Marconi Award" went to David, KD4NOQ. Paul Wilson, WA4HK, 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 K4IH—Pres, Jim KF4AO—VP, Chuck N5JUD—Sec, Frank, WB4DXW—Treas. DRN-5 rpt 62 sess, 539 msg, TN rpt 62% by W4OGG, KE4GYR and K4WWQ. Net/Sess/QTC: TMPN 31/39; TCWN 27/96; TEMPN 23/36; TEPN 26/100; TSCWN 21/6. Tfc: N4PU 202, W4SQE 128, WB4DYJ 101, WA4HKU 58, W4SYE 26, KA4KDB 17, WD4JJ 14, K4IV 12, WA4GLS 6, KD4BAM 4.

GREAT LAKES DIVISION

KENTUCKY: SM, Bill Uschan, K4MIS—ASM: Tom Lykins, K4LID. SEC: Ron Dodson, KA4MAP. SGL: Bill Burger, WB4KY. STM: Farler, K4AVX. TC: Scotty Thompson, K1AAT. PIC: Steve McCallum, W2ZBY. ACC: Todd Schrader, KF4WZF. BM: Ernie Pridemore, KC4IVG. Here is what I have for tentative dates of Kentucky Hamfests: March 4, 2000, Cave City, Murray State Univ., April 22-23, 2000, BARS in Lexington, August 20, 2000, Greater Louisville Hamfest, September 9, 2000. As for locations, I have no information. Owensboro Hams made the ARRL letter, January 7 issue after an F-3 tornado struck on January 3, 2000. This shows that we always need to be prepared here in Ky. Todd Schrader, the ACC, has a new e-mail address, kf4giz@arrl.net. The Y2K activation was a success and many thanks to all those Hams that participated. Any clubs that have changed officers January 1, 2000, please send the list to me. New CARS in Frankfort: Todd Schrader, President, Bill Uschan, Asst President, James Gaines, Secretary-Treasurer. Any hamfests dates or tentative dates please send them to me at k4mis@arrl.org, so we can get them in QST and the Section News. Net QN1/QTC/Sess/NM: KRN 856/23/23/ N4AFP; MKPN 1260/99/32/KALID; KTN 1536/91/31/KALID; KSN 261/71/31/KO4OL; 4A95 547/32/31/WA4RRR; TSTMN 99/33/31/KG4EAB; 7ARES/84/2/5/WD4PBF; Tfc: WB4ZDU 8, N4GD 30, K4YKI 32, AE4NW 94, AF4PX 7, KO4OL 49, KF4RBK167.

MICHIGAN: SM, Dick Mondro, W8FQT (w8fqt@arrl.org)—Congratulations go out this month to two clubs for twenty-five years of service to the amateur community as an ARRL Affiliated Club. They are the South Lyons Area Amateur Radio Club and the L'Anse Creuse Amateur Radio Club. In another area, for clubs that had 100 percent ARRL Membership for 1999 are two fine Michigan Clubs, the Chelsea Communications Club and the Shiawassee Amateur Radio Association. These four Michigan Section Clubs have met milestones in their history and give you another good reason to support your local radio clubs. I would like to extend my personal thanks to these fine clubs for supporting ARRL Programs and membership. In the next few months, the HF bands will be flooded with newcomers. They will be anxious to use their new privileges. They are likely to find bands already crowded with users, they will not be aware of where certain uses and modes are traditionally found, such as RTTY, SSTV, contests, DX windows, nets that often run on the same frequency day in and day out, bands suddenly changing causing unintended QRM, bandwidth separation to avoid splatter, even asking if the frequency is in use, etc. The newcomers may not be prepared for what may be in store. That's before we come to the operators whom will be more than willing to "put the newcomers in their place." If nothing is done, the potential for conflicts and disillusionment exists. I view our challenge as one of joining the educational effort that must be undertaken with the following objectives in mind: We must engage in a campaign to prepare the existing HF licensees that newcomers are coming and that they will need some coaching and guidance. No matter what the old timers think of restructuring the fact is that they will be here and us "old timers" can help them adjust to their new bands and privileges. The best way to show the true spirit of ham radio is to

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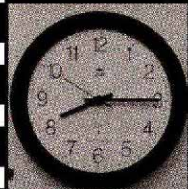
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Three sets of output terminals include a pair of heavy duty five-way binding posts for HF/VHF radios, two pairs of quick-connects for accessories and a covered cigarette lighter socket for mobile accessories.

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Built-in 0-25 VDC voltmeter. Six feet super heavy duty eight gauge color-coded cable with ring tongue terminals. Binding posts are spaced for standard dual banana plugs. Heavy duty aluminum construction. 12 1/2"x2 1/4"x2 1/2" in.

MFJ-1116, \$49.95. Similar to MFJ-1118. No 30 amp posts. Has ION LED and 0-25 VDC voltmeter. 15 amps total.

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make them feel welcome and to engage them in a positive way. The clubs via their club newsletters must reach out to the newcomers and explain some of the nuances to operating on HF. The League publishes an item called "The Considerate Operator's Frequency Guide" that could be of help or for a story in your newsletter. Perhaps the basics of HF operations could also be a topic for lively club meeting sometime in the months ahead. A sustained educational campaign for courtesy and patience is in order and would be most helpful. Please keep in mind that there will be many young people, YLs/YLs, Scouts, and entire family units coming on the air and calling other family members into the radio room to hear the contact with far off lands. I'd love to see us dispense with the rudeness, not so nice language and other unpleasanties occasionally encountered on the bands. Bottom line is restructuring is here and we need to learn to make the best of it for all concerned. Sharing is the name of this game! 73, Dick. Traffic reports for December 1999: K8GA 299; K8LJG 217; K8ZYY 168; N8FPN 168; WX8Y 155; AA8P1 116; N8JGS 35; K8AE 88; AA8S 61; W8RNQ 52; K3UWO 40; K8GM 29; K8MWW 39; K8AI 38; W8K 35; K8UPE 33; K8ZJU 29; K8GR 27; N8OC 23; W8DHB 21; W8F 21; W8YIQ 20; N8TDE 12; K8EIIW 10; K8QA 8; KA8LAR 6; N8XS 2.

OHIO: SM, Joe Phillips, K8QOE, Fairfield, (to contact me, see page 12)—Please welcome our newest Section appointment, Larry Rain, WD8HHP, wdb8hp@arrl.net, Mansfield, who is the new Section Emergency Coordinator (SEC). He replaces Larry Solak, WD8MPV, who has served the Ohio Section as SEC for 15 years. Mr. Rain has been a district emergency coordinator for 3 years and served 6 years as EC of Richland County, has been president of MASER, of Mansfield, and been active in the Northern Ohio Skywarn Steering Committee. He is a retired arson investigator and is committed to strengthening our district emergency coordinators. Contact him for all ARES programs in Ohio. Time to prepare for May's Hamvention in Dayton which is also site of the 2000 National Convention of the ARRL; June's Field Day activities and the September 15th Ohio Section Conference in Columbus. Never too soon to plan...The Ohio Section Journal is published 4 times each year. In May (Hamvention issue); August (pre Ohio Section Conference); October (post Ohio Section Conference) and December (year end issue). If for some reason you do not know what the OSJ is, contact me immediately...OHIO SECTION CONGRATS (A) TO OHKYIN ARS (Cincinnati) as his new officers, Eric Neiheisel, N8YCL, pres; Rick Halterman, KD4PYR, veep; Susie Scott, N8CGM, rec sec; Carol Hugentober, K8DHK, corres sec; Bill Simpson, K14QJ, treas; and Phil Smith, K8GAP, Brian DeYoung, KE4HOR and Lynn Ernst, WD8JAW, trustees...(B) TO Mahoning Valley ARA (Youngstown) for its new officers, Jerry Vile, W8JV, pres; Dean DeMain, W8YU, veep; Mike Orto, WD8CSN, tres; Al Johnson, WD8KNJ; Bob Dukish, K8BDX and Jack Sovik, K8BWP, trustee... (C) TO the Ohio ham operators and OSSBN traffic handlers who were prepared at the ready for New Year's Day activities, and (D) To Larry Solak, WD8MPV, Mantua, for 15 years of serving the Ohio Section as SEC and more...MARCH HAMFESTS, (19) TMRA, Toledo (Maumee); (25) Jackson County ARC, Coaltion; (26) Lake County ARA, Madison; and (26) Cincinnati, the Hamilton County ARPS. Now for the December traffic reports.

Net	QNI	QTC	QTR	Sess	Time	Freq	Mgr
BN (E)	151	67	287	31	1845	3.577	WD8KFN
BN (L)	189	95	333	31	2200	3.577	N8YB
BNR	94	32	903	29	1800	3.605	W8LDQ
OSN	191	76	792	31	1810	3.708	WB8KQJ
OSSBN	2231	671	2962	98	1030, 1615, 1845	3.9725	KF8DO
OH Section ARES Ne	t		1700 Sun	3.875	WD8IHP		
Tic:	KD8HB 254, N8IFX 243, N8FWA 218, WB8KFN 192, N8BC 178, W8STX 158, KF8DO 154, KA8FCC 144, WA8HED 141, WA8EYQ 141, N8RRB 122, KC8JHL 111, N8TNV 107, WA8SSI 100, KA8VWE 99, N8DD 86, K8WQO 70, WD8MIO 63, WB8HZ 50, N8CW 47, K8IG 45, W8PBX 45, N8YWX 45, W8RG 43, KC8DWM 42, K18IM 39, KD9K 39, NY8V 37, WD8KBW 37, K8OUA 36, K8BSBK 33, W8GAC 31, KF8FE 30, K18O 30, W8LDQ 29, N8GOB 26, K8BSIA 22, W8RTS 20, KC8FWU 20, K18GW 17, K8BTA 16, W8B10W 16, W9GGA 16, KC8KYT 12, N8LVA 12, AA8XS 11, KE8FK 11, KC8HFV 11, KC8HTP 10, N8WLY 10, N8IRB 9, N8RAK 8, K8RDK 6, K8QIP 3, K8WC 2.						

HUDSON DIVISION

EASTERN NEW YORK: SM, Rob Leiden, KR2L— STM: Pete Cecere, N2YJZ. SEC: Ken Akasofu, KL7JCQ. 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 Raffaeli, W2NHC. ASM: Bob Chamberlain, N2KBC. ASM: Andrew Schmidt, N2FTR. ASM: Richard Sandell, WK6R. ASM: Phil Bradley, KB2HQ. Net Reports (December 1999) Check-ins (QNI)/Traffic handled (QTC+QSP): AES 32/8 CDN 314/187 CGSEN 41/2 ESS 391/208 HVN 569/383 SDN 394/178 NYPHONE 232/966 NYPON 348/540 NYS/E 369/543 NYS/M 208/225 NYS/L 283/548. Congrats to N2YJZ (again) for BPL @ 569 pts! Upgrade now and avoid the April rush! K4ZDH is coming to SARA April 3 - All hams are invited! PSHR: N2JBA 184, K2CSS 155, WB2ZCM 148, W2AKT 132, WB2IIV 118, W2JHO 104, KC2DAA 100, WA2YBM 79. Tic: N2YJZ 569, WB2IIV 218, K2CSS 87, N2TWN 81, N2JBA 76, KC2DAA 69, WB2ZCM 66, W2AKT 54, W2CJO 44, WA2YBM 40, W2JHO 30, KC2BUV 26, N2AWI 16, WA2BSS 13, KC2BUW 3, K2AVV 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 new club officers: for LIMARC - Ray WA2CNJ President; Diane K2DO VP; Rick K2RB Treasurer; Jane K2JAN Secretary; for ARCECS - George WB2ZTH President; Lenny N2LDV VP; Don KB2PVT Treasurer; Cesare KB2NOW Secretary. Section Hamfests: LIMARC, Sunday, Feb 27 at Levittown Hall, Hicksville; GSBARC, Sunday, March 5, Knights of Columbus Hall, Lindenhurst. Check the NLI Web page at www.arrlhamson.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

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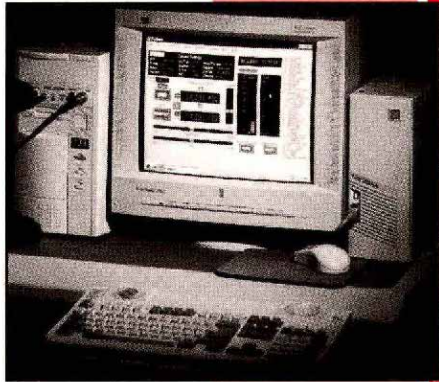
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Bethpage, NY. Bob Wexelbaum, W2ILP, 516-499-2214, LIMARC, 2nd Sat 9 AM NY Inst of Tech, 400 Bldg Rm 409, Northern Blvd. Old Westbury, Al Bender, W2OZ, 516-623-6449. East Village ARC, 2nd Friday 7 PM, Laguardia HS, Amsterdam Ave and West 65 Street, Manhattan. Robina Asti, KDZIZ, 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 Mehlman, N2YKT, 631-423-7132. Columbia U VE Team: 3rd Mon 6:30 PM, Watson Lab 6th floor 612 W 115th St NY, Alan Crosswell, N2YK, 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. Report all changes to N2GA before the 12th of the month. Tfc: W2GTG 485, N2AKZ 296, W2RJL 132, KB2KLH 107, N2XOJ 91, KB2GK 29, WA2YOW 21.

NORTHERN NEW JERSEY: SM, Jeff Friedman, K3JF—On December 4, 1999, the New Jersey Traffic Handlers association held their annual confab and awarded the "Outstanding Traffic Handlers Award" to Joe Gravel, W2JG. They also handed the K2SE Memorial Award for "VHF Traffic Handler" to Jim Dry KB2VRO. The W2UEZ "Outstanding Newcomer" Award was not given. Does this mean we are not attracting new traffic handlers? Now that the FCC has restructured the Amateur Radio licensing, it is now a given. It is obvious from the last VE session that I attended, there is an immediate positive response for potential hams to enter, and existing hams to upgrade. The first session held in Northern New Jersey after the announcement drew 18 potential license holders to the session, whereas in the past the average was 4. Some even decided to take the 20 wpm CW test for the current Extra Class qualification. I expect this trend to continue. It is up to all of us to take the responsibility and Elmer those who enter and help familiarize them with operating practices, band plans and etiquette. Let's use this opportunity to grow our hobby and build responsible operators.

