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June 2001

QST reviews

- **Ten-Tec** Jupiter HF transceiver
- **Yaesu** VR-5000 communications receiver

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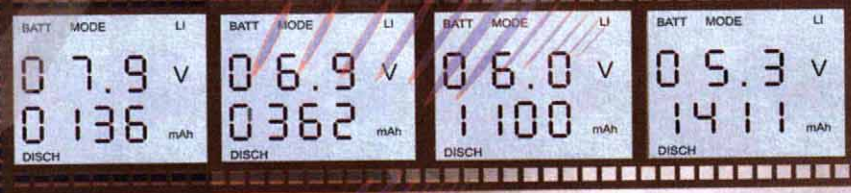

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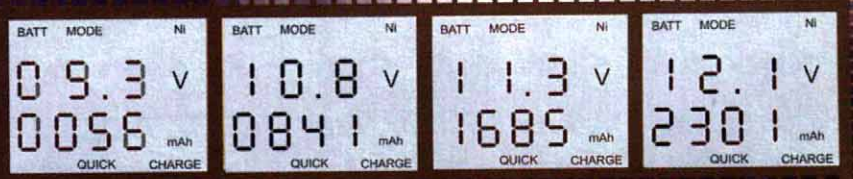

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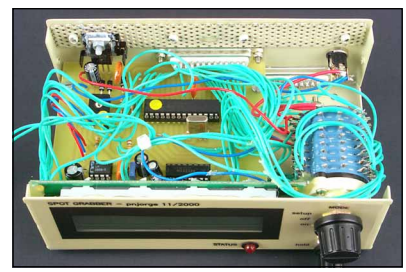

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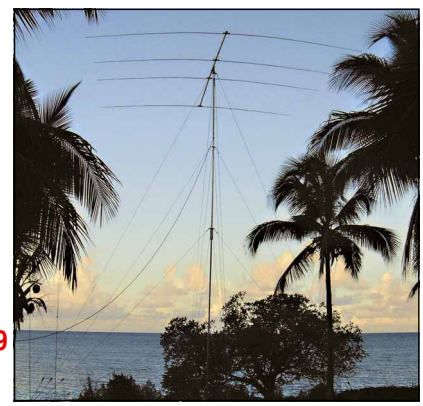

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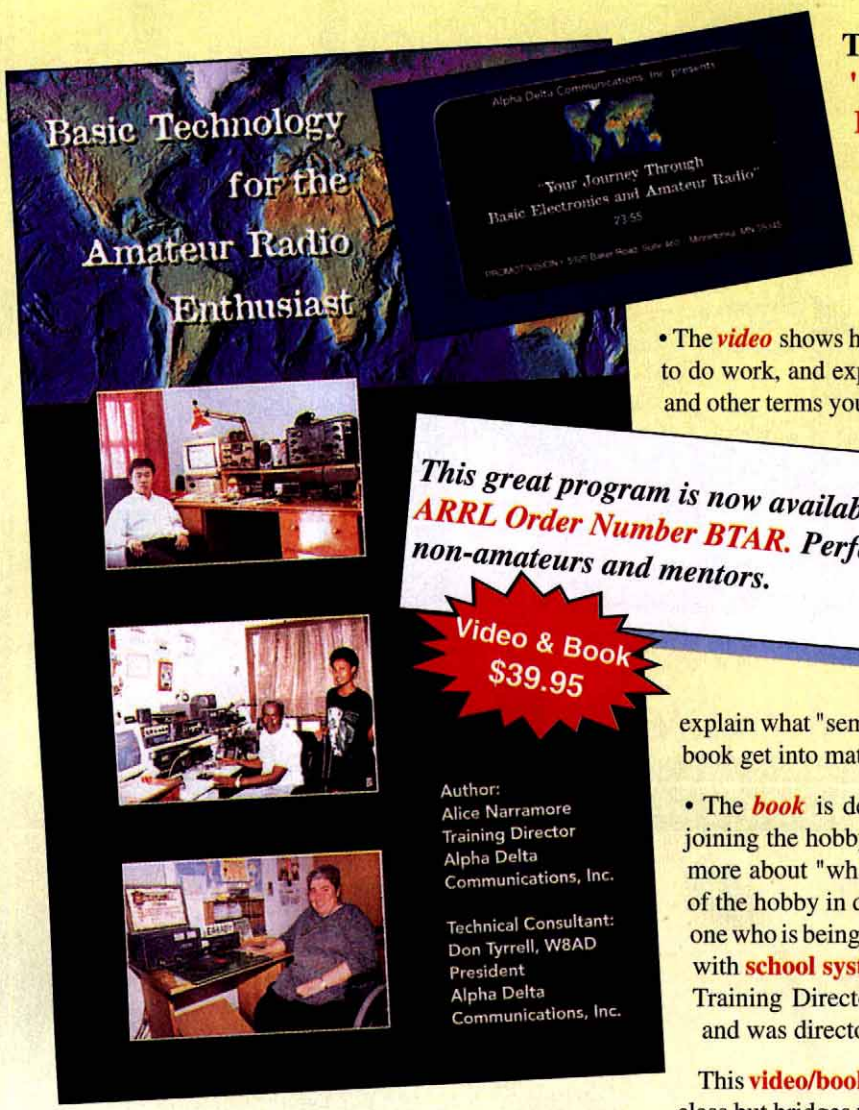

