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QST

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October 2002

QST reviews

- **Yaesu VX-7R** tri-band transceiver
- **Force 12 Sigma-5** five-band vertical antenna

Build an External GPS Antenna

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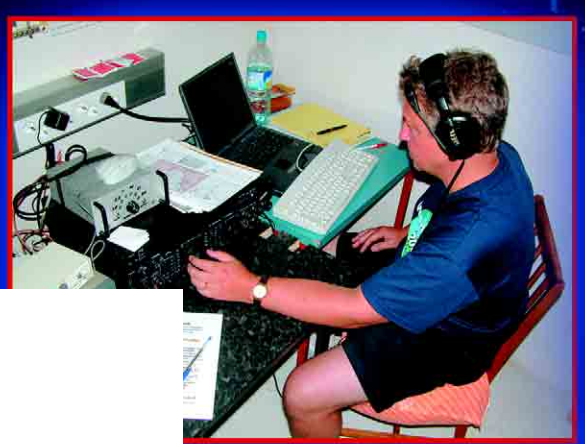
Linux and Software Radio: On the Horizon

WRTC2002—An Eyewitness Report



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Connect an optional speaker-mic or headset for more privacy

Connect to your PC for programming & cloning

Tuning Dial

Can be customized for channel selection or volume control

Up/Down Switch

Can be customized for volume control or channel selection

Rugged Construction

Die-cast aluminum case and chassis coupled with JIS-4 weather resistant construction make the 'T90 great for active outdoor operation

Backlit Keypad

Enter frequencies or memory number and use special function keys to toggle between different modes, memory banks, and more.

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Enjoy a full 5watts of power on all bands and up to 6 hours of operating time!

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Dimensions: 2.5"W x 3.4" H x 1.15"
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IC-T90A. Mini multiband marvel.

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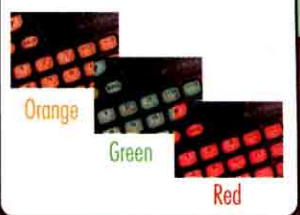

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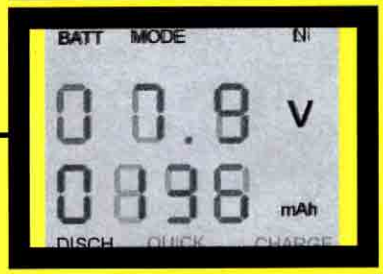

Digital display of voltage, time, and capacity throughout the charge and discharge processes.

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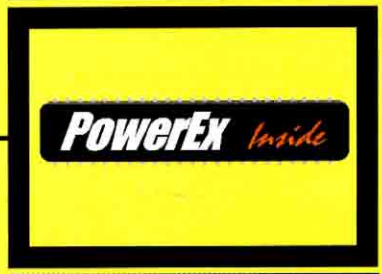
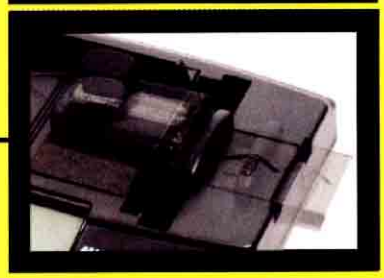


Intelligent microprocessor with Negative Delta V detection, Zero Delta V, and Delta Temperature.

FLEXIBLE



The "floating contact pin" system enables you to move the charging contacts from left to right and from top to bottom to adjust to almost any shape of battery pack.

MH-C777PLUS-II

NEW: Analyze (Discharge Only Function) the battery pack to obtain the discharged capacity of a battery pack. Information is retained on the screen until the reset button is pressed.

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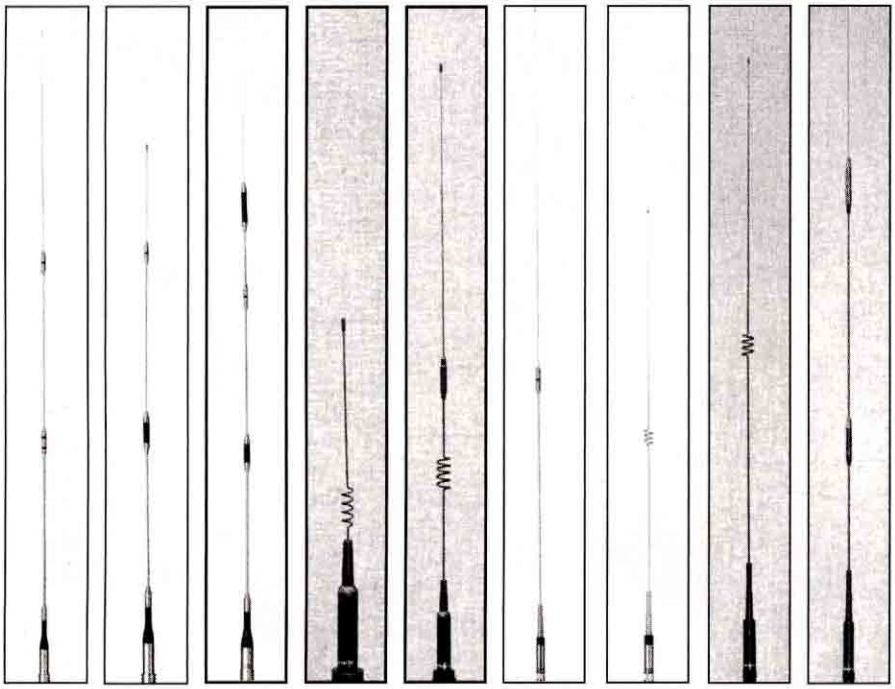

SG2000HD | SG7500A SG7500NMO | SG7900A | NR72BNMO | NR73BNMO | NR2C | NR770HA NR770HB | NR770HNMO NR770HBNMO | CR627B CR627BNMO

HV7A Mobile Antenna System

For New HF/VHF transceivers (Such as: IC706 series and FT100) NEW!

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HVC7	40m
HVC14	20m
HVC18	17m
HVC21	15m

Recommended Antenna Mounts: K400C or K600M

MX62M Duplexer

Specifications:
HF/6m & 2m/70cm bands
1.6-56 MHz LPF
76–470 MHz HPF
(76–120 receive only)
Watts: 600 P.E.P.
Loss: 0.2 dB LPF
0.3 dB HPF
Isol.: 50 dB

The NEW HV7A has 5 band capability: 70cm, 2m, 6m, and 2 HF bands through use of loading coils. Foldover feature allows for easy access into low overhead buildings. Ideal for users of IC706 series and FT100 radios.

Bands Supplied:	10m/6m/2m/70cm
Opt. Loading Coils:	40m/20m/17m/15m
Power, P.E.P.:	HF 120w/VHF 200w
Mount Connection:	UHF
Length:	54"
SWR:	1.5:1 nominal

MX62M

Use with HF/VHF mobile transceivers such as IC706 series, FT100, or combine 2m/70cm and HF rigs.

SPECIAL FEATURES:

- Factory pre-tuned/no adjustment
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- 24 Kt gold plated connector pin
- No grounding required unless noted
- Fold-over feature on most models

FOLD-OVER

Patented One-Touch Fold-over Feature
(Not available on NR72BNMO, NR73BNMO, & NR770SA.)

MODEL	BAND (MHz)	WATTS	CONN.	HT. IN.	ELEMENT PHASING
NR72BNMO*[6]	2m/70cm	100	NMO	13.8	1/4λ, 1/2λ
NR73BNMO	2m/70cm	100	NMO	33.5	1/2λ, 1-5/8λ
NR770HA[7]	2m/70cm	200	UHF	40.2	1/2λ, 2-5/8λ
NR770HNMO[8]	2m/70cm	200	NMO	38.2	1/2λ, 2-5/8λ
NR770RA	2m/70cm	200	UHF	38.6	1/2λ, 2-5/8λ
SG7000A*[6]	2m/70cm	100	UHF	18.5	1/4λ, 6/8λ
SG7500A	2m/70cm	150	UHF	40.6	1/2λ, 2-5/8λ
SG7500NMO	2m/70cm	150	NMO	41.0	1/2λ, 2-5/8λ
SG7900A*	2m/70cm	150	UHF	62.2	7/8λ, 3-5/8λ

MODEL	BAND (MHz)	WATTS	CONN.	HT. IN.	ELEMENT PHASING
NR2C	2m	150	UHF	55.5	1/2λ+1/4λ
SG2000HD*	2m	250	UHF	62.6	1/2λ+3/8λ
SG6000NMO*[6,9]	6m	150	NMO	39	1/4λ
CR224A*[6]	2m/1-1/4m	150	UHF	68.5	7/8λ, 2-5/8λ
CR320A*[6]	2m/1-1/4m 70cm	200 100/200	UHF	37.4	1/4λ, 1/2λ 2-5/8λ
CR627B*[6,9]	6m/2m/	120	UHF	60	1/4λ, 1/2+1/4λ/
CR627BNMO*[6,9]	70cm	120	NMO	60	2-5/8λ

1/4λ rated in dBi.

* Not recommended for Magnet Mount
6 Grounding required.
7 NR770HB same specifications but in black finish.
8 NR770HBNMO same specifications but in black finish.
9 52-54MHz only

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October 2002 ♦ Volume 86 Number 10

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News and Features

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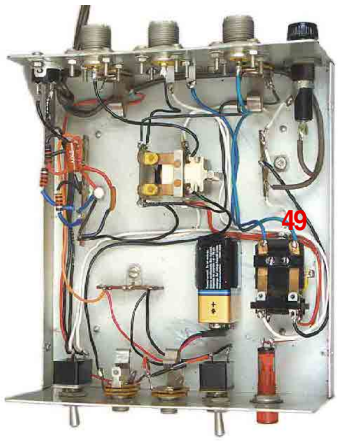
QST Workbench



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Operating

Departments

Our Cover:
This year's World Radiosport Team Championship brought some of the world's best operators to Finland for a head-to-head competition for the crown of world's best contest team. Clockwise from the top: US team members N5RZ, N1YC, N5KO and N2NL exude confidence; UA9BA and RN9AO operate OJ7W; K1TO, part of the winning team, fires up OJ3A. Photos by John Devoldere, ON4UN and (lower right) H. Ward Silver, N0AX.

US & Possessions: Membership in the ARRL, including a one year subscription to *QST*, is available to individuals at $39. Age 65 and over, with proof of age, $34. Licensed radio amateurs age 21 and under and the eldest licensee in the household may qualify for the rate of $20. Life Membership, including a subscription to *QST* is available at $975.* Age 65 and over, $850.* Membership and *QST* cannot be separated. Fifty percent of dues is allocated to *QST*, the balance for membership. Subscription rate for libraries and institutions is $39 per year. Single copies $5.

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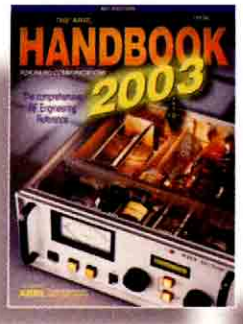

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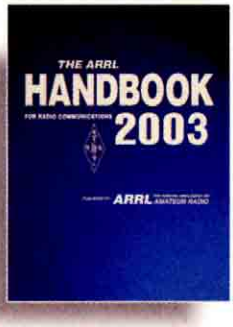

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T-2X, $649.95. *Extra heavy duty Tailtwister antenna rotator!* For large antennas up to 20 square feet wind load when mounted in-tower, or 10 square feet when mast mounted with optional support bracket. Triple 138 ball bearing race, strong electric locking steel wedge brake. Control Box has an illuminated directional indicator with North or South center of rotation scale, separate snap-action brake and rotation control switches. Accepts masts up to 2 1/16 inches diameter. Rotator size is 14 1/16Hx9 3/16D in.

CD-45II, $389.95. *Medium duty antenna rotator.* Handles antenna arrays up to 8.5 square feet windload area when mounted in-tower, or 5 square feet when mast mounted with supplied lower support. Dual 48 ball bearing race, disc brake system. Control Box has an illuminated directional indicator with North or South center of rotation scale, separate snap-action brake and rotation control switches with disc brake release. Accepts mast sizes up to 2 1/8 diameter. Includes light duty lower mast support, Rotator size is 17 3/8Hx8 D inches.

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

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"IT SEEMS TO US..."

Radio Smog

Much in the news in mid-August were reports of a major scientific study of an "Asian brown cloud" of toxic haze hovering over the most densely populated portion of that continent and threatening other parts of the world. The harmful effects of the haze on health and weather appear to be substantial: respiratory disease, drought in some areas and flooding in others, acid rain, and reductions in crop yields to name but a few. On a more encouraging note, scientists also know how to reduce the pollution and its effects: the use of cleaner energy sources and better stoves, and reduced burning to clear fields and forests.

The issue, which is really one of economics, is how to get hundreds of millions of individuals, families, and businesses to make these changes in how they live when the cost is far more immediate and tangible than the benefit. For an impoverished family, cooking its meal as cheaply as possible is a matter of survival. If cow dung is available as a "free" fuel it's a rational decision for the family to use it—but when multiplied by one hundred million, one family's tiny stove becomes an environmental calamity.

There is an obvious parallel between pollution of the Earth's atmosphere and pollution of the radio spectrum. Like the atmosphere, the radio spectrum is a precious natural resource shared by all. Like pollution, radio waves respect no political boundaries. Like the smog that fouls the air in many cities, electronic smog fouls the radio spectrum as a consequence of human activity—and like toxic haze, radio smog is an economic rather than a technical issue. We know how to control it; the debate is over whether it's worth the price to do so, and who should pay.

We're used to hearing public policy debates about air and water pollution. While people may disagree on costs vs. benefits in some instances, no one can possibly dispute that, for example, the quality of life in London improved dramatically after Parliament curtailed coal-burning in 1956. If someone were to suggest today that Londoners could save money by switching back, they would not be taken seriously—to put it mildly. The same would be true if someone were to suggest that their community could save money by dumping its raw sewage into the river. Such thoughts might have been acceptable 100 years ago, but not today. We've made too much progress, at too great a cost, to go back.

Unfortunately, the same cannot be said of spectrum policy. In some ways we do indeed seem to be going backwards, or having to fight against pressures in that direction.

Many sources of radio smog are unintentional. Switch-mode power supplies are not designed to generate radio interference. Unfortunately, in some cases they are not designed not to. They could be, and if either consumers or governments insist on it they will be.

Line noise is a big problem for many amateurs and other radio users. Power lines are not supposed to emit RF energy, and if they do it's a sign something's wrong. Some power companies care, and know what to do. Others either don't know or don't care (executive bonuses being more important than overtime pay for linemen, perhaps). The FCC can make them care, and in several recent cases has done exactly that by threatening enforcement action.

Radio smog also results from putting RF where it doesn't belong. RF has this wonderful property: it wants to radiate. And it *will* radiate from any conductor you introduce it to, unless the conductor is either shielded or balanced. So, why would anyone deliberately put RF on a conductor that is neither shielded nor balanced if they didn't want it to radiate? For the same reason that the destitute Asian family uses cow dung to heat its dinner: economics.

What we're talking about here are plans to use power lines to distribute broadband digital signals to homes and offices. The wires are already there, the reasoning goes, so why not use them? Utilizing existing infrastructure in new and creative ways is good for business and good for society. Offering competitive choices to consumers lowers prices and improves service. How can anyone be opposed to that?

Here's how. A broadband signal is RF. Sent down an unshielded or imperfectly balanced line, it will radiate. Putting security concerns aside as someone else's problem, this creates a new and pervasive source of interference to radio reception. In other words, this competitive choice would transfer to all of society a cost—in the form of reduced utility of the radio spectrum—that is not imposed by other, more environmentally friendly ways of providing broadband service. Our poor Asian family may not have any choice but to pollute. We do.

Is it possible to do power line communications without causing interference to over-the-air communications? Count us among the skeptics. What may be a fine transmission line at 60 Hz looks more like an antenna at HF. And that's a matter of physics, not economics.

Writing in the Summer 1994 issue of *EPA Journal* about London's historic "pea-soup" fogs that gave rise to the term "smog" in 1905, David Urbinato said: "At the turn of the century, cries to reduce the smoke faced a tough opponent. Coal was fueling the industrial revolution. To be against coal burning was to be against progress. 'Progress' won out. Not until the 1950s, when a four-day fog in 1952 killed roughly 4000 Londoners was any real reform passed."

New sources of radio smog are no more acceptable than are new sources of the visible kind. At the turn of the new century our policymakers should—no, must—be able to distinguish real progress from cow dung.

—*David Sumner, K1ZZ*

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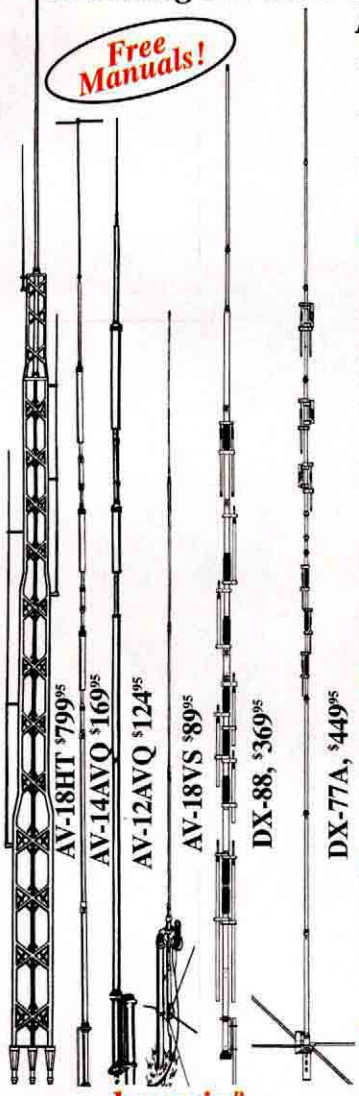

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They offer remarkable DX performance with their extremely low angle of radiation and omnidirectional pattern.

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

Heavy duty, slotted, tapered swaged, aircraft quality aluminum tubing with full circumference compression clamps is used for radiators.

Includes all stainless steel hardware. Recessed SO-239 prevents moisture damage.

Hy-gain verticals go up easily with just hand tools and their cost is surprisingly low.

Two year limited warranty.

AV-18HT, $799.95. (10,12,15,20,40,80 M, 160, 17 Meters optional). 53 ft., 114 lbs.

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

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

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

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

DX-88, $369.95. (10, 12, 15,17,20,30,40,80 Meters, 160 Meters optional). 25 ft., 18 lbs. All bands are *easily* tuned with the DX-88's *exclusive* adjustable capacitors. 80 and 40 Meters can even be tuned from the ground without having to lower the antenna. Super heavy-duty construction. DX-88 OPTIONS: 160 Meter add-on kit, KIT-160-88, $189.95. Ground Radial System, GRK-88, $99.95. Roof Radial System, RRK-88, $99.95.

DX-77A, $449.95. (10, 12, 15, 17, 20, 30, 40 Meters). 29 ft., 25 lbs. *No ground radials required!* Off-center-fed Windom has 55% greater bandwidth than competitive verticals. Heavy-duty tiltable base. Each band independently tunable.

Model #	Price	Bands	Max Power	Height	Weight	Wind Surv.	Rec. Mast
AV-18HT	$799.95	10,15,20,40,80	1500 W PEP	53 feet	114 pounds	75 MPH	------
AV-14AVQ	**$169.95**	**10,15,20,40**	**1500 W PEP**	**18 feet**	**9 pounds**	**80 MPH**	**1.5-1.625"**
AV-12AVQ	$134.95	10/15/20 M	1500 W PEP	13 feet	9 pounds	80 MPH	1.5-1.625"
AV-18VS	**$89.95**	**10 - 80 M**	**1500 W PEP**	**18 feet**	**4 pounds**	**80 MPH**	**1.5-1.625"**
DX-88	$369.95	10 - 40 M	1500 W PEP	25 feet	18 pounds	75 mph no guy	1.5-1.625"
DX-77A	**$449.95**	**10 - 80 M**	**1500 W PEP**	**29 feet**	**25 pounds**	**60 mph no guy**	**1.5-1.625"**

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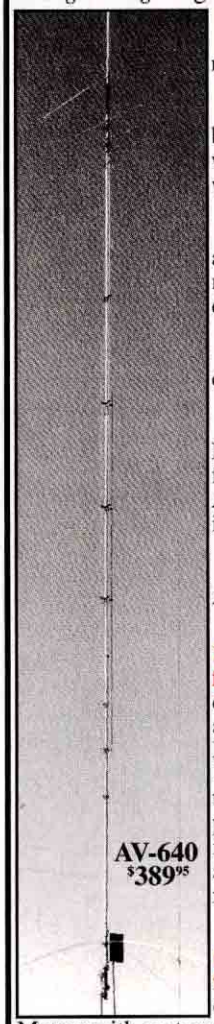
Hy-Gain's new **PATRIOT** HF verticals are the best built, best performing and best priced multiband verticals available today. For exciting DX make full use of your sunspot cycle with the **PATRIOT's** *low 17 degree angle* signal.



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

Sleek and low-profile

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

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Handles 1500 Watts key down continuous for two minutes.

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AV-620, $289.95. (6,10,12,15,17,20 Meters). 22.5 ft., 10.5 lbs. The AV-620 covers all bands 6 through 20 Meters with no traps, no coils, no radials yielding an uncompromised signal across all bands.

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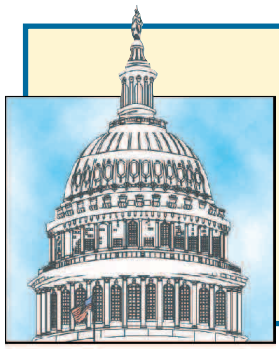


DC Currents

By Rick Lindquist, N1RL

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.

ARRL Homeland Security Federal Grant Training Program Kicks into Gear

Amateur Radio emergency communications training supported by a $181,900 federal homeland security grant to the ARRL was set to begin September 1 instead of next year as initially anticipated. During its first year, the grant from the Corporation for National and Community Service (CNCS) special volunteer program will reimburse the cost of Level I ARRL Amateur Radio Emergency Communications Course training for up to 1700 volunteers.

"It will begin with the recruitment of additional mentors and trainers for the national program," said ARRL Chief Development Officer Mary Hobart, K1MMH. Hobart and Dan Miller, K3UFG—formerly ARRL Certification and Continuing Education Program Coordinator and now the Emergency Communications Course Manager (see "ARRL Welcomes New Staff Members" on p 73 of this issue)—have been working out the grant details with CNCS.

The League was among several dozen nonprofit organizations designated July 18 to receive some $10.3 million in federal money to boost homeland defense volunteer programs.

"ARRL is the national association for Amateur Radio and is the national leader in emergency communications by volunteers who operate their own equipment on their time at no cost to any government, organization, or corporation," said the announcement from Homeland Security Director Tom Ridge. The ARRL plans to revise and update the emergency communications curriculum to incorporate additional elements of emergency preparedness and homeland security.

ARRL President Jim Haynie, W5JBP, said he was extremely pleased by the news. "This adds legitimacy to the public service work Amateur Radio has been doing for years," he said.

The first priority for the grant-supported training effort is recruiting and training at least 200 Amateur Radio Emergency Communications course mentors/trainers. These volunteers then will help to manage and train the student load for the first year of the grant. In mid-August, ARRL section managers each recommended up to five students to sign up to take the Level I Amateur Radio Emergency Communications on-line course starting in September. These individuals also will receive additional training to become instructors and mentors for future classes.

"Although we have a core group of wonderful mentors and instructors who have helped students through the courses given to date, we need more to help with the volume of students training under the CNCS grant," Hobart emphasized. "With the help of the section managers, we will ensure a good distribution of mentors nationwide who can advise students about local ARES groups and activities in addition to helping them with the course material."

Homeland Security Director Tom Ridge

Anyone who has already completed the Level I course is qualified to become a mentor with some additional training.

Once the ARRL members hand-picked by section managers to train as mentors have completed the program, registration for routine Level I training will open October 1, initially for ARRL field appointees. Miller anticipates that the program will continue to handle approximately 200 students per month. "As much as we'd like to, we can't train everyone at once," he said. "Please be patient."

Students taking advantage of Level I emergency communications training under the grant program are being asked during registration to pay for the course via credit card. Upon successfully completing the training and certification, students will be reimbursed the $45 fee.

"We are following an accepted tuition reimbursement process," Miller said. "When each student has a financial stake in completing the course, each dollar of the grant will have maximum impact." The goal is to dramatically improve the course completion rate from the current 68 percent to nearly 100 percent, he added.

Level I course candidates from Connecticut will continue to be trained under a $33,000 grant from United Technologies Corporation to expand Amateur Radio emergency communications training opportunities. Hobart says the UTC Connecticut grant paved the way for success under the new federal grant.

Hobart emphasized that community involvement is key. "It's not enough to just finish the course," she said. "You're expected to join and take part in your local Amateur Radio Emergency Service organization." The grant training program is especially interested in attracting more seniors—those 55 and older—and those for whom the course fee would mean a hardship unless they were reimbursed.

To comply with grant requirements, the ARRL also planned to survey served agencies and certain segments of the amateur population. The League wants to ensure that the course offered accurately represents "what really happens in the field" during an emergency or disaster, Hobart said.

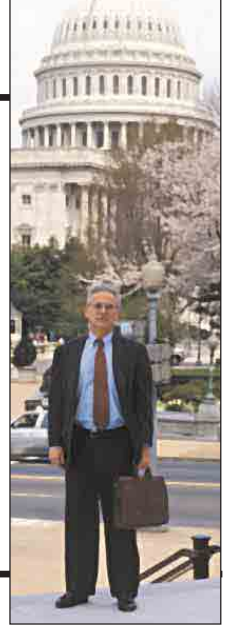
News of the grant generated extensive media coverage. Hobart said the attention has given Amateur Radio and emergency communications volunteers some well-deserved recognition.

"I think this is an extraordinarily exciting day for Amateur Radio that the role of Amateur Radio in homeland security is recognized at the highest levels of government," Hobart said upon learning of the grant. The League's grant application characterized Amateur Radio as "the bedrock of communications when other outlets fail."

Citing Amateur Radio's response in the aftermath of the September 11 terrorist attacks, Hobart said the federal grant "will help continue our work in providing public service and to protect lives, homes, businesses and our frequencies, as we have for decades."

"We are deeply grateful to Tom Ridge and to the Corporation for National and Community Service for providing Amateur Radio with a unique opportunity to serve our country," Hobart said.

ARRL Chief Executive Officer David Sumner, K1ZZ, said he was pleased that the League would be able to extend its Amateur Radio Emergency Communications program to thousands of amateurs who might otherwise not be able to afford the program.



Steve Mansfield, N1MZA, SK

Shown here during one of his many visits to Capitol Hill on behalf of ARRL, Steve had edited "DC Currents" since its inception. For more on his accomplishments, see page 71 of this issue.

Media Hits

- ARRL's federal grant from the Corporation for National and Community Service (CNCS) has garnered a good amount of press so far. Connecticut media hits include *The Hartford Courant*, the Connecticut bureau of the Associated Press, *The Advocate*, *The Herald*, the *Record-Journal*, *The Day*, WFSB-TV, Connecticut Radio Network, *Newington Life* magazine and WDRC-FM/AM Radio. Outside of the state, stories ran in the *Christian Science Monitor* and *The Post-Standard & Herald-Journal* (Syracuse, NY).
- Southern Florida Public Information Coordinator and now incoming Section Manager Sherri Brower, W4STB, did a fantastic job of using the federal grant angle in a local press release that she sub-mitted to the *Vero Beach Press Journal*. Brower tied the grant in with local emergency training sessions put on by Indian River County ham radio operators. The story, using most of the information included in Brower's release, ran August 8.
- *The Bozeman (Montana) Daily Chronicle* ran a story on mountain climber Clint Kaul, rescued thanks to ham radio after becoming stranded during a local climb. Kaul's uncle, Roger Kaul, K3TM, used his hand-held VHF transceiver to issue a call for help for his injured nephew, and a rescue effort was mobilized. Members of the Gallatin County ham radio club also assisted with the rescue. A deputy sheriff cited in the article praised the hams' efforts: "The ham radio club played a key role," he said.
- Glen Reid, K5FX, alerted us to an excellent media hit on KKOB Radio in New Mexico. Reid reports that ham radio was the subject of a station program called "High Tech New Mexico." The radio show covered various aspects of Amateur Radio, and several local hams were interviewed.

CC&R Bill, HR 4720, Attracts Additional Cosponsors

Still more cosponsors have signed aboard HR 4720, the bill in Congress aimed at providing relief to amateurs faced with private deed covenants, conditions and restrictions—CC&Rs—in erecting antennas. The list of 18 members of Congress who have agreed to cosponsor the measure includes two amateurs. They are Oregon Republican Greg Walden, WB7OCE—one of the two original cosponsors of HR 4720 with Texas Republican Pete Sessions—and Arkansas Democrat Mike Ross, WD5DVR.

Walden and Ross are believed to be the only Amateur Radio licensees in the US House of Representatives. Arkansas Section Manager Bob Ideker, WB5VUH, who ran into Ross at the Little Rock airport while both were waiting for flights, claims at least some credit for getting the Arkansas Fourth District representative to sign onto the bill as a cosponsor. Ideker has invited Ross—a Novice licensee and ARRL member—to visit some club meetings in his district. He's also been working on other members of the Arkansas congressional delegation to join Ross.

New York Democrat Steve Israel introduced HR 4720—the "Amateur Radio Emergency Communications Consistency Act"—on May 14. The measure would require private land-use regulators—such as homeowners' associations—to "reasonably accommodate" Amateur Radio communication consistent with the PRB-1 limited federal preemption. PRB-1 now applies only to states and municipalities.

In addition to Walden, Sessions and Ross, the list of HR 4720 cosponsors now includes Representatives JD Hayworth (R-AZ), Patrick Tiberi (R-OH), Patsy Mink (D-HI), Ken Calvert (R-CA), Rick Boucher (D-VA), Joseph Hoeffel (D-PA), John Duncan Jr (R-TN), Dennis Moore (D-KS), Charles Stenholm (D-TX), David Price (D-NC), Bob Schaffer (R-CO), Sherrod Brown (D-OH), Bart Gordon (D-TN), Charles Taylor (R-NC), and Ralph Hall (D-TX).

Visit the US House of Representatives Write Your Representative Service Web page, **www.house.gov/writerep/**, for information on how to contact your representative. The ARRL requests those writing or e-mailing members of Congress—whether or not they are supporting this legislation—to copy ARRL on their correspondence—via e-mail to **ccr-bill@arrl.org** or via US Mail to CC&R Bill, ARRL, 225 Main St, Newington, CT 06111. Correspondents should include the bill number, HR 4720, as well as their name and address on all correspondence.

Pending CITEL Resolution is a Step Toward Global Ham Ticket

Ham radio has moved another step closer to an internationally recognized license. Delegates to the Third Regular Assembly of the Inter-American Telecommunication Commission (CITEL) in August approved a resolution that would extend reciprocal recognition of the International Amateur Radio Permit (IARP) Convention to member states of the European Conference of Postal and Telecommunications Administrations (CEPT).

The resolution includes as a goal "to promote the development of a global Radio Amateur Permit working with other regional organizations within the framework of the International Telecommunication Union."

ARRL Technical Relations Specialist Jon Siverling, WB3ERA, attended the CITEL Assembly August 12-16 in Washington, DC, as a member of the US delegation. "In an ideal world, we'll one day have an international Amateur Radio permit that's like an international driver's license—good around the world," Siverling said. He conceded that CITEL-CEPT reciprocity will not benefit US amateurs, however. Only licensees elsewhere in the Americas would be affected, since US licensees already enjoy automatic or nearly automatic reciprocal licensing in many countries throughout Europe and the Americas.

The next step is approval by the Organization of American States General Assembly, which meets in June 2003.

The resolution builds on existing CITEL and CEPT arrangements. A CITEL convention already provides for temporary amateur station operations in one member state by individuals holding an IARP and licensed by another member state "without further review." A similar CEPT mutual-recognition arrangement in many European signatory countries—*Recommendation T/R 61-01*—makes possible operation by amateurs from CEPT countries during short visits to other CEPT member countries or to non-CEPT participating countries—including the US—without having to obtain a temporary license.

Among other things, the CITEL proposal, called *Resolution 32*, would encourage CITEL member states to adhere to the IARP Convention. It further calls upon those member states to approve the draft protocol to the IARP convention to extend to CEPT license holders from countries that have implemented CEPT Recommendation T/R 61-01 the same privileges IARP holders enjoy.

International Amateur Radio Union Region 2 President Pedro Seidemann, YV5BPG, represented the IARU at the CITEL assembly.

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New Dual-Band Handheld HTX-420

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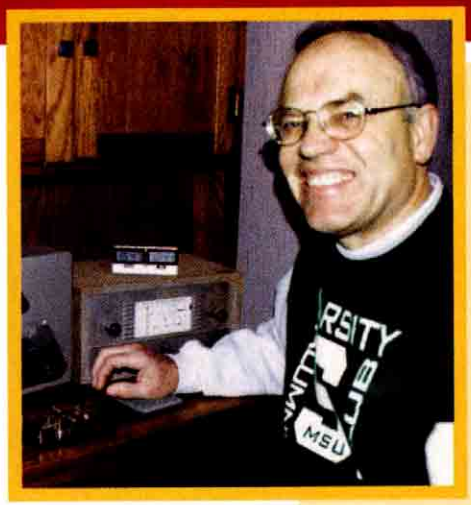
ARRL membership? Why? What's in it for Me?



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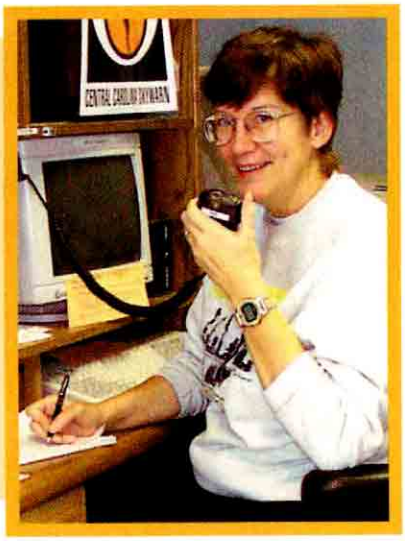

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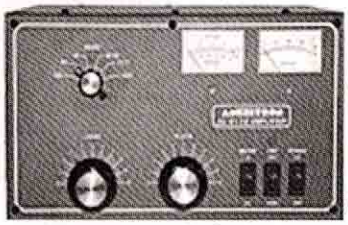

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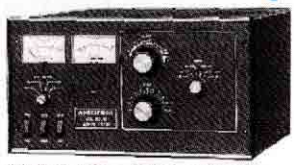

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AL-600
$1299
Suggested Retail

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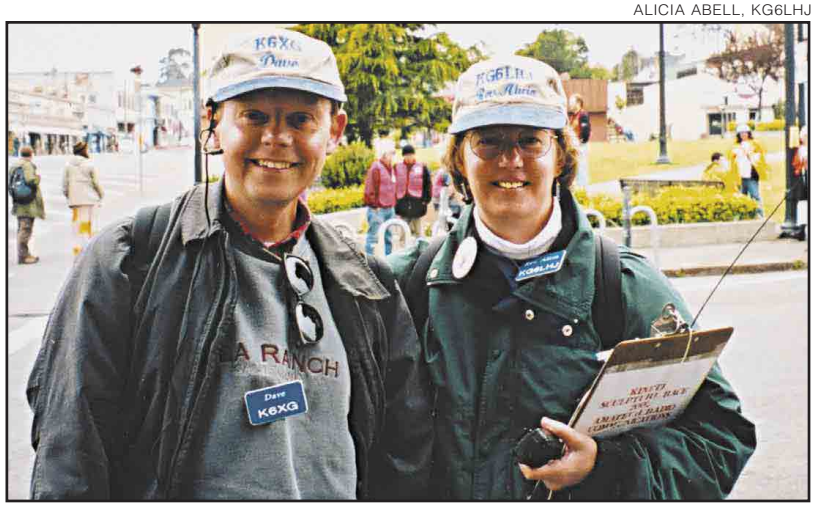
UP FRONT IN QST

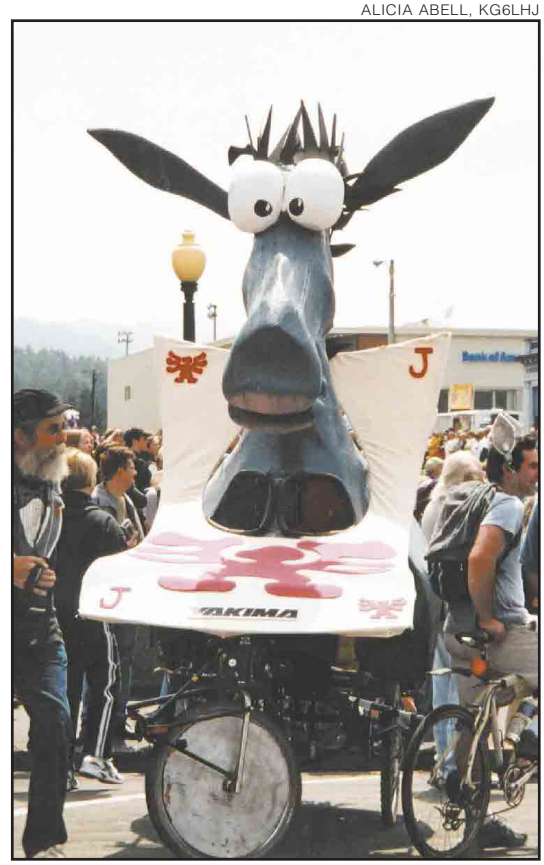
And the winner was . . . So who won this year's Kinetic Sculpture Race in Arcata, California? Yes, it was Jackass, the cross-eyed fellow in the photo. Pastor Alicia Abell, KG6LHJ, explains: "This is a unique assembly of human-powered machines that must be able to float, go on sand and on surface streets. It is a three-day race that is 38 miles in length and draws entrants from around the world. . . It takes about 100 volunteers to run the race and the Humboldt ARC was a big part of that team—and I got to be one of them!" Pastor Abell had had her license for all of two weeks when she assisted with the race.

ALICIA ABELL, KG6LHJ



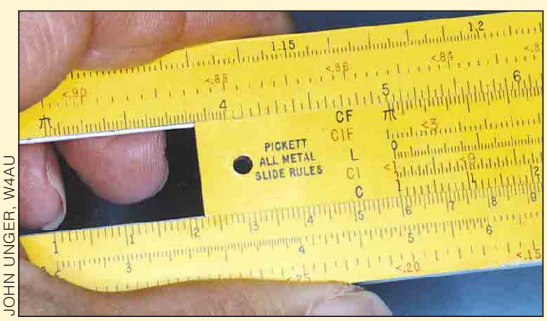
Pastor Alicia Abell, KG6LHJ, with fellow ham volunteer (and husband) Dave, K6XG.

ALICIA ABELL, KG6LHJ



The proud winner of the 34th annual Kinetic Sculpture Race. Entrants in the 38-mile race are human-powered. Hams from the Humboldt ARC help make it happen.

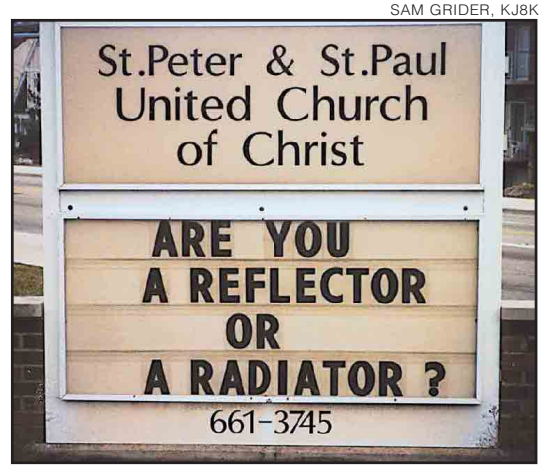
JOHN UNGER, W4AU



What's this contraption? It's the slide rule (if you're under 50, look it up in the dictionary) Paul Suppan, WB4JCY, of Leesburg, Virginia, used recently to pass his Amateur Extra class exam. "The examiners all smiled, and no one asked me to clear the memory," he reports. Paul, who had used the same slide rule 34 years earlier to pass his Advanced exam, is an orthodontist who keeps *QST* in his waiting room. For his Extra exam, he wore his high school sweatshirt and a '60s-era paisley shirt to maintain the retro theme.

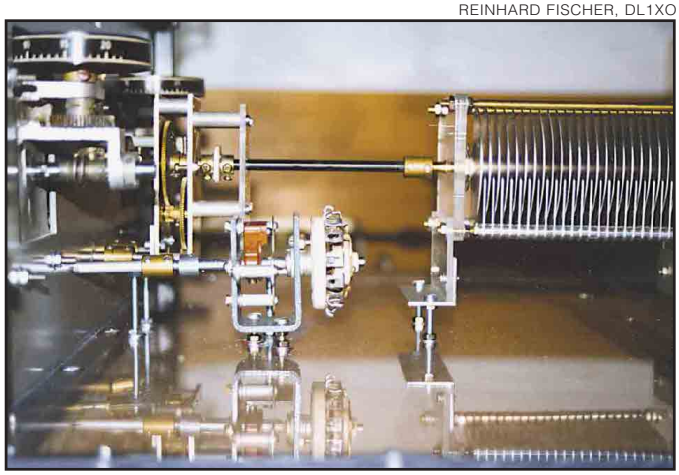
LINDA WASSERMAN, WA2IQL

SAM GRIDER, KJ8K



Harvey Wasserman, K2BOG, of McAfee, New Jersey, who spotted this ham purveyor in Severna, Park, Maryland, observes: "Unfortunately, it looks like they allow turkeys, too." At the right, a Cincinnati church with a message we can all relate to.

REINHARD FISCHER, DL1XO



REINHARD FISCHER, DL1XO

Painstaking, but worth it. Reinhard Fischer, DL1XO, of Nussbaumweg, Germany, is an avid collector of old radio gear—and a builder. As the photo of the interior of his new antenna tuner indicates, his workmanship is superb. Part of his collection is in the photo at the right.

DAVID ROSENTHAL, N6TST

Following up his snow-shortened December 2001 mobile DX trip to Kanab Point, a remote spot on the North Rim of the Grand Canyon, David Rosenthal, N6TST, made morning contacts with stations in Europe, South America, Hawaii, Africa and all over the US—this time in early June. "It was the quietest radio environment I've ever encountered," he writes. His account of the earlier excursion is in June 2002 *QST*, pp 40-43.

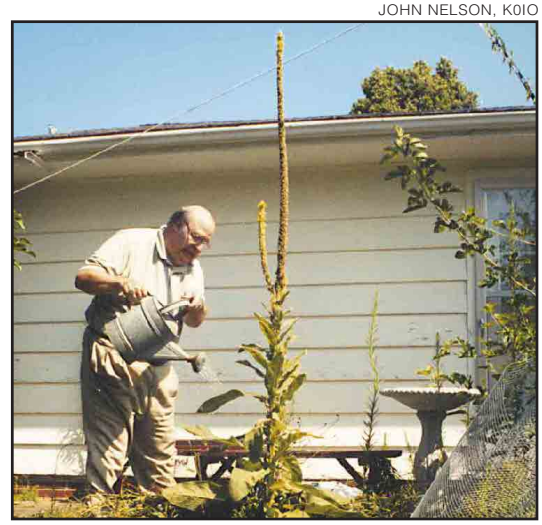
Now they advertise! Riley Hollingsworth, take notice—these jammers (left) are plying their trade right out in the open in southwest Portland, Oregon, where Jim Schaeffer, KB7ADH, caught them with his camera.

At the right, the place Minnesota jammers apparently go to avoid apprehension.

HANS BRAKOB, K0HB

JIM SCHAEFFER, KB7ADH

JOHN NELSON, K0IO



Former ARRL Circulation Manager John Nelson, K0IO, takes special care of his *verbascum thapsus*. The plant, he points out, is more commonly called the common mullein, but he prefers to call it his Wouff Hong plant. Those unversed in Wouff Hong lore may wish to take a look at the description on *ARRLWeb* (**www.arrl.org/tis/info/history.html#hong**) or the article in Sep 1996 *QST*, p 59.

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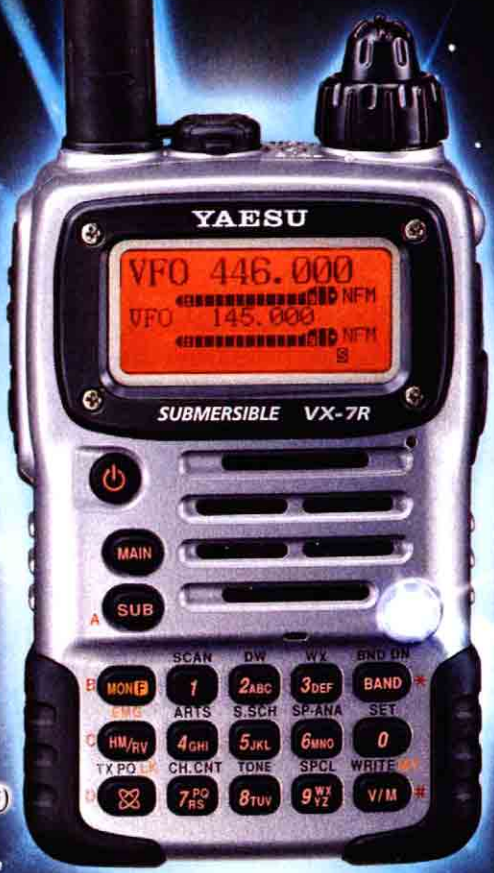

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FT-8900R

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EVERYONE SHOULD HELP ADVERTISE

♦ I am 16 and just had my license issued yesterday. While reading a copy of *QST* from my library I couldn't help noticing that many people didn't think that there were enough new young people in the hobby. I would like to get a radio and get on the air, and would except for one problem, my parents. They some how think that ham radio is dangerous. not in the fact of RF radiation or electricity (I am an avid home brewer) but that I will be talking to strangers on the air. They think that somehow I might be kidnapped. I think that birds of a feather flock together (applied to people) and so far it's true. The only hamfest I've gone to everyone was very friendly and I even struck up an hour-long conversation with a person I'd never met while waiting for my license. For some reason they don't mind me talking to people I meet in person but are afraid of me talking on the "air." I know many smart and people who would be quite capable of passing the test (and some have); it's just that they haven't seen all the stuff that you can do such as some of the newer digital modes. Maybe if you want more younger people to join everyone should help "advertise" ham radio. Hopefully I will get on the air someday.—*Kieran Levin, KC9BZY, Winfield, Illinois*

THE NVIS ANTENNA

♦ The article on NVIS antennas by Albert Pion, KK7XO, in June 2002 *QST* was, as always, interesting and thought provoking, but I am concerned that many inexperienced or less technical amateurs might be tempted to reduce the height of their antennas in the mistaken belief that it will miraculously increase their high angle signals.

One cannot argue with the data which is presented in the article showing that high angle performance of a dipole antenna is theoretically superior at one eighth wavelength above ground compared with a height of a half wavelength, but that is an incomplete picture. The fact is that high angle radiation is maximum around one quarter wavelength above a perfect ground (about 60 feet on 50 meters) progressively decreasing to practically zero as the height is decreased to ground level.

It is true that antenna modeling programs will often show little change in the high angle pattern, or even present a small increase at ridiculously low heights above ground, but these do not take account of increasing losses due to closer proximity to imperfect ground, trees, buildings, wire fences, etc, as the antenna height is lowered. Add to this the reduction in receive performance due to increased proximity to sources of electrical noise, and the increasing risk of swamping household appliances with RF, and it should become apparent that reducing antenna heights below one quarter wave is not to be recommended.

Most amateurs can only dream of antenna heights significantly exceeding one quarter wavelength on the lower frequency bands, and as far as operation above about 10 MHz is concerned, high angle radiation is of little value and increasing antenna height will progressively increase the level of useful low angle radiation. Therefore, in most practical situations the "higher the better" rule of thumb still holds good.—*Steve Craske, G3ZLS, Exeter, Devon, UK*

♦ About seven years ago I put up a low (8 feet off ground) full-wave, square loop for 40 meters. It was to be used for receiving only to reduce the excessive noise picked up by a vertical. Ladder line is used as a feeder, along with a tuner.

However, I was amazed by its performance during daylight hours on transmit. A good non-scientific test of an antenna is to call CQ. Unless you are DX to the listener you will seldom receive a call if your signal is weak. We all prefer to answer a strong signal! Over the years the antenna has performed to my satisfaction. (I use 5 to 50 W output.) Noise reduction is so good, that at times a signal unreadable on the vertical is easily copied on the loop. Of course, the down side is this is not a DX antenna. However, I have had my fill of 10-second DX "QSOs." Now, I enjoy ragchewing over DXing. There are so many stations within a 300 mile radius with whom to converse that I don't miss the DX.—*Arthur C. Erdman, W8VWX, Worthington, Ohio*

HOW ABOUT SOFTWARE FOR MACS, LINUX?

♦ I doubt that independent-minded Americans would take kindly to the notion that henceforth they could only buy one brand of gasoline or beer or shotgun shells. I can also predict what would happen if somebody tried to restrict our ranks to using only one mode of digital communications to the exclusion of all others! Yet the world of amateur radio is painting itself into such a corner as computer software written for amateur use tends more and more to be released only for the Windows/PC environment.

A perusal of new software introduced or reviewed in the pages of *QST* in recent years gives stark evidence that 99 percent is for PC computers and virtually none for the Macintosh platform. This is not a healthy trend!

While newer Macs can and do run "PC emulation software," I can only wonder why North American amateurs are so willing to let Bill Gates/Windows "rule the world."

The advantages of user-friendly Linux as programming language were reported in the pages of *The Canadian Amateur* in a two-part series this summer. I would encourage all amateurs writing new software, for whatever use, to explore Linux, or at least use cross-platform translators for their creations.

Americans historically accept the concept of fair and open competition in creativity. Why not in computer software? —*Andy Neimers, VA3SMM, Hamilton, Ontario, Canada*

RESOLVING RFI

♦ I read with interest the letter from Mr Long, N3ZOC, in your June 2002 "Doctor is IN" column (p 53). We at Kidde value customer satisfaction, are committed to continuous improvement, and are always ready to discuss our customers' problems or suggestions. Our engineering staff has a number of active Amateur Radio operators who would be more than happy to help Mr Long with his issue. Not knowing the type or age of Mr Long's product, it is not possible to speculate on the cause of his problem, but Kidde has made improvements to its detectors over the years to increase their rejection of RF interference. I would advise against modifying the alarm itself, as any changes could have unintended effects on the unit's performance.

As a result of your column, we have contacted Mr Long and are currently

working to resolve his issue. Thank you for bringing this to our attention.—*Joe Deluca, Engineering Manager, Kidde PLC, Colorado Springs, Colorado*

67 YEARS AND COUNTING

♦ First *QST* in 1935 off the newsstand. Many thanks for all the incentives, antennas, rigs and everlasting interest for 67 years.—*Dick McIntyre, Basye, Virginia*

FIRST FIELD DAY

♦ An interesting article in the June 2002 issue about the first Field Day ["The First Field Day," pp 44-45]. I'm sure it will get a response from other oldsters, such as myself, who remember those days.

OM Bergren has an excellent memory, but I discerned two minor discrepancies: first, the old Federal Radio Commission was a part of the Department of Commerce, and both operator and station licenses were issued by it. Second, in the post-WWII redistricting, Indiana, Illinois and Wisconsin remained in the 9th call area. The FCC was established in 1933 by the US Congress and was not part of the DOC.

I did not participate in that first Field Day, but the following June my older brother (W3NF) and I set up a small wall tent in an isolated corner of the family 400 acre farm south of Easton, Pennsylvania, and did a token participation using a '45 Hartley oscillator powered entirely by batteries and a regenerative receiver using UV199 "peanut" tubes. We made, as I recall, 12 contacts in the 24-hour period, were devoured by mosquitoes and other blood-sucking insects, got little if any sleep—but we were young. I was 20; Ed was 24. We were thoroughly infected with Field Day fever and in subsequent years seldom missed one. My total participation must be around 60 and I still, at age 88, show up at FD with my local club. It's a great tradition.—*George Hart, W1NJM (ex-W3AMR), Newington, Connecticut*

LIGHTNING DETECTOR PASSES MUSTER

♦ Though I have been hamming for more than 50 years and reading *QST* for much longer, I have found only a few construction articles that I felt I needed and wanted to build. I recently found such an article in page 59 of the April 2002 issue, "A Lightning Detector for the Shack" by N2PWP.

This is the kind of article that deals with something all hams should have and can use. It has a simple circuit, requires very few parts, is well written, easy to understand and construct, and has a test procedure included. It was fun to build and I had almost all the parts on hand. It works as advertised.

Please keep this kind of article in *QST* as often as you can. I enjoy constructing items that I believe are an asset to an already crowded shack.—*Meyer A. Minchen, AG5G, Houston, Texas*

A TIME TO RECONNECT

♦ My friend and ARRL Legislative and Public Affairs Manager Steve Mansfield, N1MZA, died on July 29 and September *QST* arrived in my mailbox August 16. Steve missed the deadline to make the next issue of *QST* and I would have razzed him unmercifully about it. It probably was the only *QST* deadline he ever missed. He would have laughed, because he had a great sense of humor, something we perhaps had in common as Hoosiers—natives of Indiana.

When friends my age die way too young, it makes me want to get on the air again, to reconnect with those of us who are fortunate enough to carry on.—*Jim Cain, K1TN, Manchester, Connecticut*

STILL HAMMING TOGETHER

♦ Back in 1959 I was a Novice and wanted to work something far away on 80-meter CW, so I got up at 3 AM one morning. Lee, K7IOC, 15 miles away, came back to me. So much for DX!

Lee and I have remained friends all these years and we are still enjoying ham radio. Lee's father and my mother are taking a sign language class together. The friendships made via ham radio are wonderful!—*Bob Ramborger, K7JNV, Edmonds, Washington*

MOXON RECTANGLE—KEEP IT QUIET

♦ We are a small group of hams way out in the province of Québec. Field Day has been our main activity since 1981. Each Field Day is an occasion to "try something different." Over the time we have tried the dipole, folded dipole, vertical, G5RV, etc.

This year was different. I built a Moxon rectangle from the June 2000 issue of *QST*. The next day, four of us put the monster up in the sky. After our first call a station from Texas told us it was a bit too soon for Field Day. But, we knew the monster was going to work for us.

I have a request. Please don't tell anyone that this antenna works so well. I was charged by the members of our club to put those wires in a box and hide them. It will be our secret weapon for the next Field Day! The Club of RadioAmateur de Beauce (CRAB) wants to tell you a big *thank you* for this antenna. This Field Day was the best one we have done.—*Jean Jibouleau, VE2GHI, St Georges, Quebec* QST

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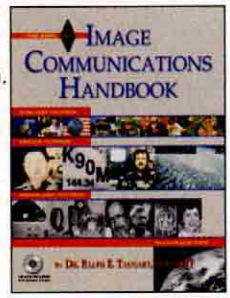

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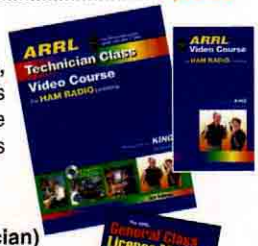

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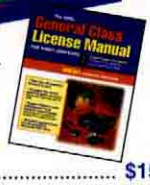

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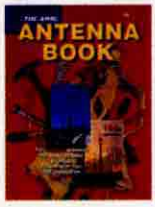

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By Al Ward, W5LUA, and Barry Malowanchuk, VE4MA

The Journey to EME on 24 GHz

Part 1—The art and science of communicating throughout the world by bouncing signals off the surface of the Moon has captivated hams for decades. Advances in hardware and software have placed this aspect of Amateur Radio within the grasp of the average ham on the VHF and UHF bands, but the "high frontier" remains to be explored with microwaves.

Moonbounce or EME (Earth-Moon-Earth) has always been our ultimate goal for each of the VHF and microwave amateur bands. The primary reason for EME was to aid in achieving the ARRL's Worked All States award on bands above 6 meters. For someone who lives in the middle of North America, EME is the only way to work Alaska and Hawaii. The authors have worked each other on the 8 amateur bands from 432 MHz through 24,192 MHz—all via EME over the past 25 years. For each band, it was a matter of getting the most gain out of our antennas, the most power out of the final amplifier without producing unwanted smoke and noise, and getting the last 0.1 dB out of our low noise receive amplifiers. For years, I can remember each of us bringing our low noise preamplifiers to the Central States VHF Conference and seeing whose was better and trying to better ourselves the following year.

A Short History of EME

A team of folks at the Signal Corps Engineering Laboratories accomplished the first attempt at bouncing signals off the Moon on January 10, 1946 on a frequency of 111.5 MHz. The equipment consisted of a 64-dipole array producing 24 dBi of gain and a 3.5 dB noise figure low noise amplifier. The equivalent of very short dots were sent to the Moon at a peak power level of 3000 W. The return echoes from the Moon were both visually and audibly recorded.

The first amateur work at receiving one's own echoes was accomplished back in 1953 on 144 MHz by W4AO and W3GKP. VHF pioneer Sam Harris, W1FZJ, was also very active in the late '50s. Having heard his echoes on both 50 and 144 MHz, Sam decided it was time to switch to 1296 MHz and on July 21, 1960 made the first-ever amateur EME QSO between W1BU and W6HB. The first 144 MHz EME QSO was made on April 11, 1964 between W6DNG and OH1NL followed by W1BU making the first 432 MHz EME contact with KH6UK on May 20 in 1964. In the late '60s, we find W4HHK and W3GKP making an attempt at the first 2304 MHz EME contact. It was not until after many years of work that the first 2304 MHz EME QSO took place between W4HHK and W3GKP on October 19, 1970. The first 220 MHz EME contact took place on March 15, 1970 between W7CNK and WB6NMT (now KG6UH). A couple of years later the team of W5WAX (now K5SW) and K5WVX (now K5CM) worked the team of WA5HNK and W5SXD on 6 meter EME. Their contact took place on July 30, 1972. The first 902 MHz EME contact took place on January 22, 1988 between K5JL and WA5ETV.

EME contacts on the higher microwave bands did not take place until the mid-'80s when a group from the North Texas Microwave Society decided to undertake the task. Months of intense work paid off on April 7, 1987 when KD5RO (now K2DH) worked W7CNK for the first EME QSO on 3456 MHz. Soon thereafter on April 24, W7CNK worked WA5TNY for the first 5760 MHz EME QSO. A similar effort was underway on 10 GHz with WA7CJO and WA5VJB working diligently to make the first EME QSO on 10 GHz, which occurred on August 27, 1988. So how long would it take to make the first 24 GHz EME QSO? As it turns out, just about 13 years. For more detailed information regarding the history of EME, consult Chapter 10 of the *ARRL UHF/Microwave Experimenter's Manual*[1] and Chapter 8 of *Beyond Line of Sight*.[2]

Microwave EME

Without a doubt, the most activity off the Moon in recent years has been on

[1]Notes appear on page 32.

2 meters and 70 cm. The "Big Guns" on these bands have worked in excess of 1000 different stations on each of these bands. A kilowatt amplifier, four good Yagis and a low noise amplifier and you're on with a station that can hear its own echoes and is capable of working all states and many countries. The EME career at W5LUA started on these two bands and I certainly have a lot of fond memories. However, my goal has been and always will be to go up in frequency. For me the excitement was conquering a new band both terrestrially and via the Moon.

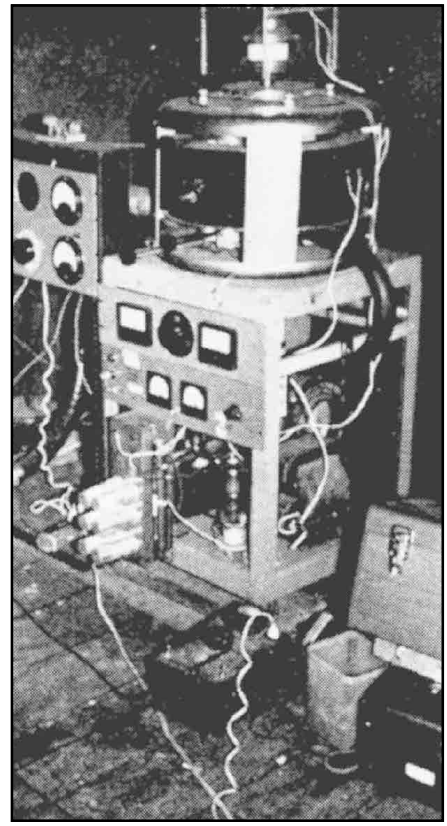
The sections that follow discuss the activity levels on the various microwave EME bands leading up to the first EME QSO on 24 GHz. The various bands will be listed by wavelength with the present US allocation listed by frequency.

33 cm (902-928 MHz)

The 33 cm band experienced a surge in EME activity shortly after the band was opened to amateur use. The 33 cm band represents the lowest frequency at which the parabolic reflector or dish is the primary antenna of choice. Rarely are multiple Yagi arrays used on 33 cm and 23 cm EME. When one considers the number of Yagis required to achieve gain similar to that of a 3-meter dish, one finds that the dish is an easier solution. Since the 33 cm band is a Region 1 allocation only, the only activity has been from the US and Canada. Weak signal work both terrestrially and via the Moon generally starts at 902.000 MHz and in some areas 903.000 MHz. The only stations known to have been active on 33 cm EME include K5JL, WA5ETV, W5LUA, K2DH, W0RAP, WB0TEM, VE4MA, NU7Z, WA8WZG and AF1T. All stations used dish antennas ranging from 3 meters in size to 8 meters. A dish antenna requires a feed system designed for the specific frequency of operation. Most stations use their dish antennas on multiple bands making multi-band operation with a single dish quite a challenge. Most amateurs just swap out feeds and T/R systems for each band. Scheduling of activity periods then becomes very important.

23 cm (1240-1300 MHz)

Interest in the 23 cm band seems to have gained significant momentum. Both terrestrial weak signal work and EME activity occurs near 1296.000 MHz. One of the main reasons for the increased popularity is the apparent greater consistency of signals compared to the lower frequencies. The use of circular polarization on 23 cm minimizes fading due to Faraday rotation and also minimizes the problem of spatial offset between two



The klystron amplifier used in the 1296-MHz EME station at W1FZJ/W1BU. It delivered 300 to 400 W output.

stations on different continents.

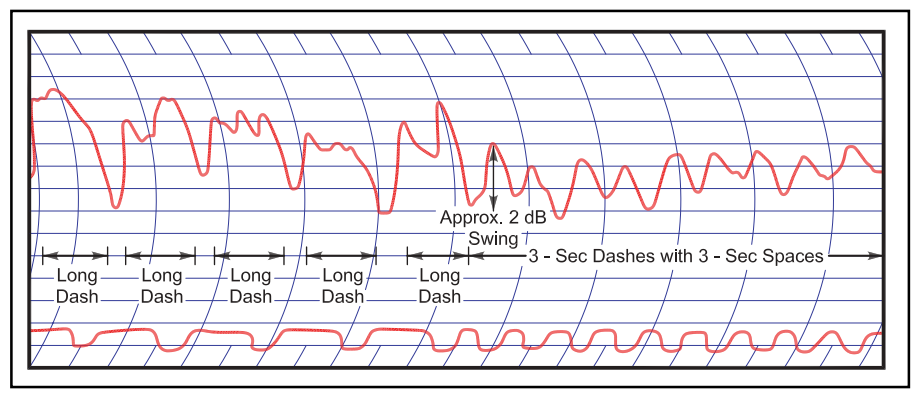
Faraday rotation randomly twists the incoming (and outgoing polarization) based on the condition of the ionosphere. This variation of a linearly polarized signal at 50 MHz through 432 MHz makes it necessary for operators to wait out the variations until the rotating polarity becomes aligned closely enough to permit completion of a QSO. More recently 144 MHz operators have realized a big improvement through the use of switchable polarity antennas. Polarity adjustment has long been a common practice on 432 MHz since Yagi antennas can be rotated easily and parabolic dish antennas are popular. In the case of dish antennas, only the feed antenna needs to be adjusted. This polarization change due to the Faraday effect is non-reciprocal so that the optimum received polarization is often not optimized in the reverse direction.

Spatial offset can be best described by the following example. When one is working Europe from the US, the difference in longitude between the two continents is nearly 90 degrees, causing a horizontally polarized signal coming from the States to the Moon to appear to be nearly vertically polarized when it is reflected off the Moon and received in Europe. This results from the geometry of the path and depends on the differences in longitude, latitude and the position of the Moon in its monthly orbit. The larger the spatial offset, the greater the polarization difference can be between two stations. This offset can be a big obstacle in completing contacts as a polarization difference of 45 degrees contributes 3 dB of loss, which increases to over 20 dB at 90 degrees.

On 1296 and 2304 MHz these problems are overcome by the use of circular polarization, so that all stations where the Moon is visible can hear each other without having to adjust polarization or suffer any loss. On the higher microwave bands the simplicity of linear polarization and relatively low number of active stations (North America and Europe only) resulted in a convention where North American stations use horizontal and European stations use vertical polarization. This worked very well until stations appeared in South Africa. Certainly there is movement toward circular polarization on 5.7 and 10 GHz.

The normal convention on both the 23 and 13 cm bands is to transmit a right-hand circular polarized signal to the Moon. Upon reflection from the Moon, the signal now appears as a left-hand circular polarized signal, which is then received as a left-hand polarized signal anywhere on Earth.

There are numerous big signals on the 23 cm band and many loud enough to



A reproduction of the chart recording made by W4HHK of the 2304-MHz moonbounce signal from W3GKP.

carry on casual SSB QSOs. All it takes is a 3 meter dish and a couple of hundred watts and one is able to hear their own echoes and work 50 to 75 different stations without much trouble. The fact that EME is possible today with only moderately sized antennas says a lot for today's technology. There are presently more than 200 active stations in more than 40 countries on 23 cm EME.

13 cm (2300-2310 and 2390-2450 MHz)

The next higher amateur band at 13 cm poses some interesting international frequency allocation challenges. Although the 13 cm band is an international allocation, not all countries allow weak signal work to occur at one common frequency within the band. In the US, 2304.000 MHz is the recognized lower end of the weak signal portion of the 13 cm band, and this is where most of the narrowband terrestrial and EME work occurs.

Although it appears that most of the terrestrial weak signal work in Europe is centered around 2320 MHz, a good portion of the European EME activity is centered around 2304 MHz. Hams in several countries including Germany, England and Wales cannot transmit at 2304 MHz and therefore transmit near 2320 MHz. This requires that stations who cannot transmit on 2320 MHz use an auxiliary receive converter for 2320 MHz to work these stations. The US does not have an allocation between 2310 and 2390 MHz and therefore we must develop a separate receive converter for 2320 MHz.

A similar frequency allocation problem occurs in Asia. Japanese amateurs have their weak signal allocation at 2424 MHz. This requires that the rest of the world have receive capability at 2424 MHz. The Japanese must also have receive capability at 2304 MHz and 2320 MHz to receive North American, European and African stations. Since the US has the 2390 to 2450 MHz spectrum of the 13 cm band, it is possible to transmit on 2424 MHz.

The first 13 cm QSO between the US and Japan was achieved when W5LUA worked JA4BLC, both transmitting on 2424 MHz. Retuning the klystron from 2304 MHz to 2424 MHz was possible for the initial QSO but later QSOs were achieved by using the cross frequency technique. The easier solution is to build individual receive converters to allow reception of the other station's transmit frequency. This generally entails having the primary receiver set up on your own transmit frequency and a separate receiver or receive converter set up to receive the other station's transmit frequency. Operating split on 13 cm EME is very similar to working one of the amateur satellites. More than 50 stations in 22 countries are presently active on 13 cm EME.

9 cm (3300-3500 MHz)

The 9 cm amateur band has limited worldwide authorization, thereby limiting the number of amateurs who can operate EME on this band. US, Canadian, German and Luxembourg stations operate at 3456 MHz. Besides the initial contacts made by KD5RO (now K2DH), W7CNK, and K0KE, the list of stations presently operational include W5LUA, DL9EBL, VE4MA, NU7Z, OH2AXH, LX1DB and OK1CA. The contact between OH2AXH and W5LUA required that both stations transmit and receive on 3405.200 MHz. This was necessary because OH2AXH does not have a transmit allocation on 3456 MHz. My contact with OK1CA made it necessary for me to receive Franta at 3400.100 MHz while still transmitting at 3456 MHz. No doubt, the limited number of countries that have access to this band has kept the number of EME contacts down, but it does offer the opportunity to use old TVRO antennas and old TVRO LNAs as receive preamplifiers. The recent availability of 20 and 40 W surplus solid-state amplifier for this band should allow one to put a respectable 9 cm EME station on the air with relative ease.

6 cm (5650-5925 MHz)

Although the 6 cm band is an international allocation it has not gained the popularity of some of the other microwave bands both terrestrially and on EME. The boost in 6 cm activity both terrestrially and EME has been as a result of numerous surplus 6 GHz uplink microwave systems including many high power TWTs in the 15 to 200 W power range. A 4 GHz TVRO type antenna has more than enough gain for use at 5760 MHz. Since the first 6 cm EME QSOs by WA5TNY, KD5RO, W7CNK, and K0KE, about 25 stations in 15 countries have emerged with EME capable systems on 6 cm. Worth mentioning is the station at W5ZN in Arkansas. Joel has a 3-meter dish and a solid-state amplifier that produces 12 W at the feed of his dish. Joel has worked several stations off the Moon with this very modest setup. Joel is presently upgrading to a larger 5-meter dish. All activity has been near 5760 MHz with one exception. RW3BP has transmit privileges at 5670 MHz necessitating that additional receive capability be built by those who wanted to work Sergei. The typical 5760 MHz transverter uses a 5616 MHz local oscillator to convert 5760 MHz down to 144 MHz where it is received on a typical multimode 2-meter transceiver. At W5LUA, the same 5616 MHz local oscillator frequency converts 5670 MHz down to an IF of 54 MHz, which is easily received by my Kenwood TS-690.

3 cm (10,000-10,500 MHz)

The 3 cm amateur band is the most popular of the upper microwave EME bands. With today's PHEMT technology providing 1 dB noise figures, the system noise floor is controlled more by the level of Moon noise received than the noise floor of the receiver. It is not uncommon to achieve between 1 and 2.5 dB Moon noise from 3- and 4-meter dishes at 10 GHz. The reception of Moon noise is possible because of the relatively narrow beamwidth of the dish at 10 GHz versus the subtended angle of the Moon. The subtended angle of the Moon is described as the apparent width of the Moon in degrees as seen from Earth. Since the beamwidth of the 3 meter dish at 10 GHz (0.7 degree) is nearly as small as the subtended angle of the Moon (about 0.5 degree), most of the noise that the antenna sees is generated by the Moon, which is significantly hotter than the background cold sky. The Moon noise can also be used as an effective means of keeping the dish on the Moon. Maximum Moon noise indicates the dish is optimized on the Moon. A 3 meter dish coupled with a 20 W TWT and a 1 dB noise figure provides a very nice 3 cm EME station that is capable of working several dozen stations. Since the first EME QSO on 3 cm by WA5VJB and WA7CJO in 1988, upwards of 50 stations in nearly 20 countries are currently operational on 3 cm EME. The smallest station W5LUA has worked to date is Dave, N4MW. Dave runs a 2.4-meter offset fed dish and 8 W at the feed.

1.25 cm (24,000-24,250 MHz)

The next higher amateur band at 24 GHz presents an even bigger technical challenge. Parabolic reflectors quite often have very limited performance above 14 GHz due to surface inaccuracies. Low noise amplifiers are not nearly as easy to make as can be done on 10 GHz. High power is very hard to come by. Part 2 of this series will address how VE4MA and W5LUA overcame these difficulties in order to make the first ever EME QSO on 24 GHz.

Path Loss and Dish Gain

One of the most interesting phenomena I have noticed on the upper microwave bands is that it appears to take less power to receive one's own echoes as frequency is increased. The path loss to the Moon and back increases by 6 dB every time frequency is doubled. The

theoretical increase in dish gain for doubling frequency is also 6 dB. However, the increase in dish gain is realized on both transmit and receive. Therefore, for a similar power output and a similar noise figure, doubling the frequency will improve the signal-to-noise ratio of one's echoes by 6 dB. This assumes there is no additional attenuation due to oxygen and water vapor absorption in the atmosphere.

Equipment

If one were to have to purchase all the equipment at new prices, very few would actually be on the air. Thanks to the vast electronics surplus market, it is possible to procure the components required to build a system at very reasonable cost. It is also possible to pick up surplus instrumentation TWTs sometimes for only hundreds of dollars versus the new market price of many thousands of dollars.

So where does one find commercial equipment for the microwave bands? Most microwave stations start with a good multimode 2-meter transceiver or HF transceiver and a transverter. A transverter is a device that can either be homebrewed or purchased and takes the 28 MHz or 144 MHz receive and transmit signals from the basic radio and converts them to higher frequencies. The design of homebrew transverters can be found in numerous ARRL publications including the proceedings of various Microwave Update and Central States VHF Society conferences held over the last several years. If one is inclined to purchase equipment, various amateur microwave equipment manufacturers, such as Down East Microwave and SSB Electronic, supply transverters and low noise amplifiers in either kit form or already built and tested. eBay is also a goldmine of various electronic equipment that is up for sale or bid.

Signal Distortion and Signal Reports

The Moon's surface is very rough and as a consequence the reflected signals can suffer distortion as the multiple reflections combine. The effect varies with the frequency band and the particular motions of the Moon relative to the Earth at any particular time. With rapid fades on top of already weak signals, parts of characters can be lost and thus "dots" in characters tend to be lost. With marginal EME stations, this makes successful reception of an RST report and calls difficult at best. The distortion effect tends to increase with frequency, reaching a peak at 2304 MHz where at times a signal can be quite strong but readability very poor. On the bands above 2304 MHz the tones become almost musical at times on 5760 MHz and spread into a hiss or buzz at 10 and 24 GHz.

An EME signal reporting convention was adopted early on by the amateur community. The convention uses the letters T, M or O for reporting. Being long characters, they tend to survive the distortion. Transmission sequences are normally 2 minutes on 2 meters and 2.5 minutes on 432 MHz and higher. The last 30 seconds of each transmit period is normally reserved for the signal report. Calls are normally sent repeatedly for either 1.5 or 2 minutes depending on the length of the sequence. This gives the receiving station time to find the frequency, optimize the tuning and receive enough good messages to be sure of the content. If calls are correctly received then the next transmission sequence should include either an "M" or "O." The "M" is the minimum acceptable signal report signifying the correct reception of calls and an "O" report indicates that the signal is well above that required for minimum reception. Most often an "O" report is accompanied with an RST report. On 432 MHz and higher, the report of a "T" signifies the detection of a signal, but not enough to put together complete calls. As an example, on 432 MHz, the reception of a "T" report may be an indication that Faraday has rotated the polarity of one's signal, making it difficult to copy at the other end. The 432 MHz operator might then try rotating the polarity of his Yagi array in an attempt to increase the signal level at the other end or the receive end. This offsets the effect of Faraday rotation or compensates for the spatial offset.

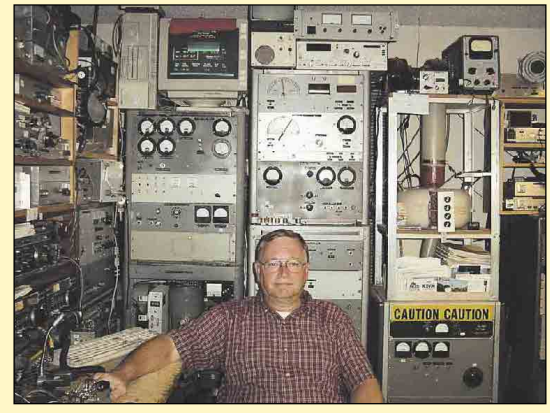
Frequency Setting and Accuracy

The shifting of the received frequency due to the Doppler effect is the result of the Moon's moving around the Earth. This relative motion of the Moon with respect to a fixed point on Earth results in a shift of the frequency of an incom-

W5LUA

I earned my amateur license in 1965 as WN9QZE and soon became WA9QZE in Barrington, Illinois. I had my first exposure to EME through a good mentor, W9YYF. From that point on, my goal was to make an EME contact on 2 meters. I envisioned taking four 8-element HyGain antennas and phasing them. I had already built a kW using a pair of 4CX250Rs while in college. While at the University of Illinois I managed to talk my advisor into letting me build a low noise preamplifier for 144 MHz. I wrote to Texas Instruments and requested samples of the new MS-175TE transistor. This new state-of-the-art bipolar transistor was capable of 1.5 dB noise figure at 2 meters so I was pretty excited. In 1973, we did not have the best equipment for measuring noise figure so the best I could do was determine that the noise figure was something less than 3 dB. As luck would have it, I managed to get a job with Texas Instruments in Dallas, Texas so 2 weeks after marrying Emily, we headed to Dallas with one stop-off on the way. The stop was at the home of W9YYF to pick up two Oliver Swan 14-element Yagis for 2 meters. These were to be the start of a 4 Yagi array for 2-meter EME.

It wasn't until we moved into our first house in Richardson, Texas in 1975 that I was able to build my "big array." I did not really learn what a "big array" was until I met a friend W5SID. W5SID, now K5GW, has certainly redefined in my mind what a big array is! Nonetheless, I still set out to hear my first echoes on 2 meters. On a cold winter night in December, I was poised and ready to "bleep" at the Moon. My four 14-element Swan antennas, 500 W at the antenna and my 1.5 dB highly optimized homebrew LNA were ready. At the sight of the Moon coming across the horizon in Richardson, I sent out three dashes and upon returning to receive, I heard dah-dah-dah! I could not believe it. I did it again and again. Every time I heard my echoes. Boy, was I in heaven! That was the best moment in my Amateur Radio career. Since my early days on 2 meters, my goal has been to make EME contacts on every VHF and higher Amateur Radio band. I am not done yet!



The microwave station of Al Ward, W5LUA. The klystron amplifier at the right is the same unit that W3GKP used to work W4HHK for the first 2304 EME QSO.

VE4MA

My father Andy was an Amateur Radio operator (VE5MA and VE4MA before me) and he introduced me to the hobby. I attended a local ham club meeting in late 1964 where Wally, W0PHD, played a tape of his reception of moonbounce signals from KP4BPZ using the 1000-foot radio telescope dish at Arecibo, Puerto Rico and I said to myself, "I want to do that someday." Being a teenager fascinated with the race to the Moon and anything related to space travel, I began my lifelong quest "to go to the Moon."

Bolstered with extra money from my father I began working on getting a high performance 432 MHz station together, building transistor preamplifiers and 4 and 8 long Yagi arrays for 432 MHz in the hope that KP4BPZ or Sam Harris, W1FZJ, would once again become active on moonbounce. I also began building a 2.2-GHz receiver in hopes of hearing Apollo astronauts visiting the Moon. Neither ever occurred, but as I went through university in the early 1970s, moonbounce became possible for normal hams such as VE7BQH and VE7BBG with the availability of low-noise microwave transistors and better antenna designs.

After completion of university in 1974, I continued my pursuit of moonbounce with the assistance of Jack, VE4JX, who having a large piece of property was willing and able to host an 8 × 13-element Yagi array initially and later a home-made 20-foot diameter dish. Jack and I made many 432 MHz EME QSOs starting in April 1975 including one with my longtime friend Al Ward, WB5LUA (now W5LUA). In 1978 I was able to put up my own 432 MHz EME station at my home, and the relentless pursuit of technology and higher frequencies began.

Barry Malowanchuk, VE4MA, at his station in Winnipeg, Canada.

ing RF carrier, upwards for a rising Moon and downwards for a setting Moon. The absolute frequency of the RF carrier determines the actual magnitude of the shift, with it being a maximum of ±300 Hz at 2 meters (144 MHz) and up to ±60 kHz at 24 GHz. Fortunately, the actual shift at any moment is calculable by the many computer programs available for tracking the position of the Moon.

The setting of the absolute frequency is not trivial. Most commercial radio equipment has relatively poor frequency accuracy and stability, so that at 1296 MHz the possible error can be as high as ±2 kHz. When combined with a maximum Doppler shift of approximately 3 kHz there can be a range of ±10 kHz required for tuning in the search for weak moonbounce signals. Fortunately the absolute frequency is not important if there are high power "beacon" stations operating. This makes finding a reference frequency much easier. Another exciting development is the availability of Global Positioning System (GPS) satellite clocks at reasonable prices that provide a frequency accuracy improvement of approximately 200,000. This translates to an accuracy of less than ±1 Hz at 10 GHz!

Activity Periods and Scheduling

In the early days of moonbounce when signals were very weak, all activity centered on a period of approximately one week when the Moon was closest to the Earth in its elliptical orbit. The point at which the Moon and the Earth are closest is called *perigee*. This provided a signal strength improvement of approximately 2 dB, which was difficult to achieve in any other manner. A few key people around the world compiled written requests (this was long before e-mail!), developed schedules and published them in monthly newsletters that were mailed around the world. So activity tended to focus on one weekend a month.

As the newsletter and moonbounce activity grew, additional people began functioning as schedule coordinators, taking the written requests and schedules passed on the 20-meter international moonbounce nets that operate on 14.345 MHz. The 70-cm-and-Above EME Net starts at 9 AM CST/CDT Saturdays and 10 AM CST/CDT on Sundays. The 2-Meter EME Net immediately follows the 70 cm net at 11 AM CST/CDT. The present Net control station for the 70-cm-and-Above EME Net is K1RQG in Maine, and for 2 Meters it is Lionel, VE7BQH, in Vancouver, British Columbia. Both of these nets are also a good source of technical information.

Many schedules are now arranged directly by e-mail and through the use of an e-mail reflector. Moonbounce activity and signal levels have increased to the point that there is activity nearly every weekend when the Moon is visible in Europe and North America on 2 Meters, 432 and 1296 MHz.

Operating Aids

Since the beginning of Amateur Radio moonbounce activity, the biggest challenge has been locating the position of the Moon and knowing when distant stations have Moon time in common so that contact is possible. Before hams had access to mainframe computers this was nearly impossible. Later in the 1980s, as personal computers became commonplace, a variety of machine language and BASIC programs became available for amateurs to use. Today these programs exist for virtually every operating system and provide such advanced features as real time operating clocks, indication of Doppler frequency shift, station polarity differences and antenna pointing information. They can even perform antenna control.

Further, these programs permit the planning of moonbounce activities by looking for mutual windows, minimum polarity difference, and prediction of signal strengths based on the position of the Moon in its orbit, station equipment capabilities and the position of celestial noise sources. Many of these programs are free or shareware. More information can be found by visiting the Web sites **www.ve1alq.com** and **www.nitehawk.com/rasmit/ws1_1.html**.

Tune in next month for Part 2 of this series. See you in the ARRL EME contest October 26, 27 and November 23, 24!

Notes

[1] *The ARRL UHF/Microwave Experimenter's Manual*, Chapter 10, ARRL, 1990. Available from ARRL (order no. 3126), toll-free 888-277-5289 or on *ARRLWeb* (**www.arrl.org/store**).

[2] *Beyond Line of Sight, A History of VHF Propagation from the Pages of QST*, Chapter 8, ARRL, 1992. Available from ARRL (order no. 4025), toll-free 888-277-5289 or on *ARRLWeb* (**www.arrl.org/store**).

You can contact Al Ward, W5LUA, at 2306 Forest Grove Estates Rd, Allen, TX 75002-8316; **al_ward@agilent.com**. *Barry Malowanchuk, VE4MA, can be reached at 54 Boisselle Bay, Winnipeg, MB R3X 1M4, Canada;* **ve4ma@shaw.ca**.

By Mike Marcus, N3JMM/7JIAKO

Linux, Software Radio and the Radio Amateur

How software radio technology might revitalize experimentation in Amateur Radio.

For a long time there has been concern about the decline of experimentation in the Amateur Radio community, the impact of this on the demographics of the community, and the possible impact on the regulatory situation of the Amateur Radio Service (ARS).[1] Advances in electronics, some pioneered within the ARS, have led to widespread use of technologies that are beyond the hardware implementation skills of most hams without a professional engineering background. Indeed, the title of this article is inspired by an article written nearly 50 years ago by John Costas, K2EN. John feared that widespread use of SSB would lead to a rapid decline in HF equipment building by hams and a consequential adverse impact on the ARS.[2] The thesis of this article is that a well-conceived strategy for using software radio technology in the ARS might have a positive impact on reversing the apparent decline of experimentation and might even bring a new, younger, and experimentally motivated group into Amateur Radio.

What is Software Radio?

A software radio is one in which one or more transceiver functions are performed by digital circuitry under software control on a digital representation of the signal.[3] Software radios use digital signal processing (DSP) for filtering, modulation and demodulation of signals within the radio. While DSP can do everything an analog radio can do, it can also do functions that are difficult or impossible for analog radios. But more importantly, software radios are related to the computer software revolution that is affecting our society. The design and implementation of these radios involves the technical skills that stimulate great interest in today's younger generations.

A good example of a software radio is the DSP-10 2-meter transceiver that has been developed by Bob Larkin, W7PUA, and which has been available in kit form from the Tucson Amateur Packet Radio (TAPR) organization.[4] This radio implements a 2-meter transceiver with DSP and makes the source code available for modification by users.

Just as personal computers use both hardware and software and can be modified by adding or modifying software, software radios can acquire new functionality throughout their hardware lifetime if new or modified software is used. No need here for the old soldering iron!

In the brave new world of software radios, ham experimentation would involve writing software to perform transmitter or receiver functions, modifying existing software to "tweak it," or reading about a new software program, downloading it, and trying it out over the air. I believe that this type of experimentation can generate new interest in ham radio and develop skills that are valuable in today's society.

Present Barriers to Software Radios

While some innovations in ham radio technology might have been slowed by

[1]Notes appear on page 35.

FCC inaction, that does not seem to be the case here as present FCC Rules appear to enable both the use and sale of software radios. The previously mentioned pioneering work by TAPR shows this policy in action. The major barrier seems to be lack of interest in the ham radio manufacturing community towards making a radio that allows users to have meaningful interaction with the software.

A check of ads for top-of-the-line ham transceivers will show that most of them already have computer interfaces and many of them already claim to have DSP. So what's the problem? The problem comes in the words "meaningful interaction" that were used previously. Today's computer interfaces allow one to tune the radio and change modes via a computer—just like turning the knobs. They do not allow you to actually rewrite any of the software in the radio.

Consider the following simple example: Both traditional radios and software radios usually have receiver filters with a variety of bandwidths. In a traditional hardware radio this is achieved with a crystal filter or mechanical resonator for each bandwidth. In the software radio, a mathematical algorithm is used and a set of variables determines the filter bandwidth and shape. Change the variables and you change the bandwidth and shape.[5] Yet no ham manufacturer today allows users to change this functionality! The only commercially available model of which I am aware that allows user modification of internal software is the Australian-made WiNRADIO 3000-series receivers.[6] But this is only a receiver and the DSP in it is done on audio signals after all the tuning, IF filtering, and detection is performed with analog circuitry.

I have had discussions with several ham manufacturers on the issue of software radios for ARS. Several points have kept recurring in these conversations. First, manufacturers have expressed concern that software development by users will require access to manufacturers' proprietary software.[7] The manufacturers probably have legitimate claims concerning the intellectual property in their products for specific functions: for example, downconverter, demodulator and the overall architecture of their software implementation. But one wonders if they are pressing this view of intellectual property in order to maintain or slightly improve market share in the decreasing overall ARS hardware market. Perhaps after reading this article the whole ham community will think about how reinvigorating the ARS might reverse trends and grow the ARS hardware market by attracting a new type of ham.

However, the intellectual property argument doesn't explain the inability to load filter constants into any present radios. Changing filters is not writing a program: It is just downloading to the receiver a set of constants that are used by programs. The explanation for this shortfall probably lies in the remaining concerns.

The second concern expressed by the manufacturers is the issue of user support. Ham equipment is sold with a relatively small budget for user support and manufacturers cringe at the thought of getting calls from purchasers who are trying to get their new SSB demodulator program to work and keep having problems. They have a valid point here. They don't want to ruin their reputation with a user support problem that is impractical. However, I have a suggestion here and I'm sure others might think of alternatives. Sell the radio without the hardware interface and software documentation needed to change the software in the radio; then enlist a few technologically advanced ham groups to be the sole distributors of the hardware/software package. Hams would buy the package from the ham groups and the ham groups would provide user support in the best tradition of the ARS.[8] To save people from themselves, I suggest that any such transceivers have a reset button that resets the software to factory settings so no one can complain that his radio has lost all functionality.

The third point raised is that hams aren't interested in developing and maintaining the software for such radios. I respond to this by pointing out the well-documented DSP-10 2-meter software radio and the new GNU Radio project. Check it out on the Web at **www.gnu.org/software/gnuradio/gnuradio.html**.

You probably have been wondering why Linux is mentioned in the title of this article. GNU Radio, a free software project that is being sponsored by the Free Software Foundation, is a cousin of Linux, the open computer operating system. At present, GNU Radio is a software receiver, not a transceiver. But the principle has been established for using Linux-style development for software radios. A few years ago computer hard-

ARRL's Active Role in Software Radio

Early in 2002, the ARRL leadership appointed a Software-Defined Working Group to press for development of some of the things for which Mike calls, and more. The group, Chaired by Bob Larkin, includes Leif Åsbrink, SM5BSZ; Gary Barbour, AC4DL; Paul Rinaldo, W4RI; Gerald Youngblood, AC5OG; and yours truly. Mike participates *ex officio*. We filed our first report with the ARRL Technology Task Force in July 2002. You can view it on the Web at **www.arrl.org/announce/board.html**. Look for the link to the July 2002 committee reports.

It is true that manufacturers could have done some of the things Mike suggests a long time ago and he rightly points out obstacles to their doing them. That's not stopping some experimenters, though! At least four Working Group members have published articles on software radio and have produced working units. Others from around the globe have been coming out of the woodwork with their designs. A short bibliography for those who want to see what's cooking appears at the end of the article.

Some ham transceivers have had the ability to alter software by plug-in card (Kachina) and flash ROM (Ten-Tec); however, users have not been able to obtain source code to write their own embedded software. Support issues aside, I can safely state that such software—usually written in assembly language, the native language of the DSP in use—is so critical of timing and other issues as to be difficult to write, even for the best of us. That is where discussions of software interfaces begin.

For example, we recognize that a radio having a high-speed digital interface could pass digital samples to and from an external processor. Software development could then proceed on whatever platform is convenient, such as a personal computer. Sound cards also provide the means for easy data acquisition, as amply illustrated in some of the articles listed below.

Beyond that, we see it is possible to construct modular DSP software that would allow users to build block diagrams of their favorite configurations while leaving all the heavy number-crunching inside the radio. Flexibility is the name of that game.

We can expect some really neat capabilities to arise from current work percolating along those lines. Sure, we have bemoaned the decline in experimentation and homebrewing; but the level of circuit integration available from semiconductor manufacturers is actually making things easier in many ways, even if you don't use digital electronics. If you haven't dug into it lately, you're not getting the real picture. Check it out!—*Doug Smith, KF6DX, Editor,* QEX: Forum for Communications Experimenters; **kf6dx@arrl.org**.

ware manufacturers couldn't understand the Linux concept and were concentrating on more traditional operating systems. Many have now accepted Linux and its freeware concept as a valid player in the personal computer area. Perhaps ARS manufacturers might have a similar conversion, especially if consumers encourage them.

Near-Term Steps

There are several near-term steps that could usher in the movement toward ham use of software radio and the consequent changes to the ARS. One might be for someone to just manufacture the DSP-10 2-meter software radio. It is available in kit form, but kit building is almost a lost art and most young people have never heard of Heathkit.

Another near-term step might be for manufacturers to include in their radios, or offer through technically oriented ham clubs, digital inputs and outputs for audio and IFs at audio-like frequencies in a convenient interface such as USB or Firewire.[9] With such input and outputs, hams could experiment with digital processing outside of the transceiver without being forced to send the signal to and from the receiver in analog form and introducing distortion in multiple A/D and D/A conversions. This external DSP could be done without access to the DSP within the radio and avoids proprietary information issues.

As previously mentioned, allowing hams to change the filter constants in receivers would be another promising first step that would not compromise any proprietary information of the manufacturers. Yet this would expose hams to the full reality of today's digital filter-design programs.

A full software radio with user access to the software should be a midrange goal because of its potential impact on the ARS. I urge manufacturers to work with ham groups to explore this option in detail and see whether their present concerns need be long-term barriers. I also urge hams to think about these issues, consider joining development efforts such as at TAPR and GNU Radio, and communicating their views to the manufacturers and the leaders of ham organizations.

Summary

In summary, DSP technology might have a broad impact on the future of the ARS if hams can access hardware that gives them flexibility to experiment and rapidly share software for new design features. However, present trends in manufactured equipment make the commercial availability of such hardware doubtful in the near future. An effective dialogue between hams and the manufacturer community on this topic might lead to mutual benefits.

The author wishes to acknowledge the useful comments he received while writing this article from Paul Rinaldo, W4RI, and DeWayne Hendricks, WA8DZP.

Note: The views presented here are those of the author and not necessarily those of his employer.

Recent SDR-related Articles

R. Green, VK6KRG, "The Dirodyne: A New Radio Architecture?" *QEX*, Jul/Aug 2002.

J. Scarlett, KD7O, "A High-Performance Digital Transceiver Design: Part 1," *QEX*, Jul/Aug 2002.

G. Youngblood, AC5OG, "A Software-Defined Radio for the Masses," *QEX*, Part 1, Jul/Aug 2002; Part 2, Sep/Oct 2002.

L. Åsbrink, SM5BSZ, "Linrad: New Possibilities for the Communication Experimenter, Part 1," *QEX*, Nov/Dec 2002.

D. Smith, KF6DX, "Introduction to Adaptive Beamforming," *QEX*, Nov/Dec 2000.

C. Ping, BA1HAM, "An Improved Switched-Capacitor Filter," *QEX*, Sep/Oct 2000.

For further information visit **www.arrl.org/tis/info/sdr.html**.

Notes

[1]The Amateur Radio Service uses generous spectrum allocations that it has received to further the five goals enumerated in 47 CFR 97.1. While these goals have been around for a long time, increasing demands for spectrum from many sectors makes defense of existing allocations vital. One might model the current allocations as a social contract between the government and hams, with resulting mutual obligations. Contributing to the advancement of the radio art is one of the five goals.

[2]John Costas, "Poisson, Shannon, and the Radio Amateur," *Proc IRE*, Dec 1959. The connection between this article and Costas' concern about the fate of ARS was given in private communication with the author. Among other things, Costas was trying to advocate suppressed-carrier double sideband because it was simpler to build and had overall throughput comparable to SSB according to his analysis. This article is also viewed as a key milestone in the development of CDMA cellular radiotelephone technology as it foresaw the efficiency of that technology.

[3]General sources of information about software radio technology and its implications are **ourworld.compuserve.com/homepages/jmitola/** and **www.sdrforum.org/** as well as Chapter 18: "Digital Signal Processing," *ARRL Handbook for Radio Amateurs*.

[4]Bob Larkin, W7PUA, "The DSP-10: An All-Mode 2-Meter Transceiver Using a DSP IF and PC-Controlled Front Panel—Part 1-3," *QST* Sep-Oct-Nov 1999; text available at **www.arrl.org/tis/info/sdr.html**. The TAPR site for information on this project including kit availability is **www.tapr.org/tapr/html/dsp10.html**.