Net	Mgr	Sess	QNI	QTC	QSP
NJM	WA2OPY	31	199	192	178
NJPN	W2CC	35	194	31	29
NJSN	K2PB	26	139	4	4
NJNE	AG2R	31	232	166	135
NJNL	AG2R	31	193	96	76
CJTN	N3RB	31	305	78	51
NJVN/E	N2RPI	31	358	48	38
NJVN/L	N2OPJ	31	332	31	30

Tfc: N2XJ 375, W2MTO 124, N2GJ 89, KC2AHS 69, N2OPJ 67, KB2VRO 37, N2RPI 36, K2PB 31, N3RB 29, W2CC 21, N2AQE 16, N2TTT 12, KB2VVB 8.

MIDWEST DIVISION

IOWA: SM, Jim Lasley, N0JL—ASM: N0LDD—SEC: NA0R. ACC: N0JLP @ KE0BX. BM: K0IIR @ W0CXX. SGL: K0KD. At least one club has gone to an all e-mail newsletter due to economics. If you do, remember me at n0jl@arri.org. Looks like many were busy for Y2K. Now we can look for 2/29! A hearty welcome to W0EJ as the new Midwest Division Director. Oh, yea, welcome again to K0BJ as VD. (That doesn't sound right.) Have you had any luck finding a study guide to upgrade before tax day? How about finding an exam session? OARC had a small one recently. Three examinees, three exams, three passed 4B! Welcome to N0YZ, the new EC over in Delaware county. The Cyclone ARC was active in the 10 Meter contest and several other projects. Story county is developing ARES once again. TSARC is working on a pancake breakfast. The new pres there is W0OHEO. From DMRAA: "Maggie Harmon, KB0ZBL (was) awarded the 1999 Winthrop Mager Plaque award for her diligent efforts in volunteering in the Public Service sector, and her genuine interest in supporting the Amateur Radio Service in her community." I add my congrats also! I just recvd the last 3 Siouxland ARES/SKYWARN News issues. Welcome to SA/S! Time to get your code speed up to five wpm! Sorry to note the passing of W0VMN. He is missed. Please also note the deaths of the brother of N0XOA and the brother in law of N0LDD. Newsletters were received from IIAARC, FMAARC, OARC, CARC, SCARC, TSARC-N, DMRAA, CVARC, SA/S. Traffic: W0SS 146, KA0ADF (Oct) 82, N0JL 49, W0B0 18.

KANSAS: SM, Orlan Cook, W0OYH—Don't forget the ARRL state convention Aug 27 at Salina. The Y2K watch went well world wide. There was lots of activity across our section. Thanks to you who participated state wide on 3920 kHz. Your support of ARRL in this watch through your SEC and SM is much appreciated. The following stations reported in on HF after midnight confirming no problems: N0ENO, AA0RI, KF0WS, WA0PNU, W0SRR, KB0MZE, KB0CNK, K0JF, W0DDMV, W0PBY, N0LM, K0UER, W0WWR, W0ADF, KB0WEQ, WA0JLF LSW, TCS, TEX, JR, IKA. Let me know if I missed anyone. Scott, KC0DYA, accepted the PIC job, TKS. Ron, KB0DTI, accepted the STM job. www.colossus.org/kar/ for more info. See www.colossus.org/ares/ for the Jo Co. great ARES site. TKS4 supporting HR & the ARRL/KsSec Nov Kansas Nets: sessions/QNI/QTC, K5BN 30/1232/86 KPN 21/312/10 KMW30/574/473 KWN30/953/608 CSTN 26/1641/91 QKS 59/307/74 QKS-SS 11/32/7. SEC: W0DDMV 33/329/8. TEN 249 mgs 60 sessions Ks 65%. DTRN 60/574/349 BBS reports: W1AWBul/Per/NTS AA0HJ 3/515/0 NOOBM 49/2/0. Tfc: N0KJ 386, K0PY 106, W0BZNY 93, W0OYH 54, NBOZ W0WWR 47, K0RY 45, KB0DTI 22, NBOZ 18, KB0NTD 10, KX0I 8, K0BJ 4, W0FCL 4. Have a great 2000.

MISSOURI: SM, Dale Bagley, K0KY—ASM: John Seals, WR0R. ACC: Keith Haye, W0EG. OOC: Mike Musick, N0QBF. PIC: Dennis McCarthy, AA0A. SGL: E.B. DeCamp, KD0UD. STM: Charles Boyd, KE0K. TC: Wayland McKenzie, K4CHS. <http://www.qsl.net/arri-mo>. January was an active time for Hamfest in Missouri. The Northwest MO Winter Hamfest was held in St. Joseph, MO. This Hamfest is jointly sponsored by the Missouri Valley ARC and the Ray-Clay ARC. Dick Merrell, KC0AMY, and Kevin Phillips, KC0AWM, shared the leadership efforts for that Hamfest. Winterfest 2000 was next on Jan. 22 in St. Charles,

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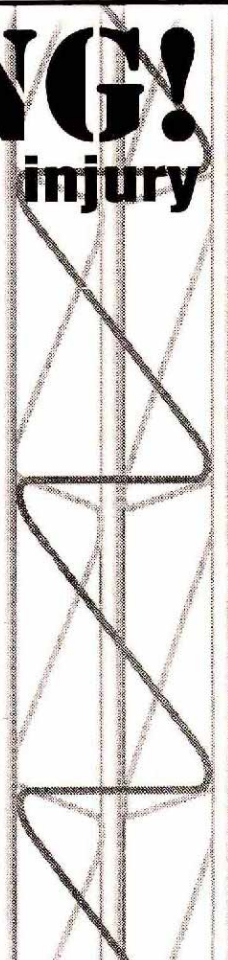
Get professional, experienced help and read your Rohn catalog or other tower manufacturers' catalogs before erecting or dismantling any tower. A consultation with your local professional tower erector would be very inexpensive insurance.

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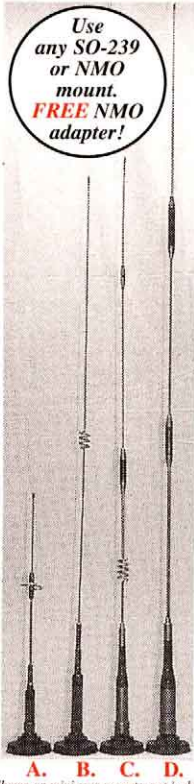
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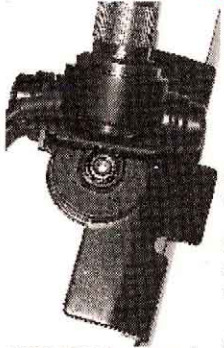
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Extra-wide four inch lip and large reinforcing tabs on each side safely distributes the load over your vehicle's lip.

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.
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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.

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MO, at the St Charles Exposition Hall. This hamfest is sponsored by the St Louis Repeater, Inc. Bill Coby, KB0MVG, lead the Winterfest 2000 effort. The Friends of Amateur Radio group sponsored a Hamfest in Springfield, MO. I enjoyed visiting with the Bootheel ARC at their Christmas dinner and meeting. Larry Anthony, WB0VAM, incoming Bootheel president, Larry Ford, N0RIC, and the rest of the club were great hosts. I learned much about their activities and that they have a great Radio Club. The Tri-County ARC held their Christmas Dinner in Moberly at the QTH of Bill Turner, KF0KC. The food was great as was the fellowship with all the amateur operators and family that attended. The Tri-County ARC sponsors several repeaters and cosponsors the NC MO Hamfest. The Hannibal ARC was issued a National Traffic System Service award for their efforts sponsoring FM repeaters and support of NTS activities. Net Sess/QNI/QTC/NM: Hambutchers 23/664/35 KD4NK; AARC 5/53/3 WB0SEN; CARL 4/29/0 KCO MV; WAARCI 4/107/0 KBOVZP; MON-1/31/82/34 K10PH; MON-2/31/65/10/K10PH; MTN 31/599/130 KO1PM; Rollabillboard/31/66/4/NAOV. Tlc: KE0K 123. PSHR: KE0K 122.

NEBRASKA: SM, Bill McCollum, KE0XQ—It is with deep regret to inform you that Greg Holloway, KB0TKE, became a Silent Key November 28 when he was killed in a traffic accident. He was a police officer from Gordon responding to a call when an allegedly drunk driver pulled out in front of him. I want to thank all for their preparation and support of Y2K. Midlands ARES had over 70 amateurs on duty in Douglas and Sarpy Counties. 12 ARES members from Buffalo County supplied backup communications at various locations. A special thank you to John Hauner (WA0YFY) and Steve May (WA0ASM) for their work concerning the HF Y2K nets that have been going on for nearly a year. There were few problems in Nebraska and it was Amateur Radio's finest hour! The Lincoln ARC racked up an impressive 4,298.75 hours in public service for 1999. Congratulations to KE0GI, 1999 recipient of the Jerry Cox Award for exemplary service to Amateur Radio. Many challenges face us in 2000, especially with license restructuring. Expect to see record numbers at VE sessions, with many wanting to upgrade before April 15. I realize everyone is not pleased with the FCC's report and order, but hopefully we will see our ranks begin to swell. Net Reports: NCHN; QNI 333, QTC 15 & 29 sessions. Lincoln/Logan ARES; QNI 161, QTC 4 & 13 sessions. NE 40 meter; QNI 442, QTC 13 & 30 sessions. NESN; QNI 981, QTC 32 & 31 sessions. MIDNE ARES; QNI 353, QTC 32 & 31 sessions. Tlc: KOPTK 95, WOAP 58, KE0XQ 30, W0RWA 10, W0DBFO 4, WY0F 4, WBOART 2, W0UJ1 2, KA0DBK 2, WCOO. PSHR: KA0DBK 110, KB0YTM 28, KB0YTO 37.

NEW ENGLAND DIVISION

CONNECTICUT: SM, Betsy Doane, K1E1C—BM: KD1YV. OOC: WA1TJT. PIC: W1FXQ. SEC: WA1D. SGL: K1AH. STM: K1HEJ. TC: W1FAI. Greetings and Happy 2000 again! What a special time the New Year was! Amateur Radio in CT sure got lots of PR around the Y2K scenario. Jen, N1DTP, and Don, N1HAX, were on Channel 61; Anne, K1STM, Hilda, KB1EYH, and Nina, WB1DJL, were featured in a story written about in *The Hartford Courant*. Their story was carried by the Associated Press in many other newspapers! There was more coverage about hams and Y2K in the CT Post and the Stamford Advocate. Congrats and thanks to you all for taking the time to spread the word about our hobby. Thanks, too, to many of you who took the time over the New Year to stand by in case help was needed. Many ops were available and even some new contacts with local communities and agencies were established. Did you know that you can keep up with current issues and events on line regarding the Amateur Radio Emergency Service? Subscribe to an e-mail list: send a blank message to connares-Subscribe@onelist.com. The list is operated by Joe, K1IKE, and SEC Darrow, WA1D. I had a wonderful time at the Stamford Amateur Radio Association's January meeting. I spoke about the details of the license restructuring document and updated members about CT Amateur Radio news. Many thanks to Jim, N1NNG, who has agreed to serve as President of the Stamford ARA for another term. Let's hear from the NTS ops—how should CT celebrate 50 years of NTS? Net sess/QNI/QTC: ECTN 31/297/52; Nutmeg 31/173/82; WESCON 31/348/117; CPN 31/273/7; CN 2/778/34; BEARS of Manchester 26/316/398. Tlc: NM1K 2109, KA1VE4 422, KA1GWE 217, KE1A1 148, KB1CTC 169, K1STM 136, N1VXP 115, WA4QXT 74.

EASTERN MASSACHUSETTS: The following was submitted by STM Bill Wornham, N21D.

Net	Sess	QTC	QNI	QTR	NM
EMRI	62	242	228	633	K1SEC
EMRIPN	31	153	185	497	WA1FNM
EM2MN	31	278	331	669	N1LKJ
HHTN	31	158	278	612	N1ST
CITN	31	108	306	567	N1SGL
WARPSN	4	13	66	NA	K1BZD
NEEPEN	2	4	6	NA	WA1FNM
*CHN	31	48	228	497	W2EAG

Tlc: WA1TBY 675, N1LKJ 387, W2EAG 252, KY1B 230, N1TAT 204, N21D 176, WA1FNM 96, KB1EB 89, WA1LPM 85, N1PTU 72, K1SEC 71, N1G1A 64, KD1LE 59, N1BNG 55, K8SH 55, N1VUX 50, N1ST 40, K1BZD 39, N1LH 38, N1OBL 34, N1AJJ 32, WA1VRB 32, N1TDF 17, NK1L 8.

MAINE: SM, Bill Woodhead, N1KAT—ASMs: WA1YNZ, KA1TKS. STM: NX1A. BM: W1JTH. SGL: W1AO. ACC: KA1RFD. OOC: KA1WRC. PIC: KD1OW. SEC: N1KGS. Asst. Dirs: W1KX, KA1TKS, K1NIT. Web Site: N1WFO. With the new restructuring plan to start in April, hopefully, this will encourage many new calls to show up down at 3,940 kc at 5 PM and help pass some traffic to those remote parts of the state, or just check in and get acquainted with the people on the oldest traffic net in the country: 60 years - congratulations! Happy to report that all went well with the Y2K hospital deployment. It was a very uneventful night. However, it did demonstrate that we do have the ability to perform a major task, when called upon. Being able to link all the hospitals statewide was quite the accomplishment. All who participated deserve a pat on the back and a 'well done!' All don't forget the State Convention and Andy Hamfest on Mar 24 & 25. If you plan to stay overnight at the Ramada, be sure to ask for the special Ham Radio rate; it is only \$55 a room - not a bad deal. Looking forward to a great time for all. 73, Bill, N1KAT.