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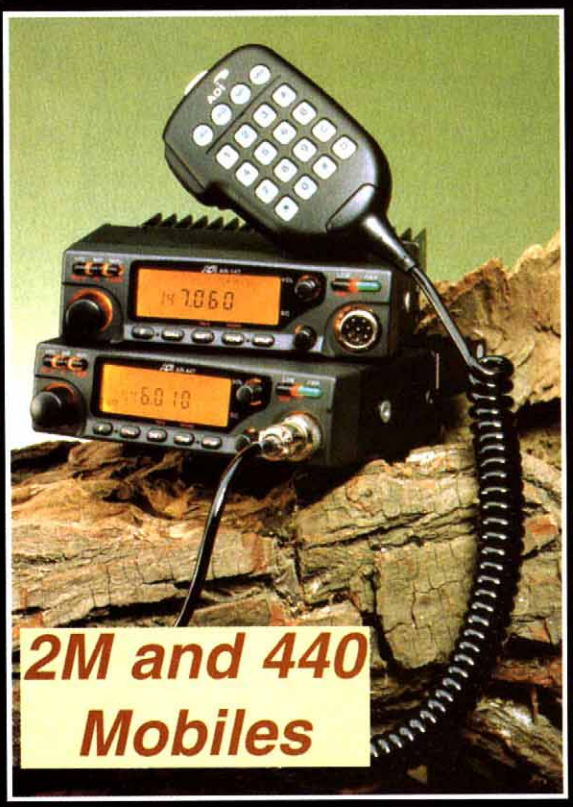

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"IT SEEMS TO US..."

Article S25: More Than Morse

Many hams seem to think that the "Article S25" item on the 2003 World Radiocommunication Conference (WRC-03) agenda is limited to the Morse question—that is, whether the international Radio Regulations will continue to require that administrations verify the ability of their amateur licensees to send and receive Morse code messages before they can operate below 30 MHz. In the January issue we devoted this page to the Morse question; at least for now there is no need to revisit it. At its meeting in January the ARRL Board of Directors acknowledged that it is highly likely the international requirement will disappear after WRC-03. This will give each administration, including the FCC, the opportunity to decide—sometime after 2003—whether it is in their national interest to drop Morse from their domestic licensing requirements.

While many amateurs hold strong opinions about the Morse requirement, it is but one of 11 paragraphs in Article S25 of the international Radio Regulations. The other 10 paragraphs are also on the WRC-03 agenda, and it would be extremely shortsighted of us if we were not to review these other provisions and seek such changes as may be appropriate. It will be years, if not decades, before we get another chance.

Recognizing this, in 1995 the International Amateur Radio Union (IARU) established the Future of the Amateur Service Committee (FASC) to initiate worldwide consideration of all of the provisions of Article S25. A discussion paper was released in April 1996. FASC submitted four detailed reports to the IARU Administrative Council between 1996 and 1998, and in October 1998 the Administrative Council agreed that IARU policy is to seek the amendment of Article S25 in accordance with the principles set out in the FASC Final Report. Anyone who is interested in the detailed history can find the related documents on the IARU Web site, **www.iaru.org**.

The Morse question aside, and not necessarily in order of importance, here is what the IARU is seeking from the review of Article S25 at WRC-03:

Retention of the requirement that administrations shall verify the technical and operational qualifications of any person wishing to operate an amateur station. The fact that all radio amateurs possess technical and operational qualifications distinguishes us from "consumer" radio services and ensures our ability to continue to serve the public interest.

Protection of the non-commercial nature of the amateur and amateur-satellite services. To that end, some limits on the content of amateur communications must be preserved and the definition of the amateur service as one carried out by "duly authorized persons interested in radio technique solely with a personal aim and without pecuniary interest" must be retained.

Inclusion of specific provisions to recognize the disaster communications role of the amateur service. The IARU seeks a new provision urging administrations to take the steps necessary to allow amateur stations to prepare for and meet communication needs in the event of a natural disaster—something we take for granted in North America but that is far from universal. Another provision being sought would encourage administrations to recognize amateur licenses issued by other administrations in order to facilitate temporary operation; it is frustrating for amateurs to be needed in another country but to be unable to operate until paperwork gets done.

Relief from the third-party traffic prohibition. International communications on behalf of third parties are now prohibited unless special arrangements have been made between the concerned administrations. This provision, adopted in 1932 over strenuous IARU objections, was intended to protect the government telecommunications monopolies that existed at the time. In recent years the privatization of telecommunications has made the provision obsolete, yet it remains a stumbling block for welfare messages on behalf of the victims of disasters. The time is long past for it to be dropped.

Elimination of the "banned country list." The very first paragraph of Article S25 provides that "Radiocommunications between amateur stations of different countries shall be forbidden if the administration of one of the countries concerned has notified that it objects to such communications." This has led to many misunderstandings over the years and in any case is unnecessary. If an administration decides to prohibit its amateurs from communicating internationally it can accomplish this much more effectively through its own regulations.

Elimination of redundant provisions. Several paragraphs of Article S25 simply repeat regulations that apply generally to all radio services with regard to transmitter power, purity of emissions, and station identification. In the interest of making the international Radio Regulations shorter and easier to understand they can be safely deleted.

Developed over a three-year period and with extensive worldwide consultation, the IARU draft of a new Article S25 contains just six paragraphs yet covers everything that is needed in the international regulations for the amateur and amateur-satellite services. The ARRL and other IARU member-societies will be urging that their administrations adopt the IARU draft as part of their proposals for WRC-03.—*David Sumner, K1ZZ*