[5]The variables are numbers that define the impulse response of the filter and therefore its frequency response. Given a frequency response and the sampling rate in use, anyone could design a new set of variables using public-domain programs. One possible application of changing filters externally might be to design a filter in real time to counter QRM and improve reception.

[6]**www.winradio.com/home/sdk.htm**.

[7]Note that the microprocessors usually used for DSP are very different than the ones used in personal computers and have been optimized for the specific functions they need to do.

[8]In the early days of the personal computer, industry user groups were key to the support of new hardware and software. This might also be a good model for technologically advanced software radios.

[9]Although we generally use IFs at frequencies such as 455 kHz and higher, an IF can be at any frequency greater than half the bandwidth of the signal involved. Thus a 10 kHz IF could handle most ham modulations and would allow signals to be manipulated by hardware designed for audio applications. A 10 kHz IF may seem untraditional, but in theory and in practice it can work quite well!

Mike Marcus, N3JMM/7J1AKO became interested in radio in high school and finally got a Technician license in 1991 with the encouragement of his father-in-law, Arnold Halpern, W2GDS. He is an electrical engineer and has worked for the federal government for more than 20 years in the spectrum management area. Also licensed in Japan, which he often visits, he uses 2 m and 70 cm there for language practice and has carried his HT to the top of Mt Fuji for some QSOs. He can be reached at **n3jmm@aol.com**.

NEW PRODUCTS

PORTABLE GROUND-COUPLED ANTENNA MOUNT FROM MFJ

◊ Designed for portable operation or for use in antenna-restricted neighborhoods, MFJ's new Model 1904 Ground-Coupled Antenna Base/Mount is aimed at providing an effective earth ground and convenient physical mount for ground-mounted vertical antennas. Simply place the four-legged platform at the desired location, push the legs into the ground and mount your vertical antenna.

The mount is a 2 × 2-foot stainless-steel square with reinforced "legs." Two handles make carrying and removing the mount fast and easy. The built-in antenna mount has an SO-239 coaxial connector, a threaded attachment for standard $^3/_8$-inch × 24 mobile whips and two U-bolts to handle most commercial, mobile and home-brew verticals without modification.

Price: $99.95. For more information, contact your favorite Amateur Radio products dealer or MFJ, 300 Industrial Park Rd, Starkville, MS 39759, tel 800-647-1800, fax 662-323-6551; **mfj@mfjenterprises.com**; **www.mfjenterprises.com**.

Next New Products

By Mark Kesauer, N7KKQ

An Inexpensive External GPS Antenna

If you operate APRS or just need an external antenna for your GPS receiver, here's one that is easy to build yet offers surprisingly good performance in a compact size. Best of all, it uses commonly available components and materials.

This antenna design is based on a classic turnstile configuration (for circular polarization)—two dipoles are placed on the same plane but rotated 90° from each other. These dipoles are then spaced ¼ wavelength above a ground plane. A ¼ wavelength "parallel-plate" transmission line (printed circuit-board material) serves as the connection method and mounting post for the dipoles.

Construction

Start with the base plate. Cut a 4-inch diameter circle out of thin hobby tin or brass. (It happens that the inside diameter of the container lid is 4 inches, approximately the same width as the hobby tin/brass sheet.) Mark the exact center of the base plate. This is where the parallel-plate transmission line assembly is attached (see Figure 1).

Cut two 4-inch lengths of #14 solid copper or brass wire and bend each in the exact center at 90°. Make the radius of the bend as small as possible. Set these aside, they will be soldered to the parallel-plate section later.

Select an 8-foot length of RG-58/U, RG-174 or RG-188 coax. Attach a male BNC connector to one end (or whatever compatible connector is used on your particular GPS receiver). I used a solderless connector but removed the screw and then soldered the center conductor directly into the screw hole. If your GPS unit has a BNC antenna connection, you can use an Ethernet coax cable found at most computer stores. Just make sure they are 50 Ω. They'll already have the BNC connectors crimped on each end. Just cut in the center, trim to length and you'll have enough for two antennas. The GPS frequency is 1.57542 GHz so the

Table 1
Materials

Hobby tin (K&S #254) or brass sheet (K&S #251) (0.010 thick).
Sheet of single-sided, glass-epoxy PCB material (FR-4 or G10 .062″ thick, enough to make two 2-inch pieces 0.250″ wide.
Solderless right-angle male BNC connector (RadioShack 278-126) or the appropriate type for your GPS receiver.
8-foot RG-58/U (Radio Shack 278-1314), RG-174 or RG-188 coax.
8-inch #14 solid bare copper or brass wire.
Empty 8-oz cream cheese container.
Misc—Clear 5-minute epoxy or superglue.
Clear spray lacquer, #600 fine sandpaper.

K&S Engineering, 6917 W 59 St, Chicago, IL 60638; voice 773-586-8503; fax 773-586-8556; www.ksmetals.com/.
RadioShack, www.radioshack.com/.

Figure 1—Close-up view of the coax connection to PCB transmission line and support.

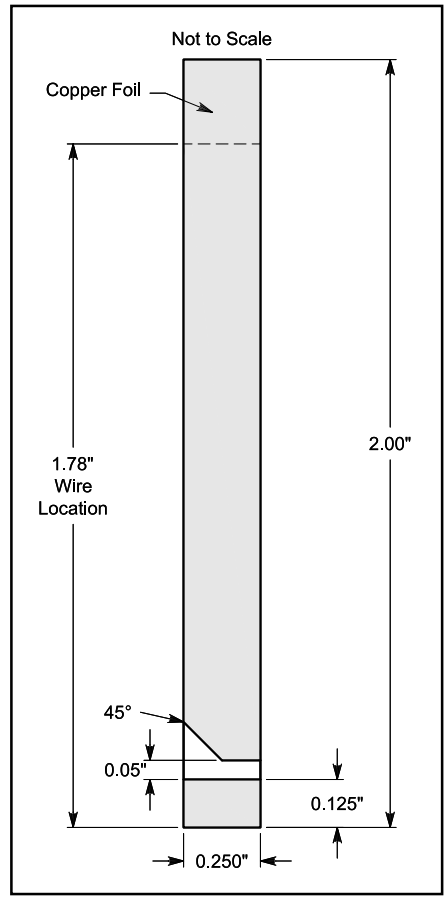


Figure 2—The active side of the transmission line.

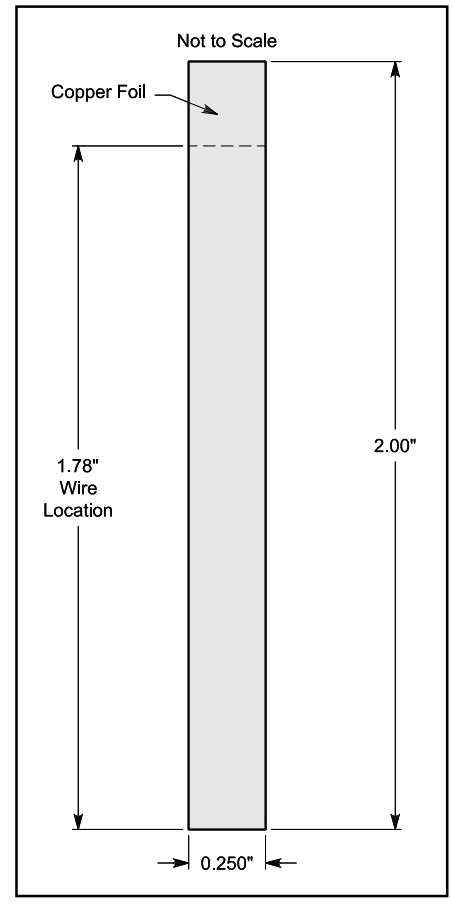


Figure 3—The ground side of the transmission line.

longer the coax, the greater the loss. Use no more than 8 feet—less if you don't need the length.

To make the parallel-plate transmission line, cut two 2-inch lengths of single-sided printed circuit board material that are 0.250-inch wide. Make sure it is glass-epoxy (FR-4 or G10 type material) and that it is 0.062-inch ($^1/_{16}$ inch) thick.

On one of the PCB strips, cut the copper foil with a sharp hobby knife or Dremel tool, as shown in Figure 1. This will be the "active" section of the parallel-plate where the other non-modified strip will be the "ground" side, as shown in Figure 2. The 45° cut on the active side is known as a "microwave turn" which allows the signal to effectively turn 90° to the coax. Glue the two strips together (copper outside) and set aside to dry.

I've found it easier to cut the PCB strips a bit wide and glue them together first. Then I just file both edges to the correct dimensions. A light sanding with #600 sandpaper finishes off the edges and removes any burrs.

Double-sided 0.125-inch thick PCB material could be used but can be difficult to obtain for the average hobbyist. Conversely, by using a single 0.063-inch thick double-sided material we would be working with a rather small and fragile structure (half the thickness equates to roughly half the width). This might not hold up during handling and operation. By using the two sections glued together, we've solved the problem by creating our own 0.125-inch thick material.

Solder the transmission line section to the base plate keeping it as square and plumb as possible. Drill or melt a hole in the plastic container the same diameter as the coax. Feed the end of the coax through the hole and attach the coax to the transmission line active side as shown in Figure 4.

Measure 1.78 inches up from the base end of the parallel-plate section and scribe a line in the copper foil. Solder one of the #14 wires to the ground side of the parallel-plate section. Position as shown in Figure 4. Do the same with the active side—you may need a helping third hand as it's difficult to hold the soldering iron, antenna and position the wires all at the same time.

Measure each leg of the horizontal wires and trim to 1.51 inches from the center junctions. Next, trim both the 45° wires to 1.82 inches from the center junction. If all went well, you should have approximately ½ inch between the tips of the 45° wires and the base. If not, carefully resolder or bend the wires to this dimension.

Using a fine saw or a Dremel tool, remove the excess length of the transmission line just above the wire junctions. Sand the exposed junction to remove any burrs and check for a short circuit.

Note that we've purposely kept the transmission line section length long, until after construction. The thin copper foil tends to separate from the glass epoxy during heavy duty soldering. The longer length acts as a heatsink to preserve the bond between the copper foil and the glass-epoxy base.

Final Assembly

I've found that an empty, upturned 8-ounce cream cheese container makes a practical radome for the antenna. More importantly, it helps protect the internal workings from mechanical damage.

I usually don't paint the container but I do remove the silk-screened label by using an automotive rubbing compound. It takes some effort but it does come off. Just follow the manufacturer's instructions. Be careful not to apply too much pressure to the lid when you rub the label off. It's made of a different plastic than the container and stretches easily.

You should be able to snap the base plate into the lid of the container. It's a tight fit so just work your way around the lid until the entire base plate is flush with the lid bottom You might have to cut a notch in the lip of the lid to allow the coax to exit the unit cleanly. Carefully align the coax with the lid notch and snap the cover onto the lid. It's normal for the top of the transmission line assembly to slightly raise the "bump" on the container bottom.

Theory of Operation

In a normal turnstile, we would have a double dipole configuration with both dipoles on the same plane but rotated 90° from each other. Additionally, the second dipole is fed 90° out of phase with an-

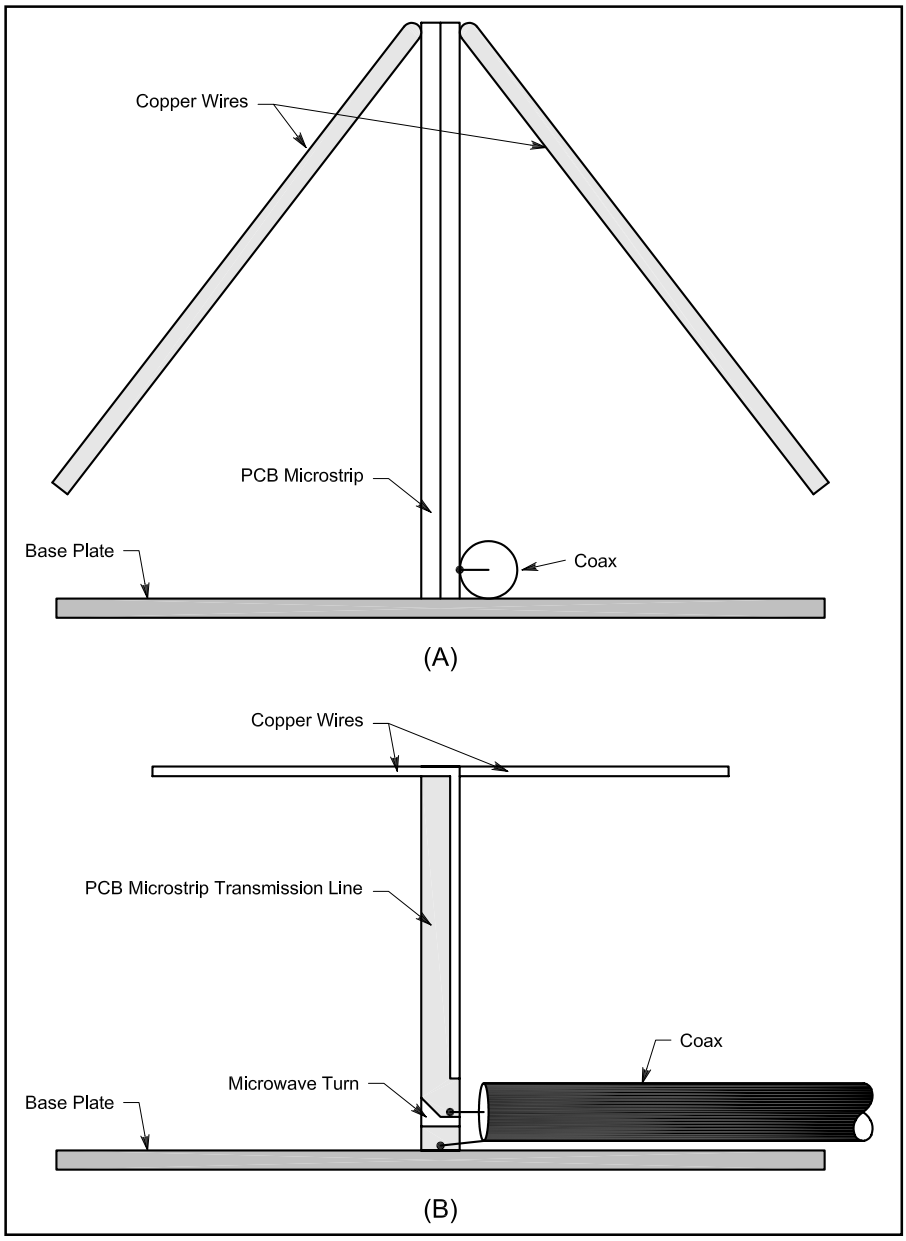


Figure 4—Side (A) and front (B) views of the parallel-plate transmission line and radiating elements.

other ¼ wavelength of coaxial cable (see Notes 2 and 3). This creates some difficult assembly problems since you would have to isolate the second dipole section from ground while maintaining the tight distance and spacing requirements. Due to the size constraints, this second dipole connection would require a very small diameter coax that might be difficult to work with and even harder to obtain. With this antenna, we cheat a bit and use a self-phased quadrature type feed.

To obtain circular polarization without a coaxial phasing line, the shorter dipole is cut so its impedance is $50 - j50\ \Omega$. The longer dipole is fashioned into an inverted V shape and cut so its impedance is lowered to $50 + j50\ \Omega$. With the combined asymmetrical dipoles and with them spaced slightly closer than ¼ wavelength to the ground plane, the antenna's impedance is near 50 Ω with a much more omnidirectional pattern, an important consideration for reception of GPS satellites close to the horizon.

Operation

Connect the antenna to the GPS receiver and watch the signal-strength indicator. You should see an improvement over the supplied stock antenna. You can tweak the antenna by bending the wires up and down gently and watching the results on your GPS unit. Be careful of the solder joint—it's rather fragile. Adjust for maximum displayed signal. Repositioning the antenna may also improve reception. With this antenna, I routinely receive five to eight satellites on my Garmin II receiver.

If you are using a GPS unit that sends dc voltage volts up the coax to power an external preamp or amplified antenna, don't worry. Since the elements are not grounded or shorted, there is no dc path. Just be careful not to let either end of the active elements touch ground. [Be ad-

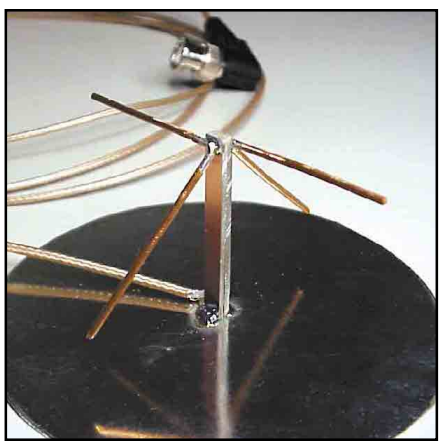


Figure 5—View of the parallel-plate support with elements attached.

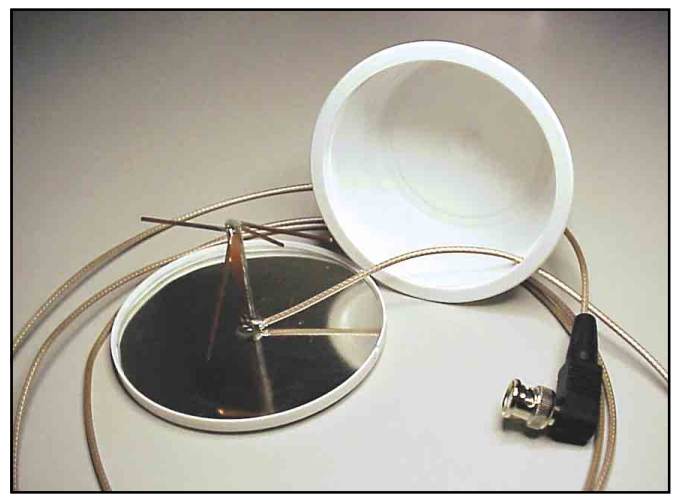


Figure 6—The finished GPS antenna with radome ready to snap into place.

vised that some GPS receivers with internal patch antennas have an antenna switching circuit. This circuit disables the internal antenna when an amplified external antenna is attached. The receiver senses current flow that is intended to power the amplifier of the external antenna. If your receiver has this feature, you will want the switch to activate and disable the internal patch antenna. Placing 1 kΩ to 5 kΩ across the ground and center conductor of the coax should be sufficient. Check with the manufacturer of your GPS receiver.—*Ed*.]

If you are mobile, most GPS receivers will do a fair job of receiving signals through the windshield of a car. During the summer, however (and especially out here in the Southwest), the GPS gets baked while sitting in the hot sun. Obviously, one way to solve this problem is to locate the receiver somewhere cooler and place this external antenna on the dash. Once that's done, you've protected your expensive receiver while sacrificing a $10 antenna.

This design was not intended for outside use, hence the lack of external mounting suggestions. Any prolonged exposure to the elements will degrade the antenna's unprotected metal parts. My suggestion—if you plan on using this unit outside, at least spray the metal parts with clear lacquer and seal the exposed coax end with RTV. Otherwise, don't waste a lot of time weatherproofing it. Because these antennas are so cheap and easy to build, if one does deteriorate throw it away and build another. Perhaps you might want to keep a couple of spares on hand, just in case.

My thanks to Zack Lau, W1VT, of the ARRL Lab for his advice and expertise.

Notes

[1]Tom Hill, WA3RMX, "A Triband Microwave Dish Feed," *QST*, Aug 1990.
[2]Zack Lau, W1VT, "A Simple 10-Meter Satellite Turnstile Antenna (RF)," *QEX*, Nov 2001.
[3]Zack Lau, W1VT,"A Simple 10-Meter Satellite Turnstile Antenna (Feedback)," *QEX*, Jan 2002.

Mark Kesauer, N7KKQ, received his Novice license in 1969. He has held the call signs WN8CGM, KA5ZCH and his present Extra class call sign. Mark belongs to QCWA, Ten-Ten International and has been a longtime ARRL Member. Mark holds an Engineering degree and has been a Computer Aided Designer (printed-circuit boards) for 29 years. Mark may be contacted at **n7kkq@arrl.net**.

FEEDBACK

◊ The impressive 13-star flag flying proudly from page 20 of Sep 2002 *QST* is actually a Bennington Flag, not a Ben Franklin flag. Our thanks to several readers who pointed out that the original can be seen at Vermont's Bennington Museum (**www.benningtonmuseum.com/flaghistory.html**).

◊ In the Apr 2002 *QST* article "AMRAD Low Frequency Upconverter," there is a short across R10 in Figure 2. That short should be removed. Also, early versions of the PC board used a slightly different crystal oscillator circuit. That circuit worked fine except it occasionally would not start. Several of those boards were shipped from FAR circuits. If you have one, they will exchange it for the later circuit if you wish. The older circuit is shown in the hand-drawn schematic on the AMRAD LF Web page at **www.amrad.org/projects/lf/** if you wish to use the older circuit.

STRAYS

VIDEOCONFERENCING BOOK FROM K8OCL

◊ John Champa, K8OCL, has written a new book titled *Videoconferencing Skills*. The book offers students and instructor's detailed information about how to present dynamic and forceful videoconference meetings. The ten lessons in *Videoconferencing Skills* provide an activity-driven approach with three to five activities in each lesson, instructional illustrations, an introduction to the equipment used in videoconferencing, instruction in preparing PowerPoint slides for a videoconference and much more. A separate instructor's manual is available as well. John has been a ham since 1959 and is chairman of the ARRL High-Speed Digital and Multimedia Working Group. *Videoconferencing Skills* is available for $11.50 (the Instructor's Manual is $15) from: Thomson Learning, Order Fulfillment, 10650 Toebben Dr, Independence, KY 41051; tel 800-354-9706 (8 AM-6 PM Eastern); **www.swlearning.com**.

Next Strays

NEW PRODUCTS

THE K2/100 HIGH-PERFORMANCE HF TRANSCEIVER KIT FROM ELECRAFT

◊ Elecraft's landmark K2 kit transceiver is now available in a 100-W model. The compact K2/100 is based on the K2, with the same features and same world-class receiver performance. It has the portability and efficiency of a QRP transceiver with a 100-W punch when you really need it.

Created by Elecraft co-founders Wayne Burdick, N6KR, and Eric Swartz, WA6HHQ, the K2/100 uses an integral heat sink as its top cover, thus retaining the same form factor as the base K2.

Features include silent, diode-based T/R switching; a built-in remote control port with true RS-232 levels; low receive-mode current drain for enhanced portability; all basic K2 features, including dual VFOs, multiple memories, split TX/RX operation, RIT/XIT, full-break-in CW, built-in memory keyer, narrow IF crystal filtering, excellent receiver dynamic range and IF-derived AGC.

The K2/100 shares a number of K2 options, including the KSB2 SSB adapter, KNB2 noise blanker, K160RX 160-meter adapter with second receive antenna jack, KAF2 audio filter/real-time clock and the MH2 Heil/Elecraft microphone.

Price: The K2 sells for $589 and the KPA100 100-W Integration Kit (internal), which completes the K2 as a K2/100, sells for $349. For more information, point your Web browser to **www.elecraft.com** or e-mail **sales@elecraft.com**.

NEW 50-Ω COAX FROM CABLE X-PERTS

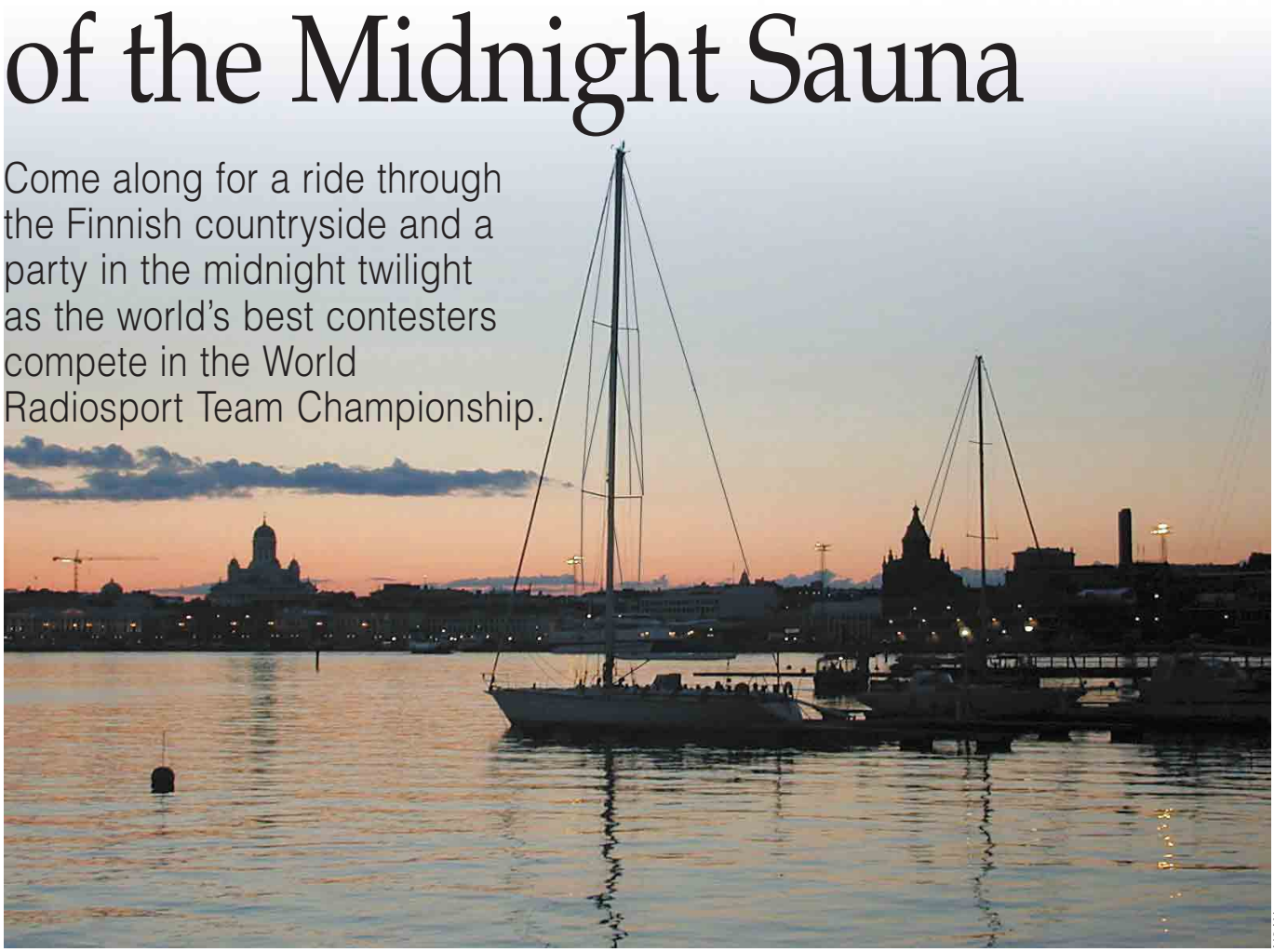
◊ Cable X-Perts, Inc, is pleased to introduce a new version of their CXP1318FX, a 50-Ω low-loss coaxial cable. Manufactured with a "gas-injected" foam polyethylene dielectric and a 19-strand center conductor, this cable is designed to give exceptional flexibility and reliability. Other enhancements include a double shield (100% bonded-foil and 95% tinned copper braid) and noncontaminating and direct-burial jacket. Nominal attenuation (per 100 feet) is said to be: at 150 MHz, 1.6 dB; 450 MHz, 2.9 dB; 1200 MHz, 5.0 dB, and 2400 MHz, 7.5 dB. Available in bulk and ready-made lengths with UHF (PL-259) and N connectors. For more information, see **www.cablexperts.com** or via email at **cxp@cablexperts.com**. Cable X-Perts, Inc, 225 Larkin Dr, Ste 6, Wheeling, IL 60090-7209, tel 800-828-3340; Fax 847-520-3444.

Previous • Next New Products

By H. Ward Silver, N0AX

WRTC 2002—In the Land of the Midnight Sauna

Come along for a ride through the Finnish countryside and a party in the midnight twilight as the world's best contesters compete in the World Radiosport Team Championship.



N0AX

The skyline of Old Helsinki was a beautiful sight across the bay from the Klippan dinner hall where the Awards Banquet was held.

"Ladies and Gentlemen, welcome to Helsinki and thank you for flying with us." The adventure begins—arriving in a foreign land, with new sights, sounds, and smells all washing over you. With relief my wife Nancy, KD7PMX, and I saw the "WRTC" sign held high by Arno, OH7XM, and Marje, wife of OH1RX. Soon we disembarked at the WRTC HQ hotel in Espoo, a suburb of Helsinki. The lobby was a blizzard of new arrivals, their luggage and a number of large cases that looked like they might contain radio equipment. Let WRTC begin!

The 2002 version of WRTC was organized jointly by the Contest Club of Finland (CCF) and the Finnish Amateur Radio League (SRAL). Led by Jouko Häyrynen, OH1RX, Jukka Kulha, OH2MA, Martti Laine, OH2BH, and Pasi Luoma-aho, OH2IW, over 40 Finnish hams and volunteers spent countless hours organizing and managing the event. Fifty-two hosts near Helsinki set up nearly identical antenna installations with a small triband Yagi and a multiband Windom 12 meters above the ground. The topography of this area of Finland is one of low rolling hills, lakes, and lots and lots of forest. As a result, no one station would have an advantage due to location. The committee was extremely thorough in its preparations. Detailed information on WRTC is available at **www.wrtc2002.org**.

Helsinki to Himos

By late afternoon of Tuesday, July 9 all of the teams and referees were on hand, so it was get-acquainted time. Outside on lawn, in a large tent, at the bar, in the hotel cafe—anywhere you went were hams shaking hands, saying "Hello" in many languages, laughing and talking. While we are familiar to each other by call sign, not many had met face-to-face.

What a great beginning, but how do you manage to greet every one of 300 friends in a single evening? Luckily, at 60° North, evening lasts, well, all night. My eyes were saying "9 PM," but my watch was saying "Midnight" and my body was saying "11 AM." Confusing? Yep. I think I'll have another of those great sausages known as "Finnish Vegetables," thanks! *Kippis!* (Cheers)

Wednesday, after an introductory meeting at the nearby Dipoli ("dipole-y")

And the Call Sign Is...

As every contester knows, the choice of call sign is important to a winning effort. For the casual entrant, it doesn't matter very much, but if you plan on making better than one hundred QSOs per hour over long periods of time, then it makes a big difference.

For example, during a typical contest, the top stations may say or send their call several thousand times. That makes a single extra syllable, dot or dash, or cumbersome phonetic an unwanted burden. For each thousand calls, every extra one-half of a second spent fiddling about with the key or making a noise into the microphone results in 8 minutes of the contest lost. At the top levels of competition, the choice of call can easily make or break a winning effort.

The call signs that were available for WRTC were derived from call signs issued to radio clubs around Finland, but with the special prefix OJ substituted for OH. Each call sign had a numeral, from 1 to 8, and a single-letter suffix. Inevitably, some call signs were better than others. Nevertheless, the teams felt that the calls were reasonable.

The assignment of calls to teams was done in a random drawing on Friday, a full day before the starting bell. Each team captain selected a sealed (and opaque—we checked) envelope identified by number only and held by the referee. The WRTC committee would know what team had drawn what call, but the referee could only open the envelope 10 minutes prior to the contest! This barely gave the teams enough time to configure their logging software and get ready to go.

Keeping the call secret prevents any "creative marketing" that might otherwise go on, encouraging the "home town crowd" to work their friends disproportionately (and unfairly) to the other teams. While some recognition of a unique voice is unavoidable, WRTC attempts to level the playing field in every way possible and keeping call signs secret is a good way to go.

Teams Participating in WRTC2002

	Call	Team	Mults/QSOs	Referee	Host	Score
1	OJ3A	N5TJ & K1TO	438/2782	G4BUO	OH2HXP	1,629,798
2	OJ8E	RA3AUU & RV1AW	426/2627	K1VR	OH3AXA	1,619,226
3	OJ2V	DL2CC & DL6FBL	473/2468	OH1MA	OH1XX	1,608,673
4	OJ3R	N6MJ & N2NL	436/2705	OH2JA	OH2FQ	1,560,008
5	OJ8K	KQ2M & W7WA	394/2816	OH6DO	OH2JTE	1,479,470
6	OJ5A	VE3EJ & VE7ZO	437/2635	UA6HZ	OH2QV	1,473,127
7	OJ1M	K5ZD & K1KI	457/2519	SM3CER	OH2AAB	1,469,255
8	OJ6E	UT4UZ & UT3UA	416/2637	TG9AJR	OH1RX	1,468,064
9	OJ5W	LY1DS & LY2TA	416/2638	N2AA	OH6XY	1,459,744
10	OJ5M	DK3GI & DL1IAO	440/2534	IV3TAN	OH2WC	1,456,840
11	OJ6W	OE2VEL & OE9MON	416/2560	WC4E	OH2BCI	1,436,448
12	OJ6C	RW1AC & RW3QC	395/2776	W6OAT	OH2LQS	1,414,100
13	OJ5U	N6RT & N2NT	432/2435	OH7JR	OH1PV	1,412,640
14	OJ8W	9A9A & 9A5E	373/2778	OH3BU	OH2BNX	1,405,837
15	OJ7M	SP3RBR & SP8NR	403/2650	K9ZO	OH2BJ	1,402,440
16	OJ2F	N6TJ & N6AA	397/2428	OH6RX	OH2HUH	1,391,088
17	OJ3T	RZ9UA & UA9MA	395/2708	KM3T	OH2HE	1,390,795
18	OJ2H	N5RZ & K2UA	410/2559	DL6LAU	OH2VB	1,388,670
19	OJ8A	K1AR & K1DG	432/2382	SM3EVR	OH1BOI	1,382,400
20	OJ2J	HA1AG & HA3OV	408/2602	OH6LNI	OH2LB	1,368,432
21	OJ3N	N2IC & K6LL	405/2513	HA6ND	OH2BC	1,355,940
22	OJ4M	K3LR & N9RV	366/2642	OH7BX	OH2HXT	1,347,612
23	OJ3D	W4AN & K4BAI	389/2530	F6BEE	OH2BP	1,347,107
24	OJ2Y	UA2FZ & RW4WR	421/2389	N0AX	OH2BAH	1,331,623
25	OJ4N	ON6TT & ON4WW	416/2260	K3NA	OH2KI	1,301,248
26	OJ2Q	YU7BW & YU1ZZ	381/2743	W0RTT	OH2ES	1,300,734
27	OJ6X	OH1MDR & OH1MM	438/2267	W0GJ	OH2BR	1,293,414
28	OJ7C	ES5MC & ES2RR	393/2505	S50R	OH2CV	1,288,254
29	OJ2Z	G4PIQ & G4BWP	419/2342	4Z4KX	OH2BH	1,277,950
30	OJ6N	OK2FD & OK2ZU	379/2446	N7BG	OH2BO	1,274,577
31	OJ1S	SP7GIQ & SP2FAX	371/2498	N3AD	OH2NMZ	1,234,317
32	OJ5T	SM5IMO & SM3SGP	386/2381	W6UM	OH2MM	1,214,742
33	OJ7X	S50A & S59AA	379/2542	K6AW	OH2LOI	1,210,147
34	OJ4S	JM1CAX & JE1JKL	392/2289	OH5BM	OH3BHL	1,205,008
35	OJ7N	YL2KL & YL3DW	382/2392	K6NA	OH1MK	1,196,424
36	OJ3X	5B4ADA & 5B4WN	386/2310	KC1F	OH2MH	1,186,950
37	OJ7S	N5KO & N1YC	389/2177	OH4XX	OH2ME	1,142,882
38	OJ1X	K1ZM & N6ZZ	370/2354	OH1EB	OH2KFI	1,139,230
39	OJ5E	OH6EI & OH2XX	402/2059	WX0B	OH2TA	1,131,630
40	OJ1F	NT1N & AG9A	397/2101	OH5NQ	OH2KU	1,105,645
41	OJ5Z	F6FGZ & F5NLY	375/2016	K8NZ	OH2NRV	1,086,750
42	OJ8N	YT1AD & YU7NU	359/2335	OH6OS	OH1BV	1,069,820
43	OJ7W	UA9BA & RN9AO	368/2168	N7NG	OH5KW	1,052,480
44	OJ6K	VE7SV & VE7AHA	351/2257	T93Y	OH2BPI	1,045,980
45	OJ4A	DJ6QT & DL2OBF	347/2166	K7BV	OH2RF	1,005,259
46	OJ1C	LU7DW & LU1FAM	322/2335	RZ3AA	OH6YF	986,930
47	OJ7A	PP5JR & PY1KN	333/2263	SM3DMP	OH5BQ	978,021
48	OJ1N	EA3AIR & EA3KU	340/2140	K6KR	OH2KKU	954,380
49	OJ8L	S56M & S57AL	345/1920	N4GN	OH2HAN	883,545
50	OJ1W	ZS6EZ & ZS4TX	369/1723	G0MTN	OH2BAD	880,065
51	OJ6Y	IK2QEI & I4UFH	339/1921	N3BB	OH2MZB	878,349
52	OJ4W	UN9LW & UN7LAN	297/1893	OH1JD	OH2KW	699,732

building on the Helsinki Institute of Technology campus and a great buffet featuring the first of many ways to enjoy salmon, we were packed off to the SRAL Summer Camp. This event is held at a resort in Himos, near Jämsa and 270 km north of Helsinki.

Why did WRTC go "upcountry"? July is holiday month in Finland. Forget about doing business—the Finns are all at the beach or in the country! Hams take part in extended hamfests, of which Summer Camp is one example. The camping area at Himos was full of vans and campers sporting verticals and wire antennas strung between the birch and pine trees.

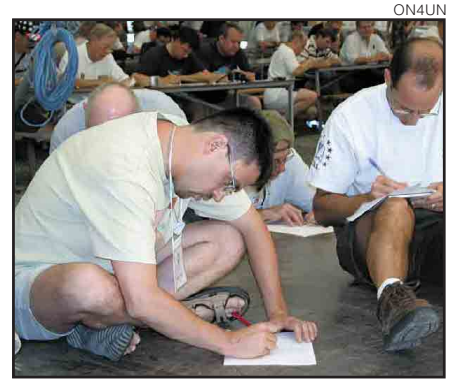
From Himos to the Hosts

Meetings got the basic questions out

N0AX

The WRTC teams all used these small tri-banders made by Oy Finnish Antennas Ltd, mounted on a 12-meter crank-up tower.

ON4UN



No table was available during the just-for-fun pileup test, so competitors used whatever surface was handy, as demonstrated by HA1AG and N5TJ.

ON4UN

At the opening ceremony, the teams encircled the inside of the big tent.

of the way about rules, equipment, judging, logging—all the minutiae associated with the top competitors in any sport. The Opening Ceremony was held in the aptly named Big Tent. Each country's team filed in, waving to the crowd. The games were declared open and a jazz combo regaled us with a special piece, "CQ Serenade."

On Friday morning, we had one final wrap-up meeting and then it was time for the teams to meet their referees and hosts. As each team captain selected a random envelope containing their secret call sign, the hosts and referees were introduced.

Our host, Juhani, OH2BAH, was waiting for us back in Helsinki. By evening, the teams were speeding off to all corners of southern Finland. The contest was less than 24 hours away, beginning at 3 PM local time. There was a lot of work to do and the teams were mighty anxious.

My Team and Host

We got to know each other over the 56 km drive to Juhani's location. Communication problem? No way—jokes and bad puns were shared in fluent English. Besides, we could always use Q signals. Which is the one for "Pass that fine Estonian cheese"?

As we arrived at OH2BAH's lakeside summer home—a common feature of Finnish life—we were startled to see a homebrew 10-meter moonbounce dish built by Juhani's brother. The QTH also features two large towers with large Yagis and quads. If only that Big Aluminum was available...*not!*

Igor and Sandy immediately got to work while I assisted with whatever small thing I could do. WRTC referees are charged with enforcing the rules during the contest, but we try to help our teams before and after the contest. Soon the radios and computers were operational. Any big problem at this point can be fatal, so having the station working was a huge relief.

Our dinnertime discussion was free-ranging and we all enthused about the great changes in the world since WRTC1990. Igor really captured the moment by asking, "Isn't it wonderful that Finns, Russians and Americans all sit at the same table and talk freely?" A toast to that, my friend! If fishing is not always about catching a fish, WRTC is not always about contesting. Long after the QSOs are a distant memory, moments like that dinner with three new friends will last a lifetime.

The Contest!

In the morning, Sandy fine-tuned the station while Igor repaired the team's antenna switch box. Juhani had fired up the sauna (the -au is pronounced *ow*) and with one hour to go, we were all roasting in the wood-fired lakeside hut. Approaching 100° (C not F), all the tension of the past days literally melted away and it was time to dash outside, down the short dock and plunge into the pure, sweet waters at 70° (F not C). A good, old American cannonball into the lake felt terrific!

With 10 minutes to go, I ceremoniously opened the envelope containing the secret call. OJ2Y! Cheers by all—not too long and not difficult for Russian speakers (WRTC this year was in English-only). The logging software was quickly set to use the new call and we waited for

N0AX

Team OJ2Y—N0AX, UA2FZ, OH2BAH, RW4WR—are all smiles after a post-contest sauna and dip in the lake.

ON4UN

The action was fast and furious as UA9BA and RN9AO mine the bands.

Real-Time Scoreboard—At Last!

At WRTC2002, something new was added—the "Real-Time Scoreboard"—a huge success. Once an hour, scores from all the teams were posted to a Web page as a large bar graph. Thousands of hams around the world viewed the site. How did they do that? Here's the secret.

Because many of the WRTC committee members work for the mobile phone manufacturer Nokia, the major WRTC corporate sponsor, it was only natural that a very handy feature of the mobile phone network was put to use. The Short Messaging Service, or SMS, allows short text messages to be sent to any other mobile phone. Text characters and numbers in the message can be interpreted by a computer program, as well.

Each team was assigned a mobile phone with its ID set to the call sign of the team captain. During the contest, the referee would send the team's score to HQ once per hour. The SMS system also passes the ID of the phone, so the receiver would know both the identity of the team and the score. From there, it was just a "Simple Matter of Programming" (the four most dangerous words on Earth) to create the chart showing the team scores, automatically updated every hour and it worked great.

The WRTC2002 committee and the Scoreboard committee led by Veijo Kontas, OH6KN, get the credit for breaking new ground that has been long, long overdue in radiosport. Well done! Now...can you please do it for CQWW?

the clock to roll over to 1200Z. They're off at last!

While the team did battle, the referees had volunteered to undertake the hardest possible task for a contester—maintaining silence—listening 24 hours straight to every QSO. I check for possible rule infractions, observe carefully for logging mistakes, and note in my referee's log anything that might affect the team score. So many times, the referee wants to lend a hand...I must admit to once blurting out, "It's an M!" during a difficult QSO. *Bad* ref! All referees will understand the urge, though.

Igor and Sandy could make a lot of QSOs in a hurry, averaging 100 QSOs per hour for the entire contest. Peak rates were well over 200 QSOs per hour as packet spots would steer a crowd our way. With special awards for working all the OJ stations, the contest was a series of massive pileups and lower-rate interludes for picking up HQ and other multiplier QSOs.

Before the contest, there was a lot of concern about propagation. Would WRTC turn out to be a Europe-only Sweepstakes? It rapidly became clear that conditions were excellent. With solar flux in the mid-130s, 15 and 20 meters provided an endless source of European QSOs in the west to UA and JA in the east. At the US sunset, the East Coast appeared, followed by 8s, 9s and 5s. Ten meters offered up short openings to the south.

If you think 40 is a tough band in the States, you should try it in Europe! The phone band is only 7040 to 7100 and crammed with signals. In addition, just above are megawatt SW broadcasters. 20-over-9 in the US, they are needle-pinning front-end-crushers in Finland. The team spent the long twilight night jumping between 80, 40 and 20. The next morning, rate stayed high on 10 and 15 meters with the points piling up right to the end.

Finally, 3 PM rolled around and the bands got very, very quiet. There was only a brief respite—logs had to be handed to the referee within 15 minutes! The station was quickly packed and it was on to more serious business. Juhani had stoked the sauna around noon, "Not so cool today...100°!" In we went; sauna, lake, cold 807, sauna, lake, cold 807. I could get used to this!

Spare rig cradled on Sandy's lap like a sleeping child, we sped back to WRTC HQ. We found that the team was in the middle of the pack with 2460 QSOs and 1,340,000 points. They had scored better than the average team of champions. Not bad for a day's work!

The Awards Banquet

After correcting some score calculation errors, it looked like N5TJ-K1TO would be in the running along with DL2CC-DL6FBL and RA3AUU-RV1AW. The judges worked through the night, literally, to check logs and compare notes. Contesters worldwide had been encouraged to e-mail their logs to the WRTC to provide extra checking data and 943 of the Early Bird logs were received—thanks! The results remained a closely guarded secret through the day.

Monday evening tour boats ferried us to a small island where we were treated to a formal dinner at the Klippan dinner hall. Andrew, G3WZZ, and Lissa, "The Ham Band," led a singalong of two ham

N0AX

Peter Tigerstedt, OH5NQ, lectures during a trip to his family's Mustila Arboretum, one of the many fine cultural activities made available to WRTC attendees.

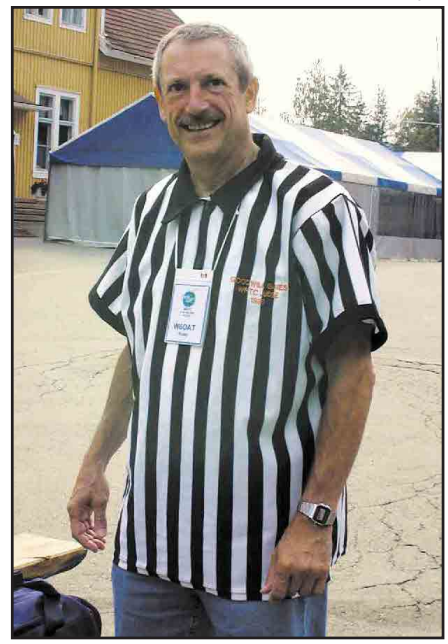
N0AX

Team Belgium—Peter, ON6TT, and Mark, ON4WW. Both are heard frequently from rare locations because their work as communications specialists for the World Food Programme carries them around the globe.

N6TV

The winners! L to r—Silver medalists RV1AW and RA3AUU (host OH3AXA), Gold medalists N5TJ and K1TO (host OH2HXP), and Bronze medalists DL2CC and DL6FBL (host OH1XX).

N0AX



Referee Rusty Epps, W6OAT, sporting the judicial attire that he has worn to all four WRTCs.

radio songs. Soon it was time—would N5TJ-K1TO "three-peat"? Yes! German and Russian teams were very close behind, taking silver and bronze in by far the tightest finish ever. Coming in fourth was the youngest team at the games, Americans Dan, N6MJ, and Dave, N2NL. This bodes well for the future of WRTC.

We headed back to WRTC HQ for more tale-telling and farewells. The organizing committee, their long labors finally coming to a close, could finally relax and enjoy themselves. They deserved every "Congratulations" and "Good job!" ladled over them. While there isn't yet a host for the next WRTC, any group with the enthusiasm and effectiveness of the OH team will assuredly do the job right.

Nakemiin (Goodbye) to Finland

The next couple of days saw our numbers dwindle. By Wednesday just a few of us remained at the breakfast buffet. Team Africa—ZS6EZ and ZS4TX—and VE3EJ mulled over the competition, WRTC in general, and ideas for the next one. John, W2GD, and Elaine, KB2ERI, shared a travel story or two. Walter, DJ6QT, shared a tuoppi (mug) of beer. And then we were gone. Back to our homelands around the world, to meet again in the coming fall contests as competitors. Now we have a deeper appreciation of what it is like for the other guy, what he is like, how the band sounds on his end.

I will take a moment to say, "Hi Igor, Hi Sandy!" and remember diving into Juhani's clear Finnish lake. That's the way it should be and that's why WRTC is such a success. Thank you, organizing committee and hosts, for giving up so much of your own time to support all of us. Thank you, competitors, judges and fellow referees for traveling long distances and making fair play and good sportsmanship the order of the day. A special thanks to Marianne Lund (wife of OH3UU) and her daughter Taija who deftly managed the travel arrangements for the more than 300 attendees. And thank you to the people of Finland who made us feel welcome and opened their country to us. In the little Finnish that we know, but will carry with us always, *Kiitos!* Thank you!

N0AX

This is what the sky looks like at 0145 at latitude 62° North. Is it sunset or sunrise? Yes!

ARRL member H. Ward Silver, N0AX, is an engineer, author and teacher. He lives on Vashon Island, Washington. First licensed in 1972 as WN0GQP, his primary interests are DXing and contesting. Ward also works to develop local emergency communications capabilities and Elmers new and would-be hams of all ages. The author can be reached at **n0ax@arrl.net**.

By Jean Wolfgang, WB3IOS; Rick Lindquist, N1RL, and Steve Ford, WB8IMY

2001/2002 Award Winners

The ARRL Board of Directors recognizes award winners for 2001/2002.

Each year at its July meeting, the ARRL Board of Directors conveys a number of awards to recognize excellence in public relations, education and technical innovation. This year's winners were announced briefly in September *QST*'s report on the Board meeting (pp 41-43). This month we introduce you to the winners and share some background on their accomplishments.

2002 Philip J. McGan Memorial Silver Antenna Award

Sharon T. "Sherri" Brower, W4STB, of Vero Beach, Florida, is the winner of the 2002 Philip J. McGan Memorial Silver Antenna Award. Established in 1993, the McGan Award honors an amateur who demonstrates outstanding public relations success at the local, state or national level on behalf of Amateur Radio.

A ham since 1989, Brower has been an ARRL Public Information Officer since 1995. She holds an Extra ticket and is an ARRL Life Member. She's also an Official Emergency Station in Indian River County and active in ARES and RACES.

ARRL Southern Florida Section Manager Phyllisan West, KA4FZI, nominated Brower for the McGan Award. "Rather than being a single, loud thunderstorm, Sherri's public relations contributions are a refreshing and encouraging yearlong rain that keeps Amateur Radio in view of the public throughout her three-county district and spills over into other parts of the Southern Florida Section," West said. She said Brower makes a special effort to aim her public relations activities at youth, with demonstrations on Earth Day and Kid's Day as well as during scouting activities and in classrooms. "She is prominent at all local hurricane expos with a ham radio demo setup and ARRL flyers explaining how ham radio can fill the gap in a communication emergency," West continued.

West said Brower's efforts have helped to educate local governmental officials about ham radio and its benefits. In addition, she said, her presentations have helped in the fight against antenna restrictions in Florida. Brower, who will succeed West as Southern Florida SM on October 1, will receive an engraved plaque.

2001 Professional Educator of the Year Award

William Dumond, W7QT, of Redmond, Washington, is the 2001 ARRL Professional Educator of the Year. This award is presented to a teacher who uses Amateur Radio within the curriculum. The Lambda Amateur Radio Club of Philadelphia, Pennsylvania, is an award cosponsor.

Dumond, a third-grade teacher at Stillwater Elementary School in Carnation, Washington, applied for and received an in-district grant of $1200 in 1994. This money made it possible to install a high frequency radio station at the Stillwater Elementary School. To date over 700 students in third, fourth, and fifth grade have participated in the program known as "Radio Experience."

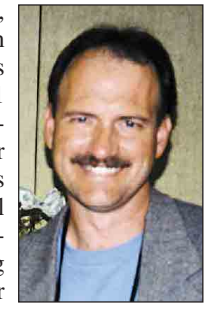
Dumond provides a variety of learning tools associated with Amateur Radio. After a successful contact, students are required to write a letter to the contact. All letters are sent out with the school's QSL card. Students also make an informal oral presentation profiling who they contacted, where they live and what the weather conditions were like there. Students also use a classroom map to find the geographical location of the contact. Dumond says, "the nice thing about amateur radio is that while you're learning you're also having fun!"

Although Dumond is on the air three or four times a week with students from school, he also enjoys making evening QRP CW contacts on 20 and 40 meters. He also enjoys building QRP radios, rag-chewing and hunting DX as well as learning about the digital modes. In Dumond's words, "Enjoying the hobby just never ends for me."

In nominating Dumond for this award, Janie Dalton, WA7GNI—a former student and instructional assistant—cited his level of enthusiasm, support, encouragement and caring. "He puts all of these qualities into action for the benefit of his students," Dalton said.

Dumond will receive an engraved plaque and a $100 ARRL publications gift certificate.

2001 Professional Instructor of the Year Award



Thomas Henderson, WD5AGO, of Broken Arrow, Oklahoma, is the winner of the 2001 ARRL Professional Instructor of the Year Award. This award is given to an individual who teaches an Amateur Radio licensing class as a regular course in an educational institution, such as a community college or vocational school. Henderson has been incorporating Amateur Radio into his Wireless Design class at Tulsa Community College for eight years.

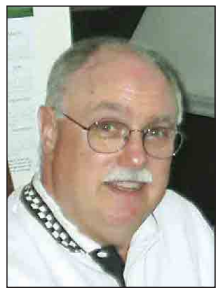
Students in Henderson's classes build amateur transmitter and receiver projects as well as VHF and UHF antennas, which can be tested on the college's antenna range. The students get to keep their finished projects.

"Mr. Henderson uses a vast array of teaching styles to emphasize the particular subject matter that the class is covering. These include hands-on demonstrations, computer simulations, overhead transparencies, and handouts. He breaks down complex ideas and relates them in ways that help his students better understand the concepts and ideas of the covered material," according to a current student, Gregg D. Koontz, KB0QDI.

Henderson will receive an engraved plaque and a $100 ARRL publications gift certificate.

2001 Herb S. Brier Instructor of the Year Award

Richard W. "Rick" Crockett, W0PC, of



O'Fallon, Missouri, has been chosen to receive the 2001 ARRL Herb S. Brier Instructor of the Year Award. The award, named for the late, longtime *CQ* Novice editor, honors an individual who represents the spirit of Brier's effective and caring Amateur Radio instruction. Cosponsoring the award is the Lake County Amateur Radio Club of Crown Point, Indiana.

Crockett, who's been teaching licensing classes for more than 25 years, is an active member of the St Charles Amateur Radio Club. He enjoys SSTV, CW and PSK31. While Crockett admits to listening more than transmitting, he enjoys checking into the local club 2 and 10 meter nets along with the Firebird net on 40 meters.

Crocket not only has all his rigs interfaced to computers, but another favorite pastime is building and/or restoring PCs. After completion, these computers are donated to youth who otherwise could not afford them.

"Rick is knowledgeable, easygoing and creates an atmosphere in his classes that makes it very easy for the students to succeed," said former student Larry Carr, K0LAC. And, according to Ron Ochu, KO0Z, president of the St Charles Amateur Radio Club, "our membership rate is increasing largely due to Rick, W0PC. Rick's love for the hobby is contagious and not only his students are exposed to Rick's devotion to ham radio, but club members pick up on his enthusiasm and once again sparks are rekindled."

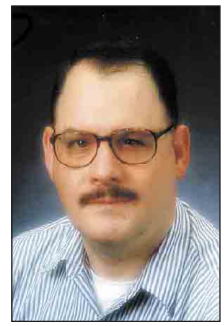
Crockett will receive an engraved plaque and a $100 ARRL publications gift certificate.

ARRL 2001 Doug DeMaw, W1FB, Technical Excellence Award

John Stephensen, KD6OZH, received the 2001 Doug DeMaw, W1FB, Technical Excellence Award for the best *QST* or *QEX* technical article. John's article "Reducing IMD in High-Level Mixers," appeared in the May/June 2001 issue of *QEX*, *QST's* sister publication for experimenters.

The article discussed the shortcomings of common diode-ring mixers and how they might be improved to reduce intermodulation distortion (IMD). By following John's designs and suggestions, homebrewers can build receiver front ends that surpass the performance of commercial radios.

John has been interested in radio communications since building a crystal radio kit at age 11. By the time he entered high school, he was building radios from vacuum tubes and other components obtained from discarded black-and-white TV sets. He then went on to study Electronic Engineering at the University of California and has worked in the computer and electronics industry for 29 years. He was a cofounder of Poly-Morphic Systems, a PC manufacturer, in 1975 and a cofounder of Retix, a communications software and hardware manufacturer, in 1986.



John received his Amateur Radio license in 1993 and has been active on 14 MHz through 24 GHz. His interests have included 10-meter, VHF and microwave contesting, and HF and satellite DXing. Lately he has had time to design and build Amateur Radio gear and some of this work has been documented in a series of articles in *QEX*. His latest project is examining how 21st century technology, including programmable logic devices and SoCs, can be incorporated into home construction of ham equipment.

Established in 1975 as the ARRL Technical Excellence Award, the name was changed in 1997 to honor the late Doug DeMaw, W1FB, a former ARRL Headquarters technical editor and well-known Amateur Radio author. The award consists of an engraved nine-inch pewter cup.

2001 ARRL Technical Innovation Award

The 2001 ARRL Technical Innovation Award will go to three amateurs. This award is given to an amateur or group of amateurs whose technical research and development accomplishments are of the most exemplary nature.

Keith Lamonica, W7DXX, of N Easton, Massachusetts; Bob Arnold, N2JEU, of Canastota, New York; and Stan Schretter, W4MQ, of Reston, Virginia, are the recipients of the 2001 award. They were cited for their development of Internet control of remote HF stations with new and unique software and a hardware interface. Their efforts were recognized in an article, "Remote-Controlled HF Operation Over the Internet," by Brad Wyatt, K6WR, which appeared in the November 2001 issue of *QST*.

The Internet Remote Control station has made it much easier for hams to enter, or re-enter the hobby. Many operators live in condos, apartments, or other places where installing a decent antenna is difficult if not impossible. In the past one would have to be satisfied with limited space and a generally poorly radiating antenna. Now they can remotely operate stations which provide moderate antennas and better opportunities.

Schretter tells of another application. "I think my most satisfying occurrence was providing a totally blind ham access via the standalone client. This software was originally designed for laptop operation so was heavy on keyboard operations vs just being mouse driven. Michael learned quickly how to operate the remote and became so enthused that he studied and took his Extra and then set up his own station."

Arnold developed a software interface to control some all band and SWL receivers using the Internet and his Web site. He installed this software on his Web site to control receivers.

In late 1999, Lamonica and Arnold modified the software to operate a transmitter remotely over the Internet. Lamonica assembled the hardware and software and placed it on the air. Improvements were made to the original software to add transmitter control functions and to provide for limited access to the system via login names and passwords. A system to limit operation to frequencies appropriate to the user's license class was also added.

Schretter combined the two concepts and developed the software that could operate his Kachina radio through the Internet via a client/server, and TCP/IP architecture. Next he developed an innovative approach to providing an "interactive" radio tuning concept within a browser, using standard HTML/Javascript Web programming. This tied together concepts from Javascript, HTML frames, and the Long Running Web Interface (LRWP) available in the Xitami open source Web server. While the standalone client is the choice of many operators of the remote base today, the interactive Web version allows immediate access to ham radio to all with a computer on the Internet. Thus it allows demonstration of ham radio on any computer without loading any special software.

For more information about Internet ham radio, visit **www.arrl.org/tis/info/internet.html**.

W4MQ

Stan Schretter, W4MQ, has been an active ham since 1957. When not writing software or pursuing his many volunteer activities, Schretter can often be found on the air ragchewing on 40 meter CW or 20 meter PSK31. On

many Fridays, he demonstrates and discusses amateur radio at the Smithsonian Institution ham station, NN3SI, located in the Museum of American History in Washington, DC.

While Schretter works as a consultant in communications and computers for defense related projects, the Internet Remote Base project has given him a hands-on opportunity to merge two of his favorite technical interests—ham radio and computer software.

Keith Lamonica, W7DXX, became a ham in 1958. Currently he teaches Mass Media courses related to broadcasting at Bridgewater State College in Massachusetts.

According to Lamonica "the Internet remote base flowed from my early interest in the Internet. There were remote controlled receivers but no transmitting capabilities. That was a challenge that Bob Arnold and I took on a couple of years ago and now it would appear the idea has caught on. With software from both Stan and Bob, other remote bases are coming on-line."

Bob Arnold, N2JEU, a ham since 1987, is a Network Manager/Designer employed by Onondaga Community College in New York. His responsibilities include a gigabit fiber optic backbone system serving over 1500 computers.

At home Arnold dabbles in networking using his eight PC systems. Current projects include the remote controlled receivers, setting up his own Internet Remote Base system based on a Kenwood TS-570SG and ICOM IC-756PRO and an Internet remote controlled robot for educational use. All projects will use his own software.


N2JEU

The ARRL Technical Innovation Award carries a cash award of $500 and an engraved plaque.

2001 Hiram Percy Maxim Memorial Award

Tamara M. Stuart, KF6RIV, of Palm Springs, California, is the winner of the prestigious Hiram Percy Maxim Memorial Award for 2001. Established in 1936, the award goes each year to a radio amateur under the age of 21 whose Amateur Radio accomplishments and contributions are of the most exemplary nature.

A recent graduate of Palm Springs High School, Stuart is active in the Desert Radio Amateur Transmitting Society of Palm Springs ("Desert RATS"), the Southwest Remote Radio Club, the Radio Amateur Civil Emergency Service (RACES) and the Civil Air Patrol (CAP) United States Air Force Auxiliary. She's a Technician licensee and an ARRL member.

For the past four years Stuart has experimented with radio wave propagation and antenna design, and her list of science fair projects is praiseworthy. Her 2001 entry was "Radio Frequency (RF) Radiation Propagation and Polarization of One-Wavelength Loop Antennas." She also has made presentations about her radio experiments to youth and community service groups, and she has encouraged young women to pursue nontraditional careers in science and engineering.

A ham since 1998, Stuart enjoys operating on VHF and UHF. She remains active in school and community activities and was selected as Miss Palm Springs 2002. She's also a 2001 National Discover Card scholarship winner. While in high school, she maintained a 3.91 grade point average while participating in an advanced placement program. In the fall, she plans to attend Harvey Mudd College in Claremont, California.

As the Hiram Percy Maxim Memorial Award winner, Stuart will receive a cash award of $1500 and an engraved plaque. QST

ARRL 2002 TECHNICAL AWARDS CALL FOR NOMINATIONS

By Jean Wolfgang, WB3IOS

"Necessity is the mother of invention." I don't know who said that, but I wonder if they were talking about ham radio operators? Do you know someone who has been "tinkering" with a particular aspect of ham radio? If so, now is the time to nominate yourself or your colleague(s) for one or all of the awards described below. ARRL members are encouraged to send nominations to ARRL Headquarters. Please include basic contact information for both you and the nominee. Submit support information along with a nomination letter, including endorsements of ARRL affiliated clubs and League officials. Nominations should thoroughly document the nominee's record of technical service and accomplishments.

The nomination form for these awards can be found at **www.arrl.org/ead/award/application.html**.

ARRL Technical Service Award is to be given annually to the licensed radio amateur whose service to the amateur community and/or society at large is of the most exemplary nature within the framework of Amateur Radio technical activities. These include, but are not limited to:

- Leadership or participation in technically oriented organizational affairs at the local or national level.
- Service as an official ARRL technical volunteer: Technical Advisor, Technical Coordinator, Technical Specialist.
- Service as a technical advisor to clubs sponsoring classes to obtain or upgrade amateur licenses.

The Technical Service Award winner will receive an engraved plaque. In addition, the winner may request ARRL publications of a value up to $100.

ARRL Technical Innovation Award is granted annually to the licensed radio amateur whose accomplishments and contributions are of the most exemplary nature within the framework of technical research, development and application of new ideas and future systems. These include, but are not limited to:

- Promotion and development of higher-speed modems and improved packet radio protocols.
- Promotion of personal computers in Amateur Radio applications.
- Activities to increase efficient use of the amateur spectrum.
- Digital voice experimentation.

The Technical Innovation Award winner will receive a cash award of $500 and an engraved plaque.

ARRL Microwave Development Award is given each year to the amateur (individual or group) whose accomplishments and contributions are the framework of microwave development, i.e., research and application of new and refined uses and activity in the amateur microwave bands. This includes adaptation of new modes both in terrestrial formats and satellite techniques.

The Microwave Development Award winner will receive an engraved plaque. In addition, the winner may request ARRL publications of a value up to $100.

Nominate Now!

Send nominations to: ARRL Technical Awards, 225 Main St, Newington, CT 06111. Nominations and support information must be received at Headquarters by March 31, 2003. Send any questions to Headquarters or e-mail **jwolfgang@arrl.org**.

QST

By Dr Anthony R. Curtis, K3RXK

The Legacy of AMSAT-OSCAR 6

Thirty years ago this month the first Phase-2 hamsat enticed many of today's best-known Amateur Radio satellite enthusiasts.

It was an electrifying time. Sci-fi was in high season as Trekkies held their first convention. Astronauts were back from the Moon and the Russians were in their space station. TV signals from Paris, Tonga, Nigeria and Brazil were bouncing off sky-high relays as astronomers were measuring the Galactic Center in submillimeter waves.

It was 1972, and radio amateurs around the globe were primed to take it to a new level when AMSAT-OSCAR 6 lifted off on a Delta 300 rocket from Vandenberg Air Force Base in California.

On October 15, AO-6 started the second generation of Amateur Radio satellites known as Phase 2. Launch took the hamsat to a circular, sun-synchronous, low Earth orbit (LEO) and landed a lot of excited hams on cloud nine.

This new way to talk around the world drew a gleeful crowd of neophytes to the high frontier of hamsats. AO-6 introduced a broad spectrum of hams to their first great fun with a satellite. Around the globe, the ranks of satellite enthusiasts grew as newcomers spread the tantalizing word about the ease of using AO-6.

"If you already had a decent 10 meter receiver, it didn't cost much to get on," says AMSAT Vice President for International Affairs Ray Soifer, W2RS, of New Jersey. "As I recall, I bought a used Ameco TX-62 for about $30, plugged in a crystal and a key, threw a whip 2-meter antenna out the window and there I was."

The 35-pound (16 kg) hamsat rode to a 900-mile orbit (1450 × 1459 km) alongside the government weather satellite ITOS-D (NOAA 2). The inclination was 101.7 degrees.

Bob Decarniere, ON4DY, of Belgium, remembers AO-6 as "an excellent working satellite I still remember very well, and which opened a new era in amateur communication. My first QSO was on 27 Nov 1972 orbit 540 with G3JVL (569-569) and second one G3HBW."

"AO-6 was special for me—my first amateur satellite experience thanks to Marty Davidoff, K2UBC, and the Baltimore Amateur Radio Club," remembers Art Feller, W4ART (ex-WA3JDY and ex-WB2GFV), of Virginia, who was part of the first mobile sat QSO with Joe Kasser, G3ZCZ.

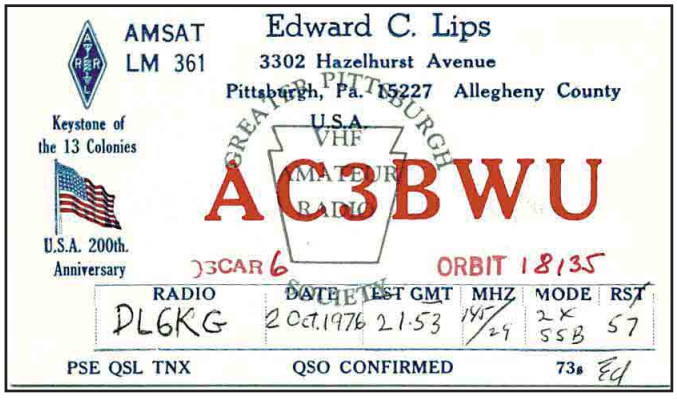
The hamsat's two-way communications transponder received signals from the ground on 146 MHz and repeated them at 29 MHz with a transmitter power of 1 W. The 100-kHz-wide 1-W transponder was in what was then called "Mode A." Low-power ground stations with simple antennas were successful in using the satellite.

Don Fortner, W4ETV (ex-K4SAO), of South Carolina, says, "I had previously participated in AO-5 and submitted 10-meter reception reports of the beacon. AO-6 provided a 'new' method of communications using simple equipment."

W2RS recalls, "Through it, you could work DX up to 4900 miles distant. That exact figure sticks in my mind because Hawaii was just out of range from here, and I was unable to complete my OSCAR WAS until the higher-altitude RS birds went up."

The spacecraft was box-shaped and measured 17 × 12 × 6 inches (430 × 300 × 150 mm). The antennas were quarter-wave monopoles for 144 and 435 MHz and a half-wave dipole for 29 MHz.

Parts of AO-6 were built in the US,



Hans, DL6KG, received this QSL from AC3BWU (W3BWU using the special Bicentennial prefix) confirming their contact via OSCAR 6 in October 1976.

From shaky rookie to AMSAT vice president: Ralph Wallio, W0RPK.

Australia and West Germany, and critical parts had redundant back-ups.

VHF Rigs Were Not Common

ON4DY says, "In the early '70s, most stations were still using AM and were crystal controlled. The first FM transceivers were just appearing on the market… and were also crystal controlled. Only a couple of years later—I think it was 1972—some were available with an outboard VFO. (Standard SRC-806G and Kenwood TR-7200). I made my first QSOs with a 10-W '806 of which I managed to key the VFO, until [the] Kenwood all-mode transceiver TS-700G."

Ralph Wallio, W0RPK of Iowa (ex-K9JPR), remembers that he "found and refurbished an Ameco TX-62 and acquired the right crystals for AO-6 and AO-7 2-meter Mode-A uplinks."

W4ETV remembers "using a Hallicrafters SX-117 receiver with a Hamtronics 10-meter preamp. The transmitter was an old Ameco TX-62 that was VXO controlled. The antennas used were a homebrew turnstile for two meters and a 10-meter dipole or converted 11-meter beam."

Hans Rath, DL6KG, of Germany, remembers that "DL6SES was on vacation and his 2-meter homemade transmitter/receiver for 2 meters was available to me for two weeks. Up to then, I was only hunting DX on shortwave and so I was, of course, receiving on 10 meters. With the transmitter/receiver on loan I could now (for the first time) use 2 meters. For overhead-contacts, I built a horizontal quad in the attic of my house for the 10-meter downlink. For DX-contacts the TH-3 Hy-Gain beam did the job.

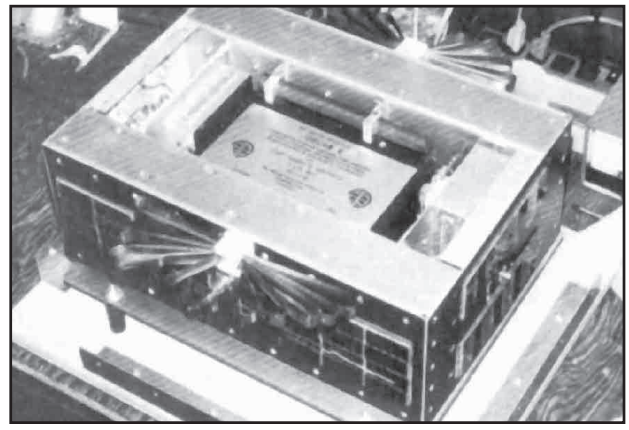
"I was soon liking this form of QSOs and bought my own German rig for 2 meters," he recalls. Later, he used the same equipment to work Russian hamsats.

"Most of the activity was on CW, at least in the early days, and that appealed to me too," notes W2RS. "The popularity of AO-6 would change that, though, because it greatly expanded the market for all-mode 2-meter transceivers and some very attractive ones soon appeared. Later, when AO-7 was launched with its Mode B transponder, 70-cm and multiband radios began appearing as well. By creating markets for new products, AO-6 and AO-7 changed the entire complexion of the 2 meter and 70-cm bands."

Jan King's Inspiration

Hamsat articles in *QST* intrigued W0RPK, "Especially Jan King's [W3GEY] two-part *QST* Technical Report in 1973, 'The Sixth Amateur Satellite,' focused my interest for a new challenge. I didn't yet know what I didn't know, but it was clear this mode of ham radio communications had great technical depth, eg, I didn't understand most of what Jan was talking about. It took a couple of years of mellowing for this interest to lead to action but by early 1976 I had learned a great deal from the *AMSAT Newsletter*, weekly AMSAT nets and *QST* articles," he says.

"All this led to my first five AO-6 and AO-7 QSOs during February 7-10, 1976," W0RPK says. "I was a shaky rookie and did not note in my log whether these Mode-A QSOs were via AO-6 or AO-7 and there are no QSL cards in my file to fill in the information. However, some of these QSOs must have been via AO-6 because *AMSAT Newsletter* reference orbits and operating schedules of that era show AO-7 in Mode-B for a couple of those days."



AMSAT-OSCAR 6 was dedicated to the memory of AMSAT treasurer Harry Helfrich, W3ZM.

Telemetry And Power Subsystems

AO-6 had a magnetic attitude-stabilizing system and a sophisticated telemetry beacon, which reported information about many parts of the spacecraft, including voltages, currents and temperatures. Where AO-5 had seven kinds of data reported in its telemetry beacon, AO-6 had 24.

The satellite's NiCd batteries were charged by energy generated in solar panels. That subsystem delivered 24 V at 3.5 W of power to the three transponders.

Codestore was a digital store-and-forward CW and teletype message system built into the hamsat. Ground controllers in Canada sent messages to the satellite, which were stored and repeated later to ground control stations in Australia.

An Advanced Ground Control System

The hamsat had an elaborate ground-control system that could turn off parts of the satellite selectively and react to 35 different commands from ground stations in Australia, Canada, Great Britain, Hungary, Morocco, New Zealand, West Germany and the United States. It was the first complex control system using discrete logic.

ON4DY says, "I was 90 percent of the time in CW, and the passband was fully used on every orbit…10-meter signals were good on a simple dipole or ground plane antenna, with little fading, and sometimes peaking through below horizon. One annoying fact was the satellite sometimes switched off, often just after acquisition, and sometimes in the middle of an orbit. This lasted 4 or 5 minutes."

It was a good thing AO-6 had that ground-control system. Static in the satellite affected its computer, which read the noise as a command to shut down. To overcome the problem, controllers eventually sent a continuous stream of ON commands to the satellite to keep it turned on. Where AO-5 had been commanded twice a week, AO-6 received 80,000 a day. The trick worked.

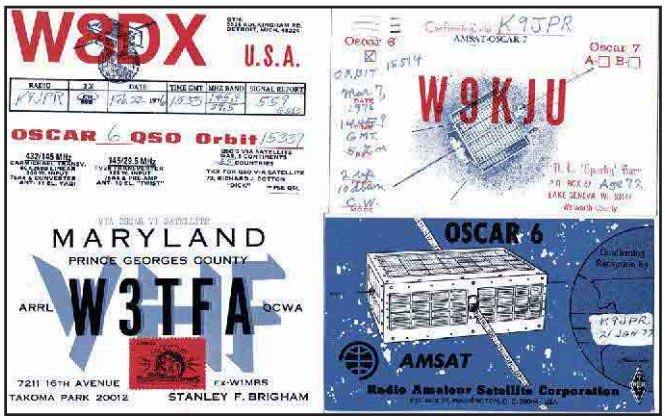
AO-6 was the first long-lived amateur communications satellite. The solar-charged batteries allowed the radio to work 4.5 years in orbit until they failed and operation ceased June 21, 1977.

"My last QSO via AO-6 was with Stan Burghardt, W0IT, on March 27, 1977 just a few months before [AO-6] went off-the-air in June," remembers W0RPK.

The inert AMSAT-OSCAR 6 continues to circle Earth in about the same orbit today (1449 × 1454 km, inclination 101.7°). It's in the USSPACECOM catalog as number 6236 and carries the international designation code 1972-082-B.

More Space Firsts

- AO-6 was the first satellite to demonstrate Doppler-location of ground stations for search and rescue purposes. Later, governments incorporated the technique in the international search and rescue (COSPAS/SARSAT) systems.
- The hamsat also demonstrated the relay of low-cost medical data from remote locations.



QSLs from Dick, W8DX, Sparky, W9KJU, and Stan, W3TFA—the Grand Old Men of the OSCAR 6 era.

● A contact between WA3JDY and G3ZCZ/W3 via AO-6 was the first mobile-to-mobile radio communication via satellite in any service.

● In a cooperative project with the Voice of America, AO-6 carried the first demonstration of direct broadcasting from a satellite for reception by existing, inexpensive HF receivers.

● AO-6 saw the first satellite-to-satellite link-up in history after AO-7 was sent aloft on November 15, 1974. A signal was transmitted to AO-7, which relayed the signal to AO-6, which repeated it to a different station on the ground.

Working DX through AO-6

"Because it was a LEO, working DX through AO-6 was a lot more challenging (read: fun) than AO-10, AO-13 and, yes, AO-40, which are more suitable for ragchewing than the sort of DXing that I enjoy most," W2RS recalls.

"I well remember the struggle to work stations on the edge of the footprint, in central and eastern Europe or Africa, with which we had a window of a minute or even less. Being located in the northeastern US, I was fortunate to be in a place from which LEO DXCC was possible, and a number of us were in there trying. I didn't complete mine until 1983, with the help of the RS sats which were a little higher," W2RS says.

"Crossing the big pond was, of course, the big challenge at the end of the suitable orbits," recalls ON4DY. "According to an old list of worked stations, I find as first one W1WM, followed by K2GUG, W2WD, W3TMZ, W1TGB, W2BXA, K2ZRO, W1NU, W2LX, VE2BYG and VE3CUA."

YO2IS "enjoyed the excellent Mode A transponder of AO-6, which despite my poor downtown location gave me the chance to contact a lot of rare DX like JY9BB, 5Z4JJ, TF3IRA, OX3WX, the first Sardinia satellite DXpedition of the late I5TDJ, etc. Some of the big DXers gave AO-6 a try, [which allowed me to] meet ON4UN, F2MA, EA3JE, G3IOR, I8CVS, I4EAT, OK3AU, OH3TH and others."

AO-6 provided "wonderful times" for YO2IS. "I am a proud holder of the Satellite DX Achievement Award for AO-6…and the first AO-6 user from YO. Some of the AO-6 DX [contacts] helped me to get the DXCC satellite award #33/1990."

The station log of Henryk Ignasiak, SP5DED, of Poland, shows him working two dozen SP stations via AO-6 in 1972-73.

AO-6 Was A Great Training Ground

"AO-6 was ideal for learning sat communication, because of the two (easy) bands—2 and 10 meters," DL6KG says. "Because of my growing satellite interest I joined AMSAT-NA in 1976 and became a life-member in 1980." He also became a member of AMSAT-DL and AMSAT-UK.

"My experience with the low orbit birds prepared me for the Russian RS series that came later," says W4ETV. "These were worked mobile-mobile with relatively low uplink power on 2 meters and basic receiver on 10. This type of operation prepared me for the British UoSat-OSCAR 9 (UO-9) and UO-11 that followed and eventually AO-10, our first high orbit bird."

W0RPK says, "It was my fortune and pleasure to start my career with AMSAT and OSCAR operations in the era of OSCARs 6 and 7. Little did I know while I absorbed the science, engineering, operating protocols and station requirements that those early days would lead to more than a decade of service to AMSAT through the eras of OSCAR 13 and the Microsats."

ON4DY says, "So far the 2-meter equipment was only used for local contacts and a few scarce and time limited unpredictable DX openings to the surrounding countries. As an avid DXer on the HF bands, VHF and UHF were not attracting me so much, until AO-6 revealed to bring our 2-meter signals several times a day well over the distances of the best sporadic-E or aurora or any other mode of propagation. This [brought] me until today to the use of the satellites."

For YO2IS, "AO-6 and 7 offered me an open gate to my best achievements in my ham activity including the ultimate challenge, moonbounce on 2 meters and 70 cm."

Strong commitments led YO2IS to be the first East European AMSAT area coordinator and W0RPK to start a weekly Chicago Area AMSAT net.

Amateur Radio satellite enthusiasts around the globe echo the sentiment of W4ETV when he says, "Thanks to everyone for all the hard work in providing many the opportunity to touch the edge of space."

There is more about AO-6 in the ARRL book, *The Radio Amateur's Satellite Handbook*, ARRL order no. 6583, **www. arrl.org/shop/**, tel (toll-free) 1-888-277-5289.

Help Keep the Amateur Satellites in Orbit

Your support for AMSAT will help ensure that we—and generations to follow—will continue to enjoy the thrill of communicating through amateur satellites. To join AMSAT-NA, call 301-589-6062, visit the AMSAT Web site at **www.amsat.org/** or write AMSAT, 850 Sligo Ave, Ste 600, Silver Spring, MD 20910-4703.

ARRL Life Member Anthony R. Curtis, K3RXK, first wrote about OSCAR satellites in national magazines such as Popular Mechanics *back in the 1970s. Living today in Laurinburg, North Carolina, he is "a dc-to-daylight kind of guy" interested in AMSAT, TAPR, ARES, HF, VHF, UHF, digital, CW, SSB, FM, QRP, contesting, DX and emergency preparedness. Licensed since 1954, he originally held the call sign W8TIZ. An Extra class op with a PhD in mass communication, Curtis has written 72 books about space, astronomy, computers and electronics. He is editor of* Space Today Online *at* **www.spacetoday.org**. *Active as an ARRL field volunteer, Curtis served as Section Emergency Coordinator for the Maryland-DC Section and as net manager for the Maryland Emergency Phone Net. He now serves as an ARRL Educational Advisor and a Roanoke Division Assistant Director. He also has been president of clubs and repeater associations. Curtis is chair of the Mass Communication Department at University of North Carolina Pembroke. He is a NASA Solar System Ambassador and an Apple Distinguished Educator. Readers can contact Tony Curtis via e-mail at* **k3rxk@arrl.net**.

By H. Ward Silver, N0AX

The ARRL Frequency Measuring Tests

It's 14,349.50 kHz—do you know where your emissions are? One-half kHz below the top of the band, right? Maybe not!

With today's digital radios, it is easy to be complacent about frequency. In the days of slide-rule dials, hams had to be ever vigilant. Calibrations against W1AW or other Official Transmitting Stations were the rule. High-stability master oscillators and 10 Hz resolution make knowing one's frequency a lot easier, but the requirements to operate within license privileges are as strong as ever.

To that end, the ARRL is sponsoring a series of measuring tests, beginning with frequency. These tests will exercise the capabilities of hams to measure important operating parameters, improve their understanding of complex radios and give them a better mental picture of their transmitted signals. The goal is a more technically aware amateur confident of compliance with FCC regulations.

PART 1—BACKGROUND

History of the Frequency Measuring Tests

The first ARRL Frequency Measuring Test (FMT) was held in October 1931 and 213 measurement reports were received.[1,2] Winners demonstrated better than 99.99% accuracy and more than half received certificates for better than 99.90% accuracy. Participation was required of all stations in the Official Relay System, including the Official Observers.[3]

Until 1980, thousands of hams participated in the FMT.[4] The tests finally lost popularity due to the rapidly improving quality of radios. Twenty years later, it's time to revisit frequency awareness.

Precision, Accuracy and Stability

Precision is the smallest difference in frequency that can be displayed. At 28 MHz, precision of 10 Hz is equivalent to 0.36 parts per million (ppm).

Accuracy is a measure of how close the frequency displayed by the radio is to the actual frequency. For example, my FT-1000MP manual says displayed frequency will be ±7 ppm from the actual frequency.

Stability is the ability to remain at a specific frequency over time and temperature. My FT-1000MP specification is for ±10 ppm stability from –10 to +50° C. Table 1 contains accuracy and stability data for several common radios.

Frequency Displays

What is your radio actually displaying? This varies with operating mode, as shown in Table 2 and Figure 1. A transceiver may display the receive or transmit frequency. This varies by manufacturer and may be configurable.

On CW the radio listens at a frequency

[1]Notes appear on page 54.

Table 1
Display Configuration Capabilities of Some Transceivers

Transceiver	*Display Resolution (default)*	*Minimum Tuning Step*	*Warm-up Drift (1st Hour)*	*Display Error After Warm-Up*
ICOM IC-781	10 Hz	10 Hz	± 1 Hz	10 Hz
Kenwood TS-2000	10 Hz	<1 Hz ("fine")	± 4 Hz	<10 Hz
Yaesu FT-1000	100 Hz	10 Hz	± 2 Hz	<100 Hz
Yaesu FT-1000MP Mark V	10 Hz	0.62 Hz (menu adjustable)	± 1 Hz	<10 Hz

Table 2
How Mode Affects the Frequency the Transceiver Displays

Mode	*Transmitted Carrier Frequency*	*Transmitted Signal Occupies*	*The Radio Displays*
CW	14,040.00 kHz	14,039.75-14,040.25 kHz Assuming a 500 Hz wide signal	14,040.0 kHz
LSB	14,200.00 kHz	14,199.70-14,197.00 kHz Assuming 300-3000 Hz audio	14,200.00 kHz
USB	14,200.00 kHz	14,200.30-14,203.00 kHz Assuming 300-3000 Hz audio	14,200.00 kHz
AM	14,200.00 kHz	14,197.00-14,203.00 kHz Assuming 300-3000 Hz audio	14,200.00 kHz
FM	29,600.00 kHz	29,603.00-29,597.00 kHz Assuming 300-3000 Hz audio	29,600.00 kHz

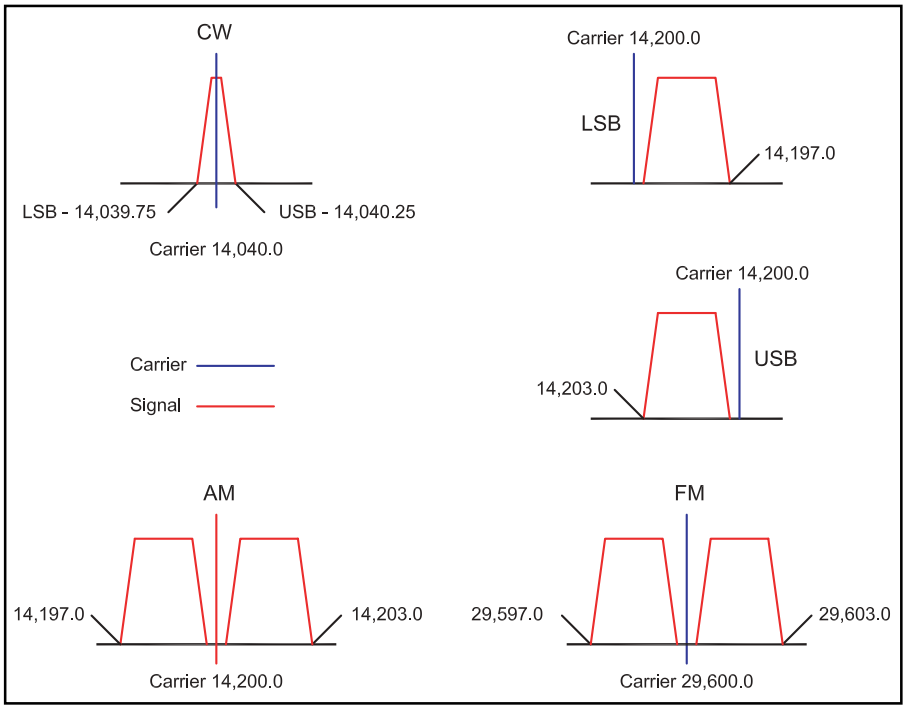


Figure 1—A depiction of how the frequency-display data in Table 2 was derived.

slightly different from that of the transmitted signal to generate the audio tone you hear. Similar considerations apply to frequency-shift keying (FSK) mark and space tones.

On AM, SSB and FM the radio displays the carrier frequency of the signal. On AM and FM, the carrier frequency is in the middle of your transmitted signal.

You must know where your transmitted signal is with respect to the displayed frequency! This is essential for both compliance with your license privileges and for operating convenience. The article cited in Note 5 provides an excellent explanation of how frequency displays actually work. It is available from the ARRL Technical Information Service at **www.arrl.org/tis/info/using-equip.html**.

Radios may also be configurable to display frequency in different ways. It is necessary to read the operator's manual carefully to determine exactly how the configuration settings and values affect the display. If you buy a used radio, be aware that the previous user may have changed the display configuration.

How Wide is a Signal?

What constitutes the limits of a signal? No signal or filter is perfect, so all signals have components, however weak, that extend beyond the main signal. How much of that spurious output is considered in determining where you are transmitting? What does the FCC consider the limits of a signal?

FCC rule 97.307(c) specifies an absolute power level of 50 mW for spurious emissions as well as a minimum amount of attenuation from the peak signal level.[6] The amount by which spurious output signal components must fall below the peak signal level varies from 30 dB for QRP, to 40 dB for "barefoot," to 44 dB for full-power HF operation.

It's a myth that CW is a zero-width emission. Any time a carrier is turned on and off, sidebands appear with a width determined by the rise and fall times. Words-per-minute has little effect. A CW signal with rise and fall times of 2 ms will be approximately 400 Hz wide. Shorter rise and fall times broaden the signal.

On phone, signal width depends on the shape of your audio and sideband filters, plus the microphone gain, compression and ALC settings. We'll discuss signal bandwidth in a subsequent article.

Band-Edge Examples

Example 1

You are operating CW on the 10 MHz band with a radio whose manufacturer specifies ±10 ppm accuracy. The radio is configured to use USB and displays the carrier frequency without including any tuning or pitch offsets. How close to the band edge can your displayed frequency be?

The worst-case difference between the displayed and actual signal frequencies is equal to one-half the signal bandwidth plus the accuracy variation. At 10 MHz, the maximum variation of 10 ppm is 100 Hz. For a CW waveform rise and fall time of 2 ms, half the signal's bandwidth of 400 Hz is 200 Hz.

When using USB, the difference is subtracted from the displayed receive frequency. This means that the lowest displayed frequency at which you can have confidence you are operating legally is 10,100.30 kHz.

Example 2

You are operating LSB on the 3.5 MHz band with a radio whose manufacturer specifies ±12 ppm accuracy and uses a 2.4 kHz filter. Assuming you are not overmodulating or splattering, how close to the General class band edge of 3850 kHz can you tune?

At 3850 kHz, 12 ppm is 46 Hz. Since data for a radio's SSB bandwidth is difficult to specify exactly, assume a full 3 kHz sideband width. On LSB, both the display uncertainty and the sideband width must be added to the band edge to find the displayed carrier frequency.

3850 kHz + 0.046 kHz + 3 kHz = 3853.046 rounded to 3853.05 kHz

This is the lowest displayed frequency at which your signal will be sure to meet the General class license privileges—more than 3 kHz from the band edge!

PART 2—MEASUREMENT

Practicing Frequency Measurement

Good frequency standards are the Standard Time and Frequency stations WWV, WWVH[7] and CHU.[8] WWV and WWVH modulate their AM signals with a 500 Hz tone, while CHU uses an FSK data signal. You can use these audio tones and your own ears to measure your receiver's accuracy quickly.

Tune to the highest standard you can clearly receive. Switch back and forth between USB and LSB while adjusting frequency until the audio modulation is the same pitch. The steady tones transmitted by WWV and WWVH are easier to compare. The difference between the displayed frequency and the known standard frequency is the display error.

How To Measure Frequency

It's not that difficult...

The Basics

The simplest form of frequency measurement—reading the receiver display—depends entirely on the quality of the receiver's master oscillator. If you measure your display error regularly and find it to be consistent and predictable, your measurement can be accurate to about twice

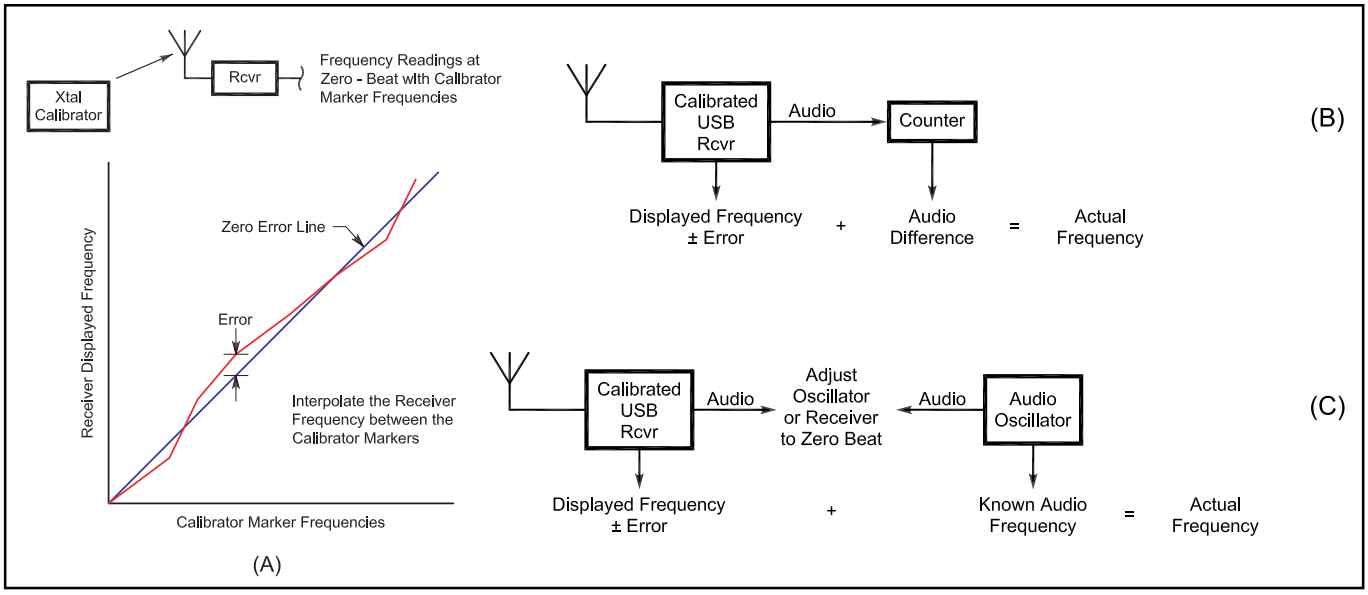


Figure 2—Three ways to make receiver-dependent measurements. The technique shown in A uses a traditional calibrator, B shows how a counter is used and C shows how to use a calibrated oscillator.

the precision of the frequency display; that is, ±10 Hz or 1 ppm at 10 MHz. As the receiver drifts, so does the measurement.

Figure 2 shows three other techniques that use the receiver to make comparisons using a calibrator, calibrated oscillator or frequency counter. Figure 2A shows the traditional calibrator measurement. The calibrator generates markers every few kilohertz. The receiver's error is charted across the band by zero-beating the receiver at each of the calibrator's markers. Interpolation is used between marker frequencies. *The ARRL Handbook* describes a crystal calibrator that can generate markers on all of the amateur HF bands.[9]

Figure 2B shows a counter used with a receiver tuned to an unknown frequency within ±5 kHz of the test frequency. The receiver stays tuned to this frequency. When the test signal appears, its audio tone is measured by the counter. If the receiver's oscillator drifts during the measurement, that error will be included in the test source's frequency. Figure 2C shows a calibrated oscillator used in the same way.

In Figures 3A and B, no direct reading of receiver frequency is made. The method of Figure 3A requires calibrator markers every 10 kHz and a frequency counter. The receiver is tuned to within ±5 kHz of the test signal and the audio from the nearest marker is measured by the counter. When the test signal appears, the markers are removed and the audio from the test signal is measured. Since the marker frequency is known, the test signal frequency is the marker frequency plus the difference in audio frequencies.

In Figure 3B the markers are replaced with a transmitter connected to a dummy load and counter. The transmitter is then tuned until the operator detects zero beat. Frequency is read directly from the counter.