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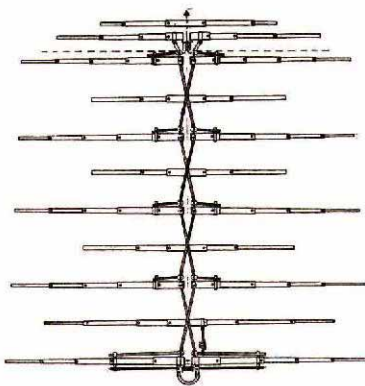
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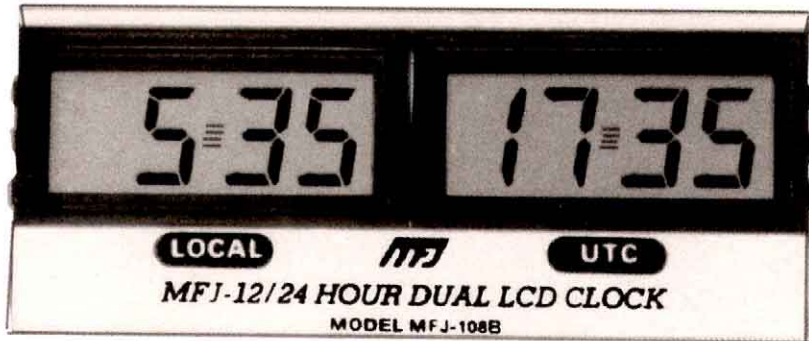
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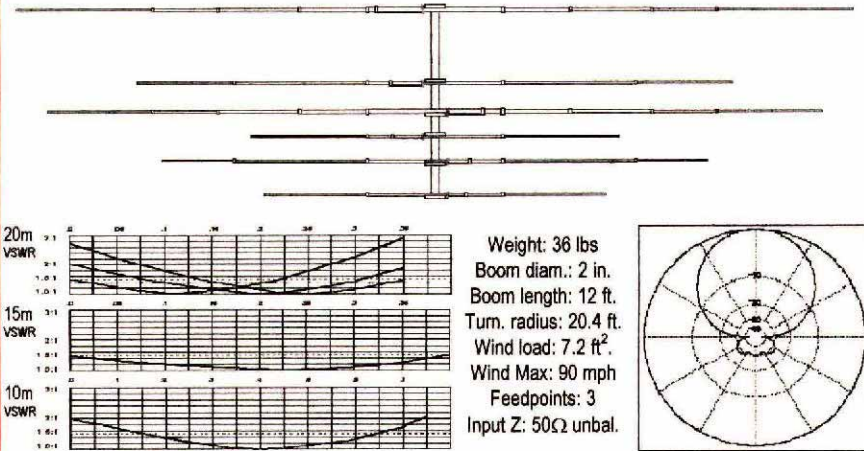
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NEW HAMPSHIRE: SM, Mike Graham, K7CTW—ASMs: WW1Y, W1NH, WB1ASL, N1KIM, TC: WA1HOG, STM: WA1JVV, PIC: KA1GOZ, OOC: W1GTA, SGL: K1KM, BM: KH6GR, ACC: AA1QD, SEC (acting): WW1Y. Survive the Y2K we did - survive Y2K's Flu bug - no way! Also, hope to have some brief report from Ed, K2TE, on how the Y2K QSO Party went by next issue. New Officers at North Country ARC are Mort, KH6GR, Pres; Stewart, N1ZGK, V/P; Louise, N1OSK, Sec'y; and "Mr. CW" Tom, WA1JVV, Treas. Congrats all. Lots of folks working ARES New Year's Eve. Special kudos to Chris, N0CUH, and the Jaffrey ARES crew. They even had a group of six 11-Meter Neighborhood Watch operators involved! And to all who participated throughout the State, sincere thanks. I'm just glad that Y2K, for the most part, was a non-event. Our Illustrious Former Great Kahuna, Bill, WB1BRE, reports he's up to his eyeballs in preparations for several Picosat launches at AMSAT. Hope to report on their success soon. As previously reported, Louise Shaw, bride of Stewart, N1ZGK, passed her Tech Exam and is now KB1EMK. I warned Stew he'd darn sure better see to it that Santa was good to her or he'd be spending winter in an unheated barn. Stew reports Louise is now sporting a new ICOM IC-207H, and he's staying warm! The Flea market season is rapidly approaching. Stay tuned. For now, best 73. Net NM/Seas/QNI/OTC: G5FM N1RCQ/31/259/31; G5PN K1TOY 24/79/50/583; T5EN N1VFM 5/54/5; W1NH WA1JVV 31/166/148. Tfc: W1PEX 1111, K1PTQY 281, N1NH 182, WA1JVV 113, W1ALE 52, KA1OTN 39, N1CPX 12.

RHODE ISLAND: SM, Armand Lambert, K1FLD—The NCRC, who celebrated 50 Years of ARRL affiliation on 12-13-99, has stood the test of time with many revered traditions, treasured memories and service to the community. It was indeed a pleasure and an honor to present the 50 Year Affiliation Certificate from ARRL Headquarters and to also dine with this great group of radio operators. Many thanks for the invitation. NCRC election results: Pres: Jack, K1IG; Vice Pres: Ellis, W3PDK, Sec: Charlie, W1CG, Treas: Raleigh, N1VXO. You can visit the club Website: www.qsl.net/w1sye. Also have fun working 10 members of NCRC and get a special certificate. On the millennium Y2K scene, appreciation goes out to our area hams that staffed emergency centers throughout the state of RI. Because of them, RI was prepared. The US Coast Guard, Local and State Government Agencies have expressed their gratitude and recognition as our volunteers have gained new respect for the Amateur Radio Service. Thanks to all of you. It appears that the long-awaited restructuring event is causing quite some excitement in our midst. This should prove to be a Boon to Amateur Radio. VEs are already gearing up to accommodate the increase in applicants for licenses and upgrades. Reminder: keep watch on the expiration date of your ham license to renew it on time. Having fun serving you, 73, Armand, K1FLD.

VERMONT: SM, Bob DeVarney, WE1U—Well, we made it through Y2K without so much as a hiccup. A word of thanks is due to the many hams who were on standby throughout the state in case of emergency. I spoke with many of you from the Red Cross in Burlington. A congratulations and thank you goes out to Mike, W1RC, for "demiling" several types of collectible radios that were due to be unceremoniously "thunked" with a sledgehammer before being sold for scrap. I am sure we collectors owe you a greater debt than we know. Congratulations go out also to Fred, N1ZUK, on his appointment as ARRL VHF Awards Manager for Vermont. Now we'll be able to field check VUCC apps! Lastly, a special thanks goes out to Joe Armstrong, KA1YLN, who will be stepping down as SEC, for the many years of dedicated service to the amateur community in Vermont. Last we spoke on the phone, you sounded a lot less stressed, and I hope it continues. Joe will be stepping down effective whenever we can find someone to fill his big shoes. Thank you all very much and 73 de WE1U.

WESTERN MASSACHUSETTS: SM, William C. Voedisch, W1UD, w1ud@arrrl.org—ASM: N1LZC. ASM (digital) KD1SM. STM: W1SJV, SEC: K1VSG. OOC: WT1W. The commission has acted. Now there are only 3 classes of license. The code speed for all classes will be 5 wpm. Considering everything that could have happened, I think we made out really well. Nobody will lose anything and now there will be no excuse not to upgrade. For years, I have heard the old complaint that the code portion of the examination was stopping people. It isn't any more. All the hysteria about Y2K passed with nothing happening. Some minor glitches, but considering what was predicted the universe is still here. John, AF1B, will be opening an ARES net Sunday morning on 53.230 PL 162.2 at 9:15 local. Mark, N1ZYG, will do the same thing on 224.100 (no PL) at 9:30 local. N1MUV was instrumental in coordinating this addition to the ARES program. Chas, WA1FIA, and the MARA crew covered the Leominster, Fitchburg hospitals with emergency vehicles in preparation for a potential Y2K problem. Tfc: N1ISB 19, W1ZPB 161, KD1SM 6, W1SJV 24, W1UD 229.

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 Myron Babcock, AL7Q, re-elected President of the Arctic ARC, and to Don Koehler, N7MGT, new President of the Elmendorf Amateur Radio Society. Fairbanks, Arctic ARC hams provided comm support to the 200 mile Henry Hahn Sled Dog Race — special thanks to 11 amateurs from the Two Rivers Dog Musher's group over the 2 day event. Patrick Scannell, AL0Q, is organizing a slow code net on 40 or 80 meters and is requesting assistance. Hams on-duty state-wide during Y2K rollover report it all as a big "no event", but the food was great! PSHR (Dec): AL7N 77.

EASTERN WASHINGTON: SM, Kyle Pugh, KA7CSP— (January Report) I wasn't going to mention Y2K again, but I'd like to pass on this "Thank You" to all hams in your communities from Gordon Grove, WA7LNC, Spokane Co EC — "The rollover was not a problem, and many of you served by waiting on-call at home, but there is no way that it was a non-event. Don't forget that Amateur Radio played a role in every agency's Y2K plan, so much that ARES/RACES had to become a rationed resource. This confidence in ARES/RACES came out of our reputation of

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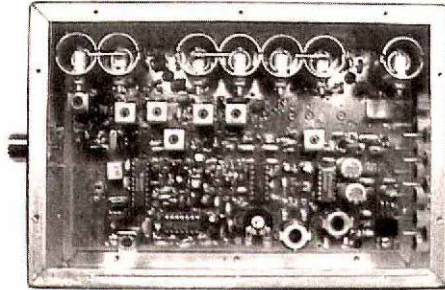
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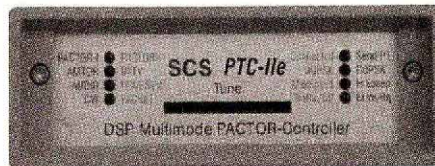
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being able to deliver on our promises to our served agencies. Our county DEM chief said: "We all felt a lot better knowing you were here!" 9 out of 12 OO stations reported monitoring activity. In Memorium — Duncan Smith, WA1UI, Silent Key on Dec. 4. Net Activity: WSN: QNI 842, t/c 371; Noontime Net: QNI 8466, t/c 514; WARTS: QNI 3523, t/c 158. T/c: K7GXZ 464, W7GB 459, KA7EKL 121, K7BFL 113, KK7T 25, W7UVP 2. PSHR: W7GB 138, K7GXZ 126, W7UVP 65.

IDAHO: SM, M.P. Elliott, KF7ZQ — OOC: N7GHV. SEC: AA7VR. STM: W7GHT. With restructuring complete, it's time to get aboard and do what we can to make the change positive. Regardless of personal feelings, restructuring is with us — let's make the most of it! It all begins in mid-April, make sure you check its impact for you. It is my sad duty to inform you of the passing of an outstanding Idaho ham — Lem Allen, W7JMH. Lem was dedicated to the advancement of our hobby and served in many capacities with local clubs and was a two-time ID Section Manager. Lem will be best remembered for the years of radio classes he taught and the exams he held. We will miss you, Lem! 73 — Mike, KF7ZQ. T/c: W7GHT 306, KB7GZU 91, WB7VYH 60, and N7MPS 29. PSHR: W7GHT 133, WB7VYH 104, and N7MPS 68. Net (SESS/QNI/QTC/ Mgr.): FARM-31/2503/33/W7WJH: NWTN-31/1469/90/KC7RNT; IDACD-23/602/16/K7UBC; IMN-31/459/166/W7JMH.

MONTANA: SM, Darrell Thomas, N7KOR—Most of the Amateur Radio activity in the Montana Section during December was in preparation for assisting in Y2K activities on the 31st. All most all of the clubs and many individual amateurs were involved with local governments and Emergency Operating Centers to provide back-up communication should the need arise. Many were stationed at Red Cross shelters, hospitals and public utility sites. Thankfully all went well, and no crises came up. All in all this was an excellent exercise in emergency preparation which gained some very good publicity for Amateur Radio. Net/QNI/QTC/NM MSN 109/0 W7OW: MTN 2198/45 N7AIK; IMN 459/166 N7MPS. PSHR: N7AIK 133.

OREGON: SM: Bill Sawders, K7ZM—ASM: KK7CW. ASM: KG7OK. SEC: WB7NML. STM: W7IZ. SGL: N7QQU. OOC: NB7J. STC: AB7HB. ACC: K7SQ. I wish to thank all the fine clubs within the Oregon Section, that have put me on their mailing list for club bulletins. It's a great way for me to know what your club is doing in the community! If your club sends out a newsletter, be sure to tell the news editor to include me on your mailing list. From the "Watts Up" newsletter, from the Umpqua Valley Amateur Radio Club, comes word of new 2000 officers: President, (and awarded the "1999 Ham of the year" award), Lee, K6AZW. First VP: Steve, KC7HYX, Second VP: Don, KB7WTA, Secretary: Russ, W7DUR, and Treasurer: Ed, KC7UFZ. By reading your newsletter, you are doing a great job for ham radio! Congratulations! Joe Novello, KB7FYZ, a Toledo High School instructor, has been nominated as ARRL's professional teacher of the year. His nomination will be reviewed by ARRL board members, and the winner will be announced soon. Good luck, Joe! Don't forget, the Oregon QSO Party, normally held in May, has been switched to the third Saturday in August. That's the 19th, this year, from 7 AM to 9 PM PDT. Mark that date on your calendar, and plan to put your County on-the-air! Keep in touch. NTS traffic totals for December: KK1A 517, N7DRP 228, K6AGD 121, N7NLM 84, KC7ZB 68, W7VSE 55.

WESTERN WASHINGTON: SM, Harry Lewis, W7JWJ—STM W7ZIW filed final reports for the last month of the century noting that George, K7BDU, earned honors with a traffic count of 1331, Jeri, W7TVA, followed with 562 and Larry, K7MOF, just missing BPL with a traffic count of 469. These following stations made the Public Service Honor Role at year's end. K7BDU, W7LG, W7NWP, K7MOF, KJ7SI, W7TVA, KA7TTY N7YSS and STM W7ZIW. Are you about to enter the world of HF with a new General Class license? Try message handling by checking into the 75 meter traffic nets. We'll show you how. The first major electronic flea market of the season will be March 11 at the Puyallup fairgrounds and sponsored by the Mike and Key ARC. Yes, we were prepared! As SEC N7NVP notes, ARES units were on station for Y2K, checking equipment and propagation, setting up nets, ready to provide communications for Emergency Management, USCG, hospitals, power companies, water suppliers, etc. A tip of the hat goes to all those operators who unselfishly gave up their New Year's Eve to support their communities! Countless volunteer hours went into preparation for Y2K. They were not wasted! We gained, ACS/ARES members, training equipment, customers and best of all, we strengthened our position with those we serve. DEC Monte, W7MLS, reports history was made in WWA, when approximately 30 volunteers from Clallam, Cowlitz, Grays Harbor, Jefferson, Kitsap, Lewis, Mason, Pacific, Pierce and Wahkiakum County's ARES & RACES groups participated in a Washington State Patrol event, the 8th alternate communications exercise which involved over 200 hours of planning, preparation and execution. Volunteers staffed the EOC in each county, all WSP detachment offices and district headquarters. Jot now on your calendar the Communications Academy May 6-7, sponsored jointly by Medical Services Teams, Seattle ACS, King City EOC support Team and King Co ARES. It is open to leadership and members of all teams. The new century is upon us and unfolding now is the new high speed Internet. How will we marry Amateur Radio with these new services? We've ably accommodated communication restructuring and new technology in the past by serving in a leadership role. Now is not the time to falter; full speed ahead.