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$139.00

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$89.95

963 Switching Power Supply
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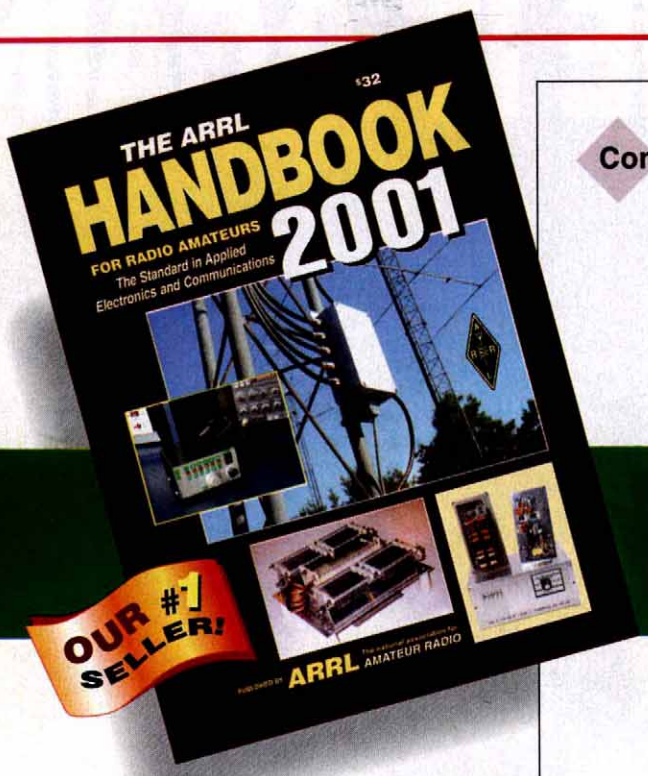
Model 701, Accessory Hand Mic, not shown.



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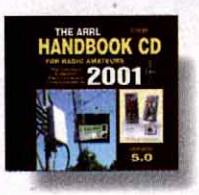

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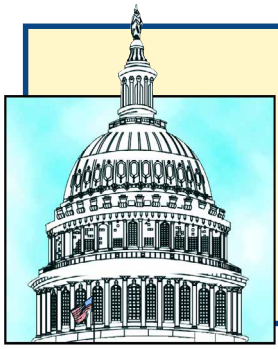

DC Currents

By Steve Mansfield, N1MZA
Manager, Legislative and Public Affairs

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

New FCC Chairman Powell Aces First Subcommittee Inquisition

Newly seated FCC Chairman Michael Powell clearly demonstrated his formidable political skills even before delivering his testimony. He greeted members of the House Telecommunications and the Internet Subcommittee like old friends during a recent hearing, and then delivered testimony and answered questions in a way that left most members of the subcommittee and many other members of Congress beaming. As some commented, it earned Powell an A for "Attention to Detail."

The hearing began with statements from committee members, including an opening statement by the new Chairman Fred Upton (R-MI-6th) whose style seemed more conciliatory than the previous Chairman, W.J. "Billy" Tauzin (R-LA-3rd) whose impatience with FCC Chairmen had become nearly legendary. Tauzin is now Chairman of the House Energy and Commerce Committee, to which the Telecommunications and Internet Subcommittee is subordinate. As is traditional in such hearings, Chairman Upton then went 'round the table to permit any of the other 32 Subcommittee members who wanted to make a statement to do so.

Much attention was on former chairman Tauzin who, even though he has moved up the chairs to be Chairman of the Energy and Commerce Committee, still sits on the Subcommittee. He has a distinct capacity to help form the agenda, as well as a forum to take whacks at any FCC Chairman who displeases him. But Tauzin's opening comments first praised Chairman Powell's ability and skills, and then tried to set the stage for the day by focusing on what he thought was the commission's woeful need for management restructuring, which he was assured the new Chairman could accomplish. Tauzin's comments were particularly harsh about what he perceives as previous uneven treatment of various services—particularly the emerging broadband services—and the commission's approval process, which he indicated he believed had become somewhat glacial. However, Mr. Tauzin concluded by praising Commissioner Powell as "a man with the vision to take the FCC into the 21st Century."

After enduring the comments of Congressman Tauzin and all the committee members who followed, Chairman Powell took his position at the witness microphone and began by outlining how the commission is being affected by the dramatically changing communications industries and the blurring of the lines that once separated them. He then outlined his own vision of an FCC makeover. His plan included creation of a new agency "policy vision," emphasized building management skills within agency staff, featured a training and development program to ensure technical and economic expertise, as well as outlining an organizational restructuring to align with the changing and converging marketplace.

Part of the backbone of Chairman Powell's policy vision was emphasis on the timely deployment of broadband technology nationally in pursuit of creating universal service, while "rationalizing and harmonizing" the commission's regulatory efforts to foster competition and industry growth. His ideas about building management skills included evaluation of managers by their ability to reduce backlogs within the agency and to prevent backlogs from recurring, and establishing uniform measures of productivity. The Chairman also emphasized the need to modernize and upgrade the commission's "information technology infrastructure," and vowed that such an objective includes technology to help the public get information from the agency much faster. With regard to ensuring technical and economic expertise, the chairman noted that during the last six years the commission's engineering staff has decreased by 20 percent, and 40 percent will be retiring over the next four years.

To address the situation, the commission is developing an "Excellence in Engineering" program to attract technically oriented new employees and will be putting more training programs in place for existing employees, especially those who are not already engineers. Powell noted that the commission's management structure tended to mirror the technological environment it sought to regulate, but noted his goal will be to restructure along market lines rather than types of technology. In closing his presentation, the Chairman promised to try to work closely with the Telecommunications and Internet Subcommittee and Congress.

Powell's presentation was evaluated by committee members cited by *Broadcasting & Cable* magazine as being a "virtuoso performance."

Cell Towers Occasionally Coming Under Fire as State Bills Continue to Focus on Cell Phones in Cars

A quick look at bills introduced in state legislatures in the month of March (most recent available data) that turned up in our computerized database search suggests that curbing the use of cellular telephone use by drivers operating motor vehicles continues to be a major battle in some state legislative arenas. At the same time, a burgeoning number of bills introduced to control the proliferation of commercial communications sites tends to suggest that some state legislatures just might have a mild streak of "anti-technology" in them. No cause for alarm for hams; these bills (see Hawaii SR.65 below, for example) are generally in response to lawmaker concern about all those big cellular and PCS towers going up around town, and have nothing to do with ham radio. What should come as good news is that more Amateur Radio-oriented "PRB-1" type bills are also appearing, which put into state statutes the requirement to afford Amateur

Radio operators "reasonable accommodation" when installing an antenna or support structure.