When performing zero-beat measurements, the receiver AGC should be set to FAST or turned OFF. This minimizes AGC-induced level changes that might mask or interfere with the low-frequency beat. At beat frequencies below 10 Hz, the beat will only be audible as a slow rise and fall of the received signal strength or of the signal's modulation.

There are many variations on these basic themes. Feel free to experiment! For readers interested in the history of frequency measurement by amateurs, Note 10 describes the use of the BC-221 frequency meter (see Figure 4).

Effects of Sky Wave Propagation

Another source of error is Doppler shift of the reflected signal due to vertical movement of the ionosphere's reflecting layers. This can introduce transient errors of less than 1 ppm generally lasting no more than a few seconds.

Stations near the limits of ground wave propagation may experience very short duration errors due to interference between sky and ground wave signals. For stations relying on sky wave signals, taking measurements at regular intervals and averaging them minimizes the temporary Doppler shifts errors.

Reducing and Compensating for Errors

The two most effective methods of reducing error are to eliminate temperature changes and to make repeated, regular measurements.

Temperature changes affect the physical characteristics of the oscillators, causing changes in frequency. Simply leaving the equipment on for several hours before the tests greatly enhances stability. If possible, the equipment should be in a room kept at a stable temperature. Frequency standards are best left on continuously. Spreadsheets can be used to average or otherwise process the data so that offsets, drift and repetitive errors can be removed.

What the Heck is Zero-Beat?

The term "zero beat" has been around ham radio a long time. While the original usage has drifted, the intent remains the same. Zero beat is the condition in which two signals are transmitted with exactly the same carrier frequency.

Back in the "good old days" (or "dark ages" depending on when you were first licensed) receivers and transmitters were completely separate. The receiver was tuned to the desired frequency and then the transmitter would output a very low-power "spotting" signal (this is where the term "Spot" comes from). The two signals caused a beat frequency in the receiver equal to their difference. When both signals were on the same frequency, the beat frequency dropped to zero—"zero beat." On CW you tuned to the received signal directly and on AM, to the carrier. On SSB there is no beat to zero, but the condition of being exactly on frequency is still called zero beat.

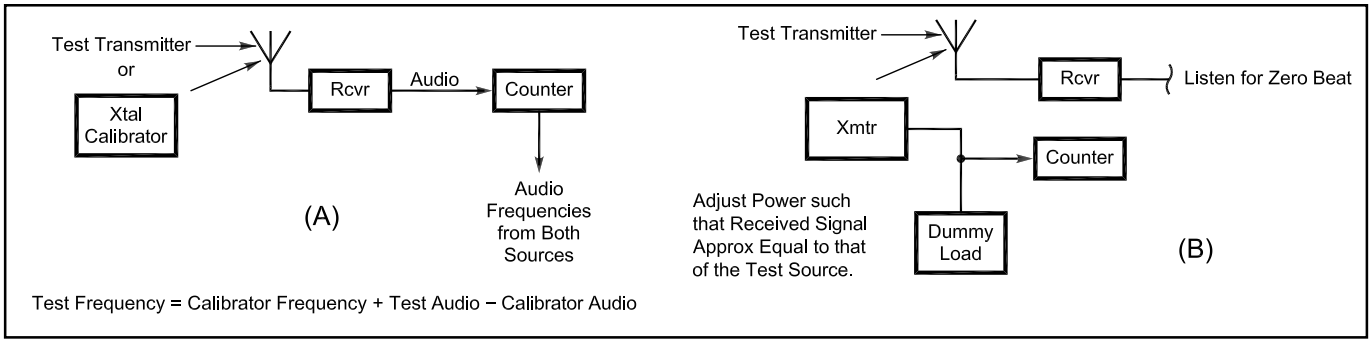


Figure 3—Measuring frequency with a calibrator independent of the receiver. The method used at A requires calibrator markers every 10 kHz and a frequency counter. At B, the markers are replaced with a transmitter connected to a dummy load and counter.

PA0PCR

Figure 4—The SCR-221/BC-221 frequency meter, a precision instrument used in both military and civilian applications.

The 2002 ARRL Frequency Measuring Test

Schedule

The first W1AW FMT will run November 7, 2002 at 0245Z (November 6, 2002, 9:45 PM EST). It will replace the W1AW Phone Bulletin normally scheduled at that time. It is recommended that participants listen to W1AW's transmissions prior to the event to get an idea of conditions and to see which band (or bands) will be best for measurement purposes.

Format

The FMT will begin with a general W1AW (*QST*) call beginning exactly at 0245Z sent simultaneously on four amateur frequencies. The test will consist of 20-second key-down transmissions, followed by a series of dits, followed by station identification.

The test will last for a period of approximately 5 minutes total. The test will end with a series of Vs, followed by station identification. W1AW will identify before, during and after the transmissions.

The approximate frequencies are as follows:

80 meters	3580 kHz
40 meters	7047 kHz
20 meters	14,048 kHz
15 meters	21,068 kHz

Reporting and Results

The submitted report should include the time of reception, frequency measured and signal report, in addition to name, call and location. If possible, participants should submit reports on more than one band (but not necessarily on all four).

A Certificate of Participation will be available to all entrants. Those entrants who come closest to the measured frequency as measured by the ARRL Laboratory will be listed in the test report and will also receive special recognition on their certificate.

Entries should be postmarked by December 6, 2002 to be eligible. Send entries to W1AW/FMT, 225 Main St, Newington CT 06111, USA.

If you would like more information about the equipment that will be in use at W1AW to generate the test signals, take a look at **www.arrl.org/w1aw.html**. For more information about the FMT, including a Frequently Asked Questions list, copies of the articles listed in the Notes and updates to test schedules, a Web page has been prepared at **www.arrl.org/w1aw/fmt**.

In Conclusion

As Amateur Radio prepares to enter its second century, fundamentals remain vitally important. The techniques of frequency measurement are within the capabilities of nearly everyone—we hope we'll see your report!

Notes

[1]Handy and Lamb, "The Frequency Measuring Test," *QST*, Sep 1931, p 36. This article and others mentioned in the Notes are available at **www.arrl.org/w1aw/fmt**.

[2]Handy, "Frequency Measuring Test Results," *QST*, Jan 1932.

[3]Official Observers were required to demonstrate an accuracy of at least 71.43 ppm to receive Class 1 status.

[4]Wood, "Try the FMT!!!," *QST*, Jul 1970, p 54.

[5]Newkirk, WJ1Z, "What Your Frequency Display Really Tells You," *QST*, Aug 1991, p 28, and Sep 1991, p 26.

[6]Part 97.307(c), *The ARRL's FCC Rule Book*, 12th Ed. (Newington, CT: ARRL). ARRL Order No. 7857 from ARRL Publication Sales, 1-888-277-5289 (toll-free) or from *ARRLWeb* (**www.arrl.org/shop/**).

[7]**www.boulder.nist.gov/timefreq/stations/wwv.html**.

[8]**www.nrc.ca/inms/time/chu.html**.

[9]*ARRL Handbook for Radio Amateurs* 79th Ed. (Newington: ARRL), "A Marker Generator with Selectable Output," p 26.16.

[10]Sapp, W4AWY, "Frequency Measurement with the LM/BC-221," *QST*, Sep 1965, p 28.

NEW PRODUCTS

HANDMADE KEYER PADDLES FROM I2RTF

◊ Handcrafted sports cars and motorcycles have put Italy on the industrial technology map for decades—but custom-made keyer paddles are definitely new! The two models made by Pietro Begali, I2RTF, aren't well-known in the US, but they're attracting a following in Europe.

Both Classic and Simplex models are built on a heavy, gold-colored base with a diamond-ground surface. Other features include dual ball bearings for each rigid, alloy paddle arm; large "marine rated" contacts; thumbscrews for tool-free spacing and tension adjustment; soft rubber feet to keep the three-pound paddles in place; and more. As befitting any work of art, you can have your call sign engraved in the base.

Price: $119 plus $9.50 s/h to US addresses. For more information, contact Pietro Begali at Via Badia 22, 25060 Cellatica, Italy; tel 0039 30322203, fax 0039 30314941, e-mail **pibegali@tin.it**.

Previous • Next New Products

By Steve Ford, WB8IMY

QST Changes on the Horizon

Beginning in 2003, *QST* will partner with its "sister media," the ARRLWeb, to offer expanded Section and contest coverage.

Magazines traditionally use their January issues to unveil changes to readers. That's also true of *QST*, and soon there will changes in the way that ARRL reports the results of ARRL contests and Section News from the 71 Section Managers who lead the Field Organization. As reported in September *QST*, in July the ARRL Board voted to begin publishing Section News and contest line scores on the ARRL Web site, rather than in *QST*, effective with the January 2003 issue.

The Board initially addressed this topic at its January 2002 Annual Meeting. Economic realities dictate the number of *QST* pages that we can afford to print and mail while still doing everything else that you expect from your League membership. There is intense competition for the space available in *QST* for articles and columns, and over the years it has been increasingly difficult to provide a balanced magazine that covers the breadth and depth of Amateur Radio. Although Section News and the contest program have intensely loyal followings, we know from reader surveys that neither of these sections of *QST* enjoy wide readership compared to articles and columns on other topics.

Meanwhile, the Internet has matured, and e-mail and the ARRLWeb provide a widely accessible, timely means to supplement the information in *QST*. Since the January Board meeting, we have developed online tools for both Section News and contest reporting that offer capabilities far exceeding what is possible in a monthly printed magazine. Despite rumors to the contrary, contesting and the Field Organization will still have a place in *QST*. Combining the power of the Web and *QST*, those members interested in contests and the Field Organization will have access to more information than ever before. In addition, there will be more room for articles and features of more general interest—including more features highlighting these two important activities.

David Sumner, K1ZZ, covered this issue in depth in his March 2002 *QST* editorial, "What Belongs in *QST*?" (page 9).

Section News

Section News has appeared in the pages of *QST* for decades as an important forum for Section Managers. Although this function is clearly needed, it is not efficient to print and mail every member the equivalent of six *QST* pages filled with news of all 71 sections, when any given member is potentially interested in only a small piece of that information.

Even though Section News is leaving the magazine, we have created an alternative in cyberspace, through Section pages on the ARRL Web site and through e-mail newsletters and bulletins. Early this year we dedicated a portion of the ARRLWeb entirely to the Field Organization. Informative, attractive Section pages sprung up almost overnight and were received enthusiastically by the membership. In addition, members can sign up to receive Section/Division news via e-mail from the Members Only Web page. Section Managers and others in the Field Organization can now communicate with League members almost instantly.

If you register at the ARRLWeb (**www.arrl.org**), you'll be treated to news "alerts" from your Section Manager. These alerts appear prominently on the ARRLWeb home page when you sign in. In addition to alerts, SMs may post news, stories and photos about Section activities at any time.

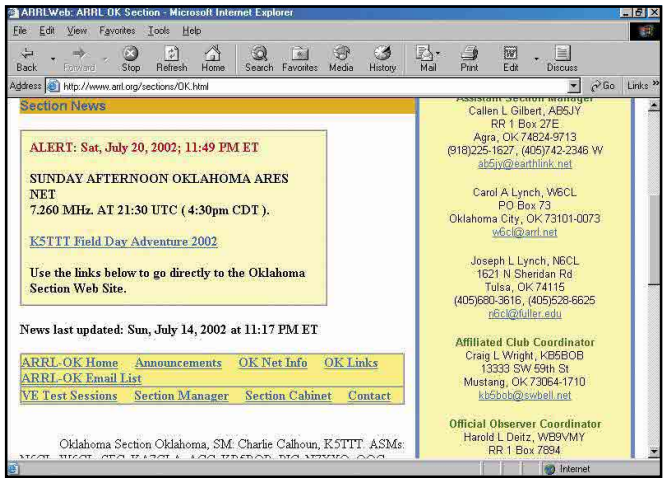
We're adding another feature: SMs will be able to upload, on a monthly basis, a summary of the most important news from their Sections (much like the current *QST* Section News). These summaries will then be distributed in a several ways. The summaries will be published in a special area on each Section's Web page and remain there for a month. For example, highlights of December's news would be published in early January and remain there until the next month's news is published in early February. This same summary will be emailed to all ARRL members who have signed up for the Section/Division e-mail when it is posted on the Web. Past monthly summaries will be available on the Web (as are the ARRL Letter, W1AW bulletins and other news features), and the monthly highlights will be saved and included in the annual *QST* CD-ROM, readily available for future reference.

Although more than 90% of ARRL members have Internet access, some do not. Members without e-mail or Web access may request that this monthly summary be printed and mailed to them. Note that we'll be able to print this information in larger, more readable type than we use in *QST*. To receive your monthly Section highlights by mail, send your request to Steve Ewald, WV1X, Field & Educational Services, ARRL, 225 Main St, Newington, CT 06111.

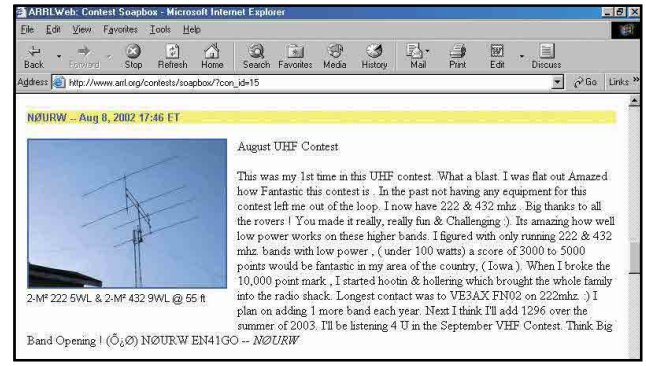
Sign Up Now

It's easy to sign up to receive your Section news via e-mail and take advantage of other Members Only features on the ARRL Web site. First, you need to register for the Members-Only features if you have not already done so. To register, go to **www.arrl.org/members/** and follow the instructions. You will need to supply your call sign and membership number and a password of your choice for future visits.

Members who are already registered may sign up to receive Section/Division e-mail via the Member Data page at **www.arrl.org/members-only/memdata.html?modify=1**. Under the heading "Which of the following would you like to receive automatically via email from ARRL?" check the box that says, "Division/Section notices (Note: Some Divisions/Sections may not send notices.)" While you're there, check out the other features that you can sign up for.



Members in the Oklahoma Section enjoy this informative Section page on the ARRLWeb.



N0URW contributed this 2002 ARRL UHF Contest soapbox entry to the ARRLWeb, along with a photo of his antennas!

Contest Results

The Amateur Radio contest community is thriving. Contests keep operating skills sharp, provide a focus for activity on the bands and add a competitive, enjoyable element that is attractive to newcomers and old-timers alike.

Effective with publication of the June VHF QSO Party results in January 2003, the individual line scores and extensive tables will be published on the Web. *QST* contest write-ups will focus on a review of what happened during the contest, photos and information to promote the contest to hams who don't currently participate. Scores of the top stations in various categories will be published, but the lion's share of every article will be devoted to telling the *story* of the contest. Who succeeded and why? Who fell victim to Murphy's Law? What role did propagation play? We'll have room to tell the more interesting stories about the experiences of the people who participate. Field Day scores will continue to be reported in *QST* as they are now.

The *QST* contest report will be supplemented by an online version that includes full line scores and additional features. There has already been considerable development of the Web presentation, beginning with the 2001 ARRL Sweepstakes results last spring. If you haven't done so already, check out **www.arrl.org/contests/results/**. Publishing on the Web offers a distinct advantage in timeliness, and you will begin to see results more quickly after the end of the contest. 2003 will no doubt be a transition year as we adjust to the new schedules.

Some of the new online features are on the Members Only portion of the ARRL Web site, while other are on the public portion. To register for Members Only features, go to **www.arrl.org/members/** and follow the instructions. You will need to supply your call sign and membership number and a password of your choice for future visits. The key elements of online contest reports are:

1. **Searchable database of line scores.** Each score includes the information currently published in *QST* (call used, operator call(s), score, total QSOs, total multipliers, entry class, power). In addition, a breakdown of QSOs and multipliers and by band and mode (as applicable in the particular contest) is available for each entry. The database is searchable by many parameters. (Members Only)

2. **Downloadable, delimited file of line scores.** Those who want to do more detailed analysis can download the line scores in a file compatible with popular database or spreadsheet programs. (Members Only)

3. **Downloadable PDF file with the line scores similar to the current *QST* presentation.** For convenient printing and filing of the contest results, we offer a PDF file organized like the current *QST* results, along with the *QST* version of the contest report. This file is available on the public part of the Web site (ie, nonmembers may access the PDF version from the Web site after it has been published for members, as has been our practice since 1997). The vast majority of contest entries arrive at ARRL via e-mail, but entrants without Internet access who submit by postal mail may request a printed copy of the PDF version of the results by including an SASE or SAE/postage with their log.

4. **Online Soapbox.** All participants can upload stories and photos about their operation immediately after the contest. Soapbox comments are available on the public part of the Web site (**www.arrl.org/contests/soapbox/**) and linked to the score database. Contest photographs are always welcomed, and now we'll have more room to show your station and your smiling face to the world. Photos don't have to be professional works of art. Just grab a camera and snap away (or have a friend or spouse photograph you in action). Digital photos are fine, but please use the highest resolution your camera will provide. Be sure to say who is in the photo (name and call sign). Photos are easily uploaded via the online Soapbox, but you can also mail prints or slides to the Contest Branch at ARRL HQ or e-mail digital images to **contests@arrl.org**.

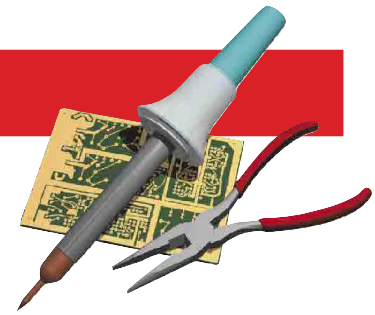
5. **Expanded Contest Write-up.** Without the space constraints of *QST*, the online contest write-ups are more detailed and include many photos, sidebars, tables, station descriptions and other interesting information. (Members Only)

6. ***ARRL Contester's Rate Sheet.*** This biweekly contest newsletter edited by Ward Silver, N0AX, features reminders of upcoming contests, log deadlines and other useful news. See **www.arrl.org/contests/ratesheet/**. Members may subscribe to have the *Rate Sheet* e-mailed to them, and everyone may read it on the public part of the Web site. Members who are already registered for Members Only features on the Web site may sign up to receive the *Rate Sheet* via email by visiting the Member Data page at **www.arrl.org/members-only/memdata.html?modify=1**. Under the heading "Which of the following would you like to receive automatically via email from ARRL?" check the box that says, "*ARRL Contest Rate Sheet* (biweekly contest newsletter)."

7. **Logs Received listing.** As logs are received after the contest, information from the contest robot is be fed back to the ARRL Web site in near real time to compile a list of logs that have been received. This information is available on the public part of the Web site. In addition, the contest robot now does more up-front checking of entries to minimize errors in getting your score accurately into the results.

Other features for contest reporting can be considered as resources are available. We welcome your input—contact ARRL Contest Manager Dan Henderson, N1ND, (**n1nd@arrl.org**) at ARRL HQ with your comments and suggestion.

Steve Ford, WB8IMY, is the Editor of QST.



The Doctor is IN

Q I would like to save money and use 12-V car and motorcycle batteries as power supplies for my camera and radio modules which require 7 to 8.5 V dc at a current of 1200 to 1800 mA. Can a simple circuit be recommended to drop the battery voltage?

A You have two choices of voltage regulator—linear and switching. A linear regulator is a simple circuit and does not create any switching noise, but dissipates a lot of your battery capacity as heat. Essentially a "smart resistor," the regulator will dissipate 4 W when dropping 12 V to 8 V at a load of 1 A—one-third of the total power! A switching regulator, while slightly more complex, is also much more efficient—80 to 90%—which will extend battery life. If you choose to use a linear supply, three-terminal regulators such as the LM350 (**www.national.com/pf/LM/LM350.html**) can be used alone or with external pass transistors to boost current capacity. The *ARRL Handbook* also has a 28 V dc linear power supply design from which the regulator circuit can be adapted.

Building a switching regulator is much easier than you might think. The LM2596 (**www.national.com/pf/LM/LM2596.html**) can handle up to 3 A and uses only a handful of components. There is even a design tool at the National Web site to help you select your component values. The July 1997 issue of *QST* also has an article on a general-purpose dc-dc converter switching supply.[1] OEM dc-dc converters can also be found at retail and surplus electronics dealers.

Q Ron Ziegler, W1RZ, writes: I want to make a 4:1 balun using a ferrite toroid (FT-240-61) that requires bifilar windings. I have conflicting information about how many turns to wind on this type of toroid for this design.

A The Doctor suggests going with the design dimensions suggested by Jerry Sevick, W2FMI, in his excellent book *Building and Using Baluns and Ununs*.[2] For a 4:1 ratio with bifilar windings on a core with a permeability of 125, use 14 turns of #14 tinned copper (bare), covered in number 13 Teflon tubing (wall thickness of 20 mils). The windings should be equally spaced around the whole core so that the ends of the windings are close to each other. Be sure to label each end of the windings.

Connect the input coax center conductor to the first end of "winding 1" and the shield to the first end of "winding 2." Connect the second end of winding 1 to the first end of winding 2 (same connection as the coax shield). Connect the balanced output across the first end of winding 1 (same point as the coax center) and the second end of winding 2 (which isn't connected to anything else).

Q Rob Bennett, WD4DUI, writes: I am designing an active op-amp audio filter for my radio outputs. Is there any disadvantage to utilizing quad or dual devices that are contained in a single chip versus single op-amp per package? Would there be crosstalk or other unwanted interaction between the sections? Is it worth the extra expense of using high performance devices compared to the more common/older devices such as an LM346 or TL084?

A You can get unwanted interaction between devices if the signal levels differ greatly—for example, using one section as an oscillator and another as a sensitive low-level preamp. It's also easier to get a clean circuit board layout with single or dual-section devices. For most communications applications, high-performance devices are not required except at very low signal levels, for very low distortion, or where power consumption must be minimized. Most op-amp are also unable to supply much output power for driving headphones or speakers cleanly. Audiophiles may be a useful resource—you might be able to find Usenet posts or Web sites that discuss the performance of op-amp in a highly discerning audio performance context.

Q Bill Schmidt, KC5JHW, asks: I have set up a 115 A/h, deep-cycle, lead-acid battery as my station's emergency power source. I charged it with my car battery charger and now have a 12 V dc, 1 A wall power supply charging it. The voltage rose to 14 V and it is drawing 38 mA. How do I know when it is fully charged? Is it safe to leave the wall power supply connected all the time? After discharging the battery, can the wall power supply eventually recharge it or do I need to use a car battery charger?

A The battery is fully charged if monitoring the voltage shows no change over a long period of time. Most manufacturers state that you can continually supply a battery with a very small amount of current ("trickle" charge) indefinitely without harm as long as the battery is in good shape and the electrolyte hasn't evaporated. The small power supply will eventually recharge the battery, but it will take a long time and it will likely be heavily loaded if connected to a discharged battery of that size. A quick recharge on the car battery charger followed by trickle-charge is the best option.

If something happens to the battery or power supply, an unprotected connection could cause trouble and even be hazardous in some situations. Add a fuse or circuit breaker to the wall power supply output and also attach a thermal fuse to the battery case itself (on the side) to assure that the battery isn't overheating during charge. Your battery manufacturer may have a recommended maximum temperature.

Q Staying with the battery theme, Vern Koepke, NT9N, inquires: I'd like to operate portable with my ICOM IC-706, carrying a separate battery in a cart on wheels. What kind of battery should I use? A deep cycle marine battery? I would operate only about 40 minutes or so, 5 days a week. The battery can be recharged at home.

[1] S. Ulbing, "My All-Purpose Voltage Booster," *QST*, Jul 1997, pp 40-43.
[2] Available from the ARRL Bookstore (order no. 7644); tel 888-277-5289; **www.arrl.org/shop/**.

A To minimize the battery size required for the short-term use you describe, the deep-cycle type is recommended. Assuming you transmit 10% of the time, you will need a battery with a capacity of 20 A × 6/60 + 2.5 × 54/60 = 2 + 2.25 = approximately 4.5 A/h. If you figure as much as 30% on the transmit (very little time listening!) that would be 6 + 1.75 = approx 8 A/h. If you want some overhead and time to operate longer, a 10 to 12 A/h rating would be recommended (and the size is still reasonable). Before choosing a battery, it's a good idea to check the manual for the requirements of your transceiver.

Q What is the definition of microvolts per meter? Is this related to distance from the source or the size of the antenna?

A This is a measure of electric field strength in an electromagnetic wave and specifies how much electrical potential exists between two points 1 meter apart. It is usually designated with the letter E. A magnetic field is also developed in an electromagnetic wave. Its magnitude is expressed in A/m. It is usually designated with the letter H. E and H are usually used in conjunction with power flow or density.

In the far-field of an antenna, the electric and magnetic field will be related to each other such that E / H = 377 ohms. 377 ohms is the impedance of free space. In the far field, power density, the amount of power that flows through a given unit area, is found by the formulas E × H, $E^2/377$ or $H^2 \times 377$, giving the power density in W/m^2.

Q John Gregson, KL1AS, is having trouble with a TV: I just had to have my TV repaired and I was told by the repair facility the problems were caused when I transmitted. I live in a condo and my antenna is on the balcony just outside the living room where the television is located. How far should my antennas be from the TV? Can filters eliminate the risks of damaging other electronic equipment when transmitting?

A Unfortunately, there is no definite answer about antenna placement. It is most unusual, but not impossible, to cause physical damage to the circuitry in the TV unless maybe you are running a legal-limit amplifier. Did you notice any interference effects prior to the TV failure? RF overload to consumer electronics equipment is normally a result of the wires associated with the device acting as antennas. It gets worse if the length of the wire approaches that of a resonant antenna. There is really no way you can filter the output of your transmitter if it is getting directly into the device, since the device is acting improperly as a receiver of those frequencies.

The best approach to reducing unwanted RF pickup is to install some common-mode chokes on ALL the wires connected to the device you are concerned with. This includes power cords, speaker leads, interface cables and antenna cables. They will usually significantly reduce the amount of RF received. For some more information on common-mode chokes, take a look at **www.arrl.org/tis/info/HTML/catvi/index.html**.

Q William Riley, N3SNU, needs the formulas for the dimensions of a J-pole antenna: I already have an MFJ pocket roll-up J-pole for 2-meters, but I'd like to assemble others for other bands, including Marine VHF and the General Mobile Radio Service, to add to my "go kit."

A The J-pole antenna is a ½-wave radiator fed with a ¼-wave matching stub. See Figure 1. The length of the ½-wave portion is calculated using the standard 468/f (MHz) formula (same as a dipole) and the length of the ¼-wave section is calculated using the free-space wavelength (246/f), multiplied by the velocity factor of the section used as a transmission line. For twin-lead J-poles, this is about 0.85; for copper pipe, about 0.95. The attachment point on the ¼-wave section is adjusted for the best SWR, but starts roughly 0.015 wavelengths from the shorted end of the ¼-wave stub.

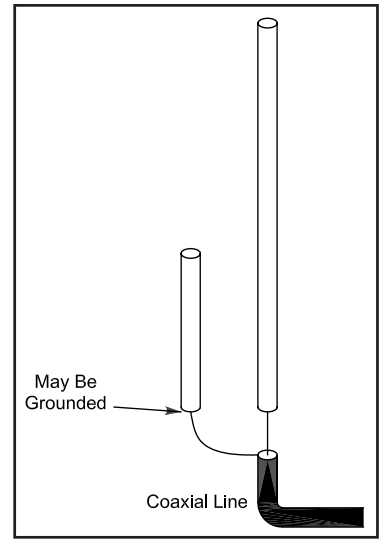


Figure 1—Two versions of the J antenna, used in mobile applications or in vertical arrays where parasitic elements are rotated around a fixed radiator.

Feeding the balanced stub of the J-pole with unbalanced coaxial cable requires a balun. Use a split ferrite bead (Palomar Engineers FSB-1/4 using Type 43 material is a good choice for VHF) and place it around the coax about 13 inches from the antenna's feed point (this is a high current point on the coax). You can use electrical tape to hold it in place. Ferrite beads can be purchased directly from Palomar, Box 462222, Escondido, CA 92046; tel 760-747-3343; fax 760-747-3346; **info@Palomar-Engineers.com**; **www.Palomar-Engineers.com**.

Q Larry Rolewic, WA9SVD, wonders: Is there a way to use a "computer" electret microphone with modern rigs and achieve acceptable results? Also, I've noted some electret mike elements are three wire (audio, V+ and ground) and most of the computer mikes are only two connections, but on a three conductor cable.

A Stick with a good-quality communications microphone such as those supplied by your rig's manufacturer or the Heil Company (**www.heilsound.com**). Computer microphones are optimized for reasonable frequency response to both voice and music, so they pass very low frequencies (less than 200 Hz) and very high frequencies (above 10 kHz). This is *not* what you want in a communications application. The energy on these frequencies will be wasted in the transceiver and the response on the voice range frequencies isn't as good as microphones designed for voice in the first place.

Q Peter Jacqueline, WH6BDO, writes: Where can I obtain a satellite tracking program that will run on my Casio Cassiopeia Pocket PC, Model E-125. This unit runs Windows CE Version 3.0.9348 with a MIPS VR4122 processor. I've already found a program called *pTrack* but have been unable to get it to run—I believe it was developed for an earlier model.

A You may want to try *TrackSat/CE* by ZL3TPL. You'll find it on the Web at **www.qsl.net/zl3ad/tracksat.htm**. If this doesn't do the job, join the AMSAT e-mail reflector and post a message asking if other programs are available. You can join the reflector at the AMSAT site at **www.amsat.org**.

Do you have a question or a problem? Ask the Doctor! Send your questions (no telephone calls, please) to: "The Doctor," ARRL, 225 Main St, Newington, CT 06111; doctor@arrl.org; www.arrl.org/tis/. Add your comments: "The Doctor is On-line" at www.arrl.org/members-only/qst/doctor/. QST

SHORT TAKES

The RIGrunner

Let's say you have a single 12-V dc power supply and it features one, maybe two, output connectors. Looking around your station you see that you have a number of 12-V devices to connect. You can bundle the separate cables and bring them to the power supply, twisting and braiding until they all fit onto the available connectors. This may work, after a fashion, but you run the risk of a poor connection, or possibly even a short circuit. Worst of all, the convoluted mess is an unholy hassle to untangle when you need to remove a device or add a new one.

The West Mountain Radio solution to this unsightly and inconvenient situation is the RIGrunner power strip. A RIGrunner expands your power-connection options from one or two ports to as many as 12 depending on which model you buy.

Hook 'em Up

One cable connects the RIGrunner to the power source (battery, generator, power supply, etc). The RIGrunner, in turn, distributes power to your equipment using a bank of Anderson PowerPole sockets and their mating plugs.

The PowerPole plugs are easy to install on your dc power leads using some care and a common crimping tool. (Once I had the knack, it took about two minutes per plug.) West Mountain Radio has some very helpful information about this on their Web site. If you're an ARES or RACES member, you may see PowerPole connectors in frequent use. By standardizing on a single power connector, operators can rapidly switch different radios between many different power sources.

The PowerPole connectors simply push onto the RIGrunner jacks. The plugs are color-coded and "polarized," which is to say that you can't insert them the wrong way. Although they don't lock into place, the connectors fit quite firmly. If you wrap your foot in a wire and take a determined step, you will probably yank the cable out of the RIGrunner socket. On the other hand, if you are entangled in a power cord and about to kiss the carpet, you have more serious things to worry about.

Three Flavors

RIGrunners come in three models depending on how many outlets you need: 12, 8 or 5. Every model is rated at 40 A. The 12- and 8-outlet RIGrunners (models 4012 and 4008, respectively) feature LEDs that indicate the status of each socket and an audible over- or under-voltage alert system. The 5-socket model 4005 is primarily designed for mobile use and lacks the LED and audible indicators.

For this review I tested the model 4012. I found the LED indicators to be particularly convenient, but the audio alarm is a nice touch in applications where the power strip is out of sight. Each outlet is fused with ATC/ATO automobile fuses. Not only are they easy to replace, the blown-fuse LED indicator flags the location of the problem fuse instantly. Fuses are available in 10 values from 1 to 40 A, so you can choose the appropriate fuse for the hardware in question.

Impressions

The RIGrunner is a deluxe solution for a common problem. In my station I power five devices from one supply. By extending my power-supply ports with the RIGrunner, I could quickly remove and replace whatever happened to be attached to the 12-V bus—including my transceiver, digital wattmeter, sound card interface and more. When I want to move the radio from the house to the car, the process of detaching the power cable from the RIGrunner required about 5 seconds' worth of effort—a vast improvement.

I found the RIGrunner to be attractively designed and rugged. West Mountain took the extra step of incorporating RF suppression into each RIGrunner as well. With the RIGrunner in place I have no RF-induced problems (and my antenna is close to my operating position). RIGrunners are ideal station accessories for the sake of convenience and for public-service applications where time is precious and reliability is paramount.

Manufacturer: West Mountain Radio, 18 Sheehan Ave, Norwalk, CT 06854, tel 203-853-8080; **www.westmountainradio.com**. *Model 4012 with 12 PowerPole connector pairs and a 6-foot power supply cable; $109.95. Model 4012 without connectors or cable; $99.95. Model 4008 with 12 PowerPole connector pairs and a 6-foot power supply cable; $89.95. Model 4008 without connectors or cable; $79.95. Model 4005; $49.95.* QST

STRAYS

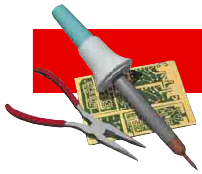
ATTENTION MARS OPERATORS AND USERS

◊ A project for the US Marine Corps Historical Division is seeking written and oral histories of service and civilian personnel who participated as operators in the MARS (Military Affiliated Radio System) program. Although the main focus is Navy/Marine Corps MARS during the Vietnam Era, contributions from all services and all eras are welcome and encouraged. In addition, if you used the MARS systems t communicate with your families or others, using either phone patches (Over!) or MARSGRAMS, please contact us. We are also seeking artifacts for the exhibit (at MCRD San Diego), MARSGRAMS, pictures of stations and personnel, orders (DNC-8), etc.

Please submit your MARS service dates, stories, etc, to: (e-mail) **MARS@borgmangroup.com**; or via postal mail to Borgman Group, Ltd, 3342 S Sandhill Rd, Ste 9-326, Las Vegas, NV 89121. *—Dr Daniel L. Borgman*

Previous • Next Strays

Steve Ford, WB8IMY ♦ *QST* Editor ♦ sford@arrl.org



By Louis L. D'Antuono, WA2CBZ

The Triple-Play Transmit-Receive Switch

A T/R switch that also mutes the receiver and allows for monitoring the CW sidetone—perfect for your vintage station.

In baseball, the most exciting and memorable infield action takes place in a triple play. It is also the most effective way to end an inning. The same thing takes place in my design of a transmit-receive switch, which controls antenna switching, receiver muting and CW sidetone provision simultaneously.

The current interest in restoring vintage tube equipment is coupled with a need for reliable transmit-receive switching. Usually, this consisted of a simple SPDT relay alternately switching a single antenna between the two units. The problem remains lacking the ability to monitor CW sidetone as well muting the receiver. Both of these features are integrated in modern transceivers but were not included in earlier separate units. An article in the January 1965 issue of *QST* described a transmit-receive switch that combined antenna switching with CW sidetone monitoring.[1] This unit was named *The Mox-Box*, meaning manual operating switching. There was, however, no provision for receiver muting nor was there any arrangement for convenient control. The option remained for using a foot pedal switch to facilitate command.

Three Enhancements

I decided to upgrade the original unit with three additional features. First, I installed a pilot light on the front panel to indicate when the unit was in the transmit mode. I used a 117 V ac neon bulb wired in parallel with the original DPDT relay. I then installed an additional DPDT relay and wired it into the original circuit. One section would be used for receiver muting while the other half would be used to ground out the receiver antenna connection during transmitting. This prevents any stray radiation from a high power transmitter damaging a receiver front end. This would be a more critical consideration in receivers with solid-state front ends. The limitation of this switch is the immense number of cables to facilitate all of these functions. These involve cables for antenna switching, others for the muting circuit, as well as still others for sidetone monitoring. In any case, this permits all operations to be controlled from one switching unit.

Before attempting to build this project, the builder will require a copy of the original article. It can be found on *ARRLWeb*, or it can be ordered at no charge from the ARRL Technical Secretary.[2] The next step is locating an adequate size enclosure for the circuit. I would recommend the RadioShack Deluxe Metal Utility Cabinet, #270-253A, because of its all-metal

construction as well as its standard rubber feet included to prevent scratching of a finished surface. The size of the enclosure is 3 × 5¼ × 5⅞, large enough for all of the components but small enough for the operating bench. Parts placement is not critical but the antenna switching relay section should be as close to the rear panel as possible. See Figure 2. The code monitoring circuit requires wiring in advance for either a cathode keyed or grid block transmitter circuit. Many older transmitters, due to their design simplicity, are cathode keyed. These include the E. F. Johnson Adventurer, Heathkit DX-20 and the KnightKit T-50. Later transmitters, such as the Heathkit DX-60, used grid block keying. For the sake of simplicity, I would recommend building different units for each type of circuit and color coding the cabinets to prevent confusion.

Putting it Together

Figure 2 shows how the components are placed. The code monitoring circuit was built on a separate terminal strip located at the rear left. Located in the lower right corner is the additional relay for muting and antenna grounding. Additional terminal strips were used to simplify wiring. Different-color wires were used to differentiate separate circuits. The expanded schematic illustrates how the additional relay was wired into the circuit. Keep in mind that all ac line wiring in this unit was above ground to prevent shorting and electrical shock. I installed a fuse into the ac circuit to prevent any damage to the unit. Labeling for the front and rear panel connections will make wiring easier. Solid wire was used in most of the circuits, but stranded wire was used for the moving sections of

[1]Notes appear on page 62.

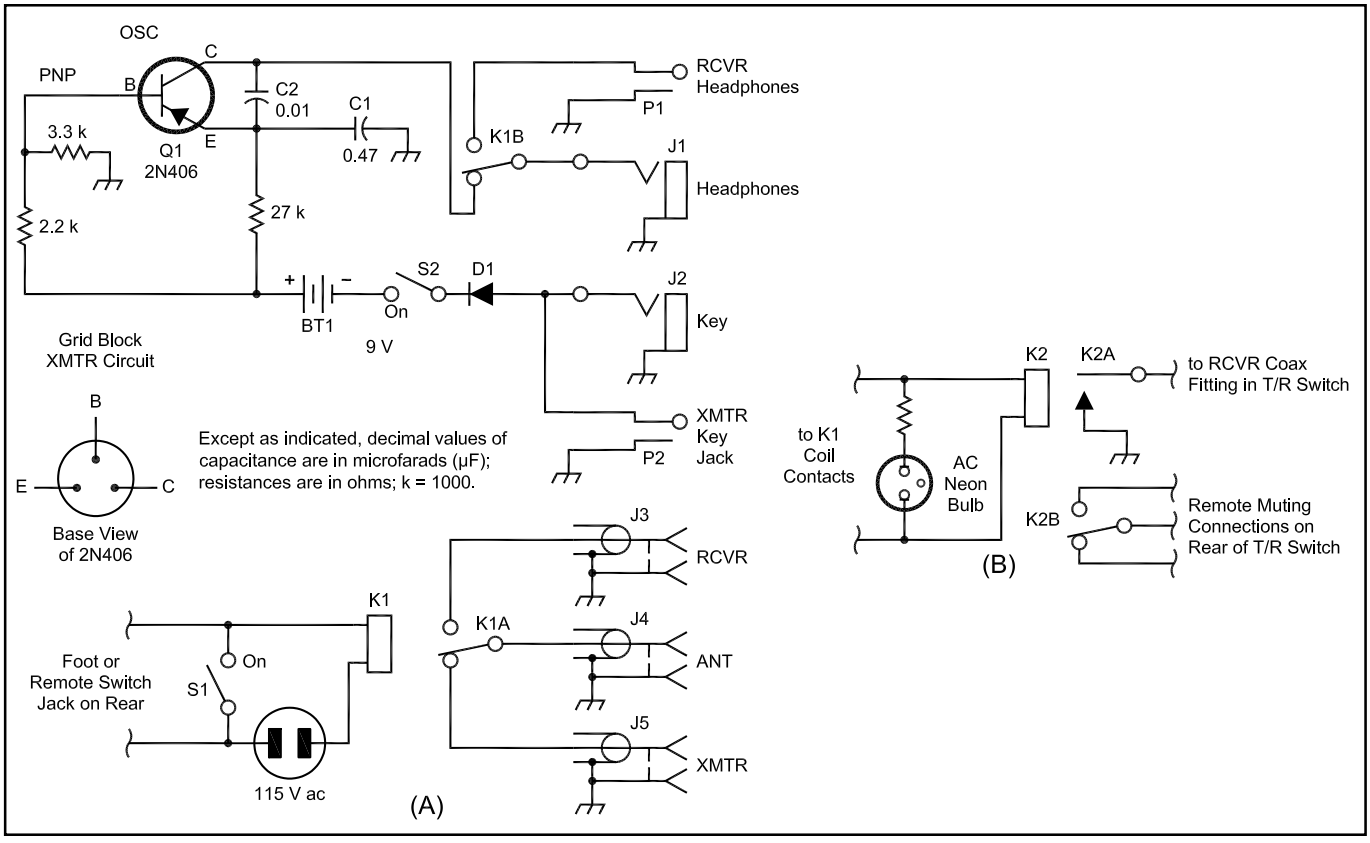


Figure 1—At A, the original Mox-Box schematic. B shows the additions the author made to the original. For transmitters having negative voltage at the key, use a PNP transistor; for positive voltage, NPN. Also, for transmitters with positive voltage at the key, the battery and diode polarities should be reversed, compared with what is shown here. Resistors are ½ W.

BT1—9-V transistor battery.
C1—0.047-µF paper for high impedance phones (2000 Ω), 0.15 µF for low-impedance phones (200 Ω). Any working voltage rating over 10 V is suitable.
C2—0.01-µF disk ceramic.
D1—Silicon rectifier, any PIV rating over 250 V.
J1, J2—Phone jack, open circuit.
J3-J5—Coax chassis receptacle type (SO-239).
K1—DPDT relay, 115 V ac (Digi-Key Z185-ND, plug style).
P1, P2—Phone plug. Phone jacks will also work and look better; a phone plug to phone plug cable will be required, however.
Q1—PNP type 2N406 or 2N2905; NPN type 2N647 or 2N2222.
S1, S2—SPST toggle switch.

the relays to prevent breakage from repeated use over time.

Before mounting parts on the front and rear panels, I suggest making up a template before starting any drilling. This helps to improve component spacing, which gives a project a more finished and professional appearance. Using Greenlee or other chassis punches cuts down not only on the time and effort but also creates better tolerances for component mounting. For some components other than those I used in this project that are rectangular in shape, a nibbling tool would be most useful. Remember, before wiring in the code oscillator used in the monitor, you must decide whether it will be designed for cathode or grid block keying. The next precaution is to make sure the polarity of the diode in this circuit is correct. The code monitor uses a 9-V battery but a power supply could be used instead. For the purpose of simplicity, I used the battery. Before putting this unit into actual operation, I would recommend testing it on its own. Make sure as a precaution, you do not check this unit without an antenna or dummy load on the transmitter. Also as a precaution, I added a fuse between the power line and K1.

The front panel consists of a number of controls and monitoring devices. Starting from left to right (see the title photo), there is a toggle switch to manually operate this unit independent of outside control. Then there are jacks for the headphones and the transmitting key. Finally, there is a switch to turn the code monitor on or off and a pilot light to indicate when the unit is in the transmit mode. The order in which these controls are positioned is at the builder's discretion. I used this sequence because I am right-handed and it seemed more convenient to have the receiver tuning at my right with

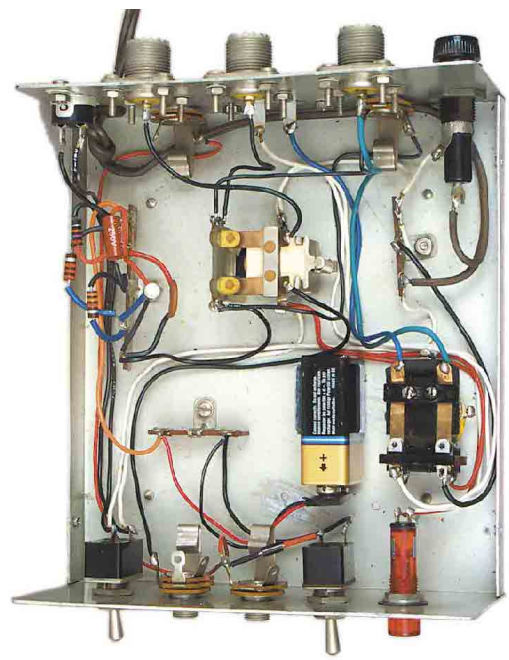


Figure 2—Photo showing the interior of the Triple Play T/R switch.

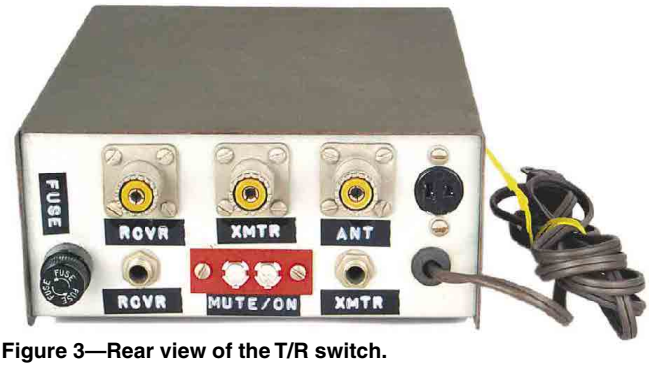


Figure 3—Rear view of the T/R switch.

the station controls at my left. When installing the toggle switches, it might be useful to use the Greenlee punch designed specifically for this purpose because the notch it creates inhibits shaft rotation. Most of the parts I used were out of my junkbox, but using new ones aids appearance. If low-impedance headphones are used, a matching transformer could easily be wired into the unit or used in an outboard capacity.

Hooking it Up

The rear panel contains all the connections needed for proper switching operation. As can be seen in Figure 3, there are three SO-239 connectors for the receiver, transmitter and antenna at the top. A Greenlee punch is used after drilling a pilot hole. A small automotive socket wrench could accelerate this procedure. From left to right, there are the fuse, receiver connection for monitoring, remote connection for receiver muting, and a phone jack for transmitter keying. Then there is the line cord opening and above it is a jack for remote operation of the unit. Remote control of the switch would ideally be controlled from the transmitter. Many of these early ones were designed with a switch that applied full power, and if there are extra contacts, these can be used to activate this unit. Others simply have a slide switch, such as the E. F. Johnson Adventurer, which switches from grid to plate monitoring. This can be utilized in this capacity by adding a set of contacts to activate the unit. The receiver muting can be wired for either normally on or normally off, depending on the circuit.

The limitation of this unit is that it is manually operated and will demand more attention than a switch that is automatic. Constant monitoring of relay noise will pinpoint problems and prevent damage to a transmitter if the relay malfunctions. I used this switch with my separate units, the Hallicrafters SX-146 receiver and a Hallicrafters HT-46 transmitter. Its operation was flawless. My addition of an extra DPDT relay will broaden its use to other receiver and transmitter combinations. Remember, the builder must know the keying circuit type of the transmitter before using this switch or damage will occur. I recommend building both types to accommodate different keying circuits. Additionally, the muting circuit's wiring depends on the particular receiver utilized. The builder can always attempt a more complicated and automatic transmit-receive switch. Amateur publications, past and present, are replete with these options. This project was both interesting and enjoyable, primarily because of its simplicity and, most important, its utility.

Notes

[1]Lewis G. McCoy, "The Mox-Box, A Simple Monitoring and Control Unit," *QST*, Jan 1965, pp 22-24, 144.

[2]An Adobe Acrobat file can be found at **www.arrl.org/files/qst-binaries/**. If you would like a photocopy at no charge, send a self-addressed stamped business-size envelope to the ARRL Technical Secretary, 225 Main St, Newington, CT 06111, tel 860-594-0200, and request the "Complimentary Mox-Box article from January 1965 *QST*."

NEW PRODUCTS

POWER PORT "RADIO GLOVE" FOR YAESU'S VX-7R HAND-HELD TRIBANDER

◊ Whether you're looking for good looks or extra protection for your VX-7R hand-held tribander, the new PowerPort Radio Glove from Cutting Edge Enterprises can do the job. The soft, supple radio protector is made from fine glove leather and features a sturdy belt clip and a Velcro-style cover. The PTT switch is fully accessible while the radio is in the pouch, which sports a secure compartment for storing an extra antenna tip.

Price: Leather, $19.95. For more information, contact Cutting Edge, 620 Highland Ave, Santa Cruz, CA 95060; tel 800-206-0115, fax 831-426-0115, **www.powerportstore.com**.

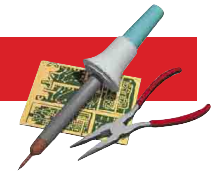
"FINAL MILE" SELF-SUPPORTING TOWER SERIES FROM ROHN

◊ Tower-makerRohnIndustries has released a new tower series. Available in heights of up to 100 feet, the Final Mile freestanding units have been designed to meet the EIA Standard for basic wind speeds from 75 to 100 miles per hour. The towers come in 10-foot sections for easy transport and can be shipped assembled or knocked-down. Each tower is galvanized for years of corrosion-free service. Options include side arm mounts, face mounts, rotator plate assemblies, step bolts with built-in climber attachments, anti-climb panels and more.

For pricing and additional information, contact Rohn at PO Box 2000, Peoria, IL 61656; tel 309-697-4400; fax 309-633-6868, **www.rohnnet.com**.

Previous New Products

HINTS & KINKS



USING SURPLUS METERS

◊ Have you ever gone to a hamfest and found that you couldn't resist buying some of those small meters with special scales indicating VUs, battery level or whatever? I couldn't resist. After a few years of this, I discovered that I had quite a pile of small meters. Nevertheless, what could I *do* with them? I soon realized that these meters are not much use without characterizing them and knowing how to use them once their characteristics are known.

Meter Characterization

This is simple. Well, sort of. First, you measure the dc resistance of the meter. This is easily done with any ohmmeter. (This is true only for insensitive meters. Sensitive meters may be damaged by measurement with an ohmmeter. See page 26.4 of the *2002 ARRL Handbook* for a method that is safe for all meters—*Ed.*) For an example, let's say we find that the meter resistance is 370 Ω.

Next, we need to determine what current will make it read full scale. This is also reasonably easy, but a little more involved. The way I did it was to hook a variable power supply up through a variable resistance to the meter. Start with a very high resistance (that is, megohms) and a low voltage, then slowly change the combination until you get a full-scale deflection. See Figure 1.

Once you get that full-scale deflection, you simply measure the voltage across the meter with a dc voltmeter. As an example, let's say we measured 85 mV across the meter. From Ohm's law, we get 0.085 V / 370 Ω = 0.229 mA full-scale reading.

Once you know the meter characteristics, how can you use it? Well, there are two basic ways to use your meter: as a voltmeter or an ammeter. Most projects use one or the other.

Making an Ammeter

The resistance of the coil in our example is 370 Ω. We already know that our meter measures 0.229 mA at full scale. It would be great if we had a special need that just happened to need a 0.229 mA full-scale meter, but that's not very likely. We need to add what is called a "shunt." A shunt diverts part of the current around the meter so that it will read full scale at some circuit current larger than 0.229 mA. A shunt is connected in parallel with the meter.

Let's say you were going to build a QRP wattmeter, ala Roy Lewallen's design. The circuit calls for a 1-mA meter. This means that the full-scale reading of the meter needs to be 1 mA. You need to divert most of the current around the meter. In fact you need to divert (0.001 – 0.000229) 0.000771 A, allowing only 0.000229 A to go through the meter when 1 mA flows in the circuit.

Table 1—Surplus Meter Example

Coil Resistance	370 Ω
Measured Full-Scale Voltage	85 mV
Calculated Full-Scale Current	= 0.000229 A

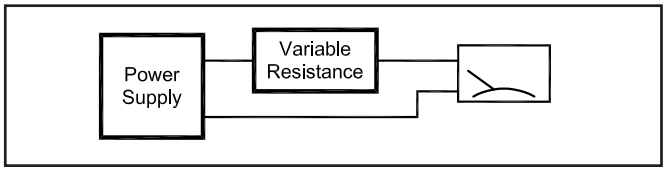


Figure 1—A test setup for measuring current at a meter's full-scale deflection.

We know that the voltage across our example meter is 85 mV, so it's also across the shunt when the meter reads full scale. Therefore we calculate the shunt resistance as R_s = 0.085 / 0.000771 = 110.24 Ω. So, if we put about 110.24 Ω in parallel with the meter, we would get a full-scale reading of 1 mA. This same procedure applies for *any* full-scale current that you might want to read.

Making A Voltmeter

So we already have a great use for the surplus meter, now what about making a voltmeter from the same surplus meter? Let's say we want to make a meter to read 15 V from our surplus meter.

This might actually be a good example, as I bet many would like a small, inexpensive 15-V meter for their homebrew QRP rigs. We know that the maximum voltage that can be across the meter is 85 mV; we need to drop (15 V – 0.085 V) 14.915 V is across a series resistor.

We also know that the meter reads 0.000229 mA at full scale, so using Ohm's law, we get 14.915 V / 0.000229 A = 65,131 Ω. So if we put a 65.131 kΩ resistor in series with the meter, it would read full scale when the circuit voltage is about 15 V. (The 0.131 kΩ is insignificant compared to the 65 kΩ.) This method can be used for any voltage reading.

Once you start using surplus meters, you'll want to start changing the faceplate to reflect the new scale that you dictate; I leave that to artists. Good luck and have fun with meters. *—Brad Mitchell, N8YG, 148 Holley St, Brockport, NY 14420-1852;* **n8yg@arrl.net**

EASY CUSTOM METER FACES AT HOME

◊ Panel-meter faces have always been a problem for me in homemade projects that use an analog panel meter. Either the meter face did not have the correct scale or it needed some changes. I have used dry-transfer labels to add markings to existing meter-face graphics. Sometimes I have used a pencil eraser to lightly remove some markings before using the dry-transfer graphics. The results were usually functional, but lacked the professional look I desire. I wanted easily customized meter faces that look great and can be easily made at home at low cost. I never found a good method until I discovered the way Jim Tonne, WB6BLD makes meter scales. Jim has written a meter-scale-drawing program that draws up to four scales on a meter face plate. This *Meter.exe* program is available from his Web site at **www.qsl.net/wb6bld/**. The program is offered at no cost for radio amateur use.

The program output may be customized to fit nearly any meter movement commonly available to radio amateurs (Figure 2). Just about every parameter can be adjusted and the output (HPGL) can be sent directly to a PCL-5 capable printer (LaserJet III or later) or to an ASCII file. A variety of useful meter faces can be made by Jim's program as is. He is working, as time allows, enhancing the program, but in its current form, the

Figure 2—Checking dimensions for a new meter face.

program has some limitations. I'll describe a method that allows nearly any graphics printer to be used by the program, show how to substitute additional fonts, insert custom graphics, and add colors to the meter faces you generate using Jim's software.

The *Meter.exe* DOS-based program generates output files in HPGL and can add the required header and footer so a PCL-5 capable printer can accept the HPGL file. The HPGL format was developed by Hewlett Packard to allow standardized printing to their popular plotters. An HP device connected to the standard LPT1 printer port will print if that device can accept HPGL or HPGL plus the header/footer pair. If your printer can't respond to either of those formats, it won't print correctly. An inexpensive inkjet printer won't work and many non-HP laser printers won't work. The font generated by the program is suitable for many purposes, but since font choice is a personal decision, sometimes an alternate font would be useful.

I have a procedure that allows your existing graphics printer to work and allows any font handled by Windows to be printed on your custom meter. In addition, we'll see how to introduce custom graphics and colors to create truly custom meter plates.

Easy Steps to Success

We need to:

- Convert the *Meter* printer output to something compatible with your graphics editor
- Change fonts, add text, insert graphics and color with your graphics software
- Print the modified meter face with your existing Windows graphics printer

First, in *Meter.exe*, select the "write PCL5 data to file" option. This writes a file to your disk drive with a ".PRN" extension. Then use a file-conversion utility to convert this PCL data file to one that your graphics editor can read. Good results were attained with a shareware program called *ViewCompanion*. The free download from **www.softwarecompanions.com** will give you a 30-day free evaluation of the program. This *ViewCompanion* software converts from the HP PCL-5 file format to about fifteen different raster file formats. This means that programs that use filename extensions of JPG, PCX, DXF, PDF, etc can now work with the *Meter* file output. I use *TurboCAD* for Windows (DXF file extension) for my changes. Another CAD drawing program may give you good results. After your changes are made, simply print to your printer using your graphics editor software.

While making changes to the meter scale using my CAD software, the thought occurred to me to just make the entire scale in CAD from the start. While it's possible to do this, I found that using Jim Tonne's software meter engine and importing the result to CAD software was easier. I just let the meter engine take care of the hard part. The only items I usually change in CAD are the font and perhaps the line thickness of an arc or a meter scale marker. These simple operations are relatively easy to learn in most CAD programs and won't require a long learning process.

For best results, use a high quality paper designed for your printer. Get paper with the highest brightness rating you can find. A rating of 100 is the whitest. The common papers have a rating of only about 80 or so. Since premium paper is more expensive, consider buying a smaller package. You can make your trial-and-error prints with common paper and switch to the premium material for your actual meter face. Select a clean work area since your internal meter movement will be open and exposed. Carefully cut the new meter face drawing from the paper sheet. Remove the original meter face and turn it over. Secure the new face to the back of the original plate with adhesive. Do not use water-based glue because it may cause the paper to crinkle while drying. I have had good results using a spray adhesive made by Elmer's called "Extra-Strength Spray Adhesive." The orange and blue can is marked acid free, permanent bond, dries clear, no bleed through. I got a 10-ounce spray can at a Home Depot store.—*Bill Jones, K8CU, 5411 Spruce Ln, Westerville, OH 43082;* **k8cu@arrl.net**

IS YOUR TNC DRIVING YOU CRAZY?

◊ A few years ago I purchased a used PK-80 TNC. It was driving me crazy with very random and unpredictable behavior. Recently my Kantronics KPC-3+ started doing weird things. I spent about half of a day troubleshooting before finding the source of the problem. The keep-alive battery (a CR-2032) was going dead. None of the troubleshooting charts mention how to tell when this battery needs replacement. The symptoms I had were quite strange. The TNC would randomly reinitialize without any apparent pattern. After much troubleshooting, I discovered that the TNC was reinitializing each time a packet was received. My theory is that when a packet is received the TNC draws a bit more current for processing, and it was just enough that the keep-alive battery could not keep up and instead was loading down the power supply circuits.

The solution for my KPC-3+ was to replace the battery. I could not find a replacement battery for the PK-80, so I just operate without one. I could have replaced the battery with something of the correct voltage, but since most modern packet software packages load the parameters each time they are started, I never went to the trouble. Bottom line: Power is often a culprit in digital circuits when things seem to make no sense.—*Chuck Rexroad, N4HCP, 7511 Fairwood Ln, Falls Church, VA 22046;* **n4hcp@arrl.net**

Hints and Kinks items have not been tested by *QST* or the ARRL unless otherwise stated. Although we can't guarantee that a given hint will work for your situation, we make every effort to screen out harmful information. Send technical questions directly to the hint's author.

QST invites you to share your hints with fellow hams. Send them to "Attn: Hints and Kinks" at ARRL Headquarters (see page 10), or via e-mail to **h&k@arrl.org**. Please include your name, call sign, complete mailing address, daytime telephone number and e-mail address on all correspondence. Whether praising or criticizing an item, please send the author(s) a copy of your comments. QST

The Yaesu VX-7R Handheld Tranceiver

Reviewed by Brennan Price, N4QX
Assistant Technical Editor

Yaesu's newest HT, the VX-7R, looks very much like its predecessor, the VX-5R, reviewed by Jay Mabey, NU0X, in the May 1999 *QST*. It is a shade taller and wider, but not so visibly different from the VX-5R that it raises eyebrows upon first inspection. Nevertheless, when I first unwrapped the new HT, there were enough subtle differences to prompt my exploration of this unit. It didn't take long to notice improvements that previous VX-5R users will like.

It *Feels* More Sturdy

When Yaesu unveiled the VX-7R at the 2002 Dayton Hamvention, a collection of the HTs were displayed in a water-filled case. In fact, both the front panel of the radio and its operating manual tout the VX-7R as "submersible." Handling the radio for the first time, I noticed a few structural enhancements from the VX-5R that would help the HT stand up to water.

The 18 front-panel keys resist just a little when pressed, finally registering with a satisfying click. The keys are larger and more resistive than those on the VX-5R, and these features make frequency entry and programming a snap on the new radio. Also, the microphone/speaker and dc power jacks are plugged by snug, form-fitting rubber caps, obviously resistive to anything on the outside. While these caps, particularly the dc power cap, were at first a little tougher to open than the easy-flip caps on many HTs, it doesn't take long to adapt.

"Sturdy and solid," I thought to myself. "Maybe I need to get with the ARRL Lab and develop a submersibility test." As tempting as it was to throw the thing in the sink and see how it worked when it came out, I held off until I played with the radio some more. It seemed wise to hold the potentially destructive tests off until last.

Turning it On and Tweaking the Settings

As with the VX-5R, the power on/off switch is controlled by a prominent key to the upper left of the front-panel speaker. Frequency entry is a snap; just enter six numbers on the keypad (with leading zero[es] if tuning below 100 MHz). When a frequency in the usual 2-meter or 70-centimeter repeater range is entered, the transmit offset is automatically entered. This Automatic Repeater Shift feature may be turned off or overridden for machines with nonstandard repeater frequencies or shifts.

Familiarity with the highly detailed (but easy to follow) user's manual soon becomes necessary. Out of the box, the VX-7R is set to dual-band receive mode, and the squelch controls on both VFOs are set very low. Users in high-noise areas may therefore be greeted with a blast of white noise. When this happened to me, I thought, "No problem, I'll change the squelch." But, like the VX-5R, there is no squelch knob. Squelch is controlled via a menu option, the first option that pops up when the menu is activated for the first time.

Working with the Menus

The extensive menu system is accessed fairly intuitively, by pressing the F and 0/SET keys. This is similar enough to the VX-5R. The user can cycle through menu options using the dial at the top of the radio, concentric with the volume knob. What is different—and not at all obvious to the user who has not read the manual—is the procedure for changing a menu setting that is displayed on the screen.

On all menu items, the user cycles through the options using the MAIN and SUB keys, the same buttons used to switch transmit VFOs and switch into and out of Dual Receive mode. MAIN steps up to the next setting on the list, and SUB steps down. It would have been a nice touch had this somehow been indicated on the case of the HT, but once you read about it in the manual, it becomes easy.

Some menu options, most notably the selection of a CTCSS tone, require the user to press the BAND key before changing the setting with the MAIN and SUB keys. Beyond setting the CTCSS tone (from the new industry standard list of 50) or DCS code (from 104 possibilities), the list of menu items that require this keystroke is beyond the scope of this review. If a user knows the above, he or she can get on the air for most uses.

How Does it Sound?

After everything was set, working through repeaters and on simplex frequencies was a pleasant experience with the VX-7R. Requested reports on the quality of transmitted audio were all positive, and the front-panel speaker was pleasant to listen to.

Users may cycle through four power settings on 6 meters, 2 meters and 70 cm, ranging from 5 W to 50 mW. The United States version of the VX-7R also has limited capability on the 222-225 MHz band, with two power settings of 300 and 50 mW. Yaesu is to be commended for incorporating the 1.25-meter band in this rig; the availability of more equipment should encourage use of this very good band. However, amateurs looking for more than nominal power may be disappointed. At the "high power" setting of 300 mW, I was only able to reliably activate the nearest repeaters. While the 222 MHz capability is nice, the documentation rightly identifies the VX-7R as a "triple-band" HT.

One really neat thing about this rig: it does AM! Not just when receiving broadcast and aircraft signals (which it does well), but when *transmitting* on the 50 MHz band! While any frequency on the band may be chosen for such operation, care should be taken to avoid interference with other modes. The band plan recommended by the ARRL Board of Directors sets 50.4 MHz as an AM calling frequency, with activity scattered about the "all modes" region of 50.3 to 50.6 MHz. The actual usage where you live may be vary; consult your local frequency coordi-

Bottom Line

Those who like the VX-5R will also like the VX-7R. Yaesu has improved the feel and friendliness of its top-of-the-line tri-band HT.

Brennan Price, N4QX ♦ Assistant Technical Editor ♦ n4qx@arrl.org

Table 1
Yaesu VX-7R, serial number 2G022193

Manufacturer's Claimed Specifications	Measured in the ARRL Lab
Frequency Coverage: Receive, 0.5-30 (AM), 30-59 MHz, 59-108 MHz (WFM), 108-137 MHz (AM), 137-174, 174-222 (WFM), 222-225, 225-420 MHz,[1] 420-470 MHz, 470-729 (WFM), 800-999 MHz (cell blocked); transmit, 50-54, 144-148, 222-225, 430-450 MHz.	Receive and transmit, as specified.
Power requirements: 10.0-16.0 V dc;[2] receive, 0.24 A; transmit, 1.9 A (max, high power).	Receive, 0.32 A (max volume, no signal); transmit, 1.6 A, tested at 13.8 V.
Size (height, width, depth): 3.5×2.4×1.1; weight, 9.2 ounces.	
Receiver	**Receiver Dynamic Testing**
Sensitivity: AM, 10 dB S/N, 0.5-30 MHz, 3.0 μV; 108-137 MHz, 1.5 μV; WFM, 12 dB SINAD, 76-108, 1.0 μV; 470-540 MHz, 0.35 μV; 540-800 MHz, 3.0 μV; NFM, 12 dB SINAD, 30-50 MHz, 0.5 μV; 50-54 MHZ, 0.16 μV; 57-76 MHz, 1.0 μV; 137-140 MHz, 0.2 μV; 140-150 MHz, 0.16 μV; 150-174 MHz, 0.2 μV; 174-225 MHz, 0.3 μV; 300-350 MHz, 0.5 μV; 350-400 MHz, 0.2 μV; 400-470 MHz, 0.18 μV; 800-999 MHz, 1.0 μV.	AM, 10 dB S+N/N, 1.0 MHz, 1.0 μV; 120 MHz, 0.56 μV; WFM, 12 dB SINAD, 100 MHz, 0.7 μV; NFM, 12 dB SINAD, 50 MHz, 0.15 μV; 144 MHz, 0.16 μV; 222 MHz, 0.36 μV; 430 MHz, 0.15 μV.
Two-tone, third-order IMD dynamic range: Not specified.	20 kHz offset from 52 MHz, 54 dB, 10 MHz offset from 52 MHz, 86 dB. 20 kHz offset from 146 MHz, 63 dB, 10 MHz offset from 146 MHz, 76 dB. 20 kHz offset from 222 MHz, 61 dB, 10 MHz offset from 222 MHz, 76 dB, 20 kHz offset from 440 MHz, 58 dB, 10 MHz offset from 440 MHz, 65 dB.
Adjacent-channel rejection: Not specified.	20 kHz offset from 52 MHz, 67 dB. 20 kHz offset from 146 MHz, 65 dB. 20 kHz offset from 222 MHz, 65 dB. 20 kHz offset from 440 MHz, 61 dB.
Spurious response: Not specified.	IF rejection, 13 dB;[3] image rejection, 44 dB.[4]
Squelch sensitivity: Not specified.	At threshold, VHF, 0.09 μV; 222 MHz, 0.3 μV; 430 MHz, 0.08 μV.
Audio output: 400 mW at 10% THD into 8 Ω (dc).	690 mW at 10% THD into 8 Ω.
Transmitter	**Transmitter Dynamic Testing**
Power Output: 50 MHz, 1.0 W high (AM only); 50, 144, 430 MHz, 5.0 W high; 222 MHz, 0.3 W high; 5.0/2.5/1.0/0.035	52 MHz, 4.8 / 2.4 / 0.84 / 0.1 W. 146 MHz, 5.1 / 2.6 / 1.1 / 0.02 W. 222 MHz. 0.33 / 0.03 W. 440 MHz, 4.5 / 1.9 / 0.8 / 0.02 W.
Spurious signal and harmonic suppression: 60 dB.	VHF, 54 dB; UHF, 70 dB. Meets FCC requirements for spectral purity.
Transmit-receive turnaround time (PTT release to 50% of full audio output): Not specified.	Squelch on, S9 signal, VHF and UHF, 70 ms.
Receive-transmit turnaround time ("tx delay"): Not specified.	VHF, 60 ms; UHF, 70 ms.

[1]"Action Band 1"—mode varies with frequency range within this segment.
[2]External dc. Battery is 7.2 V.
[3]For 52 MHz. IF rejection on 146, 222 and 440 MHz was 90, 72 and 91 dB, respectively.
[4]For 222 MHz. Image rejection on 52, 146 and 440 MHz was 88, 63 and 65 dB, respectively.

nation body to make sure, and listen before you transmit. Our tests were promising. Power in the AM mode is fixed at 1 W.

Like the VX-5R, the '7R has substantial expanded receive capability. With the exception of cellular frequencies, the radio will receive in AM, narrow FM and wide FM modes from 500 kHz to 999 MHz on the MAIN VFO. Reception and transmission on the SUB VFO is limited to the 6-meter band, 137-174 MHz, and 420-470 MHz. The included rubber-duck antenna, slightly longer than the one that came with the '5R, has a screw-off tip. A loading coil is included for operation on the 6-meter band and reception on lower frequencies. The loading coil works well, but keeping up with it can be challenging to a forgetful amateur like myself.

Memory fiends will not be disappointed. In addition to the 450 standard, programmable memory channels, there are 10 one-touch memory channels, which, when enables, can be handy for rapidly changing frequencies on the fly. Adding other types of memory (such as a "home" frequency for each band) brings the total number of programmable frequencies to over 500.

Bells, Lights and Features, Oh My!

Hams who come from the "simple is good" school of thought will be pleased

Figure 1—The front panel and front cover of user's manual for the Yaesu VX-7R says the radio is submersible. We put it to the test in the ARRL Lab.

with the performance of this radio. That doesn't mean that hams from the "give me lots of neat little features" school are left empty handed. To the contrary, the VX-7R enhances the considerable list of features found on its predecessor. Returning from the VX-5R are such oldies and goodies as the "Smart Search" feature, which will scan for 15 active signals and automatically store them in a memory bank. The graphical Spectrum Analyzer feature returns, and the enhanced LCD dot-matrix display allows for a relative signal strength to be displayed on each peak. The '7R can detect CTCSS tones or DCS codes of incoming signals, and the radio comes equipped with a1750-Hz tone generator for use with European repeater systems.

The first thing I noticed after the first charge of the battery was the front panel LED. "Oooh, what a lovely hue of blue," I thought to myself. The status LED to the top right of the keypad is called the "STROBE," and the various colors and intensities for the different statuses are programmable. If you prefer orange for transmit and chartreuse for receive, instead of the traditional red and green, you can arrange that.

Figure 2—Thirty minutes after being placed in 8.5 quarts of water, the Yaesu VX-7R, water dripping off its chassis, works like new.

The option to install a barometric pressure/altimeter unit is also carried over from the VX-5R. Added is a built-in thermometer, which will not be accurate when the HT is held in a 98.6°F human hand, but works well when standing alone. A time-of-day clock can be set, as can an "alarm" feature. Someone who wants to use the VX-7R as a clock radio can do so; I did so on my July trip to Maine.

Speaking of that trip to Maine, it was a humdinger weather-wise. I made extensive use of the VX-7R's ability to scan NOAA weather channels. Keying F and 3/WX limits the radio to the 10 NOAA frequencies, and scanning can be turned on and off with the PTT switch. The radio can be set to sound an alarm when a 1050 Hz alert tone is detected on an active frequency. Thanks to this feature, I was alerted to severe thunderstorm warnings in four different counties on three different NOAA stations.

One thing not held over from the VX-5R is its compatibility with the same rapid charger. While the ac wall adapter sold with the VX-7R is the same as its predecessor, the accessory rapid charger is a different model. Users looking to upgrade will need to buy both items if the charging stand is important to them.

Going for a Swim

Now that I had played with the radio, it was time to put the submersibility claim to the test. Yaesu does not specify a depth and duration in the manual, but its advertisements have indicated that the VX-7R is submersible to 3 feet for 30 minutes

I did not have a 3-foot deep container in which to submerge the radio, but I did find a 10-quart mop bucket in the ARRL maintenance closet. I filled the bucket to the 8.5-qt level, just enough to submerge the VX-7R from base to tip of the non-extended antenna, as shown in Figure 1.

Thirty minutes later, I removed the radio from the water. It powered up immediately, even with water droplets clinging to the case, as shown in Figure 2. While I would not recommend that users of a VX-7R repeat this feat, it does indicate that Yaesu's efforts to fortify the radio have been effective.

A Worthy Successor

At first glance, the Yaesu VX-7R looks much like its predecessor. But within a few minutes, users will begin to discover and enjoy a unique feel and style that is easy to fall for. HT enthusiasts will appreciate the plethora of features, the solid performance on the three main bands, and the modest but welcome capabilities on 222 MHz and 6-meter AM.

Manufacturer: Vertex Standard, 10900 Walker St, Cypress, CA 90630; tel 714-827-7600; fax 714-827-9100; **www.vxstdusa.com**. $359.95.

Force 12 Sigma-5 Five-Band Vertical Dipole Antenna

Reviewed by ARRL Staff

The Force 12 Sigma-5 is a vertical dipole composed of a center element with two perpendicular bars, one at each end. The entire assembly is 11 feet tall. The upper and lower T bars are 48 inches wide (24 inches each side). In true dipole fashion, the feed point is located at the middle of the center element, where a printed circuit board receives the feed line. On the board are several relay controlled loading coils, facilitating a direct 50-Ω match. The board, relays, and loading coils are neatly enclosed in a covered styrene tube. A short piece of feed line (with connector) and the end of 50 feet of relay control line are soldered to the board and wire-tied to a feed point extension bar affixed to the center assembly.

No Tools Required

Our favorite part of the instruction manual says, "Tools required: NONE."

Bottom Line

The Force 12 Sigma-5 offers five HF bands in an easy-to-install package for the ham with limited space.

This happens so infrequently in building anything, including children's toys, that we still felt compelled to have a tool box nearby. We never used any tools, however.

The delivered antenna includes well-labeled parts. After aligning all the parts and matching them up by their letters, the joints are secured with machine screws, lock washers and finger-tightened wing nuts. Factory drilled holes align very well, and there wasn't a single metal burr on any piece of cut tubing. Welded parts and rivets were clean and solid. Assembly is fast. We were done in a couple of minutes.

Locating the Antenna

One person can easily raise and maneuver the assembly. To maximize its efficiency, the manufacturer advises against placing the antenna too high above the ground. Force 12 recommends installing the Sigma-5 using a 5-gallon bucket with cement for the base post, or sinking a slightly larger pipe in the ground for the base post to fit over. The antenna can also be placed on the ground and guyed with rope.

It's recommended that the antenna be installed away from any closely surrounding metal objects, and to run the coax feed line and relay control line at a 45-degree angle (or higher) away from the antenna for several feet to avoid coupling to the antenna. Dropping the lines too close to the Sigma-5 may have the effect of detuning the factory-set matching. The installation manual also suggests that persons using more than 100 to 200 W compute allowable RF exposure limits, citing possible strong energy exposure fields that may exceed FCC recommended limits.

We attached a coax feed line and ran it with the relay control line to our test station. Inside, the control wiring is accomplished using an included switch assembly. The relay control line and 12 V dc leads (it draws only 95 mA) were quickly screwed down to a wiring bus on the assembly. A rotary switch is pre-wired to the opposite side of the bus. As the switch is rotated, energized relays activate different sets of loading coils on each side of the feed point. The switch is rotated through five bands: 20, 17, 15, 12 and 10 meters. Without any power applied to the relays, the antenna is tuned for 20 meters. For convenience, the switch includes 20-meter positions at both ends of the rotation.

We settled on a relatively hidden location in a small yard that placed the antenna among some scrawny trees and within the dense ground cover of some pachysandra. The location ended up being slightly farther away than the included 50 feet of relay control line. We replaced the control line with 100 feet of common 5-conductor rotator cable and found it quite easy to disassemble the center tube to expose the relays and circuit board.

Figure 3—The delivered, disassembled Sigma-5. Components include the antenna sections, center feed point housing (with circuit board, relays and loading coils inside), 50 ft of relay control line and relay switch assembly. Gina is not included.

Table 2
Force 12 Sigma-5 Vertical Dipole

Manufacturer's Claimed Specifications	*Measured in the ARRL Lab*
Frequency Range: 20, 17, 15, 12 and 10-meter bands.	As specified.
Power rating: 1200 W PEP SSB, 700 W CW.	Tested only at 100 W SSB.
Dimensions: 9 ft tall, 18 in. base post.	As specified.
Weight: 7 lb.	As specified.
VSWR: < 2:1 at 17-10 m, <2.2:1 at 20 m	As specified.

Figure 4—Each joint is clearly labeled. Assembly requires machine screws and finger-tightened wing nuts.

The Check-Out

We found that, regardless of the antenna's location, the VSWR at 14.2 MHz was higher than referenced by the manufacturer (greater than 2:1). Instead, the measurement flattened out to nearly 1:1 at around 14.0 MHz. Within the manual is a note explaining that the bandwidth on 20 meters will not quite cover the entire band. There are instructions for re-locating the tuned center of the band, which involves pulling back the housing on the center assembly, and slightly spreading the turns of the 20 meter coils at both ends of the circuit board. The clear instructions allowed us to successfully achieve a reasonable VSWR at 14.2 MHz. Similarly, we could have tuned the antenna higher or lower in the band.

Our efforts did not change the good VSWR measurements of the other four bands. In reassembling the center housing, we noticed that the 20-meter coils (the largest coils on the board) brushed against the inside of the plastic housing. Care should be taken when removing or reassembling the center housing to avoid contacting the coils. Such contact may compress or spread the coils, inadvertently changing the tuning.

On the Air

From our station in the Connecticut River Valley, we gave the Sigma-5 a workout during July's RSGB Islands on the Air event. Operating SSB with about 100 W, we contacted nearly all of the stations we could hear, often breaking pileups. Signal reports were good to excellent.

The antenna is very credible, particularly for those looking for a multi-band antenna solution that is easy to assemble and handle. The design of the Sigma-5 makes it easy to work on, with the understanding that you may have to adjust some of the factory tuning to suit your operating needs. Hams with limited space availability will find a good deal of capability in a small package.

Manufacturer: Force 12, Inc, PO Box 1349, Paso Robles, CA 93447; Order Line 800-248-1985, fax 805-227-1684, technical support 805-227-1680; **www.force12inc.com**. $349. QST

TECHNICAL CORRESPONDENCE

VOCODER REVIVED

By Jack MacLean, K2IUK, 935 Rabbit Creek Rd, Franklin, NC 28734; **k2iuk@yahoo.com** *and Al Hirsch, K2SKV, 6 Mountain Trail, Warren, NJ 07059-7018*

◊ The article by Doug Smith ("Digital Voice: The Next New Mode," *QST*, Jan 2002, pp 28-32) brought back pleasant memories for us. As retired members of Bell Telephone Laboratories, we were delighted to note that Doug, in describing the use by amateurs of voice coding, recognized the pioneering work done in the field years ago by the scientists of the Acoustic Research Department of Bell Labs. We were fortunate enough to have known and worked with many of those listed by Doug in the footnotes of his article. Several of them were hams. Indeed, the papers cited in the article stand as part of the foundation for the "new" vocoder described in the follow-up article ("Digital Voice: An Update and Forecast," *QST*, February 2002, pp 38-41).

Certainly, the achievements of today, as described in the update article, could have been envisioned about 70 years ago when Homer Dudley at Bell Labs described his design of a voice coder, the Channel Vocoder.[1] With later developments, the vocoder output was digitized using various sampling and quantizing techniques and encrypted for transmission within a voice channel. Incidentally, a variation of the vocoder was used during WW2 for secure communications. This complex technology did not attract many (if any) hams!

Vocoder work continued and, over 40 years ago, our colleagues at Bell Labs were simulating digital vocoders using large mainframe computers.[2] As the reference points out, it took about 1000 seconds of computer time to process 1 second of speech using one of the best computers of that era. How times have changed! The result of the simulation, together with ingenious work by the researchers, was a Voice Excited Vocoder (VEV) that had a 2:1 compression ratio exhibiting excellent voice quality.[3]

We hope other hams will follow Doug's lead, and develop voice coding as the next wave of amateur activity. They have a wonderful foundation to build on.

[1]Notes appear on page 70.

UNBVC DISCUSSION

By Phil Karras, KE3FL, 3305 Hampton Ct, Mount Airy, MD 21771-7201; **ke3fl@arrl.net**

◊ I read your August Technical Correspondence (pp 65-66) and was intrigued. I see two "problems" which may cause this method to not catch on and would very much like to hear your take on these.

1. The voice you hear will have nothing to do with the voice that belongs to the ham on the other end.
2. There will be delays between speaking and receiving an answer, much like the astronauts on the moon. What will that delay be, how long?

I have seen and tried PSK-31. I noticed that I could actually read each letter as it comes across. This means if I say something like, "My rig is a Kenwood TS fifty" and we assume 0.1 sec for each letter, we have a transmission delay of about three seconds. This is a simple short statement, and the delay does not include that for converting from analog voice to digital PSK-31. (I don't know the time it takes for each letter to be transmitted; I just took a guess.)

I do know that the bandwidth of a CW signal depends on the sending speed. While I've forgotten the exact numbers, I think a 20-WPM CW signal is about 100 Hz wide. So this would mean a rather large delay, as I said, very much like the delay we get from very long distances and the speed of light.

If, say, 10 WPM is coming out and an average word is five letters, we would have a delay of about five seconds between words. That is even worse than my estimate of about 0.1-second per letter in a word. Can you give me any evidence to suggest that I am way off base here? I sure would not want to wait five seconds between words! What are your ideas on this?

By Sumner Weisman, W1VIV, 43 Agnes Dr, Framingham, MA 01701-3815; **w1viv@arrl.net**

◊ Thanks for your interesting comments on my digital-voice communications article in *QST*. I have not implemented this idea—it was a "concept" article to get people thinking about digital voice communications. Eventually, I think it will be the next big step and will replace SSB. I'm a retired electronics engineer, (hardware, not software) and do not have the software skills needed. I would like to reply to some of your comments.

Your point one is correct. However, removing individual voice characteristics was the only way I could imagine to provide voice communication within the bandwidth of a PSK signal.

Regarding your point two, the delays should be small—only the conversion delays of each word. I have experimented with text-to-voice software, and delays were very small if you tell it to process one word at a time.

For the sample phrase that yielded a three-second delay, you probably used a macro to put in an entire sentence (for example, your rig description). If you convert and transmit one word at a time, the delays are only that length. In addition, if you watched each letter come across at the receiving end that may have been because of a slow typist you were working at the time. I agree, though, that there will be some delay through the system, and that will take some getting used to.

Again, it was not intended as a practical construction article. I just meant to get people thinking about digital voice. I received several nice letters from some very smart people working on more sophisticated techniques, including the guy who developed *Digipan*. My idea is certainly not as elegant as some "in the works," but if it gets folks thinking it has served its purpose!

TEST YOUR FILTER KNOWLEDGE—AGAIN!

By Ward Silver, N0AX, 22916 107th Ave SW, Vashon, WA 98070-6542; **n0ax@arrl.net**

◊ As Will Rogers said, "It's not what you don't know. It's what you do know that ain't so!" In the good Doctor's February '02 quiz, the solution for the problem involving stubs of RG-58 turned out to be off the beam. Several of the League's technical wizards caught the erroneous analysis and contributed correct solutions. Dick Knadle, K2RIW, contributed this extensive (and correct) analysis. Thanks to all the sharp-eyed readers.

By Dick Knadle Jr, K2RIW, 316 Vanderbilt Pkwy, Dix Hills, NY 11746-5856; **k2riw@arrl.net**

◊ "Test Your Knowledge! Filtering and Tuning" (*QST*, Feb 2002, p 65), teaches

many of the principles of filtering. However, the answer to question six, about shunt-coaxial stubs, has a serious mathematical error. It implies that a shorted half-wave coaxial stub can only create a null of 9.6 dB (for RG-58), and 13.9 dB (for RG-8) at 14 MHz. If that were true, coaxial stubs would rarely be used. In reality, many amateurs have used single coaxial-stub filters to eliminate the TVI on the transmission lines to thousands of TV receivers—by as much as 25 or 30 dB. A double-stub band-stop filter can do even better.

I believe the author fell into a very logical trap, that of considering the situation as a *power* relationship, rather than a *voltage* relationship. Whenever multiple signals are being combined or canceled, the vector voltage consideration is usually the correct approach. What follows are two approaches (complicated and simple) to calculating a coaxial stub's null depth, thus demonstrating a more correct approach.

The Classic Approach

In the book *Microwave Transmission Design Data* by Theodore Moreno (Dover Publications, 1948), on page 38, the author states that the impedance looking into a shorted coaxial stub that is made from lossy cable, is:

$$Input\ Impedance = Z_0 \times \tanh(\gamma L) \qquad \text{(Eq 1)}$$

where:

Z_0 = The cable's characteristic impedance (50 Ω)

tanh = hyperbolic tangent function

$\gamma = (\alpha + j\ \beta)$, a complex number.

α = Cable loss in nepers per foot, which is the loss in decibels per foot divided by 8.686

β = 2 π/λ, this is the cable's phase constant in radians per foot, at the operating frequency, including the cable's velocity factor.

π = 3.1416

λ = The wavelength being considered (in feet, with the velocity factor)

L = Cable length in feet.

The Factors

Like the author, I simply assumed that RG-58 cable has a loss of 1.1 dB per 100 feet, at both 7 and 14 MHz. At 14 MHz, $\gamma = (1.266E{-}3 + j\ 0.1354)$. At 14 MHz, $\lambda/2$ of cable (with a 66% velocity factor) is 23.2 feet long.

The Stub's Input Impedance

Plug this data into the impedance equation, and the shorted stub's 14-MHz input impedance is (1.469 + j 0) Ω, or 1.469 Ω resistive. This is so assuming that the transmitter is a 50-Ω source and the stub is connected to the antenna feed line (a 50-Ω load) by a T connector, which places the stub in parallel with the antenna feed line.

The Rejection Calculation Method

Next, perform a resistive voltage-divider network calculation, by comparing the transmitter output *voltage*, with (and without) the stub; this comparison gives the stub's rejection. I'll assume the transmitter is a 50-Ω source.

Without the Stub

The transmitter-to-antenna system has an apparent *voltage* transfer coefficient of 50 / (50 + 50) or 0.5, that's an apparent power loss of 20 log(0.5) = –6.02 dB[4]—that's the transmitter system's "reference loss." Don't worry; this 6.02 dB "reference loss" isn't caused by something we did wrong. All "matched impedance" signal generators perform this way—half of the generator's *voltage* is lost internally because of its Thevenin-equivalent impedance.

With the Stub Installed

The 1.469-Ω stub is now in parallel with the 50-Ω antenna lead (1.427 Ω total load). It will cause a *voltage* transfer ratio of 1.427 / (50+1.427) = 0.0277, which is an "apparent power loss" of 31.13 dB. This is 25.1 dB different from the "reference loss," so the RG-58 stub is providing a rejection of 25.1 dB. When performing the same calculation with RG-8 (0.4 dB per 100 feet), the calculated stub rejection is 33.6 dB.

At 7 MHz

By using the same stub input-impedance formula, the calculated input impedance of a 23.2 foot RG-58 stub (a shorted $\lambda/4$) is 3404 Ω (almost an open circuit). In parallel with the 50-Ω antenna lead (49.28 Ω, total), that stub will cause an "apparent insertion loss" of:

$$20\log\left(\frac{49.28}{49.28+50}\right) = -6.06\ \text{dB}$$

Therefore, the "true loss" is 0.04 dB from the "reference loss," a negligible amount. When using RG-8 cable at 7 MHz, the stub input impedance will be 9455 Ω. It will cause a true insertion loss of 0.02 dB—a very negligible amount in my book.

A Reality Check

At 7 and 14 MHz, a quality connector has virtually no loss, so these calculations should be very close to the real-world situation. I have often performed stub-rejection experiments in a laboratory using a good sweeping signal generator. I have realized null-rejection numbers very similar to these calculations. In the past, some smart people have said, "one good experiment is worth 1000 theories."

The Simpler Approach

Assuming RG-58 has a loss of 1.1 dB per 100 feet, the two-way *power* loss of 23.2 feet of cable is 0.5 dB. Next, convert this to a ***voltage*** ratio by:

$$voltage\ \ ratio = \log^{-1}\left(\frac{-0.5}{20}\right) = 0.944$$

This means that reflected *voltage* on the stub will cancel 94.4% of the *voltage* that was previously present (without the stub) at the T connector, leaving 5.6%. The stub cancellation is now 20 log[0.056] = –25.0 dB, which is very close to the classic-approach calculation of 25.1 dB. When using the same simple approach with RG-8 cable, the cancellation is 33.7 dB, versus 33.6 dB for the classic approach.

Conclusion

I believe that Mother Nature usually looks at RF energy from a *voltage* viewpoint, but we amateurs (and engineers) love to consider the power that our Bird model 43 demonstrates as flowing in various directions. When there are multiple signals present, that power consideration method can easily lead us astray to derive some wrong conclusions.

Notes

[1]US Patent 2,151,091, filed Oct 30, 1935, issued Mar 21, 1939: H. Dudley, "Channel Vocoder," *Journal of the Acoustical Society of America* 1 1 (1939) 169.

[2]R. M. Golden, "Digital Computer Simulation of a Sampled Data Voice-Excited Vocoder," *Journal of the Acoustical Society of America* 3 5, 1358-1366 (1963).

[3]E. E. David, Jr, M. R. Schroeder, and A. J. Prestigiacomo, "Voice-Excited Vocoders for Practical Speech Bandwidth Reduction," *IRE Transactions on Information Theory* 8, No. 5, 101-105 (1962).

[4]A loss is a negative gain, so gain calculations yield negative decibel values for losses. —*Ed.*

Technical Correspondence items have not been tested by *QST* or the ARRL unless otherwise stated. Although we can't guarantee that a given idea will work for your situation, we make every effort to screen out harmful information.

Letters for this column may be sent to Technical Correspondence, ARRL, 225 Main St, Newington, CT 06111, or via e-mail to **tc@arrl.org**. Please include your name, call sign, complete mailing address, daytime telephone number and e-mail address on all correspondence. Whether praising or criticizing a work, please send the author(s) a copy of your comments. The publishers of *QST* assume no responsibility for statements made herein by correspondents. QST

ARRL Legislative and Public Affairs Manager Steve Mansfield, N1MZA, SK

Steve Mansfield, N1MZA

ARRL Legislative and Public Affairs Manager Steve Mansfield, N1MZA, died July 29 following a spirited battle with brain cancer. He was 55. With the League for 11 years, Mansfield was the ARRL's representative on Capitol Hill and managed the League's public relations efforts.

"I shall remember his wit and enthusiasm when we worked together in Washington," ARRL President Jim Haynie, W5JBP, said of Mansfield—a professed "political junkie" who'd accompanied Haynie on official trips to DC. "His greatest delight was to point out various Washington characters and to tell their stories. He loved that, and he loved his job, and he will be missed."

Although Mansfield initially bounced back following a diagnosis of brain cancer and subsequent surgery in 2000, he suffered several setbacks in recent months. He died peacefully with his family nearby.

Among Mansfield's most notable accomplishments was his behind-the-scenes effort to facilitate introduction of the Amateur Radio Spectrum Protection Act, HR 817. The measure—still before Congress—would ensure that amateurs receive equivalent replacement spectrum for any frequencies lost to other services. Mansfield also was deeply involved in the effort to promote the Amateur Radio Emergency Communications Consistency Act, HR 4720. That bill would provide relief to amateurs prevented by deed covenants, conditions and restrictions—CC&Rs—from installing outdoor antennas by making such private land-use regulations subject to the PRB-1 limited federal preemption.

As part of ARRL's "Washington Team," Mansfield gave a face to Amateur Radio as he shared its story with members of Congress and their staff members. He met periodically with the staff members of the ARRL's DC office, ARRL General Counsel Chris Imlay, W3KD, and lobbyist John Chwat to strategize on issues, legislation and regulations important to Amateur Radio.

Imlay remembered Mansfield as "a consummate professional and team player" with a keen, probing intellect. "The best thing about Steve was his absolute love for people, and his interest in the quirkiness of human relationships," Imlay said.

Mansfield also wrote and edited "DC Currents," which details the League's Washington efforts in the front pages of each issue of *QST*.

"He did an extraordinary job for the League in Washington," said ARRL Chief Executive Officer David Sumner, K1ZZ, who called hiring Mansfield as the League's public information manager in 1991 "one of the smartest personnel decisions I ever made." Mansfield came aboard with "the right stuff," Sumner recalled, and, although not a ham when he joined the staff, Mansfield rekindled the passion for Amateur Radio he'd felt after building a shortwave receiver as a youngster, and he soon became N1MZA.

Mansfield, who grew up in Muncie, Indiana, was an avid runner, rock climber, hiker and kayaker. In *QST* for February 1995 he wrote a feature, "Hams at the New York City Marathon," which reflected his enthusiasm for running and personal fitness. He also had an affection for Ireland, its landscape, its people and its music and enjoyed playing Irish tunes in jam sessions. He had a appreciation of great literature, which he quoted ably on appropriate occasions.

Mansfield held a bachelor's degree from Wabash College and a master's degree in fine arts from Columbia University. Before joining the ARRL staff, he was a vice president of Mason and Madison of New Haven, Connecticut, and later operated his own public relations firm. He also taught a senior public relations seminar at the University of Connecticut.

ARRL Public Relations Manager Jennifer Hagy, N1TDY, worked for Mansfield for eight years. "Steve was my mentor and my friend," she said. "I'll never forget the day he hired me, or the lessons he's taught me, professionally and personally. I will miss him deeply." Roanoke Division Director Dennis Bodson, W4PWF, called Mansfield "a very dedicated, and hard-working individual who loved his work and the League" and said he would be sorely missed.

Survivors include his wife, Ellyn, two daughters, Ramona and Elizabeth, two sisters and a brother. Condolences may be sent c/o Ellyn Mansfield, 102 Clifton Ave, W Hartford, CT 06107-1720. The family has invited memorial contributions to a food bank of your choice or to The Burris School, Ball State University Foundation, PO Box 672, Muncie, IN 47308.

United Parcel Service Shifts into Neutral on SAVI 70-cm Proposals

United Parcel Service (UPS) now says it's taking no position on a petition by SAVI Technology to deploy RF identification tag devices at 433 MHz at much greater duty cycles than current Part 15 rules permit for such devices. UPS clarified its position August 13 in an *ex parte* filing to the FCC.

"UPS takes no position on the rule changes proposed in the SAVI Petition because they will have virtually no impact on UPS's shipping operations and are inconsistent with efforts to promulgate international standards for RFID tags," the shipping company said. The change in position was doubly significant because UPS has an equity interest in SAVI through its UPS Strategic Enterprise Fund.