PACIFIC DIVISION

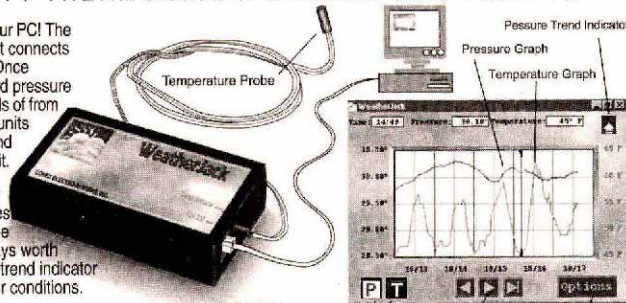
EAST BAY: SM: Andy Oppel, KF6RCO—SEC: KE6NVU. DEC's: WA6TGF/Alameda County, KO6JR/Contra Costa County, WA7IND/Napa County, K6HEW/Solano County, N6UOW/Training, KE6HCI/Administration, W6CPO/Technical Services, KQ6TM/Section Plans and Administration. STM: K6APW. OOC: W6NKF. Check out the EB WWW Page at <http://www.pdarrl.org/ebsec/>. Webmaster is KB6MP. Special thanks to W6RGG for 22 years service as EB SM - we wish him much success as Vice Director. ORCA is in the midst of extensive upgrades to their RACES room with much more planned for 2000. They also have plans to provide communications for the Baker to Vegas race on Apr 15. EBARC elected new officers: Pres/KE6MSF, 1VP/KE6RS, 2VP/KE6SZG, 3VP/AA6XZ, Sec/KF6HEN and Tres/N6UW. OOC welcomes new member KE6OZP. LARK had a SEMS training session taught by KD6YKE, Senior Emergency Planner with the Contra Costa EOC. HRC mourns the loss of

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RG8/U STRD BC FOAM 95% BRAID UV RESISTANT JKT 0.9dB/1350WATTS @ 30MHz.....	.34/FT	.32/FT	.30/FT
RG8 MINI(X)95% BRAID UV RESISTANT JACKET 2.0dB/875 WATTS @ 30MHz.....	.15/FT	.13/FT	.12/FT
RG58/U 95% BRAID UV RESISTANT JACKET 2.5dB/400 WATTS @ 30MHz.....	.15/FT	.13/FT	.11/FT
RG58A/U STRD CENTER 95% TC BRD UV RESISTANT JKT 2.6dB/350 WATTS @ 30MHz.....	.17/FT	.15/FT	.13/FT
RG214/U STRD SCC 2.95% BRD NC/DB/UV JKT 1.2dB/1800WATTS @ 30MHz.....	.25FT/UP	1.75/FT	
RG142/U SOLID SCCS 2-95% SILVER BRAIDS Teflon® JKT 8.2dB/1100WATTS @ 400MHz.....	.25FT/UP	1.25/FT	

COAX (75 OHM GROUP)

	100FT/UP	500FT	1000FT
RG11A/U STRD BC (VP-66%) 95% BRAID NC/DB/UV JKT 1.3dB/1000WATTS.....	.44/FT	.42/FT	.40/FT
RG6/U CATV FOAM 18GA CW FOIL + 60% ALUM BRAID.....	.20/FT	.13/FT	.11/FT
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RG8/U strd BC foam 95% braid UV resistant JKT. 0.9dB 1350 watts @ 30MHz.
150' \$64.95 125' \$54.95 100' \$44.95 75' \$34.95 50' \$24.95 25' \$14.95
10' \$13.95 6' \$11.95 3' \$9.95 1' \$8.95

RG8 MINI(X) strd BC foam 95% braid UV resistant JKT. 2.0dB/875watts @ 30 MHz
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25' \$39.95 15' \$32.95 10' \$25.95 6' \$16.95 3' \$15.95 1' \$14.95

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longtime member N6DOC. Installation Dinner for new HRC officers will be on Jan 15th. VVRC elected new officers: Pres/KF6KFP, VP/W6HAB, Sec/KF6FZY, Tres/KF6VBJ, Dirs/K6ZU, KE6MDM, KD6ME. MDARC's new board includes Pres/KE6VTA, VP/KE6WRE, Sec/N6JOX, Tres/KF6GLV, EC/KO6JR, Dirs/KE6TOT, KE6JGA, KM6QX, K6SFD. Dec tlc: W6DOB/1048, WB6UZX/35. PSHR: W6DOB. BPL: W6DOB. Tlc nets: NCN1/3630/7PM; NCN2-SLOW SESSION/3705/9 PM; NCN-VHF/145.217/30PM; RN6/3655/7:45 PM & 9:30 PM; PAN/3651/7052/8:30 PM. Your check-ins are always welcome.

NEVADA: SM, Bob Davis, K7IY—ASM: Jan, NK7N. ASM: Jerry, W7YDX. SEC: N7JEH. TC: NW7O. ACC: N7FFP. STM/SGL: N7CPP. PIC: WW7E. OOC: N7ELV. Greetings to the Nevada Section. As mentioned previously, please welcome the following New Section Appointee's, Jerry, W7YDX, in Elko to Assistant Section Manager, Eastern Nevada, Jim, K7ICB, in Reno to OO in the Amateur Auxillary and Bill, AA7WB, in Sparks, also to the position of OO. I am sure the years of experience held by these new appointee's will add greatly to an already strong base of volunteers in Nevada. Reports are indicating that the VEC testing program is going fast and furious with tons of upgrades due primarily to the FCC license restructuring ruling. This renewed interest is also adding to the club rosters in fair numbers. Please continue to suggest that your new members consider joining the ARRL also. For the record, the RARA organization has the highest percentage of members that are also League members of all Affiliated Clubs in Nevada...92%...Hi to Walt, W6ULT in ClearLake. 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 Fukunaga, KH6H; Stu Johnston, NH6DR. SEC: Dennis Carvalho, KH7H. TC: Chuck Cartwright, AH7Y. PIC: Russ Roberts, KH6JRM. ACC: Bob Schneider, AH6J. The Hilo ARC and HI QRP Clubs participated in the ARRL 10M contest, 10, 11, 12 Dec weather conditions were not too helpful. The operation was from Laupahoehoe Point using KH6IN memorial callsign. Operators, cooks and encouragers: KH6AFS, KH6BMM, KH6AFQ, NH6XB, KH7SO, KH6GQM, WH6JL and KH6B. Please welcome aboard Stu Johnston, NH6DR, as the new ASM for west Hawaii. Thanks for your interest, Stu. Y2K communications took place on Oahu with many organizations involved. Final reports and recommendations will be available in early 2000. Many thanks to all who participated as I'm sure we will all learn from our experiences. Please continue to let me know how QST delivery is going. Aloha and 73, Ron, AH6HN.

SACRAMENTO VALLEY: SM, Jettie Hill, W6RFF—The following are the Volunteer Staff for the section: K6BZ-SEC, W6KJ-BM, WB6RBE-TC, WA6WJZ-STM, WA6OWH-PIC, WY6O-OOC, N6IG-SGL, W6RFF-ACC. Each one is responsible for a group of other volunteers. It seems that we survived the Y2K bug OK. There were a group of DXers who contacted other countries and sent news of any problems to the State OES by the DX Cluster packet. Thanks to all that helped at the State and County OES offices. I was able to attend Holiday Parties with the Sacramento RC, Sierra Foothills ARC and North Hills RC. By now all new club Officers should be in place and planning for the year. Have you volunteered to work on a club committee? It takes more than just the Officers to make the club survive. The license restructuring will start soon and I have received several calls regarding up-grading. Let us hope the classes and VE exams will be busy for a while up-grading to General and Extra. River City Contesters held their annual Holiday Party and election of Officers at OTH of K6NO. They are avid contesters and win their share of trophies in the small/local club category. It is time to think about Field Day, pick a chairman and get plans made. The Shasta Cascade ARS will be holding a Hamfest on March 4, Redding. Check with KE6OUA for more information. Other clubs planning hamfests also, stay tuned. More news next month. Hope all goes well in Y2K. 73, Jettie.

SAN FRANCISCO: SM, Len Gwinn, WA6KLL—ASM: N6KM. SEC: WB6TMS. TC: N1AL. Thanks to all for their participation in Y2K. Many hams active and on standby. Remember to continue to upgrade your emergency communications as we still have a lot of potential this spring and summer. Emergencies did not stop with Y2K. With the new FCC regulations many VE test sessions will occur. Now is the time to upgrade! I challenge ALL of you to bring some new people into our hobby and service. Field Day planners do not forget VHF/UHF operations. Sad to report WB2CHO/VP2ML of Santa Rosa SK. Looking for volunteers for section appointments. Contact me via e-mail. Get active, get on the air!! I will be visiting clubs in your area soon.

SAN JOAQUIN VALLEY: SM, Donald Costello, W7WN—Well, we all made it through Y2K and even through License Restructuring. The 21st Century will bring some change to Amateur Radio, and hopefully more good than bad. Only time will tell. The Fresno Amateur Radio Club will once again hold their annual hamfest. However, as yet, no firm date has been decided upon. Keep watching this column for more details. The International DX Convention will take place the weekend of April 15th in Visalia, and I hope to see many of you there. The IRS will not be attending...hi,hi! There has been quite a bit of two meter side-band activity in the Section on or about 144.200 - 144.240 MHz of late, both mobile and fixed station. Many of you have FT-100 and IC706's so join the fun. The 2meter ssb net meets on 144.250 MHz on Tuesdays, Thursdays and Sundays. The 1.2 GHz repeater operated by the Turlock Amateur Radio Club is up and working just fine from Mt. Bullion on a Frequency of 1284.300 MHz with an input on 1272.300 MHz with PL of 88.5 so, give the machine a try, it has great coverage. There is a 1.2 GHz ssb group that meets simplex on 1296.100 MHz on Tuesday nights at 8:00 PM local. Support your local radio club and please, volunteer for emergency groups such as ARES and RACES. Your work in providing communications during times of emergency is an outstanding use of Amateur Radio for the public good.

SANTA CLARA VALLEY: SM, Glenn Thomas, WB6W—SEC: KM6GE. BM: WB6MRQ. TC: WA6PWW. OOC: KB6FPW. The Y2K festivities (sic) have come and gone. Even though it was an unusually quiet evening, thanks to all who participated. The Naval Postgraduate School ARC will be hearing from Col. Constantine of the CAP. The NPSARC 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 SVECS group will be holding their quarterly breakfast on Jan 22. The planned speaker is East Bay SEC

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DTU-2 Digital paging; TM-541A	14⁹⁵	SC-41 Soft case; PB-32	4⁹⁵
MB-13 Mobile mt; TS-50S	19⁹⁵	SC-43 Soft case; TH-79/PB-33/34	4⁹⁵
MB-14 Mobile mt; TM-742AD	19⁹⁵	VP-1 Bumper mount, spring	9⁹⁵
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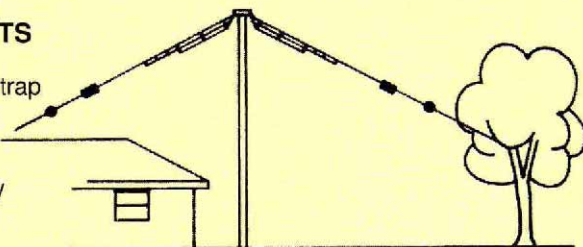
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KE6NVU on the amateur support for the Baker to Vegas relay race. The SVECS nets meets at 8 PM every Tuesday on WB6ADZ/R, 146.115+. The Millbrae ARC meets the 1st Thursday of the month, 7 PM in the community room of the Millbrae library at #1 Library Ave. You guys are on our roster for sure! The Saratoga ARA received special thanks from the Coast Guard Auxiliary for their assistance in monitoring HF distress frequencies during the Y2K event. They also received special recognition from the county sheriff for their assistance every Halloween. Well done! The SARA net meets every Tuesday at 7:30 PM on 28.4 MHz (SSB) and 146.655- (114.8pl). The Santa Clara County Amateur Radio assc heard from N6PCQ on fractal antennas at their meeting. They meet 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 Hospita 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 Gavilan Restaurant in Gilroy on Monterey Avenue. Palo Alto Amateur Radio Association meets the first Friday at 7:30 PM in the Menlo Park Recreation Center, 700 Alma Street, Menlo Park. 73 de Glenn WB6W. Tfc: W6PRI 4.

ROANOKE DIVISION

NORTH CAROLINA: SM, W. Reed Whitten, AB4W— SEC: KE4JHJ. STM: K4IWW. TC: K4ITL. SGL: K4IAN. OOC: W4ZRA. PIC: KN4AQ. ACC: W4CC. BM: KD4YTU. The Y2K standby activities provided an opportunity for improved cooperation with government, corporations, and relief agencies. Several county ARES groups (including Mecklenburg and Randolph) made significant progress with organizations that had previously been reluctant to use ARES. Thanks to all who took advantage of this occasion. Thanks also to the PIOs who used these activities to publicize our emergency communications capabilities. I cannot over emphasize the importance of increasing public awareness of the Amateur Radio Service. Riley Hollingsworth, of the FCC, echoed these sentiments at the Richmond Frostfest. You can hear him speak (and also attend the ARRL Section Forums) at the Raleigh Hamfest on April 9. Restructuring will bring changes to Amateur Radio. We should not let it cause dissension. Amateur Radio is a fraternity, and the personal contact is one of its most appealing aspects. Amateur Radio provides us with a way to meet people and, during emergencies, to help people. On top of that it is FUN! One of its greatest strengths is that it is NOT an anonymous activity. That is part of the reason that CB did not, and the Internet will not, make Amateur Radio obsolete. Indifference to our responsibilities is a greater threat to our chosen activity. See Gene's, W4YBQ, Area 10 DEC, thoughts on those responsibilities and ARES on the NCARRL Web site, <http://www.ncarrl.org>. Support our hamfests! Meet your new SM at the ARRL Section Forums at the Charlotte Hamfest, Mar 11-12. Enjoy the fellowship at the Down East Hamfest in Kinston on Apr 2. More forums and fellowship at the Raleigh Hamfest, Apr 9. Tfc: W4EAT 787 (BPL), W2CS 560 (BPL), NC4ML 327, WB4TOP 289, N4AF 226, K4IYY 221, K4IWW 207, AA4YW 195, W4IRE 133, AC4DV 123, KE4JHJ 123, W4FMN 62, W3HL 52, K4AIF 39, KE4AHC 35, AB4W 34, W4SRD 28, AD4XV 26, W4CC 24, NT4K 23, WD4MRD 23, AC4ZO 17, KB8VYCZ 17, KF4OZF 12, KR4ZJ 12, N0SU 12, KT4CD 8, KF4YHG 6, N2JLE 6, KF4KZD 5.