Arkansas

HB.2314—states that a "municipality that regulates the placement, screening, or height of radio antennas shall reasonably accommodate Amateur Radio antennas."

HB.2397—would amend current law on the interception of telephone communications. Amended to exempt Amateur Radio operators.

Connecticut

SB.276—amended recently to make it illegal to drive while distracted. The bill includes but does not limit distractions to operating cellular phones and CB radios.

Florida

HB.1045—promotes access to technology to create a better-rounded student and citizen by gaining academic, life, and employment skills to provide opportunities for productive lives. Funds efforts to integrate technology and training into curriculum.

HB.1349—makes it a third-degree felony to use a two-way communications device, including a portable two-way wireless device, to commit or help commit a crime.

SB.1198—makes the use of a two-way communications device to commit or help commit a crime a felony of the third degree.

SB.1502—provides criteria for the permitting and installation of poles, masts, and towers for supporting antennas used in the operation of Amateur Radio stations licensed by the Federal Communications Commission. States that "condominium associations shall reasonably allow erections of Amateur Radio antennas as described in this section or allow antennas attached to fascia of roof to a height not to exceed 15 feet above the highest point of a rooftop."

Georgia

SR.382—provides for the formation of a Senate Study Committee on Cellular Telephone Use While Driving to file a comprehensive study of available statistics and facts which correlate the use of cellular telephones while driving and motor vehicle accidents.

Hawaii

SR.65—urges a state commission to identify appropriate sites for locating telecommunication towers and antennae and develop a program to encourage co-location of antenna towers to minimize the aesthetic impact on residential areas, cultural landscapes, and open areas of the state in general.

Louisiana

HCR.35—calls for the creation of a Task Force on Driver Distractions to undertake all necessary studies of driver distractions, including communications technology and nontechnological activities, and to submit recommendations to the legislature.

SB.130—prohibits the use of a hand-held cellular telephone while operating a motor vehicle.

Minnesota

SF.1539—would make it a misdemeanor to use a cellular telephone when driving any motor vehicle within the state.

Missouri

HB.999—provides that governing body of counties, cities, towns or villages require anyone planning to install, construct or locate a telecommunication tower or other structure for wireless communications or telephone service to notify all owners of property within two thousand feet.

New Jersey

AB.3402—permits the use of cellular telephones equipped for hands-free operation in moving vehicles during and beyond a two-year transition period phasing out hand-held cell phones in vehicles.

New York

AB.6135—requires information about whether a person involved in an accident was using a mobile telephone to be indicated in an accident report.

AB.6509—enacts the Wireless Facility Siting Act to provide for municipal regulation of the placement, construction and modification of wireless services facilities. The bill recognizes the ability of local governments to adopt review criteria for the planning and siting of communication towers and wireless facilities.

AB.7014—makes it unlawful to operate a motor vehicle while using a hand-held cellular phone or participating in any other activity that may distract a person's vision away from the road. The bill exempts hands-free devices and CB radios.

Oregon

HB.2987—states that a city, county or other local government may not enact or enforce any charter provision, ordinance, resolution or other provision regulating the use of cellular telephones in motor vehicles.

HB.3936—states that, "no city, county or other political subdivision shall regulate the use of mobile telephones in motor vehicles. 'Mobile telephone' means a handheld device designed to receive and transmit voice communication. A citizens band radio or other two-way radio is not a 'mobile telephone.'"

Texas

HB.2722—provides a means for Amateur Radio operators who are handicapped, with handicapped license plates, also to apply for Amateur Radio plates.

Wisconsin

AB.201—requires the Department of Transportation to include in the uniform traffic accident report form or automated format an area designating whether use of a cellular or other mobile telephone contributed to causing the accident

AB.202—provides that no person may operate a cellular phone while driving with a probationary license.

AB.240—prohibits a person from operating a motor vehicle (other than an authorized emergency vehicle) while using a cellular or other mobile telephone (cellular phone), whether or not use of the cellular phone interferes with the operation of the vehicle.

Media Hits

- *The East Valley Tribune* of Mesa, Arizona captured the excitement of an Amateur Radio exchange between students at Arcadia High School and one of the school's prominent alumni—astronaut Bill Shepherd, KD5GSL who was aboard the International Space Station (NA1SS) in orbit above the earth. Student-hams named in the article include Gwen Johnson, KD7LME; Ross Tucker, AC7JO and Christa Laser, KD7LMF. Also mentioned, Allan Cameron, N7UJJ, the educational advisor on hand for the QSO.
- The Rock City Sams of Little Rock, Arkansas earned more than a page in *Highways*, a magazine dedicated to the recreational vehicle (RV) community. Their many public service activities, ranging from maintaining the Central Arkansas Radio Emergency net to volunteer work with the Multiple Sclerosis Society and the American Diabetes Society were cited in the article. Mentioned by name were Don Sugg, KD5CBV, Bill Westfall, KG5WG. The Rock City Sams are part of the Good Sam Club, the world's largest RV owners' organization.
- When nearby construction cut through a main telephone cable, the Glendale Memorial Hospital in Glendale, California, was without communication with the outside world. Glendale Emergency Amateur Radio Service (GEARS) stepped in at hospital officials' request and set up ham stations at key areas of the hospital, and also began calling in needed hospital staff via autopatch. A hospital official said the hams were "critical to our ability to respond," and the story was favorably reported in the *Glendale News-Press*. GEARS members Jim Olliff, KE6URZ, and Michael Benner, N6IJR, followed up with a professional-appearing news release to other media.
- Massillon (Ohio) Amateur Radio Club members Terry Russ, N8ATZ; Perry Ballinger, W8AU; Gary Kline, WC8W, and Don Finley, W8DEF, were pictured in a large color photo illustrating an article on the activities of the Massillon Amateur Radio club which was published in *The Repository* of Canton, Ohio. The club is headquartered at the Massillon Senior Center.