RFID tags are used to track shipments and packages, among other applications. While the ARRL has said package tracking using RFID technology "is a beneficial application as a general matter," going along with SAVI's proposals would result in severe and harmful interference.

ARRL Chief Executive Officer David Sumner, K1ZZ, said the League was pleased to learn that UPS had "done the right thing." Sumner had pointed out UPS's support of the SAVI petition in his "It Seems to Us . . ." editorial in the December 2001 issue of *QST*.

"The ARRL is very gratified that, upon

Rick Lindquist, N1RL ♦ Senior News Editor ♦ n1rl@arrl.org

FCC News

FCC TAKES TOUGHER STANCE TOWARD OFFENDING UTILITIES

♦ The FCC is getting tougher on electric utilities that fail to fix problems causing interference with Amateur Radio and other licensed communications. Electric utilities must correct equipment problems that cause harmful interference to stations operating in the Amateur Service, FCC Special Counsel for Enforcement Riley Hollingsworth made clear August 9 in a letter to Reliant Energy Company of Houston. The case involved unresolved interference complaints from Edward J. Gerber, W5GCX, of Houston.

"Reliant must do all things necessary, and bear any and all necessary costs, to comply with its obligations as an operator of unlicensed devices pursuant to the Commission's Part 15 regulations," Hollingsworth reminded the utility's attorneys. He asked Reliant to provide a written report in 30 days detailing steps taken to eliminate the interference to W5GCX and said the FCC "expects a complete solution without further delay."

The letter to Reliant came in the wake of Hollingsworth's mid-July meeting at ARRL Headquarters with Ed Hare, W1RFI, and John Phillips, K2QAI, of the ARRL Lab staff to discuss various electromagnetic compatibility (EMC) issues. As a result of that session, changes were made in the way ARRL and FCC cooperate on power-line cases.

"What we've done is to review all cases that the League has worked on where we had no cooperation," Hollingsworth said. "In at least three instances, the power company in question hasn't cooperated as it should have." Hollingsworth said these cases will "go to the next step," which likely will entail involving the appropriate FCC field office for additional investigation and appropriate enforcement.

That's what happened in the Reliant case. Hollingsworth said that in the future, initial letters from the ARRL and the FCC will impose a shorter compliance window and will be more firmly worded. In addition, follow-up letters from the FCC will be sent to utilities that fail to respond appropriately to the initial inquiry.

In its reply to a May 23 letter from the FCC, Reliant had suggested that the interference Gerber was experiencing had come from an otherwise properly operating 250 kVA step-down transformer. The utility had proposed to relocate the transformer away from Gerber's residence at his expense.

Hollingsworth pointed out in his August 9 letter that the utility may not pass on the cost of fixing the problem to the victim of the interference. "It is exclusively the obligation of the operator of the unlicensed device," Hollingsworth wrote, referring to the FCC's Part 15 rules. Part 15 classifies most power-line and related equipment as "incidental radiators." This means the utility equipment does not intentionally generate any radio-frequency energy but may create it as an incidental part of its intended operation.

In responding to the initial FCC letter, the utility's attorneys—Baker Botts LLP of Houston—had attempted to deny any obligation on the utility's part to avoid interference to amateur stations by declaring that individual amateur stations did not constitute a "service" under Part 15. In his August 9 reply, Hollingsworth called the attempted distinction "baseless." He further emphasized that not only manufacturers but operators of Part 15 devices are required to cease operation if harmful interference occurs to authorized radio users.

Utilities that appear unwilling to abide by Part 15 rules regulating unintentional radiation are in the minority, Hollingsworth said. By and large, utilities contacted by ARRL as a result of power-line noise complaints from amateurs have been extremely cooperative, and he had high praise for the League's role in resolving complaints in the early going. Only a handful of cases—perhaps a dozen in all—have ended up being forwarded by the ARRL to the FCC for action.

Phillips applauded Hollingsworth's tenacious approach to dealing with interference complaints involving power companies. "Amateur Radio is very fortunate to have someone like Riley Hollingsworth in our corner," he said. "There is no way that amateurs could ever hope to resolve some of these problems with out the backing of the FCC." The League has worked with the FCC and utilities to resolve dozens of interference complaints.

Over the past year, the League has worked with amateurs on behalf of the FCC to handle 72 complaints of suspected power-line interference. Hare, the ARRL Lab supervisor, says that the effort has had its successes, some cases may require more than an advisory letter from the FCC.

"The League and the FCC both hope that continued cooperation will bring these cases to a satisfactory end without having to resort to drastic enforcement measures," he said.

Amateur Enforcement

♦ **Enforcement Bureau supports granting Schoenbohm's return bid:** Two years ago, when the US Supreme Court effectively ended his battle to retain his Amateur Radio license, Herb Schoenbohm—formerly KV4FZ—vowed to one day return to ham radio. Following a hearing earlier this year to determine Schoenbohm's fitness to once again be an amateur licensee, it appears that the FCC Enforcement Bureau is willing to grant him another chance.

"The evidence supports granting Herbert L. Schoenbohm's application for a station license and a General class operator license in the Amateur Radio Service," the Enforcement Bureau said in its *Proposed Finding of Fact and Conclusions of Law* in WT Docket 01-352. The Bureau said there's sufficient evidence in the record to support a finding that Schoenbohm had rehabilitated himself and would be unlikely to engage in future misconduct. The document—the equivalent of closing arguments in a jury trial—was submitted in early July to FCC Administrative Law Judge Arthur I. Steinberg.

Schoenbohm, who lives in the US Virgin Islands, told the ARRL that the Enforcement Bureau's decision to support his application was unprecedented. "It just does not work this way in the usual federal litigation" he said. "When the government comes after you, they mean to win their point."

careful consideration, UPS has changed its position and now recognizes that the SAVI proposal for 425-435 MHz offers no benefit," Sumner said. "We are confident that if the FCC devotes the same attention to considering the issue, it will come to the same conclusion."

UPS said it wanted to clarify its position in light of the many comments filed in response to the *Notice of Proposed Rulemaking* (NPRM) in ET Docket 01-278 that cited the shipping company's initial support of the SAVI petition. UPS has not directly commented on the *NPRM* previously.

UPS now says that, after further consideration, it does not see that its "strategic vision" for the use of the 433-MHz RFID system would be advanced by the changes SAVI has proposed. "UPS now does not envision any of its applications requiring a transmission duty cycle in excess of what is currently permitted under Section 15.231," UPS said in its filing. The shipper said that's because it doesn't anticipate having to store or transmit large amounts of data while tracking shipments.

More than 130 amateurs filed comments in opposition to SAVI Technology's RFID tags proposal, and most support the League's position that the proposed rules are flawed and should not be adopted.

The FCC put Schoenbohm's renewal application for KV4FZ up for hearing in 1994 following his 1992 felony conviction on federal fraud charges. The Commission finally turned down his renewal application in 1998, the US Appeals Court upheld the FCC's decision in 2000, and the US Supreme Court declined to hear the case later that same year.

In March 2001, not long after his authority to operate as KV4FZ had expired, Schoenbohm took and passed the examination for a General ticket. A couple of weeks later, he passed the Extra test. The FCC has refused to act on the second application before dealing with the first, however, and it subsequently designated Schoenbohm's General license application for hearing on the basis of character issues. The Enforcement Bureau's proposed findings and conclusions resulted from testimony at that hearing, held May 7 in Washington, DC.

Schoenbohm testified that being denied amateur privileges for 15 months had caused him "personal shame" and was an adequate sanction. He also acknowledged "fatal mistakes" in hearing testimony during his renewal fight, when the FCC had accused him of a lack of candor.

One sour note concerned Schoenbohm's participation in a DX contest operation from his station conducted last October by Steve Reichlyn, AA4V, under Reichlyn's call sign. Schoenbohm took the mike for about two hours while Reichlyn was in the vicinity. The Enforcement Bureau said the hearing findings "support, and it should be concluded" that Schoenbohm's operation of Reichlyn's station violated federal law, because the station had to be under the physical control of a licensed control operator, and Schoenbohm no longer was licensed.

Schoenbohm submitted a similarly supportive brief to Judge Steinberg, asserting that he's kept out of trouble for the past 10 years, his criminal conviction was based on actions that had occurred in 1987 and that he had not violated FCC rules during his appeal.

Judge Steinberg was expected to issue an opinion within a few months. The FCC has the final say in the matter.

NCVEC ENDORSES TESTING-VIA-VIDEOCONFERENCING TRIAL

The National Conference of Volunteer Examiner Coordinators has endorsed experimental use of videoconferencing technology to conduct Amateur Radio testing in remote areas of Alaska. Meeting July 26 in Gettysburg, Pennsylvania, the NCVEC voted 6-3 with two abstentions to back a one-year trial run to be conducted by the Anchorage Volunteer Examiner Coordinator.

ARRL

The FCC's Bill Cross, W3TN (at podium), told the NCVEC conference that a formal FCC opinion was not necessary to authorize the Anchorage VEC videoconferencing trial.

Jim Wiley, KL7CC, of the Anchorage VEC told his VEC colleagues that it's very expensive to provide Amateur Radio test sessions to the thousands of Alaska residents who live in remote areas. The vote followed discussion on whether having a VE team remotely monitor a test session while an unlicensed individual proctored the exams on site would comply with FCC Part 97 rules. Section 97.509(c) calls for three VEs to be "present and observing" the examinees.

The FCC's Bill Cross, W3TN, of the Wireless Telecommunications Bureau, was among several FCC staff members attending the annual gathering. "I told them that the VEC and the VEs are responsible for the proper conduct of the exams," Cross told ARRL, "and that no rule changes appeared to be necessary because the rules do not address the 'how to' of exam administration." He said VECs already have authority under Part 97 rules to determine the manner in which their VE teams conduct examination sessions.

Cross emphasized no VECs would be required to coordinate exam sessions using a testing method they were not comfortable with. He said the conference seemed willing to allow the Anchorage VEC to conduct a trial of the program, once it's described in greater detail.

Wiley said he believes ham radio tests can be administered using videoconferencing technology without compromising exam integrity while maintaining "the same level of confidence in the testing process" that now exists. He agreed to provide progress reports to the NCVEC on the videoconferencing trial.

ARRL VEC Manager Bart Jahnke, W9JJ, said he abstained from voting because he did not believe a vote was necessary, since the FCC's Cross had indicated that the concept could be applied under existing rules.

In other business, the NCVEC gathering turned back a proposal to bring back multiple-choice format Morse code examinations. The vote was 9-2.

ARRL WELCOMES NEW STAFF MEMBERS

Chuck Skolaut, K0BOG

Chuck Skolaut, K0BOG, joined ARRL Field and Educational Services July 30 as a field and regulatory correspondent. He'll work with the Amateur Auxiliary to the FCC and the ARRL Official Observer program as well as assisting with field organization and regulatory information matters.

"Amateur Radio has played an important part of my life," says Skolaut, who came to ARRL Headquarters from Great Bend, Kansas, after a career in television broadcasting.

In his new position, Skolaut replaces Brennan Price, N4QX, who has assumed new duties as *QST* "Product Review" editor and as managing editor of *National Contest Journal—NCJ*. (Price also maintains editorial responsibility for the *ARRL Repeater Directory* and will continue to occupy the National Frequency Coordinators' Office.)

Skolaut says Amateur Radio captured his attention while he was in high school in 1960. Following active duty in the military as a radio operator, he was employed in engineering and operations by TV stations in Great Bend and Wichita.

Skolaut's older daughter Elizabeth, now KA0YSP, acquired her dad's interest in ham radio while she was in the fifth grade and soon worked her way from Novice to General. His wife, Mary, now N0TIK, and younger daughter, Angie, now N0UAI, followed. His brother, Vernon, is WA0NHS.

Skolaut says he's looking forward to serving the ARRL membership.

Howard Robins, W1HSR, began duties August 19 as the new ARRL Certification

Howard Robins, W1HSR

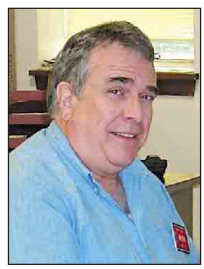
and Continuing Education Program Coordinator. He succeeds Dan Miller, K3UFG, who has accepted the position of Emergency Communications Course Manager at ARRL. In that role, Miller will oversee the Corporation for National and Community Service special volunteer program and United Technologies Corp training grants.

A Connecticut native, Robins is a relatively new licensee who rekindled his boyhood interest in ham radio earlier this year after wrapping up a 30-year career in the telephone and telecommunications industry. He was licensed last March and already holds an Extra ticket.

"I took the ARRL HF Digital Communications course and have discovered a whole new dimension to Amateur Radio," he said, adding that he's on his way to completing the Level I Amateur Radio Emergency Communications course and finding the information very valuable. "These programs are a terrific way for newcomers and experienced hams to learn about aspects of the hobby." He says he's looking forward to adding courses of value to League members.

"Amateur Radio was in my blood as a young teenager and responsible for my interest in electronics and subsequent career in telecommunications," said Robins. "Being employed by ARRL is a boyhood dream come true. I'm very excited and honored to be a part of the Headquarters team."

Also new to Field and Educational Services is Jerry Ellis, WS1K. A native of Long Island, New York, Ellis came aboard in late May as ARRL Certification and Continuing Education (C-CE) Program Assistant. He works with Robins and Miller.



Jerry Ellis, WS1K

First licensed in 1992, Ellis says he was involved in the Amateur Radio Emergency Service on Long Island, where he held the call sign KG2LL and served as Assistant Emergency Coordinator for Smithtown Township. He relocated to Connecticut about two years ago to be near his fiancée (and now wife) Kim. When he upgraded to Extra earlier this year, he obtained WS1K.

Ellis says he considers it an honor to be working at ARRL Headquarters. "Employment with ARRL is a milestone in my life, and I really respect the privilege of contributing to Amateur Radio through my employment here," he said.

Debra Johnson joined the ARRL staff August 19 as a development associate in the office of Chief Development Officer Mary Hobart, K1MMH. Johnson came to ARRL from Connecticut Public Broadcasting, where she was executive assistant to the president/CEO and to the chief financial officer and handled some project management work.

Debra Johnson

Johnson cited her past working relationship with Hobart—also previously employed at CPB—as a factor that attracted her to ARRL. "I know how dynamic she is," she said. "She was willing to offer me an opportunity to contribute and to learn." In her new role, Johnson will support Hobart's efforts in building the League's development program.

A graduate of Princeton University, Johnson holds a degree in philosophy and religion and has completed some graduate-level classes in counseling and social work. "I look forward to working in a new department where I can contribute to shaping the future of ARRL's development efforts," she said. "This is an incredible opportunity."

INCUMBENT PUERTO RICO SECTION MANAGER RE-ELECTED

ARRL Puerto Rico Section Manager Victor Madera, KP4PQ, has been re-elected for another two-year term. He defeated challenger William T. Genter, KP3O, 173 to 48. Ballots were counted August 20 at ARRL Headquarters.

Madera has served as Puerto Rico Section Manager since January 2000. He joins seven other incumbent ARRL section managers who ran unopposed and will continue in their present positions when new terms for the current election cycle begin October 1.

Other incumbent SMs returning for new terms were Betsey Doane, K1EIC, Connecticut; John Cline, K7BDS, Idaho; Randy "Max" Wendel, KM0D, Minnesota; Kent Olson, KA0LDG, North Dakota; Joe Phillips, K8QOE, Ohio; John Ellis, NP2B, Virgin Islands; and Scott Bauer, W2LC, Western New York.

Two newcomers will join the ranks of ARRL SMs on October 1. Sherri Brower, W4STB, of Vero Beach, will succeed Phyllisan West, KA4FZI as SM of Southern Florida. Brower was this year's ARRL Philip J. McGan Memorial Silver Antenna Award winner. In South Dakota, Richard Beebe, N0PV, of Sioux Falls, will take over for outgoing SM Roland Cory, W0YMB. West and Cory did not seek new terms.

SECTION MANAGER ELECTION NOTICE

To all ARRL members in the Arizona, Arkansas, Iowa, Kentucky, Mississippi, Montana, North Texas, Orange and Wyoming sections. You are hereby solicited for nominating petitions pursuant to an election for Section Manager (SM). Incumbents are listed on page 12 of this issue.

To be valid, a petition must contain the signatures of five or more full ARRL members residing in the section concerned. Photocopied signatures are *not* acceptable. No petition is valid without at least five signatures, and it is advisable to have a few more than five signatures on each petition. Petition forms (FSD-129) are available on request from ARRL Headquarters but are not required. We suggest the following format:

(Place and Date)

Field & Educational Services Manager, ARRL
225 Main St
Newington, CT 06111

We, the undersigned full members of the _____ ARRL section of the _____ division, hereby nominate _____ as candidate for Section Manager for this section for the next two-year term of office.

(Signature___ Call Sign___ City__ ZIP__)

Any candidate for the office of Section Manager must be a resident of the section, a licensed amateur of Technician class or higher and a full member of the League for a continuous term of at least two years immediately preceding receipt of a petition for nomination. Petitions must be received at Headquarters by 4 PM Eastern Time on December 6, 2002. Whenever more than one member is nominated in a single section, ballots will be mailed from Headquarters on or before January 2, 2003, to full members of record as of December 6, 2002 which is the closing date for nominations. Returns will be counted February 18, 2003. Section Managers elected as a result of the above procedure will take office April 1, 2003.

If only one valid petition is received from a section, that nominee shall be declared elected without opposition for a two-year term beginning April 1, 2003. If *no* petitions are received from a section by the specified closing date, such section will be resolicited in the April 2003 *QST*. A Section Manager elected through the resolicitation will serve a term of 18 months. Vacancies in any Section Manager's office between elections are filled by the Field & Educational Services Manager. You are urged to take the initiative and file a nomination petition immediately.—*Rosalie White, K1STO, Field & Educational Services Manager*

REPEAT NOMINATING SOLICITATION

Since no petitions were received for the Oklahoma section manager elections by the deadline of June 7, 2002, nomination petitions are herewith resolicited. See the above for details on how to nominate. QST

Of Hounds and Hams

By Scott Ratchford, W5JSR

KATHIE ENGELKE, KD5EYX, PHOTOS

An overview of APRS was presented on Saturday morning before the exercise.

The Howard County Search and Rescue van was just one of several similar vehicles on display during the conference.

During the weekend of June 1-2, 2002, search and rescue teams from all over Arkansas, met for Rescue 2002. Held in the sleepy southern town of Nashville, the annual conference met for the fourth time in a beautiful city park. Teams arrived from all four corners of the state on Friday afternoon and evening. By Saturday morning, more than 80 search and rescue (SAR) members had arrived.

The Howard County Search and Rescue (HCSAR) team sponsors this event for the purpose of training teams across the state to use similar methods and procedures and to share new ideas. Several training classes were held during the weekend and included two classes about Amateur Radio. In fact, of the 80 SAR members present, one-third or more were Amateur Radio operators! One of the requirements for membership in HCSAR is that you hold an Amateur Radio operator's license or are in the process of obtaining one.

The HCSAR team communications officer and Amateur Radio Emergency Service (ARES) Emergency Coordinator (EC) is J. B. Davis, N5THS. This year, J. B. asked two hams, Scott Ratchford, W5JSR, ARES EC for Benton County, and Mike Engelke, KD5DGT, Assistant ARES EC for Benton County, to come down and give two classes. Scott and Mike accepted the invitation and came down to offer classes on Introduction to Ham Radio and APRS (Automatic Position Reporting System).

Friday night, Scott, gave a short class on Amateur Radio. "I teach ham radio classes each month in Benton County, and I wanted to show that SAR members at the seminar a simple way to study for the Technician class license and show them some of the new equipment available today. I use the ARRL *Now You're Talking!* for the class and explained how to use the book," Scott said. He also touched on Amateur Radio's role in emergency services and about ARES and RACES. "After the class, I had several SAR members ask further questions, and they presented a real interest in obtaining their license!"

Saturday morning, Scott and Mike, worked together to present a program on APRS. "Last year we came down for the first time to give this class, and we were successful. This year we came down to again present the class, and to test the program in a real-world situation. Our class was well attended and we presented an overview of the APRS program features," Scott said.

APRS, the Automatic Position Reporting System, is a program created by Bob Bruninga, WB4APR, that uses GPS (global positioning system) receivers and Amateur Radio to track objects. APRS uses a connectionless form of packet radio to transfer information and is capable of tracking objects in real-time. This is a program that has many uses, and is capable of delivering messages instantly to any other APRS station. "This program is perfect for situations like this, where you need to know where your SAR teams are at any given moment," mentioned J.B. "We can track our teams out there that are two miles away and show it on our laptop computer here in the command vehicle. I think this technology will help us on our searches, and we will add this to our setup."

A good portion Saturday afternoon was dedicated to field testing and a mock search. There were four canine and search teams that were tasked with finding several lost persons in the woods. "We put three tracking devices (made up of Kenwood TH-D7A radios and Garmin GPSs) on search teams and used the APRS program in the HCSAR command vehicle to present a visual clue of team locations to the Incident Commander. The three teams that we tracked were taken about two miles away to a staging area. We were able to watch each team as they left the area and began their track," Scott said. "We set the tracking devices to beacon a position every 30 seconds. The APRS program captured the path that the teams took and we used that data to over-

Steve Ewald, WV1X ♦ Public Service Specialist ♦ sewald@arrl.org

James Davis, N5THS, the head of communications for Howard County Search and Rescue, operates during the live search exercise.

lay a track on the map that would show us where the teams had been and areas where they missed." The field test lasted about 2½ hours.

That evening after the mock search, it was time to hold a debriefing. The debriefing began with an overview of what was seen on APRS. Scott began with a map of the area search and outlined the path of each team. After the debriefing, a question was asked of the SAR teams. "What would you like to see more of next year? What can we do to improve the conference? The answers were, "Communications," "Ham Radio," "GPS" and "APRS"!

Search and Rescue 2002 was a success for Amateur Radio as much as it was for the SAR teams that were present. There were many Amateur Radio operators in attendance including N5THS, W5JSR, KD5DGT, KA5ZYY, KC5BYB, KB5SSW, N5YKL, N5XFW. Also present were representatives of the Arkansas Department of Emergency Management (DEM), Arkansas Fire Academy, and several county-level DEM managers. A lot of information was passed, a lot of training programs offered, and it was made clear that Amateur Radio will remain to be a vital part of Search and Rescue in Arkansas!

ADDITIONS TO 2001 SET RESULTS

Please note the following additions to the 2001 Simulated Emergency Test Results that appear in July 2002, *QST*, pp. 87-89. We regret that these net reports were not included in the "Section/Local Nets" segment of the article.

In the ARRL Michigan Section (a part of the Great Lakes Division), the **Alcona County Amateur Radio Group** submitted an SET net report showing 254 points. The Net Manager is W8SZ. This was the highest net activity report in Michigan during the 2001 SET.

Also in Michigan, the **Great Lakes Emergency Traffic Net** submitted a 2001 SET score showing 68 points.

In the ARRL North Texas Section (a part of the West Gulf Division), the **Dallas-Forth Worth Metroplex Traffic Net** combined both early and late sessions during their 2001 SET. The net gathered 251 points. N5JZ is the manager of the early session and K5NHJ is the manager of the late session. This net was the highest net activity report in North Texas during the 2001 Simulated Emergency Test.

Get your latest Section News on *ARRLWeb*. See **www.arrl.org/sections**.

Field Organization Reports

Public Service Honor Roll
July 2002

This listing is to recognize radio amateurs whose public service performance during the month indicted qualifies for 70 or more total points in the following 6 categories (as reported to their Section Managers). Please note the maximum points for each category:
1) Participating in a public service net, using any mode. —1 point per net session; maximum 40.
2) Handling formal messages (radiograms) via any mode. —1 point for each message handled; maximum 40.
3) Serving in an ARRL-sponsored volunteer position: ARRL Field Organization appointee or Section Manager, NTS Net Manager, TCC Director, TCC member, NTS official or appointee above the Section level. — 10 points for each position; maximum 30.
4) Participation in scheduled, short-term public service events such as walk-a-thons, bike-a-thons, parades, simulated emergency tests and related practice events. This includes off-the-air meetings and coordination efforts with related emergency groups and served agencies. — 5 points per hour (or any portion thereof) of time spent in either coordinating and/or operating in the public service event; no limit.
5) Participation in an unplanned emergency response when the Amateur Radio operator is on the scene. This also includes unplanned incident requests by public or served agencies for Amateur Radio participation. — 5 points per hour (or any portion thereof) of time spent directly involved in the emergency operation; no limit.
6) Providing and maintaining a) an automated digital system that handles ARRL radiogram-formatted messages; b) a Web page or e-mail list server oriented toward Amateur Radio public service — 10 points per item.
Amateur Radio stations that qualify for PSHR 12 consecutive months, or 18 out of a 24 month period, will be awarded a certificate from Headquarters upon written notification of qualifying months to the Public Service Branch of Field and Educational Services at ARRL HQ.

2010 N5NAV
747 K6SOJ
525 W2MTA
420 W5ZX
357 W5JYJ
345 W7TVA
334 N2CCN
330 N2LTC
298 NN2H
280 KA2ZNZ
235 AC5XK
230 KB2KOJ
210 W8JEB
205 KB2SNP
196 KB0DTI
195 KE4GYR KA2GJV VE3EUI
190 KC2EOT WI2G
188 N2HQL
185 N5SIG
180 K4DND
171 W6DOB
170 KB2CCD
162 WB5NIC
160 WN0Y
159 NN7H
158 KC2GFS W6IVV
155 W2LC
150 KK1A W9RCW
149 KA2YKN
142 N9KNJ
141 KB2ETO
140 WB5ZED N8DD W7GB KB2RTZ WA0LAW W3BBQ
135 NM1K W3YVQ AB2IZ WA2YL KB8ZYY
132 N1IST
134 N3WAV
130 KJ9J K8AE
126 N4VVX
125 K4BEH
122 N0ZIZ
120 KW1U W1GMF N4TAB W4EAT K4IWW K6YR WB0TAQ W8YS KA4FZI KG4CHW WA4DOX K0IBS W6QZ
118 KB3GFC
117 N2AKZ
116 WB4GM
115 N1LKJ K9LGU K9FHI AA8SN
WD4GDB
114 N2JRS
113 N0ENO K4DZM
112 W4CC
110 K4RLD KE4JHJ W0OYH K8GA W4ZJY KK3F AC7DD N7YSS K4BB AF4NS W5GKH N5OUJ K2UL KB9KEG AG9G NJ5M K8GA N8FPN AB4XK KD4GR KC4ZHF K0IBS AA4AT W7QM NR2F WX4H
109 N0SU KC8CON W4AUN
107 NB4K
105 KA1VED AB5SU W5XX KF6OIF N8NMA
104 KG4OQA
103 WA1JVV W7ZIW
101 K4YVX K4DZM
100 KA4UIV W0WWR AA3GV KC7SRL KO4OL WA8SSI KA4LRM N0BN K7GXZ KB2KLH W9CBE WA0TFC WW8D KF4OPT K4SCL WA9VND WA4EIC WD9F W7LG N9MN
99 KC8SZR WA1QAA
98 WB4GGS WA2YOW
97 NB4K
96 KC8KYP WA5KQU
95 WB2QIX W3CB W5IM W1ALE KA7TTY
94 WA9JWL W4MOO
93 KJ7SI
92 KD6OKR
91 AL7N N3KB KO4OL
90 N1IQI KG2D WB2IJH WX8Y W4CKS KA1GWE KC7SGM N8OD W8STX AF4QZ W4WXA AA2SV KC8LBZ KA8WNO WB4PAM KG4OTL KV4AN K3SS WB4UHC K6IUI W6JPH
88 KA2IWK WJ2F
87 WD4LSS
86 W4NTI K9SXM N5JCG WB4BIK N8JAT K4RBR
85 KD4CQJ K1CFI WB2LEZ
84 W7VSE KC6NBI K9JPS WA5OUV W4VLL
83 KI4YV W4DGH W7TC WA2CUW
82 K8SH KL5T
KU6Z KB0DBK K4FQU
81 W9YCV
80 AA4YW AK6DV AA8PI KE4UOF AA4BN W8IM K1JPG KC6SKK
79 K6RAU
78 W7DPW AG4DL
77 W7EP KD4EFM
76 KD1SM K8ZJU WA2MSU
75 K2DN W4FAL W4QAT W4PIM KD7LAH K1FP WA8DHB N8FXH
73 KG4FXG N7LV K4MVO
72 K4WKT WD0GUF K4FB KE4DNO
71 K1TSV N2VQA
70 WA2GUP N8PAM K4FUM N4FNT KD6YJB

The following stations qualified for PSHR points in previous months, but were not recognized in this column: (Jun) N2CCN 320, KA2ZNZ 290, KE4GYR 225, KB2CCD 213, KC2EOT 185, KB2SNP 150, W3YVQ 125, KC3Y 91, KG2D 90, WB2IJH 90, KE3FL 70. (May) N2BVM 88, WD4LSS 85.

Section Traffic Manager Reports
July 2002

The following ARRL Section Traffic Managers reported: AK, AL, AZ, CO, CT, EMA, EPA, EWA, GA, IA, IL, KS, KY, LA, MDC, ME, MI, MN, MS, MT, NC, NFL, NLI, NNJ, NM, NV, OH, OK, OR, SB, SC, SD, SDG, SFL, STX, SJV, SNJ, TN, VA, VT, WCF, WI, WMA, WPA, WV, WWA, WY.

Section Emergency Coordinator Reports
July 2002

The following ARRL Section Emergency Coordinators reported: AK, AZ, CT, EWA, IA, IN, KS, KY, LA, MI, MO, NC, NNJ, NNY, NLI, OH, SFL, SNJ, STX, SV, WPA, WV.

Brass Pounders League
July 2002

The BPL is open to all amateurs in the US, Canada and US possessions who report to their SMs a total of 500 points or a sum of 100 or more origination and delivery points for any calendar month. All messages must be handled on amateur frequencies within 48 hours of receipt in standard ARRL radiogram format.

Call	*Orig*	*Rcvd*	*Sent*	*Dlvd*	*Total*
NM1K	787	313	999	6	2105
KK3F	23	1000	956	44	2023
W1PEX	0	1813	41	0	1854
N2LTC	0	598	603	26	1227
W1GMF	0	500	627	42	1169
KK1A	—	—	—	—	1100
WB5ZED	19	530	534	9	1092
WX4H	0	456	570	6	1039
KF5A	2	501	532	0	1035
K9JPS	0	428	45	411	884
W0WWR	1	174	580	20	775
KW1U	0	396	291	22	709
N9VE	0	312	54	312	660
N1IQI	287	35	287	0	609
K7BDU	0	299	251	14	573
W4EAT	0	279	271	3	553
W6DOB	1	195	334	22	552
W9RCW	0	256	12	239	507
W3BBQ	10	241	236	15	501

BPL for 100 or more originations plus deliveries: K9GU 333, NJ5M 184

HOW'S DX?

Those Blank QSL Cards

By Chris R. Burger, ZS6EZ

I'm sure we all have a few, or at least have seen them lying around. They come through the mail with legitimate cards; they get handed out as "visitor's cards"; they are handed out as printers' samples at ham conventions; they land in the trash when the visitors' board is cleaned out afterwards.

Although most QSL managers probably take care to control the outflow of blank QSL cards, others are careless to the point where it is extremely easy to obtain blank cards from a large number of countries. I've seen color cards from IS0, HB0 and even ZA handed out as print samples at Friedrichshafen. I've seen cards from ET and 3V being left on display boards after the show, making them easy pickings for would-be collectors. I've been given blank samples by intrepid DXpeditioners. And, probably my own personal favorite, I've received them through the mail with a stick-on note boldly proclaiming that the blank card is for "in case I need the country on another band."

I found my first few blank cards disturbing. Didn't they debase DXCC, and awards in general? Didn't they somehow tarnish the achievement? But as time went on, I realized that blank QSL cards are just another manifestation of the phenomenon that DXing is. It's an activity where you set your own handicap. You determine whether you're prepared to sell your soul by checking into a DX net. You decide whether you're prepared to break the law by running excessive power. You decide whether you're prepared to jeopardize your career and family by spending way too much time on a hobby. You decide whether you ask DX Telnet to find all the stuff on the cluster for you, or whether you actually tune the bands and find the stuff yourself.

And, I guess, you decide how meaningful the result is in the light of the constraints. If you have tall towers and long-boom Yagis, a DXCC score of 300 is not a big deal. If you live in an apartment and use indoor antennas with a QRP radio, it is. If you check into a DX net to work stuff that your antennas would otherwise not crack, you ride on the back of someone else's preparation. Is it an achievement? Some don't think so. However, your DXCC certificate is not endorsed for "Sundays only, barefoot, no DX nets." It looks just like everyone else's.

What about blank QSLs then? I was in the interesting position once that I needed only two QSL cards to get on the DXCC Honor Roll. I was 29, and no other ZS had yet made Honor Roll before their forties. I thought it would be nice to make it in my twenties. Gee, I even had four blanks from countries that I needed! All I had to do was fill them in, and I'd be on the Honor Roll. Fortunately, I still have those blanks, and they're still blank. Selling your soul for Honor Roll just isn't worth it.

I now have a collection of blank cards from over 160 countries. I really enjoy showing them to guys who are very serious about DXing. Gee, I even have blanks from one of the countries I still need on SSB. Now lemmesee, if I fill it out, I could even become the top ZS on that Honor Roll... Or should I rather become the first in the world with an EME DXCC on 1296 MHz ATV?

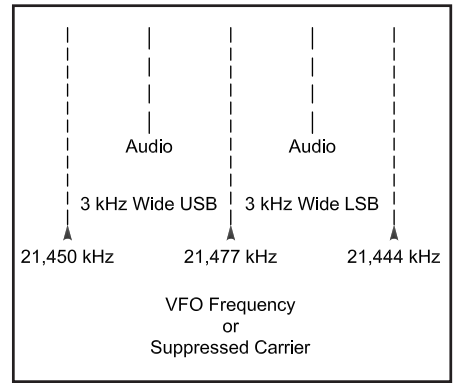
But then, what would it prove? Would it give me a warm feeling? I strongly doubt it. If one's self-esteem is built on the "oohs and ahs" of others, maybe that's the way to go. But if one's DXing is only for fun and as a challenge to oneself, blanks cards remain a fun novelty. Something to show guys who are very serious about their DXing, perhaps?

Afterthought: Much the same argument applies to log manipulation in contesting. Log padding, database sanitation and rubber clocking are all in the same league as filling in blank QSL cards. Fortunately, in contesting the advent of computer log checking has closed some of those doors to a large extent. Perhaps electronic QSLing (with proper cryptographic protection) will do the same for DXing. Of course, cheating is still possible; excessive power, illicit use of packet, "buddy" contacts and DX nets will not disappear. But those who compete for their own challenge will continue to shun these practices, and those who compete for glory will probably continue to bask in fake glory, and in the scorn of those in the know.

OUT OF THE BAND?

By Bruce E. Richards, WD4NGB

If you are on USB and your radio is showing 21,447, your audio is 3 kHz wide,



and above your suppressed frequency. If you are closer than 3 kHz to your upper band edge, and on USB, you are probably out of band. On the other end of the phone section, if your radio is showing 21301,and you are a General, your USB signal is from 21,301-304, all above 21,300 with a safe margin, so you are okay. Operating on 21,300.5 would be pushing it, but if equipment is *perfect*, and not excessive compression, would be okay.

This means if your radio is on 21,448, you will be out of band if you transmit. This also applies if you transmit with your radio showing 14,348. This would put your USB signal from 14,348 to 14,351, thus out of band.

If you are at the bottom of 15 m SSB, 21,200.5 on USB for an Extra would be very close, but with a correctly adjusted rig, it would be okay. Remember: Your rig shows the suppressed carrier frequency, not the center of emission on SSB. 21,201.0 would be a better choice.

This also applies to LSB, but in reverse. You need to stay 3 kHz away from the lower edge on LSB. This information is for a properly adjusted radio.

[There is a related article on pp 51-54 of this issue.]

DX NEWS FROM AROUND THE GLOBE

7Q—MALAWI

7Q7CE will be the Malawi call for IN3VZE, Ely, September 22-October 8. QSL to IN3VZE.

8P—BARBADOS

8P2K will be manned by Dean, 8P6SH, in the CQ/RJ RTTY contest September 28-29.

Bernie McClenny, W3UR ♦ 3025 Hobbs Rd, Glenwood, MD 21738-9728 ♦ w3ur@arrl.org

He is considering either single op all band or single op 15 m. QSL to KU9C.

C9—MOZAMBIQUE

Babs (YL), DL7AFS, and Lot, DL7ZG, hope to use the C98DC call again from Mozambique for two weeks starting September 22. Rei, DL6DQW, plans to join them in Maputo and travel to a northern island where Rei will handle CW and 6 m using his own C98RF call. Babs and Lot want to concentrate on RTTY and PSK31. Look for them on 18,101 kHz. QSL C98RF CW and 6M to DL6DQW. QSL D98DC SSB, RTTY and PSK31 to DL7AFS. Babs and Lot were on last October from Mozambique's Inhaca Island.

CLIPPERTON DX CLUB CONVENTION

The 24th annual Clipperton DX Club Convention is planned for September 27-29 in Bretagne, France. For details go to **cdxc.free.fr/**.

HC8—GALAPAGOS ISLANDS

Trey Garlough, N5KO, and others will have HC8N on the air again in the CQ/RJ contest September 28-29. They will be multi-multi. Their new QSL manager is W5UE.

KH0—MARIANA ISLANDS

AH0B will be the call for Osamu, JA2VUP, if his plans to go to the Mariana Islands materialize. He hopes to be on from Saipan (OC-086) September 26-29 including the CQ/RJ RTTY contest, single op all band. Outside the contest he plans to focus on 12, 17 and 30 meters and PSK31. QSL via JA2VUP.

KH8—AMERICAN SAMOA

A multi-national team of DXers will be going to American Samoa KH8 starting October 26, 2002. They will concentrate on Europe when propagation allows, thus allowing EU to gain (IOTA OC 077) during openings. The team is studying the propagation forecasts for 160 meters and it is hoped that they will be able to give the deserving (KH8 on top band). The group intends to activate two islands at the same time (3 operators on each island): These are the islands of Tutuila (OC-045) and Ofu (OC-077). They plan to be QRV on CW, SSB, RTTY, PSK31 and SSTV. From October 29 to November 8 one team will be QRV from Tutuila and from October 30 to November 6 the other team will be QRV from Ofu. The teams will consist of Glyn Jones, GW0ANA, Team Leader; Doug Roberts, G0WMW; Dr Markus Dornach, DL9RCF; Roger Mulzer, DL5RBW; David Flack, AH6HY, and Thomas Steinmann, DJ6OI. They will have local help on KH8 from Larry Gandy, AH8LG. Check out the group's Web page at **www.ukdxers.co.uk** for more information.

NEW IARU SOCIETIES

During the July American Radio Relay League Board of Directors meeting members unanimously voted that the Secretary of the ARRL is instructed to cast a vote on behalf of the ARRL in favor of International Amateur Radio Union proposals (#233 and 234) concerning the admission of the Association des Radio Amateurs du Cameroun (TJ) and Associacao dos Radioamadores de Macau (XX9) into the IARU. The IARU is expected to announce final results of these two new potential members in December. Cameroon, TJ, is currently on the DXCC list and is a member of the United Nations (UN) and has its own ITU prefix block. The vote will have no effect on its DXCC status.

Macau on the other hand is not a member of the UN and doesn't have its own ITU prefix block. This DXCC Entity has remained on the DXCC list since its return to Chinese sovereignty in late 1999. The ARRL has been waiting to see what would happen to Macao and now it seems this territory will become a member of the IARU, thus ensuring its status on the DXCC list. As a reminder there will be no more deleted countries/entities. If a country/entity no longer meets the DXCC criteria the said country/entity would be removed from the DXCC list. Thus if Macao were removed from the DXCC list back in December 1999 and then be granted IARU membership and then added back onto the DXCC list, everyone would have to work this DXCC entity again for DXCC credit! It now looks as if Macao will not be the first DXCC entity to be removed from the DXCC list.

W0DXCC CONVENTION

Mark your calendars and bring your QSL cards on Saturday, September 28 for the Midwest's Finest DX Convention in Omaha, Nebraska. This convention will prove to be a great time for the new DXer to the experienced operator with DXCC and WAZ. Exhibitors from around the Midwest will be available to show and sell you new radio equipment. Various forums including Antennas, Radios, DXing, DXpeditions and Organizations will be presented throughout the convention. DXCC, WAS, WAZ and CQDX award card checking will be available throughout the day as well. The convention continues into the evening with a fantastic banquet, speakers and surprises! Much more information can be found at the W0DXCC Convention Web site at **members.cox.net/w0dxcc**.

XX9—MACAU

Ed, N1UR (ex-K8EP), will be heading back to Asia later this year. First stop will be Macau where he will be QRV on and off October 11-21. Activity will be as XX9TEP on 10-160 meters. He will be using an ICOM IC-706 with a C3 and inverted Vs. QSL via N1UR. Next Ed plans to be QRV during the CQWW SSB DX Contest as 9M6A. He will probably be single band 15 or 20 meters. QSL this operation via N2OO.

YA—AFGHANISTAN

Peter, ON6TT, reports YA5T has now made 40,462 contacts since last November. AP2ARS has made 30,000 QSOs since early 2001. After the summer break, Peter will be back in Pakistan for 2-3 weeks. He says, "We still have antennas up, but need to bring the radios back in." From the beginning of September through October the UN team will travel around Afghanistan installing satellite communications for the UN World Food Program. They will not stay in one place more than two weeks so there will be some YA5T activity but with limited power and antennas. After October the group of hams who have been putting Afghanistan on the air as YA5T expect to leave central Asia. They expect to log another 10,000 or so QSOs from Afghanistan and maybe another couple of thousand from Pakistan.

CY0—SABLE ISLAND

A group of Canadians are planning to be on Sable Island (CY0MM) November 15-26, including the CQ World Wide CW DX Contest. The DXpedition will depend on sponsors. If they can raise enough funds by October 15 then they'll go. Two major expenses include the charter plane ($4250) and accommodations ($4000). The group would cover the remaining funds. Unfortunately only three operators can fly in at once. The team of George, VE3NZ; Nick, VE3EY; and Lali, VE3NE, have a Web page at **www.dipole.com**. They are also looking for sponsors for the Web page. Activity is expected on all HF bands plus 6 meters on CW, SSB and RTTY.

JT—MONGOLIA

JU840C will be a Mongolian (JT) commemorative call sign October 21-31, celebrating the 840th anniversary of the birth of Gengis Khan, founder of the Mongolian empire. A DXpedition will be on the air from his birthplace in Khentii Province.

WRAP UP

That is all for this month. I'd like to thank KE3Q, WD4NGB, ZS6EZ and *The Daily DX* for helping to supply information for the column. Until next month, see you in the pileups!—*Bernie, W3UR*

VHF/UHF CENTURY CLUB AWARDS

Compiled by Eileen Sapko
Awards Manager

The ARRL VUCC numbered certificate is awarded to amateurs who submit written confirmation for contacts with the minimum number of Maidenhead grid locators (indicated in italics) for each band listing. The numbers preceding call signs indicate total grid locators claimed. The numbers following the call signs indicate claimed endorsement levels. The totals shown are for credits given from June 13 to August 9, 2002.

The VUCC application form, field sheets and complete list of VHF Awards Managers can be found on the VUCC Web site at **www.arrl.org/awards/vucc**. An SASE to ARRL is required if you cannot download these forms. If you have questions relating to VUCC, send an e-mail to **vucc@arrl.org**.

50 MHz
100

1235	W5CIA
1236	KD5FTD
1237	K0AWU
1238	W7JWC
1239	KG4ERR
1240	AG4KI
1241	KE6NDG
1242	KA0ZEE
1243	KR5V
1244	W4TMR
1245	AB9FN
G8BQX	550
WA2HFI/0	350
WB0ULX	350
K2CS	275
WT3P	275
N3AO	150
AF4HX	275
W4PRZ	125
N4IQ	200
W4SW	175
N5WD	200
W5TFW	200
W5OZI	975
K6QG	350
N6JV	500
KC6ZWT	200
WO7GI	125
NH7RO	200
W7KNT	600
N8CN	200
N8II	400
W8WG	250

144 MHz
100

603	KR5V

3.4 GHz
5

62	N0UGY

5.7 GHz
5

43	N0UGY
44	KM0T

10 GHz
5

121	W4SW
122	W0GHZ
123	KM0T

Satellite
100

116	KJ6JO
117	IK0WGF
118	WA9AFM
XE2AT	475
N7SFI	775

Fall Prospects

Solar Cycle 23 surprised most observers, not with a double peak (a characteristic of many previous cycles), but with a second peak of activity that was greater than the first. See Figure 1. Some of the highest daily and average monthly measurements of 10.7-cm solar radiation of the entire cycle occurred during the fall and winter of 2001-02. This unexpected resurgence of solar activity provided several months of outstanding worldwide DX on 6 meters.

Will this second peak remain high enough to support another season of worldwide DX this fall and winter? Unfortunately, the forecasts from NOAA suggest not. The predicted 1-month average 10.7-cm solar flux drops from 130 this October to less than 110 by May. When the solar flux was last at these levels in the fall and winter of 1998-1999, very little worldwide DX was reported from anywhere. If the daily flux should pop into the 150 to 200 range at any time this fall, especially if solar activity persists in this range for several consecutive days, there may be some possibilities for F-layer propagation at 50 MHz. Otherwise, little can be expected in the way of ordinary F-layer DX, especially from midlatitude areas like the US.

Even under the most optimistic scenarios, the most likely 6-meter F-layer paths will be those that lay adjacent to or cross the geomagnetic equator. Examples of such paths are Brazil to southern Europe, Europe to South Africa, southern California to the South Pacific and the southern US to South America. Stations located too far north or south to be within one-hop range of the high maximum-usable frequency (MUF) areas at around 15-20° north and south of the geomagnetic equator may still have some success with backscatter paths skewed toward the south. This is especially so on days with relatively high solar activity.

NOAA/SEC

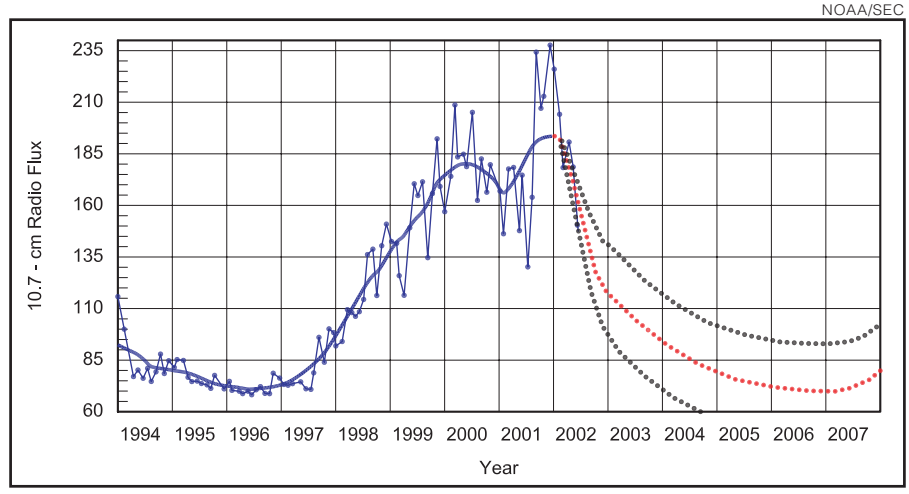


Figure 1—Solar Cycle 23 progression as marked by average 10.7-cm solar flux. The solid blue line is the 13-month running average; the thinner blue line connects one-month averages, indicated as blue dots. The red dotted line is the projected 13-month average, with upper and lower predicted thresholds in black dotted lines. Note the projected sharp decline through 2002.

Transequatorial FAI

This fall season may be nearly ideal for 6-meter propagation via transequatorial field-aligned irregularities, as it is most evident around the fall and spring equinox periods, especially during the peak years of each solar cycle. Transequatorial (TE) simply means "across the equator," but not all F-layer paths that cross the equator are truly propagated via transequatorial field-aligned irregularities (FAI).

In general, the highest levels of F-layer ionization form during daytime in two bands just north and south of the geomagnetic equator, which in turn support the highest MUF regions on any given day. The MUF elsewhere over the Earth is usually lower. Thus, the earliest and most common 6-meter paths have their midpoints within these broad bands of relatively high ionization. Some ordinary F-layer paths do cross the equator, so to that extent, they are transequatorial, but most are not due to the special circumstances of field-aligned ionization.

FAI forms in these same high-ionization bands parallel and adjacent to the geomagnetic equator, but only late in the afternoon as the F-layer begins its daily decay and the ordinary MUF is actually declining. Remaining free electrons align themselves along the Earth's magnetic field lines, which are nearly horizontal in this region. Field-aligned ionization exhibits some unusual characteristics with regard to VHF radio signals, similar to field-aligned ionization found in aurora or E-layer FAI (which often forms as sporadic-E regions decay). Signals approaching regions of FAI are scattered efficiently only when parallel to the magnetic field lines and only over specific angles. VHF scattering from the aurora in northern latitudes is possible only when stations beam generally north and thus parallel to the geomagnetic field lines, which appear nearly vertical. Scattering toward the south takes place at particular angles only, depending on the stations' locations relative to the auroral region.

The situation is similar in the case of F-layer FAI, save that the Earth's magnetic field lines are nearly horizontal in near-equatorial regions. In order for VHF signals to be scattered efficiently from F-layer FAI regions, they must also arrive parallel to the geomagnetic field lines. This requirement is met only for complete signal paths that are nearly perpendicular to the geomagnetic equator. If the stringent geometry is met and the ionization is sufficiently dense, 50 and even 144-MHz signals are scattered twice over

This Month

October 6	Good EME conditions (new Moon)
October 21	Orionids meteor shower peaks
October 24-27	Joint Eastern VHF/UHF Conference—Microwave Update (Enfield, Connecticut)
October 26-27	ARRL EME Contest

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just the right angles by each FAI region to create generally north-south paths of 5000 to 8000 km. FAI-propagated signals usually have a distinctive fluttery or hollow aurora-like sound.

Stations on either end of a true transequatorial F-layer FAI path must also be within 2500-4000 km either side of the geomagnetic equator. Southern California, Texas and Florida lay on the northern edge of this region. Stations that are too far north (or south) of the geomagnetic equator to make use of F-layer FAI directly sometimes reach the FAI region via a sporadic-E hop or rarely via some other mode of propagation. Signals arriving over these mixed propagation paths may be weak, but they still typically exhibit the fluttery and hollow-like sound of pure FAI.

Some reliable and strong paths, such as Brazil to Europe, are sometimes attributed to transequatorial FAI, because they cross the equator and are sometimes open when no other DX paths are evident. Even so, this is probably not a strictly correct use of the term. These transatlantic contacts cannot be via FAI, as commonly understood, because the geomagnetic equator makes an extraordinary northern loop over the mid-Atlantic, leaving the Brazil-Europe path nearly perpendicular—not parallel—to the Earth's magnetic field lines. The most likely explanation is that these ordinary F-layer contacts are propagated by the high MUF regions that routinely form adjacent to the geomagnetic equator.

Aurora

Aurora can appear any time of year and during any point in the solar cycle, but it is more common during the two equinox periods and during the decline of the solar cycle. Therefore, auroras have a statistically better chance of appearing during the next several fall and spring seasons, centered on September 21 and March 21, than at other times. Auroras are triggered by geomagnetic storms, which also disturb the ionosphere in other strange ways. When such storms are in progress, be alert for other unusual propagation, even if you are too far south to hear auroral signals. Other modes such as transequatorial FAI or enhanced F-layer paths may be evident, most especially those that cross the high MUF regions adjacent to the equator.

Other Propagation

No other radio propagation modes have such clear associations with the solar cycle. Despite one of the poorest North American sporadic-E seasons in many years, it is difficult to blame these conditions on high solar activity. Over the long-term, the relative occurrence of sporadic-E in North America has varied considerably from one year to the next. Yet, available data cannot support the hypothesis that sporadic-E is less probable during solar cycle peaks—even though it was poor this past summer. In contrast, Europeans seemed to have enjoyed quite good sporadic-E conditions this summer.

The occurrence of meteors and their effects on the E-layer ionosphere are essentially independent of the solar cycle, but ionospheric forward scatter may be enhanced slightly during periods of great solar activity. The coming fall season may be an opportune time to experiment with this mode on 50 and 144 MHz, especially in the absence of any other unusual propagation. The best times are around noon. Any effects of solar activity on the weather may be too subtle to affect the appearance of tropospheric ducting. Solar activity does affect EME conditions, to the extent that geomagnetic storms usually degrade EME paths. Moonbouncers may be thus be frustrated a little more than usual during the next year or two, as geomagnetic storms are statistically more common during the period immediately after a solar-cycle peak than at other periods of the cycle.

ON THE BANDS

Conditions for all propagation modes were unusually poor in July and activity levels were consequently lower than average. There was noticeably less sporadic E across North America, with few double-hop contacts on 6 meters, and there were no reported openings on 2 meters. Two or three evenings of aurora were quite limited in duration and extent. Quite a number of stations have reported excellent success using the WSJT modes on meteor scatter, EME and extended tropo scatter.

Tropospheric ducting was also rare. Jeff Dover, KU4WW (EN54 in Alabama) reported good tropo conditions on 144 through 432 MHz north to Michigan and Ontario on July 7 after 0150. His longest contacts on all three bands were with VE3TFU (EN92) at about 1150 km. W2DRZ (FN02) in western New York was booming in much of the evening from 1175 km away.

Thanks to W3BTX, WA4JQS, NW5E, N6TR, F1DFR, JA1VOK, WP4LNY, XE2YVW and YV4DDK for their reports, not otherwise acknowledged. Dates and times are all in UTC.

Six Meters

There is simply not much to report beyond expected single-hop sporadic-E openings, but even these were unusually scarce during July. KL7NO (BP54) made some unusual contacts into the Midwest on July 19 after 0400. N0LL and N0JK (Kansas), W7XU (South Dakota) and K0HA (Nebraska) were among those who worked the Alaskan. N0JK also found NL7ZW and WL7YF on July 29 after 1645.

There were no general European openings either, making this perhaps the slowest July in a decade. Only individual contacts were reported. NW5E (EL98) worked EH7KW on July 2 and W3BO (FN20) worked him on July 15. ON4ANT reported a short and quite limited opening to the US Northeast on July 9. There may have been a few other scattered contacts, but these are all that were reported.

Expedition Results

Jimmy Treybig operated as FS/W6JKV on 6 meters from Saint Martin, June 27 to July 7, with a large Yagi and a kilowatt amplifier. He made 422 contacts across much of the US and 35 DXCC entities; 122 of those contacts were with Europe. Despite this success, Jimmy thought conditions were poor and down from previous trips.

Arliss Thompson, W7XU, led a group from the upper Midwest to St Paul Island and put CY9DH on 6 and 2 meters, from June 29 to July 6. Conditions on 6 meters were only good enough to make 400 contacts across the US as far west as Colorado, along with three European QSOs and two with Caribbean DXCC entities. The group had some unexpected success on 2 meters running 500 W to a single 18-element Yagi. They made about 40 meteor-scatter contacts using the FSK441 digital mode as far westward as K9MRI in Indiana and completed an EME QSO using JT44 with W7GJ.

VO1/W3EP/m found poor 6-meter sporadic-E conditions while traveling though 14 different grids in Newfoundland, June 29-July 8. Despite listening and calling periodically everyday, the band opened only on July 4, 1230-1305, from GO21, a rare grid that includes the northern tip of the province. Only four stations made it into the log: VE3SXE, WA2SPL (NY), NA1CW (NH) and W1AIM (VT).

A German-based team put 5K0Z on the air from San Andreas Island (HK0) in the Caribbean during late July. Their main efforts were on the HF bands, but they made some 6-meter contacts into the eastern half of the US on July 19 and 26, at least. San Andreas is two E-hops distance to most of the US.

FEEDBACK

Add another handful of 222-MHz beacons to the map in the August column. Jon Platt reports that he has been operating W0ZQ/b on 222.061 MHz from EN34 for some years. The beacon runs 50 W to a pair of loop antennas at 60 feet. Jack Henry, N6XQ, also pointed out four others west of the Mississippi: K5BYS (EM13) on 222.015, W0PW (EM26) on 222.050, N6XQ (DM12) and W6TOD (DM15) both on 222.052.

As it turned out, K7CW was not the first US operator to earn the Worked All Japan Award on 6 meters (see the August column). Several other US stations have worked all 47 Japanese prefectures and received WAJA certificates in the early 1980s, including N7DB (April 1981), WA7GCS (June 1981) and W6BYA (April 1983). W6BYA noted that he also received the VU-2000 certificate for confirmed contacts with 2000 Japanese stations on 6 meters—that is enough to make anyone's head spin. QST

QRP Philosophy

Often we take our Amateur Radio pastime a little too seriously. If someone else's idea of how to pursue QRP is not the same as our own, we get defensive and confrontational. I have seen this happen on the QRP reflectors, as well as in person. QRP means different things to different people.

Diversity

Each of us has a slightly different take on Amateur Radio and this is a good thing. It offers the possibility of expanding one's horizons when interacting with other QRPers. Left to our own narrow viewpoints Amateur Radio would stagnate.

QRP is often considered by mainstream ham radio as a group of arcane individuals who practice the esoteric art of CW. In fact, QRP is the fastest growing facet of ham radio. With the advent of low cost, high performance kit radios, thousands have flocked to the ranks of low power communications and become homebrew aficionados in the process. PSK31 has opened the HF bands to many newly licensed hams who have had little interest in our side of the hobby, fearing a lack of CW proficiency would prove fatal to their dreams of enjoying QRP.

New rigs like the Yaesu FT-817 have raised portable QRP operation to an art form for thousands (if sales records are accurate). The idea of using a tiny rig as a "pedestrian mobile" station has captured the imagination of the folks who hang out on the HFPack reflector. Many innovative ideas are discussed on this reflector, resulting in a very lively discussion group and an outstanding source of information on portable HF operation.

Our diversity is our strength. By encompassing many different methods of enjoying QRP we evolve and grow. This evolutionary process is vital to our survival if we are to attract new blood into ham radio.

What is QRP?

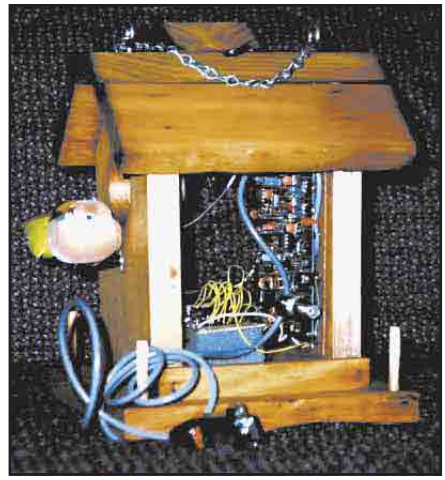
Strictly defined, QRP is the pursuit of ham radio at the 5-W level—nothing more, nothing less. While for some, QRP has become a lifestyle bordering on religion; it's still *just* an avocation. Many times non-QRP hams have been treated to a litany of reasons as to why QRP is "right" and high power (QRO) operation is "wrong." Nothing turns people off faster than having a fanatic get up in their face and collectively tell them they are doing things wrong. Both are having fun. Neither is "wrong."

This concept extends even into the ranks of QRP itself. There are those who practice the "Minimalist Concept," which states that true QRP can only be accomplished by using the bare minimum of homebrew gear and wire antennas. Power for the radio is obtained via a solar charged battery or a small generator attached to the side of the hamster cage. Big beams, log periodics, rhombics and phased arrays are evil and not in keeping with the "True Spirit of QRP."

The counter argument is that QRP is a power level *only*, and efficient antennas level the playing field. Minimalist QRPers view all others as being heretics while non-minimalists view their counterparts as being totally out of step with reality.

There is no "right" or "wrong" here. How you choose to pursue QRP is your business. If it is fun and you enjoy your time on the air using the Minimalist Philosophy, that's great! If, on the other hand, you really can't get into the Minimalist Movement, then that's okay, too, as long as you're having fun doing QRP your way.

LAMAR DERK, N3AT



Kevin McCauley, KB3EJM, of East Stroudsburg, Pennsylvania, built the NJ QRP Club PSK Warbler kit into a bird house. The sides are plexiglass so its workings can be seen. Kevin added an AF amp so it "warbles" when in use. The bird on the front of the structure is perched on the AF volume control shaft. Kevin took the "Bird House Warbler" to Field Day, and the *Pocono Record*, the local newspaper, featured a photograph of this unique PSK transceiver as part of an article on Field Day.

When QRP Isn't Enough

I know I'm going to take some heat for this topic, but it must be said. All grandiose, righteous, ostentatious motivation aside, there are those times when 5 W isn't going to work. In those instances there is nothing wrong or shameful about going to a higher power level. That's why we have linear amplifiers.

To be perfectly clear, the FCC mandates that we use the minimum power to effect and maintain communications. This doesn't mean that we need to run 1500 W to talk to a friend across town! Conversely, it also means that if we are in QSO with someone and they are having a problem copying our 5-W signals, then it would be perfectly justifiable to increase power a few decibels to reduce the difficult copy at the receiving end.

Skills

One of the first facts that a new QRPer has to face is, with a 13 dB power disparity between 5 and 100 W, special skills are vital for success. Developing and honing these skills is an ongoing process. Developing good listening skills is paramount. Listen to the DX pileup. Learn when the ebb and flow occurs, and get your call in where it will do the most good, instead of trying to go head-to-head with the wolf pack. Listen to how the DX operator is working stations and time your call so he can more easily pick your QRP signals out. Listening skills are developed after spending many, many hours in front of the radio.

Sending ultra-clean CW is a must. Don't try to send faster than you can copy. If you have a problem visualizing the characters as you send them, write down the basic QSO format first, so you don't make unnecessary mistakes, which saves time, embarrassment and confusion. To some this may mean using a CW keyboard. We are after flawless CW and if the CW keyboard is the answer, use it.

And in Conclusion. . .

Ours is a great pastime. We regularly show the world how to communicate, *and* we do it with only a few watts, much to the chagrin of the high power crowd. Theoretically we are all mature people who enjoy communicating via radio. Let's act that way. Honest—there is enough room in Amateur Radio for everyone. QST

Rich Arland, K7SZ ♦ 25 Amherst Ave, Wilkes Barre, PA 18702 ♦ k7sz@arrl.org

Ham TV in 1930

Nicholas Bozzay (SK) helped form the radio club at the Grover Cleveland High School in Caldwell, New Jersey, around 1928. Even though there were no licensed amateurs there, he and his friends studied all about ham radio. He graduated in 1932, still without a license. It was about this time he picked up his first television receiver.

Mechanical TV was the big thing in radio back then. Everyone wanted to see moving pictures in their home. Living near New York City provided him with several sources of broadcasted experimental video. He constructed a radio receiver and hooked it to his model "T-3 Pioneer Scanner," as it was called.

He was successful and had many exciting evenings viewing the small objects that were broadcast. He also found others, hams, who were doing the same. By 1938 he held the license W2LVD.

Nick joined the Navy when war broke out. He was a radio technician aboard the USS *Manila Bay* when a Japanese suicide plane struck it. That crash knocked out the ship-to-ship communications. He was later cited for his resourcefulness and quick thinking for hooking up a plane's radio on the deck with special extension cables he used for working on them in the shop. This allowed the *Manila Bay* to continue in the battle instead of retreating.

Pioneer was a local company to Nick, based in Jersey City. They advertised the T-3 in early radio magazines for $8.50, less tube. The special "Neon" type tube sold for about $3.

The T-3 consisted of a series wound brush type synchronous 1200 r/min motor. It had an on-off switch (bottom) and a special switch (top) to open the brushes, allowing the motor to coast until it could be synchronized with the incoming picture. See Figure 1, a close-up view of the motor. One had to be careful, as a misplaced finger would result in an electrical shock.

The 16-inch black-painted aluminum disk had two series of 60 holes, cut in a spiral. This allowed the tube to be moved up and down to also adjust the incoming picture, once the speed was set. It took 60 holes to spin past the tube to make a picture. The light emitted from the holes formed a 1 × 1½-inch, 60-line picture. The picture viewed was made up of either orange light or dark spots, making the two tones. The resolution was poor, but great for the time.

A complete set-up is shown in Figure 2. Here is a 1928 Silver-Marshall Around the World Four receiver. The audio output feeds the Mutter three-tube amplifier. The amplifier raised the signal voltage to about 200 V, which fires the neon tube. The tube has a large 1-inch-square plate that glows when the signal is right, then goes dark for the black part of the picture. All this happens at a high rate of speed, allowing the eye to see a moving picture.

By changing the neon tube to a bright bulb and using a photocell, a ham could send pictures to his friends. The photocell output was hooked to the ham's AM modulator causing a buzzing sound to be transmitted.

Visit my Web page, **www.eht.com/oldradio/arrl/index.html**, for more on mechanical TV. I will have two great Web sites listed, each with many examples of early television. There will also be a demonstration picture to help you visualize exactly what it looked like back then.

My thanks to Robert Bozzay, WB2UXA, for his father's interesting story, Tom Genova at the Television History site and Steve at the Early Television Foundation for providing information for this column.—*K2TQN*

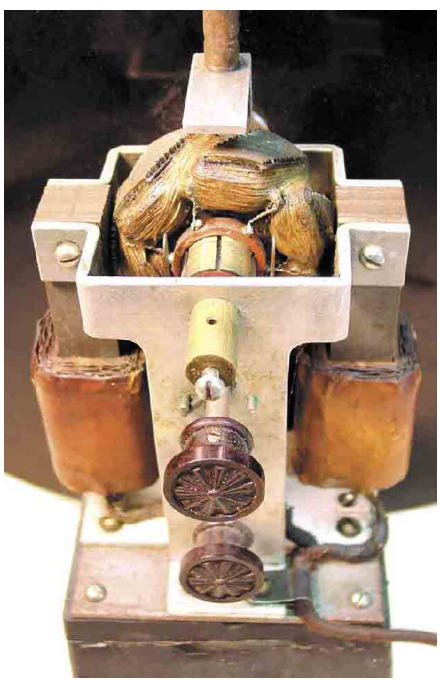


Figure 1—A close-up view of the motor.

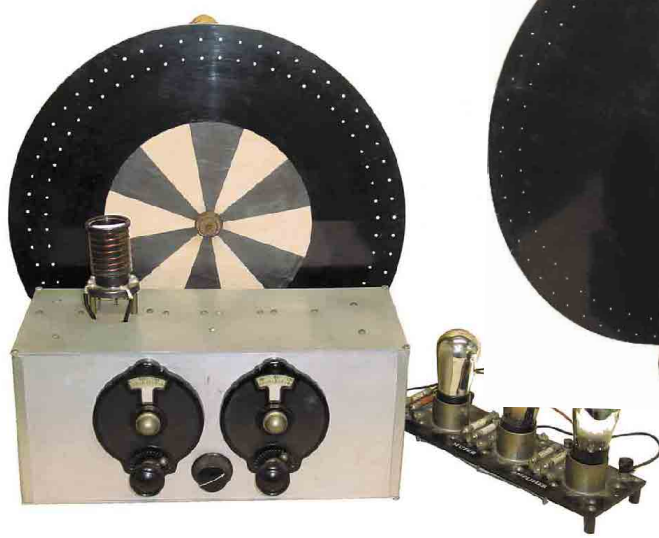


Figure 2—An operating station to receive 1930-era TV. The three main parts are the radio, the scanning disk and the three-tube amplifier.

Figure 3—The mechanical side of the scanner.

John Dilks, K2TQN ♦ 125 Warf Road, Egg Harbor Township, NJ 08234-8501 ♦ k2tqn@arrl.org

SILENT KEYS

It is with deep regret that we record the passing of these amateurs:

ex-W1ARE, Daniel Smith, Nashua, NH
NO1A, Frank L. Less, Groton, MA
ex-W1BUK, James S. Cebik, Stratford, CT
N1CPF, John H. Taylor, Harrison, ME
W1DMA, Fred A. Goddard, Wakefield, MA
W1EYC, Richard Loescher, Northampton, MA
*K1FSU, Frederick S. Bacon, Marion, MA
N1MZA, Steve Mansfield, West Hartford, CT
W1NHT, George R. MacDonald, East Millinocket, ME
WA1PWZ, Thomas L. Galante, Center Ossipee, NH
KT1R, Lewis E. Stafford, Chelmsford, MA
W1RLI, Edward S. Banas, Katy, TX
N1TDF, William G. Sullivan, Randolph, MA
AA1UX, Richard G. Robinson, Franconia, NH
K2CJ, Thomas A. George, Chenango Forks, NY
WA2EZV, Duane Church, Coram, NY
WB2LCN, Frank D. Hackett, Vestal, NY
WA2MKT, J. Thomson Fuller, Johnson City, NY
WA2SYJ, Stanley F. Lash, Woodstock, NY
N2YKH, William G. Norris, Southold, NY
W3AYO, Arthur W. Auchenbach, Reading, PA
W3BZ, Benjamin S. Zieg, Atlanta, GA
KE3CN, Joseph N. Webb, Knox, PA
W3HAP, Harvey H. Arnold, Orlando, FL
W3OJX, John A. Aller, Sun City, AZ
W3RGX, Pierre A. Portmann, Jupiter, FL
W3SAA, Thomas J. Baxter, Philadelphia, PA
KB3ZC, Bernard V. Luty, West Newton, PA
K4AGI, Marvin C. Eshleman, Sun City Center, FL
W4AYM, Kelly Jones, Mobile, AL
WA4DAV, Roy D. Satterfield, Buford, GA
K4DSK, George R. Dennis, Hopkins, SC
AC4EN, Louis R. McLeod, Mobile, AL
KA4ERE, Robert F. Brown, Daphne, AL
KI4EV, James O. Binion, Olive Hill, KY
WA4FIF, John M. Littlefield, Warner Robins, GA
W4FVK, Samuel P. Johnson, Ethelsville, AL
W4FVM, David E. Von Schaaf, Chattanooga, TN
KG4GOP, Roy H. Lawson, Church Hill, TN
W4HBE, Zach W. Lee, Grantville, GA
*K4HRV, Norman A. Mesker, Clearwater, FL
N4JAW, Sarah R. McCormack, Dora, AL
WD4JLE, Warren H. Phelps, Bozeman, MT
W4LES, Fred J. Harder, Hendersonville, NC
NC4ML, Michael W. Lamb, Seagrove, NC
W4ORY, Joseph M. Rhodes, Memphis, TN
K4OUB, Benjamin B. Eckles, Eastman, GA
WA4PLR, Clare W. Eldridge, Rock Hill, SC
KD4PSD, Raymond E. Caudill, Garfield, KY
KB4PSL, Max R. Ortega, Chattanooga, TN
N4RD, Charles R. Dean, Englewood, FL
W4TDT, Luther T. Cruse, Alexandria, VA
AF4TG, Randal L. Newton, Killen, AL
KA4VHV, Rick E. Wallis, Calhoun, GA
*W4VJU, Robert G. Dent, Nashville, TN
KD4ZAO, Paul E. Burcham, Hazard, KY
ex-WA5BLG, Joseph C. DeBlanc, Metairie, LA
WA5BMP, Leslie C. Haskell, Belleville, MI
W5EDC, Donald F. Easterwood, Dallas, TX
KD5EPB, Mark W. Pinckard, El Dorado, AR
W5FPE, Waverley Conway, Vicksburg, MS
W5GG, Hollis H. Whittenberg, Dallas, TX
N5HZW, Earle M. Sigler, Mobile, AL
KA5JWK, Russell L. Neehouse, Carlsbad, NM
KD5KEV, Chester W. Caskey, Trinity, TX
W5MKD, John D. Johnson, Covington, OK
KA5NYB, Wilma Dicks, Vicksburg, MS
KG5SF, Thomas B. Trotter, Greenville, MS
W5STB, Fred J. Bacon, Albuquerque, NM
W5UY, Harry R. Conley, Lafayette, LA
W6ARK, Albert P. Rovelli, Eureka, CA
KH6AY, Manuel D. Pires, Honolulu, HI
KX6D, Stephen A. Grant, Carmel, CA
WA6GUC, Kent W. Simcoe, Roseville, CA
KE6HRG, Kurt E. Carter, Sunland, CA
WA6JXO, Harley N. Rogers, Sac City, IA
AD6MK, Donald W. Hawkins, Sun City, CA
KF6POS, Jonathan G. Callahan, Fresno, CA
W6PYM, Charles W. Abern, Chico, CA
W6TUW, David E. Harbaugh, Santa Cruz, CA
NH7AB, Daryl B. Bicoy, Kaunakakai, HI
W7AJS, Wallace H. Hewitt, Seattle, WA
W7BIL, Bernard E. Hansen, Marysville, WA
KL7B, Richard Attwood, College, AK
W7EHJ, Orville W. McGaughy, Graham, WA
W7EIL, Walter A. Gray, Bellingham, WA
WB7FEM, Revel D. Newton, Glendale, AZ
KF7H, Jon Parle, Seattle, WA
N7IYV, Clarke D. Clayton, Avondale, AZ
N7LFH, Donald J. Hart, Renton, WA
KB7MNH, Charles J. Shoemaker, Chino Valley, AZ
KD7OBR, Adam E. Mead, Phoenix, AZ
*KA7QLP, Francis B. Smith, Seattle, WA
NA7SS, Scott H. Stevenson, Aurora, CO
KC7UUD, Joshua J. Pardee, Tempe, AZ
W7ZRZ, Gustave E. Wieland, Seattle, WA
AA8CU, Raymond J. Krause, Cincinnati, OH
N8EKK, George R. Plummer, Circleville, OH
NA8E, Albert L. Hillenbrand, Cleveland Heights, OH
KB8GHP, Kevin Croll, Cincinnati, OH
KB8HO, Gregory Pawlowski, Northville, MI
KA8ITP, Forrest R. Frederick, Kalamazoo, MI
W8JIK, Richard S. DeMello, Portland, MI
W8LEW, Lewis H. Buck, Hamilton, OH
KC8TBH, David L. Watson, Gerrardstown, WV
W8TV, Robert K. Dye, Columbus, OH
KD8YZ, James E. Barker, Sidney, OH
WA9ABE, Herschel Russell, Winslow, IN
WA9ALY, Homer A. Evans, Fort Wayne, IN
WB9EMH, Richard T. Dayton, Bedford, IN
W9HAX, Wayne H. Burgdorff, West Allis, WI
NJ9H, Ronald M. Howe, Plover, WI
W9ILZ, Chester J. Kuharski, Monona, WI
WB9JUP, Glenn A. Ames, Bourbon, IN
W9JZK, Robert W. Deiker, Fort Worth, TX
K9LMH, Robert W. Maris, Rockville, IN
W9NWG, Le Roy A. La Bardi, Edwardsville, IL
W9OKA, Thomas G. Clemens, Canadensis, PA
N9PFQ, Mary M. Muckerheide, Tomahawk, WI
WB9TOA, Victor B. Janzer, Milwaukee, WI
KB9UOD, Emil H. Rasmussen, Waupun, WI
N9XKO, Donald E. Morris, Fort Wayne, IN
N0CUY, Dale L. Cumpston, Lawrence, KS
W0DRB, Jack Bronson, Great Bend, KS
WB0FWG, Gary H. Hildebrand, Liberal, KS
KB0IQ, Marjorie A. Zapf, Ward, CO
W0NHS, Jack B. Hubbell, Aurora, NE
W0RMK, James L. Dowd, Elephant Butte, NM
N0SLN, Larry L. Williams, Union, MO
W0UZE, Burt E. Davis, Loveland, CO
CO2VM, Sergio Armenteros Ocasio, Habana, Cuba
G4KZH, Ray Withers, Halesowen, Great Britain
G0TYV, Walter E. Jones, Kent, Great Britain
VE3GS, Roy J. Athey, Chelsea, QC, Canada
*VE3YA, R. W. Graham, Thornhill, ON, Canada

*Life Member, ARRL
**Charter Life Member, ARRL
‡Call sign has been re-issued through the vanity call sign program.

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 ♦ n1gzo@arrl.org

STRAYS

QST congratulates...

♢ Ralph H. Brock, W5MV, of Lubbock, Texas, an ARRL life member and an ARRL Volunteer Examiner, who has been elected to the Board of Directors of the State Bar of Texas. He will serve a three-year term. At the Annual Meeting in June, W5MV, also received the State Bar President's Award for outstanding service to the Bar, the highest award presented to a Texas lawyer. As members of a 2001 State Bar of Texas People-to-People delegation to Cuba, W5MV and his wife, Carolyn F. Moore, W5CFM, a Hearing Officer for the Texas Workers' Compensation Commission, met with members of the Federación de Radioaficianados de Cuba at their headquarters in Havana. They hope to return to Cuba later this year with another People-to-People delegation.

♢ Professor Bill Call, KJ4W, who recently received an award from the Murray State University ARC for his "37 years as steward to the club [and] for a lifetime of service to the organization's many members over the decades, and for his outstanding contributions to the amateur radio service and hobby."

♢ Eric Forslund, N8XT, of Astoria, Oregon, a Helicopter Rescue Swimmer in the US Coast Guard, who has been awarded the Association for Rescue at Sea Gold Medal award.

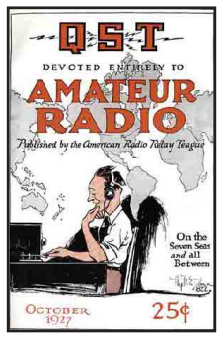
♢ Olin Boyer, of Tulsa, Oklahoma, age 70, who recently passed all four exam elements in one test session, and now holds his father's old call sign, W5LNK.

♢ Thomas Gossett, K4TWG, and Catherine Gossett, KG4TWI, of Baconton, Georgia, both members of the Albany ARC, who were married recently at the Albany Swap Fest by the Reverend Stan Halstead, W4GOD.

Previous • Next Strays QST

75, 50 AND 25 YEARS AGO

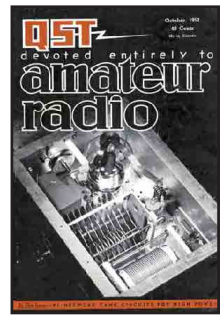
October 1927



♦ The cover, by Clyde Darr, 8ZZ, shows a ham at his rig, a map of the world behind him, and the caption, "On the Seven Seas and all between." The editorial discusses the International Radiotelegraphy Conference, and assures American hams that our interests will be supported by the American delegation.

Howard Mason, 7BU, tells of "An Arctic Adventure," a March trip in a Stinson-Detroiter DN-2 biplane from Fairbanks, Alaska, to Point Barrow, to deliver mail and critical supplies—with radio on board, of course. Ralph Pierce, 1AXA, describes "An Oscillating Amplifier for the Crystal Transmitter," which can continue to transmit if the crystal or crystal oscillator stage stops working. Following the earlier *QST* article on the Army side of things, Fred Best writes about "The Naval Reserve in the Army-Navy Maneuvers." Lawrence Jones presents "The International Test Results," with 20 meters turning out to be the workhorse. "The Voice of the Sky" tells about a 1-kW audio system built into a Fokker F-VII trimotor airplane for airborne advertising. The owner of the audio equipment (and Vice-President of Voice of the Air, Inc) is George McCauley, 5AJR. Allan Hanscom tells how to get "More Selectivity with Three Tubes." The article "International Communication," by Fergus Sunshine McKeever, shows how Amateur Radio can be used to further friendships among hams in most of the countries of the world.

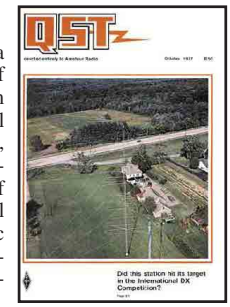
October 1952



♦ The cover photo shows the plate-circuit compartment of a nice-looking 4-250A amplifier built by W1DF, and described in this issue. The editorial encourages the 14,000 new amateurs licensed during the past year to become active on the air—and to join the ARRL!

In the cover article, George Grammer, W1DF, discusses "Pi-Network Tank Circuits for High Power." Dick Baldwin, W1IKE, makes good suggestions for contest operation, in "Sweepstakes Trade Secrets." As they continue to look for better receiver selectivity, Oswald Villard, W6QYT, and José Díaz, XE1RZ, present "The Shunt 'Selectoject.'" John Huntoon, W1LVQ, tells how to build "A B.F.O. for Your Mobile." New Novice John Ramsey, WN1UJG, describes "A Novice-Built Test Meter." Richard "Red" Blanchard, W6UYG, explains S.S.B. in simple terms, in "Sugar-Coated Single Sideband." Gabriel Rumble, ex-W5BBB, provides simple theory for the Novice, in "How Rectifiers Work." Jim Friend, W6ECJ, feeds a quarter-wave antenna with 300-ohm line, resulting in "A Broad-Band 40-Meter Vertical." Ed Tilton, W1HDQ, describes "An Antenna Coupler for 50 Mc."

October 1977



♦ The cover photo is a great "aerial" view of W2PV's antenna farm and home. The editorial discusses WARC-79, pointing out the non-technical aspects of the problem—political log-rolling, economic disparities among countries, and finite resources.

Wayne Overbeck, K6YNB, discusses "Measuring Antenna Gain with Amateur Methods." Yardley Beers, W0JF, tells about "Optimizing Vertical Antenna Performance." Mike Piper, WA7QPC, describes "The Emergency Broadcast System." Vernon Gibbs, W4JTL, tells how to get "An Extended Frequency Range for the Collins 75S-1." Bob Cavin, WB0OSX, discusses "Printed Circuit Boards—An Easier Way." Doug DeMaw, W1FB, urges the reader to try "The Gentlemen's Band—160 Meters." Morris Jones, N6DE, reminds us of the upcoming Scouting event, the "20th Jamboree-on-the-Air, 1977." In two companion articles Joel Kleinman, WA1ZUY, presents Part 1 of "QSLs," and Willard Brownlee, W2HMX, tells "How to Roll Your Own." David Sumner, K1ZZ, reports that "Amateurs Respond to FCC WARC Inquiry," including the ARRL's own comments on the FCC proposals. Drago Novcak and Anton Zeleznikar, YU3EM, describe a "Morse Code to ASCII Translator Using a Microprocessor." Robbie Reid, WB5VXL, explains "The Zany Zener—Facts about This Special Diode." QST

Al Brogdon, W1AB ♦ Contributing Editor ♦ w1ab@arrl.net

W1AW Schedule

PACIFIC	MTN	CENT	EAST	MON	TUE	WED	THU	FRI
6 AM	7 AM	8 AM	9 AM		FAST CODE	SLOW CODE	FAST CODE	SLOW CODE
7 AM-1 PM	8 AM-2 PM	9 AM-3 PM	10 AM-4 PM	VISITING OPERATOR TIME (12 PM-1 PM CLOSED FOR LUNCH)				
1 PM	2 PM	3 PM	4 PM	FAST CODE	SLOW CODE	FAST CODE	SLOW CODE	FAST CODE
2 PM	3 PM	4 PM	5 PM	CODE BULLETIN				
3 PM	4 PM	5 PM	6 PM	TELEPRINTER BULLETIN				
4 PM	5 PM	6 PM	7 PM	SLOW CODE	FAST CODE	SLOW CODE	FAST CODE	SLOW CODE
5 PM	6 PM	7 PM	8 PM	CODE BULLETIN				
6 PM	7 PM	8 PM	9 PM	TELEPRINTER BULLETIN				
6:45 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	10PM	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, 7½, 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 2001 *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 K6YR. See "Contest Corral" in this issue. 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. The fee structure is $10 for a certificate, and $7.50 for endorsements.

♦ **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. QST

Hey, YLs—Look at This!

That was the battle cry at the 15th International Young Ladies Radio League Convention in Cleveland, Ohio this past August. Not since the last convention in Long Beach, California three years ago has there been a bigger gathering of YLs in the US. The Buckeye Belles and Chix on Six and Two YL clubs were the host clubs and this event was dedicated to the Ohio YLs who hosted the 4th International YLRL Convention in Columbus, Ohio in 1964.

The attendees started arriving at the Clarion Hotel in Middleburg Heights (a Cleveland suburb) on Thursday night. Most went directly to the YLRL hospitality suite on the ground floor. The room was set up with many large tables and was hopping with activities, conversations, displays and demonstrations of every type. There were gals at the HF station talking about band conditions (the vertical and wire antennas were centered around a YL's large RV parked outside). Some were looking at photos and mementos of past conventions and YL DXpeditions or admiring the handmade crafts that were being raffled and the ones being created (from the YLRL emblem in counted cross-stitch to a Norwegian YL's monkey's fist keychains, a skill she learned in the Merchant Marines).

The YLRL Convention Committee, including Jean Ruth, KB8YHN, president of both host clubs, infected us with her excitement about the convention and her new love—kit building. She was on crutches from a recent knee injury, but didn't let that slow her down in the least and rounded up a good crowd for the "hands-on" Kit Building forum that evening presented by Joe Eisenberg, K0NEB. Other members of the YLRL convention committee, Jean, AA8KI; Judy, KC8BOM; Carol, KI8IM; Lois, W8FOT; Nancy, KC4IYD, and May, N8MZJ, somehow managed to get us all signed up and registered for the events.

There was much to see and do—the Rock 'n' Roll Hall of Fame (my OM's favorite place in Cleveland), Science Museum and IMAX *Titanic* movie, lunch cruise on Lake Erie and the Cuyahoga River, official meetings and luncheon (YLs only), a trolley tour of the city and waterfront, and more.

DIANE ORTIZ, K2DO

YLRL Convention Chairman Nancy Rabel Hall, KC4IYD, enjoys the event with her 4-year-old daughter Carol.

On Friday morning the news arrived that Convention Chairman (and past YLRL President) Nancy Rabel Hall, KC4IYD, was being interviewed by National Public Radio for winning NASA's Exceptional Achievement Medal for "unmatched initiative, dedication and volunteer service in educational outreach." Nancy, a scientist at NASA's Glenn Research Center in Cleveland, has worked on experiments that have flown on the Space Shuttle and soon, the International Space Station. The rest of the day was filled with the cruise, tours, dinner and the YL DXpedition forum. Ann Santos, WA1S (Kingman Reef); Vicky Luetzelschwab, AE9YL (YK9A and OJ0 Market Reef) and Jan Scheuerman, WA2YL (Niue Island), gave a multimedia presentation and answered questions about their trips. All were the first YLs to operate from those locations and Vicky was also able to attend the WRTC in Finland after flying back by helicopter. She said the first thing she did was take a long bath, as the facilities on Market Reef were primitive.

The atmosphere at the convention was part reunion, part welcome wagon and part "ladies night out." The air was supercharged, and not just from the RF in the room. These women ham radio operators who traveled from Japan, Norway, Canada, Europe and all over the United States to this gathering in Ohio were very enthusiastic and their excitement was contagious. Many recognized an old friend or someone they had worked, but never met. And everywhere during this convention weekend there were YLs excitedly talking and talking.

On Saturday morning we assembled for the traditional group photo. Afterward the OMs left for their scheduled activities while the YLs had their official business meeting and luncheon. There were 61 members present and many items to discuss and decide, including the location of the next convention—which will be in 2005 in Denver, Colorado. Other items included the YLRL awards, contests, Handi-hams, CQ Hall of Fame nominee, affiliated clubs, 33 Award, historian materials and Web page (**www.qsl.net/ylrl/**). Special recognition was given to Harriet Barker, W6QGX, who has attended every convention since their inception.

The evening banquet was a time for awards, and YLRL President Kay Eyman acknowledged the contributions of many, including longtime member Jean Chittenden, WA2BGE. ARRL Ohio Section Manager Joe Phillips, K8QOE, Master of Ceremonies for the dinner, introduced banquet speaker Kay Craigie, WT3P, ARRL Second Vice President. Kay spoke eloquently about her personal experiences as a YL ham and the Education and Technology Program, "The Big Project." She encouraged all of us to "do just a little more" to promote Amateur Radio in any way we can through our local radio clubs, emergency service organizations or donations. *—33, Diane K2DO*

YL CONTESTS

This month is the YL Anniversary Party, CW is Oct 9-11 and SSB Oct 16-18. Call CQ YL, the exchange is call, QSO #, RS(T) and ARRL section/VE province/country. All licensed women operators throughout the world are invited to participate. Check the YLRL Web page for details.

YL DXPEDITIONS

Look for Ann Santos, WA1S, from Ogasawara (JD1), Oct 8-18. QST

Diane P. Ortiz, K2DO ♦ PO Box 296, Bellport, NY 11713 ♦ k2do@arrl.org

COMING CONVENTIONS

PACIFIC NORTHWEST VHF CONFERENCE

September 27-28, Bend, OR

The Pacific Northwest VHF Conference, sponsored by the Pacific Northwest VHF Society, will be held at the Central Oregon Environmental Center, 16 NW Kansas. Doors are open Friday at 6 PM for "No-host VHF Pizza Party" (Papa's Pizza, 20265 Meyer Dr), Saturday 8 AM to 3:30 PM. Features include weak-signal VHF, UHF and Microwave programs, technical seminars, Pacific Northwest VHF Society annual meeting, VUCC checking. Admission is $25 (includes Saturday conference sessions and catered buffet breakfast). Contact Don Krug, K7HSJ, 1126 NE Burnside Ave, Bend, OR 97701; 541-382-7561; **ghcdk@bendnet.com**; **www.qsl.net/pnwvhfs/**.

W0DXCC CONVENTION

September 28, Omaha, NE

The W0DXCC Convention, sponsored by the W0DXCC Assn, will be held at the Holiday Inn Central Convention Center, 3321 S 72nd St, 2 blocks N off I-80 and 72nd St. Doors are open at 8AM. Features include exhibitors, new radio equipment, forums (radios, antennas, DXing, DXpeditions), card checking (DXCC, WAS, WAZ, CQ-DX award), grand banquet (7 PM, cocktail hour 6 PM). Talk-in on 146.94. Admission is $35 (convention and lunch), $55 (convention, lunch, and banquet). Contact Nick Critelli, K0PCG, 5816 N Waterbury Rd, Des Moines, IA 50312; 515-277-1166; **k0pcg@CritelliLaw.com**; **members.cox.net/w0dxcc**.

WESTERN STATES VHF/UHF & MICROWAVE CONFERENCE

October 11-13, Cerritos, CA

The Western States VHF/UHF and Microwave Conference, sponsored by the Western States Weak Signal Society, will be held at the Sheraton Cerritos Hotel, Towne Center, 12725 Center Court Dr, just off the 91 Freeway at Bloomfield, 2.5 miles E of the 605 Freeway; go S on Bloomfield, turn left at Towne Center Dr, right on Center Court Dr. Doors are open Friday at 6 PM; Saturday & 7 AM to 9 PM; Sunday until 10 AM (informal car trunk sale only). This is a conference to provide VHF/UHF enthusiasts the knowledge and tools to work DX and contests on 6 meters and up. Features include exhibit room (manufacturers, vendors, organizations, displays), sessions (contesting, microwave, antennas, satellites, EME set ups, working DX with new DSP software, and more), Western States Weak Signal Society Annual Meeting, VUCC award card checking, table-top and tailgate swap, banquet (Saturday eve; $35 pre-registration, $40 at the door on a space-available basis; ARRL First Vice President Joel Harrison, W5ZN, special guest speaker), ample free parking. Talk-in on 144.2, 146.52. Admission is $15. Contact Steve Cooper, WB2KXC, Box 5594, Sherman Oaks, CA 91413-5594; 818-995-6074; **info@wswss.org**; **www.wswss.org**.

NORTHERN NEW YORK SECTION CONVENTION

October 12, Lake Placid

The Northern New York Section Convention, sponsored by the Northern New York ARA, will be held at the Horse Showgrounds on Rte 73; from the S take Exit 30 on Northway, stay on Rte 73, Showgrounds are across from Ski Jumps and adjacent to the Lake Placid Airport. Doors are open for setup Friday at 2 PM; public Saturday 8 AM to 4 PM. Features include vendors, tailgating, forums, Special Event Station, CW contest runs, VE sessions, RV spaces. Talk-in on 145.11 (123.0 Hz). Admission is $3 in advance, $4 at the door. Tables are $9 (includes 1 admission; electricity is available with advance request); additional tables are $2.50 each. Contact Tom Valosin, WB2KLD, 117 Warrior Way, Middleburgh, NY 12122; 518-827-4800; **valosin@midtel.net**; **www.geocities.com/nnyara**.

September 20-21
W9DXCC, Rolling Meadows, IL*

September 21
Arkansas State, North Little Rock*

September 28-29
Roanoke Division, Virginia Beach, VA*

November 16-17
Indiana State, Fort Wayne

December 7-8
Florida State, Palmetto (Tampa)

***See September *QST* for details.**

EASTERN WASHINGTON SECTION CONVENTION

October 12, Spokane

The Eastern Washington Section Convention, co-sponsored by the Kamiak Butte Amateur Repeater Assn, the Spokane Radio Amateurs, the Inland Empire VHF Club, the NW Tri-State ARO, and the Palouse Hills ARC, will be held at University High School, 12420 E 32nd Ave; take Exit 289 (Pines Rd) off I-90, go S on Pines Rd, continue straight to 32nd Ave; school is on corner of Pines and 32nd. Doors are open for setup Friday 6-9 PM; public Saturday 9 AM to 5 PM. Features include seminars and demonstrations (packet, weather, PSK-31, soldering connectors, and more); VE sessions (no admission charged for license exam only); special guest Brennan Price, N4QX, from ARRL Hq; Special Event Station; free testing of all HTs; test gear table; Country Store; refreshments. Talk-in on 147.24, 146.52. Admission is $5, under 16 free. Tables are $10. Contact Bill Craze, KC7YSF, Box 141731, Spokane, WA 99214; 509-218-1110 or 509-326-5353; **spokanehamfest@yahoo.com**; **kbara.org**.

CONNECTICUT STATE CONVENTION

October 13, Wallingford

The Connecticut State Convention, sponsored by the Nutmeg Hamfest Alliance, will be held at Mountainside, High Hill Rd; I-91, Exit 15, E on Rte 68, left on Research Pkwy, right on Carpenter Ave, left on High Hill Rd to Mountainside. Doors are open for setup at 6 AM; public 9 AM to 3 PM. Features include hamfest/computer show; large flea market; major vendors; seminars and lectures; ARRL forum; special guest speaker John Dilks, K2TQN; demonstrations; VE sessions (10 AM; Joel Curneal, N1JEO, 203-235-6932); ample free parking; refreshments. Talk-in on 147.36. Admission is $7. Tables are $30, outside space $20. Contact Andrew Purchia, N1XXU, 116 Kensington Ave, Meriden, CT 06451; 203-235-8440; **n1xxu@arrl.net** or **nutmeghamfest@qsl.net**; **www.qsl.net/nutmeghamfest**.