SOUTH CAROLINA: SM, Les Shattuck, K4NK— Greetings again from your section manager. As we write this, we are getting ready to go to the Greenwood hamfest tomorrow. Hope to see you at our table. Well...for good or for bad, the FCC restructuring report is out. I have gotten about 70 percent saying no good and 30 percent saying it was great. My observation is it won't do a thing to get more people into Amateur Radio. I have my six meter beam back up and am looking for contacts. I monitor 50.125 most of the time. Other newsBill, K4NNP, has settled into his new place in Anderson, Joyce and I had a guest for Christmas dinner ..Al, KM4TN, the section Tech Cood. We still have a bunch of openings for ARRL members in the field organization. Put something back into your hobby. Volunteer today. There is a job for everyone. Welcome, Mike Mello, N5MJ as a new OES. Nets...3.915 nightly at 7 PM, local, South Carolina SSB Net. Also 3.930 on Sat 9 AM for the Palmetto chapter QCWA net. Please join us. On two meters, I try to check into the upstate nets also. How about checking into your local repeater net and join the fun. As a last comment this month, yours truly has gotten a PMR-6 and AF-67. If you remember these, how about dropping me a line. You probably got a few gray hairs like me. Tfc, Dec 1999: Tfc: WW4SC 471, KA4LRM 123, KA4UIV 105, KT4SJ 104, W4DRF 57, K4JMV 50, W4UGD 46, K4NK 26, W4CQB 11. PSHR, Dec 99: KA4UIV 143, WW4SC 123, KA4LRM 122, KT4SJ 108. Congrats to all the stations who upgraded during 1999.

VIRGINIA: SM Lynn Gahagan, AF4CD—ASM: W4TLM. SEC: K4EC. ASM/DSEC: KR4UQ. SGL: KK4IY. TC: W4IN. PIC: W2MG. OOC: KR4UQ. STM: ACC: AF4CD. The ARES/RACES Amateurs in Virginia joined together as a team for the Y2K event New Years Eve. There were no significant problems reported in our Section. One good thing out of this exercise was that we were able to have a statewide event to test our skills working together. This event, being quite different than the Floyd activation back in September, we were able to use and test more of our amateur resources, due to the whole Section being involved. We were able to capture more newspaper and television exposure than ever before. Throughout the Commonwealth, over 730 Virginia Amateur Radio operators manned 73 Emergency Operation Centers, numerous rescue squads, fire stations, hospitals, police and sheriffs' departments. In a letter addressed to our SEC, Michael M. Cline, VDES State Coordinator writes a thank you on behalf of the Commonwealth of Virginia. A copy of this letter can be viewed on the Va. ARES/RACES Web site www.aresva.org. I would like to thank "AC" W4HJ, Geep WA4RTS, Bill W3IHZ, Ralph N4EHJ, and Jack, WD4KOF, for being NCS for our HF net on 3.940 MHz. Gentlemen, you did an outstanding job! A special thanks to all of the volunteers who provided an important service to the citizens of Virginia during a potential emergency. I don't want to forget the "crew" in the "Bunker" at Richmond. Ben, KC4ASF, ASEC Digital Ops notes that prior training before hand seems to have gone a long way. Other than a marginal link into the SW Va., things went very well. This was the result of your working to put the digital loop back into operation around the state. Ben envisions we will see the comple-

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tion of the digital network within the Va. Section in the year 2000. Frank, K4EC, has added, "In a true demonstration of volunteerism, there was a lot of time and effort devoted to planning for and participating in being ready for any potential problems as a result of what we all called the Y2K event. Fortunately, the predictions were not true with the evening relatively uneventful. However, we all learned a lot from what I would call the largest SET in Virginia history." 73 de AF4CD. Tfc: K4MTX 402, WA4DOX 223, KR4MU 223, W3BBQ 192, WD4MIS 162, K4YVX 128, N4ABM 110, WB4ZNB 88, W4UQ 65, K4DFUN 52, W4CAC 52, AA4AT 45, W4YE 36, K0IBS 35, AF4CD 32, WB4UHC 27, W4JLS 22, K4IX 22, WB2KQG 15, N4FNT 10, KB4CAU 7, W4MWC 4, W4IN 2, K4JM 2, W4HDW 1.

WEST VIRGINIA: SM, O.N. (Olie) Rinehart, WD8V—STM: N8OYY. SEC: W8XF. ASEC: KA8ZOO. SGL: K8BS. TC: K8L.G. OOC: N8OYY. ACC: WD8MKS. APRSC: W8XF. DC: K8MHR. PIC: WD8V. Restructuring is here, and in fact will become effective April 15th. The latest information I have at the time of this writing is that you will have your new question pools in hand by the time you read this. Lots of thought and informal survey done by me, leads me to believe at this time, that the total effect will be very similar to that experience by the Canadian amateurs. Little or no obvious effect on the quantity and quality of use of the amateur bands. I have become more aware of the absolute need for an active "Elmer" program for our newer people as well as a refresher course for some of our older hams, who may have forgot some of their past training or picked up some undesirable operating practices. No matter what is here, and we must make the best we can of it. Congratulations to all the amateurs who did update their contacts and procedures, fine tune their equipment and readiness skills, and like any pending disaster, the Y2K program was a total success. We are looking for an official Net Manager for the WV Section is progressing and seems to be quite healthy. My appreciation to all those ARES/RACES/NWS SKYWARN activities keep us all safe, secure and busy. Tfc: KA8WNO 427, WD8V 118, W8WVF 107, WD8DHC 101.

ROCKY MOUNTAIN DIVISION

COLORADO: SM, Tim Armagost, WB0TUB—Year 2000 came and went—and it appeared to be the "non-event" of the millennium. The fact that the Y2K bug was not a factor is testament to all those who fixed their software and imbedded technology prior to the roll-over. Amateur Radio in Colorado helped served agencies throughout the state. Many, many hams put aside their personal lives—and a once in a lifetime opportunity to usher in a special New Year—to be "on duty" at emergency operations centers, hospitals, fire stations, shelters, police and sheriff's facilities, and other locations. Well done and thanks to everyone who participated. A special thanks to the ECs across the state, and your section leaders—especially Erik, WOERX, Mike, N5LPLZ, Mark, KG0PA, and Tim, WB0TUB, who were at the forefront in preparing for this special date in history. In late December, Pikes Peak ARES got an opportunity to test their Y2K plan for real when the 911 system serving Colorado Springs and parts of El Paso, Teller, Pueblo and Fremont counties failed. Hams across the district were immediately dispatched and provided emergency communications for just under three hours until the problem with the telephone system was repaired. Congrats to MHDXA new officers Bill, KOMSP; Don, W0DM; Greg, W0ZA; and Jack, WMOG. Congrats also to Jerry, AD0A, elected as new NM for TWN Cycle 4 Net. And finally: Wow! The FCC issued their Report and Order changing the face of Amateur Radio as we know it. More on that in future columns. 73, de N0WPA. NTS traffic: AD0A 233, K0TER 63, N0UOD 33. CAWN Totals: W0WPD 1016, W0GGP 618, N0DKK 543, AA0ZR 538, N0JUS 395, W0LVI 368, N0NMP 360, K10ND 356, W0BOVET 355, K0HBZ 344, N0FCR 254, W0NCD 189.

NEW MEXICO: SM, Joe Knight, W5PDY—ASM: K5BIS & N5ART. SEC: K6YEJ. STM: N7IOM. NMS: WA5UNO & W5UWY. TC: W8GY. ACC: N5ART. New Mexico Roadrunner Net handled 104 msgs with 1089 checkins. New Mexico Breakfast Club handled 250 msgs with 1081 checkins. Yucca Net handled 29 msgs with 817 checkins. Caravan Club Net handled 10 msgs with 50 checkins. SCAT Net handled 16 msgs with 583 checkins. Four Corners Net handled 26 msgs with 300 checkins. GARS Net handled 3 msgs with 295 checkins. Rusty's Net handled 112 msgs with 775 checkins. Valencia County Net handled 10 msgs with 58 checkins. We survived the Y2K A-OK in NM. There were several minor events, but everything went real well. Our thanks go out to K6YEJ, SEC, NM, and who is the official in charge of ARES/RACES in NM, and to all the ARES/RACES members in the state who did so much preparation and who participated in the exercises that made the operation such a success. Our thanks also to KB5VWV and his crew for the excellent job at the NM State EOC in Santa Fe. Lots of good PR for Amateur Radio on TV and Broadcast stations around the state. Guess the Y2K bug is still with us, since our Motor Vehicle Dept. computers crashed today. It seems they installed some new software last week and erased their Y2K fix, but they are back up and running now. Good reports from other SMs around the country. Have had lots of phone calls and e-mail from around the state regarding the FCC's restructuring rules. Guess we can't all be happy, but will have to live with what they pass down to us. Best 73s, W5PDY.

UTAH: SM, Mel Parkes, N5UVP—License restructuring has created a lot of interesting comments!!! If you are in a position to upgrade, I would suggest that you dig out the books and start studying. If nothing else, April 15th will have a new meaning in 2000. I guess we should thank the FCC for that! For all those who have enjoyed HF privileges, a new opportunity awaits—start now to find those who are upgrading and become their Elmer. Remember the first time you tried HF? Well, let's help those who take the initiative to obtain new privileges. Check out the Utah Hamfest 2000 Web page at <http://www.utahhamfest.org> and register early. 73 N5UVP.

WYOMING: SM, Bob Williams, N7LKH—The Hams of the WY Section participated extensively in the year-end Y2K communication support exercise New Year's Eve. It was the culmination of all the three practice sessions earlier in the year. Sixteen of the 23 Wyoming counties checked in via Amateur Radio with 104 operators on duty. Both HF and VHF were used resulting in solid contact with the WEMA Control Center at Cheyenne. There were no Y2K anomalies reported, but the WY Section Amateur Radio community was ready. Scott Harris, W7WRO, the Wyoming State RACES Officer was very pleased with our response. He points

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HANDHELDS



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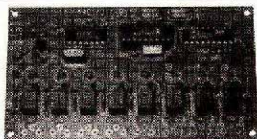
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out that this was just one com-support event, and more can be anticipated at any time so continue to be prepared. In particular note that we will be asked to provide com-support for the March of Dimes Walkathon in April, and we have already been asked to provide the com-support for the Tour de Wyoming bicycle tour again this year in July. The bicycle tour route and schedule will be presented for discussion at the Hamfest in May.

SOUTHEASTERN DIVISION

ALABAMA: SM, Bill Cleveland, KR4TZ—ASM's: W4XI KD4PQQ, WB4GM, KB4KOY. SEC: AF4HE. STM: K9CNI. BM: KA4ZXL. OOC: WB4GM. SGL: KU4PY. ACC: KV4CX. TC: W4OZK. PIC: KA4MGE. We are near the severe weather season in most of Alabama. Please volunteer to help the local and section level SKYWARN operations. During times of statewide severe weather, the Alabama Emergency Net will activate on 3965 kHz. In addition, we're asking that all Alabama ARES groups participate in a SKYWARN net during severe weather. The National Weather Service Offices in Alabaster, Mobile, and Tallahassee (FL) handles the forecasting duties for Alabama. For information on which NWSO you report to and how, check out our Web site at www.qsl.net/al-arri. Jeff O'Brien, KV4CX, has volunteered to be our new ACC. Let's all welcome Jeff aboard, and wish him the best of luck! Also, George Byron, KD4HUA, has volunteered to be the editor of the Alabama Section News. Please send any news clippings from your club's newsletters to George so that he can include it in the Section News. George's e-mail address is KD4HUA@AMSAT.ORG. PSHR (Dec 99): WB4GM 216, WA4GQS 201, AF4HE 180, W4ZJY 174, WB4TVY 160, AC4CS 148, KC4TLG 144, KC4VNO 132, K4AKC 123, W4CKTS 118, KC4PZA 111, W4PIM 108, W4XI 107, W4DGH 104, W4NTI 92, W4ZBA 76. Tfc (Dec 99): WB4GM 316, W4ZJY 315, W4PIM 117, W4CKS 78, AF4HE 65, WA4GQS 45, KC4VNO 42, K4AKC 40, W4ZBA 24, AC4CS/16, W4NTI 15, W4XI 14, W4DGH 13, WB4TVY 12, KE4OLE 9.