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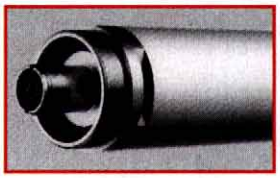
Ruggedized Base/Repeater Antenna



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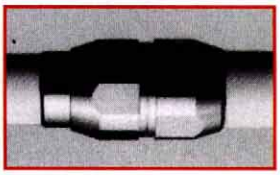

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The X50NA is an excellent choice where ruggedness is required in a medium–gain, dual-band, base/repeater application.

Features

- Wide frequency bandwidth
- Heavy duty fiberglass radome
- Stainless steel mounting hardware and radials
- Type–N Cable connection
- Compact size for easy mounting/ installation

Specifications:

Freq.: 2m: 144–148MHz
70cm: 440-450MHz
Power: 200 watts
Wind Rating: 135 MPH (no ice)
Height: 5.6 feet

X500HNA

Diamond Antenna's best base station repeater antenna. Designed for strength and performance, the X500HNA is pretuned to achieve maximum gain in both the 2m and 70cm amateur bands.

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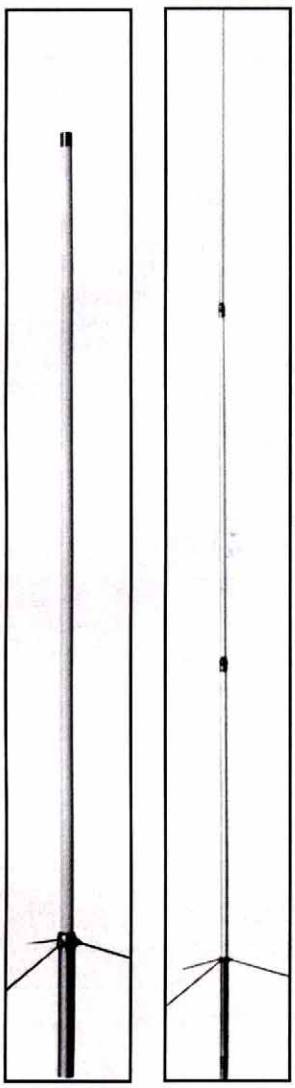
- Stainless steel mounting hardware and radials
- Strong–waterproof joint couplings
- Type–N Cable connection
- Wide band performance

Specifications:

Freq.: 2m: 144–148MHz
70cm: 440-450MHz
Power: 200 watts
Wind Rating: 90 MPH (no ice)
Height: 17.8 feet



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DIAMOND Mono-Band Base/Repeater Antennas

MODEL	BAND (MHz)	WATTS	CONN.	HT. FT.	RATED WIND MPH (No. Ice)
CP22E [1]	144	200	UHF	9.0	90
DPGH62 [1,6]	50	200	UHF	21.0	78
F22A	144	200	UHF	10.5	112
F23A	144	200	UHF	15.0	90
F718A [2]	440	250	N	15.0	90

DIAMOND Dual-Band Base/Repeater Antennas

MODEL	BAND (MHz)	WATTS	CONN.	HT. FT.	RATED WIND MPH (No. Ice)
X50A	144/440	200	UHF	5.6	135
X50NA	144/440	200	N	5.6	135
X200A	144/440	200	UHF	8.3	112
X510NA [3]	144/440	200	N	17.2	90
X510MA	144/440	200	UHF	17.2	90
X500HNA	144/440	200	N	17.8	90+
X700HNA	144/440	200	N	24.0	90
X2200A	144/222	150	UHF	11.5	112
U200	440/1240	100	N	5.9	135

DIAMOND Tri-Band Base/Repeater Antennas

MODEL	BAND (MHz)	WATTS	CONN.	HT. FT.	RATED WIND MPH (No. Ice)
U5000A	144/440/1240	100	N	5.9	135
V2000A [4,6]	52/144/440	150	UHF	8.3	110
X3200A [5]	146/222/440	100/200	UHF	10.5	112
X6000A	144/440/1240	100/60	N	10.5	112

1 Heavy duty aluminum construction.
2 F-718A: 440-450MHz., F718L: 420-430MHz.
3 X510NJ: 144-147/430-440MHz.
4 1/4λ. rated in dBi. Most requirement: 1.4"-2.4".
5 2m: 146-148; 100 watts
6 52-54MHz. only; DPGH62 adjustable from 50-54MHz.

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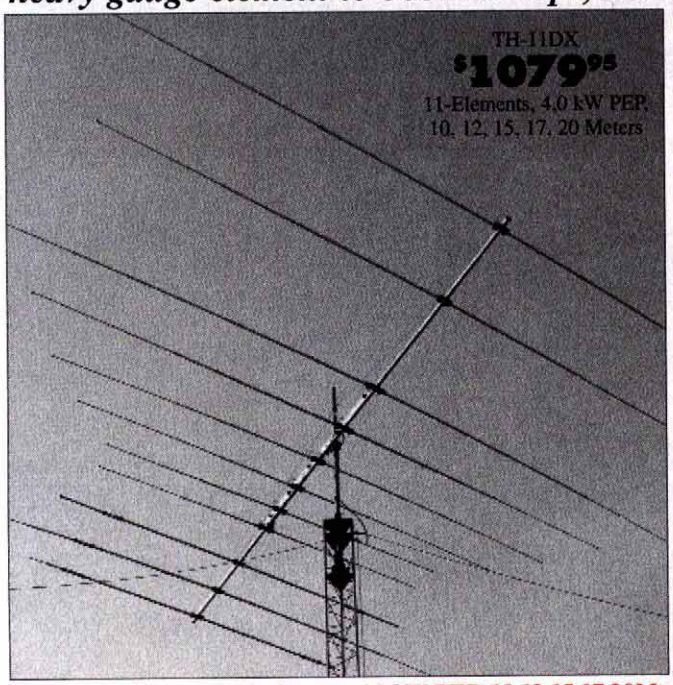

TH-11DX, $1079.95. 11-element, 4.0 kW PEP, 10,12,15,17,20M

The choice of top DXers.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

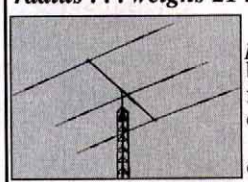
BetaMATCH™ provides DC ground to eliminate static. Includes BN-86 balun. Easily assembled.