PACIFIC DIVISION CONVENTION

October 18-20, Concord, CA

The Pacific Division Convention (Pacificon 2002), sponsored by the Mt Diablo ARC, will be held at the Sheraton Hotel at Concord's Buchanan Airfield, Concord Ave; E on Concord Ave from Hwys 242 or 680; about 28 miles E of San Francisco. Doors are open Friday 8 AM to 10 PM, Saturday 6 AM to midnight, Sunday 7 AM to 3 PM. Features include opening breakfast buffet (Saturday, 6:45 AM, $12.50; special guest speaker ARRL President Jim Haynie, W5JBP), electronics swapmeet (Saturday, 6 AM to noon; $10 for double-car slot), vendors, exhibitors, forums and seminars, antenna seminar (Friday, 8 AM to 5 PM, $10), Exhibitor "shootout" (Friday, 7:30-10 PM), T-hunts (Sunday 8 AM and 9 AM; beginners and advanced), banquet (Saturday eve, $35; special guest speaker Chris Imlay, W3KD, General Counsel to the ARRL), Special Events Station, Wouff-Hong ceremony, VE sessions (Saturday and Sunday, 9 AM to noon; Technician through Extra Class, nominal fee). Talk-in on 147.06 (100 Hz). Admission is $10 in advance, $15 at the door. Contact Greg Estep, KE6VTA, c/o PACIFICON, Box 272613, Concord, CA 94527-2613; 925-932-6125; **grestep@attbi.com** or **pacificoninfo@earthlink.net**; **www.pacificon.org**.

MICROWAVE UPDATE & EASTERN VHF/UHF CONFERENCE

October 24-27, Enfield, CT

The Microwave Update and Eastern VHF/UHF Conference, co-sponsored by the Eastern VHF/UHF Society and the North East Weak Signal Group, will be held at the Radisson Hotel, One Bright Meadow Blvd; from Bradley International Airport take Rte 20 E to I-91 N, take Exit 49, bear right at the end of the ramp, turn right at the light, take your immediate right onto Bright Meadow Blvd, Hotel will be on your left. Features include dish tour (Thursday, leaving 8 AM; contact **W1GHZ@arrl.net**), tour of ARRL Hq (Thursday, 2-5 PM), flea market (Sunday, 8 AM), swap (Friday eve), dealers, technical presentations, lab sessions, noise figure measurements, Antenna range, banquet (Saturday eve). Admission is $40 in advance, $45 at the door. Tables are $5 (for flea market on Sunday). Contact Matt Reilly, KB1VC, 7 Conant Dr, Stow, MA 01775; 978-897-0848; **kb1vc@kb1vc.org**; or Bruce Wood, N2LIV, 3 Maple Glen Ln, Nesconset, NY 11767; 631-265-1015 (home) or 631-293-9600 (work); **bdwood@erols.com**; **www.microwaveupdate.org**.

GEORGIA SECTION CONVENTION

November 2-3, Lawrenceville

The Georgia Section Convention, sponsored by the Alford Memorial RC, will be held at the Gwinnett County Fairgrounds, 2405 Sugarloaf Parkway; from I-85 southbound, take Hwy 20 to Sugarloaf Parkway. Doors are open for setup Friday at noon, Saturday at 6 AM; public Saturday 9 AM to 5 PM, Sunday 9 AM to 3 PM. Features include inside flea market, paved tailgating, exhibitors, vendors. Talk-in on 146.76. Admission is $6 in advance, $8 at the door ($6 for students with ID, under 16 free). Tables are $20 (flea market), $85 to $105 (exhibitors). Contact Randy Bassett, KR4NQ, Box 1282, Stone Mountain, GA 30086-1282; 770-663-4244 (x-3989); **kr4nq@bigfoot.com**; **www.totr.radio.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. QST

Gail Iannone ♦ Convention Program Manager ♦ giannone@arrl.org

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 **October 1** to be listed in the **December** issue. Hamfest information is accurate as of our deadline; contact sponsor for possible late changes. For those who send in items for Hamfest Calendar and Coming Conventions: Postal regulations prohibit mention in *QST* of prizes or any kind of games of chance such as raffles or bingo.

(Abbreviations: *Spr* = Sponsor, *TI* = Talk-in frequency, *Adm* = Admission.)

†Alabama (Montgomery)—Nov 9; set up Friday 3-8 PM, Saturday 6-8 AM; public 9 AM to 3 PM. *Spr:* Montgomery ARC. S Alabama State Fairgrounds, Garrett Coliseum, Federal Dr; take Exit 6 off I-85, turn W, take Hwy 231 Exit, turn left, go about 3 miles to Fairgrounds on right. 25th Annual Hamfest/Computer Show, inside flea market, tailgating ($2 per vehicle space), vendors, forums, VE sessions (8 AM, on site; bring original and copy of your current license, picture ID, $3 fee), free parking. *TI:* 146.84, 147.18 (Ragchew), 444.5, 444.45. *Adm:* $5, under 13 free with paid adult. Tables: advance $10 door $15. Phil Salley, K4OZN, 7173 Timbermill Dr, Montgomery, AL 36117; 334-272-7980 (after 5 PM CST); **k4ozn@arrl.net**; **jschool.troyst.edu/~w4ap/**.

†Arizona (Tucson)—Oct 19, 8 AM to 1 PM. *Spr:* Old Pueblo RC. Pima County Fairgrounds; E on I-10 to Houghton Rd Exit, go S to Fairgrounds. Tailgating ($5 per space), ATV and ARPS demos, VE sessions. *TI:* 146.88 (110.9 Hz), 448.55 (110.9 Hz). *Adm:* $2. Tables: $15. Cliff Hauser, KD6XH, 8741 N Hollybrook Ave, Tucson, AZ 85742; 520-744-9095; **kd6xh@arrl.org**; **www.hamsrus.com**.

California (Cerritos)—Oct 11-13, Western States VHF/UHF & Microwave Conference. See "Coming Conventions."

California (Concord)—Oct 18-20, Pacific Division Convention. See "Coming Conventions."

†Colorado (Golden)—Oct 19, 8 AM to 2 PM. *Spr:* Rocky Mountain Radio League. Jefferson County Fairgrounds, 15200 W 6th Ave; Indiana Exit from 6th Ave. ARRL forum, VE sessions, refreshments. *TI:* 145.22. *Adm:* $5. Tables: $10. Ron Rose, N0MQJ, 13481 W Alaska Pl, Lakewood, CO 80228; 303-985-8692; **n0mqj@attbi.com**; **rmrl.hamradios.com**.

Connecticut (Enfield)—Oct 24-27, Microwave Update & Eastern VHF/UHF Conference. See "Coming Conventions."

Connecticut (Wallingford)—Oct 13, Connecticut State Convention (Nutmeg Hamfest). See "Coming Conventions."

Florida (Jacksonville)—Oct 5. Billy Williams, N4UF, **n4uf@nofars.org**.

†Florida (Jacksonville)—Oct 19, 8 AM to 4 PM. *Spr:* Greater Jacksonville Hamfest Assn. Morocco Shrine Auditorium, 3800 St John's Bluff Rd, S of Beach Blvd (US 90), just N of The University of North Florida Campus; I-95 S to JTB (John Turner Butler), turn left, go approximately 3 miles to St John's Bluff Exit, turn left, go 4 miles to Auditorium on left. Commercial booths ($100), VE sessions. *TI:* 146.76. *Adm:* $6. Tables: $25. Richard Smythe, KF4PBL, 4473 Hudnall Rd, Jacksonville, FL 32207; 904-739-9713; **rsmythe2@bellsouth.net**; **www.jaxhamfest.com**.

Florida (Plantation)—Oct 12. Robin Terrill, N4HHP, 954-583-3625.

†Florida (Starke)—Oct 12; set up Friday 3-6 PM, Saturday 6 AM; public 9 AM to 4 PM. *Spr:* ARC-Bradford Area. Bradford County Fairgrounds, just N of Starke on US 301; directly behind FL Hwy Patrol Office on W side of US 301. Vendors, tailgating ($4), VE sessions (reservations required).

†ARRL Hamfest

TI: 145.15. *Adm:* $4, under 13 free. Tables: $5 (plus admission; every 4th table is free). John Bradley, KU4AY, 904-782-1185; **ku4ay@ku4ay.net** or **hamfest@ku4ay.net**; **www.ku4ay.net/starkehamfest.html**.

†Florida (Umatilla)—Nov 2, 8 AM to 5 PM. *Spr:* Lake ARA. Umatilla High School Annex, 200 Block of Central Ave; located on Hwy 19, directly across from Umatilla Police Station. Inside vendors, outside tailgating ($7), VE sessions. *TI:* 147.255. *Adm:* $5. Tables: $10. Al Szirski, K2SSE, 11146 Springdale Ave, Leesburg, FL 34788; 407-469-0007; **k2sse@gdi.net**; **www.qsl.net/k4fc**.

†Florida (West Palm Beach)—Nov 2, 7 AM to 2 PM. *Sprs:* Major Armstrong FMA and Yesteryear Village RC. Southern Florida Fairgrounds, Southern Blvd and Sansbury Way; enter Gate 4. Yesteryear Village Radio Museum, free tailgate spaces, VE sessions. *TI:* 146.67. *Adm:* Free. Jeff Beals, WA4AW, Box 1584, Loxahatchee, FL 33470; 561-499-4156; **wa4aw@arrl.net**.

†Georgia (Evans)—Oct 12, 9 AM to 3 PM. *Spr:* ARC of Augusta. Evans Middle School, 4318 Washington Rd. New and used equipment vendors, tailgating, forums (ARRL, ARES), VE sessions. *TI:* 145.49. *Adm:* $5. Tables: $10. John Samples, KG4LEY, 4074 Melrose Dr, Martinez, GA 30907; 706-736-7509 (days) or 706-651-9504 (eves); **kg4ley@hotmail.com**.

Georgia (Lawrenceville)—Nov 2-3, Georgia Section Convention. See "Coming Conventions."

†Hawaii (Keaau)—Oct 12, 9 AM to 4 PM. *Spr:* Big Island ARC. Community Center, central Keaau; about 9 miles from Hilo, behind Keaau Police and Fire Station. Swapmeet, special talks, VE sessions. *TI:* 146.52. *Adm:* Donation. Tables: 10% of the take. Ron Phillips, AH6HN, HC 2, Box 6637, Keaau, HI 96749; 808-982-6513; **ah6hn@arrl.net**; **www.arrl.org/sections/PAC.html**.

Illinois (Chicago)—Nov 10. Melissa Meneely, KB9QWZ, 773-908-0518 (Ham Radio Auction).

†Illinois (Decatur)—Oct 6, 7 AM to noon. *Spr:* Cenois ARC. Richland Community College, One College Park; off I-72 at corner of Rea's Bridge and Brush College Rd. Flea market, vendors, VE sessions, refreshments. *TI:* 147.1 (103.5 Hz), 442.25 (103.5 Hz). *Adm:* $5. Tables: $1 per foot (6-ft minimum, indoors). Spencer Carter, N9LVW, Box 245, Blue Mound, IL 62513; 217-692-2460; **n9lvw@msn.com**; **www.cenois.com**.

†Illinois (Godfrey)—Oct 20, 7 AM to noon. *Spr:* Lewis and Clark RC. Lewis and Clark Community College, River Bend Arena, 5800 Godfrey Rd; on US Rte 67, 25 miles N of downtown St Louis, MO and 4 miles N of Alton, IL. Indoor/outdoor flea market, commercial vendors, ARRL booth, VE sessions (registration 9:30 AM, testing 10 AM, all classes; preregistration required for "no code" exams, walk-ins accepted for all other exams; Rich Morgan, KF9F, 618-466-2306), handicapped parking, free parking, refreshments. *TI:* 145.23. *Adm:* advance $2 each or 3 for $5; door $3 each or 2 for $5. Tables: $10 (outside spaces $5). Chris Holland, N9WHH, 965 N Wood River Ave, Wood River, IL 62095; 618-254-9465; **n9whh@ezl.com**.

†Illinois (Oakbrook Terrace/Chicago)—Oct 13; set up 7 AM; public 8 AM to 1 PM. *Spr:* Chicago ARC. Oakbrook Terrace Fitness Center, entrance at Park View Dr, N from Cermak Rd (22nd St); 1 block W of Rte 83. Vendors, tailgating, free paved parking. *Adm:* advance $4, door $5. Tables: free space (bring your own tables). Melissa Meneely, KB9QWZ, c/o CARC, Box 410535, Chicago, IL 60641-0535; 773-908-5331; **w9caf@chicagoarc.com**; **www.chicagoarc.com**.

†Iowa (Davenport)—Nov 3, 8 AM to 2 PM. *Spr:* Davenport RAC. Mt Joy Airport National Guard Hanger; ½ mile N of I-80 and ½ mile W of Hwy 61. Hamfest/Computer/Electronics Flea Market, vendors, free parking. *TI:* 146.88. *Adm:* advance $5, door $6. Tables: $12 (8-ft, electrical hookup $1 additional). Dave Mayfield, W9WRL, 1821 7th St, Moline, IL 61265; 309-762-6010 or 309-781-9308; **hamfest@gwltd.com**; **www.gwltd.com/hamfest**.

Iowa (Des Moines)—Oct 27. Rod Ivers, KI0BW, 515-278-9945.

†Kentucky (Hazard)—Nov 9. *Spr:* Kentucky Mountains ARC. Carr Creek Marina, Meeting Building, Carr Creek Lake State Park; on Rte 15, about 15 miles S of Hazard; midway between Hazard and Whitesburg. Swapfest. *TI:* 146.67. *Adm:* $5. Tables: $5. John Farler, K4AVX, 109 Hall St, Hazard, KY 41701; 606-436-5354; **k4avx@arrl.net**; **www.qsl.net/k4avx/kmarc.html**.

†Louisiana (Baker)—Nov 1-2; Friday 5-8 PM, Saturday 8 AM to 4 PM. *Spr:* Baton Rouge ARC. Baker Municipal Auditorium, 3325 Groom Rd; approximately 5 miles N of Baton Rouge. Flea market, technical forums, special FCC forum with Riley Hollingsworth, VE sessions, DXCC card checking, RV hookups, refreshments. *TI:* 146.79. *Adm:* advance $4 (before Oct 15), door $5. Tables: $15 (good both days). Herb Ramey, W5LSU, Box 68, Greenwell Springs, LA 70739; 225-654-6087; fax 225-654-5730; **W5LSU@att.net**; **www.brarc.org**.

Louisiana (Pineville)—Oct 19. Julius Saucier, W5CJN, **w5cjn@aol.com**.

†Maryland (Westminster)—Oct 27, 8 AM to 3 PM. *Spr:* Carroll County ARC. Carroll County Agricultural Center, Smith Ave; Rte 140 to Center St to Gist Rd to Smith Ave; or Rte 97 to Rte 32 to Gist Rd to Smith Ave. Tailgating ($5), free commercial radio checks, VE sessions, refreshments. *TI:* 145.41. *Adm:* $5. Tables: $12 each (every 4th table free; full payment by Oct 5). Steve Beckman, N3SB, 2145 Bethel Rd, Finksburg, MD 21048; 410-876-1482; **n3sb@qis.net**; **www.qis.net/~k3pzn**.

Massachusetts (Cambridge)—Oct 20. Nick Altenbernd, KA1MQX, 617-253-3776.

†Michigan (East Lansing)—Oct 13; set up 5 AM; public 8 AM to 1 PM. *Sprs:* Central Michigan ARC and Lansing Civil Defense Repeater Assn. Lakeside Christian School Gymnasium, 7868 M78 Highway; I-96 to Lansing, take Exit 94, turn left at first traffic light, school is ¼ mile on right. Amateur Radio/Computer Show, vendors, ham gear and electronics, trunk sales ($10 per spot), VE sessions (registration 9:30 AM; Joe Denomme, 517-589-5263, **n8vys@voyager.net**), plenty of parking. *TI:* 145.39 (100 Hz), 146.52. *Adm:* $5, under 12 free with ID. Tables: advance $10 (by Aug 13), door $12 (or after Aug 13). Mike Rhew, KC8DBP, Box 27321, Lansing, MI 48909-7321; 989-725-1853; **kc8dbp@arrl.net**; **www.qsl.net/lcdra/hamfair2002.org.htm**.

†Michigan (Kalamazoo)—Oct 13; set up 6 AM; public 8 AM to 3 PM. *Sprs:* Kalamazoo ARC and SW Michigan AR Team. Hazel Grey Bldg at Kalamazoo County Fairgrounds, 2900 Lake St; I-94 to Sprinkle Rd (Exit 80 N), Sprinkle Rd to I-94 Bus Loop, left to Olmstead Rd to Lake St to Fairgrounds. Trunk sales ($5 per space), campsites with electricity and water, free parking, refreshments. *TI:* 147.04. *Adm:* advance $3, door $4. Tables: $12 (8-ft; optional electric hookup $10). Allen Lewis, W8JCY, 6185 Old Log Trail, Kalamazoo, MI 49009; 616-375-0770 or 616-337-7602; **w8jcy@arrl.net** or **hamfest@kalamazoohamradio.com**; **www.KalamazooHamRadio.com/hamfest**.

†Michigan (Kinross)—Oct 19-20; Saturday 9 AM to Sunday noon. *Sprs:* Eastern Upper Peninsula ARC and Algoma Chippewa ARES/RACES Net. Chippewa County Fairgrounds, M-80; I-75, Exit 378, E on M-80, ½ mile to Fairgrounds on left in 4-H Building. Swapshop, VE sessions, JOTA weekend on site, camping. *TI:* 146.64. *Adm:* advance $3, door $5. Tables: non-commercial $7, commercial $15. Dave Deatrick, WA8OLD, 220 Hursley St, Sault Sainte Marie, MI 49783; 906-

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635-0215 (home) or 906-293-5168 (work); **wa8old@sault.com**; **www.w8eup.org**.

†Michigan (Warren)—Oct 27, 8 AM to 1 PM. *Spr:* Utica Shelby Emergency Communications Assn. Italian/American Cultural Center, 28111 Imperial Dr; I-696 to Exit 24 (Hoover Rd), N on Hoover to 12 Mile Rd, E on Hoover past hospital to Imperial Dr, S 1 block to Center. Hamfest/Computer Swap, seminars (HF and Mobile Antennas, packet radio, APRS and GPS PSK-31), contesting, VE sessions (8 AM to noon; preregister with Joe, N8OZ, 586-977-7222), plenty of parking, refreshments. *TI:* 147.18 (100 Hz). *Adm:* $5, under 12 free. Tables: first $15, additional $10 each. Delphine Wrona, KC8JSH, 17516 Brill Dr, Clinton Twp, MI 48035; 586-791-4669; **delwro@att.net**; **www.useca.org/**.

†Minnesota (St Paul)—Oct 26, 8 AM to 3 PM. *Spr:* Twin City FM Club. Touchstone Energy Place at RiverCentre, 175 Kellogg Blvd at W 7th St; Marion St/Kellogg Blvd Exit off I-94. Flea market, factory representatives, vendors, commercial booths, seminars, VE sessions. *TI:* 146.76 (114.8 Hz). *Adm:* advance $7, door $10. Tables: $20. Paul Ramey, WG0G, 2847 County Rd G, Glenwood City, WI 54013; 715-265-7288; **wg0g@arrl.net**; **www.hamfestmn.org**.

†Mississippi (Starkville)—Oct 4-5; Friday 8 AM to 4 PM, Saturday 7 AM to 1 PM. *Sprs:* ARRL Mississippi Section and MFJ Enterprises. McKee Park/MFJ Production Facilities, 300 Industrial Park Rd; S of US 82. Annual ARRL "Day in the Park.". Tailgating; tour of MFJ facilities; DX forum; Special Event Stations; VE sessions (Saturday, 9 AM; Bob Ray, K5VVA, 662-241-5342; **k5vva@cableone.net**); special guest ARRL President Jim Haynie, W5JBP; picnic; refreshments. *TI:* 146.73 (210.7 Hz). *Adm:* Free. Malcolm Keown, W5XX, 14 Lake Circle Dr, Vicksburg, MS 39180; 601-636-0827; **w5xx@arrl.org**; **www.mfjenterprises.com/daypark2002.php**.

†Missouri (Grandview)—Oct 19; set up 6 AM; public 8 AM to 2 PM. *Spr:* SouthSide ARC. Grandview Middle School, 12650 Manchester; from Hwy 71 take Main St/Highgrove Rd Exit, go E 1.2 miles to Manchester, go N 0.6 miles to school (East Junior High). Vendors, forums (ARRL, SKYWARN, packet radio, PSK-31, APRS, ATV), refreshments. *TI:* 147.12. *Adm:* advance 4 for $5, door 3 for $5; single tickets $3. Tables: $15 (includes 1 admission). Donna Quick, KB0YJN, 632 SW 36th Terr, Lees Summit, MO 64082; 816-537-7464; **kb0yjn@juno.com**; **www.qsl.net/southsidearc**.

†Missouri (Springfield)—Nov 9, 8 AM to 1 PM. *Spr:* Southwest Missouri ARC. Expo Center, 2610 N Glenstone, located E of Glenstone Ave, behind the Atrium and Bass Country Inns. Commercial vendors, informational booths, VE sessions. *TI:* 146.91, 145.49 (136.5 Hz). *Adm:* $5. Tables: $10. Lora Smith, KC0EPD, 1103 S Gelven Ave, Springfield, MO 65804; 417-886-4152; **lora@cooldude.com**.

†Missouri (St Louis)—Oct 26, 7:30 AM to 1 PM. *Spr:* St Louis ARC. Kirkwood Community Center, 111 S Geyer Rd; I-270, S from I-64, Dougherty Ferry Rd, E to Geyer Rd, S to hamfest. Halloween Hamfest, indoor swap tables, vendors, VE sessions (9 AM sharp, pre-registration requested; Greg, 314-890-9612), free parking, refreshments. *TI:* 146.91. *Adm:* advance $1 each or 6 for $5; door $2 each or 3 for $5; under 12 free. Tables: commercial $15 (with electricity), noncommercial $10. Ken Craig, WA0IYY, 1216 Summers End Dr, St Louis, MO 63026; 314-780-2959; **wa0iyy@arrl.net**; **www.halloweenhamfest.com**.

Nebraska (Omaha)—Sep 28, W0DXCC Convention. See "Coming Conventions."

†New Jersey (Washington Township)—Oct 12; set up 6 AM; public 8 AM to 2 PM. *Spr:* Bergen ARA. Westwood Regional Jr/Sr High School, 701 Ridgewood Rd; from Rte 17 N or S to Linwood Ave, go E to Pascack Rd, N on Pascack, go ¼ mile to Ridgewood Rd, E on Ridgewood to High School. Vendors ($10 per space, includes admission), VE sessions (8-10 AM; Novice through Extra, $10 fee), DXCC card checking, lots of parking, refreshments. *TI:* 146.79, 146.52. *Adm:* $5 (spouses and children free). Jim Joyce, K2ZO, 286 Ridgewood Blvd N, Washington Township, NJ 07676; 201-664-6725; **k2zo@arrl.net** or **hamfest@bara.org**; **www.bara.org**.

†New Mexico (Deming)—Sep 28, 8 AM. *Spr:* Deming ARC. Mimbres Valley Learning Center, corner of Country Club Rd and Motel Dr; Exit 81 or Exit 85 off I-10. Tailgate only ($2.50 per space). *TI:* 146.82. *Adm:* Free. Carol Brown, N5CMB, 713 W Spruce St, No 161, Deming, NM 88030; 505-544-4766; **n5cmb@arrl.net**; **www.zianet.com/darc**.

†New Mexico (Socorro)—Oct 26, 8 AM to 3 PM. *Sprs:* Socorro ARA, NM Tech ARA, and the City of Socorro. NM Firefighters Training Academy; go W on Hwy US 60 (Spring St), at first stop sign go straight, follow signs. Swapfest, tailgating ($5), commercial vendors, presentations, demonstrations, 2-meter foxhunt, VE sessions, refreshments. *TI:* 146.68 (100 Hz). *Adm:* Free. Tables: $5. Al Braun, AC5BX, 722 California St, Socorro, NM 87801; 505-835-3370; **ac5bx@juno.com**; **www.ees.nmt.edu/sara/hamfest.html**.

New York (Lake Placid)—Oct 12, Northern New York Section Convention. See "Coming Conventions."

†New York (Lindenhurst)—Oct 27; set up 7 AM; public 9 AM to 2 PM. *Spr:* Town of Babylon ARES. Knights of Columbus Hall, 400 S Broadway; Hall is 3 blocks N on Broadway which is off Montauk Hwy (Rte 27A). Flea market, vendors, computers and accessories, radio equipment dealers, electronic components, books and technical manuals, tune-up clinic, ARRL and club information. *TI:* 146.685 (110.9 Hz). *Adm:* $6, spouses and under 12 free. Tables: advance $15, door $20 (6-ft, includes 1 admission and electricity). Walter Wenzel, KA2RGI, 373 15th St, W Babylon, NY 11704-2606; 631-957-0218 (until 11 PM); **ka2rgi@arrl.net**; **www.tobares.org**.

†New York (Queens)—Oct 20; set up 7:30 AM; public 9 AM to 3 PM. *Spr:* Hall of Science ARC. NY Hall of Science Museum Parking Lot (Flushing Meadow Corona Park), 47-01 111th St. Electronics and computer equipment, commercial dealers, tailgating ($10 per space), ARRL info, VHF tune-up clinic, VE sessions (10 AM; Lenny Menna, W2LJM, 718-323-3464, leave message), free parking, refreshments. *TI:* 444.2 (136.5 Hz), 146.52. *Adm:* $5, under 12 free. Stephen Greenbaum, WB2KDG, 85-10 34th Ave, Jackson Heights, NY 11372; 718-898-5599 (eves only); **wb2kdg@bigfoot.com**; **www.qsl.net/hosarc**.

†North Carolina (Maysville)—Oct 13, 8 AM to 3 PM. *Spr:* Maysville Hamfest Assn. Maysville Community Bldg (outdoors), 101 8th St; 1 block W of intersection of NC Rte 58 and US Rte 17. Ham Auction, tailgating (you must provide your own table). *TI:* 146.685. *Adm:* Free. Donna Jones, KB4MYE, 183 Cedar Ln, Newport, NC 28570; 252-727-4750; **kb4mye@coastalplanes.com**.

†Ohio (Canton)—Oct 27; set up 6 AM; public 8 AM to 3 PM. *Spr:* Massillon ARC. Stark County Fairgrounds, 305 Wertz Ave NW; from I-77 N take downtown exit, turn left (W) on W Tusc, turn right on Wertz Ave to Fairgrounds; from I-77 S take 4th St NW Exit, turn right (W) into Fairgrounds. All indoors, auction (10 AM, 15% commission charged on all items sold; no computer equipment), handicapped accessible, free parking. *TI:* 147.18. *Adm:* $5, under 12 free. Tables: $12 (8-ft, with electricity). Terry Russ, N8ATZ, 3420 Briardale Circle NW, Massillon, OH 44646; 330-837-3091; **w8np@qsl.net**; **www.qsl.net/w8np**.

†Ohio (Georgetown)—Nov 9, 8 AM to 3 PM. *Spr:* Grant ARC. ABCAP Building, 200 S Green St; S SR 68 to SR 125, old Georgetown High School at Main and Green Sts, across from Georgetown Fairgrounds. Charity auction, VE sessions (9 AM, all classes; walk-ins accepted), handicapped accessible. *TI:* 146.73. *Adm:* $2. Tables: Free with the purchase of 1 admission ticket. Dot Silman, KB8TQU, 502 Lake Waynoka Dr, Sardinia, OH 45171; 937-446-2234; **huggee@bright.net**; **www.geocities.com/garcohio**.

†Oklahoma (Bristow)—Oct 12, 5-10 PM. *Spr:* Oklahoma DX Assn. Bristow Library, 117 W 7th Ave; N on Hwy 66 from I-44, W on 7th to Library. Meeting, banquet (speaker/program). *Adm:* Meal Cost Only. Mark Duensing, KD5DLL, 5358 E 5th St, Tulsa, OK 74112; 918-835-1816; **kd5dll@arrl.net**.

Oklahoma (Enid)—Nov 2. Tom Worth, N5LWT, 580-233-8473.

†Oklahoma (Kingston)—Oct 25-26; Friday 3 PM to Saturday 3 PM. *Spr:* Texoma Hamarama Assn. Lake Texoma Lodge, on Hwy 70, 5 miles E of Kingston. Flea market, tailgating ($5), new equipment vendors, dealers, programs, club events, VE sessions, RV parking ($7 per night fee). *TI:* 147.39 (118.4 Hz). *Adm:* advance $7, door $8. Tables: $15 (indoor). Joanie Sleeper, KC5LBN, 8144 Carriage Ln, Wichita Falls, TX 76305; 940-855-5820; **retmarine@cst.net**; **www.angelfire.com/tx5/TexomaHamarama/**.

Oregon (Bend)—Sep 27-28, Pacific Northwest VHF Conference. See "Coming Conventions."

†Oregon (Rickreall)—Oct 26; set up Friday 6-8 PM, Saturday 7 AM; public 9 AM to 3 PM. *Spr:* Mid-Valley ARES. Polk County Fairgrounds, 520 South Pacific Hwy; W of Salem where Hwy 22 meets 99W. Swap tables, commercial dealers, meetings and seminars, emergency communications vehicle displays, Country Store (hosted by Salem ARC), self-contained RV camping ($10 per night), handicapped accessible. *TI:* 146.86 (186.2 Hz). *Adm:* advance $5, door $7, under 13 free. Tables: $15 (with power), $13 (without power). Dean Davis, KL7OR, Box 13848, Salem, OR 97309; 503-540-3270; **kl7or@arrl.net**; **www.qsl.net/w7oem/swaptobe.html**.

†Pennsylvania (Carlisle)—Oct 26, 8 AM. *Sprs:* South Mountain Repeater Assn and Central PA Repeater Assn. Carlisle Productions, Carlisle Fairgrounds, 1000 Bryn Maur Rd. Vendors, tailgating ($5 per space), computers and accessories, VE sessions, special guest speaker Riley Hollingsworth, plenty of parking, refreshments. *TI:* 145.43. *Adm:* advance $4, door $5; under 12 free. Tables: $10 (electricity provided). Bill Smyser, KA3LUT, 404 Walnut Bottom Rd, Shippensburg, PA 17257; 717-532-6195; **ka3lut@pa.net**; **www.qsl.net/kb3cvo**.

†Pennsylvania (Sellersville)—Oct 20; set up 5 AM; public 7 AM to 1 PM. *Spr:* RF Hill ARC. Sellersville Firehouse, 2 N Main St (Rte 152), 5 miles S of Quakertown and 8 miles N of Montgomeryville; from Montgomeryville go N on Rte 309 to Telford Exit (Rte 152), right at bottom of ramp, left at stop light, 1½ miles to Firehouse. Vendors, VE sessions (10 AM to 1 PM, all classes; bring documents). *TI:* 145.31. *Adm:* $5. Tables: $12 each (indoor, 5 or more $10 each); $6 (outdoor 9-ft frontage space, bring your own table). Linda Erdman, KA3TJZ, 2220 Hill Rd, Perkiomenville, PA 18074; 215-679-5764; **werdman@enter.net**; **www.rfhill.ampr.org**.

†Pennsylvania (Wrightstown)—Oct 13; sellers 6 AM, buyers 7 AM. *Spr:* Mt Airy VHF RC. (PACKRATS). Middletown Grange Fairgrounds, Penns Park Rd; between PA Rtes 232 and 413. Flea market ($10 per car space), refreshments. *TI:* 146.52. *Adm:* $6, nonham spouses and under 13 free. Ed Finn, WA3DRC, 174 Orthodox Dr, Richboro, PA 18954; 215-322-2105; **packrats_w3ccx@yahoo.com**; **www.ij.net/packrats/Hamrama2002/Hama_02.html**.

Quebec (Montreal/Longueuil)—Oct 26. Micheline Simard, VE2XW, 450-446-0477.

†South Carolina (Sumter)—Oct 26, 8 AM to 4 PM. *Spr:* Sumter ARA. Sumter County Fairgrounds, American Legion Memorial Building, 700 W Liberty; I-95 to Rte 378 W, turn right onto Alice Dr, left on Liberty, go 3 blocks. Hamfest/Computer Show, indoor/outdoor flea market, dealers, vendors. *TI:* 147.015 (156.7 Hz). *Adm:* advance $5, door $6. Tables: $10. Jim Higgins, KB3PU, 210 Mallard Dr, Sumter, SC 29150; 803-469-8160; **higginsj@sc.rr.com**; **www.geocities.com/CapeCanaveral/2695/sara.htm**.

†Tennessee (Chattanooga)—Oct 26, 9 AM to 3 PM. *Spr:* Chattanooga ARC. Camp Jordan Arena, 323 Camp Jordan Rd; Exit 1 off I-75, go S on Hwy 41, left on Camp Jordan Rd. Flea market, dealers, VE sessions. *TI:* 146.79, 444.1. *Adm:* $5. Louise Carter, KE4DGW, 107 S Bragg Ave, Lookout Mountain, TN 37350; 423-821-4043;

wa4rmc@aol.com (Barbarra Gregory); www.hamfestchattanooga.com.

†**Tennessee (Oak Ridge)—Oct 19**, 9 AM to 3 PM. *Spr:* Oak Ridge ARC. Fraternal Order of Eagles Bldg, 1650 Oak Ridge Turnpike (Hwy 95); Illinois Ave to Oak Ridge Turnpike, turn left on Oak Ridge, location is on right going W on Turnpike. Commercial dealers, outdoor flea market, new and used equipment, parts and components, VE sessions, free parking, refreshments. *TI:* 146.88. *Adm:* $5. Tables: $10. David Bower, K4PZT, Box 4291, Oak Ridge, TN 37831; 865-670-1503; d.bower@ieee.org; www.korrnet.org/orarc/.

Texas (Belton)—Oct 5. Mike LeFan, WA5EQQ, 254-773-3590.

†**Texas (Denton)—Oct 12**; set up 6 AM; public 8 AM to 1 PM. *Spr:* Denton County ARA. Denton Civic Center, 515 N Bell Ave; NE of Town Square, corner of McKinney Ave and Bell Ave. Flea market, dealers, vendors, demos and programs (Microwave, APRS), VE sessions, testing and repair table, all the coffee you can drink. *TI:* 146.92 (110.9 Hz). *Adm:* advance $2, door $5. Tables: advance $10, door $15. Randy Wooten, KD5KJZ, 3103 Twilight Dr, Denton, TX 76208; 940-566-7973; kd5kjz@yahoo.com; www.dentonhamfest.org.

†**Texas (Odessa)—Nov 1-2**; Friday 5-9 PM, Saturday 8 AM to 5 PM. *Spr:* West Texas ARC. Holiday Inn Convention Center, 6201 W Hwy 80; 3 miles E of downtown Odessa. Flea market, vendors, new and used ham and computer equipment, forums, VE sessions (Saturday, 1 PM), free parking. *TI:* 145.47, 444.425. *Adm:* $3, students free. Tables: $10 (includes 1 free admission). Craig Martindale, W5BU, 1719 Rosewood Ave, Odessa, TX 79761; 915-366-4521; w5bu@arrl.net; www.wt5arc.com.

†**Washington (Bremerton)—Oct 12**, 9 AM to 3 PM. *Spr:* North Kitsap ARC. Kitsap County Fairgrounds President's Hall, 1201 NW Fairgrounds Rd, NW corner of Fairgrounds Rd at Nels Nelson Rd; from Bremerton follow Warren Ave N on SR 303 for 3.6 miles, turn left onto Fairgrounds Rd, continue for 1½ miles, follow signs to hamfest on right. Commercial dealers, computers and software, electronics parts, new and used equipment, ARRL table and info, Kitsap County Emergency Communications Van, live antique radio station, demos (PSK-31, APRS, DX Node), VE sessions (10 AM, pre-registration encouraged; Susan, AB7MD, 360-697-9379), free parking. *TI:* 146.62 (103.5 Hz), 146.52. *Adm:* $5, under 13 free. Tables: $15 (includes 1 admission, until Sep 30), $20 (after Sep 30); commercial spaces $30; electrical power $2 per table. Russ Swank, KI7PG, Box 2268, Silverdale, WA 98383-2268; 360-697-6451; rswank@krl.org or nkarc@yahoo.com; silverlink.net/nkarc.

Washington (Spokane)—Oct 12, Eastern Washington Section Convention. See "Coming Conventions."

Attention All Hamfest Committees!

Get official ARRL sanction for your event and receive special benefits such as donated ARRL publications, 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.

Promoting your event is guaranteed to increase attendance. As an approved event sponsor, you are entitled to advertise your event in *QST* at special rates. Make your hamfest a success by taking advantage of this great opportunity. Call the ARRL Advertising Department at 860-594-0209, or e-mail hanan@arrl.org. QST

CONTEST CORRAL

Feedback

In the 2001 ARRL 10 Meter Results, **F5VHJ's** log claimed to be a mixed mode entry, when in fact it was Phone only. In the Unlimited Category of the Affiliated Club Competition the final standings should show the **Potomac Valley Radio Club** as the winner with a score of 32,649,320 points and 77 logs. Second place goes to the Society of Midwest Contesters with 30,517,922 points from 96 logs.

In the 2002 January VHF Sweepstakes, the log of **N3AHP** should be listed in the EPA section as Single Operator High Power with a score of 980 points on 68 QSOs and 14 multipliers.

W1AW Qualifying Runs are 10 PM EDT Friday, October 4, and 4 PM EDT Thursday, October 17. The K6YR West Coast Qualifying Run will be at 9 PM PDT Wednesday, October 9. Check the W1AW Schedule for details.

Abbreviations

SO—Single-Op; M2—Multiop—2 Transmitters; MO—Multi-Op; MS—Multi-Op, Single Transmitter; MM—Multi-Op, Multiple Transmitters; AB—All Band; SB—Single Band; S/P/C—State/Province/DXCC Entity; HP—High Power; LP—Low Power; Entity—DXCC Entity

No contest activity on 30, 17 or 12 meters. Refer to the contest Web sites for information about awards. Unless stated otherwise, regional contests only count QSOs with stations in the region. Publication deadline for Contest Corral listings is the first of the second month prior to publication. In order to publicize the maximum number of contests, readers will be referred to an earlier issue of *QST* if the rules have been published within the past year.

Oct 5-6

TARA PSK31 Rumble (Fall Classic), 0000Z-2400Z Oct 5 (see April *QST*, p 93).

Oceania DX Contest—Phone, supported by the Wireless Institute of Australia (WIA) and New Zealand Association of Radio Transmitters (NZART), 0800Z Oct 5-0800Z Oct 6 (CW is 0800Z Oct 12-0800Z Oct 13). Frequencies: 160-10 meters, work VK/ZL/Oceania stations only. Categories: SOAB, SOSB, MS, MM, SWL. Exchange: RS(T) and serial number. QSO Points: 160—20 pts, 80—10 pts, 40—5 pts, 20—1 pt, 15—2 pts, 10—3 pts. Score: QSO points × WPX prefixes counted once per band. For more information—www.nzart.org.nz/nzart/update/contests/oceania/. Logs due Nov 25 in Cabrillo format to phoctest@nzart.org.nz (CW to cwoctest@nzart.org.nz) or Oceania DX Contest, c/o Wellington Amateur Radio Club Inc, PO Box 6464, Wellington 6030, New Zealand.

EU Autumn Sprint—SSB, sponsored by the EU Sprint Gang, 1500Z-1859Z Oct 5 (CW is 1500Z-1859Z Oct 12). Frequencies: 80-20 meters, work EU stations only. SOAB category only. Exchange: your call, serial number, name, other station's call. Special QSY rule—see Web site. Score is number of QSOs. For more information—loja.kkn.net/~i2uiy/. Logs due 15 days after the contest to eusprint@kkn.net or Paolo Cortese, I2UIY, PO Box 14, I-27043 Broni (PV), Italy (CW logs to Karel Karmasin, OK2FD, Gen Svobody 636, CZ-674 01 Trebic, Czech Republic).

California QSO Party—CW/SSB, sponsored by the Northern California Contest Club, 1600Z Oct 5-2200Z Oct 6. Frequencies: 160-2 meters. Categories: SOAB (HP >100 W, LP, QRP <5 W), MS, MM, CA County Expedition, Mobile, Novice/Tech, Club, School. SO work 24 hours only. 10-minute rule for MS. CW QSOs in CW subbands, except 160. Work CA stations in each county. County lines count for 1 QSO but multiple counties. Exchange: serial number and SPC or CA county. QSO Points: CW—3 pts, Phone—2 pts. Score: QSO points × CA counties (max 58) or CA stations multiply by states and VE call areas (max 58). For more information—www.cqp.org. Logs due by Nov 15 to cqp@contesting.com or to Alan Maenchen, AD6E, 3330 Farthing Way, San Jose, CA 95132.

QCWA QSO Party—CW/Phone, 1800Z, Oct 5-1800Z, Oct 6 (see April *QST*, p 109).

RSGB 21/28 MHz Contest—SSB, sponsored by the RSGB, 0700Z-1900Z Oct 6 (CW—0700Z-1900Z Oct 20). Frequencies: 15 and 10 meters (see Web site for band plan). Categories: UK and DX SO or MS (Open, Restricted, QRP <10 W) and SWL (Open and Restricted). Exchange: serial number and UK district. QSO Points: 3 pts/QSO. Score QSO points × UK districts (UK stations use DXCC entities plus JA, W, VE, VK, ZL and ZS call areas) counted once per band. For more information—www.rsgbhfcc.org. Logs due Nov 20 to hf.contests@rsgb.org.uk or to RSGB—G3UFY, 77 Bensham Manor Rd, Thornton Heath, Surrey CR7 7AF, England.

Oct 9-11

YLRL Anniversary Party—CW, sponsored by the YLRL, 1400Z Oct 9—0200Z Oct 11. (phone Oct 16-18) Frequencies: 160-10 meters. Exchange: serial number, RS(T), and ARRL section/VE province/country. QSO Points: US or VE YLs—1 pt/QSO, DX YLs—2 pts. Score: QSO points × sections +VE provinces + DXCC entities. For more information—www.qsl.net/ylrl/ylcontests.html. Logs due 30 days after the contest to wa6uvf@pe.net or to Jeanie Parker, WA6UVF, 8400 Vista del Valle, Hemet, CA 92544, USA.

Oct 12-13

Worked All Germany—CW/SSB, sponsored by The Deutscher Amateur Radio Club, 1500Z Oct 19 until 1459Z Oct 20. Frequencies: 80-10 meters, work German stations only. Categories: SOAB (HP >100 W , LP <100 W, QRP <5 W) CW or Mixed Mode, MS, SWL, packet spotting allowed for all classes. Exchange: RS(T) and serial number or DOK (local area code). QSO Points: 3 pts/QSO. Germans count DXCC/WAE countries per band. Score: QSO points × DOK codes (Germans use DXCC entities or WAE countries) counted once per band and mode. For more information—www.darc.de/referate/dx/fedcg.htm. Logs due Nov 20 to wag@darc.de or to Klaus Voigt, DL1DTL, PO Box 12 09 37, D-01010 Dresden, Germany.

10-10 Day Sprint—Phone/CW/Digital, 0001Z-2400Z, Oct 10. One QSO per station, regardless of mode (see August *QST*, p 87, for rules).

Oceania DX Contest—CW, 0800Z Oct 12-0800Z Oct 13 (see Oct 5-6).

EU Autumn Sprint—CW, 1500Z-1859Z, Oct 12 (see Oct 5-6).

Pennsylvania QSO Party—CW/Phone, sponsored by the Nittany ARC, 1600Z Oct 12-0500Z Oct 13 and 1300Z-2200Z Oct 13. Frequencies: CW 1.810 MHz and 40 kHz above band edge; Phone—1.850 3.980 7.280 14.280 21.380 28.310 MHz; Novice/Tech—10 kHz above edge of segment; mobiles 5 kHz below the listed frequencies. Work mobiles in each county. County lines count for 1 QSO but both counties. Categories: SO (HP > 150 W, LP, or QRP <5 W), MS, MM, SO or MS Portable, Novice/Tech/TechPlus, Mobile, Rover. Exchange: serial number and ARRL/RAC section (PA stations send serial number and county). QSO

H. Ward Silver, N0AX ♦ 22916 107th Ave SW, Vashon, WA 98070 ♦ n0ax@arrl.org

Points: CW—2 pts on 160 and 80, 1.5 pts on other bands; Phone—1 pt. Score: QSO points × PA counties (PA stations use PA counties + ARRL/RAC sections + 1 for a DX QSO) ×2 if QRP or ×3 if Novice/Tech. Add 200 points to final score for each QSO with W3FRC. PA mobiles and rovers add 500 points for each county with 10 or more QSOs. For more information—**www.qsl.net/narc/parules.html**. Logs due by Nov 15 to PA QSO Party, PO Box 614, State College, PA 16804, USA.

FISTS Fall Sprint—CW, 1700Z-2100Z Oct 12 (see February *QST*, p 109).

Iberoamericano Contest—SSB, sponsored by the Union de Radioaficionados Españoles (URE), 2000Z Oct 12—2000Z Oct 13. Frequencies: 160-10 meters, IARU band plan. Categories: Iberoamericano (IB) and DX SO, MS, and EA Novice. Exchange: RS and serial number. QSO Points: DX—1 pt with DX and 3 pts with IB, IB—1 pt/QSO. Score: QSO points × IB countries (IB stations count IB countries + DXCC entities and WAE countries) counted once per band. For more information—**www.ure.es**. IB countries are CE, CO, CP, CT, CX, C3, C9, EA, HC, HI, HK, HP, HR, KP4, LU, OA, PY, TG, TI, XE, YN, YS, YV, ZP, 3C. Logs due 30 Nov to **ea5al@ure.es** or to URE Contest Manager, Vicente Aguilella, EA5AL, PO Box 87, 12200 Onda, Castellon, Spain.

North American Sprint—RTTY, 0000Z-0400Z, Oct 13 (see March *QST*, p 114).

Oct 16-18

YLRL Anniversary Party—SSB, 1400Z Oct 16-0200Z Oct 18 (see Oct 9-11).

Oct 19-20

JARTS WW RTTY Contest, sponsored by the Japanese Amateur Radio Teleprinter Society, 0000Z Oct 19—2400Z Oct 20. Frequencies: 80-10 meters. Categories: SOAB, MO, SWL. Exchange: RST and age (multiop sends 99, YL may send 00). QSO Points: own continent—2 pts, diff cont—3 pts per QSO. Score: QSO points × DXCC entities + JA, W, VE and VK call areas counted once per band. For more information—**www.edsoftz.com/JARTS/2002/rules2002.html**. Logs due Nov 30 to **jarts@edsoftz.com** (e-mail logs only).

QRP ARCI Fall QSO Party—CW, sponsored by QRP ARC International, 1200Z Oct 19—2400Z Oct 20, operate 24 hrs max. Frequencies: 1.810, 3.560, 3.710, 7.040, 7.110, 14.060, 21.060, 21.110, 28.060, 28.110, 50.128 MHz. Categories: SOAB, SO-High Band (20-6), SO-Low Band (160-40). QSO Points: member QSOs—5 pts, non-member on same cont.—2 pts, nonmembers on diff cont—4 pts. Score: QSO points × SPC × Power Multiplier (<250 mW ×15, <1 W ×10, <5 W output ×7, >5 W ×1). For more information—**personal.palouse.net/rfoltz/arci/arcitst.htm**. Logs due 30 days after contest to **rfoltz@turbonet.com** or QRP ARCI Contest Manager, Randy Foltz, K7TQ, 809 Leith St, Moscow, ID 83843.

Asia-Pacific Sprint—CW, sponsored by the Asia-Pacific Sprint Contest Committee, 0000Z-0200Z Oct 20. Frequencies: 14.030-14.050 and 21.030-21.050 MHz. Categories: SO <150 W only. Works Asia-Pacific stations only. Exchange: RST and serial number. Special QSY rule. Score: QSOs × WPX prefixes counted once only. For more information and AP country list—**jsfc.org/apsprint**. Logs due 7 days after contest to **apsprint@kkn.net** (Cabrillo format encouraged, no paper logs accepted).

RSGB 21/28 MHz Contest—CW, 0700Z-1900Z Oct 20 (see Oct 5-6).

40th Anniversary Illinois QSO Party—CW/Phone, sponsored by the Radio Amateur Megacycle Society (RAMS), 1800Z, Oct 20-0200Z, Oct 21. Frequencies: 160—2 meters, CW—50 kHz above band edge, Phone—3.890, 7.290, 14.290, 21.390, 28.390 MHz; Novice/Tech—30 kHz above edge of segment. Categories: SO, MS, Mobile. Work stations in each county, county line contacts count for 1 QSO from each county. Exchange: RS(T) and SPC (IL stations send county). QSO Points: Phone—1 pt/QSO, CW—2 pts. Score: QSO points × IL counties (IL stations use states + IL counties + VE provinces + up to 5 DXCC entities). Count additional DX for points, but not multipliers. One bonus multiplier for each eight QSOs with the same IL county. For more information—**my.core.com/~jematz/rams.html**. Logs due Nov 18 to RAMS, c/o John Matz, KB9II, 7079 West Ave, Hanover Park, IL 60103.

Oct 26-27

CQ World Wide DX Contest—SSB, sponsored by *CQ Magazine*, 0000Z Oct 26-2400Z Oct 27. (CW is 0000Z Nov 23-2400Z Nov 24). Frequencies: 160-10 meters. Categories: SOAB and SOSB (HP >100 W, LP, QRP <5 W), MS, MM. MS have 10 minute rule. Exchange RS(T) and CQ zone. QSO Points: same cont—1 pt (NA stations count 2 pts), diff cont—3 pts. Stations in the same entity may be worked for zone credit only. Score: QSO points × CQ Zones + DXCC entities + WAE countries counted once per band. Logs due Dec 1 (Jan 15 for CW) to **ssb@cqww.com** (CW logs to **cw@cqww.com**) or to *CQ* Magazine, 25 Newbridge Rd, Hicksville, NY 11801, USA.

ARRL International EME Contest, 0000Z Oct 26-2400Z Oct 27 (see September *QST*, p 103).

10-10 International CW/Digital Contest, 0001Z, Oct 26-2400Z, Oct 27 (see August *QST*, p 109).

STRAYS

HAM RADIO EQUIPMENT INSURANCE ... THE NEXT ADDITION TO YOUR STATION

◊ The next addition to your ham radio station, and the most important, should be ham radio Equipment Insurance. Your ham radio station has cost you hundreds, if not thousands, of dollars. If you do not have proper insurance to cover your investment, you need to look into purchasing it before a disaster strikes.

In a few months, old man winter will return. Along with him comes snowstorms, freezing rain, high winds, below zero temperatures, which can mean nothing but damage to your ham radio equipment. The cost to replace your damaged equipment can mean nothing but damage to your wallet.

The American Radio Relay League, along with the insurance administrator, has carefully developed a plan to suit its members' needs. Your membership enables you to receive this customized insurance plan designed specifically for ARRL members.

The ARRL "All Risk" Ham Radio Equipment Insurance Plan

"All-Risk" means there are few exclusions to your coverage. You are covered for all loss or damage to equipment from theft, breakage, vandalism, fire, lightning, earthquake, hail, sleet, wind, flood and other accidents and natural hazards. It features coverage to your amateur station, mobile equipment, towers, rotators and antennas. Your equipment is covered while off premises or in transit.

Coverage is also provided for computer software (up to $1000), and hardware that you have scheduled, including related accessories. A new property coverage feature has been added automatically protecting any equipment you purchase valued under $1000. This way, you have protection for equipment purchased at a hamfest.

Don't Let the Unexpected Keep you off the Air!

After a misfortune it is important to get back on the air. Don't get caught uninsured or underinsured. The best scenario is to get back on air as quickly as possible and with the same equipment that you previously had. The "All-Risk" Ham Radio Equipment Plan allows for that. Claims are based on actual replacement cost; you will not have to sacrifice quality in order to get back on the air.

Many people believe their homeowner's policy will cover any loss, but this may not ring true if the loss is due to a natural disaster. Most homeowner's policies won't cover your business-related equipment at your office, home or in your car. If you find one that does provide coverage, it is often subject to a high deductible.

Group buying power enables members of ARRL to obtain this customized insurance plan at competitive rates. It helps keep the cost of this plan down. The cost of this plan is tax-deductible too, as a normal business expense. Consult your tax advisor for details.

Join the thousands of already insured ARRL members. If you would like more information on the ARRL "All-Risk" Ham Radio Equipment Insurance Plan, contact the Insurance Administrator, Marsh Affinity Group Services, a service of Seabury & Smith, by mail at 1440 Renaissance Dr, Park Ridge, IL 60068-1400, by phone at 1-800-503-9230 or visit their Web site at **www.seaburychicago.com**. For more information, see the Marsh advertisement on page 114.

NEW ARRL EXTRA CLASS CERTIFICATE

◊ The Awards Branch of the ARRL Membership Services Department is offering a newly designed Extra Class License Certificate acknowledging the achievements of newly licensed Amateur Extra Class amateurs as well as those who qualified for this license class long ago. The attractive 8½×11 certificate is suitable for framing. ARRL members send $7.50 ($10 for nonmembers) to the Awards Branch, ARRL, 225 Main St, Newington, CT 06111. Be sure to include your name and call sign (exactly as you wish it appear on the certificate), address and the date your Extra Class license was issued (year is close enough). To learn more about ARRL awards, point your Web browser to **www.arrl.org/awards**.

Previous Strays

SPECIAL EVENTS

Greenport, NY: Peconic ARC, W2AMC. 1300Z **Sep 21**-2000Z **Sep 22**. Maritime Festival/ Lightship Nantucket. 14.270 7.270. Certificate. Peconic ARC, PO Box 113, Peconic, NY 11958.

Dallas, TX: Dallas County REACT ARC, W5D. 1500Z-2400Z **Sep 28**. 35th Anniversary of Dallas County REACT. 28.480 21.380 14.280 7.280. Certificate. Dallas County REACT ARC, PO Box 600215, Dallas, TX 75360-0215.

Berlin, PA: Somerset County Amateur Radio Club, K3SMT. 1700Z **Sep 28**-1700Z **Sep 29**. Whiskey Rebellion Days. 28.325 20 M 40 M. QSL. Somerset County Amateur Radio Club, 474 Barnett Rd, Boswell, PA 15531.

Alexandria, MN: Runestone ARC, W0W. 0501Z **Oct 1**-0459Z **Oct 15**. Discovery of America by early Vikings in 1362 (Kensington Runestone). 14.250; 20 m CW; 80 m SSB; 20 m PSK. Certificate. Bill Klundt, 509 Pine St S, Sauk Centre, MN 56378.

Massillon, OH: Massillon ARC, W8NP. 1300Z **Oct 3**-2200Z **Oct 6**. Massillon ARC Diamond Anniversary—75 years. CW all bands, up 35 kHz; SSB 40/20 meters, up 260 kHz, 15/10 meters up 360 kHz. Certificate. Massillon ARC, PO Box 73, Massillon, OH 44648.

Anamosa, IA: Jones County ARC, N0CWP. 1300Z-1700Z **Oct 5**. Anamosa Pumpkinfest, in the pumpkin capital of Iowa. 14.260 ± QRM. Certificate. Jim McClintock, N0CWP, 301 Vine St, Morley, IA 52312.

Milwaukee, WI: US Coast Guard Auxiliary, K9G. 1400Z-2200Z **Oct 5**. 63rd Anniversary of the US Coast Guard Auxiliary featuring ISAR 2002 Search and Rescue competition. 28.390 21.335 14.255 7.235. QSL. George R. Bores, USCG Station, 2420 S Lincoln Memorial Dr, Milwaukee, WI 53207.

Philadelphia, PA: US Coast Guard Auxiliary, K3G. 1400Z-2200Z **Oct 5**. Coast Guard Auxiliary 63rd anniversary. 28.330 21.330 14.270 7.270. QSL. Dan Amoroso, W3DI, 196 Dam View Dr, Media, PA 19063.

Radioville, IN: Porter County Amateur Radio Club, K9PC. 1500Z-2000Z **Oct 5**. Celebrating the history of Radioville. 28.446 21.346 14.246 7.246. QSL. PCARC, PO Box 1782, Valparaiso, IN 46384.

Robbinsville, NC: Smoky Mountains Amateur Radio Team, N4GSM. 1400Z-2000Z **Oct 5**. Anniversary of Cherohala Skyway opening. 14.240 7.240. Certificate. Smoky Mountains Amateur Radio Team, PO Box 517, Robbinsville, NC 28771.

St Thomas, USVI: US Coast Guard Auxiliary, N2A. 1400Z-2100Z **Oct 5**. 63rd Anniversary of the US Coast Guard Auxiliary. 28.355 21.380. QSL. Deborah Thomas, NP2DJ, PO Box 9280, St Thomas, VI 00801.

Starkville, MS: ARRL Day in the Park/MFJ Enterprises, Inc, K5MFJ. 0600Z-1600Z **Oct 5**. Mississippi ARRL Day in the Park/K5FLU 30 Year Business Anniversary. 146.52 14.035 14.245 7.245. Certificate. K5MFJ Commemorative QSL Card, c/o MFJ Enterprises, Inc, 300 Industrial Park Rd, Starkville, MS 39759.

Tarrytown, NY: Amateur Radio Lighthouse Society Members, KA2ZJE/WA2MZZ/NB2D. 1500Z-2100Z **Oct 5**. Activate Tarrytown Lighthouse USA #836. 147.105 147.060 21.370 14.270. Certificate. Mr. I. Felsenfeld, 3354 Nutly Cir, Yorktown Heights, NY 10598.

Anderson, IN: Madison County ARC, W9VCF. 1600Z **Oct 5**-0400Z **Oct 6**. Annual running of the Indiana Derby at Hoosier Park. 21.375 14.255 7.265 145.39/R. Certificate. Mike Brown, K9MI, 2521 E 6th St, Anderson, IN 46012.

Greenfield, IN: Hancock Country ARC, W9RJR. 1700Z **Oct 5**-0100Z **Oct 6**. Honoring Hoosier Poet James Whitcomb Riley. 28.465 21.365 14.265 7.265. Certificate. R. Simcox, AA9XJ, 3780 S Creekside Dr, New Palestine, IN 46163.

Middletown, RI: Newport County RC, W1SYE. 1400Z **Oct 5**-2100Z **Oct 6**. Norman Bird Sanctuary 28th Annual Harvest Fair. 28.400 21.350 14.290 7.240. QSL. W1SYE, PO Box 3103, Newport, RI 02840.

Nellis AFB-Las Vegas, NV: Nellis RAC, N7V. 0001Z **Oct 5**-2359Z **Oct 6**. America's USAF "Aviation Nation" Airshow. 28.460 21.260 14.260 7.260. Certificate. Nellis RAC, PO 363813, N Las Vegas, NV 89036-7813.

Gainesville, GA: Lanierland ARC and GA Baptist Comm Unit GA 14C, W4M. 1400Z **Oct 11**-2100Z **Oct 13**. Mule Camp Days. 21.350 14.325 7.235 3.975. Certificate. Terry Jones, W4TL, 4816 Windwalker Dr, Flowery Branch, GA 30542. **lanierlandarc.org/mule.htm**.

Alton, IL: Lewis and Clark RC, W9LD. 1400Z-2100Z **Oct 12**. Lincoln-Douglas Debate 144th anniversary celebration. 28.370 21.370 14.270 7.270. Certificate. Lewis and Clark RC, PO Box 553, Godfrey, IL 62035.

Brainerd, MN: Brainerd Area ARC, W0UJ. 1400Z-2200Z **Oct 12**. Dedication of our new communications trailer. 28.450 21.350 14.250 7.250. Certificate. BAARC, PO Box 801, Brainerd, MN 56401.

Cairo, MO: Camp Thunderbird, Order of the Arrow, AB0OA. 0000Z-1800Z **Oct 12**. In celebration of the OA Section C-6 Conclave. 28.400 21.350 14.250 7.250. QSL. Doug Mallory, AB0OA, 608 Sherwood Rd, Paris, MO 65275.

Carrollton, OH: The Barberton Public Library Morse Code Preservation Society, W8A. 0900Z-1700Z **Oct 12**. Algonquin Mill Festival. CW/SSB 10-40 meters. Certificate. Joseph Conte, AB8AV, 3764 Johnson Rd, Norton, OH 44203.

Lake Placid, NY: Northern New York ARA, N2Y. 1300Z-2100Z **Oct 12**. NNY Hamfest/ARRL Convention. 147.52 145.11 14.245 7.245. QSL. Richard Sherman, 25 Pines Rd, Malone, NY 12953.

Northridge, CA: San Fernando Valley ARC, W6SD. 1600Z-2400Z **Oct 12**. 55th anniversary of SFVARC. 28.310 21.296 14.345 7.220 PSK31. Certificate. San Fernando Valley ARC, PO Box 280517-0517, Northridge, CA 91328-0517.

Nowhere, KS: Douglas County ARC, W0UK. 1400Z-2100Z **Oct 12**. Midland Historical Railway Train, Baldwin City to Nowhere, KS. 21.365 14.245 7.245 7.044. Certificate. Ken Blair, KC0GL, 1711 W 19th Ter, Lawrence, KS 66046.

Nowhere, IL: Iowa Radiosport Society, W0FUN. 1500Z-2000Z **Oct 12**. The Royal Order of Thuggs Fram-A-Stam event. 14.243. QSL. Iowa Radiosport Society, PO Box 73, Denmark, IA 52624.

Randleman, NC: Tri-County ARC, NC4AR. 1300Z-1900Z **Oct 12**. 14th Annual NASCAR Days Festival. 14.268 7.268. Certificate. NC4AR, PO Box 747, Trinity, NC 27370.

Thomasville, GA: Thomasville Amateur Radio Club, W4UCJ. 1200Z-2000Z **Oct 12**. 35th Annual Fly-In. 28.350 21.350 14.250 7.250. Certificate. Thomasville ARC, PO Box 251, Thomasville, GA 31799.

Thomasville, NC: Tri-County ARC, NC4AR. 1400Z-1900Z **Oct 12.** 150th Anniversary of Thomasville, NC, Heritage Days. 14.278 7.278. Certificate. NC4AR, PO Box 747, Trinity, NC 27370.

Easton, PA: Frankford RC, W3FRC. 1600Z **Oct 13**-2300Z **Oct 14**. 75th Anniversary of the Frankford RC. 21.380 14.280 7.280. QSL. John Lindmeier, 12479 Barbary Pl, Philadelphia, PA 19154.

Gainesville, GA: Lanierland ARC and GA Baptist Comm Unit GA 14C, W4M. 1400Z **Oct 18**-2100Z **Oct 20**. Georgia Special Olympic Games. 21.350 14.325 7.235 3.975. Certificate. Terry Jones, W4TL, 4816 Windwalker Dr, Flowery Branch, GA 30542. **lanierlandarc.org**.

Festus, MO: Jefferson County ARC, KB0TLL. 1700Z-2000Z **Oct 19**. Great Ozark Chili Cook Out. 147.075 7.240. QSL. Lori Robinson, KB0WWQ, 3168 Old Hwy A, Festus, MO 63028.

Newport News, VA: Peninsula Amateur Radio Club and The Mariner's Museum, W4MT. 1300Z-2000Z **Oct 19**. Raising the turret of the Civil War ironclad USS *Monitor*. 28.360 21.360 14.260 7.260. Certificate. Rick Thomasson, WB4GQA, 42 Glendale Rd, Newport News, VA 23606.

Concord, CA: Mount Diablo ARC, W6CX. 1600Z **Oct 19**-1900Z **Oct 20**. Pacificon Convention and the Boy Scout Radio Jamboree. 28.390 21.360 14.290 14.230 (SSTV). QSL. MDARC, PO Box 23222, Pleasant Hill, CA 94523.

Crescent City, CA: KA6SPQ. 1500Z **Oct 19**-2100Z **Oct 20**. St George Reef Lighthouse—Activated Oct 20, 1892. 28.400 21.300 14.250 7.250. Certificate. Bill Wortell, KA6SPQ, PO Box 1653, Crescent City, CA 95531. **ka6spq@charter.net**.

Nutley, NJ: Robert D. Grant United Labor ARA, N2UL. 1200Z **Oct 19**-2300Z **Oct 20**. JOTA, Patriot's Path Council BSA HQ at Mountainside, NJ. 28.420 21.375 14.260. Certificate. RDGULARA, c/o WA2VJA, 112 Prospect St, Nutley, NJ 07110-1716.

Ventura, CA: Poinsettia ARC, WA6BMH. 1700Z-2300Z **Oct 20**. Poinsettia ARC 70th Anniversary. 28.350 21.350 14.250. QSL. Poinsettia ARC, PO Box 268, Ventura, CA 93002.

Chattanooga, TN: Chattanooga ARC, W4C. 1800Z **Oct 25**-2100Z **Oct 26**. Hamfest Chattanooga. 14.225 7.225. QSL. Loyd C. Headrick, 30 S Germantown Rd, Apt 7, Chattanooga, TN 37411.

Visalia, CA: Tulare Country ARC, WA6BAI. 2300Z **Oct 26**-0400Z **Oct 27**. 150th Anniversary of Tulare County. 10-20-40 m, 146.880 MHz. Certificate. WA6BAI, PO Box 723, Visalia, CA 93279.

Certificates and QSL cards: To obtain a certificate from any of the special-event stations offering them, send your QSO information along with a 9×12 inch self-addressed, stamped envelope to the 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 an SASE (send to Special Requests, ARRL, 225 Main St, Newington, CT 06111, and write "Special Events Form" in the lower left-hand corner). You can also submit your special event information on-line at **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; that is, a special event listing for **Dec** *QST* would have to be received by **Oct 1**. Submissions may be mailed (Attn: Maty Weinberg), faxed (860-594-0259) or e-mailed (**events@arrl.org**) to ARRL HQ. QST

Maty Weinberg, KB1EIB ♦ Special Events ♦ events@arrl.org

By Scott Robbins, W4PA

2002 ARRL International DX CW Contest Results

"So it has been, so it will always be."

Contesters worldwide were treated to another round of phenomenal HF propagation for the 2002 running of the ARRL DX CW contest on February 16 and 17. At the solar maximum, we contesters tend to adopt the "so it has been, so it will always be" attitude about contest band conditions. "Of course 20 meters will always be open all night. I'll make hundreds (or thousands) of contacts on the high bands, just like I did last year. Those elusive multipliers will show up over the pole just when I need them. I don't need a linear amplifier; I can work anything I hear."

"So it has been, so it will always be." At least for 2002, the axiom held true. Band conditions easily rivaled the great propagation noted for the 2001 running, which had been described by some as maybe the best ever for ARRL DX CW. The top multi-multi stations made contacts in all 48 hours of the event on 20 meters. They worked thousands of contacts—on 10 meters alone. One of the top-10 High Power ops made a contact in 40 of the 48 hours on 20 meters, missing contacts only on hours when 10 and 15 were so open that to be on 20 at that time would have been strategy-deficient.

"So it has been, so it will always be." I am sure Greg Cronin, W1KM, would disagree with that sentiment. One only need look as far as W1KM's winning single op High Power effort in the 1996 contest when he stomped the competition with a fabulous 10 meter contact total of… four! That's a far cry from the heady high band QSO totals of these past few years.

"So it has been, so it will always be." Low bands great during the top of the sunspot cycle? What? "This was my seventh or eighth trip down there," says 8P9JA operator Jim Stevens, K4MA, "except for possibly one trip at the bottom of the prior cycle, the low bands were absolutely the best I have ever heard from there. Even more amazing was that we got two good nights in a row."

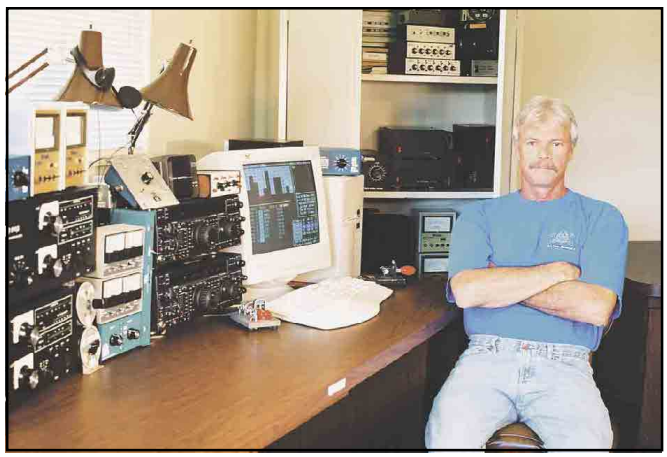
"So it has been, so it will always be." Yes, and no. Familiar faces and newcomers alike appear in the top 10 boxes spread among the various contest categories. 1969 Low Power winner John Comella, N8AA (ex-W8QXQ), operating from the same metro Cleveland QTH as then, credits a modern HF transceiver, better antennas and the advent of contest logging software for his ability to keep up the pace and dit-dah his way to a 2002 #8 Low Power finish. Not to mention a snappy new call sign, eh, John?

Contesting conventional wisdom today is that you simply cannot effectively compete without the benefit of multiplier-spotting aids. It was with great interest this year when John Golomb, N2NC, of the N2RM Multi-2 crew announced they were going to try operating the 2002 ARRL DX CW without the benefit of spotting to see if they could be competitive in the Multi-2 category. The gang at 'RM have proven that, indeed, one can be competitive in the multi-op categories without spotting aids by taking the #1 spot after hunting down each and every one of the multipliers they worked without assistance outside the shack.

W/VE QRP

The winner's circle for the single operator QRP category was occupied by Fred Sanborn, KG9X, from Illinois. While reasonably close to other QRP entrants at 1627 contacts (a total of 7 QRP logs would top 1000 QSOs each), Fred's multiplier total of 375 vs 325 for N4KG and 308 for K2DM powered his station to a score of 1,830,375 and his first ARRL DX CW QRP victory. His final score was 1,830,375.

George Briggs, K2DM, keyed his New Jersey station to a second place QRP finish…for the third time! Tom Russell, N4KG (AL), fought hard and came in with



Mike, KH6ND, became the first winner of the DX CW contest from the Pacific since 1971.

Expanded 2002 International DX CW Contest Results Available on *ARRLWeb*

Interested in more in-depth coverage of the final results? Wish you had an easy way to search the data and compare your efforts to others? Wonder how your individual band by band breakdowns compared to your rivals?

You can now find this information and more at the ARRL Contest Results Web site at **www.arrl.org/contests/results**. ARRL members can read an expanded write-up of the results coverage, view enhanced Top Ten box scores and see what kind of station equipment top stations are using. The Online Soapbox includes photographs and interesting stories from many of the competitors.

Using the interactive searchable database, you can do your own analysis of the contest results. What bands were the best for the top stations in my class? Where might I consider spending more time during the next contest to improve my score? What type of antennas work well for other stations?

A wealth of additional information awaits you at the ARRL Contest Results online. Visit today.

Top Ten—US

Single Operator High Power

K5ZD (W4PA,op)	6,173,244
K1DG	5,629,746
AA1K	5,276,700
W9RE	5,063,502
K1ZZ	5,045,175
N2IC	4,902,660
W1WEF	4,854,462
K2UA	4,789,530
K5GN	4,628,520
K3CR (LZ4AX,op)	4,446,192

Single Operator Low Power

W1UK	3,123,012
K7SV	2,901,756
KS1J	2,898,252
N2NT (LU9AY/W2,op)	2,836,095
N4TZ	2,804,970
K1VUT	2,751,960
K0SR	2,575,620
N8AA	2,559,609
N4ZZ	2,549,385
K8PO	2,333,028

Single Operator QRP

KG9X	1,830,375
K2DM	1,375,836
N4KG	1,288,950
VA3TTT	907,581
NA4CW	840,465
W9WI	806,607
N7IR	795,795
N0UR	772,548
N7OU	725,040
N9CIQ	722,724

Single Operator Assisted

K3WW	7,007,520
K2NG	5,260,104
KI1G	4,974,318
AA3B	4,439,244
KQ3F	4,323,564
N2MM	4,222,944
W2RE	4,143,480
W7/DL3OI	4,103,280
N1EU	3,984,087
W3FV	3,548,484

10 Meters

W4ZV	700,488
K9NW	650,430
K2VV/0	623,700
N9AG	594,243
K5RX	558,252
N7KU (NJ6D,op)	449,400
K4WI	425,418
W6YA	408,912
K7QQ	376,200
K7BG	375,813

15 Meters

N2MF	631,344
K4VX/0 (K9BGL, op)	572,094
VE6JY (TI2WGO,op)	563,997
K5MR	523,050
K4OAQ	512,550
W7UT	386,640
W8FT (AA8UP,op)	336,798
WF3J	321,912
VE3MQW	225,432
WA1FCN	217,959

20 Meters

W7WA	590,208
W5MX	550,278
WE1USA (WA1LNP,op)	447,480
VE6EX (@VE6JY)	392,196
WB2DVU	172,800
W8TWA	126,063
K7ABV	123,372
K9CAN	97,944
VE3XL	79,680
WY3T	78,003

40 Meters

KT3Y	388,194
N4PN	346,626
W5AO	267,840
VE6WQ (@VE6JY)	230,496
WB9Z	212,184
K6TA	203,964
N1RL	96,789
K9CJ	51,870
W9GXR	51,546
K3XXX (K8BK,op)	50,808

80 Meters

W1MK	258,315
K1PX	74,112
K8AQM	67,308
N3DL	54,600
W4VQ	34,968
VE3PN	30,690
K3SV	30,447
W7DD	18,963
K4IE	12,696
NA2X	11,844

160 Meters

VY2ZM	127,800
W8TOP (W8UVZ,op)	14,076
K4TEA	11,844
K3JJG	10,998
VE3DO	4,284
W2VO	3,690
NX5M	3,108
VE3OSZ	2,688
N0TT	2,592
N5FG	1,320

Multioperator Single Transmitter

K8AZ	6,752,262
W3BGN	6,317,595
K1IR	5,896,380
K2WI	5,561,322
AA2FB	5,089,854
N0NI	5,049,414
N0DY	4,304,040
WT1T	4,239,960
NE3F	3,733,173
WN9O	3,063,042

Multioperator Two Transmitters

N2RM	12,216,933
K1AR (@K1EA)	11,955,648
K1KI	10,723,380
W4AN	10,693,257
N3RS	10,610,379
K4JA	9,931,320
K8LX	7,642,866
W5KFT	5,867,100
N5TW	5,650,512
N4TO	4,955,136

Multioperator Unlimited Transmitters

KC1XX	17,542,008
W3LPL	17,530,500
K3LR	17,127,864
K9NS	15,634,296
K1XM	14,354,664
K1RX	12,801,348
W4MYA	11,955,648
NY4A	11,586,816
K1TTT	11,198,616
K8CC	11,173,869

a solid third place effort, his QSO total not able to offset K2DM's multipliers for second place, as they finished only 86k apart—1,375,836 to 1,288,950.

W/VE Low Power

It was Jim Parise, W1UK, operating from Connecticut and taking the top Low Power spot with 2683 QSOs and 388 multipliers for a score of 3,123,012. Jim has spent countless hours planning his station at the new QTH as well as significant time working with local planning and zoning officials as he engineered his station to meet tough local restrictions. It is a victory hard fought on many fronts.

Behind leader W1UK, there was a dogfight for the next five positions, with only 150k points separating positions 2 through 6. It was Larry Schimelpfenig, K7SV (VA), finishing #2 with George Johnson, KS1J (CT), Matt Vanni, LU9AY, operator at N2NT (NNJ), Terry Zivney, N4TZ (IN) and Dave Clemons, K1VUT (EMA), in close pursuit.

W/VE High Power

Scott Robbins, W4PA, traveled from Knoxville, Tennessee, to the well-equipped Massachusetts station of K5ZD to take the #1 position with a score of 6,173,244. His 2002 score marks only the third time that the 6 million-point plateau has been topped in the High Power category.

Topping the 4000 QSO mark along with Scott were 2nd and 3rd place finishers Doug Grant, K1DG, in New Hampshire at 5,629,746 and Jon Zaimes, AA1K, in Delaware at 5,276,700. K1DG's 5.6 million-point effort was good for his 4th consecutive top-10 High Power finish.

W/VE Single Op, Assisted

Also called "single op distracted" by some unable to master watching packet spots and running a pileup at the same time, this category has seen some impressive score totals racked up over the past few years. 2002 was no exception with Charles Fulp, K3WW (EPA) coming in over the 7 million point mark for a convincing first place Single Operator Assisted finish. The "distracted" label does not apply here; not only did Charles beat all of the unassisted High Power entrants for QSO total (4494), he racked up a single op second-best 520 multipliers to cruise to victory.

Finishing second to Chas in this competitive category was Noah Gottfried, K2NG, with a score of 5,260,104 from his QTH in Northern New Jersey. Rick Davenport, KI1G, finished with New England-best score of 4,974,318 (RI), while a couple of "Joe's" also from Eastern PA stations took fourth and fifth place—Joe "Bud" Trench, AA3B, 4,439,244 and Joe Stepansky, KQ3F, 4,323,564.

W/VE Single Band

Jeff Briggs, K1ZM (brother to #2 QRP finisher K2DM), traveled to his 'alter ego' station on Prince Edward Island in Atlantic Canada to operate VY2ZM to a runaway win in the 160 meter Single Band category, making an amazing 600 DX contacts on top band for a 127k score. The VY2ZM score also more than doubles the previous W/VE 160 meter single band record. On Single Band 80 meters, veteran low band entrant, Robye Lahlum, W1MK operated his way to his 9th consecutive victory with more than 1000 QSOs and a final score of 258,315 points.

The higher band categories each featured a closer race than the low bands, with Phil Allardice, KT3Y topping Paul Newberry, N4PN, for the Single Band 40 meter win. On Single Band 20 meters, WRTC competitor Dan Handa, W7WA, came in #1, topping Bryan Bydal, W5MX, by a comfortable 7% margin to take home a plaque. Single Band 15 meters saw a fairly competitive run with 5 stations in contention. It was Brian Edward, N2MF, outpacing K4VX (K9BGL, op), to take home the 15 meter wood. Finally, Single Band 10 meters featured a competitive finish with Bill Tippett, W4ZV setting a new scoring record at 700,488 points. K9NW, K2VV/0 and N9AG finished #2, 3 and 4 behind Bill and all three of them scored above the previous category record as well.

W/VE Multi-Op Categories

In the Multioperator Single Transmitter category it was a fine effort by the members of the North Coast Contesters, operating K8AZ (OH) to a solid first place finish with a score of 6,752,252. Close behind were W3BGN (EPA) at 6,317,595 and K1IR (EMA) at 5,896,380.

The Multioperator Two Transmitter category featured a race between the "packet-less" team at N2RM (SNJ) and K1AR (at K1EA in WMA)), with N2RM prevailing by a score margin of approximately 2% to win from southern New Jersey. Coming in a strong third and fourth behind the leaders were Connecticut's K1KI and the north Georgia superstation of W4AN.

The super-competitive Multi-Multi category featured the closest race of 2002 and in the end it came down to less than a one-thousandth of one percent score margin separating the top two finishers for not only the victory but the new multi-multi scoring record. It was the crew at KC1XX in NH pulling it off with 17,542,008 points to W3LPL's 17,530,500 final tally from MDC. How close is that? One more multiplier or six more contacts (out of some 9000 for each station), W3LPL wins.

DX High Power

Hawaii can be either a plus or a minus for contest operation. During the run peaks

Top Ten—DX

Single Operator High Power

KH7R (KH6ND, op)	4,351,074
EA8BH (OH2BH,op)	4,262,853
VP5U (AJ6V,op)	4,043,637
V31JP (K8JP,op)	3,856,620
FG/YL2KL	3,685,407
TM5C (F6ARC,op)	3,380,076
WP2Z (N2NI,op)	3,148,761
J37ZA (K2KQ,op)	3,128,664
G4BUO	3,093,960
V47KP (W2OX,op)	2,767,770

Single Operator Low Power

P40W (W2GD,op)	3,899,097
VP5GA (N2GA,op)	3,586,320
VP9/W6PH	3,017,556
XE1/N6AN	2,199,996
J38A (K4LTA,op)	2,094,960
PJ7/ND5S	1,976,688
EA7GTF	1,686,528
JH4UYB	1,336,680
KH0/JM1LRQ	1,319,310
YO3APJ	1,238,076

Single Operator QRP

LZ7X	961,350
V31AH (W0AH,op)	958,365
LY5A (LY2PAJ,op)	838,368
KL7AC	435,333
DL3KVR	402,375
SP6AYP	336,765
SP5DDJ	333,576
EU8RZ	324,960
I1BAY	300,900
HB9BMY	280,332

10 Meters

EI4BZ	254,619
M0TTT	253,995
G3WVG	235,944
G4TSH/P	232,578
9A5Y	224,967
F5MZN	219,126
S50K	217,710
DL6RAI	215,238
S56M	211,515
OM1CW	206,736

15 Meters

5U9C (I2UTY, op)	345,150
GM3POI	306,033
OH6AC	273,780
SP5GRM	244,260
S51TA	221,781
PI4TUE (PA3EZL,op)	208,506
TI7/N4MO	208,278
YT0A	204,450
OT2H (ON5YR,op)	198,186
4O6A (Z32AF,op)	198,012

20 Meters

OH4A (OH6QU,op)	294,060
OK1RF	281,076
YT9X	272,340
RA1ACJ	267,480
IU9S	233,817
IO4L	230,376
LY6A (LY2BM,op)	194,877
LY9A (LY3BA,op)	178,872
UZ8M (US0MR,op)	159,558
RW9UP	159,384

40 Meters

C6AKQ	229,140
4U1ITU (OM3CGN, op)	195,402
SP2FAX	181,080
HA8IB	163,548
S53M (S53ZO,op)	159,384
OM0M	156,114
S57DX	154,164
GW7X (GW3NJW,op)	151,164
YT7A (4N7DW,op)	146,910
SP4Z	125,628

80 Meters

C6A/K7RE	166,026
G0IVZ	123,255
OT2T (ON4UN,op)	116,316
TM2Y (F5MZN,op)	107,172
YV4GLD	98,010
EA8ZS	94,608
PV8DX	79,866
S59CAB (S57MW,op)	65,661
H6C (YN4SU,op)	63,063
DJ0MDR	59,211

160 Meters

XE2AC	44,100
IK4MGP	13,137
S57M	13,104
HA5JI	9,153
OM5RW	8,352
ON4BR	6,072
F8BPN	4,692
G4OBK	576
UX0IB	504
OM7CW	270

Single Operator Assisted

V26G (N2ED,op)	3,936,000
DK3GI	2,446,386
M0SDX	2,328,339
DK8ZB	2,284,200
OT2L	1,808,325
OH6NIO	1,507,257
G3LZQ	1,281,180
OM5AW	1,168,170
JN2AMD	1,138,371
JY9NX (JM1CAX,op)	1,123,626

Multioperator Single Transmitter

8P9JA	5,133,441
ZF2NT	5,094,336
ZF1A	4,786,950
6D2YFM	4,337,658
PJ2T	4,333,560
KL7Y	3,802,554
T48K	3,409,776
KG4DZ	3,177,366
HG1S	2,861,685
OA4O	2,776,284

Multioperator Two Transmitters

RU1A	3,987,210
9A7A	3,766,008
OH0R	3,765,720
HG6N	3,661,038
ES6Q	3,300,387
RM6A	3,157,272
OL7W	2,961,288
SK3W	2,452,056
UU2JQ	1,933,620
JA1YFG	1,519,746

Multioperator Unlimited Transmitters

MD/DL5AXX	6,063,552
9A1A	5,620,692
JA3YBK	3,568,740
LY7Z	3,503,520
OZ5W	3,341,844
LY7A	2,880,459
LT1F	2,577,390
YZ7A	2,012,310
JA1YPA	1,268,148
M3S	239,592

Plaque Winners

Congratulations to the winners of the following sponsored plaques for the 2002 ARRL International DX CW Contest.

Plaque Category	*Winner*	*Plaque Sponsor*
W/VE Single Operator High Power CW	K5ZD (W4PA, op)	Frankford Radio Club
W/VE Single Operator Low Power CW	W1UK	Dauberville DX Association
W/VE Single Operator QRP CW	KG9X	Tod Olson, K0TO
W/VE Single Operator Assisted CW	K3WW	Pete Carter, K3VW Memorial
W/VE 3.5 MHz CW	W1MK	SM3DMP
W/VE 7 MHz CW	KT3Y	Northern Arizona DX Association
W/VE 14 MHz CW	W7WA	QSLs by W4MPY
W/VE 21 MHz CW	N2MF	Carl Luetzelschwab, K9LA
W/VE 28 MHz CW	W4ZV	Green River Valley, IL ARS
W/VE Multioperator Single Transmitter CW	K8AZ	Northern Illinois DX Association
World Single Operator High Power CW	KH7R (KH6ND, op)	North Jersey DX Association
World Single Operator Low Power CW	P40W (W2GD, op)	Jim Stevens, K4MA
World Single Operator QRP CW	LZ7X	Jerry Griffin, K6MD
World Single Operator Assisted CW	V25G (N2ED, op)	Willamette Valley DX Club
World 1.8 MHz CW	XE2AC	In Memory of DL1FF
World 7 MHz CW	C6AKQ	Faisal Al Ajmi
World 28 MHz CW	EI4BZ	Ft Wayne DX Association
World Multioperator Two Transmitter CW	RU1A	Tom De Meiss K2TD Memorial
World Multioperator Unlimited CW	MD/DL5AXX	H Stephen Miller, N0SM
Single Operator Asia CW	JH5FXP	Alamo DX Amigos
Single Operator Europe CW	TM5C (F6ARC, op)	Jerry Griffin, K6MD
Single Operator North American CW	VP5U (AJ6V, op)	Potomac Valley Radio Club
Asian Multioperator Single Transmitter CW	JR3NZC	Yankee Clipper Contest Club
Europe Multioperator Single Transmitter CW	HG1S	The Radio Place
North America Multioperator Single Transmitter CW	8P9JA	Gary Stilwell, KI6T, and Glenn Stilwell, WR6O
Europe Multioperator Two Transmitter CW	9A7A	Jim George, N3BB
Caribbean Multioperator Single Transmitter CW	ZF2NT	The YASME Foundation
Europe Multioperator Unlimited CW	9A1A	Texas DX Society
Japan Low Power All Band CW	7L4IOU	Western Washington DX Club
Ninth Call Area All Band CW	W9RE	Northern Illinois DX Association
Seventh Call Area All Band CW	W7GG	Willamette Valley DX Club
Central Division High Power All Band CW	N9CK	Society of Midwest Contesters
Central Division Multioperator Single Transmitter CW	WN9O	Society of Midwest Contesters
Rocky Mountain Division Single Operator Low Power CW	K0RI	Grand Mesa Contesters of Colorado

Overall category winners, continental winners, ARRL Division winners or US call area winners may purchase their un-sponsored plaque for $60 by contacting the ARRL Contest Branch at 860-594-0295. Inquiries may also be sent via email to **contests@arrl.org**.

for ARRL DX CW, the vast majority of North America is looking to Europe and the Caribbean, making North American runs not terribly easy from KH6 for many hours during the contest. To win from west of NA requires tenacity and skill!

2002 turned out to be a "plus" year for Hawaii and KH7R operator Mike Gibson, KH6ND. Mike keyed his way to 4291 QSOs for a score of 4,351,074 and victory over second place finisher Martti Laine, OH2BH, operating from his world-class station at EA8BH and posting a final score of 4,262,853. This is the first single op, high power ARRL DX CW win from the Pacific since 1971.

Ed Radlo, AJ6V, accepted the Caribbean challenge and took third place in the category from VP5U and was the top North American finisher with a score of 4,043,637. TM5C was operated by Joseph Cornee, F6ARC, and was the top European finisher and sixth place overall. Satoshi Hara, JH5FXP, was tops among Asian participants and Eduardo Schmidt, OA4SS, finished first among South American participants.

DX Low Power

John Crovelli, W2GD, made his umpteenth journey to the scenic isle of Aruba to operate P40W to a first place finish in the Low Power category. His score of 3,899,097 would have been good enough for a #4 High Power placing and sets the new South America continental record for a Low Power entrant.

Following John at the top was Kurt Pauer, who was the operator for VP9/W6PH and was tops among North American participants. The top European station was Manuel Osorio, EA7GTF, who finished seventh overall while Masaki Okano, JH4UYB, was the top Asian participant, finishing eighth. The continental winners were completed by Nobuyuki Arai, KH0/JM1LRQ, in ninth place with the top Oceania score and Jacques Saget, F6BEE, operating CN2JS from Africa.

DX QRP

The QRP category saw a close race between Dimitar Raitchev, LZ7X, and Doug Allen, W0AH, operating V31AH. LZ7X made 1450 QSOs for a 961k score, just enough to squeeze by V31AH at 958k. They were the European and North American continental winners. 3V8SM, operated by Carsten Esch, DL6LAU, was the top African station in the category while Hisami Dejima, 7L4IOU, posted the winning score from Asian stations. The Oceania winner was Dale Law, who operated as DU7/N7ET, while the top South American score was posted by Alex Correia, PY1KS.

DX Single Assisted

Single Operator Assisted category saw Ed Wlodarski, N2ED, operate from

Antigua as V26G and come in with a runaway victory at just shy of 4 million points. Ed was the top North American in the category. There was a close race for the next three spots with Roland Mensch, DK3GI, taking top European honors and edging out Sergey Rebrov, M0SDX, and Barney Bandrack, DK8ZB. All three finished in the vicinity of 3 million with only 150k separating them. Satomi Yamauchi, JN2AMD, was the top finisher in the category among Asian stations and finished ninth overall.

DX Single Band

Victories in the single band categories were notched by Luis Delgadillo, XE2AC, on 160, Brian Kassel, C6A/K7RE, on 80, Bob Patten, C6AKQ (N4BP), on 40, Jari Koski, OH4A (OH6QU), on 20, Paolo Cortese, 5U9C (I2UIY), on 15, and Dave Moore, EI4BZ, on 10. A total of 475 single band entries were received from among the 1240 DX logs received—a remarkable 38% of all DX entries.

DX Multi-Op Categories

In the DX multi-single category it came down to a close race between a pair of two-man operating teams in the Caribbean. Jim Stevens, K4MA, and Will Roberts, AA4NC, operating from Barbados as 8P9JA were able to maintain their edge in the claimed scoring to take the victory. Second place finishers Bruce Sawyer, N6NT, and Rick Tavan, N6XI, operated from Bruce's house in the Cayman Islands as ZF2NT. The 11 additional multipliers worked by 8P9JA led to win by a score of 5,133,441 to 5,094,336. The PJ2T team was the top score in South America and placed fifth overall in the category. HG1S was the top score from Europe while JR3NZC posted the highest score from Asia.

DX Multi-Two featured a close race… at least after the leader. It was the Russian team of RU1A (including WRTC-2002 silver medallist RV1AW on the operator list) who will take home top honors with a fine 3.98 million point effort. The race began at the #2 and #3 positions, with 9A7A edging out the group at OH0R in the Åland Islands by a margin of less than one QSO to take second place. The team at JA1YFG was the top non-European finisher, winning Asian continental honors.

The Germans on the Isle of Man are this year's DX multi-multi category winner, operating MD/DL5AXX to a solid victory over 9A1A for top European honors by a score of 6,063,552 to 5,620,692. JA3YBK's 3,568,740 score was good for third place and the top score from Asia. Finally, the team manning LT1F had a score of 2,577,390 and was the top reporting team from South America.

Coda

As the sunspot cycle declines, it is interesting to follow the discussion in the contest community about whether we have reached the golden era of radio contesting. Scoring and participation levels have never been higher. Band conditions for the last three years have been superb. Most importantly, enthusiasm is infectious. Be positive, set a good example, and let all of us enjoy the sport of contesting for many years to come. The 2003 ARRL International DX CW contest will be held February 15-16. See you next year!

Scores

Scores are listed by DXCC Entities and ARRL/RAC Sections. Within each Entity or Section, scores are listed in descending order, by power categories, followed by multi-operators. Line scores list call sign, score, QSOs, multipliers, power (A = QRP, B = Low Power, C = High Power), and band (if single band entry).