GEORGIA: SM, Sandy Donahue, W4RU—ASM/South GA: Marshall Thigpen, W4IS. ASM/Legal: Jim Altman, W4UCK. SEC: Tom Rogers, KR4OL. STM: Jim Hanna, AF4NS. SGL: Charles Griffin, WB4LUV. BM: Eddie Kosobucki, K4JNL. ACC: Bob Lear, K4SZ. OOC: Mike Swiderski, K4HBI. TC: Fred Runkle, K4KAZ. PIC: Matt Cook, KG4CAA. I have appointed a Public Information Coordinator, Matt Cook, KG4CAA. Matt is a radio news anchor with WGST radio and the Ga News Network. Matt can be heard in most of the state on radio stations that are affiliates of GNN. He anchors the daytime news on the half hour. He got us some good exposure with WSB-TV during the Y2K activities. Speaking of Y2K, nearly every county was ready and staffed with hams ready to assist with backup communications in case of problems. There were none, of course, but the exercise was very educational and put ARES in a most favorable light. Thanks again to SEC, KR4OL, for organizing the event. He is so organized, he was able to take a vacation with his family on New Years Eve and ARES purred along like a finely tuned engine. New officers for Albany club: Pres KD4OZR, V Pres, KF4YED, Sec KF4TJR, Treas K4PHE. The Albany club lost a valued member. Retired banker, Hubert King, N4RJG, passed away on Christmas Day. He was very active in the Albany floods and the annual hamfest. Hope to see you at the Kennehoochee Hamfest, March 18, at Jim Miller Park, Smyrna. At the annual ARES conference in Forsyth, the ARES Amateur of the Year award was presented to Mike Boatwright, K04WX, DEC for GEMA. Your benevolent SM presented KR4QL with a 2000 Handbook, special leather bound edition, for his leadership during my 1st term. 73, Sandy. Tfc Dec: K1FP 175, WB4GGS 118, WU4Q 109, AF4NS 91, KA4HHE 63, K4BEH 56, KU4WJ 39, K4WKT 20, K4BAI 4.

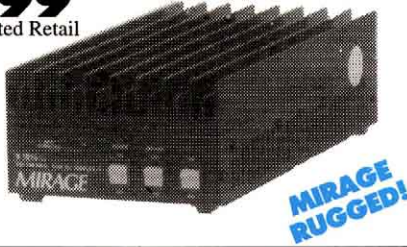
NORTHERN FLORIDA: SM, Rudy Hubbard, WA4PUP—ASM-E CENTRAL: AC4PF. ASM-WPAN: K04TT. ASM-APRS: WY8O. ACC: WA4B. BM: N4GMU. OOC: AF4EW. PIC: KF4HFC. SEC: WA4NDA. SGL: KC4N. STM: WX4H. TC: K04TT. Packet: N4GMU. December was Y2K, and it seems everyone was ready to participate. Instead of a party, the Amateur Radio operators stood by their radios just in case the unexpected happened. The State EOC was ready for any event, and depended on Amateur Radio if the worst happened. At the last minute so to speak, I spoke with the Communications Officer at the SEOC, and suggested they use the Northern Florida Section Emergency Frequency of 3950 to poll the counties with Ham Radio in the local EOCs. This worked very good, and the majority of the counties did have ham radio HF capability. The operation took about 6 to 8 hours, and was the done in an outstanding manner. Signals were great, and very little relays. Everyone participating deserves to be congratulated. The ARES/RACES personnel operated the local EOCs and the Capital District provided the personnel for the States' State Warning Point Station. The Orlando Hamcation will be history by the time you read this, and hopefully, we all will have an opportunity to talk about the other ARRL programs. Last month, I was critical of the encroachment by the WCF into NFL. The served agencies should not assume operational responsibility or direct any of the ARRL programs, especially the emergency aspects. It is difficult to manage any program with volunteers, and to have it managed by each of the disaster agencies would be a disaster. That would be like having that many agencies with their own operators. In like manner, each Section should manage its own without the intrusion of another Section. This does not mean that cooperation and coordination is not desired. To the contrary, it is imperative to have a good relationship with adjoining Sections because there are times a need exists to help one another. 73 de Rudy. Tfc: KE4DNO 333, N0Z0 262, AF4PU 236, KE4PRB 154, AD4DO 105, WD4II0 97, K1JPG 95, N9MM 94, W5MEN 71, AF4GF 66, W4KIX 65, WB2FGL 60, KF4NFP 59, KF4TM 51, K4JTD 32, KB4DCR 27, KJ4HS 27, WD4JNM 27, WB2IMO 26, N4ORZ 16, AB4PG 14, KM4WC 12, WA4EYU 9, W8IM 8, WX4J 7, KG4EZO 2.

SOUTHERN FLORIDA: SM, Phyllis West, KA4FZ1—A hearty thank you to Neil, W4NHL, now in WCF, who handled the special Y2K requests for SFL. His TV news interview was the Channel 8 top story of the hour and gave ham radio a very positive image. KD4GR, SFAN net manager, reports 35 SFL EC's and ARES members checked into the SFL ARES net for the rollover into 2000. Fortunately, all went well. I was pleased to see the excellent attendance at the Ft. Myers Hamfest, a good way to start the year! Congratulations to KJ4N and WA8PXL for the cover picture and feature article in the QCWA Journal. W4SS has completed the revision of the SFL Emergency Plan to include MOUs with served agencies. Copies will be given to each

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Power Curve -- typical B-5016-G output power

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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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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.

More 160 Watt, 2 Meter Amplifiers... B-2516-G, \$299. For 10 to 35 watt mobile or base stations. 160 watts out for 25 watts in.

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100 Watts for 2 Meter HTs

B-310-G
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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 1/8 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!

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.

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MIRAGE Dual Band 144/440 MHz Amp

BD-35
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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
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- Reverse polarity protection
- Works with all FM handhelds to 7 watts
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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).

6 Meter Amplifier

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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.

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.

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144-148	KP-1/2M	KP-2/2M
220-225	KP-1/220	KP-2/220
430-450	KP-1/440	KP-2/440

1 1/4 Meter Amps (223-225 MHz)

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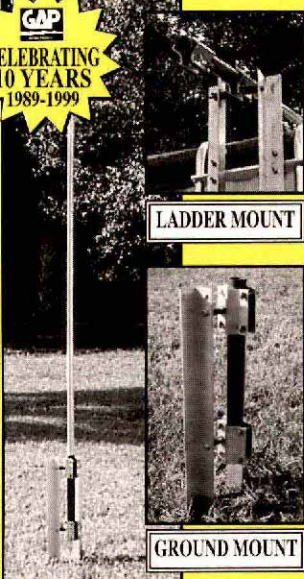
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DEC, EC, ASM, and cabinet member at the Miami Hamboree workshop. Thanks to N2PNO, Adam Levenson, for a job exceptionally well done as EC for Martin Co. He handed the reins to N3PYQ this month. The new bulletin manager for SFL is KC4ZHF. Bob is very active in NTS on all bands, CW and phone, with extensive experience as manager, NCS and rep. He consistently makes PSHR and serves as OES and ORS. He will be contacting the OBS this month. The new ACC, WA4AW, has begun contacting all SFL clubs. Jeff has been licensed for 36 years, is a life member of ARRL and QCWA, held EC and RO appointments in Lee and PB Counties, and holds a TS appointment. He has extensive experience with ham radio clubs as club president among other offices. He is an FCC licensed technician serving as Regional Communications Engineer for the Division of Forestry. If your club has not been contacted by Jeff, please contact him whether or not your club is ARRL affiliated. He is compiling a list of ALL SFL clubs. The newly appointed OOC is RL Caron, K4GP. He will be starting to organize his team shortly. My thanks to all who have graciously volunteered to fill an open or new appointment as we continue to build the section. Plans for our section-level workshop at the Miami Hamboree are moving along. Traffic by KJ4N: WA9VND 879, K4FQU 841, K44FZ1 570, W7AMM 524, AB4XK 517, K4SCL 384, KC4ZH 343, KJ4N 240, WA4EIC 227, KD4GR 204, KB4WBY 183, KD4HGU 173, W8SZU 157, WB4PAM 146, AA4BN 137, KE4IFD 126, KE4UOF 94, WA4CSQ 91, AD4IH 68, K4RBR 51, AA4HT 49, W4WDN 44, WT4XK 42, KF4KSN 39, W6VIF 37, W4AUN 37, KF4IDG 33, WD4JN 27, KG4CHW 26, KT4PM 24, KE4ESV 24, W4WYR 23, KT4TD 22, KV1S 21, KE4WBI 18, K4OVC 9 KE4VBA 9, AF4NR 7, KG4DUF 6, W3JI 6, K4ENA 4, KF4UTH 4, WA4EXA 4. 73 de K4AFZL.

VIRGIN ISLANDS: SM: John Ellis, NP2B, (np2b@arrl.org)—ASM: Drew NP2E, St Thomas. ASM: Mal NP2L, St. John; SEC: Vic WP2P, St Croix. PIC: Lou KV4JC, St Croix; ACC: Debbie NP2DJ, St Thomas; NM Bob, VP2VI/W0DX, Tortola. Things returning to normal, many folks still without phones or cable TV on St Croix, but repeaters are up and running. No word yet on Team RTTY in St Thomas, should have something next month. Ron, KP2N, Drew, NP2E, and Bernie NP2W always active. 146.91 machine on St Croix is down but the 147.25 is up with the higher gain antenna. That antenna works good, but the 5/8 wave whip has the staying power during the hurricanes! SM, again, wants to thank the folks at Ackley 99 Communications for their generous donation of repeater space, antenna space and power for the 147.25 machine. Antenna party at Lou's (KV4JC) to put tower back up. NP2EF, W9UUKK, KV4JC, NP2B and any others we can muster will be pressed into service. St. Croix ARC party this coming weekend (January 15) promises to have 40-45 people. Repeater 146.63 St John, 146.81 St Thomas, 147.25 St Croix. That's it for now, John, NP2B.

WEST CENTRAL FLORIDA: SM, Dave Armbrust, AE4MR, ae4mr@arrl.org—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. Join me in welcoming the following new cabinet member: Affiliated Club Coordinator, Frank Morton, AC4MK. The Web page for the new section has received a lot of changes if you have not visited it lately stop by and check it out again. With the turn of the new millennium, the new ARRL section and restructuring around the corner there never has been a better time to get more involved in the future of Amateur Radio. The future of ham radio is in our hands. Together, we can make these new beginnings into something special in WCF-County. There are many wonderful clubs through out the section that would love to have you more involved. ARES groups are in need of your assistance with emergency communications. VE teams can use more examiners. Become a part of the SKYWARN program. Our hobby has so many exciting opportunities to learn something new or to teach others what you already know. With so many new radios available with new feature and functions, becoming more involved is a good way to justify that need to buy a new model! Hamfests- Englewood 3/11. 73, Dave AE4MR.

SOUTHWESTERN DIVISION

ARIZONA: SM, Clifford Hauser, KD6XH—By the time this article is published, you will have formed an opinion on the new FCC license structure. If you don't agree with the proposal, write to the FCC and express your opinion. My only concern is the lowering of the knowledge of Amateur Radio procedures and operating practice for the EXTRA class license. Yes, CW is not needed as much as before, but if you have every been in an emergency situation when radio conditions are bad, you know that CW signals will get through easier than voice signals. If this class of license is to be the elite of the operators, then something more than just an easy written test is needed. An Extra class operator should be very proficient in operating procedures. But no matter what we think or propose, the FCC will have the final word. I don't think this was the way the ARRL people wanted the structure to change. Did you survive the Y2K bug? Each community emergency personnel had their own way to make sure all went well. The Glendale hamfest went quite well, but it was cold in the early morning. The Kingman area hams plan to help with the "Another Dam Race" professional bicycle race on February 25th. Tucson area hams will provide radio support for the "Climb A Mountain" cancer walk on 8 February. The spring Hamfest is March 11th at Scottsdale Community College. Please stop by and see me if only to say hello. It has been rumored that Riley 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 latest ARRL letter stated that Riley Hollingsworth, K4ZDH, will also be the guest speaker at the 2000 Dayton Hamfest. My e-mail address is kd6xh@arrl.org, and my home telephone number is 520-744-9095. 73, Clifford Hauser, KD6XH.

LOS ANGELES: SM, Phineas J. Icenbice, Jr, W6BF—According to the Olympia Amateur Radio Society, "Watts News", some 15 or more Q signals are missing from the official ARRL list. John Queen, KA7SEY & Mike Colyar, K7ITL, have provided a suggested list. Some very useful new "Q" samples are, as follows: QLF = I am sending with my left foot QRC= Rag "chewer" on frequency QET= Phone home QFH= This frequency is Hogged (go elsewhere). The complete list is available from the "Tri-county Amateur Radio Association, January 2000 bulletin QRM.—The information released at the January meeting of the Los Angeles Area Council of Amateur Radio Clubs (LAACARC) was that the ARRL Convention on the Queen Mary (1999) was a big success



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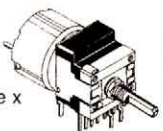
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and all of the clubs and individuals who participated should be congratulated. A letter of congratulations is in order for Nate Brightman, K6QSC, and his entire crew who negotiated a very respectable return for each participating club. Above all, the convention was a huge success. Thanks to ADOA, Jerry, and his write-up on how to conduct a convention, we have now trained a large number of Hams who know the ropes and how to pitch them. We have even trained a few real experts. — Many comments about the FCC's Restructuring Program for Amateur Radio Licensing, revolve around "what a waste of time and money why can't we work on something worthwhile". — How do we increase the activity and interest in ARES, was a subject discussed by Spud, K6KH, and Hank K6YJM, at the LAACARC meeting at the RED Cross building. If you have any suggestions please contact Hank or Spud. Vy 73, Phineas, de W6BF.

ORANGE: SM, Joe Brown, W6UBQ—The Field Organization of the ARRL Orange Section is in need of volunteers. If you want to serve and give something back to our wonderful hobby, sign up. There are many areas of service, e.g. FCC Auxiliary tactical use of packet, resource management and public service. Through your involvement in ARES, RACES, NTS, local clubs, training and other organized activities, the many problems facing the Amateur Radio Service can be minimized. We need you! There are 12 section level appointees to help you make Amateur Radio better and more enjoyable: ASMs: (Riverside) Joe, K06XB, ko6xb@arrl.net; (San Bernardino Co) James, K6LWJ, daiuy@idt.net; (Orange Co) Art, W6XD, w6xd@arrl.org; (Special Projects) Fred, W6TKV, w6tkv@arrl.net. EC, Disaster: Mike, N6KZB, burtton@firecom.com. ACC: Sandi, W6WZN, w6wzn@arrl.org. BM: Al, W6BBH, w6bbh@arrl.net. OOC: Nick, KA6VGY, ka6vgy@juno.com. PIC: Mike, W6MJU, w6mj@jps.net. STM: Glenn, N6GIV, gmliler@ccl-29palms.com. TC: Art, K6GHF, asutoru@pe.net. SGL: Ed, N6IIE, edslaughter@eee.org. The Amateur Service has done a fantastic job in supporting public activities. Training and organization is dependent upon your support of ARES/RACES. Contact any of the Section Leaders to offer your support. SEC: Ted, N6RPG, n6rpg@jps.net. DEC (Riverside): Norm, K6BDWJ, poppo@inland.net. DEC (Orange): W5BYG, corky@arrl.net. DEC: Ron, K6N6B, kn6nb@jps-net.com. By working together with clubs and the Orange Section leadership, our goal is to develop a more aggressive, more visible and more effective Amateur Radio presence in every community. Very 73, Joe Brown, W6UBQ, w6ubq@arrl.org.