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

QK-710, $169.95. 30/40 Meter option kit for EXP-14.

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

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



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

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

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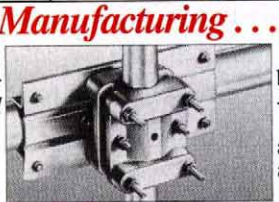
Model No.	No. of elements	avg Gain dBd	avg F/B dB	MaxPwr watts PEP	Bands Covered	Wind sq.ft. area	Wind (mph) Survival	Boom (feet)	Longest Elem. (ft)	Turning radius(ft)	Weight (lbs.)	Mast dia O.D.(in.)	Recom. Rotator	Retail Price
TH-11DX	11	*For Gain and F/B ratio--See...*		4000	10,12,15,17,20	12.5	100	24	37	22	88	1.9-2.5	T2X	$1079.95
TH-7DX	**7**			**1500**	**10, 15, 20**	**9.4**	**100**	**24**	**31**	**20**	**75**	**1.5-2.5**	**HAM-IV**	**$819.95**
TH-5MK2	5	• www.hy-gain.com		1500	10, 15, 20	7.4	100	19	31.5	18.42	57	1.5-2.5	HAM-IV	$699.95
TH-3MK4	**3**	• Hy-Gain catalog		**1500**	**10, 15, 20**	**4.6**	**95**	**14**	**27.42**	**15.33**	**35**	**1.9-2.5**	**CD-45II**	**$439.95**
TH-3JRS	3	• Call toll-free		600	10, 15, 20	3.35	80	12	27.25	14.75	21	1.25-2.0	CD-45II	$329.95
TH-2MK3	**2**	800-973-6572		**1500**	**10, 15, 20**	**3.25**	**80**	**6**	**27.3**	**14.25**	**20**	**1.9-2.5**	**CD-45II**	**$339.95**
EXP-14	4			1500	10,15,20 (6m optional)	7.5	100	14	31.5	17.25	45	1.9-2.5	HAM IV	$549.95

Tooled Manufacturing . . . Highest Quality Materials

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



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

3. Thick-wall *swaged* aluminum tubing

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

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

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

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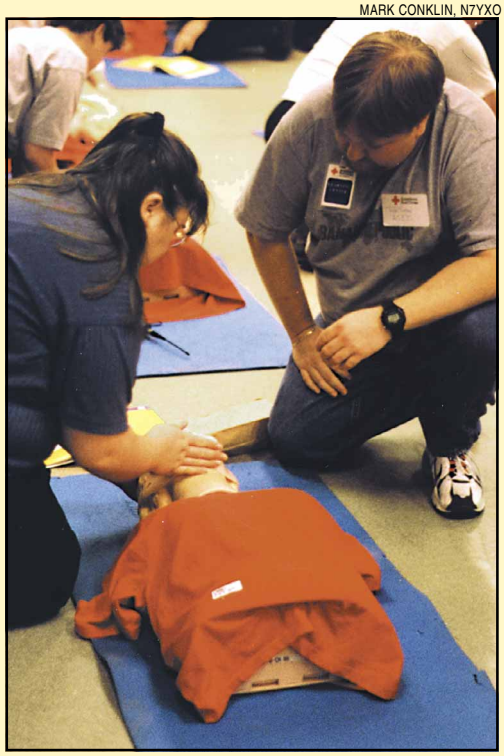
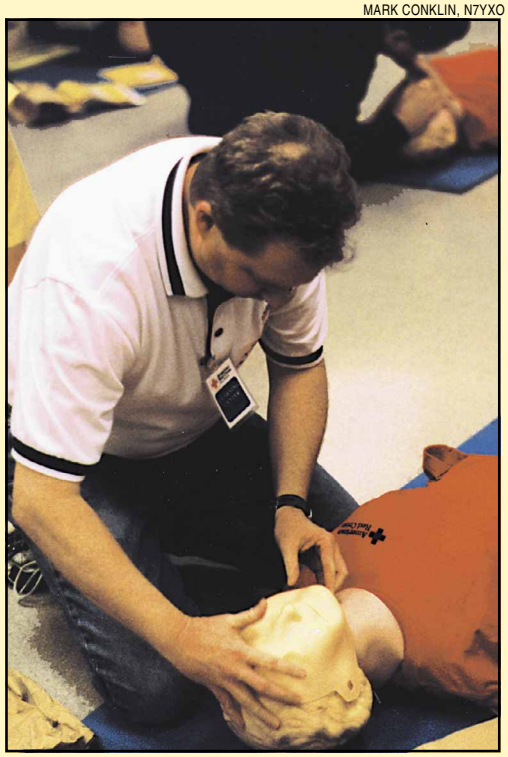
UP FRONT IN QST