CW

W/VE

Single Operator

1

Connecticut

N1TM	408,408	616	221	A	
K1ZE	134,100	298	150	A	
K1RFD	64,440	179	120	A	
W1UK	3,123,012	2683	388	B	
VA3PL	140,640	293	160	B	
W3TB	9,450	75	42	B	
N1KB	3,906	42	31	B	
K1ZZ	5,045,175	3957	425	C	
W1WEF	4,854,462	3686	439	C	
KQ2M	4,283,928	3606	396	C	
NT1N	1,767,780	1610	366	C	
K1VDF	1,241,391	1717	241	C	
K1RM	646,425	1105	195	C	
AK1N	533,970	698	255	C	
N1JW	204,828	404	169	C	
WY1U	157,035	361	145	C	
K1PX	74,112	386	64	C	80
WA1FCN	217,959	749	97	B	15

Eastern Massachusetts

K1VUT	2,751,960	2584	355	B	
K1VR	2,203,350	1985	370	B	
W1WAI	1,612,524	1619	332	B	
K1HT	1,181,178	1266	311	B	
N1DC	987,651	1281	257	B	
WG1Z	714,168	872	273	B	
N3KCJ	639,768	874	244	B	
N1DS	404,976	649	208	B	
W1TE	387,945	555	233	B	
WB1FLA	160,920	360	149	B	
KQ1F	109,272	314	116	B	
W1TW	107,184	232	154	B	
KR1B	102,060	315	108	B	
KY1B	84,294	223	126	B	
WA1OLV	22,080	115	64	B	
AA1ON	1,849,002	1766	349	C	
K1GU	1,333,443	1517	293	C	
N1AU	530,796	623	284	C	
W1FM	79,296	236	112	C	
NF1A	44,616	143	104	C	
W1MK	258,315	1013	85	C	80

Maine

KA1IS	1,328,547	1397	317	B	
W1AH	801,270	921	290	B	
K1SWG	121,275	275	147	B	
N1LW	98,643	251	131	B	
K1PQS	946,344	1204	262	C	
K1QS	64,944	246	88	C	20
K0ZK	2,673	33	27	A	10

New Hampshire

AA1CA	500,175	675	247	A	
KN1H	64,176	191	112	A	
WA1Z	511,872	688	248	B	
AE1T	256,128	464	184	B	
KB1T	220,800	368	200	B	
AE1D	98,643	251	131	B	
K1NH	65,550	230	95	B	
W1DAD	1,794	26	23	B	
K1DG	5,629,746	4027	466	C	
KR1G	4,123,548	3471	396	C	
WC1M	2,809,170	2730	343	C	
K2TE	1,847,973	1861	331	C	
KC1F	1,805,364	2134	282	C	
W1ECT	1,615,050	1850	291	C	
K1BV	576,612	1124	171	C	
K1BD	176,823	333	177	C	
WE1USA (WA1LNP,op)					
	447,480	1356	110	B	20
KA1API	2,952	41	24	A	20
W1END	92,400	400	77	B	10
KG1V	26,871	169	53	B	10

Rhode Island

KS1J	2,898,252	2597	372	B	
K1VSJ	1,506,492	1508	333	B	

Vermont

W1SA	52,020	204	85	A	
K8EP	2,213,562	2183	338	B	
K1IB	595,140	910	218	B	
W1ECH	265,500	500	177	B	
K1KU	122,181	293	139	B	
W1ZK	1,078,734	1103	326	C	

Western Massachusetts

W1KT	600,660	705	284	B	
K5ZD (W4PA,op)					
	6,173,244	4454	462	C	
KV1W	41,850	150	93	C	
N1RL	96,789	419	77	B	40

2

Eastern New York

W2ENY	109,200	280	130	A	
W2QYA	22,425	115	65	A	
AI2L	300,228	508	197	B	
KE2I	58,464	174	112	B	
KC2WA	49,140	156	105	B	
N2SQW	40,131	147	91	B	
NA2NA	18,048	94	64	B	
K2ZVI	17,622	89	66	B	
K2RI	12,144	88	46	B	
W2XL	2,571,360	2435	352	C	
WE2F	1,898,460	1990	318	C	
K2BX	748,800	768	325	C	
NA2M	417,009	607	229	C	
WX2N	46,989	227	69	B	15

NYC-Long Island

WA2VZQ	357,435	611	195	B	
N2GC	2,415,660	2119	380	C	
WB2TPS	568,227	737	257	C	
WB2AMU	46,782	226	69	B	40
K2MFY	214,032	686	104	B	10

Northern New Jersey

K2DM	1,375,836	1489	308	A	
K2JT	385,710	598	215	A	
W2JEK	44,436	161	92	A	
N2NT (LU9AY/W2,op)					
	2,836,095	2663	355	B	
W2CVW	186,624	384	162	B	
N2KPB	142,128	282	168	B	
N2LK	136,500	325	140	B	
WA2VQF	110,160	270	136	B	
K2YLH	7,920	55	48	B	
WA2NXK	588	14	14	B	
N2LT	4,202,109	3359	417	C	
WA2VYA	2,099,916	1923	364	C	
W2UDT	351,216	542	216	C	
K2JAY	166,251	367	151	C	
WA4ATJ	64,680	196	110	C	
K2WJ	34,272	204	56	C	40
KX2S	37,026	187	66	B	20
AE2JL	45,000	250	60	B	15
NA2U	305,760	980	104	A	10
N2GM	157,077	563	93	B	10
N2CG	59,625	265	75	B	10

Northern New York

N2JNZ	201,411	417	161	A	
WZ2T	126,900	300	141	A	
NS2P	548,334	743	246	B	
NT2W	71,760	208	115	B	
K2CC (KC2BMG,op)					
	11,376	79	48	B	
K3KYR	38,592	192	67	B	40

Southern New Jersey

WK2G	1,218,216	1544	263	B	
WA2VQV	470,475	697	225	B	
K2UR	314,577	549	191	B	
W2OB	297,606	514	193	B	
K2VT	153,057	313	163	B	
WA2IAU	70,035	203	115	B	
K2MK	68,400	228	100	B	
W2ESX	65,565	235	93	B	
AD3Y	38,250	150	85	B	
N2MR	1,353,387	1561	289	C	
K2OWE	456,228	667	228	C	
K2UT	316,764	419	252	C	
N2RF	42,834	242	59	B	10
K2SWZ	4,092	44	31	C	10

Western New York

W2TZ	2,146,887	2111	339	B	
K2KIR	1,782,801	1753	339	B	
WA2YSJ	506,352	616	274	B	
WA2EYA	478,170	770	207	B	
WB2HJV	272,175	475	191	B	
W2EZ	242,352	459	176	B	
N2CK	152,760	380	134	B	
KV2X	54,279	163	111	B	
W2DXE	33,147	127	87	B	
K2UA	4,789,530	3942	405	C	
W2FU	3,275,250	2750	397	C	
K2NV	2,151,846	1998	359	C	
KU2N	677,160	792	285	C	
KA2MGE	647,220	805	268	C	
KE2WY	538,230	770	233	C	
W2LC	517,752	918	188	C	
W2FUI	305,319	469	217	C	
W2VO	3,690	41	30	C	160
NA2X	11,844	84	47	C	80
K2FA (KA2KQP,op)					
	13,200	100	44	B	40
WB2DVU	172,800	640	90	B	20
N2MF	631,344	1879	112	C	15

3

Delaware

N9GG	26,100	116	75	B	
AA1K	5,276,700	4100	429	C	

Eastern Pennsylvania

KB3TS	294,273	519	189	A	
KT3A	25,875	115	75	A	
NY3A	1,951,932	2291	284	B	
K3PH	1,872,729	1909	327	B	
K3NK	1,308,312	1346	324	B	
KB3MM	1,100,748	1076	341	B	
N4XU	894,720	1165	256	B	
WF3M	856,020	1297	220	B	
K3OX	629,622	798	263	B	
N3AS	391,248	572	228	B	
WA3IIA	370,182	599	206	B	
K3VA	282,462	526	179	B	
WQ3E	244,728	412	198	B	
NE3H	108,966	286	127	B	
NU3Z	108,135	267	135	B	
W3BEN	106,488	261	136	B	
N3NZ	102,555	265	129	B	
N3RW	65,520	210	104	B	
K3CC	49,896	168	99	B	
K3MD	2,492,124	2141	388	C	
K3WU	1,850,790	1910	323	C	
KF3B	1,265,418	1743	242	C	
N3KR	880,008	991	296	C	
W3BYX	791,979	901	293	C	
N3RJ	671,895	945	237	C	
W3KV	362,250	575	210	C	
K4JLD	271,953	451	201	C	
K3QIA	206,550	405	170	C	
W3RJ	192,942	397	162	C	
W3IZ	168,642	347	162	C	
W3FVT	144,144	336	143	C	
K3JJG	10,998	78	47	C	160
N3DL	54,600	260	70	B	80
K3SV	30,447	199	51	C	80
WY3T	78,003	321	81	C	20
WA3AAN	37,200	200	62	B	15
NE3I	19,470	118	55	B	15
K3NL	10,440	87	40	B	10

Maryland-DC

K3TW	86,784	226	128	A	
W3EF	1,211,184	1294	312	B	
W3UJ	989,520	1178	280	B	
W3IUU	640,452	1007	212	B	
W3ZZ	485,856	723	224	B	
NG3K	480,702	709	226	B	
W3CP	469,908	684	229	B	
K1EFI	445,419	611	243	B	
N3WT	423,060	641	220	B	
N3OA	399,255	619	215	B	
NS3T	385,560	540	238	B	
N3ND	379,974	581	218	B	
KE3VV	307,800	513	200	B	
W3DAD	249,711	517	161	B	
W3UT	196,344	404	162	B	
AI3M	133,623	303	147	B	
W3/OM2KI	95,589	247	129	B	
W6NRJ	72,240	215	112	B	
W3FQE	63,720	236	90	B	
W3DOS (K3TW,op)					
	30,996	126	82	B	
KF3CV	28,896	112	86	B	
W3DQ	12,993	71	61	B	
K3ZO	4,298,823	3761	381	C	
K3ZZ	1,666,800	1852	300	C	
N3UM	1,236,363	1567	263	C	
K3UG	245,784	392	209	C	
W2CDO	80,154	219	122	C	
AE3M	10,701	87	41	B	20
W3EWL	105,336	418	84	A	15
WR3L	165,132	556	99	B	10
W3GN	2,544	53	16	C	10

Western Pennsylvania

K3WWP	385,497	633	203	A	
AA3GM	55,944	168	111	A	
WB3DPS	33,930	130	87	A	
N3FR	1,437,780	1546	310	B	
WO3Z	870,000	1000	290	B	
AD8J	660,240	840	262	B	
AA3LX	470,934	513	306	B	
N3GJ	349,650	555	210	B	
WA3SES	183,912	388	158	B	
K3FH	31,500	125	84	B	
K3CR (LZ4AX,op)					
	4,446,192	3376	439	C	
W3IQ	836,256	992	281	C	
K3GW	658,383	781	281	C	
KM3J	32,103	123	87	C	
WN3VAW	6,372	59	36	B	80
WW3S	276,450	970	95	B	10

4

Alabama

N4KG	1,288,950	1322	325	A	
K4NVJ	19,278	102	63	A	
K4AGT	41,172	146	94	B	
W4NTI	13,416	104	43	C	40
K4WI	425,418	1447	98	C	10

Georgia

WB6BWZ	45,954	138	111	A	
K4OGG	1,908,987	2033	313	B	
N8LM	737,586	942	261	B	
N4NX	708,339	731	323	B	
AE4Y	193,500	375	172	B	
K4GA	98,892	246	134	B	
KG4PYM	57,810	205	94	B	
KT4Q	29,346	134	73	B	
W4RHG	74,151	231	107	C	
K4TEA	11,844	84	47	C	160
AA4LR	21,900	146	50	B	15
K6EID	135,204	593	76	B	10

Kentucky

K4AO	885,105	1105	267	B	
K4DZM	116,022	317	122	B	
K4BAM	58,410	177	110	B	
WR4F	38,493	141	91	B	
WB4DZU	306,936	504	203	C	
K4IE	12,696	92	46	B	80
KA4JMZ	7,998	62	43	B	80
W5MX	550,278	1609	114	C	20

North Carolina

WA4CIT	14,457	79	61	A	
N4YDU	2,095,047	2001	349	B	
WJ9B	1,569,780	1710	306	B	
WA4DOU	581,040	807	240	B	
K4QPL	448,230	670	223	B	
K4MWB	331,362	449	246	B	
NX9T	154,440	330	156	B	
N4QVM	94,815	215	147	B	
KZ2I	63,963	207	103	B	
N4CAP	17,484	94	62	B	
N2BT	6,345	47	45	B	
KO7X	886,893	1099	269	C	
NW6S	866,880	903	320	C	
N4AA	487,188	694	234	C	
KW4DA	328,860	812	135	C	
N4UH	255,732	422	202	C	
AD4L	83,850	215	130	C	
W4IDX	37,014	199	62	B	40
N4IJ	63,450	282	75	B	20
AE4EC	8,370	62	45	B	15
W4ZV	700,488	2162	108	C	10
K4EYE	13,572	87	52	A	10

Northern Florida

KQ4YY	2,106	27	26	A	

W4AA	1,507,554	1373	366	B	
NF4A	739,518	998	247	B	
KN4Y	315,675	575	183	B	
KB4ET	171,855	285	201	B	
W4YA	129,504	284	152	B	
KB4N	114,480	265	144	B	
NN4DF	83,814	229	122	B	
K4LW	21,312	96	74	B	
AD4E	4,464	48	31	B	
W7QF	69,345	201	115	C	
W4VQ	34,968	188	62	C	80
N4PN	346,626	1179	98	C	40
ND4AA	112,488	436	86	B	10
KE1F	1,122	22	17	B	10

South Carolina

K4DLJ	1,500,912	1489	336	C	
W3VT	1,122,492	1162	322	C	
K0COP	59,388	196	101	C	
N2FY	44,676	204	73	C	40
W4HGW	68,154	307	74	B	15
W2EA (N2FY,op)	24,462	151	54	C	10

Southern Florida

NA4CW	840,465	983	285	A	
W4/VE3BUC	86,178	271	106	B	
N4PSE	64,176	191	112	B	
WT5L	52,128	181	96	B	
WB2QLP	48,822	206	79	B	
K4ZT	46,629	157	99	B	
W4OV	37,062	142	87	B	
W4SAA	1,316,658	1363	322	C	
N4QV	310,416	446	232	C	
AF4RK	270,630	485	186	C	
KG4FSN	108	6	6	A	20

Tennessee

W9WI	806,607	1007	267	A	
NU4B	265,980	403	220	A	
N4UW	210,000	400	175	A	
K4BX	53,025	175	101	A	
N4ZZ	2,549,385	2715	313	B	
WO4O	1,748,016	1592	366	B	
NA4K	786,432	1024	256	B	
AA3VA	253,080	555	152	B	
WD4OHD	114,669	279	137	B	
W4HZD	109,224	246	148	B	
W4NI	66,267	199	111	B	
W4AUI	45,000	150	100	B	
K4BP	29,766	121	82	B	
W4DNZ	24,642	111	74	B	
K0EJ	3,509,952	3232	362	C	
N4IR	377,406	723	174	C	
W4OGG	24,570	117	70	C	
KE4OAR	5,382	46	39	C	
W4NZ	14,400	120	40	C	40
NY4N	1,404	26	18	B	15

Virginia

WB3BEL	551,070	785	234	A	
WD4GBW	142,350	365	130	A	
K3SS	115,902	282	137	A	
N4UY	88,536	217	136	A	
K7SV	2,901,756	2314	418	B	
K4EU	1,276,275	1309	325	B	
K4FPF	1,062,720	1080	328	B	
K4MX	855,624	926	308	B	
W4HM	759,510	873	290	B	
K6ETM	166,320	360	154	B	
KG6ZR	96,390	255	126	B	
N4MM	45,672	173	88	B	
K4ITV	44,745	157	95	B	
K3MZ	28,980	115	84	B	
WR3Z	2,181,036	2132	341	C	
W4YE	1,392,147	1377	337	C	
W4BQF	717,696	1068	224	C	
W2YE	518,418	694	249	C	
WD4GOY	76,176	184	138	C	
KT3Y	388,194	1334	97	C	40
K4OAQ	512,550	1675	102	C	15
WF3J	321,912	1052	102	C	15
K4YT	33,015	155	71	C	10
N3JT	10,080	96	35	B	10
K4AEN	1,782	27	22	A	10

West Central Florida

N4IG	1,486,854	1462	339	B	
K4GKD	1,403,568	1368	342	B	
W1CSM/4	264,153	461	191	B	
KA6R	969	19	17	B	
N4AO (WC4E,op)	2,674,848	2533	352	C	
K5KG	40,194	154	87	C	
WN4DX	14,388	109	44	B	15
K9HUY	32,424	193	56	B	10
WA2NDP	675	15	15	B	10

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Arkansas

W5RZ	154,440	330	156	A	
W5MK	75,816	234	108	B	
KB5MSN	2,835	35	27	C	
WA5SOG	4,935	47	35	C	40
K5NX	40,986	198	69	B	15

Louisiana

W5WZ	3,108	37	28	A	
K5KLA	945,630	1106	285	B	
KM5YL	221,760	385	192	B	

Mississippi

W5KK	162,756	274	198	B	
W5LEW	43,362	146	99	B	
N5FG	1,320	22	20	C	160
AC5SU	44,154	223	66	B	10

New Mexico

K7IA	13,833	87	53	A	
N5MF	774,567	967	267	B	
W5YZ	363,132	524	231	B	
N5KH	27,594	146	63	C	
W5JRP	37,200	200	62	B	20

North Texas

WA8ZBT	341,430	599	190	A	
W0UO	1,694,046	1618	349	B	
WD5K	1,326,750	1450	305	B	
K5WO	922,488	1156	266	B	
W5RYA	451,704	649	232	B	
N5CHA	339,000	500	226	B	
N1CC	277,704	456	203	B	
NN5T	231,120	428	180	B	
N5RG	2,068,101	1931	357	C	
N5PO	1,353,456	1446	312	C	
N8SM	1,225,602	1491	274	C	
K5RA	646,356	883	244	C	
W5SQA	19,836	116	57	C	
K5MR	523,050	1585	110	C	15
AB5C	23,436	124	63	B	15
K5RX	558,252	1723	108	C	10
N5JR	157,596	571	92	C	10
W5EIJ	20,022	142	47	B	10

Oklahoma

K0CIE	489,780	907	180	B	
AA5CK	32,880	137	80	B	
K5YAA	2,150,610	2090	343	C	
W5TM	4,896	51	32	C	80
W5AO	267,840	960	93	C	40

South Texas

KG5U	377,784	636	198	A	
K5NZ	81,432	261	104	A	
N5AW	2,074,500	1844	375	B	
W5AC (KD5KQN,op)	534,600	825	216	B	
N5XZ	352,692	582	202	B	
KA5KLU	302,103	501	201	B	
AC5AA	277,056	416	222	B	
AD6G	164,220	340	161	B	
WA5SNL	70,224	209	112	B	
K5GM	62,622	213	98	B	
N5PV	34,524	137	84	B	
AC5XK	25,272	117	72	B	
NO5W	11,544	74	52	B	
KD5MJJ	1,380	23	20	B	
WA4PSO	27	3	3	B	
K5GN	4,628,520	3588	430	C	
K5NA	3,295,512	3212	342	C	
N3BB	3,241,224	3052	354	C	
AD5Q	2,755,380	2417	380	C	
K5YA	2,636,928	2616	336	C	
K6VO (K6NR,op)	1,275,444	1497	284	C	
K1TU	167,334	334	167	C	
NX5M	3,108	37	28	C	160
W5GAI	38,184	172	74	B	10
WX5I	23,904	166	48	B	10
KQ5U	12,402	106	39	A	10

West Texas

NZ5M	4,557	49	31	B	15

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East Bay

WZ6Z	245,616	476	172	A	
KA6SGT	4,560	40	38	A	
KE6QR	55,776	224	83	B	
K6LDX	27,144	116	78	B	
KK6F	67,284	252	89	C	
KG6EFU	9,408	98	32	C	10

Los Angeles

NK6A	112,167	309	121	A	
K6TV	49,662	186	89	A	
K6CEO	108,672	283	128	B	
WA6BOB	35,760	149	80	B	
K6NT	21,840	140	52	B	
N6AA	1,590,180	1559	340	C	
WO6M	637,200	885	240	C	
N6TW	555,588	759	244	C	
K6SE	231,699	457	169	C	
W6KC	51,510	170	101	C	
KU6T	7,344	72	34	B	40
N6IC	59,274	267	74	C	15
AI6Z	24,174	158	51	B	10

Orange

W6GA	66,744	206	108	A	
N6MJ	2,169,540	2127	340	B	
WA6OGO	199,080	420	158	B	
W6EEN (N6RT,op)	3,048,192	2688	378	C	
N6HC	693,129	899	257	C	
W6SA	299,400	499	200	C	
K6HRT	56,355	221	85	C	
K6CU	3,762	57	22	B	80
W7TI	4,056	52	26	C	20
WB6NL	3	1	1	B	20
W6KK	110,112	496	74	C	10

Santa Barbara

WA6FGV	325,260	556	195	B	
W6UM	753,102	834	301	C	
WA5VGI	652,674	899	242	C	
W7CB	15,912	102	52	C	
W6KNB	3,510	39	30	C	20
KA6WZR	1,215	27	15	B	15
AA6EQ	37,455	227	55	B	10

Santa Clara Valley

W6IO	106,680	280	127	A	
W6JD	84,495	215	131	A	
K8PO	2,333,028	2461	316	B	
N6NF	904,797	1081	279	B	
N6EM	406,890	685	198	B	
N7FF	104,904	372	94	B	
KN6OZ	19,662	113	58	B	
N6TV	2,312,640	2336	330	C	
K6GT	250,068	458	182	C	
W6ISQ	76,593	211	121	C	
K6III	19,872	138	48	A	15
NU6S	202,065	709	95	B	10

San Diego

W6QU (W8QZA,op)	531,738	774	229	A	
W6JVA	115,071	317	121	A	
WN6K	492,285	887	185	B	
AA6EE	75,168	232	108	B	
K2RP	22,143	121	61	B	
N7CW	1,193,400	1275	312	C	
W6MVW	507,276	693	244	C	
AK6R	53,040	272	65	B	20
WA6PY	3,822	49	26	B	20
K7JJ	109,809	441	83	C	15
W6YA	408,912	1217	112	C	10

San Francisco

W6JTI	710,946	933	254	A	
KQ6NN	101,094	406	83	B	
W6IYS	78,120	248	105	B	
WW6D	48,618	222	73	B	
K0KL	33,507	153	73	B	
K6OWL	25,428	163	52	B	
K6CTA	15,660	87	60	B	
K1EP/6	11,070	82	45	B	
AD6TF	351,840	733	160	C	
W6WB	107,640	260	138	C	

San Joaquin Valley

W6RCL	4,002	58	23	A	
AK7G	179,010	390	153	B	
NT6K	126,246	397	106	B	
W6FRH	31,302	141	74	C	
N6HK	32,763	163	67	B	15
KA6BIM	238,548	772	103	C	10

Sacramento Valley

KC9C	10,293	73	47	A	
W6RFF	284,931	549	173	B	
N6JV	1,219,092	1262	322	C	
W6FA	525,030	814	215	C	
W6NKR	305,067	511	199	C	
K6LRN	245,916	396	207	C	
W6EU	112,455	255	147	C	
K1LU	2,232	31	24	C	
K6TA	203,964	739	92	C	40
W6RKC	67,725	301	75	C	15
K6RN	47,880	190	84	C	15
WX6V	123,006	494	83	B	10

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Arizona

N7IR	795,795	1001	265	A	
NQ7X	111,708	321	116	A	
N3AIU	506,430	662	255	B	
N7CPL	209,430	390	179	B	
W7ZMD	140,304	316	148	B	
K6OP	116,340	277	140	B	
W7KQZ	53,286	214	83	B	
K7TR	31,284	132	79	B	
WA7KJC	7,056	56	42	B	
W7HX	2,898	42	23	B	
KC7V	2,088,030	2135	326	C	
KN5H	600,732	814	246	C	
W7YS	553,212	762	242	C	
K7HP	148,104	363	136	C	
KD7GGZ	90,072	216	139	C	
W2HTX	59,697	201	99	C	
W7DD	18,963	129	49	C	80
KJ7WY	10,692	99	36	C	80
N7KU (NJ6D,op)	449,400	1400	107	C	10
W7ZR	255,543	827	103	B	10
W7AYY	6,549	59	37	C	10

Eastern Washington

K7MM	521,796	737	236	A	
W7GB	15,300	100	51	B	
N7YRT	13,038	82	53	B	
KC7WUE	6,885	51	45	B	
W7LGG	40,788	206	66	C	40
K7OX	40,356	236	57	C	40

Idaho

N7ZN	356,820	626	190	B	
KK7X	271,206	494	183	B	
W7LAR	265,167	483	183	B	
W7QDM	208,662	419	166	B	
AB7YB	157,986	402	131	B	
KA7T	250,425	525	159	C	
K0IP	78,234	221	118	C	
K7TQ	23,328	144	54	A	15

Montana

KE7NO	355,350	515	230	B	
N7CZ	30,885	145	71	B	
W7KBF	798	19	14	B	
N7DXY	240	10	8	B	
KS7T	558,885	1007	185	C	
KC7UP	280,314	522	179	C	
K7ABV	123,372	447	92	C	20
K7BG	375,813	1347	93	C	10

Nevada

WA7CWM	374,796	718	174	C	
WW7Q	12,285	105	39	C	

Oregon

N7OU	725,040	1007	240	A	
W7YAQ	1,627,500	1550	350	B	
KI7Y	734,568	964	254	B	
N7VS	61,662	239	86	B	
W7GG	2,813,517	2627	357	C	
K7MI	2,484,645	2333	355	C	
W2VJN	1,452,654	1323	366	C	
WA7LT	1,402,632	1771	264	C	
K7ZZ	1,334,199	1691	263	C	
N6TR	300	10	10	C	
KA7FEF	4,410	70	21	B	10

Utah

W7HS	318,528	553	192	B	
KE7NS	302,904	601	168	B	
N7IF	234,378	449	174	B	
W7UT	386,640	1074	120	C	15
W8EQA/7	25,752	148	58	A	15

Western Washington

K7ED (WA0RJY,op)	1,248,156	1524	273	B	
N7LOX	852,891	1151	247	B	
AC7LX	610,740	870	234	B	
K1LKR	293,949	513	191	B	
AB7RW	244,296	468	174	B	
KB7N	208,302	466	149	B	
NG7Z	184,899	431	143	B	
W7GTO	138,510	342	135	B	
K7VI	100,368	272	123	B	
N7XY	35,757	137	87	B	
W7LKG	13,905	103	45	B	
AA7VT	12,282	89	46	B	
N6HR	1,158,738	1174	329	C	
W7VJ	989,196	1492	221	C	
W7IIT	351,909	641	183	C	
W7GSW	314,130	566	185	C	
W7DRA	2,652	52	17	C	80
W7WA	590,208	1856	106	C	20
K7QQ	376,200	1254	100	C	10
KD7GTI	153,252	594	86	B	10

Wyoming

WC7S	46,800	156	100	A	
NE9Z	296,448	386	256	C	

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Michigan

K8SIA	244,992	352	232	A	
KC8LTL	28,272	124	76	A	
N8KV	4,914	63	26	A	
K8IR	907,758	1073	282	B	
K8RS	406,404	639	212	B	
K8AAX	249,711	517	161	B	
K8KU	230,136	446	172	B	
KB8PGW	203,940	412	165	B	
N8NX	58,800	196	100	B	
KO8S	31,950	150	71	B	
K8KHZ	17,745	91	65	B	
W8WVU	16,500	100	55	B	
N8VEN	3,762	38	33	B	
K8GL	3,624,147	2897	417	C	
W8UD	543,228	812	223	C	
WA8LCZ	155,601	339	153	C	
K8YTO	107,124	226	158	C	
K8MD	28,800	160	60	C	
W8TOP (W8UVZ,op)	14,076	92	51	C	160
K8AQM	67,308	316	71	C	80
K3XXX (K8BK,op)	50,808	232	73	B	40
WA8RTP	23,814	147	54	C	40
W8TWA	126,063	483	87	C	20
AA8U	8,178	58	47	A	20
N8XMS	2,277	33	23	A	20
K8GVK	21,300	142	50	B	15
WA8OLD	15,369	109	47	B	15

Ohio

W8VE	331,905	545	203	A	
WV9N	52,632	172	102	A	
AA8IV	28,968	142	68	A	
NU8S	15,180	92	55	A	
N8AA	2,559,609	2171	393	B	
KV8Q	1,175,328	1272	308	B	
KE8M	588,354	794	247	B	
KG8DH	485,325	719	225	B	
AF8A	439,128	642	228	B	
W8IDM	363,780	564	215	B	
W8PN	361,746	638	189	B	
W8GOC	254,220	446	190	B	
WQ8Q	215,424	408	176	B	
N8XP	198,000	440	150	B	
K8NVR	123,540	290	142	B	
N8EW	107,778	253	142	B	
W8AN	57,024	198	96	B	
AF8C	10,125	75	45	B	
K8DX	2,459,436	2546	322	C	
KU8E	1,023,000	1100	310	C	
N8MZ	525,048	668	262	C	
W8FT (AA8UP,op)	336,798	1134	99	C	15
NG3Q	135,636	508	89	B	15
N9AG	594,243	1693	117	C	10

West Virginia

K5IID	1,201,113	1263	317	B	
N4ZR	3,313,152	2876	384	C	
K3JT	1,240,095	1759	235	C	
K2UOP	365,940	535	228	C	
K8KFJ	10,062	78	43	C	80
K8OWL	17,493	119	49	C	10

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Illinois

KG9X	1,830,375	1627	375	A	
W9SE	610,722	786	259	A	
W9JUV	328,440	595	184	A	
N9IJ	100,584	264	127	A	
WB9MII	5,400	50	36	A	
K9MMS	1,095,300	1217	300	B	
K9JE	426,906	641	222	B	
K9OR	305,505	465	219	B	
KY0Q	278,640	540	172	B	
N9BOR	171,150	350	163	B	
W9YS	151,680	316	160	B	
W9SZ	142,695	315	151	B	
K9XE	136,512	316	144	B	
K9KM	110,559	269	137	B	
WB9UGX	106,449	259	137	B	
W9YO	97,875	225	145	B	
K9PPW	85,680	204	140	B	
K9IJ	83,538	221	126	B	
N9MZP	79,650	225	118	B	
AA9NF	62,964	198	106	B	
W3HDH	62,415	219	95	B	
K9OZ	58,743	183	107	B	
WA9FIH	57,408	184	104	B	
W9DY/M	46,452	158	98	B	
W9AX	42,864	152	94	B	
AD4OS	26,784	144	62	B	
N9GUN	26,280	120	73	B	
KA9CAR	19,980	90	74	B	
NA9DM	6,732	51	44	B	
N9DT	720	16	15	B	
K9ZO	2,162,550	2218	325	C	
W9FX	467,847	687	227	C	
W9YYG	234,507	859	91	C	
K7EG	105,336	264	133	C	
KB9KTC	97,605	241	135	C	
WB9AYW	41,322	142	97	C	
KG9N	15,756	101	52	C	
KK9A	4,158	42	33	C	
WB9Z	212,184	842	84	C	40
K9CJ	51,870	247	70	C	40
W9OF	156,798	562	93	C	15
KX9DX	85,617	453	63	B	15
K9AB	50,694	238	71	B	15
N9TF	23,607	129	61	B	15
K9NU	7,380	82	30	C	15
WD9DZV	194,220	780	83	B	10

Indiana

K9DIY	8,820	70	42	A	
N4TZ	2,804,970	2527	370	B	
KJ9C	1,832,832	1776	344	B	
K9WJU (W9CG,op)	771,741	909	283	B	
W9AU	472,860	710	222	B	
K9JWI	323,010	582	185	B	
W9OZ	241,380	447	180	B	
K9IG	162,360	410	132	B	
KC9FC	157,920	329	160	B	
K9MI	36,036	156	77	B	
W9CM	15,750	105	50	B	
W9RE	5,063,502	3898	433	C	
W9KTP	408,834	678	201	C	
K9BG	47,850	275	58	B	20
K9TTT	6,804	54	42	C	20
K9NW	650,430	1971	110	C	10
K6OMB	84,825	435	65	B	10

Wisconsin

N9CIQ	722,724	916	263	A	
W9XT	388,194	667	194	A	
N9NE	93,357	253	123	A	
WT9Q	1,293,336	1518	284	B	
W9WUU	792,288	1008	262	B	
W9OA	343,332	561	204	B	
W9LO	214,140	430	166	B	
N9EZ	187,488	372	168	B	
KB9S	144,300	325	148	B	
K9OSH	100,914	278	121	B	
W9HR	12,348	84	49	B	
N9CK	3,202,992	2832	377	C	
K9MA	2,847,000	2600	365	C	
W9OP	1,553,328	1608	322	C	
K0SN	1,226,256	1732	236	C	
WA9IRV	250,416	444	188	C	
W9GXR	51,546	242	71	C	40
K9CAN	97,944	371	88	C	20
AA9PB	75,390	359	70	C	20
NI9C	112,050	450	83	B	15
N9GBB	663	17	13	B	10

0

Colorado

N0TK	118,800	300	132	A	
K1EQA	21,960	122	60	A	
K0RI	1,115,523	1173	317	B	
W0ETT	1,093,533	1211	301	B	
N0IBT	66,816	232	96	B	
N2IC	4,902,660	3891	420	C	
KJ0G	106,386	298	119	C	
KF0U	39,600	240	55	C	40
AE0Q	140,712	533	88	B	15
KI0II	7,626	62	41	A	15
W0JF	1,953	31	21	A	10

Iowa

AK0M	302,940	540	187	A	
W0PWE	103,044	277	124	A	
NU0V	45,645	179	85	A	
AA0AI	483,138	778	207	B	
WK0F	288,225	549	175	B	
K0XD	286,650	455	210	B	
NO9S	5,400	50	36	B	
K0GT	20,295	123	55	B	40
WB0B	18,876	121	52	B	15
W0ETC	86,592	352	82	B	10
KE0FT	76,356	404	63	B	10

Kansas

K0BJ	939,072	1168	268	B	
W0NXS	610,212	844	241	B	
AA0MZ	362,730	565	214	B	
W0YRN	45,570	155	98	B	
W0WPL	20,790	90	77	B	
W0UY	408,639	671	203	C	
KG0UA	133,110	306	145	C	
K0VGB	17,316	111	52	B	40
WB0YJT	2,475	33	25	A	15

Minnesota

N0UR	772,548	1082	238	A	
K0SR	2,575,620	2460	349	B	
NA0N	1,224,492	1523	268	B	
K0RC	991,512	1172	282	B	
N0FP	592,500	790	250	B	
N0HJZ	571,692	671	284	B	
KE0UI	530,199	807	219	B	
KN0V	385,728	656	196	B	
K0SQ	321,453	573	187	B	
WB0GGM	247,401	441	187	B	
WG0M	84,672	224	126	B	
K0KGS	75,048	212	118	B	
K0MPH	71,508	202	118	B	
WA2HFI	71,280	198	120	B	
WA2MNO	16,350	109	50	B	
WB0TRA	10,950	73	50	B	
K0SV	2,520	30	28	B	
W0BV	1,849,473	1593	387	C	
W0OR	992,673	1221	271	C	
W0ZQ	904,500	1005	300	C	
W0ML	530,712	756	234	C	
W0HW	264,735	555	159	C	
N0XB	236,250	525	150	C	
K4IU	162,486	354	153	C	
K0AD	39,825	177	75	C	

Missouri

K0CA	262,566	503	174	B	
K0TPY	258,264	422	204	B	
KS0M	183,210	394	155	B	
N0JRN	71,736	196	122	B	
K2HT	69,258	194	119	B	
KA0P	6,150	50	41	B	
K0OU	1,192,374	1278	311	C	
W0TY	202,905	405	167	C	
N0TT	2,592	32	27	C	160
K4VX (K9BGL, op)	572,094	1718	111	C	15
WA0OTV	5,472	57	32	C	15
K2VV	623,700	1925	108	C	10

Nebraska

AB0FX	62,370	189	110	A	
K0IL	184,272	349	176	B	
WZ0L	124,392	292	142	B	
N0LZ	630	15	14	B	
K0SW	45,105	155	97	C	
KT0K	207,870	845	82	B	10

South Dakota

KC0IOX	19,344	104	62	B	
W0RSP	6,840	57	40	A	40

Canada

Maritime

VY2SS (K6LA,op)	4,358,970	3570	407	C	
VY2ZM	127,800	600	71	C	160

Nova Scotia

VE1AYY	39,600	240	55	B	20

Newfoundland-Labrador

VO1WET	408,408	748	182	B	
VO1HP	280,269	447	209	B	
VO1MP	286,140	1004	95	C	10

Quebec

VE2AWR	1,104,900	1270	290	B	
VE2OWL	231,492	404	191	B	
VE2FFE	129,648	296	146	B	
VE2AYU	1,562,190	1730	301	C	

Ontario

VA3TTT	907,581	1069	283	A	
VE3WZ	143,622	303	158	A	
VA3JFF	130,980	295	148	A	
VE3BHW	12,720	80	53	A	
VE3KP	1,408,368	1586	296	B	
VE3BW	836,859	1037	269	B	
VA3TEE	663,780	851	260	B	
VE3GFN	599,676	847	236	B	
VE3EN	550,926	762	241	B	

VA3NR 432,288 608 237 B
VA3UZ 4,147,992 3261 424 C
VE3AT 3,165,162 2821 374 C
VA3UA 1,834,608 2066 296 C
VE3NZ 1,479,036 1996 247 C
VE3EJ 98,688 257 128 C
VE3BR 1,512 28 18 C
VE3DO 4,284 42 34 C 160
VE3OSZ 2,688 32 28 B 160
VE3PN 30,690 186 55 C 80
VA3XRZ 11,352 86 44 B 40
VE3XL 79,680 332 80 A 20
VE3MQW 225,432 744 101 B 15
VE3RCN 126 7 6 B 15
VE3IAY 108,240 440 82 B 10
VE3UKR 42,657 241 59 B 10
VE3STT 32,154 233 46 C 10

Manitoba

VE4YU 257,004 484 177 B
VE4IM 521,424 639 272 C
VE4VV 159,360 640 83 B 10

Saskatchewan

VE5ZX 1,621,455 1705 317 B
VE5SF 946,368 1272 248 B
VE5AAD 15,318 111 46 B 15
VE5CMA 2,511 31 27 B 10

Alberta

VE6ZT 582,672 796 244 B
VA6NO 247,005 499 165 C
VE6YP 50,880 160 106 C
VE6WQ (@VE6JY) 230,496 784 98 C 40
VE6EX (@VE6JY) 392,196 1334 98 C 20
VE6JY (TI2WGO,op) 563,997 1757 107 C 15
VE6BF (@VE6JY) 342,372 1108 103 C 10

British Columbia

VA7NT 69,615 221 105 A
VE7XF 483,873 653 247 B
VE7NH 463,140 620 249 B
VE7FO 374,967 683 183 B
VE7NI 316,404 564 187 B
VA7LC 156,156 364 143 B
VE7JKZ 279,072 544 171 C
VE7SL 702 18 13 B 160
VE7VF 46,848 244 64 B 10
VE7NS 18,270 145 42 B 10

Single Operator Assisted

1

KI1G 4,974,318 3303 502 C
K1HI 2,474,640 1964 420 C
N1DG 2,138,670 1602 445 C
N8RA 1,671,846 1606 347 C
AA1QD 1,589,160 1394 380 C
N4XR 1,498,107 1391 359 B
AA1V 1,492,344 1176 423 C
W1RZF 1,135,377 1179 321 C
K1JN 1,020,051 1003 339 C
K1RV 897,930 907 330 B
W1BIH 876,000 800 365 C
K1AE 785,376 864 303 C
N6RFM 663,084 678 326 C
W1ZZ 460,863 507 303 C
W1LLU 393,624 568 231 B
K1TH 377,274 554 227 C
K1LD 374,532 529 236 B
K1NU 303,360 395 256 C
W2SUQ 293,760 510 192 B
K1JB 252,486 498 169 B
K1KD 250,842 431 194 C
KZ1O 240,672 436 184 C
W1JR 138,864 263 176 A
N1KWF 83,808 291 96 C
K1TW 26,103 113 77 B

2

K2NG 5,260,104 3398 516 C
N2MM 4,222,944 2838 496 C
W2RE 4,143,480 2920 473 C
N1EU 3,984,087 2549 521 C
W2WB 3,496,620 2885 404 C
NO2R 3,494,436 2302 506 C
W6XR 3,195,912 2183 488 C
K2NJ 2,913,132 2542 382 C
W1GD 2,596,836 2101 412 C
W2GDJ 2,582,115 2179 395 C
K2QM 1,608,141 1691 317 C
KF2O 1,501,920 1120 447 C
N2CY 1,198,050 1225 326 C
N2CQ 1,085,166 1083 334 B
W2LE 1,081,668 1106 326 C
K2ONP 1,046,640 1246 280 C
N1JP 1,014,504 1031 328 C
K2SB 935,712 864 361 C
W2KA 756,702 729 346 B
W2GR 597,987 807 247 B
N2FF 594,270 639 310 C
K2EP 557,280 688 270 C
KD2P 464,475 563 275 C
K2XF 380,304 456 278 C
W2RD 372,771 427 291 C
KA2D 312,390 534 195 B
KD2HE 248,985 503 165 C
N2VW 183,480 278 220 C
W2RDS 98,745 227 145 B
K2EF 64,566 211 102 B
WO2N 14,580 90 54 C
WF2B 6,750 50 45 C

3

K3WW 7,007,520 4492 520 C
AA3B 4,439,244 3196 463 C
KQ3F 4,323,564 3268 441 C
W3FV 3,548,484 2892 409 C
W2UP 3,498,066 2574 453 C
N3AM 2,267,652 1871 404 C
N4GG 2,184,834 1622 449 C
W3AP 2,009,124 1908 351 C
W3HVQ 1,576,872 1448 363 C
NN3Q 1,493,901 1307 381 C
K3NZ 1,435,350 1367 350 C
N3ZA 1,317,600 1098 400 C
K3DI 1,191,330 1085 366 C
W3GK 1,177,821 1179 333 C
W3GG 1,127,700 1253 300 C
WT3P 1,088,010 1099 330 C
K3II 1,045,464 1016 343 C
WE3C 769,365 695 369 C
K3BHX 754,416 806 312 C
K3JG 638,979 737 289 C
WT3W 604,800 630 320 C
K3OO 553,707 799 231 C
N3SD 505,407 587 287 B
W3OV 347,490 594 195 C
N3MK 301,368 433 232 B
AA3DF 281,520 460 204 C
K3PP 207,000 345 200 C
AA0CY 199,125 375 177 B
KU3X 163,680 352 155 B
W8FJ 136,518 373 122 C
K3CT 131,262 262 167 C
K3CP 108,732 221 164 C
KD3TB 55,854 174 107 B
NZ3O 2,700 30 30 C
AJ3M 96 8 4 C

4

W4NF 3,334,986 2454 453 C
NQ4I 2,963,670 2215 446 C
K1PT 2,220,525 1775 417 C
W3YY 1,790,910 1474 405 C
AK4XX 890,295 973 305 B
K4PB 649,728 768 282 C
N4VV 600,600 770 260 C
N6MW 557,217 613 303 B
AA4V 523,110 742 235 C
K3KO 435,213 597 243 C
K4CIA 330,642 471 234 C
WI1S 286,032 404 236 B
WM3T 231,168 344 224 B
K4WW 132,696 388 114 B
KE4USA 93,492 196 159 B
N4TL 85,785 215 133 C
K8YC 53,592 154 116 C
W4ATL 11,952 83 48 B
AB4RL 3,198 41 26 C

5

N2LA 1,656,882 1509 366 C
W5PF 220,800 400 184 B
W5FL 214,488 331 216 C
NE0P 181,650 346 175 B
K5HDU 177,885 335 177 C
K5IUA 36,750 175 70 C
N5ZM 30,210 106 95 B

6

N6CW 1,546,272 1534 336 C
K6XX 1,520,268 1678 302 C
W6TK 1,104,453 1119 329 C
N6WS 766,161 781 327 B
K6RIM 662,244 692 319 C
NF6R 259,578 506 171 C
K6EP 83,433 203 137 B
KC6X 81,699 241 113 C
N6IYS 71,448 229 104 C
WB6IYM 31,284 158 66 C
N6OU 25,650 114 75 C
K6UFO 18,312 109 56 A

7

W7/DL3OI 4,103,280 3280 417 C
N7TT 2,208,141 2097 351 C
N0AX 1,754,928 1741 336 B
W7OM 1,099,680 1264 290 C
W7VV 1,048,293 1299 269 C
WA7YAZ 173,304 332 174 B
K7XZ (K1MY,op) 100,800 240 140 C

8

N8BJQ 2,775,105 2229 415 C
N8KM 629,256 628 334 C
N8PW 560,142 738 253 C
K8LY 327,555 435 251 C
K8AJS 321,030 410 261 B
ND8L 166,800 400 139 C
NX8C 75,477 181 139 B
K8LN 13,776 82 56 B
KG8CO 3,534 38 31 C

9

N9XX 1,023,090 1018 335 B
K9NR 862,641 1313 219 C
K9UQN 836,583 1111 251 C
W9TN 436,392 551 264 B
N2BJ 429,624 648 221 C
W9YK 309,447 471 219 B
K9PG 219,696 398 184 B
W9VQ 57,225 175 109 B
N9MSG 55,440 165 112 B
N9BT 40,608 141 96 C

0

N5IN 1,127,763 1053 357 C
K0KX 617,136 688 299 C
KT0R 615,960 870 236 C
K0OB 372,528 597 208 B
K0UK 304,794 574 177 B
K0IR 285,345 373 255 C
K0DG 271,890 530 171 C
N0BUI 227,664 496 153 B
W0TT 223,440 380 196 C
N0AT 57,750 154 125 C
AA0A 18,096 116 52 C
VE1OP 1,067,328 1088 327 B
VE9FX 354,048 461 256 C
VE6LB 168,795 341 165 B
VE6TN 56,163 193 97 B

Multioperator Single Transmitter

1

K1IR (+NR1DX,W1VE) 5,896,380 3892 505 C
WT1T (K1TWF,W1ES,KD1EA, K1WD,WO1N,ops) 4,239,960 3176 445 C
K0TV (+KB1PZ,NF1A,W1MJ,WO1N, W1IA,W1TO) 2,262,330 1862 405 C
W1ZT (+K1EO) 1,551,930 1445 358 C
KK1L (+K1KD,W1SJ,KM1Z,W1CX) 1,251,936 1449 288 C
W1NR (+W1BK) 728,532 708 343 C
N2OT (+WB2EPQ) 407,220 617 220 A

2

K2WI (+AA5B,WW2Y) 5,561,322 3854 481 C
AA2FB (+K2QMF) 5,089,854 3542 479 C
K2UG (KY2J,WA2JQK,ops) 2,975,712 2224 446 C
K2SX (+N2UN) 2,681,775 2175 411 C
WB2ELW (KB2KOL,K2CF,ops) 15,921 87 61 C

3

W3BGN (+K2TW) 6,317,595 4105 513 C
NE3F (+NE3F,KS3F,K3ATO) 3,733,173 2747 453 C
N3BNA (+N2WKS) 1,587,690 1495 354 C

4

W4AUB (+N4AU,K4IZN) 408,240 630 216 C
W4MOT (N4PL,N4CU,ops) 48,411 163 99 C

5

W6TER (+N5LI,W5DEZ,KT5X) 893,196 1154 258 C

6

K6ZM (K6WG,op) (+K6WG) 2,105,568 2437 288 C
N6IJ (K6SRZ,AA6EG,ops) 1,154,640 1360 283 C
W6ISO (+WX5S) 645,588 908 237 C

7

W7CT (+NC7W) 2,530,836 2324 363 C

8

K8AZ (+K8MR,K8NZ,W8BIN,W8CAR, W8KIC,N8TR,WT8C) 6,752,262 4279 526 C
W8EDU (W8WTS,W8RZ,ops) 510,384 784 217 C

9

WN9O (+W9IU) 3,063,042 2358 433 C
K9SD (+KA0GGI,K0RAY,KI9A,K0JPL, W9VHL) 3,033,516 2668 379 C

0

N0NI (+N0AC,WO0V,K0KD,N0AV, W0FLS) 5,049,414 3442 489 C
N0DY (+N0YY,W0OF) 4,304,040 3224 445 C
K0MP (+N2WW/UA6HZ,W0ZA, AB0KG/UA3YH,W0NF) 2,981,568 2344 424 C
K0JA (+K0JE) 456,576 656 232 B
WV7T (+N0QJS) 17,550 117 50 A

VE

VE3HG (+VE3RZ,VE3GGF) 1,995,084 1638 406 C
VE6AO (VE6TC,VE6BIR,VE6LB, VE6KC,VE6RCI,ops) 921,522 1186 259 C
VE7ZBK 118,800 330 120 B

Multioperator Two Transmitters

N2RM (+N2AA,N2NC,N2NT,W2RQ, WM2H) 12,216,933 7107 573 C
K1AR (@K1EA) (+K1EA,K5ZD) 11,955,648 6824 584 C
K1KI (+K1CC,KM1P,N7NG,W1RM) 10,723,380 6260 571 C
W4AN (+K4BAI,K9AY,K4RO,W8JI) 10,693,257 6469 551 C
N3RS (+N3ED,N3RD,N2SR,W8FJ) 10,610,379 6327 559 C
K4JA (+W3BP,K9GY,KE9I,K1SE, K4FJ,K4GMH) 9,931,320 5880 563 C
K8LX (+K8GM,K8IA,K8LV,N8EA, W8WA) 7,642,866 5126 497 C
W5KFT (K5OT,N6ZZ,ops) 5,867,100 3975 492 C
N5TW (+K5PI,AF5Z,N5DUW,WS4G, KE5C,N5IW,W5TD) 5,650,512 4016 469 C
N4TO (+NP3G,W4IR,W4QM) 4,955,136 3226 512 C
N0IJ (+AF9T,WJ0M) 4,487,835 3245 461 C
VE1JF (+VE1AI,VE1MOO) 4,004,796 3119 428 C
W6OAT (+K6KR,W1SRD,K1ZKM) 3,325,200 2771 400 C
AA2WN (+W2YC) 2,816,028 2148 437 C
K2RD (+W1CU) 2,730,087 1861 489 C
K6SG (+K6NO) 596,250 795 250 C
W1SRG (AG1C,KB1HJW,ops) 507,276 671 252 C

Multioperator Unlimited Transmitters

KC1XX (+AD1C,W1FV,K1GQ,K1TR, KM3T,N6HB,N9JF) 17,542,008 9108 642 C
W3LPL (+K1HTV,W2GG,K3KU,AI3M, K3MM,K3NA,N3OC,KE3Q,K3RA, K3RV,KD4D,K4ZW) 17,530,500 8990 650 C
K3LR (+W3GH,VA3RU,VA3NA,N9RV, KO9A,N3RA,K3UA,KL9A,K9VV, W3RTY,W9ZRX) 17,127,864 9048 631 C
K9NS 15,634,296 8392 621 C
K1XM (+W1KM,W1FJ,NB1B,WT1O) 14,354,664 7922 604 C
K1RX (+KF1V,N1SNB,W1AAX,WA1S, K1EPJ,K1GW) 12,801,348 7257 588 C
W4MYA (+K4WMA,KC8FS,KF4QQY, W4DR,W4HJ,W4HZ,W4TNX,WK4Y, WA8WV) 11,955,648 6824 584 C
NY4A (K2AV,K7GM,N4AF,N4CW, W2CS,ops) 11,586,816 6848 564 C
K1TTT (+NT2X,W1TO,K1MK,KB1W, W3SM,KC2FEE) 11,198,616 6526 572 C
K8CC (+AC8W,K8DD,K8NA,KT8X, N8CQA,N8MR,NU8Z,W8MJ,WX3M) 11,173,869 6569 567 C
K5GO (+K0NI,K0VBU,KM5G,K5ALU, K5LG,N5OE,N5DX,N5XR) 9,944,448 6016 551 C
W0AIH (+N0AT,K0AD,KM0O,N0XB, AA0ZZ,WR0DK,WV3B,W0UC,K0TG,KT0R, AC0W,KS0T) 9,800,190 5994 545 C
K3NM (+K3IPK,W3CF,K3ZV,WK2W, W3MM) 9,515,475 5715 555 C
W3PP (+K3FT,WB4FDT,KW3Z,N3PT, NW3Y,W3PAR) 9,102,150 5650 537 C
K4NNN (K4OJ,N4KM,T93M,WD4AHZ, W1ROX,K4FB,W1CW,W1YL,ops) 8,848,272 5392 547 C
N3AD (+N3MT) 6,988,995 4595 507 C
N6RO (+K3EST,K6RC,WA6O) 6,901,950 4895 470 C
KB1H (+N1XS,AA1CE,KB1DFB,N1NK, K1EBY,NB1U,KE1LI) 6,528,354 4201 518 C
N4RV (+K2PLF,KT4W) 6,086,124 3924 517 C
K3ANS (+WF3H,N3MX,K3YD, KC3WX,KB3CBO) 6,083,322 4207 482 C
W2CG (+W2EN,W2NO) 4,882,485 3485 467 C
W1HR (W1MD,W1JCC, ops) 4,430,952 3239 456 C
N4WW (+K0LUZ,NW5E) 4,095,777 2911 469 C
W1QK (+W1NG) 3,578,202 2967 402 C
W8ZA (+K8OQL,WD3A) 3,241,590 2299 470 C
W2OW (AA2EQ,K2FU,N2BC,K1OW, K2CM,ops) 2,515,158 1982 423 C
VE7UF (VE7ZO,op) (+VE7ZO) 2,064,825 1995 345 C

DX

Single Operator

Africa

Tunisia

3V8SM (DL6LAU,op) 259,740 585 148 A

Niger

5U9C 345,150 1950 59 C 15

Morocco

CN2JS (F6BEE,op) 874,200 1457 200 B
CN8YR 121,590 386 105 B

Madeira Islands

CT3KN 200,994 482 139 B
CT3KU 16,587 97 57 B

Canary Islands

EA8CN 873,450 1294 225 B
EA8/DJ1OJ 667,080 1020 218 B
EA8BH (OH2BH,op) 4,262,853 4319 329 C
EA8ZS 94,608 584 54 C 80
EA8/DJ3XD 6,237 77 27 B 40

Reunion

FR5FD 255,408 626 136 B

South Africa

ZS1NF 110,448 312 118 B
ZS6AJS 69,165 265 87 B
ZS5RON 35,280 245 48 B 10

Asia

Vietnam

3W2LWS (WA1LWS,op) 99,216 312 106 B

Georgia

4L1FX 25,740 156 55 B
4L8A 611,943 1369 149 C

Israel

4Z5KJ 203,847 571 119 B
4Z5OL 9,045 67 45 B
4X1VF 15,372 122 42 C 10

Singapore

9V1YC 132,606 417 106 C

Oman

A45XR 65,856 448 49 C 10

Taiwan

BW3/UA3VCS 9,600 80 40 B

Kyrgyzstan

EX8O 16,536 106 52 C

Tajikistan

EY8MM 168,378 422 133 C

South Korea

HL5AP 4,092 44 31 A
HL5UOG 219,420 530 138 B
HL1/WX8C 89,100 275 108 B
HL3AMO 67,032 228 98 B

Thailand

HS0/OZ1HET 32,736 176 62 B
E20NTS/8 81 9 3 B 40
E20HHK 882 21 14 B 15

Japan

7L4IOU 212,676 479 148 A
JG1EIQ 168,597 429 131 A
7K4QOK (JR2BNF,op) 129,948 364 119 A
JA2IU 129,948 364 119 A
JA7MJ 50,997 191 89 A
JA3DAY 43,095 169 85 A
7K1CPT/1 28,224 147 64 A
JA4CFO 3,042 39 26 A
JA5IDV 231 11 7 A
JH4UYB 1,336,680 1896 235 B
JI1RXQ 776,790 1370 189 B
JK1OLT 736,800 1228 200 B
JR7ZIT (JQ1UKK,op) 676,800 1175 192 B
JR4PMX/1 676,260 1156 195 B
JO3JYE 598,560 1160 172 B
JA1ZGP (JF3EBO,op) 463,554 849 182 B
JK1ASO 443,352 812 182 B
JF2SKV 427,386 874 163 B
JF2QNM 424,530 890 159 B
JH5PHC/5 364,287 913 133 B
JA3YPL (JJ3TBB,op) 296,868 692 143 B
JF2BDK 238,581 541 147 B
JA1CP 235,638 494 159 B
JA3MVI 190,944 468 136 B
JR7HOD/1 169,728 416 136 B
JA0EMS 166,050 450 123 B
JA5JCC 162,972 503 108 B
JA1XUY 161,379 387 139 B
JG0OXL 155,388 563 92 B
JN1NOP 153,567 453 113 B
JH6QPP 143,640 420 114 B
JH1XUZ 141,882 442 107 B
JA2VZL 131,274 374 117 B
JA3PYC 131,166 347 126 B
JE3UHV 131,076 331 132 B
JA1XRH 109,962 298 123 B
JP1SRG 104,430 295 118 B
JR5CAG 100,089 337 99 B
JA5ATN 97,344 312 104 B
JA2BQX 95,979 299 107 B
JM1NHZ 93,717 267 117 B
JA6CYL/6 86,961 287 101 B
JA0BMS/1 76,734 294 87 B
JA6SRB/4 75,276 246 102 B
JJ4PPK 69,387 229 101 B
JH5OXF 63,666 262 81 B
JE8KKX 56,637 217 87 B
JK1VSL 56,154 191 98 B
JA4BAA 54,675 225 81 B
JR1NHD 49,053 197 83 B
7L3KJV 48,000 200 80 B
JA2KPW 47,988 172 93 B
JE1HJV 47,430 170 93 B
JA1OZK 42,840 238 60 B
JR3NDM 35,112 152 77 B
JA1AZS 33,750 150 75 B
JA1HFY 32,856 148 74 B
JA2MZ 31,500 150 70 B
JH7QNG 31,050 150 69 B
JA1HHU 27,537 137 67 B
JA6CM 27,300 130 70 B
JH1MTR 25,854 139 62 B
JA1XPU 23,790 122 65 B
JA1KXT 23,400 120 65 B
JA2PFO 22,035 113 65 B
7L3AUA 20,709 117 59 B
JH0IXE 18,117 99 61 B
JN7QJA 17,784 114 52 B
JA1IZ 16,587 97 57 B
JH6WBN/1 11,421 81 47 B
JA3QOS 11,280 80 47 B
JM1LQI 9,114 62 49 B
JJ4CDW 8,580 65 44 B
JI2VLM 6,600 55 40 B
JE5HTN 4,059 41 33 B
JF7DXT 2,673 33 27 B
JA3AVO 1,539 27 19 B
JA6XTA/1 1,248 26 16 B
JA1IZZ 1,152 24 16 B
JH5FXP 2,235,018 2719 274 C
JA8RWU 1,777,113 2379 249 C
JH7XGN 1,569,612 2068 253 C
JA6GCE 1,453,995 2045 237 C
JR1AIB (JE1CKA,op) 1,369,062 1878 243 C
JA2FJP 858,480 1460 196 C
JA1JKG 826,254 1287 214 C
JA2FSM 512,592 944 181 C
JA2AXB 443,664 936 158 C
JA1HP 240,192 556 144 C
JA1MSS 192,672 446 144 C
JA3ARM 162,153 419 129 C
JA2QVP 126,000 350 120 C
JA2VQF 108,537 299 121 C
7J1ABD 50,778 186 91 C
JA5IP 37,392 152 82 C
JF2FIU 20,829 131 53 C
JA3WFQ 1,368 24 19 C
JM2RUV 180 12 5 B 160
JE1SPY 165 11 5 B 160
JE1TSD 90 6 5 B 160
JH1AEP 11,253 121 31 C 80
JK1OPL 6,240 80 26 C 80
JA0GZ 210 10 7 C 80
JA7YAA (7M1JAS,op) 89,430 542 55 C 40
JG1ILF 87,132 548 53 C 40
JA1KVT 13,266 134 33 B 40
JH1APZ 8,280 92 30 B 40
JA1PS 4,446 57 26 B 40
JE5JHZ 3,864 56 23 C 40
7K2GMJ 1,833 47 13 B 40
JA4XNF 975 25 13 B 40
JE2XBS 600 20 10 B 40
JH1AZO 45,570 310 49 C 20
JH0EPI 23,940 190 42 B 20
JR2AWS/1 216 9 8 B 20
JR8VSE 158,415 895 59 C 15
JI7NUF 146,034 854 57 C 15
7K4XNN 124,410 715 58 B 15
JA9CWJ 118,776 707 56 C 15
JF2ION 112,890 710 53 C 15
JR1MQT 108,075 655 55 C 15
JA9VOK 79,977 503 53 B 15
JA5APU 75,366 474 53 C 15
JH0NEC 36,096 256 47 B 15
JA1EM 18,396 146 42 B 15
JJ6TWQ 17,667 151 39 B 15
7N4KDU 10,710 102 35 B 15
JA7DNJ 9,207 93 33 B 15
JA1XEM 6,720 70 32 C 15
JQ1COB 5,304 68 26 B 15
JA7DNO 4,914 63 26 B 15
7J1AAI (W1NN,op) 204,345 1195 57 C 10
JH3AIU 178,416 1062 56 C 10
JF1SQC 162,132 916 59 B 10
JA7NVF 130,515 791 55 C 10
JR8OGB 124,659 729 57 B 10
JG2TKH 94,860 620 51 B 10
JA1NLX 83,634 526 53 B 10
JE2HCJ 80,613 507 53 B 10
JH7IMX 74,196 458 54 B 10
JH0SDA 62,700 418 50 B 10
JH0NVX/1 61,740 420 49 B 10
JR9NVB 61,353 401 51 B 10
JI1HFJ 54,096 368 49 B 10
JR4GPA 35,088 272 43 B 10
JA2CXF 29,808 216 46 B 10
JG3NKP/1 25,284 196 43 B 10

JA3KZV	22,386	182	41	B	10
JJ1GQH	22,050	175	42	B	10
JA2KKA	17,670	155	38	B	10
JF7GDF	11,772	109	36	B	10
JM6FMW	10,416	112	31	B	10
JA2UJ	9,135	87	35	B	10
JH1OLB	6,960	80	29	B	10
JI1BBN	4,032	48	28	B	10
JO1WIZ	3,780	45	28	B	10
JA4AKV	3,600	50	24	B	10
JR2TMB	3,267	33	33	B	10
JR0EFE/7	2,970	45	22	B	10
JO1CRA	2,268	36	21	B	10
7K2PBB	2,142	42	17	B	10
Lebanon					
OD5/OK1MU	125,001	731	57	C	10
Asiatic Russia					
RA9AE	8,184	62	44	A	
RW0BG	461,214	949	162	B	
UA0QO	169,176	424	133	B	
RU0BW	53,766	206	87	B	
RZ9IB	35,604	172	69	B	
UA9CR	33,264	168	66	B	
UA9CIR	31,755	145	73	B	
UA9OA	17,952	136	44	B	
RN9XA	15,606	102	51	B	
RX9TX	669,468	1187	188	C	
RK9CZO (RX9CAZ,op)	598,755	1115	179	C	
UA9CNV	544,968	1044	174	C	
UA0ANW	381,765	821	155	C	
RA9MA	347,424	752	154	C	
UA9OW	259,341	631	137	C	
UA0FDX	201,345	433	155	C	
UA9FM	192,930	545	118	C	
UA0LS	191,268	483	132	C	
UA9AM	171,570	430	133	C	
RU0AT	123,342	337	122	C	
UA9CKS	103,005	315	109	C	
UA9MC	80,370	285	94	C	
UA0JDD	56,430	209	90	C	
RA0FU	85,488	548	52	C	40
UA9CI	11,520	120	32	C	40
RW9UP	159,384	916	58	C	20
RA0BA	148,428	868	57	C	20
RU9WX	130,848	752	58	C	20
UA9LAC	90,720	540	56	C	20
RV9MM	68,052	428	53	B	20
RA9XE	29,808	216	46	B	20
RX9FB	26,838	213	42	B	20
UA9CCL	19,188	156	41	B	20
RK9CYA (RK9CR,op)	8,352	87	32	C	20
RA9XF	7,626	82	31	B	20
RU0AE	3,276	39	28	B	20
RA0AY	1,860	31	20	B	20
RA9WR	114,912	672	57	C	15
RK9JWV	53,622	331	54	B	15
UA9JLL	44,772	287	52	B	15
RA9JX/9	5,670	63	30	C	15
RS0F	161,784	963	56	C	10
RA0FN	101,919	641	53	B	10
UA9YAB	55,848	358	52	C	10
RX9WR	55,131	391	47	C	10
RV9WZ	27,840	232	40	B	10
RX9LW	16,956	157	36	C	10
Kazakhstan					
UN9LN	137,460	395	116	B	
UP6P	600,903	1119	179	C	
UN7QX	561,432	1256	149	C	
UN4PD	22,317	173	43	B	20
UN6G	14,391	117	41	B	20
UN4PG	23,862	194	41	B	15
UN5J	51,891	353	49	C	10
UN7EX	3,690	41	30	B	10
Hong Kong					
VR2BG	1,145,124	1844	207	C	
India					
VU2UR	30,843	149	69	B	
VU2AJ	4,284	68	21	B	
UK Sov Base Areas on Cyprus					
ZC4DW	87,120	528	55	B	20
Europe					
ITU HQ					
4U1ITU (OM3CGN, op)	195,402	1123	58	C	40
Croatia					
9A3GU	109,740	310	118	A	
9A7P	1,181,484	1774	222	B	
9A5I	779,916	1262	206	B	
9A2RD	848,904	1304	217	C	
9A4D (9A5WA,op)	79,674	542	49	C	40
9A5Y	224,967	1271	59	C	10
9A3VM	139,896	804	58	B	10
9A7DM	120,234	691	58	C	10
9A4K	17,901	153	39	B	10
Portugal					
CT1GFK	69,012	426	54	B	20
CT1FOK	91,530	565	54	B	15
Fed. Rep. of Germany					
DL3KVR	402,375	725	185	A	
DK2GZ	242,892	519	156	A	
DF1DX	159,588	403	132	A	
DL1JDQ	95,256	324	98	A	
DM3XI	40,443	221	61	A	
DL2DWP	34,839	147	79	A	
DJ6LK	28,470	146	65	A	
DJ3GE	22,656	118	64	A	
DL6ABB	14,256	88	54	A	
DL2TM	5,220	58	30	A	
DL2BQD	1,296	24	18	A	
DJ8EF	529,728	992	178	B	
DL2MDU	468,846	854	183	B	
DL4AAE	351,708	742	158	B	
DL3NSM	257,520	580	148	B	
DL8MUG	252,555	565	149	B	
DJ3JD	212,940	507	140	B	
DL9GFB	208,656	504	138	B	
DL1CW	206,448	506	136	B	
DL1TH	193,158	438	147	B	
DF6QV	189,240	415	152	B	
DL2ZAV	174,720	448	130	B	
DL3BZZ	151,404	407	124	B	
DL2RTJ	145,299	407	119	B	
DJ5IW	142,848	372	128	B	
DK3RA	137,496	337	136	B	
DK6NN	135,255	355	127	B	
DL3KWR	132,990	341	130	B	
DL7VAF	128,100	350	122	B	
DK7AN	104,496	311	112	B	
DL7UGO	100,170	318	105	B	
DL2MEH	85,785	301	95	B	
DL1DQW	84,075	295	95	B	
DL5KUD	81,510	286	95	B	
DL3ARK	70,110	246	95	B	
DJ2YE	61,272	222	92	B	
DL2HTF	58,788	213	92	B	
DM3ML	51,744	196	88	B	
DL2AL	48,960	192	85	B	
DL3DRN	47,310	190	83	B	
DK9BW	41,475	175	79	B	
DL2ARG	39,330	138	95	B	
DL2KWW	30,804	151	68	B	
DK5ZX	29,673	157	63	B	
DJ6TK	28,728	152	63	B	
DL3BRA	25,929	129	67	B	
DF2HL	22,848	112	68	B	
DL1IAO	2,327,325	2821	275	C	
DL4MCF	2,080,029	2677	259	C	
DK4WA	876,972	1366	214	C	
DL4NAC	668,250	990	225	C	
DL1JF	525,042	926	189	C	
DL7NS	451,764	846	178	C	
DL4WA	363,540	730	166	C	
DL5DXF	354,192	752	157	C	
DF4XX	215,172	516	139	C	
DL7IO	210,672	462	152	C	
DL3YA	51,000	200	85	C	
DL8UVG	45,816	184	83	C	
DL1DQJ	4,884	44	37	C	
DL7ZZ	216	12	6	C	160
DJ0MDR	59,211	459	43	C	80
DL2RUG	7,650	102	25	C	80
DK7YY	52,593	373	47	C	40
DL4CF	32,340	245	44	C	40
DL1DQY	10,260	95	36	A	20
DL7AXM	4,761	69	23	A	20
DH7KU	109,386	618	59	C	15
DL4JU	60,588	396	51	B	15
DL7BY	58,968	378	52	B	15
DJ5GG	26,634	193	46	B	15
DL6RAI	215,238	1237	58	C	10
DK3KD	147,378	847	58	C	10
DL2HQ	67,257	423	53	B	10
DL9ZP	49,824	346	48	B	10
DL7ET	17,760	148	40	B	10
DF3OL	15,660	116	45	B	10
DL6UAM	8,742	94	31	B	10
DL1DRD	240	10	8	B	10
Spain					
EA7GTF	1,686,528	2304	244	B	
EA4DRV	1,008,000	1600	210	B	
EA7AJR	653,418	1171	186	B	
EA4NP	630,180	1167	180	B	
EA3KU	591,318	1083	182	B	
EA1FD	478,710	810	197	B	
EA7AKJ	349,776	694	168	B	
EA1WX	226,746	494	153	B	
EA5EOH	192,558	479	134	B	
EA4EFJ	165,312	448	123	B	
EA4AMO	164,388	412	133	B	
EC2API	131,712	392	112	B	
EA4AAK	40,344	164	82	B	
EA7CA	36,120	172	70	B	
EA5BKV	21,228	116	61	B	
EA1FBJ	8,892	76	39	B	
EA5FV	2,133,750	2845	250	C	
EA5BY	410,025	781	175	C	
EA1AEH	30,552	134	76	C	
EA7GSU	56,016	389	48	C	80
EA7AIN	26,325	225	39	B	80
EA3ALV	3,306	58	19	A	40
EA3AR	114,144	656	58	C	20
EA4BWR	31,680	240	44	B	20
EA1CS	27,240	227	40	B	20
EA2AZ	858	22	13	B	20
EA1DAV	153,282	866	59	C	15
EA7NK	116,640	720	54	C	15
Balearic Islands					
EA6DD	109,740	295	124	B	
EA6SX	1,017,414	1362	249	C	
Ireland					
EI4DW	776,952	1199	216	B	
EI/SP3CW	38,682	307	42	B	40
EI4CF	14,364	133	36	B	40
EI4BZ	254,619	1489	57	B	10
EI5DI	140,070	805	58	B	10
Estonia					
ES2DJ	366,966	703	174	B	
ES1RF	61,110	210	97	B	
Belarus					
EU8RZ	324,960	677	160	A	
EW1CQ	242,214	553	146	B	
EW6GF	79,242	281	94	B	
EU6TV	15,933	113	47	B	
EW8EW	1,025,010	1627	210	C	
EW1WZ (EU1UN,op)	40,200	335	40	C	80
EU1AZ	14,268	164	29	C	80
EU1CJ	15,768	146	36	B	40
EV6Z	9,048	104	29	C	40
EW8DX	36,237	257	47	C	20
EW1WB (EU1-012,op)	6,480	80	27	B	20
EW1MN	34,965	259	45	B	15
EW6AW	18,720	156	40	B	15
EW6OO	45,396	291	52	B	10
EW6AF	21,360	178	40	C	10
EW1EA	11,712	122	32	B	10
France					
F6FTB	71,442	294	81	A	
F5NOD	61,200	200	102	A	
F5SGI	34,440	164	70	A	
F5IQJ	21,390	115	62	A	
F5TNI	663,408	1084	204	B	
F8PDR	537,510	943	190	B	
F5ICC	496,062	889	186	B	
F6OIE	224,895	517	145	B	
F5JBR	201,597	451	149	B	
F6HHR	180,744	443	136	B	
F6IEU	145,926	402	121	B	
F5AKL	67,080	215	104	B	
F8BUO	67,035	205	109	B	
F5UKL	62,244	247	84	B	
F2FX	21,024	219	32	B	
F5RPB	14,241	101	47	B	
F5IYJ	8,214	74	37	B	
TM5C (F6ARC,op)	3,380,076	3682	306	C	
F6AUS	677,952	1056	214	C	
F8BPN	4,692	68	23	B	160
TM2Y (F5MZN,op)	107,172	687	52	C	80
F6EYB	36,120	301	40	B	80
F5IN	136,290	826	55	C	15
F5SDD	1,296	24	18	B	15
F5MZN	219,126	1238	59	C	10
F/WO9S	72,576	432	56	C	10
F5LJY	36,603	249	49	B	10
England					
G0DCK	189,930	487	130	A	
G4EHT	4,515	43	35	A	
G4GZG	4,368	56	26	A	
G0MTN	841,698	1417	198	B	
G4KFT	286,749	633	151	B	
G3RSD	246,330	510	161	B	
G3VQO	201,498	473	142	B	
G4PIQ	199,350	443	150	B	
G0UKX	184,920	460	134	B	
G3KKJ	147,828	388	127	B	
G4ZME	70,782	251	94	B	
G0/N9LYE	64,500	215	100	B	
G3ECS	57,285	201	95	B	
M0AEK	33,495	145	77	B	
G4BUO	3,093,960	3496	295	C	
G3MXJ	1,509,000	2012	250	C	
G3UFY	741,240	1160	213	C	
G3TXF	594,015	995	199	C	
G2QT	539,760	865	208	C	
G4BJM	504,192	808	208	C	
G4OBK	576	16	12	C	160
G0IVZ	123,255	747	55	C	80
M4T (G0VQR,op)	33,792	256	44	B	20
G3JKY	22,113	189	39	B	20
G4IIY	86,337	543	53	B	15
G0MRH	7,560	84	30	B	15
M0TTT	253,995	1435	59	C	10
G3WVG	235,944	1356	58	C	10
G4TSH/P	232,578	1314	59	C	10
M0C (G0CKP,op)	194,256	1136	57	C	10
G0ORH	82,665	501	55	C	10
M6T (G4PIQ,op)	48,816	339	48	C	10
G4JZO	38,700	258	50	A	10
G3XSV	31,050	207	50	B	10
G0VDZ	2,460	41	20	B	10
Northern Ireland					
GI4KSH	120,648	457	88	C	
Scotland					
GM3NHQ	301,392	624	161	B	
GM4SID	139,392	363	128	C	
MM0BQI	4,350	58	25	B	40
GM3POI	306,033	1729	59	C	15
GM2T (GM0CLN,op)	129,978	747	58	B	10
Guernsey					
MU0FAL	275,394	581	158	B	
MU2K (G3SQX,op)	178,593	1009	59	C	15
GU4YOX	54,927	359	51	B	10
Wales					
GW0KZW	12,183	131	31	A	
GW7X (GW3NJW,op)	151,164	884	57	C	40
GW4HBK	10,464	109	32	B	40
Hungary					
HA5BDU	19,344	104	62	A	
HA8LIF	265,923	603	147	B	
HA0HH	160,716	454	118	B	
HA1CW	2,262	29	26	B	
HA8JV	2,154,600	2700	266	C	
HA2MV	222,735	479	155	C	
HA5JI	9,153	113	27	C	160
HA8DL	273	13	7	B	80
HA8IB	163,548	924	59	C	40
HA6OL/3	80,964	519	52	C	40
HA8VK	119,130	722	55	C	15
HA3LI	34,155	253	45	A	15
HA5MY	18,093	163	37	C	15
HA7UG	170,628	964	59	C	10
HA5NG	96,030	582	55	B	10
HA5PT	71,610	434	55	B	10
HG8W	46,656	324	48	C	10
Switzerland					
HB9BMY	280,332	599	156	A	
HB9DAX	150,297	421	119	A	
HB9AYZ	19,080	106	60	A	
HB9DOZ	6,840	60	38	A	
HB9ARF	502,521	877	191	B	
HB9DTM	100,485	319	105	B	
HB9DOT	70,782	251	94	B	
HB9HQX	34,410	155	74	B	
HB9FAP	1,958,580	2340	279	C	
HB9FBS	374,256	678	184	C	
HB9CZF	156,600	900	58	C	10
HB9DCM	48,240	335	48	B	10
Italy					
I1BAY	300,900	590	170	A	
I3BBK	251,766	591	142	A	
IK5YZT	140,616	372	126	A	
IZ1DFI	3,360	40	28	A	
IK1GNC	148,428	399	124	B	
I3JEX	145,008	424	114	B	
IK2AIT	143,172	388	123	B	
I6FDJ	122,484	346	118	B	
IK2WYI	111,744	388	96	B	
IK4XCL	95,979	299	107	B	
IK2NCF	49,302	198	83	B	
IK1SPR	45,936	176	87	B	
IK4NPC	15,288	98	52	B	
IV3KSE	10,530	78	45	B	
IK2RLS	10,050	67	50	B	
IT9GXE	7,605	65	39	B	
IZ6BTN	6,696	62	36	B	
IK4ZHH	535,572	1044	171	C	
IK2ANI	127,380	386	110	C	
IV3DYS	5,130	45	38	C	
IK4MGP	13,137	151	29	C	160
IK4WMA	20,475	175	39	C	80
IU2M (I2WIJ,op)	108,024	643	56	C	40
IK1QBT	103,032	648	53	C	40
IU9S	233,817	1321	59	C	20
IO4L	230,376	1324	58	C	20
I3MGN	9,405	95	33	B	20
IU4T	110,979	649	57	C	15
I1NVU	93,492	588	53	C	15
IK3SCB	75,972	487	52	B	15
IY4W	195,924	1126	58	C	10
IQ3X (IV3SKB,op)	160,950	925	58	C	10
IQ2C (IK2JUB,op)	159,732	918	58	C	10
II2K (IK2UCK,op)	150,273	849	59	C	10
IK3QAR	98,952	589	56	C	10
IK8WEI	29,469	209	47	B	10
Sardinia					
IS0IGV	142,506	406	117	B	
IS0UWX	14,406	98	49	B	
Norway					
LA9HFA	918,540	1458	210	B	
LA8OM	471,108	913	172	B	
LA9AU	21,321	103	69	B	
LA7MFA	1,352,565	1935	233	C	
LA2O	332,055	705	157	C	
LA3BO	1,680	35	16	B	80
Luxembourg					
LX1JH	100,464	299	112	B	
LX1NO	6,603	71	31	C	10
Lithuania					
LY5A (LY2PAJ,op)	838,368	1312	213	A	
LY1FDY	43,026	202	71	A	
LY2MW	504,900	900	187	B	
LY2MM	248,319	541	153	B	
LY1DS	98,910	314	105	B	
LY6A (LY2BM,op)	194,877	1101	59	C	20
LY9A (LY3BA,op)	178,872	1028	58	C	20
LY2LF	17,040	142	40	B	20
LY2TE	26,280	219	40	B	15
LY1FW	1,209	31	13	B	15
LY2FN	74,682	461	54	B	10
Bulgaria					
LZ7X	961,350	1450	221	A	
LZ1ABC	739,032	1162	212	B	
LZ4UU	274,593	583	157	B	
LZ2UZ	200,535	461	145	B	
LZ1EP	109,863	313	117	B	
LZ2ITU	60,480	252	80	B	
LZ2PL	275,370	685	134	C	
LZ2WF	215,574	589	122	C	
LZ1PM	13,392	144	31	B	80
LZ2LDS	7,200	100	24	B	80
LZ2RF	34,452	261	44	C	40
LZ3PZ	10,440	116	30	B	40
LZ1FJ	990	30	11	B	20
LZ2FM	17,892	142	42	B	15
LZ9V	35,910	342	35	C	10
LZ6C (LZ2TF,op)	34,104	232	49	B	10
LZ1CF	20,016	139	48	B	10
Austria					
OE2BZL	1,140,750	1521	250	C	
OE5CWL/5	736,092	1524	161	C	
OE3JOS	589,965	1063	185	C	
Finland					
OH2NN	296,148	667	148	B	
OH2NFS	293,832	616	159	B	
OH2VF	112,140	356	105	B	
OH3IR	107,802	318	113	B	
OH2BLI	97,584	304	107	B	
OH1BOI	97,578	278	117	B	
OH2EV	38,925	173	75	B	
OH1AL	26,901	147	61	B	
OH3KAV	20,700	115	60	B	
OH3KOK	12,870	110	39	B	
OH2BH (OH2JTE,op)	2,185,014	2834	257	C	
OH2K (OH2LRE,op)	375,366	857	146	C	
OH5NE	240,039	537	149	C	
OH2VZ	129,084	347	124	C	
OH1EB	45,198	186	81	C	
OH3WD	2,091	41	17	C	80
OH4A (OH6QU,op)	294,060	1690	58	C	20
OH2BCD	17,940	130	46	C	20
OH2BED	17,940	130	46	C	20
OH6AC	273,780	1521	60	C	15
OH6RX	199,056	1144	58	C	10
OH2BAH	44,304	284	52	C	10
Czech Republic					
OK2VWB	255,150	567	150	A	
OK1FKD	53,460	198	90	A	
OK2BND	46,065	185	83	A	
OK1DMP	6,720	56	40	A	
OK2PP	1,175,328	1696	231	B	
OK2ZV	1,157,598	1746	221	B	
OK1DSZ	1,005,660	1510	222	B	
OK1HX	832,446	1347	206	B	
OK2MBP	458,172	858	178	B	
OK2DU	378,351	729	173	B	
OK1BA	377,997	773	163	B	
OK1ZP	266,760	585	152	B	
OK1VBA	228,099	547	139	B	
OK1DKO	210,600	540	130	B	
OK2PKY	180,306	477	126	B	
OK1DSX	159,354	454	117	B	
OK1MKI	158,790	395	134	B	
OK2BJ	124,806	341	122	B	
OK1AOU	118,668	319	124	B	
OK1FHI	107,856	321	112	B	
OK1CJN	103,206	334	103	B	
OK2AJ	95,160	305	104	B	
OK1DVK	82,716	226	122	B	
OK1MZO	76,257	229	111	B	
OK1WWJ	64,452	262	82	B	
OK1AUP	50,688	192	88	B	
OK1HGM	40,182	181	74	B	
OK2PJD	34,428	151	76	B	
OK1DKM	32,016	184	58	B	
OK2PBG	30,456	188	54	B	
OK2SFO	30,420	169	60	B	
OK1SRD	20,223	107	63	B	
OK1FWW	17,649	111	53	B	
OK1TRM	16,638	118	47	B	
OK2BNC	13,392	93	48	B	
OK1FTW	12,672	88	48	B	
OK2BHE	12,546	82	51	B	
OK2BDF	10,074	73	46	B	
OK2PDT	773,115	1393	185	C	
OK1AXB	584,415	999	195	C	
OK1OX	246,744	552	149	C	
OK1ZF	212,898	518	137	C	
OK2EQ	168	8	7	C	160
OK1RK	40,248	344	39	C	80
OK1WF	23,766	233	34	C	80
OK1YO	4,158	77	18	B	80
OK1FOG	3,660	61	20	B	80
OK1DTC	71,442	486	49	B	40
OK1FKM	45,816	332	46	B	40
OL4M	32,886	261	42	C	40
OK1HFP	18,144	168	36	B	40
OK2BPL	13,167	133	33	B	40
OK1SI	8,991	111	27	B	40
OK1DZD	3,300	55	20	A	40
OK1RF	281,076	1588	59	C	20
OK2GG	134,697	761	59	C	20
OK1JDJ	1,275	25	17	B	20
OK2ZC	150,510	865	58	C	15
OK1VD	86,697	507	57	B	15
OK2SG	31,188	226	46	C	15
OK1MGW	24,231	197	41	B	15
OK2QX	17,784	156	38	B	15
OK5SAZ	10,197	103	33	B	15
OK2RZ (OK1FUA,op)	200,895	1135	59	C	10
OK1CF	188,682	1066	59	C	10
OK1XC	84,504	503	56	B	10
OK1KA	59,700	398	50	B	10
OK1AES	40,650	271	50	B	10
OK1ACF	35,424	246	48	B	10
OK2VX	27,540	204	45	B	10
OK1AOV	14,136	124	38	C	10
OK1AIJ	12,177	123	33	A	10
Slovakia					
OM5NL	641,844	1132	189	B	
OM7JG	399,627	779	171	B	
OM4DN	369,936	734	168	B	
OM7AG	320,760	660	162	B	
OM4TX	256,872	556	154	B	
OM3PQ	256,464	624	137	B	
OM5JA	169,545	445	127	B	
OM8MM	159,894	423	126	B	
OM7VF	147,600	400	123	B	
OM7RC	100,716	308	109	B	
OM7AT	97,569	293	111	B	
OM1ADM	93,810	295	106	B	
OM1AW	91,494	299	102	B	
OM6CU	65,340	242	90	B	
OM3TA	5,712	56	34	B	
OM8A (OM3RM,op)	774,834	1451	178	C	
OM2RA	578,880	1206	160	C	
OM5RW	8,352	116	24	C	160
OM7CW	270	10	9	C	160
OM0M	156,114	882	59	C	40
OM2ZZ	3,762	57	22	A	20
OM5M (OM4DW,op)	178,416	1008	59	C	15
OM3NA	163,371	923	59	C	15
OM7YC	36,300	242	50	B	15
OM5LR	11,865	113	35	B	15
OM1CW	206,736	1168	59	C	10
OM2IB	169,476	974	58	C	10
OM8AG	106,362	622	57	C	10
OM3DX	92,565	561	55	B	10
Belgium					
ON7CC	88,911	267	111	A	
ON4CAS	319,275	645	165	B	
ON4XG	312,624	624	167	B	
ON5UM	222,240	463	160	B	
ON4KJ	176,472	456	129	B	
ON4CN	94,245	305	103	B	
ON5ZO	84,900	283	100	B	
ON4CHK	66,123	237	93	B	
ON6LO	59,274	222	89	B	
ON4IG	51,744	196	88	B	
ON4IT	24,708	116	71	B	
ON6LY	24,192	128	63	B	
ON4KVA	10,260	76	45	B	
ON4BR	6,072	88	23	C	160
OT2T (ON4UN,op)	116,316	718	54	C	80
ON7DR	73,287	479	51	C	40
ON6TJ	17,400	145	40	B	20
ON4SG	6,030	67	30	B	20
OT2H (ON5YR,op)	198,186	1139	58	B	15
ON4KLG	30,774	223	46	B	15
ON7YX	78,375	475	55	B	10
Faroe Islands					
OY1CT	659,400	1099	200	C	
Denmark					
OZ5WQ	150,144	368	136	B	
OZ5UR	128,097	331	129	B	
OZ4FF	98,262	309	106	B	
OZ0RS	69,552	252	92	B	
OZ1FGS	21,312	111	64	B	
OZ1LO	2,300,208	2768	277	C	
OZ1BMA	26,280	219	40	B	20
OZ7YL	18,900	150	42	C	15
OZ8AE	31,443	223	47	B	10
Netherlands					
PA3HEQ	152,988	418	122	A	
PA9RZ	20,148	92	73	A	
PA3FSC	6,324	62	34	A	
PA0RBO	2,808	36	26	A	
PA4CW	557,496	1044	178	B	
PA3BFH	288,108	636	151	B	
PA3AAV	250,920	510	164	B	
PA5FN	221,517	489	151	B	
PA4GF	63,270	222	95	B	
PA3BNT	38,610	165	78	B	
PA0RBS	33,417	141	79	B	
PA1NRT	21,717	127	57	B	
PA2ALF	20,349	119	57	B	
PA3HGF	9,540	60	53	B	
PA0PFW	119,427	329	121	C	
PA0JNH	81,648	252	108	C	
PA5AT	24,924	268	31	B	80
PA0RCT	24,864	224	37	C	80
PA5WT	24,192	224	36	C	40
PA3ACC	3,906	62	21	C	40
PI4TUE (PA3EZL,op)	208,506	1178	59	C	15
PA3EZC	16,206	146	37	B	15
PA3EMN	51,867	339	51	B	10
PA0ADT	25,461	207	41	A	10
Slovenia					
S53O	2,510,577	3111	269	C	
S59AA	981,654	1501	218	C	
S52AU	530,244	1236	143	C	
S51SL	84,810	257	110	C	
S57M	13,104	168	26	C	160
S57LWG	3	1	1	A	160
S59CAB (S57MW,op)	65,661	509	43	C	80
S57KRI	252	12	7	A	80
S53M (S53ZO,op)	159,384	916	58	C	40
S57DX	154,164	886	58	C	40
S57Q	115,752	742	52	C	40
S57UN	100,116	618	54	C	40
S53F	65,100	434	50	B	40
S51TA	221,781	1253	59	C	15
S50R	195,660	1087	60	C	15
S52ZW	158,688	912	58	C	15
S57IIO	53,550	350	51	A	15
S50K	217,710	1230	59	C	10
S56M	211,515	1195	59	C	10
S50C (S53MM,op)	196,968	1132	58	C	10
Sweden					
SM7DBN	60,996	221	92	A	
SM7EH	242,100	538	150	B	
SM7BJW	229,749	559	137	B	
SM4SX	195,453	513	127	B	
SM7CIL	149,646	509	98	B	
SM3EAE	104,313	319	109	B	
SM7BVO	79,380	294	90	B	

SM5RE 55,104 224 82 B
SM6DUA 15,486 89 58 B
SM7BQX 12,972 94 46 B
SM1HPV 6,048 56 36 B
8S0W (SM0NJO,op)
2,553 37 23 B
8S2F (SM0OGQ,op)
1,457,379 2103 231 C
7S2E (SM2DMU,op)
1,411,722 2011 234 C
SM7CQY 389,781 807 161 C
SM6WQB 339,822 651 174 C
SM0CCE 265,440 553 160 C
SM6FUD 69,540 244 95 C
SM5ALJ 30,150 150 67 C
SM5NBE 4,968 72 23 B 80
SM0J 3,000 50 20 B 40
SM7BHM 2,907 51 19 C 40
8S0F (SM0OGQ,op)
29,118 211 46 B 20
SM5T (SM5TSP,op)
2,916 54 18 A 20
SM0DRD 594 18 11 B 20
SM7N (SM7NDX,op)
90,153 567 53 B 15
SM6CRM 38,016 264 48 B 15
SM2EKA 13,500 125 36 B 15
SM5INC 169,476 974 58 C 10
SK0X 70,848 492 48 B 10
SM5CCT 28,098 223 42 A 10

Poland

SP6AYP 336,765 715 157 A
SP5DDJ 333,576 678 164 A
SP1EK 96,228 297 108 A
SP3VT 770,994 1218 211 B
SP5GDY 388,869 767 169 B
SP2DNI 308,070 630 163 B
SP3HC 222,750 550 135 B
SP3ESV 158,460 380 139 B
SQ9DXN 155,541 373 139 B
SP3DIK 122,388 329 124 B
SQ9FMU 106,029 357 99 B
SP4CQU 77,322 263 98 B
SP3XR 62,040 220 94 B
SP9MRQ 61,410 230 89 B
SP6LV 60,435 237 85 B
SP8FHJ 58,590 210 93 B
SP4AVG 51,342 199 86 B
SN4R 45,030 190 79 B
SP5LUV 25,347 119 71 B
SQ2AJI 13,536 96 47 B
SQ1EUG 6,027 49 41 B
SP8GNF 2,394 38 21 B
SN5N 786,600 1311 200 C
SN8F 39,195 335 39 C 80
SP5GH 9,375 125 25 C 80
SP2FAX 181,080 1006 60 C 40
SP4Z 125,628 722 58 C 40
SP9HWN 17,538 158 37 C 40
SP9EMI 16,626 163 34 B 40
SP2PIK (SQ4GXO,op)
149,016 887 56 C 20
SP8UFO 114,912 684 56 C 20
SP5WA 109,998 679 54 C 20
SN5Z (SP5UAF,op)
92,988 574 54 C 20
SP8BAB 58,650 391 50 B 20
SP2BLC 30,258 246 41 C 20
SP3KRE (SQ3HTX,op)
25,110 186 45 B 20
SP9SOU 12,342 121 34 B 20
SP9DUX 11,781 119 33 B 20
SQ9CAQ 10,593 107 33 B 20
SP5GRM 244,260 1380 59 C 15
SP9XCN 109,368 651 56 B 15
SP4DEU 96,855 587 55 B 15
SP4TKR 94,122 581 54 B 15
SP4ZO 63,960 410 52 B 15
SP2AYC 24,948 189 44 B 15
SP9ODL 19,800 165 40 B 15
SP7FGA 6,972 83 28 B 15
SP1BLE 4,623 67 23 B 15
SP9W 116,466 658 59 C 10
SP3KFH (SP3JZR,op)
82,008 536 51 C 10
SP3GTS 76,272 454 56 B 10
SP8FHK/8 65,232 453 48 C 10
SP9NSV 35,136 244 48 B 10
SP4DC 31,152 236 44 B 10
SP2JLR 21,879 187 39 B 10
SP5CGN 13,209 119 37 B 10
SP3MY 8,118 82 33 B 10
SP9GNM 4,824 67 24 B 10

Greece

SV1CIB 121,590 386 105 B
SV1BSX 99,990 330 101 B
J41YM (OK1YM,op)
246,528 642 128 C

Bosnia-Herzegovina

T95A 39,732 301 44 B 20
T97M 163,560 940 58 C 15
T99W 194,880 1120 58 C 10

Iceland

TF3GB 927,864 1578 196 B
TF3VS 42,042 182 77 B

Kaliningrad

UA2FZ 872,496 1328 219 C

European Russia

UA0KCL/3 139,113 377 123 A
RA3XO 126,390 383 110 A
RZ6HX 70,680 248 95 A
RZ4AA 6,720 70 32 A
RZ4FA 554,829 989 187 B
RA6LW 423,462 793 178 B
RA3AF 379,512 753 168 B
RN1AO 305,724 698 146 B
UA1ZZ 239,760 540 148 B
RU3FF 239,148 546 146 B
UA6HON 194,310 510 127 B
RA2FW 171,069 449 127 B
RV3DAK 153,510 430 119 B
RN4SS 149,388 422 118 B
UA4AN 139,725 405 115 B
UA1ANA 134,676 387 116 B
RN6FO 132,936 382 116 B
RU6FA 131,406 362 121 B
RU4CO 122,640 365 112 B
RD4M (UA4LU,op)
120,684 356 113 B
UA6PF/3 74,601 307 81 B
UA4FEN 65,274 253 86 B
RA4HT 57,120 224 85 B
RU3AT 54,405 195 93 B
RN4HA 49,665 215 77 B
RW4CG 49,200 200 82 B
RZ6HN 47,286 222 71 B
RA3BB 47,232 192 82 B
RW4HB 45,936 176 87 B
UA3ZBN 37,758 203 62 B
RA6LAE 36,675 163 75 B
RU3DM 25,032 149 56 B
RW3PN 22,914 134 57 B
RZ3FQ 21,063 119 59 B
RW3VZ 20,880 116 60 B
RU3WR 15,150 101 50 B
RA1TV 12,972 92 47 B
RW3SU 12,240 85 48 B
RA3TT 855 19 15 B
UA4LCH 1,331,592 1964 226 C
RK4FF 1,244,196 1938 214 C
RX3APM 1,162,158 1777 218 C
RJ1Z (RW1ZA,op)
822,096 1384 198 C
RW4PL 688,338 1214 189 C
UA4FER 673,761 1201 187 C
RZ3AZ 590,175 1075 183 C
RF4R (UA4RC,op)
581,616 1154 168 C
UA3AP 551,862 989 186 C
UA3TU 460,020 902 170 C
RU6MM 450,450 975 154 C
RA3NN 387,777 793 163 C
UA3AGW 367,416 729 168 C
RV1CC 301,290 605 166 C
RX3AEX 161,805 469 115 C
RN4WA 161,595 405 133 C
UA1AQF 143,370 405 118 C
RZ6BR 115,560 428 90 C
RW6CW 112,671 351 107 C
RU3DX 48,222 171 94 C
UA1TBK 44,019 201 73 C
RA4NF 24,192 128 63 C
RA4AI 22,680 120 63 C
UA6AAW 768 16 16 C
RN6AL 8,694 126 23 C 80
RK6BZ 3,969 63 21 C 80
UA4LY 1,440 30 16 C 40
RA1ACJ 267,480 1486 60 C 20
RA4LW 111,150 650 57 C 20
UA1CEC 35,814 254 47 C 20
RX3AP 16,680 139 40 B 20
RA3NX 14,706 129 38 A 20
RX4HX 11,118 109 34 C 20
UA1NFA 9,792 96 34 B 20
RV3YR 3,096 43 24 B 20
RZ3AA 169,035 955 59 C 15
UA6LAM 24,288 184 44 C 15
UA3AVR 20,040 167 40 B 15
RX3DBG 17,784 156 38 B 15
UA3MDX 13,365 99 45 C 15
RV3DBK 243 9 9 A 15
RA3AN 58,788 426 46 C 10
RV3ACA 49,266 357 46 B 10
RW4LE 37,269 303 41 C 10
UA6LP 240 10 8 A 10

Ukraine

US9QA 143,640 399 120 A
UU4JO 84,150 275 102 A
UR7LW 505,050 925 182 B
UT8IT 211,680 504 140 B
UY5TE 198,492 476 139 B
UU5YL 91,800 306 100 B
UT2QQ 61,143 229 89 B
UU2JA 132,864 346 128 C
UX8IX 93,936 304 103 C
UT3UZ 10,944 96 38 C
UX0IB 504 14 12 C 160
UZ7U (UT3UA,op)
36,960 308 40 C 80
UY0ZG 10,764 138 26 C 80
UR5WCQ 7,776 108 24 C 80
UW5Q (UR3QCW,op)
116,985 709 55 C 40
UT1FA 84,975 515 55 C 40
UR5IOK 68,688 432 53 C 40
UU0A 65,988 468 47 C 40
UT5IZ 3,135 55 19 B 40
UX1IL 2,880 48 20 C 40
UZ8M (US0MR,op)
159,558 917 58 C 20
UR6IJ 60,996 391 52 B 20
UR6QS 29,025 225 43 C 20
US1PM 25,092 204 41 B 20
UY5YA 15,504 136 38 C 20
UY5LQ 10,434 94 37 C 20
UT2IY 128,064 736 58 C 15
UT5UT 117,798 677 58 C 15
UT7QF 107,559 629 57 C 15
UT1IA 84,240 520 54 C 15
US7IGF 72,072 462 52 B 15
UV5U (UX1UA,op)
55,650 350 53 C 15
UX3HA 15,561 133 39 C 15
US2WU 63,666 393 54 B 10
US3QW 15,840 132 40 A 10
US5MTJ 11,664 108 36 B 10
UT8IM 2,460 41 20 C 10