SAN DIEGO: SM, Tuck Miller K6ZEC, 619-475-7333— Can you hear it? Listen to all those strange sounds. Can you figure out what they are? If you listen very closely, you can hear pages turning, keyboards clicking, and hard drives whirling. What in the world could it be? Give up? Those sounds you hear are from all the folks studying to upgrade their licenses now that restructuring is now a reality. I am sure there are many views on the outcome, and we will be hearing both pro and con for years to come. Hopefully by the time you read this, I will have passed my Extra class theory, and will be waiting for that magical day, when I will finally have made it to the top. I thank all for their notes of encouragement. Two very important conventions coming up. The international DX convention in Visalia this April, and then in May, the ARRL National in Dayton. I have never been to Dayton, so am really looking forward to it. Sorry to hear about George's YL, she recently underwent an operation. We hope for a very quick recovery. Speaking of operations, Jack Dobbs, WB6AXW, also went under surgery, and is recuperating. Congrats go to Jim, N6RSL, for being the SOBARS Ham of the Year, and also post-humously to Carl, KE6JQL, for the Amateur Radio Club of El Cajon. The DX club meets the 4th Wednesday of each month, at the Hindquarter Restaurant. We will miss Ralph, W6OAB, who became a Silent Key on December 20. Ralph was chairman of the Elks Hams, of Lodge 1812. Happy St Patrick's Day to Pat, KC6VVT. He really takes this holiday seriously. Please be sure to send me all the new officers for your club. If you have a new president, have them contact me. Send e-mail to K6Zec@arrl.org For traffic KT6A 1075, KD6YJB 319, WA6ODQ 172, WA6IIK 11, BPL: KT6A 1075, PSHR: WA6ODQ 148, KT6A 138, KD6YJB 112. Until next month...Remember, Helping Others.....Always Worthwhile!! 73, Tuck, K6ZEC.

SANTA BARBARA: SM & STM: Rob Griffin, K6YR—805-543-3346 & k6yr@arrl.org. SEC: Jack Hunter, KD6HHG (kd6hhg@arrl.net); ACC: Michael Atmore, KE6DKU (jamore@telis.org); OOC, Howard Coleman, W6HQA (w6hqa@pacbell.net); PIC, Jeff Reinhardt, AA6JR, (jreinh@ix.netcom.com). TC: Warren Glenn, KM6RZ, (wglennrz@ix.netcom.com). ASM-Ventura: Don Milbury, W6YN (w6yn@juno.com) ASM- Internet, Jack Bankson, AD6AD (jackbankson@jps.net); DECS: Santa Barb-Dave Lamb, WA6BRW (dlamb@silcom.com); SLO-Bill Peirce, KE6FKS (ke6fks@arrl.net) & Ventura-Dave Gilmore, AA6VH (aa6vh@arrl.net). Congrats to Jack Hunter, KD6HHG, Section Emergency Coordinator on his nomination as the Southwestern Division 1999 Volunteer of the Year! Well deserved. Results from the SW Division SMs in next month's report. 50 year ARRL membership plaques and commemorative pins recently awarded to two or our Section members: Carl Stengel, W6JEO in Goleta, and Joe Roark, W6JGI, in Solvang. On behalf of the Section members: SALUTE. SB Sec Web: www.qsl.net/arrlsb. 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 176/508, KF6OIF 132/86, KE6MIW 96/27 & KF6UMU 115/- . That's 30, Rob, K6YR.

WEST GULF DIVISION

NORTH TEXAS: SM, Don Mathis, KB5YAM—STM: KC5OZT. SGL: N5GAR. OOC: WB5UDA. AAC: WN5PFI. ASMs: KX5K, K5RE, KK5QA, KK5NA, N5JZ, KB5LWZ, KD5HIS, AD5X, W5GPO. Visit the section Web page at (<http://www.isic.net/net/texas.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. 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. This is the first column after the first of the year. I would like to express my thanks for all of the efforts that I had seen expended in preparing for the Y2K event that didn't happen, especially of those in the section ARES group. Based on the reports that I had received before the event and the evaluations that I have received so far after the event I feel confident that we would have been able to do our part should the have been required. A plus side of all of this is that many local

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agencies have had a working relations either started or improved with the planning sessions that occurred. Hopefully we can build on this in the future. I would like to thank Malcom Shepherd, W5FB, for his ASM service to the section in the past. I have enjoyed the meetings that I have had with Malcom and look forward to meeting with their group more in the future. I would also like to thank Josiah Brown, K5UPN for his past service to the section as SEC. Joe has agreed to continue on with many of his other duties in the ARRL organization including DEC, DTTN Net Manager. He has also accepted the new job of NTX liaison to the Texas ARES Net. A couple of thoughts on the new license classes. I am glad that it is finally released. Even though it might have not been exactly what I would have wanted (what in life is???) It is now time to close ranks and make the most of what is there. I want the section members to do every thing possible to encourage new hams and to encourage all current ham to rise to whatever level that they wish to aspire to. Half of the fun of ham radio for me was the learning necessary to advance to the next level. My recommendation for everyone this next year is to try a new aspect of ham radio that you had not done before, be it CW, Digital, Satellite, ATV, APRS, SS, microwave or find some one that is doing that aspect and follow them around. Most would be very happy to have a captive audience. We will be building up the section web page with possible contacts. You might even like it. Dec SAR Report: N5JZ 336, K5AO 289, KC5OTZ 268, WA5I 127, K5MXQ 101, W5AYX 89, KC5VLW 81, KB5TGH 68, PY2CGB / W5 67, AC5Z 26, KT4CB 14, N7DXH 12, KB5YAM 10, KC5SMC 6, KD5AHW 2, N8QVT 1.

OKLAHOMA: SM, Charlie Calhoun, K5TTT—ASMs: N6CL, W6CL. SEC: W5ZTN. ACC: KB5BOB. PIC: WA9AFM. OOC: K5WJG. SGL: W5NZS. STM: K5KXL. I was very pleased with the level of activity across the state during the Y2K watch. I received reports from the following groups who manned operations for their localities. The City of Lawton and The Comanche County Emergency Management folks asked The LFSARC to support their efforts with Y2K. The Tri-State Amateur Radio group manned the nursing home and city hall. The Salvation Army AR/OK Division had 8 SA stations and 29 check-ins on their HF net. The Enid ARC supported the local hospitals, OHP, and the EOC. Shawnee amateurs supported their local EOC. Tulsa had a large operation with operators at all local and outlying hospitals coordinated through the EOC. All local clubs participated with 79 hams active. The OPEN net on 3900 was activated at 23:00 CST. Elk City hams were on standby with an operator at the hospital ready to activate them if needed. Bartlesville hams readied the local hospital and also the hospital in Nowata, coordinated through their EOC. All the reports I have compiled are on the Web page for your convenience. I want to thank you for all the sacrifices you made to make this happen. I must point out one in particular. Brad Pitts, KD5IUS, made the effort to participate even after he and his wife welcomed their new son on 12/30. Thanks and congratulations Brad! Many of the local nets had direct links to the state EOC. If you aren't on my e-mail list please let me know. <http://www.busprod.com/k5ttt>. 73, Charlie.

SOUTH TEXAS: SM, 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: K5JYN. BM: W5KLV. OOC: W5JAM. SGL: K5PNV. March is the windy month. We just finished Y2K stand-by. I noticed one thing with interest, as we watched midnight move into New York City, none of the buildings came tumbling down and the people seemed to be having a great time. I left my computer on at home and it didn't go down. I want to thank N5JIR for bringing the Prime Co Van to the New Braunfels EOC. N5HK for manning the EOC and the van. KC5WZV for manning the New Braunfels Hospital, while I manned the new Red Cross Office. We spent until nearly 4 AM on duty, just in case something happened in California. We had plenty of good food throughout the night. In the State of Texas, we had about 2500 Amateurs working with all the different agencies, due to the reports that I received. I want to thank all those who gave of their time to assist in Y2K. This is the first time that all agencies and organizations were looking to ham radio for back-up communications. This has been a great awakening as to the value of Amateur Radio for Texas and the World. Thanks again to all. On January 3 the Red Cross called me to furnish communications between New Braunfels, San Antonio, and the major fire, which burned about 400 acres, here in Comal County. N5HK was dispatched to the fire, as he was coming home from work. I stayed here in New Braunfels to coordinate between this office and San Antonio. We were released about 11 PM. It's great to have operators that are ready at a moment's notice. It was sure good to see Coy Day, N5OK, at the Austin Amateur Radio Club 80 year celebration, affiliated with ARRL. I was impressed with the CW contest, sent by foot. Those in Austin that did not attend, missed out on excellent food and fellowship. W5WIA looked a little more aged than normal, maybe he should be an actor. While writing this, I just learned that Don Dingus, K5RYT, became a SK at about 6:15 AM today. Cousin to Henry Dingus, W5YQZ. W5YQZ became a SK on December 11 and K5RYT became a SK January 11 just one month apart. Don and his wife and my wife and I were close friends. He will be missed by all. Don was very active on most of the traffic nets. Have a good March. 73 until next month. TC: W5SEC 807, KA5KLU 230, NR5ED 192, W5KLV 184, W5GKH 144, N5OUJ 72, W5ZX 47, W5ZIN 41, N5NAV 27, K5UCQ 17, W5OYV 14, N5HK 1.

WEST TEXAS: SM, Charlie Royall, WB5T, 915-944-0469, WB5T@arrl.org. ASMs-Cley, K5TRW. Ron, KB5HGM. Jerome, K5IS. Fred, W6VPI. Sandy, W5MVJ. SEC: Alex, N5LRH. OOC: John, K05D. OBM: Frank, N5WT. New Appointment: EC, Ector County, Tom McCain, KC5ETW. Midland ARC new officers: Pres, Pete Stull, WB7AMP; Vice Pres, Larry Mitchell, N5OKO; Sec, Norma Bentley, W5STG, Treas, C.A. Ross, KM5OK. Don't forget Midland's St Patrick's Hamfest, March 18 and 19 - come early; stay late! San Angelo ARC new officers: Pres, Gil Gilstrap, KK5YZ; Vice Pres, Paul Wittenborn, N7SDQ; Sec/Treas, Glenn Miller, AA5PK. SAARC's Ham of the Year was David Wolfe, KA5VTG. This New Year brought the long-awaited changes from the FCC for Amateur Radio. There is now a shortage of study guides for upgrades! My special thanks to Odessa's Gary Peek, N5XXF, for all his years to service to Ector County as the ARES EC. The ARES net control for Y2K did fantastic statewide. Everyone did their job well under the leadership of the South Texas SM, Ray Taylor, N5NAV. Thanks to all who participated. 73 de Charlie, WB5T.

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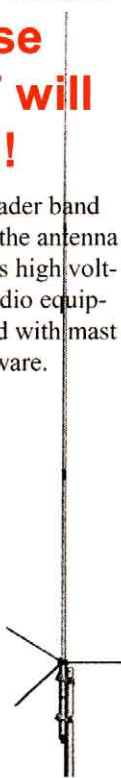
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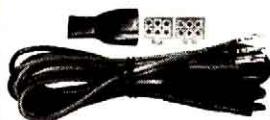
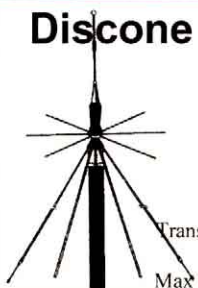
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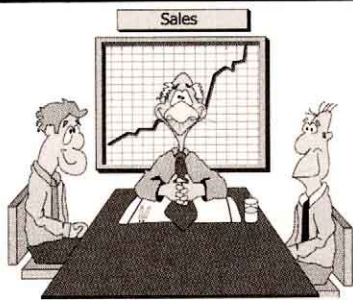


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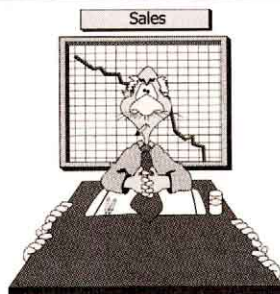
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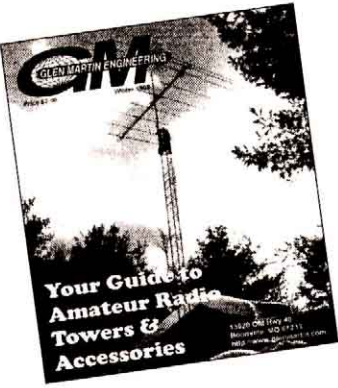