MARK CONKLIN, N7YXO



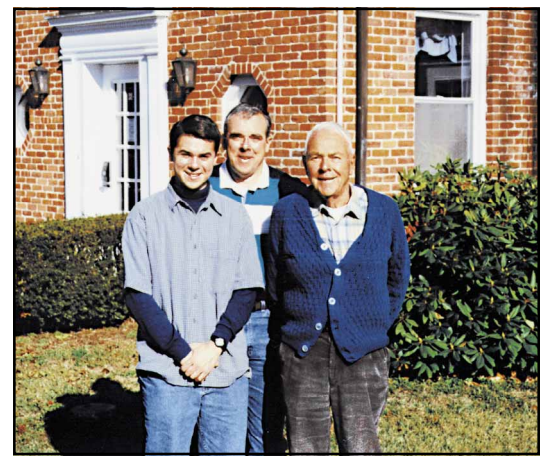
Preparing for the worst. Last February about 20 amateurs showed up for CPR and first aid classes at the Tulsa, Oklahoma, chapter of the American Red Cross. Jenny Martin, KD5LPL (above), tilts the training mannequin's head and checks for breathing as Thom Sloan, K5ZJQ, looks on. Kelly Baker, N5TUG (below), quickly finds a pulse on his mannequin.

MARK CONKLIN, N7YXO



Amateur Radio up close. Last January, after the Hudson PRB-1 Task Force meeting, ARRL Hudson Division Assistant Director Herb Sweet, K2GBH (seated), had the opportunity to show off his station to ARRL Hudson Division Director Frank Fallon, N2FF (left) and Westchester (New York) state assemblyman Ron Tocci. Tocci is the sponsor of a proposed New York tower bill.

Three generations of Andrew Maroneys visit W1AW. From left to right, Andrew IV, W2AJM, Andrew III, WA2QAX and Andrew Jr, W2SON. While at Headquarters, Andrew Jr turned in QSL cards for his DXCC Honor Roll verification, bringing his total to 325.

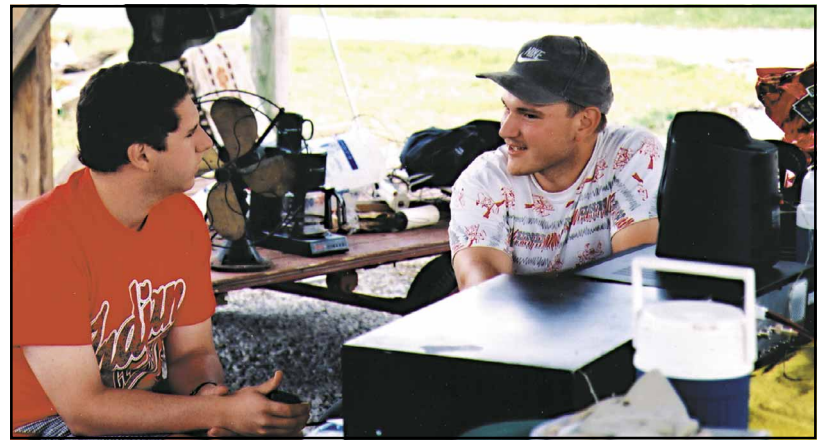


Roving Bavarians. Kurt Vetter, DL3MBY and his wife Margot, DL2MBY hail from the quaint village of Ruhpolding, Germany, but they don't seem to spend much time there. With camping gear, radios and antennas, they traveled the US, stopping here in Arizona where they met up with Bill Jackson, W6HDP.

Field Day ~ 2000 ~ A Fond Look Back

Look out below! From left to right, Don Fitzgerald, KA0EIC, Harvey Tewes, K0RY, Sid Brenner, N0OBM, Virgil Yost, N0XRS and Paul Lambert, KB0OEY, gingerly disassemble the tower at the Central Kansas Amateur Radio Club site.

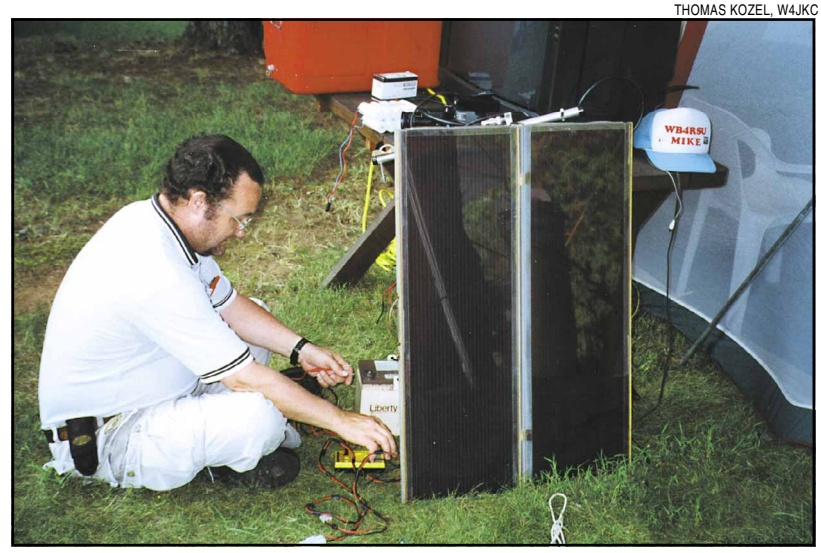
David vs Goliath—Field Day style. Lon Seaboldt, WS0V, prepares to launch antenna lines with his trusty slingshot at the K0HS site in Hot Springs, South Dakota while Chuck Palmer, N0UKO, looks on.



"You mean all hams aren't this crazy?" Aaron Schmitkons, KB8SJK (left) takes a break from the action at W8HF to explain Field Day to college friend Paul Weyant.

"CQ Field Day..." Visiting "junior op" Amber takes her turn at the Antelope Valley (California) Amateur Radio Club's Novice/Technician station.