Latvia

YL2PA 186,534 482 129 B
YL2BJ 130,410 345 126 B
YL2PN 104,535 345 101 B
YL2GTD 11,514 101 38 B
YL2SM 1,584,846 2174 243 C
YL2KO 1,173,582 1854 211 C
YL2GD 531,774 953 186 C
YL2KF 25,272 156 54 C
YL2LY 13,824 128 36 C 40
YL2EC 17,214 151 38 B 20
YL5M (YL2UZ,op)
81,648 504 54 B 10
YL2LW 2,451 43 19 B 10

Romania

YO6ADW 80,190 297 90 A
YO4AAC 57,021 229 83 A
YO3APJ 1,238,076 1734 238 B
YO8DHD 30,996 164 63 B
YO4CSL 11,352 86 44 B
YO2NAA 9,120 80 38 B
YO3FWC 98,487 353 93 C
YO2BEH 21,735 207 35 C 40
YO9AGI 9,072 108 28 B 40
YO5CL 27,270 202 45 C 20
YO9FYP 4,860 60 27 B 20
YO3KPA 185,310 1065 58 C 15
YO5OHO 63,759 401 53 B 15
YO4NF 103,530 595 58 C 10
YO6BHN 34,425 225 51 B 10

Yugoslavia

YU1LM 210,528 516 136 A
YU1OJ 533,520 988 180 B
4N1FG 476,190 858 185 B
YU7RN 206,220 491 140 B
YU8/S57AW 125,235 345 121 B
YT1AT 124,875 375 111 B
YU7AM 104,190 302 115 B
YU1KT 93,465 335 93 B
YU8/LZ1BJ 9,660 92 35 C
YU1RA 48 4 4 B 160
YU1KR 38,190 335 38 C 80
YT1R (YU1YV,op)
24,354 246 33 B 80
YT7A (4N7DW,op)
146,910 830 59 C 40
YT1LT 39,564 314 42 B 40
YU1ATA 0 0 0 C 40
YT9X 272,340 1513 60 C 20
YT0A 204,450 1175 58 C 15
4O6A (Z32AF,op)
198,012 1138 58 C 15
YT1LD 176,436 1014 58 B 10
YT1BB 141,777 801 59 C 10
YU7W 112,404 646 58 B 10
4N1SM 99,528 572 58 C 10
YU7SF 46,158 314 49 B 10
YU1HA 46,008 284 54 B 10
YU7KM 45,543 323 47 B 10

Macedonia

Z36W 376,752 752 167 C
Z35M 257,280 640 134 C
Z32LM 9,690 95 34 B 15

North America

Barbados

8P9NX 229,992 518 148 B

Bahamas

C6AGS (KI6T,op)
537,516 948 189 B
C6AMM (K1CN,op)
6,426 63 34 B
C6A/K7RE 166,026 938 59 B 80
C6AKQ 229,140 1273 60 C 40

Guadeloupe

FG/YL2KL 3,685,407 3851 319 C

Honduras

JA6WFM/HR3
140,745 853 55 C 10

Grenada

J38A (K4LTA,op)
2,094,960 2408 290 B
J37ZA (K2KQ,op)
3,128,664 3386 308 C

St Lucia

J6/G3TBK 839,322 1727 162 B

Alaska

KL7AC 435,333 961 151 A
KL7WV (W3YQ,op)
1,821,807 2031 299 C

Virgin Islands

WP2Z (N2NI,op)
3,148,761 3311 317 C

St Maarten Saba St Eustatius

PJ7/ND5S 1,976,688 2226 296 B

Costa Rica

TI7/N4MO 208,278 1197 58 B 15

Antigua & Barbuda

V31AH (W0AH,op)
958,365 1395 229 A

Belize

V31JP (K8JP,op)
3,856,620 3980 323 C
V47KP (W2OX,op)
2,767,770 3015 306 C

Turks & Caicos Islands

VP5GA (N2GA,op)
3,586,320 3516 340 B
VP5U (AJ6V,op)
4,043,637 4199 321 C

Bermuda

VP9/W6PH
3,017,556 3076 327 B

Mexico

XE1/N6AN 2,199,996 2657 276 B
XE1ZOI 674,730 1190 189 B
XE2AUB 1,296 24 18 B
XE2AC 44,100 294 50 C 160
XE1RGL 17,415 135 43 B 15

Nicaragua

H6C (YN4SU,op)
63,063 429 49 B 80

Oceania

Philippines

DU7/N7ET 121,776 344 118 A
DU1EV 11,610 90 43 B
DU3/K6IP 2,112 32 22 B
DU3NXE 145,440 404 120 C

Mariana Islands

KH0/JM1LRQ
1,319,310 2055 214 B

Hawaii

KH7R (KH6ND, op)
4,351,074 4291 338 C

Australia

VK2APK 331,584 704 157 B
VK4UC 181,500 484 125 B
VK5GN 1,040,400 1445 240 C
VK2QF 15,840 96 55 C
VK2AYD 100,965 635 53 B 10
VK4TT 27,675 205 45 B 10

Indonesia

YB2UDH 45,612 181 84 B
YB0GJS 75,570 458 55 B 20

New Zealand

ZL2BR 393,210 771 170 B
ZL6QH (ZL2III,op)
977,676 1442 226 C
ZL1TM 11,322 111 34 B 40
ZL1GO 34,272 238 48 B 15
ZL3GA 14,040 120 39 B 10

South America

Chile

XQ1ZW 612,696 1042 196 B
CE8FGC 81,000 500 54 B 20

Argentina

LU5FF 709,632 1344 176 B
LU1EWL 483,252 1046 154 B
LU8DW 480,168 1053 152 B
LW8DLB 19,116 108 59 B
LU1DZ 180,750 482 125 C
LU/N5KO 7,770 74 35 C
LW9DAH 146,850 890 55 C 20
LU1BCE 98,334 607 54 C 15
LR7A (LU7AWP,op)
150,528 896 56 B 10
LU7EE 94,284 582 54 A 10
LW3ETE (LW7DX,op)
85,698 529 54 B 10
LU7DNN 33,135 235 47 B 10

Peru

OA4SS 1,746,168 2347 248 C

Aruba

P40W (W2GD,op)
3,899,097 3903 333 B
P43JB 90,576 296 102 C

Brazil

PY1KS 112,224 334 112 A
PY3AU 35,235 145 81 B
PP7ZZ 4,620 44 35 B
PV8DX 79,866 493 54 B 80
PR7AR 10,476 97 36 B 40
PY3MM 6,384 76 28 B 40
PY2NY 103,656 617 56 B 20
PY2KN (PY1KN,op)
196,560 1092 60 C 15
PY2YU 183,396 1054 58 C 15
PY3CQ 29,025 225 43 B 15
PY3DX 83,916 518 54 B 10
PY4FQ 13,440 128 35 B 10
PY2NDX 7,524 76 33 B 10

Venezuela

YV7QP 138,546 358 129 B
YV4GLD 98,010 594 55 C 80

Single Operator Assisted

Asia

JN2AMD 1,138,371 1717 221 C
JY9NX (JM1CAX,op)
1,123,626 1726 217 C
JH7BZR 593,607 1229 161 C
JH3LFL/1 345,762 674 171 B
JI1EFP 330,084 692 159 B
JA9XBW 170,820 438 130 B
JQ1NGT 111,321 651 57 C
HS0ZDJ (W2YR,op)
91,464 296 103 C
7N2UTO 51,120 213 80 B
UA0AGI 44,604 177 84 C
JK2VOC 1,890 35 18 B

Europe

DK3GI 2,446,386 2902 281 C
M0SDX 2,328,339 2951 263 C
DK8ZB 2,284,200 2700 282 C
OT2L 1,808,325 2565 235 C
OH6NIO 1,507,257 2253 223 C
G3LZQ 1,281,180 1630 262 C
OM5AW 1,168,170 1693 230 C
IK2AHB 1,111,851 1677 221 C
RA3AJ 1,107,282 1766 209 C
OK1DG 1,044,288 1568 222 C
LY2OX 1,023,102 1509 226 C
DJ9RR 752,637 1189 211 C
RV2FW 740,544 1216 203 C
YL0A (YL2KA,op)
684,405 1135 201 B
IR2K (IK2HKT,op)
595,920 1040 191 C
DL6KVA 595,137 1007 197 C
IK0YVV 550,800 1200 153 B
OE8CIQ 544,968 1044 174 C
OK1KT 537,030 918 195 C
PA5KT 492,906 727 226 C
SM5D 430,128 824 174 C
OH4XX 355,470 697 170 C
OK2ZW 321,030 738 145 C
SK6HD (SM6FKF,op)
309,600 645 160 C
EA3GIP 214,776 456 157 B
SP5AKG 200,070 494 135 B
HA9OA 121,500 405 100 B
DF5ZV 105,537 277 127 C
YO4RHK 71,022 266 89 B
S53AU 39,525 155 85 B
IK2SAE 30,753 153 67 B
SM5AJV 23,517 117 67 B
IO2L (IK2NCJ,op)
10,320 86 40 C
SV1XV 4,788 42 38 B

North America

V26G (N2ED,op)
3,936,000 4100 320 C

Multioperator Single Transmitter

Asia

JR3NZC (+JK2VOC,JF2VAX,JJ2TKX, JO2AXB) 1,505,175 2135 235 C
JA2ZJW (JH2CMI,JA2XYO,JI4RDO, JK2XXK,JI2KVW,JM4MGM,ops)
1,449,480 2056 235 C
JA1YNE (JP1OGL,JR1NKN,ops)
1,012,176 1584 213 C
JA2YKA (JH3FBK,JP2QWO,JQ2CIK, JP2XEC,JQ2AGV,JN2FMH,ops)
660,282 1106 199 C
RK9JWZ (UA9JIJ,UA9JMS,UA9JMM, UA9JLQ,UA9JMD,ops)
299,061 707 141 C
RW9QA (+UA9QCP)
204,000 500 136 C
RZ0IWR (UA0IAS,UA0IHA,ops)
65,016 387 56 B

Europe

HG1S (HA1TJ,HA1DAE,HA1DAC, HA1AG,HA1DAI,HG6N,HA2NA,HA2SX)
2,861,685 3347 285 C
OM7M (OM3KAP,+ops)
2,761,200 3120 295 C
OL3A (OK1AY,OK1DX,OK1FCJ, OK1DRQ,OK1CM,ops)
2,639,385 3087 285 C
OE2S (OE2LCM,OE2VEL,OE2WPO, ops) 2,542,788 3071 276 C
RW2F (RN2FA,RA2FA,UA2FP,ops)
2,537,640 3021 280 C
SP3KEY (SP3RBR,SP3HRN,SP3BLP, SQ3HMM,SP6HEQ,SP3DWQ,ops)
2,208,234 2842 259 C
OL7R (OK1XVU, OK1WMV, OK1VMK, ops) 2,027,193 2609 259 C
SN8V (SP8GQU,SP8GWI,SP8HZZ, SP8ARY,SP8LBK,SP8NCF,ops)
1,799,256 2458 244 C
LY1YK (LY2CO,LY2FY,LY3CO,ops)
1,700,640 2362 240 C
DL0DX (DK2OY,DL5JS,DK5KUT,ops)
1,650,906 2237 246 C
9A5D (9A2AA,9A3ID,9A3NY,9A3DU, 9A4NC,9A5DU,9A3GA,ops)
1,628,766 2207 246 C
YL7C (YL2MD,YL2GQT,ops)
1,173,312 1746 224 C
4N7N (YT7KM,YU7QL,ops)
1,077,024 1726 208 B
YZ1V (YZ1ZV,YT1HA,4N1FAN,ops)
969,420 1510 214 B
OH2U (OH6EI,OH6LK,ops)
818,100 1350 202 C
OM3KHO (OM4EX,OM4XA,ops)
736,800 1228 200 C
II2V (I2SVA,I2SXZ,I2MBC,I2FUG, I2JIN,ops) 671,427 1223 183 C
OM3KZA (OM3TPN, OM3CUG, OM3YDX, OM6FN, ops)
548,928 953 192 B
OL2A (OK2PDK,OK21PEM, OK2HBY,ops)
440,004 991 148 C
UR4E (UR5EDX,UR7EO,UR7EU,ops)
239,904 544 147 C
UT9F (UT9FJ,UT4FJ,UR5FAI,UR0FO, ops) 205,824 512 134 C
ES1XT (ES1CR,ES1DG,ES2JL,ops)
92,247 317 97 B
UR4PWC (US-P-361,US-P-363,ops)
76,452 277 92 B
SP9KRT (SP9UXI,SP9-1753,ops)
72,030 245 98 B
UR4LWY (UR5LJC,UR4LQA, UR3LFU,ops) 37,740 148 85 C
SP9KOV (SP9HAX,SP9EMI, SP9CTS,ops) 31,296 163 64 B

Antarctica

R1ANC (RW1AI,UA1PAC,ops)
72,600 275 88 B

North America

8P9JA (K4MA,AA4NC,ops)
5,133,441 4903 349 C
ZF2NT (N6NT,N6XI,ops)
5,094,336 5024 338 C
ZF1A (W5ASP, K5WA, K6AM, ops)
4,786,950 4559 350 C
6D2YFM (K1OJ,N5TU,W5SB,W5MJ, N1LN,XE1YFM,ops)
4,337,658 4329 334 C
KL7Y (+W8LU,KR8V)
3,802,554 4102 309 C
T48K (CO8ZZ,CO8DM,CO8JY,ops)
3,409,776 3508 324 C
KG4DZ (W4ZYT,W4SD,N8CH,KU4EC, N6ZO,ops)
3,177,366 3373 314 B

South America

PJ2T (KP2L,N8LGP,W8AV,W8TK, W9EFL,W0CG,ops)
4,333,560 4312 335 C
OA4O (OA4DKC,OA4DMR,ops)
2,776,284 3353 276 C
CX5BW (+CX7BY, CX8CP)
1,300,476 2146 202 C

Multioperator Two Transmitters

Asia

JA1YFG (JL7MYL,7M4DPF,7N4QHY, ops) 1,519,746 2102 241 C
RU0LL (+RW0LZ)
878,187 1471 199 B

Europe

RU1A (RU1AA,RW1AC,RV1AW, RX1AA,UA1ARX,UA1AKC,RA1AR,ops)
3,987,210 4583 290 C
9A7A (LA5IIA,9A4RX,9A7V,9A3OS, 9A3TR,9A4PA,9A2ME,9A8A, ops)
3,766,008 4241 296 C
OH0R (OH2PM,K6AW,ops)
3,765,720 4483 280 C
HG6N (HA2NA,HA2SX,HA3OV,HA6ND, HA6NF,HA6NY,HA6PX,YO5BRZ, ops)
3,661,038 4374 279 C
ES6Q (ES5MC,ES5MG,ES5QX, ES5RN,ES5RY,ops)
3,300,387 4183 263 C
RM6A (RA6AX,RA6CO,RA6CM, RU6CQ,RN6BN,ops)
3,115,272 3732 282 C
OL7W (OK1DUT,OK1FUT,OK1AU, OK1EP,OK1HCG,OK1DRY,OK1FDR,op)
2,961,288 3739 264 C
SK3W (SM3OSM,SM3SGP,SM5IMO, ops) 2,452,056 2878 284 C
UU2JQ (+UU4JMG,UU5JBO,UU0JM, US-J-079) 1,933,620 2405 268 C

Multioperator Unlimited Transmitters

Asia

JA3YBK (JG3KIV,JI3OPA,JH4NMT, JF4FUF,ops)
3,568,740 4060 293 C
JA1YPA (JA1PEJ,JH1FDP,JF1EQA, JL1SXQ,JK2RCP,ops)
1,268,148 1948 217 C

Europe

MD/DL5AXX (+DL4LQM, DL4WG, DL5LYM, DL8WAA)
6,063,552 6336 319 C
9A1A (9A5W,9A3GW,9A5K,9A6A, 9A6D,9A7R,9A8W,9A9A,ops)
5,620,692 5929 316 C
LY7Z (LY2CY,LY2GV,LY2TA,ops)
3,503,520 4055 288 C
OZ5W (OZ1FTU,OZ1KRF,OZ3W,ops)
3,341,844 3828 291 C
LY7A (LY4AA, +ops)
2,880,459 3543 271 C
YZ7A (YU7CM,YU7KC,YU7BW,YT7DQ, YU7LM,4N7ZZ,YU7JDE,ops)
2,012,310 2570 261 C
M3S (G0WAT,G4DDX,G4BYE,ops)
239,592 536 149 B

South America

LT1F (LU1AEE, LU1FAM, LU1FKR, LU1FT, LU5DX, ops)
2,577,390 3242 265 C

Checklogs: DL2CML, DL3VC, DL5NA, G3LUW, HA3A, HB9LDO, JA0HC, K6FM, LZ2DD, LZ2SX, OK1DSU, OK1EV, OK1GS, OK2BOV, PT7WA, RK6HG, RU3DG, SM0WRA, SP2AVE, SP4HHI, SP6CES, SP6NIC, SP9DNO, SP9DTH, SP9MDY, TI2KAC, TU2MA, UA0CA VE3EF, WA2QQF, WB2JGD, WB4RUA, YL5W

2002 ARRL November Sweepstakes Rules

1. Object: For stations in the United States and Canada (including territories and possessions) to exchange QSO information with as many other US and Canadian stations as possible on 160, 80, 40, 20, 15 and 10 meter bands.

2. Date and Contest Period:

2.1. CW: First full weekend in November (**November 2-4, 2002**).

2.2. Phone: Third full weekend in November (**November 16-18, 2002**).

2.3. Contest Period: Begins 2100 UTC Saturday, ends 0300 UTC Monday.

2.4. Operate no more than 24 of the 30 hours.

2.4.1. Off periods may not be less than 30 minutes in length.

2.4.2. Times off and on must be clearly noted in paper logs. Do not indicate off times in electronic log files. The log checking software calculates it.

2.4.3. Listening time counts as operating time.

3. Entry Categories:

3.1. Single Operator:

3.1.1. QRP.

3.1.2. Low Power.

3.1.3. High Power.

3.1.4. Unlimited—Packet assisted

3.2. Multioperator

3.2.1. Multi-Single only

3.2.1.1. Only 1 transmitted signal is permitted at any time.

3.2.1.2. There is no limitation on the number of band changes.

3.2.1.3. Packet use is permissible.

3.3. School Club

3.3.1. There are three divisions to this category.

3.3.1.1. College and University

3.3.1.2. Technical School

3.3.1.3. Secondary and other School

3.3.2. School clubs compete as their own category.

3.3.3. Only currently enrolled regular students and faculty/staff of the institution are eligible to operate a school club entry. Alumni may "Elmer" but may not operate the station.

3.3.4. There is no distinction between Single and Multioperator stations or power levels in this category.

3.3.5. School clubs must operate from established stations located on the campus. No portable operation from a nearby contest station is allowed. A club may operate from a member's station only if no on-campus station exists.

4. Exchange: The required exchange consists of:

4.1. A consecutive serial number;

4.2. Precedence;

4.2.1. "Q" for Single Op QRP;

4.2.2. "A" for Single Op Low Power;

4.2.3. "B" for Single Op High Power;

4.2.4. "U" for Single Op Unlimited;

4.2.5. "M" for Multi-Op;

4.2.6. "S" for School Club;

4.3 Your Call Sign;

4.4. Check (the last two digits of the year you were first licensed);

4.5. ARRL/RAC Section

Example: WA4QQN would respond to W1AW's call by sending: W1AW 123 B WA4QQN 71 NC, which indicates QSO number 123, B for Single Op High Power, WA4QQN, first licensed in 1971, and in the North Carolina section.

5. Scoring: QSO points: Count two points for each complete two-way QSO.

5.1. Multiplier: Each ARRL Section and RAC Section plus VE8/VY1, with a maximum number of 80.

5.1.1. KP3 and KP4 are in the Puerto Rico Section.

5.1.2. KV4/KP2 and KG4 stations are in the Virgin Islands Section.

5.1.3. KH6 and other US possessions in the Pacific count as the Pacific Section.

5.2. Final score: Multiply QSO points (two per QSO) by the number of ARRL/RAC sections (plus VE8/VY1).

6. Miscellaneous:

6.1. Work each station only once, regardless of the frequency band.

6.2. Only one transmitted signal at any time is permitted.

7. Awards: Certificates will be awarded to the top operator CW and Phone scores in each category ("A," "B," "Q," "U," "S" and "M") in each ARRL/RAC section and division. Division winners in each category are also eligible for a Sweepstakes Plaque.

8. Submission:

8.1 Deadline for submission of CW entries is Wednesday, December 4, 2002. Deadline for submission of Phone entries is Wednesday December 18, 2002. Entries emailed or postmarked after the deadline may be designated checklogs.

8.1.1. The CW and Phone mode are considered separate contests and must be submitted separately.

8.1.2. Entries must be made on current ARRL entry forms or on a reasonable facsimile. Current forms may be downloaded in .pdf or ASCII format from **www.arrl.org/contests/forms**.

8.2. E-mail entries for CW should be sent to SSCW@arrl.org and Phone to SSPhone@arrl.org.

8.3. Any entry that has been created using a computer for logging must be submitted in the Cabrillo log file format.

8.3.1. Any electronic file that is not submitted in required format will not be eligible for competition and awards.

8.3.2. A paper printout for a log that has been generated by a computer in lieu of the actual data file is not an acceptable substitute.

8.4. Handwritten paper logs are acceptable entries. Any handwritten paper log of 500 or more QSOs must include the required dupe sheet.

8.5. Logs sent via the regular mail service should be addressed to: November SS CW or November SS Phone, ARRL, 225 Main St, Newington, CT 06111.

9. Other information.

9.1. See "General Rules for All ARRL Contests" and "General Rules for ARRL Contests on Bands Below 30 MHz (HF)" available at **www.arrl.org/contests** or from the ARRL Contest Branch.

9.2. All contest queries should be directed to **contests@arrl.org** or by telephone to 860-594-0232. All contest rules and entry forms may be downloaded from the Contest Branch Web Page at **www.arrl.org/contests**.

Participation Pins

The ARRL is again pleased to continue its pins program for 2002. Complete 100 contacts on CW or Phone during Sweepstakes. Each pin includes the year and mode and have become a popular tradition in the November Sweepstakes event. **Pins cost $6**, including postage and handling.

To order, attach a note to the front of your summary sheet indicating the number of pins ordered along with your check. If you enter electronically, send a copy of your summary sheet with a note and your check attached to **Sweepstakes PINS, ARRL Contest Branch, 225 Main St, Newington, CT 06111**.

Clean Sweep Mugs

Commemorate working your "clean sweep" by purchasing your 2002 November Sweepstakes mug. To earn your mug, work all 80 ARRL/RAC sections during the CW or Phone November Sweepstakes. Mug awards are based on claimed scores. The price for the keepsake mug is **$12** each (including postage and handling). If you submit electronically, send a photocopy of your Cabrillo file first page indicating how many mugs you are ordering along with your check and send to **Clean Sweep Mugs, ARRL Contest Branch, 225 Main St, Newington, CT 06111**. With paper logs, attach a note to the top of your summary sheet indicating how many mugs you are ordering and your check. Your mug will be shipped after all entries and mug orders have been processed and verified. Supplies are limited. We only guarantee filling orders received by the Phone Submission deadline of December 18.

SECTION NEWS

The ARRL Field Organization Forum

ATLANTIC DIVISION

DELAWARE: SM, Randall Carlson, WBØJJX—As you all have probably head or read by now, at the July Board meeting, the Board of Directors voted that contents of this column should be moved to the ARRL Web site (www.arrl.org) and no longer be printed in *QST* as of the January 2003 issue. Regardless of your feelings on this decision, it has been made and we must make the best use of the technology as we can. It is our plan to supplement the postings on the Web site with e-mail bulletins. It's very important that if you wish to receive this information, that on your member profile for the Web site you check that you wish to receive bulletins from your director and section manager. Note the ARRL privacy rules are still in effect and your address is not disseminated. But added to a mail distribution list used only for this purpose. We will of course continue to attend club meetings on a regular basis. Delaware traffic nets meet as follows. DTN meets M-F at 1830 local time on 3905 kHz. DEPN meets Sat. at 1800 local time on 3905 kHz. Please take the time to drop in and say hello. Traffic (July) DTN QNI 158 QTC 10 in 23 sess; DEPN QNI 25 QTC 1 in 4 sess. K3JL 34.

EASTERN PENNSYLVANIA: SM, Eric D. Olena, WB3FPL. SEC: Michael O. Miguelez, N3IRN. ACC: Steve Maslin, N3ORH. BM: Fredric Serota, K3BHX. OOC Alan Maslin, N3EA. PIC: Robert Josuweit, WA3PZO. STM: Vacant. SGL: Allen Breiner, W3ZRQ. TC: Lawrence Thomas, AA3PX. ASMs: Robert Josuweit, WA3PZO, Pietro DeVolpi, K3PD. L. James Biddle W3DCL, George Law, N3KYZ, Vincent Banville, WB3YGA, ASM for Skywarn John Holmes, WX3W. DXCC Card Checker E. Pa.: Glenn Kurzenknabe, K3SWZ. I am sure that by the time you read this article most of you, if not all, will be aware that the ongoing debate of whether or not to eliminate the contest scores and the "Section News" from *QST* has been decided. The December 2002 issue of *QST* will be the last issue that carries these two items. With the elimination of more and more "local interest" items I believe that it is now up to the Amateur Radio Clubs to ensure that items of interest are passed along to their members. One of the discussion points during the debate was that not all Amateurs have access to the Internet where the information in question is and will be available. Therefore the local ARCs should make it a point to designate an individual or two to be the persons who garner the information and disseminate it to the ARCs membership, or pass it along to the ARCs news dissemination system. Certainly the ARRL Field appointment of Official Bulletin Station (OBS) should be considered a proper appointment to help in this situation. My own opinion regarding the decision to eliminate the items from *QST* is inconsequential. The subject itself is far too controversial for many of us to take one side over the other with any firm convictions. My concern is that we go on from here and make the best of the situation. As a matter of fact many of the Sections have done some very nice things with their ARRL Section Web News page. In the E. Pa. Section Web News there are two things that will help you quickly find the items that have been recently added. First of all you will see "Section Alert" followed by a date. We use the "Section Alert" to bring to your attention the date that anything was added or modified. The second item to look for is the date that is to the left of the headline of the article. That date is the date that WA3PZO or myself added the article to the page. Between these two items you should be able to very quickly tell if anything has been added to the page since your last visit. It appears on the Web page long before it appears in *QST*. Tfc: N3EFW 245, K2BCL 217, W3IPX 183, W3NNL 120, N3SW 89, N3AO 57, W3HK 51, W3UAQ 36, W3JKX 24, W3ZQN 18, KB3BBR 14, N8JSO 14, W3TWV 13, KB3CVO 13, KA3LVP 10, KB3CEZ 9, K3ARR 6, N3AS 5, N3IRN 4, W3BNR 4, KB3DDL 2, N3HR 1. Net Reports: EPAEPTN 86, PTTN 51, MARCTN 21, PFN 8, D3ARES 8, CATN 8, LCARES 4, SEPPTN 3, MCOES 0.

MARYLAND/DC: SM, Tom Abernethy, W3TOM, 301-292-6263, w3tom@arrl.org—ASM/RACES, Al Nollmeyer, W3YVQ (w3yvq@arrl.net) SEC, Mike Carr, WA1QAA (bamcc@erols.com) 410-799-0403. The Section News has moved to the MDC Section Web page. For the latest happenings check out: http://www.qsl.net/w3tom/. Please pass along important Amateur Radio information and events to your Section Manager for reporting to ARRL HQ, and inclusion on the MDC sections Web page. 73, Tom – W3TOM. With the nets: - NET/NET MGR/QND/QTC/QNI: MSN/KC3Y/NO REPORT/, MEPN/N3WKE/no report/, MDD/WJ3K/60/156/551, MDD Top Brass/W3YVQ/161/W3CB/138/K3JL/149, BTN/K3CSX/no report/, June, MSN/KC3Y/30/38/262, MDD/WJ3K/56/158/533, MDD Top Brass/W3YVQ/161/W3CB/138/K3JL/149. Tfc: KK3F/2023, W3YVQ/158, AA3GV/95, W3CB/40, KB3GFC/20, N3OR/16, WA1QAA/14, N3DE/13, WA3GYW/12, N3KGM/0, KE3FL/0, June, KC3Y 51, W3YVQ 157, N3KGM 8, KE3FL 0. PSHR: W3YVQ 135, KB3GFC 118, KK3F 110, AA3GV 100, WA1QAA 99, W3CB 95. June, W3YVQ 125, KC3Y 91, KE3FL 70.

NORTHERN NEW YORK: SM, Thomas A. Dick, KF2GC — http://www.northnet.org/nnyham http://www.geocities.com/nnyara. E-mail: kf2gc@arrl.org. ASMs: WB2KLD, WZ2T, N2ZMS, WA2RLW. ACC: WA2JPM. BM: KA2JXI. OOC: N2MX. PIC: N2SZK. SEC: WN2F. STM: N2ZGN. TC: N2JKG. It's been a good summer and fall here in Northern New York working with Amateurs involved in "Public Service," ARES and RACES groups doing SET and related activities. I commend all the NNY counties involved this year with their various activation & /or drills. As I traveled throughout the Section I find many Amateurs willing to put time into making communications better all around. Thank you for getting involved with your local ARES/ ECs, DECs, and Radio Officers as they are here when we need them most. The training available to all of us through the ARRL Emergency Courses are making a difference as they are infused into net operations etc. Let's continue to support each other in these vital areas of our hobby. Everyone has something to contribute to make our hobby better and better. If you're not involved with a Net, Affiliated club, ARES, Boys Scout Jamboree, RACES, Contest Club, DX Cluster, i-link project or Field-day, get involved and find out more of what you have been missing out on. I would encourage you today to make it happen and meet some new folks in Ham Radio today! If nothing is happening around your area with Amateur Radio, then maybe you're not helping to make it happen. If you have a hand in making something happen with your group you will find other Hams will want to also. Many "Thanks" to all the amateurs helping out during the Hamfest/ Conv. in Lake Placid. www.geocities.com / nnyara. 73, Thomas Dick, KF2GC.

SOUTHERN NEW JERSEY: SM, Jean Priestley, KA2YKN (@K2AA)—e-mail ka2ykn@voicenet.com. ASM: W2BE K2WBW2OB N2OO N2YAJ N2XYZ N2HQL. SEC: W2GW. STM: K2UL. ACC: KB2ADL. SGL: W2CAM. OOC: K2PSC. TC: W2EKB. TS: W2PAU WB2MNF AA2BN K2SMD WB3IJB WA2NBL N2QNX N2XFM. As 2002 closes, we reflect on the changes to *QST*. Jan.1, 2003, the Section Manager column and contest reports will not be in *QST* except Field Day. The pages that were to come out to save money may now be used for other items such as public service. I put much thought into the column and will continue to on the Web. There are pros and cons to the loss of the pages and benefits to the Website. If you are on Internet, you can help your friends who are not by printing the info for them. If you are not on the Internet, ask a friend or ask at you local library about an account with them. July traffic: QNI NJM 45 WA2OPY NJPN 182 W2CC NJSN 178 K2PB NJN(E) 218 AG2R NJN(L) 171 AG2R JSARS 392 WJ2F SJTN 76 KB2RTZ NJN no rpt. SAR.WA2YK 146, K2UL 96, AA2SV 84, KB2RTZ 47, WJ2F 38, WA2CUW 33, K2UL-4 26, N2VQA 21, KC2IYC 21, KB2VYZ 7, W2AZ 7, KA2YKN 2, KB2YJD 2. PSHR: N2HQL 188, KA2YKN 149, KB2RTZ 140, WA2YL 135, K2UL 110, WA2CUW 83, AA2SV 90, WJ2F 88, N2VQA 71, KC2IYC 61, KB2YJD 27, KB2VYZ 37. Work some traffic.

WESTERN NEW YORK: SM Scott Bauer, W2LC— Congratulations to Kristy, KC2GKE, who won the 2002 Rochester Amateur Radio Association Memorial Scholarship, given in memory of K4VOS, W2WPH and an old friend and DXer Bill W2OMV. The NTS picnic was held at the QTH of Dan, N2DC, in my hometown of East Aurora. About 25 traffic handlers met to swap stories and eat. Between Bud, K2KIR, Bill W2MTA and myself there was some 25 years of section managers present! Just for old time's sake, I went in the old 5 and 10 cent store to find that it hasn't changed a bit. The same shelves and old timer running the store. Even the floor still squeaks in the same spots! Bob, N2JEU, won the Atlantic Division award for Technical Achievement for his work on Remote Controlled HF Operation over the Internet. Amateurs across WNY participated in the Empire State Games held here in the Syracuse area in early August, by providing emergency communications for the medical staff of the games. More next month when I have all of the details. Mike, KB2CCD, reports that the Air Force Research Laboratory held two Precession Emergency Automated Position Reporting System (APRS) tests this summer. The tests involved the aircraft with a simulated emergency flying over upstate New York. The purpose of the test was to demonstrate that APRS or an APRS like system to supplement current aircraft communications equipment. There will be two more Western New York Section News columns printed in QST with the December issue containing the last printed column. The ARRL Board of Directors voted to remove the Section News columns from *QST* in favor of the ARRL Web page. Thus marks the end of a long tradition of Section Managers writing section news columns about your activities for publication in *QST*. Future Section News columns will be on the WNY Section of the ARRL web site at http://www.arrl.org/sections/?sect=WNY. When you access the ARRL Web site, look to the right side for the section web page link. Please visit the Official WNY Section web page at http://home.twcny.rr.com/datahold/WNY/ which is maintained by Doc, N2IKR. On this Web page you can find a history of WNY, a Station Appointment application form, and a lot of info concerning the WNY section of the ARRL. Don't have Internet access? Contact me to receive the WNY Section News by mail. For this month's station traffic reports and net summaries please visit the ARRL Web page mentioned above.

WESTERN PENNSYLVANIA: SM, John Rodgers, N3MSE. ASM: N3MYZ. SEC: N3SRJ. ASM-ARES: WB3KGT. ASM-Packet: KE3ED. ASM-Youth AA3LX. OOC: W3ZPI. PIC: W3CG. STM: N3WAV. TC: WR4W. DEC: N3YEA, DEC-SO: KD3OH. DEC-N1: KB3A. DEC-N2: KA3UVC. DEC-S1: KA3HUK. DEC-S2: WD9GYC. DEC-Rapid Response: N3ZZI. DEC-OES: K3TB. Many of you by now are aware that beginning in January 2003, the Section News will be eliminated from *QST*. This decision was made at the recent board meeting. I would like to thank Director Bernie Fuller, N3EFN, and Vice-Director Bill Edgar, N3LLR, for their leadership and support in the effort to retain the section news. With this change, information will be posted on the section Web page at http://www.arrl.org/sections/WPA.html on a regular basis to provide up-to-date information to the members of the section. I will also be sending email messages to the members via the members only service. I encourage everyone to sign up for these features at the league web site. The section Web page provides for unlimited space and can provide current information as events develop. There is also a provision for the posting of photos. I would ask that clubs send any photos they would like to have considered for posting on the Web page. On October 12 and 13 the Pennsylvania QSO Party will be conducted under the sponsorship of the Nittany Amateur Radio Club. This is one of the best QSO parties anywhere and I encourage everyone to take part in the contest. I personally enjoy this operating event every year and it is also a great opportunity to test your emergency communication coverage in Pennsylvania. I hope to work each of you during the weekend event. Remember the section traffic net on 3983 hz nightly at 6 PM. Please join the fun. 73 de John Rodgers, N3MSE, WPA-SM n3mse@arrl.org.

CENTRAL DIVISION

ILLINOIS: SM, Sharon Harlan, N9SH—SEC: W9QBH, ACC: N9KP. STM: K9CNP. PIC: N9EWA. OOC: KB9FBI. TC: WA9IL. DEC Central: N9PN. DEC S/W: KB9AIL. On August 3rd, the Lamoine Emergency Amateur Radio Club operated a special event station N1R from the summer training camp of the St. Louis Rams football team on the campus of Western Illinois University in Macomb. LEARC is offering a certificate and asks for a $2.00 donation to help cover the cost of printing and postage. The Metro Amateur Radio Club has been invited back to the Gross Point Lighthouse for their community open house day. They will be running CW this year to balance out the predominance of phone operation during special events thus allowing Lighthouse Society members to make the CW contact many of them have requested. Phillip Lazar, K9PL, reports continued net activity on the slow speed code net. Net frequency is 7.138 MHz +/-. The net is held every Wednesday, except for the first Wednesday of the month, at 7 PM local time. All are welcome. QRS to the slowest op. On Saturday, July 13, twenty-six amateurs from Sangamon and Menard Counties participated in the first field exercise of the new Capital Area Radio Emergency Response Team. The goals of the exercise were to check equipment, net training, and to locate appropriate viewing positions for tornado and severe weather spotting and reporting to the Lincoln office of the NWS. KB9ZTP has created an interactive weather Web site for northern Illinois called the Northern Illinois Storm Lab. www.nrnilstormlab.com. It has everything from advanced forecasts to archived weather events for northern Illinois. Recently an article entitled Ham Radios: Linking the World Together, One Voice at a Time appeared in the Prairie Advocate. This article featured Russ Simpson, K9TI, of rural Mt. Carroll. This article presents ham radio in a very positive way. On August 9th, I had the opportunity to visit the Peoria club and give a short talk about the section. WB9MMM and I had a great time and would like to thank the PAARC for their hospitality. On August 10th, 9 members and friends of the Rockford Amateur Radio Association provided communications for the State Street Mile in downtown Rockford. They used ATV at the start and finish lines and mobile ATV in the timing truck. Amateur Radio is the only means of communication used in this race. Those participating were WB9MMM, KA9IMX, N9SH, KA9SOG, KA9BOD, WB9UMC, K9PK, N9LHK, and KB9ZXG. On August 11th the Winnebago County ARES group provided communications for the YMCA Triathlon. Participants N9CCE, KA9IMX, KB9NBD, KB9SKW, WA9DIM, N9SH, N9MXQ, KB9YRW, N9MCS, and WB9JDY provided communications during the bike and foot races. Upcoming hamfests for the month of August—Danville/Vermilion Co, Catlin, IL on August 25. Also on August 25, the Bolingbrook hamfest in Joliet, IL.WD9F traffic for June: Tfc 126, PSHR 168. WD9F traffic for July tfc 129, PSHR 100. W9HLX 31; NC9T 20, WB9TVD 36, KA9IMX 28, ISN report for July QNI 213, QTC 62, 31 sessions; N9KNJ July D9RN cycle 1 and 2, 61 sessions, 464 check ins, traffic 175. Average per session 2.87, IL rep. 86% by W9HLX, AC9Y, NN9M, N9PLM, N9GZ, WA9T, KA9IMX. WA9RUM reports ARES members 21, 7 pieces of traffic and 234 checkins, 5 nets.

INDIANA: SM, Jim Sellers, K9ZBM—ACC: N9RG. BM: KA9QWC. OOC: AA9WD. PIC: WA9ZCE. SEC: N9YNF. SGL: K9JZZ. STM: WA9JWL. TC: W9MWY. Condolences to the friends and families of these hams who became a Silent Key during July: KO9F 7/10, W9LE 7/30, and N6RS 7/31. They will be missed. Members of the Mid-States ARC set up and manned a booth at the Johnson County Fair during July. They provided information on Amateur Radio and the club's activities with Johnson Co. EMA. The public was invited to talk on HF radio, use PSK31, and 2-mtr modes. Club members provided EMA handouts, ARRL brochures and club information to the public. Club members were happy with the response from the public and enough interest was shown to have a technician class this fall. On July 17, John Lutton, WD9DDZ, was named Citizen of the Year by the Ligonier Chamber of Commerce. John is pastor of the Ligonier Church of the Nazarene and has been a member of the City Council for 16 years. John is also a member of the 21 Repeater Group. The Marion County ARES was asked by Emergency Management to join the Dept of Public Service in Community Day events in Indianapolis. ARES members handed out SKYWARN and storm spotter pamphlets, and displayed pictures of what they do. Hams volunteering were Mike Palmer N9FEB, Marion Co EC, Don McMorrine, K9MCM, and Richard Gerber, K9RAG. Public demonstrations of Amateur Radio are necessary to educate the public about our avocation. Is your EC reporting your group's public service activity/hours? 15 ECs reported a total of 804.05 man-hours of activity in 10 public service

Continued on page 108.

Steve Ewald, WV1X ♦ Public Service Specialist

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- Compact Transceiver w/detachable front panel
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- 12V Operation
- Simple to Use
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- One Touch Band Switching
- Direct frequency input
- VOX Built-in
- 101 alphnumeric memories

IC-W32A Dual Band Transceiver

Back by popular demand!

- 2M, & 70CM @ 5W
- V/V, U/U, V/U
- Independent controls for each band
- 200 alphnumeric memories
- Auto repeater
- CTCSS encode/decode w/tone scan
- IRLP compatible

IC-V8000 2M Mobile Transceiver

- 75 watts
- ICOM DMS scanning
- CTCSS/DCS encode/decode w/tone scan
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- Weather channel scan
- 200 alphanumeric memories
- Backlit remote control mic

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- Advanced CW functions
- 101 alphnumeric memories

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- Auto repeater
- Easy operation!
- Mil spec 810, C/D/E*1

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- 2M/70CM
- Wide band receiver - 30 to 1300 MHz**
- 200 alphnumeric memories
- Auto repeater
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- CTCSS encode/decode w/tone scan
- Mil spec 810, C/D/E*1

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IC-2100H 2M Mobile Transceiver

- Cool dual display
- 50 watts
- CTCSS encode/decode w/tone scan
- Backlit remote control mic
- Mil spec 810, C/D/E*1
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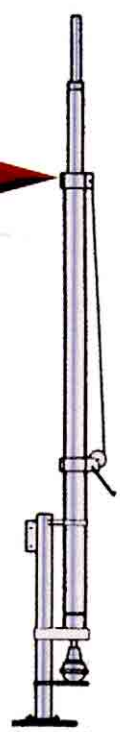

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QIN	3656	1430/2400	147	61	741	47
ICN	3705	2315	24	18	150	14
ARES	3910	1300/4th SunMo	9	1	14	1
Hoosier VHF Nets (11 reporting)			729	9	1533	56

9RN Cycle 1 and 2 for July, Sessions 61, Checkins 464, Traffic 175, Avg. per session 2.87, represented 93% by K9GBR, N9KNJ, WB9QPA, WA9JWL, KE9AK, K9QDR, and KE9F (fm N9KNJ) 9th RN Cycle 4 for July Sessions 62, Traffic 179, Time 375 mins, Avg 6.04, Rate .465, Represented 95% by Indiana Stns KO9D, K9PUI, WB9OFG, WB9UYU and W9FC. Tfc: KJ9J 145, WA9JWL 91, K9PUI 89, N9KNJ 86, KO9D 48, K9GBR 25, W9EHY 23, KB9TUI 19, WB9OFG 17, WB9NCE 11, AB9AA 9, W3GQJ 7, K9SXM 6, K9CUN 5.

WISCONSIN: SM, Don Michalski, W9IXG—SEC: WB9RQR. STM: K9LGU. ACC: Open. SGL: AD9X. OOC: W9DGI. PIC: W9UQ. TC: K9GDF. BM: WB9NRK. ASM: K9UTQ, W9RCW, W9CBE, N9VE. Bob Baird, W9NN, 96, is a SK Bob was one of the founding fathers of QCWA and recently celebrated 81 years as a member. Chet Kuharski, 79, W9ILZ, is a SK. Carlton Kerstetter, W9NVM, 65, is a SK. MRAC has a change in leadership. Dave Defebo, WB9BWP, has passed the president's gavel to the very capable hands of Patrick Moretti, W9UQ. Dave has accomplished many great things for MRAC and we wish him well. Duane Haas, W9BCV, celebrated his 70th year as an amateur! He was presented with awards at the QCWA Chapter 55 meeting and at the RRRC Field Day. Congratulations, Duane!! 9RN report for July shows 100% participation by the Wisconsin traffic team! We could use more traffic hams- both voice and CW. A complete listing of section nets are now posted on the ARRL section site: http://www.arrl.org/sections/?sect=WI. We invite you to check in and have some fun! In January 2003, the section news will only be available on the web. Go there *now* for up to date news and information!! Those without Web access can request the monthly news mailed to them. Details to follow later. Many of us had the help of an Elmer when we were getting started. So, lend a hand to a new Ham! Pass on your knowledge!! 73, Don, W9IXG. Tfc: K9JPS 884, N9VE 660, W9RCW 507, K9GU 473, W9CBE 134, K9LGU 119, AG9G 51, WA9ZTY 50, KE9VU 50, K9GHI 47, W9UW 38, W9BHL 30, KB9ROB 28, AA9BB 28, WB9ICH 25, W9IHW 25, W9YCV 21, K9UTQ 2, W9PVD 1.

DAKOTA DIVISION

MINNESOTA: SM, Randy Wendel, KMØD—At the July ARRL Board of Directors meeting, a motion was passed to eliminate ARRL Section News from *QST*...this very column you are reading. Section News and related info will be conducted on the ARRL Web site. I have been utilizing the MN Section Web site and the Section eSignals email newsletter for disbursing MN news for some time and has been a great way to provide timely news and much more info than *QST* news and has been greatly received. It's my hope that these resources will continue to serve the means of providing news to all of you. The new 800 MHz APCO-25 radio system has been running for several months now in the metro area. Carver Co Sheriff has migrated to it from VHF, Anoka Co is planning to move to it, and Hennepin Co has been in process of switching over. Other agencies will also be doing the same. The system uses complete digital format and a network to allow interoperability in the entire metro area for agencies on the system. "Patch" radios will provide other non-800 MHz users to have connectivity to the system from VHF/UHF. The system is networked via dedicated broadband and uses microwave as a backup. So far, comments have been quite positive on the system overall. Summer is in transition to autumn, my family and I enjoyed our annual camping...having spent a week in Brainerd in mid-August staying closer to home this year. 73 de KMØD Randy Wendel.

Net	*Freq*	*Time*	*QNI/QTC/Sess/Mgr*	
MSPN/E	3860	5:30 P	708/78/29	KBØOHI
MSPN/N	3860	12 P	415/32/31	WAØTFC
MSSN	3710	6 P	N/A	Vacant
MSN/1	3605	6:30 P	195/52/28	KØWPK
MSN/2	3605	9:50 P	93/6/24	vacant
PAW	3925	9A-5P	2022/71/75	KAØIZA

Tfc: WAØTFC, WØLAW, NØUC, KØWPK, WØGRW, W3FAF, KBØOHI, WØHPD, KAØIZA, KØPSH, KCØHAW, WDØGUF, NØJP, WAØYSL.

NORTH DAKOTA: SM, Kent Olson, KAØLDG —Our condolences go out to the family of Myron Shelton, KBØAOU, from Crary, ND, who became a Silent Key recently. Lu Simpson, VE4LS, also became a SK recently. Many hams from both sides of the 49th parallel knew him. Despite the hot weather, the Peace Garden hamfest was a success. They had 208 hams from both sides of the border registered. Congratulations to Richard Veal, KAØETO, of Bismarck who was named Ham of the Year. Thanks to Dennis "Doc" Murphy, KØGRM, who got Governor Hoven to declare July 8-14 as Amateur Radio Week. Hopfully, we can make that a yearly event and get some public relations mileage out of it. Please contact Rep. Earl Pomeroy and ask him to support HR 4720 and end the CC&R curse. For further information and a sample letter, see http://www.arrl.org or the Section's Web site at: http://home.earthlink.net/~qtipf16/. HF NM KEØXT reports Goose River Net, 4/20/0; WX Net 27/673/6; Data Net 31/623/13.

SOUTH DAKOTA: SM, Roland Cory, WØYMB—Hub City Amateur Radio Club at Aberdeen has been issued a new club call sign WØABR. Their repeaters have been reprogrammed with the new call sign. A new organization is being formed in the Dakotas called the Glacier Lakes Amateur Repeater Association. Their goal is to improve communications in the Dakota area for SKYWARN and general communications by updating repeater equipment and linking area repeaters in

SD, ND and Minnesota. For more information, contact N0AHL at Aberdeen. Many area clubs had lower than usual scores for Field Day due to storm static and poor HF propagation. Pierre ARC will have VE teams on Sept 21 and November 16. They have set a goal to bring at least 12 into the hobby this year. LARK club at Watertown has been issued a Certificate of Incorporation from the South Dakota Secretary of State.

DELTA DIVISION

ARKANSAS: SM, Bob Ideker, WB5VUH— Last month, I mentioned three remaining hamfests but now you can add one more in Springdale on Oct 26th sponsored by the NWAARC. A special THANKS to every club that sponsored hamfests in our section this year. I'm still hoping to see a renewed interest in more hams becoming ARRL members before the "end of this year"- deadlines are approaching. Are you helping? Will there be more signing up? It's really up to you, if it's going to happen. You can make a difference by helping to recruit & then you staying a member too. Have YOU asked others in your club to join; rejoin? It's in your hands. Too many of our hams are not taking advantage of the numerous opportunities & items of interest that have been developed. Are you using the section Web site? Have you checked it this week for new articles & items of interest? I think we saw some increased activities by clubs this year & hope to gain more momentum next year; again, its up to your efforts; not mine if we succeed. Are you helping your club in planning activities? Lots of questions; now, lets work on answers. The CAREN Club will be helping provide communications in the Arkansas Traveler 100 race on Oct 5-6. They could sure use your help. Monthly net activity for July was great with personal traffic handling by: K5BOC-29, WA5KQU-26, WB5HIL 17, W5RXU 16, W9YCE 12, & K7ZQR 11. Traffic nets had over 2,553 checking in. SUPER, & keep up the good work & TNX.

LOUISIANA: SM, Mickey Cox, K5MC - W5KB is our new SEC. I want to thank Keith for taking on this critical job. Keith's first official act was to appoint Tom, AC5TM (our immediate past SEC), as his Assistant SEC! Tom did a great job as the SEC and will be a big help to Keith. All DECs and ECs should now send their monthly reports to Keith. I'm also happy to report that Al, K5DPG, is again wearing a leadership hat (Assistant SM) for serving as the LA Section Web master (www.aisp.net/k5dpg/). The following have earned PSC certificates for their public service work during the Caney Lake Triathalon: N5FH, KD5RWQ, KD5LKB, W5VMY, KB5PKW, KB5LE, KC5TEV, KD5MNT, KB5WPV, N5FJ, KD5ETE, AD5JC, K5SKH, KC5UCV, KD5OWN, KD5LSM, K5WOJ, W5VWE, KD5OWL, KC5TBC, and KB5WFE. I'm very sorry to report that W5VUH and KD5UY are now Silent Keys. The ARRL Board of Directors decided at its July meeting to remove Section News from *QST* effective with the January 2003 issue. Section members without Web access who wish to continue to receive the LA Section News will be taken care of by some means according to ARRL HQ. Our SET exercise is scheduled for September 28. Please read page 104 in September 2002 QST for a good overview of the SET. Tfc: K5IQZ 68, W4DLZ 54, K5MC 46, KM5YL 35, K5DPG 25, W5PY 22, W5NK 17, N5JU 4. PSHR: KM5YL 155, K5DPG 115, K5MC 110, K5IQZ 100, K5ER 98, W5PY 92, W5NK 52, N5JU 37. Net Reports: sessions/QNI/QTC. LTN: 31/303/49. LCW: 30/142/49.

MISSISSIPPI: SM, Malcolm Keown, W5XX—Section Web Page: www.arrlmiss.org. Web Master: K5IBM at BillScott@StoreReport.net. ASM: N5PA, N5EZX, W5EPW, ACC: N5JGK, SGL: AB5WF, STM: KJ5YY. The Southwest Mississippi ARC will hold a Tailgate/Picnic at the Evelyn Vance Arena in Liberty on September 21. Contact WB5ASP at hrichardson@tislink.com for more details. The 2002 Mississippi Simulated Emergency Test (SET) will be conducted September 28 beginning at 8:00 AM on 3862 KHz. Local 2 Meter emergency nets will activate at the same time to deal with local emergency scenarios prepared by their ECs. The SET is the second part of our annual emergency preparedness training and emphasizes coordination with served agencies and working together through nets. And the last major event will be the Annual ARRL Day in the Park on October 4-5 at Starkville and hosted for the second year by MFJ celebrating its 30th year in the ham radio business. Our special guest will be ARRL President Jim Haynie, W5JBP. Detailed info at www.mfjenterprises.com/daypark2002.php. The Jackson ARC provided communications for the 2002 USCF Mississippi Road Races which were held in the mountainous part of Yazoo County. KM5GE's portable APRS digipeater allowed race officials to keep up with the leaders of the four concurrent races. Those participating were W5GEJ, AB5WF, KD5EDV, KD5FUY, KM5GE, KD5QQF, and KD5JKS. Congratulations to WQBC in Vicksburg for receiving the 2002 Community Service Award for its live coverage of the ISS QSO with Vicksburg High Students. This effort was sponsored by the Vicksburg ARC and chaired by N5JGK assisted by W5WAF and K5NRK. KM5GE taught the Radio Merit Badge at a Boy Scout Camp near Santa Fe, New Mexico. As a result of Bill's efforts 11 Scouts received the merit badge. Welcome to new Mississippi hams: Steve, KD5SYK - Olive Branch, Julie, KD5SVG- Natchez, Jim, KD5SXO, Shubuta, Dave, KD5STW, Ellisville, Steve, KD5SXN - Laurel, Dave, KD5STX - Soso, Krzysztof, KD5TBB - Diamondhead, Monti, KD5TAF - Biloxi, Janet, KD5SUI - Diamondhead, and Travis, KD5SST - Pass Christian. Regret to report the passing of W5FPE of Vicksburg, Dr. Ken Johnston, KG5YV, of Clinton, KB5DSN of Amory, and KC5NIX of Okolona. Net Reports: sessions/QNI/QTC: MSPN 31/3103/41, MSN 31/1356/8, PBRA 31/423/3, Jackson Co Em Net 31/345/10 MSSN 20/28/1, WCMS ARES 13/121/0, MAEN 6/110/0, LARC and Jones Co ARES Em Net 6/80/0, JARCEN 5/87/11, Attala Co ARES 4/30/2, Metro Jackson ARES 4/41/1, MBHN 4/30/0, MLEN 4/51/0, HAEN 4/36/2, CMSN 1/66/0. PSHR: WB5ZED 140, AC5SU 105, W5XX 105, N5JCG 86. Tfc: WB5ZED 1092 (BPL), N5JCG 26, W5LEW 21, KJ5YY 16, W5KWB 11, W5XX 5.

TENNESSEE: SM: Terry Cox, KB4KA-ACC: KB4KA. ASM: Ken, K4DIT & David, K4PZT. SEC: Sheila, KB4G. STM: Tim, KR4TT. TC: James, KB4LJV. OOC: Mike, KE4KMG. PIC: Greg, WN4M. Section web page at www.tnarrl.org. On Monday, July 22nd, I tagged along with Alex-KE4GYR, Western Assistant SEC in a visit to the Wide Area ARS meeting in Trenton, TN Club members at the meeting were Eugene-KC4RHD (President), Charles-N4NIH (Vice President), Bernice-WA4PSR (Secretary/Treasurer), Paul-W4RIX,

LouEllen-N4YNX, Curtis-N4YNW, Ed-W4IGW, Toy-KA4MNH, Bobby-WA4QPD and Joe-KJ4CE. We had an opportunity to discuss several ARRL issues and our PRB-1 efforts (both state and federal levels.) I'm looking forward to the possible ARRL affiliation of the club. Thanks a bunch to all the Wide Area ARS folks for the great hospitality shown Alex and myself. It was a very enjoyable evening! (See pictures on the web page.) Most of you are aware this Section News column will not appear in QST after the December 2002 issue. So, let your fingers do the walking and see all that's available on the Tennessee Section web pages as referenced by the URL at the top of the column. I try to attend every ARRL sanctioned hamfest in the Section and July 20th I made it to the Dayton (TN) hamfest. I had a fun time! This hamfest is sponsored by the Rhea County Amateur Radio Society and was an old fashion, outdoor, no fee type of affair on the banks of the Tennessee River. The weather was great and you should have been there! Good job, guys and gals! Pictures and details are on the web pages at http://www.tnarrl.org/HFP2002.html. Along the drive to and fro I was able to check into the morning and evening versions of the Saturday Tennessee Phone Nets. If you haven't checked into the CW or Phone nets lately, you should give it a try. There are a bunch of nice folks there. Jimmy, NQ4U reports the WA4ZDS-2 APRS digi is in its new home on Keith Springs Mt. near Winchester, TN. The system is on battery power with trickle charge and should run at least 8 hours after loss of electricity. This addition should help provide better coverage in the Franklin Co., Moore Co., Coffee Co. and Lincoln County areas as well as others. The Delta ARC sponsored a special event station at the Mid-South Military Vehicle Collectors Rally on Saturday July 27 from 1500-2200z (10:00 AM CDT to 5:00 PM CDT.) A special QSL card will be designed commemorating the event pictures of the event may be viewed on the Section Web pages. The results are in and the TCG has won the KY QSO Party Club trophy for a year. The director of the QSO Party wants a rep from the TCG to be at the Louisville Hamfest on 7 September to pick up. Way to go TCG! DRN5 Report Cycle 1 & 2 (SSB), July 2002, TN 85% (Missed 9 sessions) W4OGG, KE4GYR. RN5 Report Cycle 3&4 (CW), July 2002 TN, 82.3%, (Missed 11 sessions) W4SQE, W4OGG. Tfc: WA4KHU 4, KE4GYR 40. PSHR: KE4GYR 195; also late June for KE4GYR 225.

GREAT LAKES DIVISION

KENTUCKY: SM, John D. Meyers, NB4K—ASMs: KJ4W, N4VGI, WB4CTX, KJ4W, WA4SWF, KD4PWL. STM: K4LID. TC: KD4IXQ. SEC: KA4MAP. PIC: W2ZBY. OOC: K4LRX. SGL: WB4KY. ACC: KE4MZP. SKL: K4LID. Silent Keys for July were Raymond Caudill, KD4PSD, Paul Burcham, KD4ZAO, Jim Hay, K4MXO, Don Chesser, KD4YYZ, Morgan Wright, W9PEK, and Jim Settles, W4LDL. The Central Kentucky ARRL banquet and hamfest was a great success and was appropriately orchestrated by JB Young, WA4WWH, and the B.A.R.S. club in Lexington. The Kentucky S.E.T. will be this month, and I aspire that all 900 plus ARES members will check in and be part of this S.E.T.

Net	*Sess*	*Tfc*	*Checkins*	*NM*
WARN	5	6	78	KA4MAP
KEN	5	6	121	KA4MAP
MSUARC	5	0	83	KG4SGA
NKEN	5	0	76	WD8JAW
7DARN	4	7	55	WD8JAW
TSTMN	31	34	502	KB8GWL
KYN	35	30	307	K4AVX
KSN	31	23	215	KO4OL
WTEPN	5	0	46	KO4OL
4ARES	31	6	522	WA4RRR
9RN Cy K9ANJ	1/2	61	175	464
KTN	62	98	1598	KB4VKS
CARN	30	32	463	KG4KGY

PSHR reports: K4DZM 101, NB4K 107, KO4OL 9. SAR: KG4ABA 7, K4DZM 51, NB4K 22, WD8JAW 27, K4TXJ 5, K4AVX 44, KO4OL 31, WB4ZDU 8, WA4SWF 10.

MICHIGAN: SM, Debbie Kirkbride, KA8YKK (ka8ykk@arrl.org—ASM: Roger Edwards, WB8WJV (wb8wjv@arrl.net). ASM: John Freeman, N8ZE (n8ze@arrl.net). SEC: Jim Wades, wb8siw@arrl.net. ASEC/ASM: Lyle Willette AB8CB (ab8cb@arrl.net). STM: Joe Turner, K8CQF (k8cqf@arrl.net). ACC: Sandra Mondro, KG8HM (kg8hm@arrl.net). OOC: Donald Sefcik, N8NJE (n8nje@arrl.net). PIC/SNE: David Colangelo, KB8RJI (kb8rji@arrl.net). TC: Wallace Murray, KE8HR (ke8hr@arrl.net). SGL: Ed Hude, WA8QJE (wa8qje@arrl.net). Youth Activities: Steve Lendzion, N8GQ (n8gq@arrl.net). BM: Thomas Durfee, Jr.,WI8W (wi8w@arrl.net). Note the changes to the Michigan Section as listed above. Thanks to the entire Michigan Section Staff for staying on and taking on new positions. I would also like to thank Dave Smith W8YZ for his many years as TC and welcome Wallace Murray KE8HR our new TC. From the entire section staff we would like to thank Dick Mondro, W8FQT, for serving as our Section Manager. Dick was a great SM. and the entire section staff truly enjoyed working under him, also congratulations Dick on your new position as Vice Director for the Great Lakes. I will do my best to fill the remainder of Dick's term and serve all of you to the best of my ability. I look forward to taking on this new responsibility and I am pleased that the Michigan Section had enough confidence in me, to suggest that I be the one to fill the remainder of Dick's term. My thanks also to every amateur in the state of Michigan, ECs, DECs NMs, ARES, and RACES members for your time, devotion, and efforts that you have given to this state. In December the Section Managers News in *QST* will no longer be published. I will be posting the monthly news on the Michigan web site. Congratulations, Hope Francisco, AA8SN, on your award HAM of the year at the meeting of the U.P. Net members. Congratulations, Dale, Marks, K8GK. Dale is the longest serving Technical Specialist in the State of Michigan he has served us since 1985. Visit the MI Section Website at www.arrl.org/sections/MI.html. 73, Debbie. Traffic reports for July 2002: KC8LBZ 378, K8GA 337, W8RTN 215, KB8ZYY 150, K8KV 127, K8LJG 126, VE3EUI 119, K8AE 94, N8EIZ 88, K8AMR 57, WX8Y 57, AA8SN 53, W8RNQ 51, K8JN 45, WA8DHB 35,

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Icom **CR338** TCXO	**58.95**
Icom **CT17** Computer Interface	**119.95**
Icom **UT102** Voice Synthesizer	**53.95**
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Icom **IC207H**	**299.95**
Icom **RMK3** Remote Kit	**63.00**
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Icom **CR293** TCXO	**269.00**
Icom **UT102** Voice Synthesizer	**53.95**
Sub Total	**1822.90**
Minus gift certificate	**-110.00**
Total	**1712.90**

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N8JAT 34, KC8SZR 34, K8ZJU 31, WR8F 27, K8FE 18, KI8GR 15, K8YB 15,WB8WJV 11, KC8UJT 10, N8EXV 10, W8WOJ 9, N8UN 9, WI8K 6, NX8S 2. Deadline 5th of the month. Please support the following:

Net	QNI	QTC	Sess	NM	Freq.	Time	Day
QMN	632	309	62	WB8SIW	3.663	6:30&10 PM	Daily
MITN	453	249	31	N8FPN	3.952	7 PM	Daily
GLETN	545	86	31	VE3SCY	3.932	8:30 PM	Daily
UPN	863	34	35	AA8SN	3.921	5 PM	Daily (Noon Sun.)
WSSBN				WB8ICN	3.935	7 PM	Daily
SEMTN	397	94	31	K8JN	145.330	10:15 PM	Daily
MACS	228	50	31	W8RNQ	3.953	11 PM	Daily (1 PM Sun.)
VHF				KB8ZYY		Various	
MI-ARPSC	54	3	4	KA8YKK	7.232	5 PM	Sunday (Alt. 3.932)

OHIO: SM, Joe Phillips, K8QOE, Fairfield, (to contact me, see page 12 or check out the Ohio Web Page at www.arrl.org/sections/OH.html)—ASM-NE: Bob Winston, W2THU, Cleveland; ASM-NW: Ron Griffin, N8AEH, Findlay; ASM-Central: Mary Carpenter, N8OAM, Westerville; ASM-SW: John Haungs, W8STX, Cincinnati; ASM-SE: Connie Hamilton, N8IO, Marietta; SEC: Larry Rain, WD8IHP, Mansfield. STM: Jack Wagoner, WB8FSV, Hilliard. ACC: Brenda Krukowski, KB8IUP, Toledo. TC: Tom Holmes. N8ZM, Tipp City; PIC: Scott Yonally, N8SY, Mansfield; OOC: Alan Cook, N7CEU, Newark; SGL: Reuben Meeks, W8GUC, Vandalia...Section News, little capsule accounts of each of the ARRL's 71 Sections, has been a part of *QST* almost from the beginning 86 years ago. The columns had served for many years as the main source of news for the various Sections. Recently its value was to permit 71 Section Managers to get local notices and recognize local hams by name and call into our national magazine. Ohio's column was always the largest. My opposition to this move was loud and total, but now the opposition must end. The debate is over. It is time to move on and preserve the basic feature of "Section News" as a way to credit outstanding work of our members and of the Traffic Nets which operate in Ohio. To keep "Section News" special and available to the Ohio Section, the amount of text will not increase so we can preserve the special nature of the items which make the Section News columns. But changes in the publishing of this special column will be as follows: (1) We will move it to Ohio's Ham Radio newsletters and to the Section Web Sites on the Internet. (2) Traffic reports and Ohio Traffic Net news, a staple of Ohio Section News, will remain in *QST* through the December issue without changes. (3) Beginning last month, the September Ohio Section News was sent to Ohio's Ham Radio Newsletter editors. (4) Section News was also be posted on the Internet at two locations. First the Ohio Section site at www.maser.org and the ARRL Web Page address which is www.arrl.org/sections/OH.html. Notices of changes in the Web page will be given to Internet subscribers two days in advance of the publishing date. (5) Beginning in January 2003, when Section News will no longer be in *QST*, the Ohio Section Cabinet will evaluate the program and see what changes are necessary to assist newsletter editors to utilize the column. The primary emphasis of the column is to be printed in Newsletters (hard copy and Electronic) and the needs and wants of Ohio Newsletter Editors will be our primary concern. (6) As always any additional releases of the Section Manager or other news of the Ohio Section will continue to be released separately according to past news practices... OHIO SECTION OCTOBER HAMFESTS; (6) Medina2Way at Medina and (27) Massilion ARC at Canton..de Joe, K8QOE. Now for the July traffic reports:

Net	QNI	QTC	QTR	Sess	Time	Freq	NM
BN (E)	105	50	204	31	1845	3.577	WD8KFN
BN (L)	177	58	268	31	2200	3.577	NY8V
OSN	125	40	472	31	1810	3.708	WB8KQJ
OSSBN	1447	533	2346	93	1030, 1615, 1845	3.9725	N8IO

Tfc: N8IO 229, N8BV 195, WD8KFN 178, W8PBX 166, N8OD 156, N8IXF 146, KD8HB 140, W8STX 128, W8QIW 114, K8PJ 97, N8TNV 84, K3RC 82, WA8SSI 79, KX8B 76, K8CAV 75, KA8FCC 72, N8DD 64, KA8CXG 61, KB8SBK 52, W8RPS 50, N8IRB 49, N8CW 47, WB8HHZ 47, W8RG 36, NY8V 31, KI8IM 30, KC8DWM 28, W8BO 21, WB8SIQ 20, NS8C 19, KC8HTP 19, N8YWX 16, W8BZY 13, N8WLE 12, KC8KYP 10, KB8ESY 1, K8QIP 1, K8WC 1. (Jun) W8BZY 35, WD8KBW 12, W8BO 5.

HUDSON DIVISION

EASTERN NEW YORK: SM: Pete Cecere, N2YJZ. STM: Jim Peterson, K2CSS. SEC: Ken Akasofu, KL7JCQ. ACC: Sylvia Stone, K2SLY. SGL: Herb Sweet, K2GBH. PIC: John Farina, WA2QCY. BM: Ed Rubin, N2JBA. OOC: Hal Post, AK2E. TC: Rudy Dehn W2JVF. ASM: Tom Raffaelli, WB2NHC. ASM: Bob Chamberlain, N2KBC. ASM: Andrew Schmidt, N2FTR. ASM: Richard Sandell, WK6R. ASM: Phil Bradway, KB2HQ. Hello everyone. As you may have heard, this column will end being published in *QST* with the December 2002 issue. You can find the Section News on the ARRL web site under the Eastern New York Section. This makes available more current and updated information due to the elimination of the publication lag. I'm always looking for material to put on the site so contact me with info of any happenings that you or your club may be partaking in that would be of interest to other hams. With the fall season upon us, it might be a good idea to think about fixing up those antennas before the snow comes. But be safe. 73 de Pete N2YJZ n2yjz@arrl.org. Note: There was no STM report issued to me for this month's column; sorry.

NEW YORK CITY / LONG ISLAND: SM, George Tranos, N2GA—ASM: KA2D, N1XL, K2YEW, W2FX, KB2SCS. SEC: KA2D. ACC: N2MUN. PIC: K2DO. TC: K2LJH. BM: W2IW. OOC: N1XL. STM: WA2YOW. SGL: N2GA. The December Section News column will be the last in *QST*. Section News can be obtained on the Internet at http://www.arrl.org/sections/?sect=NLI or linked directly from arrl.org. SEC: Tom, KA2D, suggests participating in the Simulated Emergency Test in October to help hone your communications skills. Please consider joining ARES to be ready for the next emergency. NY City ARES responded to a power outage on July 20. Please support House resolution 4720, The "Amateur Radio Emergency Communications Consistency Act," sponsored by Steve Israel of NY, by writing your local US Congressman. STM Charlie, WA2YOW, reports NTS nets are ongoing on a daily basis - newcomers are welcome. Public Service Honor Roll for July: AB2IZ, N2AKZ, KB2KLH, WA2YOW. LIMARC plans a one day Technician course on Sept. 28 in Hicksville. Congratulations to WM2Z & the Peconic ARC and to N2MUN & the Great South Bay ARC for their participation in International Lighthouse Weekend in August. Volunteer Exam sessions, club listings, upcoming events and more are available on the NLI Website - www.hudson.arrl/nli. Tfc: N2AKZ 114, KB2KLH 75, WA2YOW 68, AB2IZ 62, WB2GTG 25, KA2UEC 20, KA2YDW 18, KE2SX 12, N2TEE 5.

NORTHERN NEW JERSEY: SM, Bill Hudzik, W2UDT—ASM: K2WJ. ASM: N2WZB. STM: WB2FTX. ACC: N3RB. SEC: K2SO. OOC: K2ZD. SGL: K1VX. TC: NR2H. Webpage: www.arrlhudson.org/nnj. We have two new ARRL affiliated clubs in NNJ: Young Hams Of The Northeast and the NJ Wireless Assn. Welcome to those clubs. In the past year, we have added several clubs to the affiliated roster. My thanks to our ACC N3RB for his help with the paperwork. The section has a few more clubs looking for affiliation. This is really a good sign that clubs recognize the benefits of ARRL affiliation. We now have DECs in all NNJ counties thanks to the work of SEC K2SO. This is a major score! Thanks, Steve! Also, welcome to N2CKH as another OO. Our OOC, K2ZD, has been recruiting NNJ members. We now have 9 OOs in NNJ with 3 others waiting in the wings. Good job, Mario! Likewise, STM WB2FTX has been doing a fine job on our section nets. Check the NNJ Web page for NNJ nets. Dave will be happy to add you to his list! Welcome to NR2H who has agreed to become the NNJ TC. Don, moved up from Technical Specialist to become the TC Coordinator for NNJ. He brings a wealth of RF experience to the slot and will be a great help to NNJ. Congrats to W2VTV who recently got his VUCC award (I know, I checked it.) Please continue to support our NNJ clubs and nets. We are growing and its thanks to the efforts of our volunteers! 73, Bill Hudzik, W2UDT.

Net	Sess	QNI	QTC	QSP
NJM	12	45	13	12
NJPN	35	182	13	13
NJSN	31	178	20	19
NJN/E	31	218	92	65
NJN/L	31	171	74	66
CJTN	31	159	65	46
NJVN/E	31	313	41	38
NJVN/L	31	369	37	36
UCTN	23	304	5	4

W2MTO 69, N3RB 55, KB2VRO 51, N2OPJ 34, K2PB 31, N2GJ 23, KJ2N 16, K2DBK 14, N2BVM 10, WB2KNS 8, W2CC 8.

MIDWEST DIVISION

IOWA: SM, Jim Lasley, N0JL—ASM: N0LDD—SEC: NA0R. BM: K0IIR @ W0CXX. SGL: K0KD. STM: K0YL. Let's see... This is August... so this will be in *QST* in October. This is the first of the last three of the Section News columns to appear in *QST*. I should have it on the Web (http:\\www.arrl.org) by mid August or about a month before you can read it in *QST*. You know that Summerfest will be a good one... and it was. I enjoyed meeting and talking with W6ROD again. Rod brought us up to date on the preparations for WARC 2003. The amount of preparation for one of these is staggering. The ARRL/IARU are the ones presenting the view of Amateur Radio. I also spoke with W0SR about the wonderful things that we can do on the Web. OK, Jim, but I need some time here! Have you commented to the right people on either the CC&R bill in Congress or the 60M proposal before the FCC? Wow! It could be too late by now! This alone should show that, with effort, we maybe able to do a better job on the net. But I will miss the history of SN in *QST*. Sorry to note the loss of KB0ZG in late July. Oh, don't forget the West Liberty and Davenport hamfests that should be coming up. About out of space for now, so 73 de N0JL. Newsletters were received from CVARC, GRARC, DARC, TSARC. Traffic: W0SS 149, WB0B 46, N0JL 42, K0YL 20.

KANSAS: SM, Orlan Cook, W0OYH—ASM/STM: Ron Cowan, KB0DTI. ASM/ACC/OCC: Robert Summers, K0BXF. SEC: Joseph Plankinton, WD0DMV. PIC: Scott Slocum, KC0DYA. TC: Rick Carver, WA0KS. SGL: Steve Hamilton. By the time you read this our ARRL Ks State convention will be over and next month I will say more about it. I want to remind you of the ARRL Kansas Section News on the web at http://www.arrl.org/sections /?=KS. We have lots of space there to give greater recognition to our Kansas hams active in public service. Speaking of public service, our world of the Public Svc Honor Roll has been turned up side down as you can see from the reports below. Those who were first for many years are now last. Preston W0WWR who handled 775 msgs is now on the bottom. Your SM is there also. There are others who were having a hard time making PSHR before the changes who can not make it now. On our KSN Web page, I level this out by showing work and not just points. Jun. Kansas Nets: sessions/QNI/QTC, KSBN 30/829/80 KPN 22/300/44 KMWN 30/538/427 KWN 30/617/427, CSTN 25/1989/ 84 QKS 58/262/114 QKS-SS 11/18/6 ARES 36/357/4 QNS KB0AMY KC0AUH N0BTH WD0DDG AA0IQ WA0SSR KB0WEQ WD0DMV. SEC Joseph. TEN 60/???/60 Ks 87% wid K0PY W0WWR NB0Z W0SS/ Mgr. Ks tfc W0WWR 775, W0OYH 59, NB0Z 42, N0ENO 42, KB0DTI 26, N0ZIZ 20, W0FCL 8, K0RY 20. PSHR KB0DTI 196, N0ZIZ 122, N0ENO 113, W0OYH 110, W0WWR 100. Room 4 UR report here!

MISSOURI: SM, Dale Bagley, K0KY—ASM: John Seals, WR0R. ASM: Bill Coby, KB0MWG. ASM: Larry Ballew, AB0HP. ACC: Keith Haye, WE0G. OOC: Mike Musick, N0QBF. STM: Charles Boyd, KE0K. SEC: Patrick Boyle, K0JPB. BM: Brian Smith, KI0MB. October Hamfests in the Section will be held all across Missouri. Starting off on Oct 5th with the Twin Lakes ARC Hamfest in Warsaw, MO. Next up is the always great South Side Hamfest Oct. 19th in Grandview, MO. The Last chance for a Hamfest in October is the Halloween Hamfest in Kirkwood, MO, and I will promise an interesting ARRL Table at this year's Hamfest again this year. The folks that work hard to organize these Hamfests need the support of the Amateur Radio Operators if they are going to continue to be successful. Plan to attend a Hamfest near you

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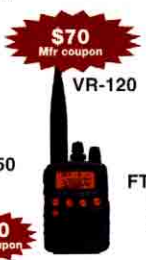

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if you want to have some real fun, share a table with some of your friends. If you haven't heard the great news yet, Rick Crockett, W0PC of O'Fallon, MO, has been chosen as the 2001 Herb S. Brier Instructor of the Year award winner. Rick has been teaching license classes for over 25 years and is an active member of the St. Charles ARC. He was nominated by Ron Ochu, KOØZ, the SCARC Pres. Amateur Radio has benefited in a wonderful way by the efforts of volunteers like Rick Crockett and we are proud of him and the honor that he has earned. It is time to remind Section Amateurs about the Missouri Traffic Nets again. The SSB net on 3.963 MHz is every evening at 5:45 PM with Phil Urquiola, KØDAT, as Net Manager and some great net controls K2HT, KE0K, W0ENW, KBØROX, K0DAT, N0UMP, K0IPM, and AE0S. The CW MTN meets at 7:00 PM and 9:45 PM on 3.585 MHz with Kent Trimble, K9ZTV, as Net Manager, the excellent net controls include K2HT, K9ZTV, W0OUD, KI0PH, and W2RRX. I recently went to the funeral in Kirksville, MO of Harold "Mayor" Bartlett, WA0DHR. He lived a long and productive life and was a founding member of the Northeast MO ARC. I have known Mayor since I was a kid. He and Charlie Porter, W0YRL, were perhaps the first ham operators with which I ever had contact. Mayor had a great sense of humor and his dedication to ham radio and his friends was inspirational.

NEBRASKA: SM, Bill McCollum, KE0XQ—ASM: W0KVM, N0MT, WY0F, WB0ULH & WB0YWO. The Elkhorn Valley ARC had a chance of a lifetime on June 19. Fred, N0VLX, and Jim, W0JJL, were interviewed on KEXL-FM during National Amateur Radio Week. Included in the interview was an on the air QSO with Don, WA0AOY, of Mitchell, SD and Roy Neal, K6DUE, of High Point, NC. K6DUE is a former NBC News correspondent and can be heard doing "Newsline." Approximately 40 Amateurs were involved in an NDMS Drill on July 27th. It was a mock disaster drill at Offutt AFB and involved hospitals in the metropolitan area. This was a good demonstration of cooperation between multiple ARES organizations. Jim Peterson, KF0FO, was honored at a recent AKSARBEN ARC meeting Jim was the SEC for many years and an EC before that. The NWS as well as the Nebraska Section honored KF0FO. Net Reports: MIDNE ARES: QNI 349, QTC 2 & 31 sessions. NPPARC: QNI 27, QTC 2 & 4 sessions. NE Storm Net: QNI 806, QTC 16 & 31 sessions. NE 40 Meter Net: QNI 448, QTC 6 & 31 sessions. MARES: QNI 163, QTC 2 & 4 sessions. NMPN: QNI 1575, QTC 33 & 31 sessions. Plattsmouth ARC: QNI 32, QTC 2 & 3 sessions. Saunders County ARES: QNI 67, QTC 8 & 4 sessions. Tfc: K0PTK 84, KE0XQ 22, KC0DVG 8, WA0ZCM 7, WY0F 4, W0UJI 4, WA0ZCN 4, N0WY 2, W0DED 2, W0EXK 2, KA0O 2, W0US 2. PSHR: KB0YTM 16, KC0HOX 40, KA0DBK 82.

NEW ENGLAND DIVISION

CONNECTICUT: SM, Betsey Doane, K1EIC—ASMs: KZ1Z, NK1J, K1STM. BM: KD1YV. OOC: W1GC. PIC: W1FXQ. SEC: KD1YV. SGL: W1UTQ. STM: K1HEJ. TC: W1FAI. Mark your calendars: CARA Ham Fest September 22 Edmondton Town Hall Newtown; Nutmeg State Ham Fest, October 17, Mountain Side Resort, Wallingford sponsored by The Meriden Amateur Radio Club; the Joint Microwave Update Conference and Eastern VHF/UHF Conference on October 24-27 at The Radison Hotel, Enfield, CT, under the sponsorship of the Eastern VHF/UHF Society and the North East Weak Signal Group. Remember that a lot of work goes into these events so please do come out and support them and have fun! Steve Ford and Dan Miller, both staff at ARRL will be speakers at "Nutfest" in October. You have undoubtedly heard that this column will no longer appear after the December issue. Please help us make this transition a smooth one by encouraging your friends to sign up online for Section and Division e-mail newsletters on the ARRL Web site. I am sure that I will make generous use of that resource. Remember to check out the CT Section link on the ARRL Web Page for news and alerts. The Radio Amateur Society of Norwich hosted a special event station at the Ledge Light Lighthouse at the mouth of the Thames River, off shore New London. The Lighthouse has a colorful history, and club members enthusiastically coordinated this event. ARES members in East Lyme under the direction of Bill, W1GTT, participated in communications for the Niantic Bay Triathlon in mid August during those hot summer days. The Middlesex Amateur Radio Society under the direction of Mark, WA1ZEK, participated in the annual Epilepsy Foundation Mud Volleyball Tournament also in the august heat. Thanks to you all in E. Lyme, members of MARS/CARES and RASON for your help with these worthy events that continue to promote our hobby. The following comes from the NARL Newsletter: HOW TO MAKE THE INTERNET SAFE FOR CHILDREN. The date is Thursday Oct. 10 at 7 PM in the Community Room at the Lucy Robbins Welles Library 95 Cedar St. (CT Route 175) Newington CT 06111. This event will be presented by the Kiwanis Club of Newington. For further information, contact PIC Al W1FXQ w1fxq@arrl.net. Net sess/QNI/QTC/NM: ECTN 29/x/38/WA4QXT; WESCON 31/298/71/KA1GWE. NVTN 24/128/22/KB1CTC; CPN 31/215/57/N1DIO; CN 25/81/67/N1AEH; BOMN 26/225/339/NM1K. Tfc: NM1K 2105, KA1VED 491, KA1GWE 107, WA4QXT 14.

EASTERN MASSACHUSETTS: SM, Phil Temples, K9HI—ASMs: WA1ECF, N1GTB, WA1IDA, N1UGA, AA1MO. ACC: N1DHW. BM: N1IST. OOC: K1LJN. PIC: N1PBA. SEC: W1MPN. SGL: K3HI. STM: N1LKJ. TC: open. e-mail list: ema-arrl@qth.net, web: http://ema.arrl.org. At this writing the New England Division ARRL Convention in Boxboro is less than two weeks away! Several area clubs plan to staff tables and displays. The EMA ARRL staff and I hope to see and speak with many EMA section members privately as well as at the various forums. Boston ARC to conduct communications for the Second Annual BAA Half Marathon event. Framingham ARA tower "takedown" photos are on-line at http://www.fara.org/photos/2002/TowerTakedown/view.php. Acton-Boxboro ARC is undergoing some restructuring. Sturdy Memorial Hospital ARC held another "Wednesday Night Market" demo in downtown Attleboro August 14. Be sure to check out the new ema.arrl.org web site! Norwood continues improvements on its 147.21+ 100 PL repeater. Falmouth ARA holds its weekly net on 146.655- 88.5 PL at 2030 ET each Monday. The Marconi Radio Club web site contains a fascinating historical overview of the Marconi Wellfleet station at http://personal.tmlp.com/k1vv/w1aa/wellfleet.html. At this writing Massasoit ARA will operate as NN1MF at the 135th Annual Marshfield Fair August 16-25. MARA will staff an Amateur Radio exhibit at the fair. N1OFC was recently appointed EMA Director for Plainville by the town's board of selectmen. North Shore ARA operates a APRS IP-Gate and digipeater. See http://www.nsradio.org/aprs/aprs_digiip_gate.htm for the particulars. Pentucket RA members are organizing a repeater site cleanup. The Waltham ARA/1200 RC annual auction will be held November 16. Details are at http://www.wara64.org/auction. By now you may have learned of the recent ARRL Board decision to eliminate the Section News columns and contest results from *QST*. Rest assured, however, I will continue to provide a Section News column via the Web at http://www.arrl.org/sections/EMA.html. 73 de K9HI. Tfc: W1GMF 169, KW1U 709, K1IQI 609, N1LKJ 443, NG1A 180, K8SH 75, N1TPU 69, K1BZD 61, WA1FNM 35, N1LAH 25, N1IST 17.

MAINE: SM, Bill Woodhead, N1KAT— ASMs: WA1YNZ, KA1TKS. STM: N1JBD. BM: W1JTH. SGL: W1AO. ACC: KA1RFD. OOC: N1RY. PIC: KD1OW. SEC: N1KGS. Asst. Dirs: KA1TKS, K1NIT. Web Site: N1WFO. This past summer will surely go down in my log as one of the best. The wx has been outstanding, along with the radio activity by Hams statewide. A special event station was one the air from the Bangor Fair; operators were: N1KVJ, KB1IHO, KB1DLO, KB1FSO, W1YTQ, WA1URS, K1ONY, WB1EMA, K1GUP, N1LX, N1OJH & N1OJD. Runners in the 10K race in Freeport on July 4 were pleased to see the friendly faces of the following Hams, insuring a safe event: K1GAX, NX1A, KB1GLW, W1HZE, KA1AIF, N1GRO, W1IF, N1NCC, KB1DUH, KA1KIX, N1XP, N1WFO, AA1ZY, AC1R, W1ZW, W1AH, N1RXJ, & KB1GRV. Hams in the town of Abbot were on hand to help the parade run smoothly: WA1JMM, WA1SBI, WA1PBR, N1DGJ, KB1EWI, N1UCN, KB1EIX, N1RCU, N1KGS & KD1YW. Hope you all enjoyed the summer, and thank you for all the help you gave to events as those mentioned above. 73, Bill, N1KAT. Tfc: W1KX 145, W1QU 59, W1JX 42, KA1RFD 31, KA2ZKM 28, N1JBD 16, W1JTH 12. (May) W1KX 72.

NEW HAMPSHIRE: SM, Al Shuman, N1FIK (n1fik@arrl.org)—NH Web site (www.nhradio.org) Sept - 6 new Amateurs for August. As reported this column will cease to exist in its present form in 2003 but will continue to appear in various forms including both the ARRL and NHRADIO web sites. Please know that although this report will change our commitment to NH Amateur Radio will continue. It was announced at the NE Div. Convention in Boxboro that NH's own Dick Christopher, N1LT is the 2002 NE Division Volunteer of the Year. Congratulations to Dick and the whole Central New Hampshire Amateur Radio Club for making it possible for NH to share in this honor. Dick's achievements and what lead up to this award can be viewed on the two web sites. Come join the Amoskeag and IRS sponsored ham breakfast held every Saturday morning at the CMC Hospital cafeteria on the West Side between 8 and 9:30 AM. Talk-in 147.33 (pl 141.3) and 146.52. I will be at the Hosstraders Flea Market October 4 & 5. For more info click on www.qsl.net/k1rqg . 73 -al- N1FIK. Net NM/Sess/QNI/QTC/Time: GSFM N1RCQ/30/161/24/289; GSPN WB1GXM 26/104/35/119; VTNH WA1JVV 31/125/84/357. Tfc: W1PEX 1854, WA1JVV 56, N1NH 45, W1ALE 35, WB1GXM 24, K1TSV 14, N1CPX 6.

RHODE ISLAND: SM, Bob Beaudet, W1YRC—ASM, Administration and Operations & ACC: WA1RI. ASM—Emergency Communications: W1PEV. SEC: N2PGD. BM: KA1BNO. OOC: W1AOM. PIC: WB1P. TC: K1DFT. SGL: Vacant. STM: Vacant. The RI ARES Training net has already become a fixture. It meets at 8:30, Monday evenings, on the 146.76 repeater. Net Control duty rotates and every session contains an interesting program intended to benefit everyone checking in. Make it a regular stop in your busy week. Our state submarine, the Russian Juliette is now open to the public. I toured the boat and can assure you that it's not built for 6+ footers. As I write this in early August, I hope that I will see most of you at Boxboro. RI section will have its own table and plan some nice prizes; AT Cross pens, ARRL memberships, VE test fees paid and maybe more. Web readers: Please stop by and register. *QST* readers: I hope you enjoyed your visit. RI SKYWARN has resumed its training nets on Wednesdays also on the '76 repeater. Check ARES NEWS on http://www.ri.arrl.org for details. Also check the RI ARRL Web page http://www.arrl.org/sections/?sect=RI for more a more detailed and timely section report. Starting with this report, I'll be reporting traffic handled on the E MASS/RI 3.918 MHz Phone Net. More details to come. 73, Bob W1YRC SM. Tfc: N1YKH 59. EM/RIPN: Sess 30, QNI 109, QTC 78.

VERMONT: SM, Paul N. Gayet AA1SU— I am happy to report that we had many successful public service events this past summer. My hat is off to you. We helped out with the Jay Peak Challenge, VT City Marathon, MS150 Bike Tour, Essex Parade, Charlotte Half Marathon, NCAA Bike Race, & several others. Keep up the good work. This month there is the Walktoberfest to keep you busy. Please welcome our new SGL Dave Cain W1DEC and new SEC Carl Phillips KC1WH. We are currently rebuilding ARES in VT; search FSD-98 on the League's web site to enroll. We could really use your help! Don't forget, our DXCC card checker is Mitch Stern W1SJ. Our site: http://www.arrl.org/sections/VT.html. Net/Sess/QNI/QTC/minutes/NM: VT YL Net 4/37/0/102/KA1LDS; VPEN 4/23/0/150 KC1WY. GMN 26/421/23/1398 N1HXC. VTNH 31/125/84/357 WA1JVV. VTPTN 31/325/34/989.

WESTERN MASSACHUSETTS: SM, William C. Voedisch, W1UD, w1ud@arrl.org – ASM: N1MAP. ASM (digital) KD1SM. STM: NZ1D. SEC: K1VSG. OOC: WT1W. The section news will no longer be published in QST after the first of the year. It will be found on the WMA Web page. Whatever the reason is, I think it is a golden opportunity for us to have extensive, up-to-the-minute news of activity in the section. For a change, the news will be fresh and there is no limitation on the amount of lines I can use. We may also upload photographs of club activities. A great opportunity for the shutter bugs in our group. I, as well as the other SMs, will be in the learning process regarding uploading etc. Bear with me. It's all new to me. By the time you read this, the convention in Boxboro will be over. I hope that I met all of you and got some feedback regarding this change over to the Web site. Bands have been poor the last month. Typical summer operating conditions plus the record setting solar flare didn't help either. Despite the conditions, I got a very large bundle of QSL cards from our bureau. Those folk do a great job distributing cards throughout the section and are to be congratulated for their untiring work. Again, I would like to get some idea how

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Use sound card and rig for all digital modes!

Plug and Play -- includes software, all cables, AC power supply . . . RFI-proof . . . Isolation transformers -- no hum, noise, distortion . . . Operate PSK-31, packet, APRS, AMTOR, RTTY, SSTV, CW, Meteor Scatter, others . . . Use as Voice Keyer, CW Contest Memory Keyer . . . Monitor On/Off Switch . . .

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New! *Includes AC power supply, RS-232 cable!*

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

Everything you need is included -- software, audio cables, RS-232 serial cable and AC power supply.

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

Models available for all transceivers with 8-pin round, 8-pin modular (RJ-45) or 4-pin round microphone plugs.

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

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

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Audio Isolation Transformers

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

RFI-Proof

Extensive RF suppression and line isolation eliminates RF feedback problems.

Automatic Microphone Override

Transmit mic audio at any time by pressing PTT to override digital modes -- great for SSTV and Contest Voice Keyer.

More Impressive Features

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

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

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

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

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

Monitor on/off switch lets you have a normal QSO and receive SSTV pictures at the same time in the *"monitor on"* position. This is great for modes like SSTV and Voice Keyer operation that may require listening to receive audio during operation.

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

Use any Transceiver

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

NEW! Order MFJ-1275T, for *4-pin round* mic plug, for Ten-Tec and others.

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Everything you need is included --audio and RS-232 cables, AC power supply and a CD with a collection of the most popular amateur radio software to operate PSK-31, RTTY, SSTV, PACKET, AMTOR, CW, HSCW Meteor Scatter, Contest Voice Keying and other modes. Use 12 VDC or 110 VAC.

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This *super* sound card interface has all of the features of the MFJ-1275 ***plus . . .***

- **Auxiliary Input Jack:** Lets you switch your sound card from MFJ-1279 so you can use your sound card for something else. No more plugging/unplugging!
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- **Headphone Jack:** Use your stereo headphones so you won't disturb your XYL (also turns off external speaker).
- **Footswitch:** Use footswitch or other for PTT (push-to-talk) when not using VOX.

Plug and Play! Includes software CD, RS-232 and audio cables, AC power supply.

Order MFJ-1279 for 8-pin round mic, MFJ-1279M for 8-pin modular (RJ-45) mic, MFJ-1279T for 4-pin round mic.

Add "X" suffix for 220VAC.

New! *Basic* Digital Interface

MFJ-1273B
$59.95

Plug and Play! Has sound card, radio, speaker, RS-232 jacks. Includes: software CD and RS-232, audio, mic cables. No external power needed. Has no mic jack or mic switch. **Order** MFJ-1273B for 8 pin round mic, MFJ-1273BM for 8-pin modular (RJ-45) mic, MFJ-1273BT for 4-pin round mic.

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MFJ-1296, $129.95. *RadioCom4* integrates PSK31, SSTV, FAX/Sat FAX, RTTY, SITOR, DSP audio filters and radio control.

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we can improve the WMA Web site. Drop me a line if you have any. Tfc: K1TMA 213, KD1SM 6, N1RLX 5, W1ZPB 124, W1UD 287.

NORTHWESTERN DIVISION

ALASKA: SM, David Stevens, KL7EB—The IOTA (Island On The Air), Deer Island Expedition on July 31 thru August 5 to a remote eastern Aleutian Island was a great success. There was almost 10,000 contacts made by Rick Kaplan, KL7AK, Larry Biederman, KF6XC, Blain Berg, KL7TG, Linda Berg, NL7RE, and Jim Model K9PPY. Robert Wilson, AL7KK, has written a new book, ECONOMICAL ANTENNAS FOR LOW AND MEDIUM FREQUENCIES. It can be found CD ROM or pdf at www.antennex.com?Sshack/loafer/loafer.html Venture Scouting need your help: contacts Anchorage Jim Wiley, KL7CC, 338 0662, or Craig Bledsoe, KL7E, 694 4730; Fairbanks Dianne Marshal, AL7FG, Wassilla Teresa Nunes, KL0WW, 373 5224. Fairbanks ARES Net 2000 Sunday KL7KC repeater, Anchorage ARES 147.30, Thursday 2000, Snipers 3920 at 1800, Bush Net 7093 at 200, Motley Group 3933 at 2100, and Alaska Pacific Net M-F 14.292 0830. David W Stevens, KL7EB, Alaska Section Manager, PSHR AL7N 1/30 2/40 3/20 total 91. Tfc: KL5T 73, AL7N 24, AD4BL 18. PSHR: AD4BL 52, KL5T 82.