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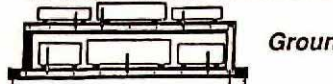
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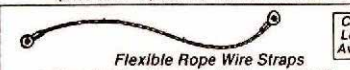
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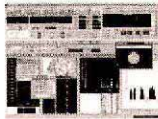
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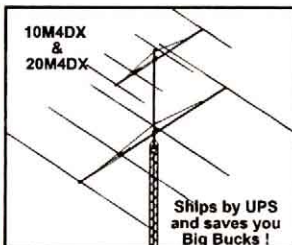
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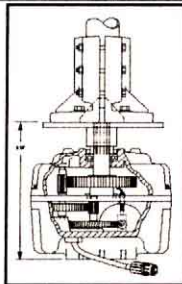
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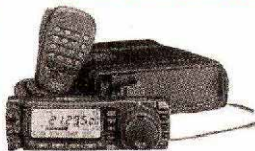
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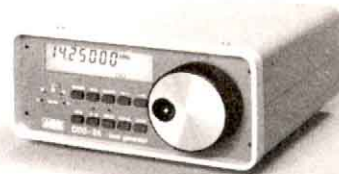
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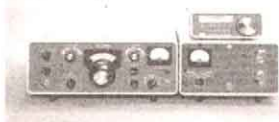
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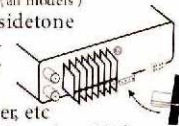
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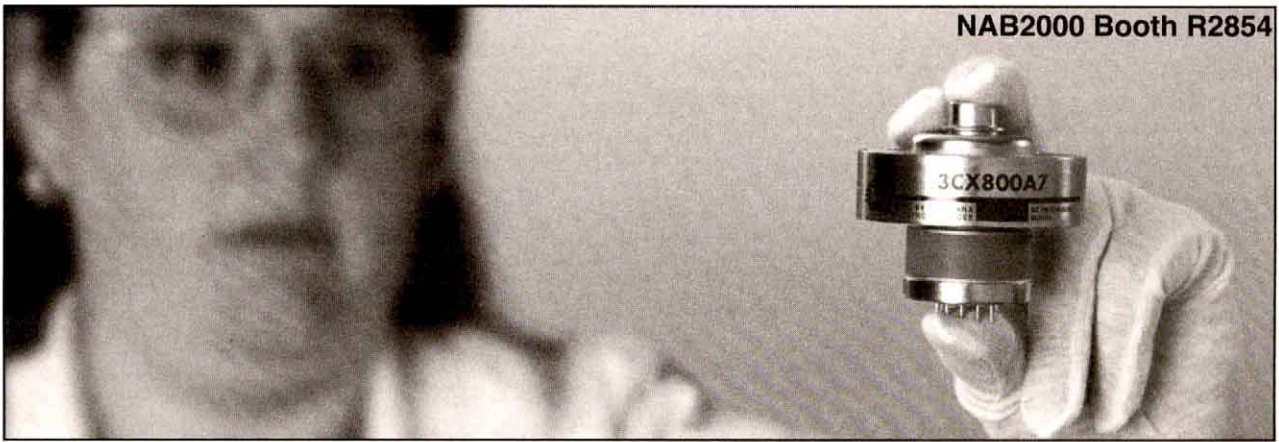
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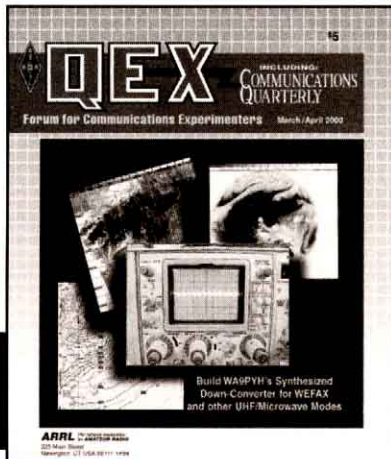


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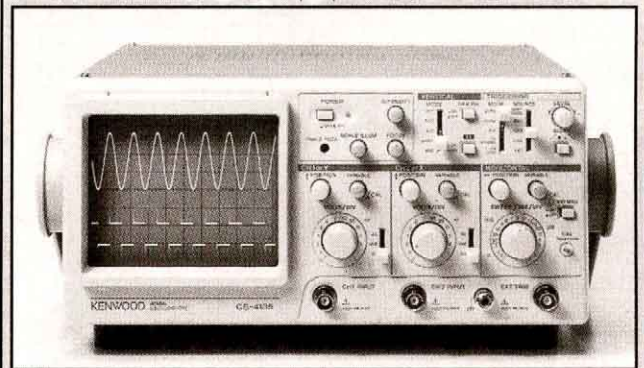
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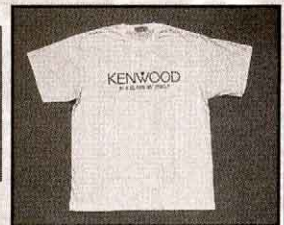
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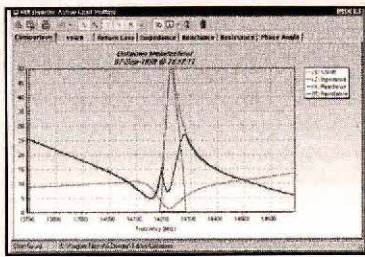
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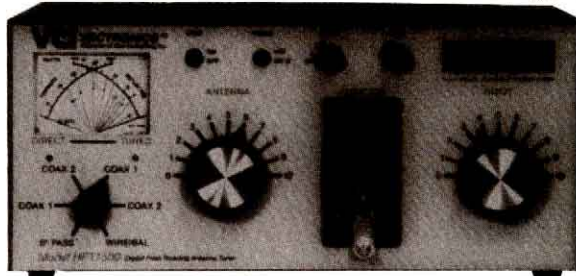
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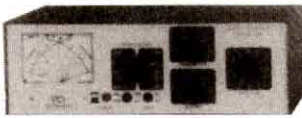
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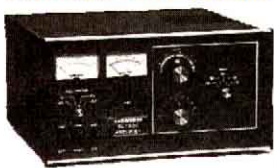
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- 2) Pass the 5 WPM Morse code test before or after April 15, and receive a CSCE. (Note: Tech Plus licensees already have 5 WPM exam credit).
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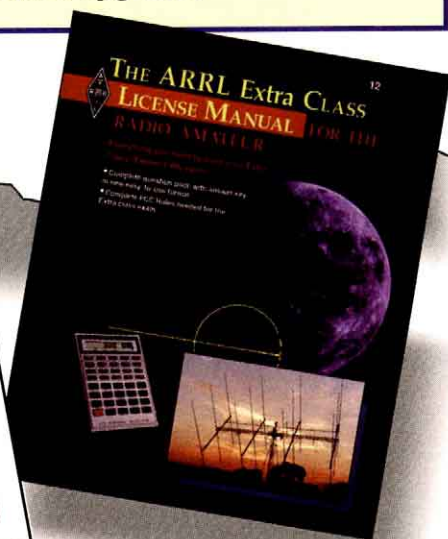
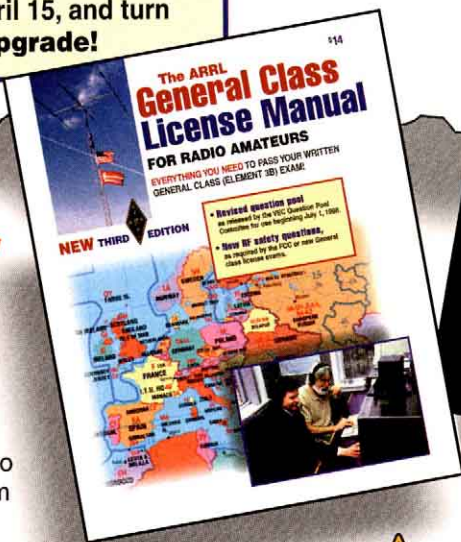
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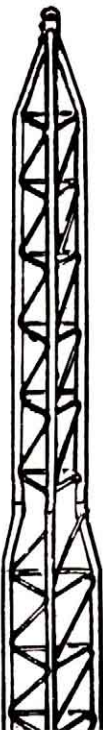
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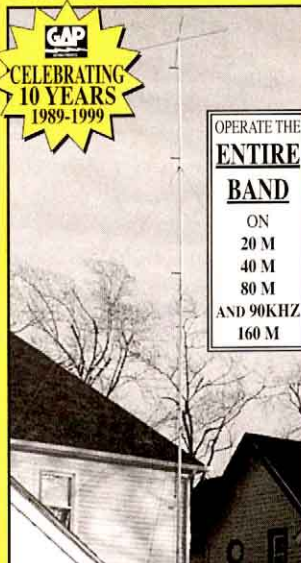
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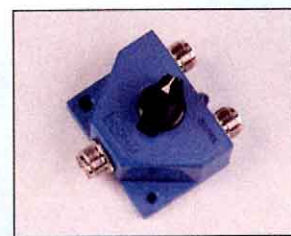
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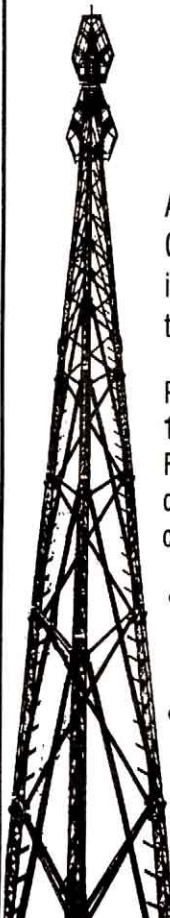
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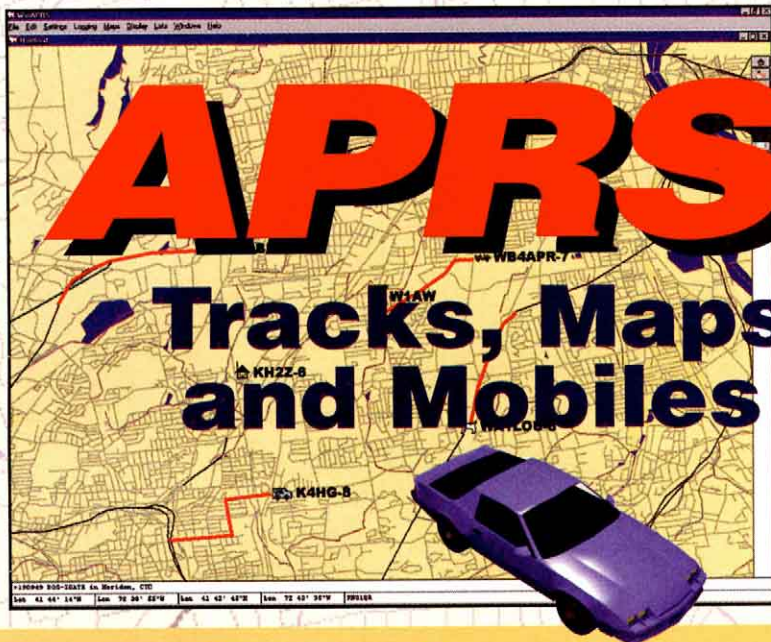
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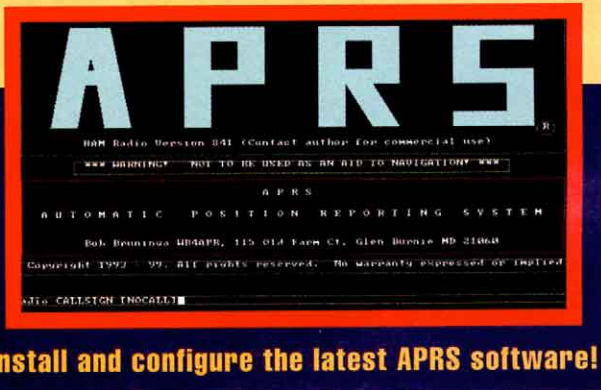


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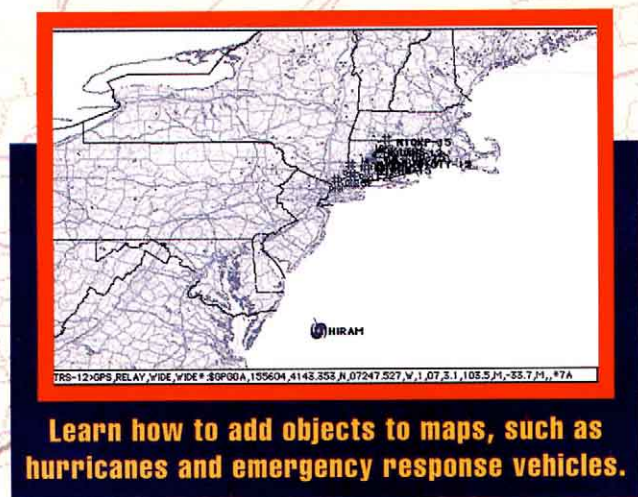
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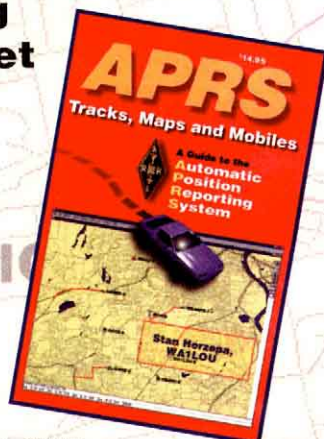
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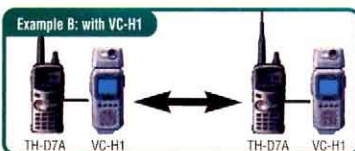
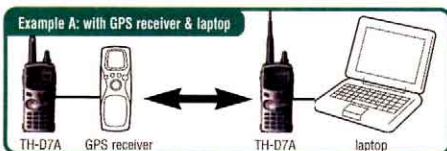
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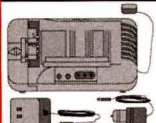
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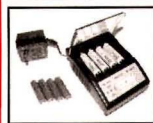
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GAR30/GAS604	\$35/24
SB25G/45/55	\$39/89/109
TB3/TB4	\$85/99
HBX32/HBX40	\$349/439
HDX48/HDX56	\$589/699
HDBX40/HDBX48	\$549/699
BXB5/6/7/8	\$39/49/59/59

Please call for more Rohn prices

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

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

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

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!

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

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

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

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

TIMES MICROWAVE LMR® COAX

LMR-400	\$.59/ft
LMR-400 Ultraflex	\$.89/ft
LMR-600	\$1.19/ft
LMR600 Ultraflex	\$1.95/ft

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

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

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

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

PHILLYSTRAN GUY CABLE

HPTG1200I	\$.39/ft
HPTG2100I	\$.52/ft
PLP2738 Big Grip (2100)	\$5.50
HPTG4000I	\$.79/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.

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

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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-2100H ... Great Low Price!

The Icom IC-2100H is a rugged 2m 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 tri-band 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!

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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-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-51R
This full-featured 5 Watt Dual-Band Handheld includes dual receive, 120 memory channels (80 if Alphanumeric), Auto Tone Search, Spectra Scope, and V/V, U/U and V/U operation.



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.



VX-1R
The pocket-sized VX-1R is small in size only. Featuring Smart Search™, DCS/CTCSS, Dual Watch, ARTS™ 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



VR-500
This miniature Handheld Receiver provides FM, AM, SSB and CW reception on 100 kHz-1300 MHz, with 1091 memory channels, Smart Search™, 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

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**



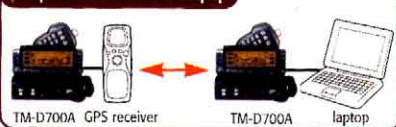
FEATURES

- ▶ 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



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Amateur Radio Products Group

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