EASTERN WASHINGTON: SM, Kyle Pugh, KA7CSP—District A DEC KC7JNJ Paul Appel reports that as a result of fires burning in the Manson area operators from Chelan/Douglas County ARES/RACES were activated to support Red Cross shelter activities at Chelan High School in July. 75 homes have been evacuated as a result of this fire which has destroyed some structures. A veteran of last year's fires in North Central Washington, Paul advises that all EWA ARES/RACES members have their 72-hour bags ready for possible activation and deployment. The Central WA ARC worked The Great Canoe Race on July 13th. In memoriam: Melvin Jensen, KA7FND, of Spokane is a Silent Key. Observation reports were received from 5 out of 9 OO stations for July. Net Activity for July: WSN: QNI 944 tfc 198; Noontime Net: QNI 9221, Tfc 313; WARTS: QNI 3390, tfc 112. Tfc: K7GXZ 113, W7GB 83, KA7EKL 45, K7BFL 44, KK7T 157. PSHR: W7GB 140, K7GXZ 100. See us on the Web at: http://www.arrl.org/sections/index.html?sect=EWA.

IDAHO: SM, John Cline, K7BDS – ASM: K7TIH, KJ7TH, KB7TYA. STM: W7GHT. OOC: W7ZU. SEC: AA7VR. TC: N7ZFE – Meet Joe "Dusty" Rhodes, W7ITN on ten meters. He celebrated his 60th year as an ARRL member in August. Born and raised in Nampa, Idaho, he first joined ARRL in August 1942 when he was in the Army Signal Corps and he has been a member ever since. Dusty credits Dan Knipe, W7IGE, with getting him interested in Ham Radio. Dan needed someone to practice CW with. Catch Dusty on Ten Meters and wish him a Happy Anniversary for 60 years with ARRL. Tfc: W7GHT 253, KB7GZU 71, WB7VYH 50, W6ZOH 29. PSHR: W7GHT 110, WB7VYH 88. Nets: FARM 31/2844/64/W7WJH; NWTN 31/1230/64/KC7RNT; IDACD 23/491/18/ WB7VYH; IMN 31/430/114/ W6ZOH.

MONTANA: SM, Darrell Thomas, N7KOR—The major event for Amateur Radio during July in the Montana Section was the Glacier Waterton Hamfest. 446 registered attendees enjoyed three days of nice weather and the wonderful Glacier Park scenery. A big thanks to the directors for organizing the event. Again it was a very nice schedule of events for the entire family. One of the kids program was an antenna making program which the kids made directional finding antennas and then used them in a bunny hunt. The Capital City Amateur Radio Club in Helena MT provided communications for the annual Elkhorn Run. Twelve amateurs manned checkpoints and safety stations on the course which consists of 39 miles of mountain trails and 23 miles of country roads. Congratulations to the amateurs is southern Montana who helped organize the rescue mission for two fallen Mountain Climbers on Granite Peak on July 31st. Net/QNI/QTC/NM MSN 77 K7YD, MTN 1804/42 KD7HWV, IMN 430/114 W6ZOH.

OREGON: SM, Marshall Johnson, Sr., KK7CW—SEC: WB7NML. STM: W7IZ. ACC: K7SQ. SGL: N7QQU. Wildfires have made our summer months very busy. Thank you to ARES/RACES volunteers putting in thousands of man hours. A special thanks to Bonnie, AB7ZQ, and Sue, AC7DD, for putting on the 2-hour traffic seminar this summer. Elizabeth, KK7VO, has taken over EC duties in Klamath County. Nov. 16th is Amateur Radio Pt. 2 ARES certification at the Salem OEM office. October 26th is Swap-Toberfest in Rickreall. Doors open at 9:00 AM. This ARES Convention will feature K6FIB and KK7XO on, "All About Digital Modes". Talk-in: 146.86 PL 186.2. Register online at http://www.qsl.net/w7oem. Congratulations to KK1A for his great month in moving traffic. July NTS: KK1A 1100 (BPL), AC7DD 208, W7IZ 198, N7YSS 136, KC7SGM 83, N7CM 58, KC7SRL 46, W7VSE 43, K7NLM 18, N7APE 8.

WESTERN WASHINGTON: SM, Harry Lewis, W7JWJ—Future activities and events plus current news of the Western Washington Section may be found on the Section Page: http://www.arrl.org/sect/wwa. I'm in receipt of an e-mail from Fairbanks noting that the dedicated American Morse landline is not being answered frequently enough at the contiguous states terminal thus delaying the handling of NTS traffic. Brush up on your American Morse boys and girls and let's help out. Handling enough traffic in 2002 is not as easy as it was 75 years ago when Internet was yet to be. One traffic handler of that vintage was Lloyd Peek, W7BA, who qualified for the Brass Pounders League every month for over 22 years. However there is now one individual in Western Washington that manages to accumulate enough traffic receiving, sending and delivering to qualify for BPL and that is George Thomas, K7BDU. In July his grand total was 573. In 1948 the WARTS net handled over 35,000 pieces of traffic. SEC Ed Bruette, N7NVP and volunteer crew have been attempting to bring the trawler MV Endurance from California up to Poulsbo. I suspect Ed may one day write a book on the misadventures. Qualifying for the Public Service Honor Roll in July these amateurs: W7DPW, W7LG, W7QM, KJ7SI, KA7TTY, W7TVA, N7YSS, W7ZIW. 73.

PACIFIC DIVISION

EAST BAY: SM, Andy Oppel, N6AJO—ASMs: NJ6T, KE6QJV. SEC: open. DECs: KE6QJV/Alameda County,

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Power your HF transceiver, 2 meter/440 MHz mobile/base and accessories with these new 25 or 45 Amp MFJ MightyLite™ Switching Power Supplies!

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No more picking up and hauling around heavy, bulky supplies that can give you a painful backache, pulled muscle or hernia.

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Less than 35 mV peak-to-peak ripple under 25 or 45 amp full load. Load regulation is better than 1.5% under full load.

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They are fully protected with Over Voltage and Over Current protection circuits.

Worldwide Versatility

MFJ *MightyLites*™ can be used anywhere in the world! They have switchable AC input voltage and work from 85 to 135 VAC or 170 to 260 VAC. Replaceable fuse.

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Front-panel control lets you vary output from 9 to 15 Volts DC.

Front-panel has easy access five-way binding posts for heavy duty use and cigarette lighter socket for mobile accessories. MFJ-4245MV has two sets of quick-connects on the rear for accessories.

Brightly illuminated 3 inch meters let you monitor load voltage and current.

A whisper quiet internal fan efficiently cools your power supply for long life.

Two models to choose from . . .

MFJ-4225MV, $149.95. 25 Amps maximum or 22 Amps continuous. Weighs 3.7 pounds. Measures 5¾Wx4½Hx6D in.

MFJ-4245MV, $199.95. 45 Amps maximum or 40 Amps continuous. Weighs 5.5 pounds. Measures 7½Wx4¾Hx9D in.

NEW! 25 Amp *MightyLite*™

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at 13.8 Volts DC. Low ripple, highly regulated. ***No RF Hash!*** Five-way binding posts for high current. Quick connects for accessories. Over voltage/current protection. 110 or 220 VAC operation. Meets FCC Class B regs. 3.5 lbs. 5½Wx2½Hx10¾D in.

MFJ 35/30 Amp Adjustable Regulated DC Power Supply

Massive 19.2 pound transformer . . . No RF hash . . . Adjustable 1 to 14 VDC . . .

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MFJ's heavy duty conventional power supply is excellent for powering HF or 2 Meter/440 MHz transceiver/accessories.

A massive 19.2 pound transformer makes this power supply super heavy duty! It delivers 35 amps maximum and 30 amps continuous without even flexing its muscles. Plugs into any 110 VAC wall outlet.

It's highly regulated with load regulation better than 1%. Ripple voltage is less than 30 mV. *No RF hash* -- it's super clean!

Fully protected -- has over voltage protection, fold back short circuit protection and over-temperature protection.

You get front panel adjustable voltage from 1 to 14 VDC with a convenient detent set at 13.8 VDC. A pair of front-panel meters let you monitor voltage and current.

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.

A front-panel fuse holder makes fuse replacement easy. Whisper quiet fan speed increases as load current increases -- keeps components cool. 9½Wx6Hx9¾D inches.

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Power two HF/VHF transceivers and six or more accessories from your 12 VDC power supply

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$74.95
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New!
MFJ-1117
$54.95

MFJ-1118, $74.95. This is MFJ's most versatile and highest current *Deluxe Multiple DC Power Outlet.* Lets you power two HF and/or VHF transceivers and six or more accessories from your transceiver's main 12 VDC supply.

Two pairs of super heavy duty 30 amp 5-way binding posts connect your transceivers. Each pair is fused and RF bypassed. Handles 35 Amps total.Six pairs of heavy duty, RF bypassed 5-way binding posts let you power your accessories. They handle 15 Amps total, are protected by a master fuse and have an ON/OFF switch with "ON" LED indicator.

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. 12½x2¾x2½ in.

MFJ-1116, $49.95. Similar to MFJ-1118. No 30 amp posts. Has "ON" LED and 0-25 VDC voltmeter. 15 amps total.

MFJ-1112, $34.95. Similar to MFJ-1116. No on/off switch, LED, meter, fuse.

NEW! MFJ-1117, $54.95. For powering four HF /VHF radios (two at 35 Amps each and two at 35 Amps combined) simultaneously. Tiny 8x2x3 inches.

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KO6JR/Contra Costa County, WA7IND/Napa County, K6HEW/Solano County, N6UOW/Training, W6CPO/Technical Services, KQ6TM/Section Plans and Administration. OOC: KD6FFN. STM: W6DOB. ACC: NJ6T. EB Web Page: http://www.pdarrl.org/ebsec/. Webmaster is KB6MP. Congrats to AC6DR for placing second in the 2002 Singlehanded Transpac race, and on serving as communications boat for the race. Congratulations to MDARC on begin designated a Special Service Club and to K6FSD, KG6KCC and KM6QX for assisting San Ramon Fire in locating a faulty transmitter that was jamming their emergency dispatch channel. CCCC mourns the loss of member K6DPQ. EBARC welcomes new member KG6HTY. ACSCT provided communications for a missing person search and the Alameda Run for the Parks. July tfc: W6DOB 552, AK6DV 131, WB6UZX 25, KE6QR 3. PSHR: W6DOB, AK6DV. BPL: W6DOB. Tfc nets: NCN1/3630/7PM; NCN2-SLOW SESSION/3705/9 PM; NCN-VHF/145.21/7:30PM; RN6/3655/7:45 PM & 9:30 PM; PAN/3651/7052/8:30 PM. Your check-ins are always welcome.

NEVADA: SM, Jan Welsh, NK7N—ASM: Dick, W6OLD. SEC: Dick Creley, KJ7UK. ACC: Melissa, KK7AA. DEC: KB7REO. STM: N7CPP. EC: AA5QJ. DEC: N7TOD. OOC: NU7T. EC: AC7EL.OES: N7JEH. Congratulate the two who switched around appointments by Matthew Parker, DEC-N7TOD to Washoe Cty. EC, and Paul Cavnar, who changed to DEC and also note he is now the RACES officer for Washoe Cty. Thanks guys. I attended the hamfest up in Reno, and sure enjoyed visiting with Dick Creley-NV SEC. Steve Lybarger-NU7T set up a luncheon with Matt Parker, N7TOD, and Pac. Dir. Jim Maxwell-W6CF and their wives, ASM-Dick and ACC-Melissa Flanagan and one other besides myself. Between the fires up in the Reno area and the Lost Cabin fire down here in Las Vegas area there have been dozens of amateurs helping out. The Clark County group have a section in the ARRL Letter noting AA5QJ- Charlie Kunz coordinating efforts and participation. The Siera, SNARS, Las Vegas Repeater Assoc, NNARS sent newsletters. Elko Amateur Radio Club is manning a Special Event Station at the Elko County Fair Aug.31st & Sept. 1st which should be fun. There's more but no more space. 73, Jan, NK7N, nk7njan@earthlink.net. Tfc: W7VPK 42, W7TC 33, N7CPP16, NV7YL 4, K7NHP 4.

PACIFIC: SM, Bob Schneider, AH6J—Written early Aug. As of January, this SM column will not be printed in QST. I will be posting it on http://www.arrl.org/sections/PAC.html. There will be additional information also. TC Dewey Proietti, NH6M, said Ted Leaf , KH6HI, and George Heloca, KH6ANA, did a nice setup at Kailua- Kona Hospital EOC. The Last meeting of BIARC was at Hilo Medical Center. Steve Palmer, RN (Hospital EOC) was the main speaker. BIARC supported the Volcano Rim Run July 27. Rep. Patsy Mink signed on as a cosponsor of HR-4720. There will be a Ham-fest October 12 in Keaau in which our Director Jim Maxwell will be speaking. ASM Warren Munro, KH6WM, reported he attended the last meetings of HARC and KARC and covered HR-4720. Ned, NH7JJ, reported the BMARC, KH6BB, (USS Missouri) participated in the Museum Ship Special Events operation on July 20/21 with 432 contacts. Their Web site is http://www.kh6bb.org/. Hawaii QSO party will be Aug 24/25. Go to http://www.pilikia.net/karc/hi_qso_party.html for more info. SGL Wayne Jones, NH6K, said there was a "Ham Radio day" on Saturday Aug 3, at the Honolulu Fire Dep't training Center near the Honolulu Airport. It was sponsored by the Civil Defense Amateur Radio Club and HFD. Jim Reid, KH7M, of Kauai has tended his resignation as ASM due to health problems. He will stay on as NM.

SACRAMENTO VALLEY: SM, Jettie Hill, W6RF— Here's a message from Jerry Boyd, K6BZ: By now, the ARRL has picked my replacement as Section Manager. My family and I, as I hinted several months ago in this column, are moving to Oregon. Hopefully, that move will be in the very near future. I want to thank all amateurs in the Section for their support during my tenure as Section Manager. It has been an honor to serve. I am particularly proud of the public service/emergency communications support amateurs in this Section have provided over the years. Keep it up, because the need will always be there. I wish my successor the very best. See you on the air. God Bless es 73 de K6BZ.

SAN FRANCISCO: SM, Len Gwinn, WA6KLK—ASM: KH6GJV. SEC: KE6EAQ. ASEC: KE6IAU. Del Norte County hams have been working with the Red Cross and county agencies during the Sour Bisquit/Florence fires. All members have been involved. KE7F has been the lead at the evacuation/shelter site. While evacuations have been few over 13 days as of this writing, much interaction and training has been done with other groups and agencies. This has proved to be GOOD training but scary because of the possibilities that could occur. Humboldt has had 16 plus people on standby as backup to Del Norte, Oregon, and the northern Sacramento Valley. Mendocino and Sonoma counties have also had people on alert. CW was used A *lot* by all groups during Field Day. FISTS activity is growing in the section. SSTV was used by a few and interesting contacts made. Some groups had CW operators working together to copy Field Day bulletins. Radio KPH has been active again and has shown up on the ham bands with West Marin operators. Bart Lee is now an EC in San Francisco, and giving us all valuable insight into major emergency communications. SFARC and the CATHAY Radio Club hosted VP6TC (ex VR6TC) who gave a great talk for a very interesting evening of entertainment and fun. Take the Basic ICS and the ARRL CCE Level I courses! Join ARES and OES/ACS to help your community by way of your hobby!

SAN JOAQUIN VALLEY: SM, Charles McConnell, W6DPD—ASM: K6YK. ACC: W6DPD. SEC: K6IN. OOC: N1VM. STM: K6RAU. PIC: W7WN. This report is being written in August Beginning with the January 2003, *QST*, the Section News Column will no longer be published there. You will be able to read the Section News on the SJV page of the ARRL web page or at the SJV page of the Pacific Division page, pdarrl.org. You may sign up for division and section bulletins on the ARRL members only Web page. You may also request the Section News be mailed to you from ARRL HQ. Details on this will be coming from ARRL HQ. Thanks to K6LFR for serving as EC for Madera County. Good job, Ken. W6RFR is the new EC for Madera County. New LGLs are N6QIY, N6EKE, and N6RDY. Congrats to W6PSQ and W6JPU on 60 years of ARRL membership. Ed Dervishian, W9VSU, became a Silent Key. He had been a member of the Turlock ARC since 1929.

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Reads complex impedance . . . Super easy-to-use

New MFJ-259B reads antenna SWR . . . Complex RF Impedance: Resistance(R) and Reactance(X) or Magnitude(Z) and Phase(degrees) . . . Coax cable loss(dB) . . . Coax cable length and Distance to fault . . . Return Loss . . . Reflection Coefficient . . . Inductance . . . Capacitance . . . Battery Voltage. LCD digital readout . . . covers 1.8-170 MHz . . . built-in frequency counter . . . side-by-side meters . . . Ni-Cad charger circuit . . . battery saver . . . low battery warning . . . smooth reduction drive tuning . . . and much more!

The world's most popular SWR analyzer just got incredibly better and gives you more value than ever!

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You can read Complex Impedance as series resistance and reactance (R+jX) or as magnitude (Z) and phase (degrees).

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You can read SWR, return loss and reflection coefficient at any frequency simultaneously at a single glance.

You can also read inductance in uH and capacitance in pF at RF frequencies.

Large easy-to-read two line LCD screen and side-by-side meters clearly display your information.

It has built-in frequency counter, Ni-Cad charger circuit, battery saver, low battery warning and smooth reduction drive tuning.

Super easy to use! Just set the bandswitch and tune the dial -- just like your transceiver. SWR and Complex Impedance are displayed instantly!

Here's what you can do

Find your antenna's true resonant frequency. Trim dipoles and verticals.

Adjust your Yagi, quad, loop and other antennas, change antenna spacing and height and watch SWR, resistance and reactance change instantly. You'll know exactly what to do by simply watching the display.

Perfectly tune critical HF mobile antennas in seconds for super DX -- without subjecting your transceiver to high SWR.

Measure your antenna's 2:1 SWR bandwidth on one band, or analyze multiband performance over the entire spectrum 1.8-170 MHz!

Check SWR outside the ham bands without violating FCC rules.

Take the guesswork out of building and adjusting matching networks and baluns.

Accurately measure distance to a short or open in a failed coax. Measure length of a roll of coax, coax loss, velocity factor and impedance.

Measure inductance and capacitance. Troubleshoot and measure resonant frequency and approximate Q of traps, stubs, transmission lines, RF chokes, tuned circuits and baluns.

Adjust your antenna tuner for a perfect 1:1 match without creating QRM.

And this is only the beginning! The MFJ-259B is a complete ham radio test station including -- frequency counter, RF signal generator, *SWR Analyzer*™, RF Resistance and Reactance Analyzer, Coax Analyzer, Capacitance and Inductance Meter and much more!

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MFJ's comprehensive instruction manual is packed with useful applications -- all explained in simple language you can understand.

Take it anywhere

Fully portable, take it anywhere -- remote sites, up towers, on DX-peditions. It uses 10 AA or Ni-Cad batteries (not included) or 110 VAC with MFJ-1312D, $14.95. Its rugged all metal cabinet is a compact 4x2x6¾ inches.

How good is the MFJ-259B?

MFJ *SWR Analyzers*™ work so good, many antenna manufacturers use them in their lab and on the production line -- saving thousands of dollars in instrumentation costs! Used worldwide by professionals everywhere.

More MFJ SWR Analyzers™

MFJ-249B, $229.95. Like MFJ-259B, but reads SWR, true impedance magnitude and frequency only on LCD. No meters.

MFJ-209, $139.95. Like MFJ-249B but reads SWR only on meter and has no LCD or frequency counter.

MFJ-219B, $99.95. UHF *SWR Analyzer*™ covers 420-450 MHz. Jack for external frequency counter. 7½x2½ x2¼ inches. Use two 9 volt batteries or 110 VAC with MFJ-1312D, $14.95. *Free* "N" to SO-239 adapter.

SWR Analyzer Accessories

Dip Meter Adapter

MFJ-66, $19.95. Plug a dip meter coupling coil into your MFJ *SWR Analyzer*™ and turn it into a sensitive and accurate bandswitched dip meter. Save time and take the guesswork out of winding coils and determining resonant frequency of tuned circuits and Q of coils. Set of two coils cover 1.8-170 MHz depending on your *SWR Analyzer*™.

Genuine MFJ Carrying Case

MFJ-29C, $24.95. Tote your MFJ-259B anywhere with this *genuine* MFJ custom carrying case. Has back pocket with security cover for carrying dip coils, adaptors and accessories.

Made of special foam-filled fabric, the MFJ-29C cushions blows, deflects scrapes, and protects knobs, meters and displays from harm.

Wear it around your waist, over your shoulder, or clip it onto the tower while you work -- the fully-adjustable webbed-fabric carrying strap has snap hooks on both ends.

Has clear protective window for frequency display and cutouts for knobs and connectors so you can use your MFJ *SWR Analyzer*™ without taking it out of your case. *Look for the MFJ logo for genuine authenticity!*

MFJ-99, $54.85. Accessory Package for MFJ-259/B/249/B/209. Includes *genuine* MFJ-29C carrying case, MFJ-66 dip meter adapter, MFJ-1312D 110Vac adapter. ***Save $5!***

New! ***Tunable Measurement Filter™***

MFJ-731, $89.95. *Exclusive* MFJ tunable RF filter allows accurate SWR and impedance measurements 1.8 to 30 MHz in presence of strong RF fields. Has virtually no effect on measurements. Works with all SWR Analyzers.

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Measure signal strength over 60 dB range, check and set FM deviation, measure antenna gain, beamwidth, front-to-back ratio, sidelobes, feedline loss in dB. Plot field strength patterns, position antennas, measure preamp gain, detect feedline faults, track down hidden transmitters, tune transmitters and filters. Plug in scope to analyze modulation wave forms, measure audio distortion, noise and instantaneous peak deviation. Covers 143.5 to 148.5 MHz. Headphone jack, battery check function. Uses 9V battery. 4x2½x6¾ in.

More hams use MFJ SWR Analyzers™ than any others in the world!

Officers of T.C.A.R.E.S are Pres K6YV, VP KG6FEY, Sec KE6RGP and Treas WA7MOB and KA6VFO. The business meeting is the 1st Tuesday at 6 PM at Your Own Place restaurant in Sonora. The breakfast social is the 3rd Saturday at 9 AM at the Pine Tree restaurant in Sonora. The club Web page is located at http://www.lodelink.com/tcares. Officers of the Central Cal DX Club are Pres W6PSQ, 1st VP KN6YD, 2nd VP W6FRH, S/T W6DPD. Email the club at w6mel@arrl.net. The club meets at Apple Annies in Tulare CA at 11 AM. Contact the club for meeting dates. Pacificon is October 18-20 at the Sheraton Inn of Concord CA. Check the Web page, pacificon.org for information. Tfc: WA2MSU 16, KB6QIB 29.

SANTA CLARA VALLEY: SM, Glenn Thomas, WB6W—OOC: Mitchell E. Lee, KB6FPW. PIC: Alan L. Zeichick, K6ALZ. SEC: Don Carlson, KQ6FM. TC: Kit Blanke, WA6PWW. For news around the Section, check the ARRL SCV Section Web Page on the ARRL Web: http://www.arrl.org/sections/SCV.html

ROANOKE DIVISION

NORTH CAROLINA: SM, John Covington, W4CC — SEC: KE4JHJ. STM: N0SU. BM: KD4YTU. TC: K4ITL. PIC: KN4AQ. OOC: W4ZRA. SGL: AB4W. ACC: vacant. http://www.ncarrl.org. As you may have heard, December *QST* will be the last issue with Section News. I am looking into several possibilities for electronic distribution after that time. I am leaning toward using a monthly plain text e-mail distribution using the Division and Section Bulletins feature that you can subscribe to on the ARRLWeb Members Only page. I'll also make it available on the Web for the benefit of those that do not receive e-mail. I have found through experience with other newsletters that most people prefer some prompting that news is available rather than having to repeatedly check the Web site to see if it is ready. When a final decision has been made on the scheduling and distribution mechanisms, I will report it in this column. Congratulations to the Cary Amateur Radio Club on receiving a Charter of Affiliation recognizing 25 years of continuous ARRL affiliation. I presented this charter to club President Ed Stephenson, AB4S at the Cary Swapfest. Hams in the southeastern corner of the state, which seems to be a magnet for hurricanes, have been working hard on something real exciting. Fourteen amateur operators, including nine ARES ECs, met with three hospital officials from the Coastal Carolinas Health Alliance (CCHA) at the Columbus County Hospital in Whiteville on July 24th to design an emergency ham radio network to support 10 hospitals in that area. More information about this meeting is on our ncarrl Web page. Thanks to all involved for their hard work. I expect to be at the Maysville hamfest on Sunday, October 13. Hope to see you there. July traffic: W4EAT 553 (BPL), K4IWW 235, AA4YW 155, K4RLD 128, W4IRE 83, KE4JHJ 62, W3HL 62, AD4XV 45, W4CC 43, KG4OQA 41, N0SU 39, KE4AHC 39, KI4YV 33, WD4LSS 27, N4TAB 26, W4FAL 24, WA4SRD 21, W4EHF 16, WA2EDN 12, KR4OE 10, N4NTO 8, NT4K 7, KB8VCZ 6. May traffic: WD4LSS 10.

SOUTH CAROLINA: SM, Patricia Hensley, N4ROS —STM: KA4LRM. SGL: K4AJJ. SEC: K8AFP. TC: N4UFP. PIC: K2XN. ACC: AE4BX. OOC: N4ENX. The cohesiveness of any ARRL section can be affected by the state's geography and distribution of its membership. Unlike many larger states whose size hinders travel and radio communication, SC is very centralized. This close physical and electronic proximity encourages direct input and feedback from the membership. One of the main goals of the weekly SM report has been to provide a platform for the timely exchange of information gathered from throughout the state. Many of you will have received this issue within several days of the remembrance of one of the most infamous dates in U. S. history: September 11, 2001. Even today, each of you can easily recall when you became aware of this incident. You will probably never forget this event due to its emotional impact. Yet, at the same time, we South Carolinians must feel a tremendous pride for the actions of the public service employees and volunteers who put assistance for others before their own well-being. They were able to do this because of their prior training, teamwork, and unified spirit. Our SC amateurs will exhibit these same attributes when they are called upon for aid. Tfc: AF4QZ 124, KA4LRM 80, KA4UIV 67, KF4HAV 27, N4VVX 26, K4JIF/WD4BUH 6. PSHR N4VVX 126, KA4LRM/KA4UIV 100, AF4QZ 90.

VIRGINIA: SM, Carl Clements, W4CAC—ASM: W4PW. SEC: N4NW. STM: W3BBBQ. PIC: W4PW. ACC: W4IM. OOC: W4NEZ. TC: KD3PC. Web page; www.arrlva.org. The Virginia Beach Hamfest (www.vahamfest.com) was held on a new date and at a new location this year. The hamfest was at Pembroke Mall on the 28th and 29th of September. As in years past, the hamfest also hosted the Roanoke Division Convention. There was a lot of excitement by vendors and hams alike prior to the show, and I hope that you went and experienced this excitement. The spring of 2002 saw the beginning of a new Amateur Radio group in the New River Valley area of Virginia. The first meeting of the New River Wireless Association was held in Christiansburg, Virginia on April 14th. President Mike Knight, KC4Q, spearheaded the club's organization. Other officers are Roger Kirtner, KG4RTH, Vice President, Melissa Howery, KE4UUF, Secretary, and Ted von Dameck, KB5YY, Treasurer. Starting with a present active membership of about a dozen amateurs, the club is looking forward to offering hams in a several country area of Southwest Virginia a variety of opportunities and benefits in the ham radio hobby. As many of you have heard, there will only be two more months of Section News published in *QST*. However, we have a Section News web page for the Virginia Section (www.arrl.org/sections/VA.html). I have been updating this page on a routine basis, sometimes even weekly. This page will give us more flexibility to include more of the happenings in the section. There will be room for announcements by clubs or groups in the section of special events, formation of new clubs, recognition of activities, recognition of achievements, and more. Please be sure to provide the information to me that you would like to see posted on the page. Also be sure to look at Pat Wilson's Virginia Section web page at www.arrlva.org. Remember, YOU are the ARRL. 73 de Carl, W4CAC. Nets/QNI/QTC/NM; VTN/28/0/W3BBQ; VSBN/269/129/W3BBQ; VNE(CW)/155/24/WA4DOX; VSN(CW)/33/29/WA4DOX; NVTN/634/126/

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MFJ uses super heavy duty components to make the world's finest legal limit tuner

MFJ uses super heavy duty components -- roller inductor, variable capacitors, antenna switch and balun -- to build the world's most popular high power antenna tuner.

The rugged world famous MFJ-989C handles 3 KW PEP SSB amplifier input power (1500 Watts PEP SSB output power). Covers 1.8 to 30 MHz, including MARS and WARC bands.

MFJ's *AirCore*™ roller inductor, new *gear-driven* turns counter and weighted spinner knob gives you exact inductance control for absolute minimum SWR.

You can match dipoles, verticals, inverted vees, random wires, beams, mobile whips, shortwave -- nearly any antenna. Use coax, random wire or balanced lines.

MFJ-989C **$359.95**

You get everything you've ever wanted in a high power, full featured antenna tuner -- widest matching range, lighted Cross-Needle SWR/Wattmeter, massive transmitting variable capacitors, ceramic antenna switch, built-in dummy load, *TrueCurrent*™ Balun, *scratch-proof* Lexan front panel -- all in a sleek compact cabinet (10¾Wx4½Hx15D in).

MFJ AirCore™ Roller Inductor gives high-Q, low loss, high efficiency and high power handling.

MFJ's exclusive *Self-Resonance Killer*™ keeps damaging self-resonances away from your operating frequency.

Large, self-cleaning wiping contact gives good low-resistance connection. Solid 1/4 inch brass shaft, self-align bearings give smooth non-binding rotation.

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MFJ will repair or replace your MFJ-989C (at our option) *no matter what* for one year.

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

MFJ-986 Two knob *Differential-T*™

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Two knob tuning (differential capacitor and *AirCore*™ roller inductor) makes tuning foolproof and easier than ever. Gives minimum SWR at only one setting. Handles 3 KW PEP SSB amplifier input power (1.5 KW output). Gear-driven turns counter, lighted peak/average Cross-Needle SWR/Wattmeter, antenna switch, balun. 1.8 to 30 MHz. 10¾Wx4½Hx15 in.

MFJ-962D *compact* Tuner for Amps

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A few more dollars steps you up to a KW tuner for an amp later. Handles 1.5 KW PEP SSB amplifier input power (800W output). Ideal for Ameritron's AL-811H! *AirCore*™ roller inductor, gear-driven turns counter, pk/avg lighted Cross-Needle SWR/Wattmeter, antenna switch, balun, Lexan front, 1.8-30MHz. 10¾x4½x10⅞ in.

MFJ-969 300W *Roller Inductor* Tuner

MFJ-969 **$199.95**

Superb *AirCore*™ Roller Inductor tuning. Covers *6 Meters* thru 160 Meters! 300 Watts PEP SSB. *Active* true peak reading lighted Cross-Needle SWR Wattmeter, *QRM-Free PreTune*™, antenna switch, dummy load, 4:1 balun, Lexan front panel. 3½Hx10½Wx9½D inches.

MFJ-949E *deluxe* 300 Watt Tuner

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More hams use MFJ-949s than any other antenna tuner in the world! Handles 300 Watts. Full 1.8 to 30 MHz coverage, custom inductor switch, 1000 Volt tuning capacitors, *full size* peak/average lighted Cross-Needle SWR/Wattmeter, 8 position antenna switch, dummy load, *QRM-Free PreTune*™, scratch proof Lexan front panel. 3½Hx10⅝Wx7D inches. **MFJ-948, $129.95.** Economy version of MFJ-949E, less dummy load, Lexan front panel.

MFJ-941E *super value* Tuner

MFJ-941E **$119.95**

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

MFJ-945E HF+6 Meter *mobile* Tuner

MFJ-945E **$109.95**

Extends your mobile antenna bandwidth so you don't have to stop, go outside and adjust your antenna. Tiny 8x2x6 in. *Lighted* Cross-Needle SWR/Wattmeter. Lamp and bypass switches. Covers 1.8-30 MHz *and* 6 Meters. 300 Watts PEP. **MFJ-20, $4.95,** mobile mount.

MFJ-971 *portable/QRP* Tuner

MFJ-971 **$99.95**

Tunes coax, balanced lines, random wire 1.8-30 MHz. Cross-Needle Meter. SWR, 30/300 or 6 Watt QRP ranges. Matches popular MFJ transceivers. Tiny 6x6½x2½ inches.

MFJ-901B *smallest* Versa Tuner

MFJ-901B **$79.95**

MFJ's smallest (5x2x6 in.) and most affordable wide range 200 Watt PEP Versa tuner. Covers 1.8 to 30 MHz. Great for matching solid state rigs to linear amps.

MFJ-16010 *random* wire Tuner

MFJ-16010 **$49.95**

Operate all bands anywhere with MFJ's reversible L-network. Turns random wire into powerful transmitting antenna. 1.8-30 MHz. 200 Watts PEP. Tiny 2x3x4 in.

MFJ-906/903 *6 Meter* Tuners

MFJ-906 **$79.95**

MFJ-906 has lighted Cross-Needle SWR/Wattmeter, bypass switch. Handles 100 W FM, 200W SSB. **MFJ-903, $49.95**, Like MFJ-906, less SWR/Wattmeter, bypass switch.

MFJ-921/924 *VHF/UHF* Tuners

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MFJ-921 covers 2 Meters/220 MHz. **MFJ-924** covers 440 MHz. SWR/Wattmeter. 8x2½x3 inches. Simple 2-knob tuning for mobile or base.

MFJ-922 144/440 MHz Tuner

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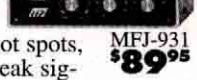
Ultra tiny 4x2½x1¼ inch tuner covers VHF 136-175 MHz and UHF 420-460 MHz. SWR/Wattmeter reads 60/150 Watts.

MFJ-931 *artificial* RF Ground



MFJ-931 **$89.95**

Creates artificial RF ground. Also electrically places a far away RF ground directly at your rig by tuning out reactance of connecting wire. Eliminates RF hot spots, RF feedback, TVI/RFI, weak signals caused by poor RF grounding. **MFJ-934, $169.95**, Artificial ground/300 Watt Tuner/Cross-Needle SWR/Wattmeter.

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KB8TNU/N8LE; VNL (CW)/131/72/WA4DOX; VLN/208/130/K0IBS; PARES/32/15/K5SFM. Tfc: W3BBQ 501, WA4DOX 192, KG4OTL 153, K4YVX 116/99, N4ABM 78, KU4MF 73, K0IBS 67, KV4AN 59, K3SS 58, K4DND 52, AA4AT 50, W4VLL 29, W3FDT 24, WB4UHC 21, KB4CAU 15, K5SFM 16, W4YE 11, W4JLS 6, WB4KQG 5, K4JM 3, W4MWC 2, N4FNT 2.

WEST VIRGINIA: SM, Hal Turley, KC8FS— ASM: W8YS. ASM: KB8NDS. SEC: W8XF. STM: KC8CON. OOC: W8DL. PIC: N8TMW. TC: W8DL. October brings the annual Simulated Emergency Test (SET), a great opportunity for statewide participation of our ARES/RACES organizations testing skills in emergency communications, working with NTS and local response agencies. In an attempt to stimulate participation levels in WV, as announced at the ARES forum at the Mill, a plaque will be presented to the ARES group that attains the highest recorded WV score in the SET. The award is offered in memory of Cal Basham, W8NR who tirelessly served WV ARES during numerous times of actual emergencies and disasters. Congrats to Don Lemley, W8DL for successfully completing all 3-levels of the EC Course offered on-line by the ARRL- FB Don! Also want to recognize Dave, WA8KAN for receiving his DXCC Award #38155. Always glad to hear from "new" Dxers Dave! 73 de Hal. Tfc (July) KA8WNO 228, W8YS 125, N8NMA 72, WW8D 55, KC8CON 54, W8WWF 30, N8FXH 20. PSHR: W8YS 120, KC8CON 109, N8NMA 105, WW8D 100, KA8WNO 90, N8FXH 75. WVMDN 542/37/391 WW8D; WVN(E) 103/43/272 N8NMA; WVN(L) 103/42/212 N8NMA; WVFN 769/110/752 KC8CON; MSEN 46/10/55 N8TMW.

ROCKY MOUNTAIN DIVISION

COLORADO: SM, Jeff Ryan, K0RM— ASM: Tim Armagost, WB0TUB. ASM: Jerry VerDuft, AD0A. SEC: Mike Morgan, N5LPZ. STM: Mike Stansberry, K0TER. ACC: Ron Deutsch, NK0P. OOC: Karen Schultz, KA0CDN & Glenn Schultz, W0IJR. SGL: Mark Baker, KG0PA. TC: Bob Armstrong, AE0B. BM: Jerry Cassidy, N0MYY. PIC: Cheryl Muhr, N0WBV. Cheryl Muhr, N0WBV, has accepted my appointment as Public Information Coordinator succeeding Erik Dyce, W0ERX. Thanks to Cheryl for volunteering and please welcome and support her as she begins this important task. Did you know that amateur radio antennas are not allowed in over 95% of all new homes in Colorado? You can help improve amateur radio in Colorado and in the US. Our State Government Liaison Mark Baker, KG0PA is organizing a political action committee at the state level to keep our legislators aware of amateur radio issues. Contact him if your club or organization is interested in a 'fire and brimstone' presentation. Better yet, contact him if you are interested in giving your state and your nation the help they need and deserve by volunteering to work on this most important committee. His email is eastbakers@juno.com. The ARRL Board of Directors has voted 9 to 6 in favor of removing this column from *QST*. My last column for print will be in December's issue. Starting in January, 2003, you will find Section News and information on the ARRL Web page at www.arrl.org/sections. XYL Gloria, N0ZFX and I had a fabulous time at the Utah Hamfest in Bryce, UT. As usual, a nice Colorado contingent included ASMs Tim WB0TUB and Jerry AD0A and CCARC Chair Bud, K0GS. 73, de K0RM. NTS Traffic: WB0TAQ 477, AD0A 133, W0ZZS 73, K0TER 36, N0BN 20. CAWN: W0WPD 1054, W0GGP 535, K4ARM 532, K0HBZ 460, W0LVI 416, AB0PG 339, N3XT 279, W0NCD 269, AA0ZR 255, WB0TYT 240, WB0VET 211, N0FCR 207, WD0CKP 183.

NEW MEXICO: SM, Joe T. Knight, W5PDY –ASM: K5BIS, N5ART & KM5FT. SEC: W5YEJ. STM: N7IOM. NMs: WA5UNO & W5UWY, TC: W8GY. ACC: N5ART. The Flagstaff (Ft. Tuthill) Hamfest on July 26-28th was certainly nice, but down in attendance due to the AZ Fires, and the uncertainty as to whether the Campgrounds would be open. Many AZ, NM, CO, CA, & TX Hams were present to enjoy the cool temperatures and good food in Flagstaff. KC5NZR from ABQ won an MFJ-269 Antenna Analyzer, which was one of the main prizes. Of course our famous "Ole Vern," W5CSY, won the prize for the oldest Ham present (92 years young and still going!). Excellent Newsletters from around the State which I will try to acknowledge later. The Duke City Hamfest (NM State ARRL Convention) is still scheduled for the afternoon of August 23rd & on August 24th with Special Event Station N5M to be in operation. A Banquet will be held on Saturday Evening August 24th. W0CP, N1RL, K0RM, and perhaps other ARRL Officials plan to be present. For details please see "qsl.net/dchf/." The Alamogordo Hamfest is scheduled for August 31st with a Banquet that evening. The Socorro Hamfest is to be held October 26th with details to follow. So sorry to report the untimely passing of W5RWC. Still don't know the details of just what happened, but Bob will certainly be missed. Best 73,W5PDY.

UTAH: SM, Mel Parkes, AC7CP—ASM: William Moyes, N7IE. ACC: Gary Roberts, AG1T. BM: Dallas Barrett, W7MEL. PIC: Lonnie Stuart, WM7E. SEC: John Mabey, W7CWK. STM: James Brown, NA7G. TC: Ron Jones, K7RJ.

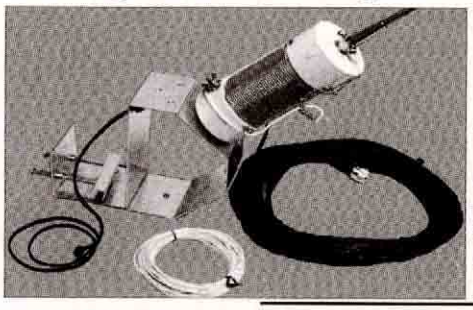
WYOMING: SM, Bob Williams, N7LKH—Wyoming was well represented at the Glacier-Waterton International Hamfest/Montana State Convention in July. Wyoming attendees were, besides ourselves (N7LKH & KF7MC), Jay, W7CW and Laura, N7VWV, Ostrem; Lee, K7MBJ, and Emmy Fouts; John, W7CA, and Bunny Hall; Dave, W7QNS and Carrol, N7YGM, Johnson; Lynn, K7IKO and Gail, KB7YRG, Knapp; Bill, WU7Y and Lee Edwards; and Tim, AB7BJ, and Sandi, K7SAN, Bachmeier. The weather was just about perfect, and a great time was had by all. Overlapping the International Hamfest was the Tour de Wyoming bicycle ride, covering a loop from Worland, to Greybull, to Dayton, to Buffalo, Century Ride (100 mi.) to Kaycee and back to Buffalo, to Tensleep, to Worland, for a total distance of about 400 miles over 6 days. Communications support activities were coordinated by Burt Bower, KC7ZTS, with assistance from Jerry Pyle (WB7S), Duane (KB7PX) and Lori Loucks, and ourselves. No significant events were reported, although we all had to pitch in to haul several riders off the mountain when the weather turned hazardous one afternoon. Tfc: NN7H 258. PSHR: NN7H 159.

SOUTHEASTERN DIVISION

ALABAMA: SM, Bill Cleveland KR4TZ – ASMs: W4XI,

MFJ *Apartment* Antenna

Covers 40 thru 2 Meters . . . Mounts outdoor to windows, balconies, railings . . . works great indoors mounted to desks, tables, bookshelves



MFJ-1622 **$99.95** *New!*

New MFJ-1622 Apartment Antenna lets you operate 40 thru 10 Meters on HF and 6 and 2 Meters on VHF with a single antenna!

Its universal mount/clamp lets you easily attach it to window frames, balconies and railings. It also works great indoors mounted to a bookshelf, desk, or table. It's not a 5 element yagi, but you'll work your share of exciting DX!

Highly efficient air wound "bug catcher" loading coil and telescoping 5½ foot radiator lets you really get out! Radiator collapses to 2½ feet for easy storage and carrying.

It includes coax RF choke balun, coax feed line, counterpoise wire and safety rope. Handles 200 Watts PEP.

Operating frequency is adjusted by moving the "wander lead" on coil and adjusting counterpoise for best SWR.

MFJ Ground-Coupled Portable Antenna Base

Provides effective RF ground and stable mount for vertical antennas . . . Antennas radiate well with low SWR

MFJ-1904 **$99.95** *New!*

MFJ *Ground-Coupled Portable Antenna Base*™ provides an *effective* RF ground 160 through 2 Meters and a stable mount for vertical antennas.

Capacitive coupling to ground is a *time-proven* principle. It needs no tuning and antenna radiates well and gives good SWR on all bands. Performance is similar to mobile stations when using a mobile antenna but is far better with longer antennas.

The base can support a lightweight multiband vertical antenna -- like the all band Hy-Gain 18AVS and the bandswitching MFJ-1795 -- and provide a semi or permanent installation.

You can easily set up and take down vertical antennas for stealth operation and hide the base by covering it with dirt.

The MFJ-1904 is a 2x2 foot *stainless steel* square with reinforcing bends that greatly strengthens it. Folded and tapered six-inch *stainless steel* legs firmly anchor the MFJ-1904 into the ground.

Built-in antenna mount with SO-239 coax connector and two U-bolts lets you mount most standard and homebrew vertical antennas.

Standard 3/8-inch x 24 mobile mount is built-in for MFJ Mobile Whips, bug catchers, *Hustlers* and screwdriver antennas.

Two handles make carrying and removing the base fast and easy. You can also attach radials for improved performance.

33 Feet Telescoping fiberglass Mast . . .

Collapses to 3.8 feet, weighs 3.3 lbs.

Super strong fiberglass mast has huge 1¾ inch bottom section. Flexes to resist breaking. Resists UV. Put up *full size* inverted Vee dipole/vertical antenna in minutes and get *full size performance!*

MFJ-1910 **$79.95**

MFJ Vertical

for Antenna Restricted Areas

40, 20, 15, 10 Meters, Automatic Band Switching

Perfect for permanent or portable operation in antenna restricted areas. Hide behind trees, fences, buildings, *in* bushes -- only 7 to 10 feet tall (adjustable).

MFJ-1795 **$149.95** *New!*

Low angle of radiation for DXing, omni-directional, handles 1500 watts PEP, low SWR.

Highly efficient end-loading. Entire length radiates.

Ground mounts with suitable ground such as MFJ-1904 *Ground-Coupled Antenna Base*, radials or ground rods. Or roof mount with radials.

HF mini-Bugcatcher

Highly efficient 40 - 6 Meter base-loaded 5½ foot Bugcatcher mobile antenna . . . Use light duty mounts

Become an *"HF Mobileer"* almost instantly with this *new* MFJ high-efficiency *mini-bugcatcher* mobile antenna! Have tons of fun rag-chewing and DXing on the HF bands. Turn boring drives into fun-filled ham adventures.

MFJ-1624 **$79.95** *New!*

Attach a simple mount to your vehicle (*mounts*: trunk lip, MFJ-347, $39.95; mirror or luggage, MFJ-342, $9.95; tri-magnet, MFJ-338T, $19.95) . . . **Screw** in your MFJ *mini-bugcatcher* . . . **Throw** your rig into your car, plug into cigarette lighter and turn power down to 20 Watts (to avoid overloading your cigarette lighter; MFJ-1624 handles 300 Watts PEP). **Operate!**

Bugcatcher design uses large highly-efficient *air-wound* inductor -- far out performs other compact HF antennas. *Exclusive* built-in inductive matching network keeps SWR low. 5½ foot whip collapses to 2½ feet for easy storage and low garages. Base loaded for minimum wind load and light duty mounts. Change band by moving *wander lead*. 3/8x24 in. mount.

MFJ Portable Antenna

MFJ-1621 **$89.95**

Operate from apartments, homes, hotels, campsites, beaches or any antenna restricted area. Work all bands 40, 30, 20, 17, 15, 12 and 10 Meters.

DXCC, WAZ, WAC, WAS have been won with the MFJ-1621! Compact 6x3x6 inch cabinet has 4½ foot telescoping whip, built-in antenna tuner, field strength meter and 50 feet coax. Handles 200 Watts.

MFJ Super High-Q Loop

MFJ-1786 **$379.95**

MFJ's *tiny* 36 inch diameter *high-efficiency* loop antenna performs like a *full-size* dipole! Operate 10 thru 30 MHz *continuously* -- including WARC bands!

Ideal for limited space -- apartments, small lots, motor homes, attics or mobile homes.

Mounts vertically or horizontally. Low angle radiation gives you excellent DX.

Super easy-to-use! Remote control auto-tunes to desired band, then beeps. No control cable needed. Handles 150 watts.

Fast/slow tune buttons and built-in two range Cross-Needle SWR/Wattmeter lets you quickly tune to your exact frequency.

All welded construction, no mechanical joints, welded butterfly capacitor with no rotating contacts, large 1.050 inch diameter round radiator -- *gives you highest possible efficiency*. Heavy duty thick ABS plastic housing has ultraviolet inhibitor protection.

Free MFJ Catalog

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

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

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FAX:(662)323-6551 8-4:30 CST, Mon.-Fri. ***Add shipping.***

http://www.mfjenterprises.com for instruction manuals, catalog, info

KB4KOY. SGL: KU4PY. ACC: KV4CX. TC: W4OZK. Scouts Jamboree on the Air (JOTA) is held on the third weekend in October, which is October 19 & 20 this year. Our goal this year is to have all the counties with active clubs and ARES groups to participate with at least one Boy or Girl Scout troop this year. Please contact your local scout organization, and see if your club can help them participate. To find your local Boy Scout Council visit their Web site at www.scouting.org/councils/index.html. To find your local Girl Scout Council visit their Web site at www.girlscouts.org. For more information about JOTA please visit the ARRL-JOTA Web site at www.arrl.org/ead/jota.html. The Section News Column is being eliminated from *QST* starting with the January 2003 issue. Even though the section news is no longer in *QST*, it will still be available on the Web via ARRL.ORG and via EMAIL. Starting last August, I have been sending an email version of the Alabama Section News. If you have not received any of these emails, please check your member settings in the ARRL.ORG members only section and make sure you check the box stating you want section updates emailed to you. Don't forget Halloween is at the end of the month, so be careful while driving. Please be safe. God Bless & 73, Bill Cleveland, KR4TZ, AL/SM. Tfc: AC4CS 382, WB4GM 112, W4CKS 77, W4PIM 66, W4ZJY 45, KD4CQJ 35, W4QAT 29, W4DGH 29, W4NTI 16.

GEORGIA: SM, Susan Swiderski, AF4FO— ASM/South GA: Marshall Thigpen, W4IS; ASM/Legal: Jim Altman, W4UCK; ASM/Web and SEC: Mike Boatright, KO4WX; STM: Jim Hanna, AF4NS; SGL: Charles Griffin, WB4UVW; BM: Eddy Kosobucki, K4JNL; ACC: Mary Ahls, W4NZJ; OOC: Mike Swiderski, K4HBI; TC: Fred Runkle, K4KAZ; PIC: Matt Cook, KG4CAA. State Website: www.qsl.net/arrl-ga. It was so hot this summer that it took two months for the fresh tar on my neighbor's roof to set. (There's a whole army of startled squirrels stuck up there in perpetuity!) After enduring all of that heat, you may not believe me, but the number one reason for declared disasters in the balmy state of Georgia is.... ICE STORMS! Strange, but true. Keep those HT batteries charged, and please, get involved with your local ARES group, because you never know when your community may need your help. Unfortunately, emergencies never occur at our "convenience", but it sure improves the situation if we're prepared to respond rather than merely react. For more info on ARES: www.qsl.net/gaares. Along those same lines, congratulations to some newly appointed ECs: Tom Rouch, W8JI, Lamar; Sykes Taylor, K4MST, Butts; Craig Gagner, W1MED, Effingham; and Lane Pierce, KD5LDU, Clayton/Henry. Thanks, guys, for your willingness to serve. Congrats, also, to 50-year ARRL members John Bunting, W4NET, and Claude Pennington, W4PN, who both received beautiful plaques from the League to mark this impressive milestone. Upcoming events: October 12: Augusta hamfest (talk-in 145.490-) and October 19: NW GA hamfest at the Rome Civic Center (146.895+) Members of the Lanierland ARC will be running Special Event station W4M those same two weekends: from the 11th-13th, for Gainesville's annual Mule Camp Festival, and from the 18th-20th, for the GA Special Olympics. On a sad note, I'm sorry to report that Dean Matthews, AD4OD, recently became an SK. Condolences to his family and many friends. "Man must not allow the clock and the calendar to blind him to the fact that each moment of his life is a miracle and a mystery." H.G.Welles. Hope your miracles are many. Until next time, this is AF4FO, signing clear. Take care of yourselves. And each other. 73, Susan. July QTC: WB4GGS 198, W4WXA 178, AF4NS 75, K4BEH 71, K4BB 55, WB4BIK 36, K1FP 27.

NORTHERN FLORIDA: SM: Rudy Hubbard, WA4PUP— It's a fact, the *QST* will discontinue the Section Activity Column, and the last time for writing will be October, which will be in the Dec issue. The ARRL Headquarters will continue to provide a Web page for each Section. It is my desire and plan to develop a web for Northern Florida Section. To this end, I need the help of each Club, Staff, and in particular anyone having the talent to put things into words. I have appointed a Webmaster (info will be forthcoming as to how to contact the Webmaster and or myself) for the express purpose of trying to get information out to all amateurs. This is where clubs come into assisting. The Webmaster will forward you information for inclusion in your newsletters, (that is if you desire), but your url, email or whatever it takes to get it to you. In turn, you need to send data to the Section Web page. Some of the clubs send newsletters to me, and it is greatly appreciated, but I know there are others that do not. Another means will use the ARRL to send info our to all amateurs having an arrl.net email address. So, if you do now have one, please request one from the Hdqrs. The most important thing at this time, PLEASE contact your Representative to support the HR4720 legislation. Some of the Legislators (including mine) do not want to support it as it is tampering on the Homeowners Assoc Rules, as the amateur radio is "only a hobby." Rest assured, I will continue be in touch with him with both letters and in person. With all this said, will you send me email as to your views and your desire to assist in distributing info the all amateurs, and in particular whether or not the clubs desires to participate. Your url and email addresses are needed. Thanks, and I am sure with your help, we can keep info available to all amateurs. de 73 Rudy. Tfc: WX4H 1039, NR2F 176, N9MN 123, WB2FGL 110, WD4GDB 89, K1JPG 85, KE4DNO 60, KF4AAF 46, W4KIX 41, W8IM 30, WX4J 27, KJ4HS 19, KF4WIJ 16, AD4GL 18, AB4PG 8, K4KAM 5, WD4ILF 5, WD4NFG 5, WB2IMO 3.

PUERTO RICO: SM, Víctor Madera, KP4PQ – Ahora necesitamos voluntarios para completar la Organización de Campo para Puerto Rico. La Junta de Directores del ARRL ya decidió eliminar el "Section News" de las páginas del *QST*. Seguiremos llevando a toda la comunidad de radioaficionados las noticias vía el Internet. Gracias a la FRA y KP4AWX junto a WP4MJP por la ayuda para entrenar a mas de 50 miembros de la Guardia Nacional en Mayagüez para obtener sus licencias. La FRA celebró su hamfest en Coamo con la asistencia de mas de 300 radioaficionados y familiares. El PRARL celebró el Lighthouse Weekend desde el Faro de la Isla de Vieques. Siguen los talleres de capacitación. Pronto se cubrirán los temas de antenas, PSK-31, fuentes de poder, QRP y otros. Nuestro pésame por la perdida de don Pedro Fullana-KP4AAN (SK). Felicitamos a KP4AWX por su up-grade a Extra y la licencia de Technician que obtuvo su nieto. Visita http://prarl.org/secmgr.html para más noticias.

MFJ *Speech Intelligibility* Enhancer

. . . makes barely understandable speech highly understandable!

MFJ-616
$169.95

"What did you say?" Can you hear but . . . just can't always understand everything people are saying?

As we get older, high frequency hearing loss reduces our ability to understand speech. Here's why . . .

Research shows that nearly *half* the speech intelligibility is contained in 1000 to 4000 Hz range, but contains a miniscule 4% of total speech energy.

On the other hand, the low frequencies, 125 to 500 Hz have most of the speech energy (55%) but contribute very little to intelligibility -- only 4%.

To dramatically improve your ability to understand speech, you must:

First, drastically increase the speech energy above 500 Hz, where 83% of the speech intelligibility is concentrated.

Second, drastically reduce speech energy below 500 Hz where only 4% of speech intelligibility lies.

The MFJ-616 splits the audio speech band into four overlapping octave ranges centered at 300, 600, 1200 and 2400 Hz. You can boost or cut each range by nearly 20 dB.

A balance control and separate 2½ Watt amplifiers let you equalize perceived loudness to each ear so both ears help.

By boosting high and cutting low frequencies and adjusting the balanced control, speech that you can barely understand become highly understandable!

Even if you *don't* have high frequency hearing loss, you'll dramatically improve your ability to understand speech. You'll get an edge in contesting and DXing and enjoy ragchewing more.

Here's what *QST* for April, 2001 said . . . *"I expected a subtle effect at best, but I was astonished . . . The result was remarkably clean, understandable speech without hissing, ringing or other strange effects . . . made a dramatic improvement . . ."*

Immuned to RFI. Has phone jack, on/off speaker switch, 2 inputs, bypass switch. 10Wx2½Hx6D". Needs 12 VDC.

MFJ-1316, $19.95. For 110 VAC operation. Provides 12 VDC/1.5 Amps.

MFJ-72, $58.80. *All-in-one MFJ-616 Accessory Pack.* Includes MFJ-392 headphones, two MFJ-281 speakers and MFJ-1316 power supply. ***Save $7!***

Try it for 30 Days

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

MFJ Contest Voice Keyer

Transformer-coupled -- No RFI, hum or feedback . . . 75 seconds total, 5-messages . . . Records received audio . . .

MFJ-434
$179.95

Let this *new* microprocessor controlled MFJ *Contest Voice Keyer*™ call CQ, send your call and do contest exchanges for you in your own natural voice!

Store frequently used phrases like "CQ Contest this is AA5MT", "You're 59" . . . "Qth is Mississippi" . . . Contest by pressing a few buttons and save your voice.

Record and play back five natural sounding messages in a total of 75 seconds. Uses *eeprom* -- no battery backup needed.

You can repeat messages continuously and vary the repeat delay from 3 to 500 seconds. Makes a great voice beacon and calling CQ is *so* easy.

You can also record and play back off-the-air signals -- great help if you didn't get it right the first time! No more "*Please repeat*".

A playing message can be halted by the *Stop Button*, your microphone's PTT/VOX, remote control or computer.

Has jack for remote or computer control (using CT, NA or other program). Lets you select, play and cancel messages.

Your mic's audio characteristics do not change when your MFJ-434 is installed.

All audio lines are RF filtered to eliminate RFI, audio feedback and distortion. An audio isolation transformer totally eliminates hum and distortion caused by ground loops.

It's easy to use -- just plug in your 8 pin mic and plug the MFJ-434 cable into your transceiver. Internal jumpers let you set it to your rig. Use your mic or its built-in mic for recording.

Built-in speaker-amplifier. Speaker/phone jack. Use 9 Volt battery, 9-15 VDC or 110 VAC with optional MFJ-1312D, $14.95. 6½Wx2½Hx6½D in.

MFJ-73, $29.95. MFJ-434 Remote Control with cable.

60 dB Null *wipes out* noise and interference

MFJ-1026
$179.95

Wipe out noise and interference *before* it gets into your receiver with a 60 dB null!

Eliminate all types of noise -- severe power line noise from arcing transformers and insulators, fluorescent lamps, light dimmers, touch controlled lamps, computers, TV birdies, lightning crashes from distant thunderstorms, electric drills, motors, industrial processes . . .

It's *more effective* than a noise blanker! Interference much stronger than your desired signal can be completely removed without affecting your signal.

It works on *all modes* -- SSB, AM, CW, FM -- and frequences from BCB to lower VHF.

You can null out strong QRM on top of weak rare DX and then work him! You can null out a strong local ham or AM broadcast station to prevent your receiver from overloading.

Use the MFJ-1026 as an *adjustable phasing network.* You can combine two antennas to give you various directional patterns. Null out a strong interfering signal or peak a weak signal at a push of a button.

Easy-to-use! Plugs between transmitting antenna and transceiver. To null, adjust amplitude and phase controls for minimum S-meter reading or lowest noise. To peak, push reverse button. Use built-in active antenna or an external one. MFJ's exclusive *Constant Amplitude Phase Control*™ makes nulling easy.

RF sense T/R switch automatically bypasses your transceiver when you transmit. Adjustable delay time. Uses 12 VDC or 110 VAC with MFJ-1312D, $14.95. 6½x1½x6¼ in.

MFJ-1025, $159.95. Like MFJ-1026 less built-in active antenna, use external noise antenna.

MFJ *tunable* Super DSP filter

MFJ-784B
$249.95

Only MFJ gives you *tunable* and *programmable* "brick wall" DSP filters.

You can continuously *tune* low pass, high pass, notch and bandpass filters and continuously *vary* bandwidth to pinpoint and eliminate interference.

Only MFJ gives you 5 factory pre-set and 10 programmable pre-set filters you can customize. **Automatic** notch filter searches for and eliminates multiple heterodynes. Advanced adaptive noise reduction silences background noise and QRM.

Free MFJ Catalog

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

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

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http://www.mfjenterprises.com for instruction manuals, catalog, info

10 Bands -- 1 MFJ Antenna!

Full size performance . . . No ground or radials

Operate 10 bands: 75/80, 40, 30, 20, 17, 15, 12, 10, 6 and 2 Meters with one antenna Separate full size radiators . . . End loading . . . Elevated top feed . . . Low Radiation Angle . . . Very wide bandwidth . . . Highest performance no ground vertical ever . . .

Operate 10 bands -- 75/80, 40, 30, 20, 17, 15, 12, 10, 6 and 2 Meters with this MFJ-1798 vertical antenna and get *full size performance* with no ground or radials!

Full size performance gives high efficiency for more power radiated. Results? Stronger signals and more Q-5 QSOs.

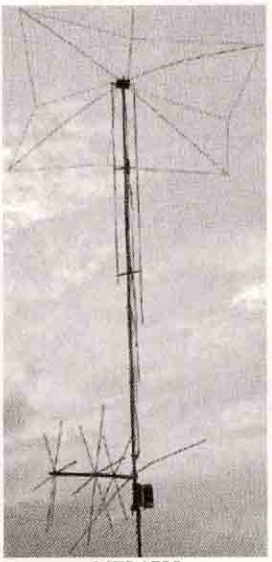
Full size performance also gives you exceptionally wide bandwidths so you can use more of your hard earned frequencies.

Full size performance is achieved using separate full size radiators for 2-20 Meters and highly efficient end loading for 30, 40, 75/80 Meters.

Get very low radiation angle for exciting DX, automatic bandswitching, omni-directional coverage, low SWR. Handles 1500 Watts PEP SSB.

MFJ's unique *Elevated Top Feed*™ elevates the feedpoint *all the way to the top* of the antenna. It puts the maximum radiation point high up in the clear where it does the most good -- your signal gets out even if you're ground mounted.

It's easy to tune because adjusting one band has minimum effect on the resonant frequencies of other bands.



MFJ-1798
$289.95
Ship Code F

Self-supporting and just 20 feet tall, the MFJ-1798 mounts easily from ground level to tower top -- small lots, backyards, apartments, condos, roofs, tower mounts.

Separate Full Size Radiators

Separate *full size* quarter wave radiators are used on 20, 17, 15, 12, 10 and 2 Meters. On 6 Meters, the 17 Meter radiator becomes a 3/4 wave radiator.

The active radiator works as a stub to decouple everything beyond it. *In phase* antenna current flows in all parallel radiators.

This forms a very large equivalent radiator and gives you incredible bandwidths.

Radiator stubs provide automatic bandswitching -- absolutely *no loss* due to loading coils or traps.

End Loading

On 30, 40, 75/80 Meters, end loading -- the most efficient form of loading -- gives you highly efficient performance, excellent bandwidth, low angle radiation and automatic bandswitching.

MFJ's unique *Frequency Adaptive L-Network*™ provides automatic impedance matching for lowest SWR on these low bands.

Tuning to your favorite part of these bands is simple and is done at the *bottom* of the antenna.

No Ground or Radials Needed

You don't need a ground or radials because an effective counterpoise that's 12 feet across gives you *excellent* ground isolation.

You can mount it from ground level to roof top and get awesome performance.

No Feedline Radiation to Waste Power

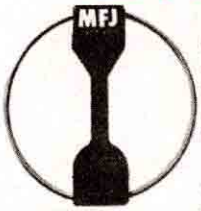
The feedline is decoupled and isolated from the antenna with MFJ's exclusive *AirCore*™ high power current balun. It's wound with *Teflon*® coax and can't saturate, no matter how high your power.

Built to Last

Incredibly strong solid fiberglass rod and large diameter 6061 T-6 aircraft strength aluminum tubing is in the main structure.

Efficient high-Q coils are wound on tough *low loss* fiberglass forms using highly weather resistant *Teflon*® covered wire.

MFJ's Super High-Q Loop™ Antennas



MFJ-1786
$379.95
Ship Code F

MFJ's *tiny* 36 inch diameter loop antenna lets you operate 10 through 30 MHz *continuously* -- including the WARC bands!

Ideal for limited space -- apartments, small lots, motor homes, attics, or mobile homes.

Enjoy both DX and local contacts mounted vertically. Get both low angle radiation for excellent DX and high angle radiation for local, close-in contacts. Handles 150 watts.

Super easy-to-use! Only MFJ's super remote control has *Auto Band Selection*™. It auto-tunes to desired band, then beeps to let you know. No control cable is needed.

Fast/slow tune buttons and built-in two range Cross-Needle SWR/Wattmeter lets you quickly tune to your exact frequency.

All welded construction, no mechanical joints, welded butterfly capacitor with no rotating contacts, large 1.050 inch diameter round radiator -- not a lossy thin flat-strip -- *gives you highest possible efficiency.*

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NEW! **MFJ-1788, $429.95.** Same as MFJ-1786 but covers 40 Meters-15 Meters continuous. Includes super remote control.

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MFJ-1621 lets you operate in most any electrically free area -- apartment, campsite, hotel, the beach, etc. DXCC, WAZ, WAC, WAS have been won with MFJ-1621! Work 40, 30, 20, 17, 15, 12 and 10 Meters with a telescopic whip that extends to 54 inches. Mounted on a sturdy 6x3x6 inch cabinet. Built-in antenna tuner, field strength meter, and 50 feet of RG-58 coax cable. Handles 200 Watts.

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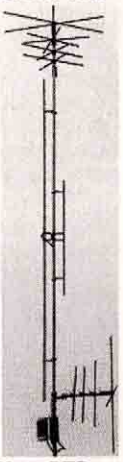
6 bands: 40, 20, 15, 10, 6, 2 Meters . . . No radials or ground needed



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

SOUTHERN FLORIDA: SM, Phyllisan West, KA4FZI—SEC: KD4GR. STM: WA2YL. ACC/TC: WA4AW. ASM/PIC: W4STB. OOC: N4QPM. BM: KC4ZHF. SGL: W1XO. DEC: W4SS. ASM: W4WYR. DEC/ASM: N4LEM, K9SHT, AA4BN. SFL Web Page: http://www.sflarrl.org. See photos on ARRL's SFL Web page. We welcome Ted Zateslo, W1XO, in Tallahassee, who graciously volunteered to be the State Government Liaison (SGL) for our SFL Section. He replaces John Hills, who was our SGL for 20 years. We look forward to many productive years as we meet the challenges of the future together. As ARRL works on a national antenna ordinance, we need to support them by contacting our representatives. N3HOE, wrote to his Congressman and received a letter in support of H.R. 4720 (antenna covenants), and he is signing on as a cosponsor of H.R. 817 (amateur spectrum). Representative Weldon told Alan, "I recognize the unique role Amateur Radio operators play in the state of Florida during natural disasters. The services provided by Amateur Radio operators during these times of national crises are critical." All of us can make a difference if we ask our reps for support. Remember our section emergency net SFAN, run by SEC KD4GR, is our link with the state EOC and other sections. Contact Jim for frequencies/times. WA4AW, ACC/TC, reports Tech Specialists in Miami-Dade, Broward, Palm Beach, Martin, Indian River, Lee, and Hendry counties. KG4JSC in Brevard is attempting to map all the repeaters in the county noting those available for emergencies. Something all should be aware of. They are awaiting authorization from the DOT to resume the "coffee breaks" along I-95 with county EOC personnel. Broward's training session was "emergency power 101." Collier held a work party at their EOC to repair the APRS, IRLP, and repeater. Bids were submitted for a replacement repeater and plans made for a backup. Indian River's main event was a Public Service Display. Altogether they put in 768 volunteer hours. Training was in Net Control and Field Dispatching. Martin took part in a successful Red Cross shelter drill. Twenty messages were passed, and plans call for more practice using NTS format. Hams in Okeechobee enjoyed a SKYWARN program presented by Mr. Decker from NWS Melbourne. Osceola's emergency team added 2 new members. Palm Beach EC received thirty VHF mobile radios and 21 power supplies donated by the Palm Beach County Sheriff's Office. They will be converted to ham VHF and programmed with the county's primary, secondary and simplex frequencies, then permanently installed in the schools/shelters in locked boxes. The Wellington ARC again served the public with its Lost Child Booth. Three lost children were quickly reunited with their parents. K9SRT is working on a ham club at a local high school. The teacher is very excited about the project. Way to go, Sean! July Traffic by STM WA2YL: WA9VND 360, KA4FZI 278, KD4GR 134, KC4ZHF 131, K4FQU 68, KG4CHW 61, WB4PAM 48, WA4EIC 45, KG4ILJ 39, KG4MLD 37, KG4EQY 33, KT4XK 30, AA4BN 28, WA4CSQ 27, K4VMC 26, KG4QIP 25, KG4MLC 22, AF4NR 7, KF4OMB 7, W3JI 7, W6VIF 4, K4ENA 2... 73, Phyllisan West, KA4FZI, SM SFL.

VIRGIN ISLANDS: SM, John Ellis NP2B, St. Croix—ASM: Mal, NP2L, St. John. Sect. Internet Mgr: Jeanette NP2C, St. Croix. SEC: Duane, NP2CY, St. Thomas: PIC: Lou, KV4JC, St. Croix. ACC: Debbie, NP2DJ, St. Thomas. QSL Mgr: Paul, NP2JF. The VI now has a new QSL manager with Paul, NP2JF, assuming the duties. Check the section Web site or the Virgin Islands section of the ARRL Web site for emerging info. Merv, W9UKK, is finishing a general class course at Southgate Baptist Church which will result in perhaps another 5 new hams on St. Croix. As you may or may not know, the section news is not going to be published in *QST* after the December issue but will be available on the ARRL Web - go to ARRL.org, scroll down a bit on the right and you will see a box entitled "US Virgin Islands Section." Click on that box and you will get the latest on QSL info, any kind of special advisories that pertain to the VI as well as the latest "section news". In the event of any impending hurricanes, go to 14.325, the Hurricane Watch Net, for info. Local area repeaters St. John 146.63, St. Thomas 146.81, St Croix 147.25, VI section Web site www.viaccess.net/~jellis. As always, you may send me news on happenings to np2b@arrl.org. And that's all the news that's fit to print! 73, John, NP2B.

WEST CENTRAL FLORIDA: SM, Dave Armbrust, AE4MR ae4mr@arrl.org http://www.wcfarrl.org— ASM/SEC NA4AR, ASM-Web: N4PK. ASM-Legal: K4LAW. TC: KT4WX. BM: KE4WU. STM: AB4XK. OOC: W4ABC. SGL: W1XO. ACC: N3BUL. PIC: WX1JAD. Please welcome Ted Zateslo, W1XO, as the new State Government Liaison for WCF. Also please welcome Fred Hendershot, N4BUL, as the new Affiliated Club Coordinator. Section news and contest results will no longer be published in *QST* as of a January. Consequently this will be one of the last times you will see section news in print. I will continue with WCF news via E-mail, the Web pages, club meetings, nets, etc. A WCF Cabinet meeting was held in Tampa on August 10th. Thanks to the Tampa ARC for hosting the meeting at their impressive club house. This will be the site for the TARCFest as well on Aug. 24th. Items discussed at the cabinet meeting include: A special web page for each WCF club is being planned. In the near future local interference committees will be formed to deal with interference issues including repeater problems, contact W4ABC or myself for more information. A club leadership conference will be planned for early next year. A digital communication conference is planned for early October to discuss future plans for packet in this area, contact KT4WX or visit the Web page for more information. SEC NA4AR discussed ARES training plans and NTS exercises. W4DG discussed work currently underway to expand the section's K4WCF repeater system with 6 new repeaters at 3 new sites in Pinellas, Polk and Hillsborough. Approximately $15K is needed to complete the project. Donations for this project may be sent to the K4WCF Repeater Fund, West Central Florida Group, Inc., % White & Finkelstein, PA, Com Center 70, Suite 15, 6150 STH 70 E, Bradenton, FL 34203 All donations are tax deductible. Ask your Congressman to co-sponsor H.R. 4720. To find your Representative visit http://www.house.gov/writerep, you may send a message to your Representative from this site as well. Consider having a letter writing session at your next club meeting. Our numbers are not overwhelming it is important that ALL of us write our Representatives. Work will continue on a State bill as well. 73 - Dave AE4MR.

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SOUTHWESTERN DIVISION

ARIZONA: SM, Clifford Hauer, KD6XH—Where are all the young people in our hobby? The age of the average person is growing. We are not doing a very good job of getting younger people into this hobby. There are several organizations here in Arizona that are attempting to get kids into our hobby. With the Internet and computer games, it is very hard to interest young people on using antique methods to communicate. Here in Arizona, we have the Explorer Post 599, Carl Hayden High School, the Phoenix Science Center, and several other schools that are set up with kids in mind. Tom Fagan, WB7NXH, Dave Kemsley, KD6BTW, and the Radio Society of Tucson as sponsors have set up Explorer Post 73 here in Tucson to educate kids on the advantages of Amateur Radio. We need to support this new organization and all the others in the state. Several of our teachers have received national recognition for their work with kids. The average of our hobby needs to go down, not up. This is the month of the OPRC Hamfest in Tucson, the date is 19 October, the place is the Pima County fair grounds, and talk in will be on 146.88 (-) (p/l 110.9). This is an indoor event so weather will not be a factor. This is also an ARCA and ARRL sponsored event. All necessary information and directions can be obtained on their web site, www.qsl.net/arrlaz or www.hamsrus.com. Everyone has heard about the grant from the government to train amateur radio operators in emergency communications. At this time, I am not sure how this will be administered, but questions can be directed to the ARRL headquarters or me. If you have already completed this course, then you can tell others about the quality training you have received. This training is very valuable for use during emergencies. Many RACES organizations across the country are requiring its members to take this course as part of their membership requirements. If your club or organization has a special event or function coming up please let me know so I can make sure it gets into this article and on the Web sites. We need to advertise to ourselves as well as others whenever possible. Also start planning for the Fall Hamfest at Mesa Community College on 07 December 2002. See you in Tucson on the 19th. Clifford Hauser, KD6XH; e-mail is kd6xh@arrl.org. ATEN 852 QNI, 67 QTC, 31 sess. Tfc: K7POF 83, W7EP 61.

LOS ANGELES: SM, Phineas J. Icenbice, Jr., W6BF – Bob Heil, K9EID, and Nate Brightman, K6OSC, were key players in the big Queen Mary Celebration last Sunday afternoon. Bob Heil donated five special, commemorative Heil microphones for the Wireless Station W6RO. Joe, WB6ACU, our celebrity guitarist from the Eagles group was among the dozens of ham notables seen aboard. The special celebration was conducted under near perfect weather conditions. Congratulations to the Associated Radio Amateurs of Long Beach for such a great celebration on the Grand Old Ship, Queen Mary. It was good to see such a great crowd of active Hams in the Wireless Room. – Neil, K6SMF, has been on active duty with his mobile station on 20 meters. We have worked Neil in about five states due to his recent travels. I hope that you can avoid operating on Tampa Ave., otherwise you will owe me a box of new S meters. After the ARRL Convention in Escondido, Neil is planning on more driving. On to the east coast and more conventions and swap meets. Drive carefully and keep the power down Neil. - Propagation, weather and the stock market should all be improved next month other wise we will all be talking about these same old subjects. Please welcome Dr. Howard Sawyer, KO6WL, back to active status on 20 meters. Howard is now actively chasing DX with his home built rig and wire beam antenna. Hank, K6YMJ, has been active raising miniature-horses. Look for Hank to be QRP Horse-mobile in a few years. Jim and Bev, have received a confirmation agreement from the Hilton (Long Beach) for the ARRL Convention scheduled for Sept. 5-6-7, 2003. Vy 73 de W6BF, Phineas.

ORANGE: SM, Joe Brown, W6UBQ, 909-687-8394— Acting SM/Technical Coordinator, Art Sutorus, KQ6HF, 909-734-1485. ASM/Orange County, Richard Thompson, WA6NOL, 714- 835-3295. ASM/San Bernardino County, Jeff Richardson, W6JJR, 909 886-3453. ASM Riverside County, Brett Romer, N6NLN, 760-436-6291. Lately, several Orange Section Hams have been reporting EMI problems of varying sources and nature. RFI from electrical power lines, CATV, poor electrical filtering and grounding appear to be the major offenders. A ready resource for information in dealing with EMI problems can be found by clicking on "RFI/EMI Solutions" on the Orange Section Web page at www.qsl.net/arrl-orange. If you want to spend $20, *The ARRL RFI Book*, *Practical Cures for Radio Frequency Interference* is an excellent buy. This publication can be very helpful in the instance where your neighbor is having problems with you practicing your hobby. No matter how "clean" your station is, good operating practice dictates using minimum power if you want to keep the neighbors happy. If additional help is required, contact the Section TC, KQ6HF. A hardy well done to the Anaheim ARA (K6SYU) for their information booth and demonstrations promoting Amateur Radio during the July Orange County Fair. Congratulations to former Golden Triangle ARC Member, Cindy Wijma, KF6MNK, who recently received a UCLA PhD in Educational Psychology. Another GTARC member who has reason to be happy is Harm Wijma AC6VN who is the lucky winner of IECARO FT-817 Transceiver drawing (Good fortune seems to be contagious in the Wijma family). 73 de KQ6HF. Tfc: KC6SKK 180, W6JPH 87, K6IUI 82, W6QZ 67. PSHR: W6JPH 137, W6QZ 120, K6IUI 90, KC6SKK 80. W6QZ NTS BBS QTC 179. SCN/V NET MGR W6JPH reports 21 sessions, QNI 121, QTC 80, avg net time 21 mins."

SAN DIEGO: SM: Kent Tiburski,K6FQ, k6fq@arrl.org 619-575-1964. The end of July and first two weeks in August had ARES operators working around the clock supporting the Red Cross at the Pines Fire. A helicopter had a blade strike on 29 Aug and setoff the largest blaze to date. ARES members mobilized and provided communications support 24/7 for over 2 weeks! Amateur Radio was the only means of communications for the Red Cross and other served agencies to coordinate the evacuation, shelter support and damage assessment effort. Well done to the following hams who volunteered; WM6B, WA6BCC, KO6BU, N6CEO, AE6CQ, WA6DNT, KB6DQO, W6DUG, KA6DUH, WD6EDG, AE6ET, KE6FHR, KA7FUW, W6GDK, W6GMQ, KG6GQT, K6GVM, W6HME, KG6KLH, KG6KVF, N6LWL, KD6OKR, K6PD, KF6PPR, KA6PSG, KF6QH, N1QIR, KF6QXU, N6RSL, K6SJA, N6SUN, NZ6T, N6URW, AD6VI, N6VKR, W6WYN, AD6Y, KF6YVC, KC6YSO, WA6YWC, KF6ZFU. Congratulations to Harry Hodges, W6YOO (ASM SDG) and Russ Downer, KA6INT (CERO) on your Southwestern Division hams of the year! Keep up to date by checking our Web site at: www.qsl.net/sdgarrl. Till next issue, best 73, Kent, K6FQ.

SANTA BARBARA: SM, Robert Griffin, K6YR— (k6yr@arrl.org). SEC: Jack Hunter, KD6HHG (kd6hhg@arrl.net). STM: Ed Shaw, KF6SHU (kf6shu@arrl.net. SGL: Paul Lonnquist, NS6V (paul@dock.net). ACC: Michael Atmore, KE6DKU (ke6dku@aol.com). OOC: Howard Coleman, N6VDV (n6vdv @arrl.net). PIC: Jeff Reinhardt, AA6JR. (jreinh@ix.netcom.com). TC: Paul Andreasen, K1JAN (k1jan@gte.net). ASMs: Ventura, Don Milbury, W6YN (w6yn@arrl.net). Santa Barbara, Marvin Johnston, KE6HTS (ke6hts@sbarc.org); San Luis Obisipo, Bill Palmerston, K6BWJ, (bpalmers@fix.net) and as Webmaster, Jack Bankson, AD6AD (ad6ad@arrl.net); and DECs: Santa Barbara, Dave Lamb, (wa6brw@arrl.net); San Luis Obispo-Bill Peirce, KE6FKS (ke6fks@arrl.net) and for Ventura-Dave Gilmore, AA6VH. A fine tribute dinner was held for Roxie, K6ELO, hosted by the Estero Radio Club, for her years of service. Congrats! FREE instant Section news updates? Join the SB Reflector by sending an e-mail message "subscribe" to: arrlsb-request@mailman.qth.net and be automatically added to the SB Section Info Hotline! SB Sec Web: www.qsl.net/arrlsb/.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) & 449.300-(131.8). That's 30. Rob, K6YR.

WEST GULF DIVISION

NORTH TEXAS: SM, Larry Melby, KA5TXL—As most of you folks have heard by now the decision has been made by the Board of Directors to move the section news to the member's only website the articles will continue to be printed in *QST* until the end of the year. We are going to take full advantage of this change. As you read this we have re-launched the section newsletter and it will be hosted on the webspace provided by the league. Two new members of my staff are editing the newsletter. They are Nancy McCain, K5NLM, and Tim Lewallen, KD5ING. I would like for all the clubs to send them copies of their newsletters you can send it to them at their call sign using the ARRL.net address. For those of you that have not signed up for the mail forwarding address or to receive section or division email bulletins I strongly encourage you to do so. As this will be the method to announce the updates to the section news similar to what we did in July to find volunteers in case they were needing for flooding relief. Texas now has 10% on HR 4720 and by the time you read this in *QST* I hope it is much higher. We currently have Pete Sessions (R-TX) original co-sponsor, Ralph Hall (D-TX) and Charles Stenholm (D-TX) as sponsors. If your representative isn't on this list and Texas has 30 right now then put this magazine down and write them now asking for their support. 73 de KA5TXL. July SAR K5UPN 553, K5MXQ 124, KB5TCH 77, KC5OZT 76, W5RDM 65, KD5SWI 65, W5AYX 58, W5OMG 42, AD5KE 36, WD5FEE 17, N8QVT 1. BPL: K5UPN 553.

OKLAHOMA: SM, Charlie Calhoun, K5TTT—Oklahoma Section News is now available on the Web. http://www.arrl.org/sections/?sect=OK 73, Charlie. Tfc: KF5A 1035, NJ5M 364, WB5NKC 352, N5IKN 302, WB5NKD 253, KK5GY 238, WA5IMO 70, WA5OUV 67, K4KXL 67, KI5LQ 65.

SOUTH TEXAS: SM, Ray Taylor, N5NAV—ASMs: KS5V, N5WSW, W5GKH, K5DG, N5LYG, WA5UZB, KK5CA, K5EJL, W5ZX, W5JHC, KB5AWM, WA5JYK, K5PFE, K5PNV, W5JAM. STM: W5GKH. SEC: W5ZX. ACC: N5WSW. TC: KJ5YN. BM: W5KLV. OOC: KA5KQZ. SGL: K5PNV. PIC: KD5HOP. October is the scary month, but not as rough as we had for the month of July. Can you just imagine watching a brick home floating down the river complete with the fire place chimney intact, until the whole thing meets up with a small dam, then disintegrate before your very eyes. My wife's nephew lives down river about 18 miles from New Braunfels on water front property. The house is up hill about 300 feet above the waters normal edge. The water came up to his back door. When the water receded, there was enough brick, rocks, and enough building material to build a large home. This is the way it would look at the bend of the river, but this was 4 miles from the bend of the river. The furry of fast moving water. As I write this it's raining and the opened the flood gates at Canyon Dam. Just what we need, more rain. We closed out the communications need on July 21 at 2:30 PM. I want to thank all those who helped in the floods of 2002. I have several of the call signs of those that helped, but still lack a lot. We found out what a 500-year flood was and then just 4 years later we have the 150 year flood. I thought there should be a greater separation between floods. We had a wonderful time at Austin Summer Fest. Have a great month. God Bless America. Tfc: KA5KLU 272, W5KLV 204, W5GKH 138, AC5XK 110, W5ZX 93, N5OUJ 65, N5SIG 64, N5NAV 58, W5ZIN 41, WB5NIC 27, W5IM 15, KØYNW 10.

WEST TEXAS: SM, Lee Kitchens, N5YBW—Missing Elmers. It has been brought to my attention that not every new or aspiring ham has an Elmer. It seems that there are actually those aspiring young people that take advantage of everything on the Internet including the ARRL Web site and with self study pass the test for their license. What happens then is they get on the air on 2 M or 70 cm, if they have the nerve, and possibly goof by not following normal repeater procedures. Next, some unthinking old ham (read got license six months ago) points out his or her error over the air. Guess what? You never hear them on the air again. They don't check into the net. They don't come to club meetings. Another young ham is lost to the hobby and the average age of the ham community continues to rise. Have you been guilty of this? Have you invited the new ham to join the net? Have you invited the new ham to come to the club meeting? Did you call the new ham on the landline and point out proper operating procedures in private? When I was a new ham 10 years ago, I goofed on the air and another kind ham talked to me in person and taught me what I needed to know. More than once I have also heard a new ham being questioned about his radio. Sometimes the young ham has had to scrape together a few bucks to even get on the air and possibly bought an older radio at a hamfest or bought the cheapest thing he could find. The old ham was then heard to say, "Why don't you get a real radio?" This is supposed to be a hobby and fun. Don't ruin it for the new ham that doesn't have a kind Elmer.

Question: What do WRC 2003, a new 5 MhZ band, Part 15 devices, the ARRL lab, 40 meters and regulatory affairs have in common?

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TM-V7A Cool Blue: The look of mobile communication. The V7A 144/440MHz FM transceiver marks a departure in ergonomic design with its easy-to-operate control panel and reversible LCD. The "5-in-1" programmable memory, 50/35W, DTSS and pager functions, and dual receive on one band make it a pace-setter. 5.5"w x 1.56"h x 7.44"d, 2.65 lbs..... **$419.99**

TM-D700A Harnessing APRS®, GPS and SSTV for world-class communications. (left) This FM 144/440MHz mobile features a built-in TNC. It even sends SSTV images (optional VC-H1). The brightest spot of the 50/35W D700A is its ability to enable APRS® without a computer. This unit also has 200 memories, dual receive, CTCSS/DCS, 10 programmable scan banks, DX cluster monitoring, and DTMF memory. 5.5"w x 1.58"h x 7.68"d, 3 lbs. total..... **$599.99**

TS-570D(G) Affordable DSP without compromise. High-end technology doesn't mean a high-end budget. With 16-bit DSP, untouchable digital filtering, heavy-duty transmitter design, central frequency control system, large LCD, and an ergonomically-optimized interface, the 570D(G) provides powerful operation on 160-10M. 10.63"w x 3.75"h x 11"d, 15 lbs ..... © **$889.99**

TS-870S Digital signal processing at the IF stage. This all-mode, HF rig is all about DSP. The 870S incorporates DSP at the IF stage with a full range of features including 100 memories, built-in keyer, interactive meny function, automatic antenna tuner and 100W power. 13"w x 4.75"h x 13.13"d, 25.35 lbs..... **$2299.99**

TS-2000 Distinctive by design, packed for performance. The all-mode, HF, 2M, 6M, 70cm 2000 is serious about DSP. Its advanced digital technology converts analog waveforms into digital data, enabling such digital processing as IF filtering, slope tune, auto notch and AGC. 10.63"w x 3.75"h x 12.5"d ....© **$1759.99**

TS-B2000 Same as the TS-2000 model above, but includes PC control software and enclosed face..... **$1799.99**

TS-2000X Same as the all-mode, HF, 2M, 6M, 70cm TS-2000 above; but also incorporates 1.2GHz.....© **$2399.99**

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IC-W32A User-friendly dualbander with independent band controls. (left) Reintroducing the high performance, full-function W32A HT that offers simple operation and advanced features. This 5W, 2M/440 unit has separate tuning and volume for each band. The W32A also has simultaneous band receive and 200 channels with name capability. It also features cloning capability, tone encode/ decode, and skip scan. 2.25"w x 5.41"h x 1.31"d, 1 lb..... **$279.99**

IC-T81A Amazingly compact quad. The T81A 50/144/430MHz/1.2GHz HT offers a variety of functions, yet is as simple as a single band. It provides 5W (1W/1.2GHz) and is water resistant. The T81A features a multi-function "joy-stick," wide FM/AM receive, 124 memories and PC programmability. 2.28"w x 4.19"h x 1.13"d, 10 oz.....Closeout **$279.99**

IC-V8 Quality, simplicity, anywhere. (right) The durable V8 144MHz FM HT has a panel and chassis that are constructed of polycarbonate and die-cast aluminum. The unit offers 5.5W, 100 alphanumeric memories, CTCSS, DTCS and DTMF encode, rotary selector, and 40 channel per second scanning. 2.13"w x 5.19"h x 1.38"d, 12.3 oz .. **$149.99**

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IC-207H Dual at single band price. Dualband capabilities of the 2M/440 FM 207H are provided one band at a time through a switching system. The 50/35W unit also features a detachable panel, tone squelch, 9600bps packet, ultra high speed scans, and 182 memories. 5.5"w x 1.56"h x 7.31"d, 2.6 lbs **$299.99**

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***Power Curve** -- typical output power in Watts*

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B-2518-G	--	0.5	30	56	91	111	135	153	160	160+	--
B-5018-G	--	--	--	52	99	119	125	130	135	145	160
Watts In	0.25	0.5	3	5	8	10	15	20	25	35	50

100 Watts for 2 Meter HTs

B-310-G **$199** Suggested Retail

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***Power Curve** -- typical B-5016-G output power*

Watts Out	25	50	75	95	100	100	100	100
Watts In	¼	½	1	2	4	6	7	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***
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35 Watts for 2 Meter HTs

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***Power Curve** -- typical B-5016-G output power*

Watts Out	18	30	33	35	35	35	35+
Watts In	1	2	3	4	5	6	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***
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35 Watts, FM only . . . $69.95

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***Power Curve** -- typical B-5016-G output power*

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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/35 Watts on 440 MHz***
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6 Meter Amplifier

FCC Type Accepted

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70 cm Amplifiers (420-450 MHz)

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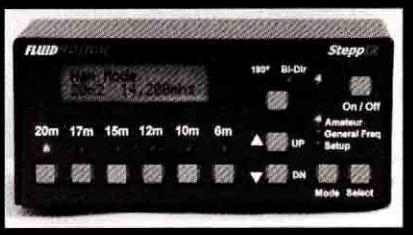
- EXTREMELY reliable - life tested to over 2 million band changes and still going strong!
- Fixed element spacing represents very little compromise because the elements are adjusted to optimize length at every frequency



Computer Models of Free Space Gain & *Front to Rear vs. Frequency

2 Element Yagi				3 Element Yagi			
Band	Gain dBi	½ Power Angle	F/R dB	Band	Gain dBi	½ Power Angle	F/R dB
20m	6.6	+/- 35°	20.5	20m	7.4	+/- 34°	25
17m	6.6	+/- 35°	16	17m	8.3	+/- 32°	25
15m	6.5	+/- 34°	13	15m	8.5	+/- 29°	20
12m	6.4	+/- 35°	10.5	12m	8.8	+/- 28°	15
10m	6.2	+/- 35°	8.5	10m	9.0	+/- 29°	11
6m	5.0	+/- 35°	1.5	6m	6.2	+/- 35°	2.8
				6m**	10.1	+/- 25°	20

*Front to rear is the worst case scenario, whereas front to back simply takes the measurement 180° from the forward antenna.
** 6m with passive element kit installed.

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TH-G71A
2M/70CM

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TECH TALK

IC-746PRO - How to tweak your DSP

Ready for new radio thrills and excitement? Gear up with Icom's new IC-746PRO and experience a totally new dimension in amateur radio enjoyment!

This new generation transceiver delivers unsurpassed DSP performance on all bands and modes, it is affordably priced, and it can also be tweaked to fit your particular operating needs or band conditions at the time. This Tech Talk overviews that concept.

Receive DSP Tweaks. First, you can select a built-in filter bandwidth that is fully adjustable from 3.0kHz to 50Hz for superb sounding SSB audio, copying weaker stations and dodging QRM or working CW in high style, as desired. Second, you can use the Twin PassBand Tuning controls to further tweak a selected filter's center frequency and width. By adjusting the concentric controls together, a received station's bass, mid range or treble tones can be emphasized. By adjusting them separately (one up, one down), a chosen filter's bandwidth can be sharpened to eliminate "side QRM" lower and/or higher in frequency. You can also menu-adjust the upper edges or shoulders of a filter's response curve and tweak the receiver's bass/treble equalization to mate with your hearing preference. Add in multiple AGC loops which, combined with the IC-746PRO's excellent DSP system, prevent strong adjacent frequency interference from reducing receiver sensitivity or causing "pumping" of receive audio, and you have new millennium performance supreme!

IC-746PRO
Supercharged Performance!

As Ray Novak, Icom's National Amateur Sales Manager, discovered during DXpedition operations from A52RN/Bhutan, copying a weak (S3) signal only 200Hz from a strong (S9+) signal is a cinch with the IC-756PROII... which uses the same DSP engine as the IC-746PRO. Now that is impressive!

SSB Transmit Tweaks. Three choices of transmit filter bandwidths, 2.8, 2.4 and 2.2 kHz plus adjustable microphone equalization let you custom-tailor the IC-746PRO's transmit audio to match your particular voice characteristics. By selecting a wide filter and boosting bass, mid range and/or high tones in that chosen bandwidth, your voice can sound extra-rich and full-bodied – even better on the air than "in person." By selecting a narrow filter and emphasizing upper range/treble tones, you can produce a remarkably strong signal with maximum "talk power" for DXing or communicating under adverse band conditions. Additionally, all filter and equalizer settings are easily changed so the IC-746PRO "has a different face to fit every need."

The Digital Difference. Some amateurs may understandably question how the IC-746PRO's performance is superior to other transceivers of similar power and bandwidth. The answer is using IF level DSP plus ultra-steep skirted filters. Combined, they ensure you hear good and sound great yet stop interference and "splatter" like a brick wall. That is the PRO's advantage and it is terrific! Test-tune an IC-746PRO at your favorite dealer and see for yourself!

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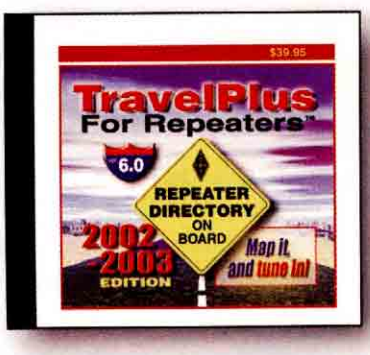

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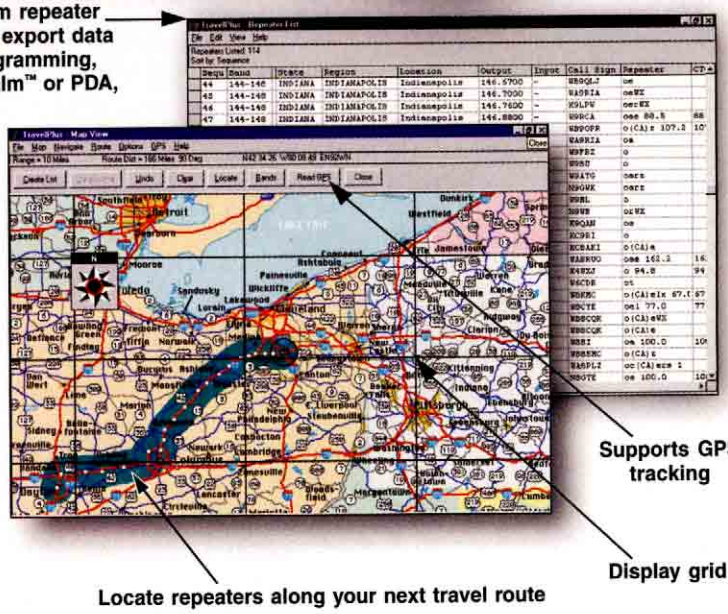

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