THOMAS KOZEL, W4JKC

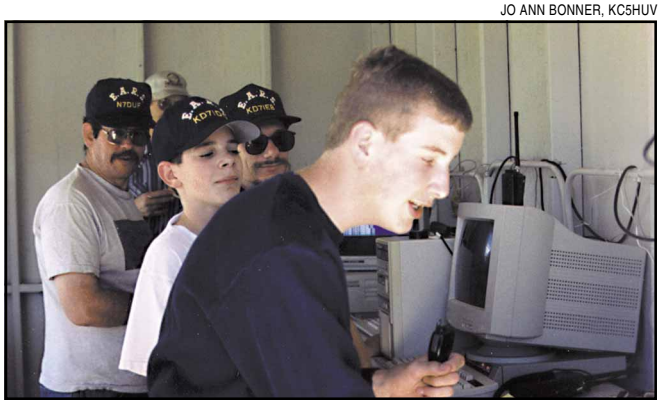


All we need now is a little sunlight. Jim Lollis, WD4BUH, puts the finishing touches on the Anderson (South Carolina) Radio Club solar-powered QRP station.

"I challenge you to a duel—potato guns at 20 paces!" John Rogstad, KB7PKL (left) and Tim Springstead, KC7CAA, compare weapons at the Mt Baker Amateur Radio Club site. They claim their spud guns will carry antenna lines over 100-foot trees on the first attempts.

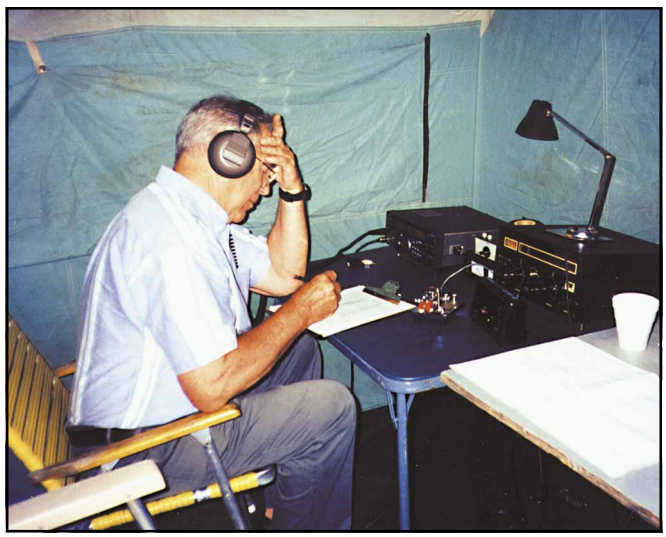
Total solar is the only way to fly. John Kountz, KE6GFF (lower right), chases 6-meter contacts at KE6GFI under 100% solar power.

JO ANN BONNER, KC5HUV



They're all *EARS*. The Eastern Oregon Amateur Radio Society (EARS) station attracted the attention of (right to left) Seth Davis, KD7GXF, Bob Henshaw KD7IDO, Simon Clowes, KD7IEB and Les Hall, N7DUF.

ARE YOU EXCITED ABOUT FIELD DAY 2001?

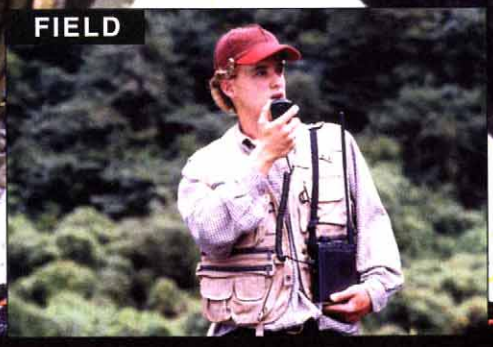


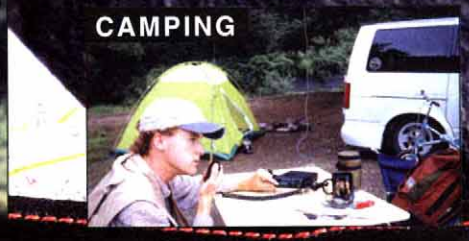
It's been a l-o-n-g day. A weary Hugh Brown, W2IB, cranks out the CW QSOs at the Ogdensburg (New York) Amateur Radio Club station.

Watch that grill! Wendy Swalwell, VE7FYY, deftly dodges the flames while on cooking duty at the London (Ontario) Amateur Radio Club Field Day effort.

The Ultimate Backpacker!

Ham Radio in the Great Outdoors: It's the Best with Yaesu's FT-817!





Actual Size

Bring Ham Radio along on your next hiking, camping, or business trip with Yaesu's amazing new FT-817 Multimode HF/ VHF/ UHF Portable Transceiver!

- **ULTRA COMPACT:** Measuring just 5.3"x 1.5"x 6.5" WHD (135 x 38 x 165 mm) and weighing about 2 1/2 pounds (1.17 kg, including the supplied antenna and alkaline cells), the FT-817 is small and light enough to take along wherever you're going.
- **WIDE FREQUENCY COVERAGE:** 160-10 meters on HF, plus the 50, 144, and 430 MHz Amateur bands. Plus FM Broadcast, AM Aircraft, and Public Safety receiver coverage.
- **MULTIMODE DESIGN:** Ready for action on SSB, CW, AM, FM, FM-Wide (Rx), 1200/9600 bps Packet, and Digital, including dedicated USB and LSB PSK-31 configurations.
- **5 WATTS POWER OUTPUT:** Using a new-technology all-band MOS FET power amplifier, the FT-817 provides 5 Watts of power output when using a 13.8 Volt DC source. When using Alkaline batteries or the optional FNB-72 Ni-Cd Battery Pack, power is automatically set to 2.5 Watts;via Menu, this can be changed to 0.5 Watt, 1 Watt, or up to 5 Watts.
- **WIDE CHOICE OF POWER SOURCES:** The FT-817 is equipped with an alkaline "AA" cell battery case, and a 13.8 volt DC cable is also supplied. Available as an option is the FNB-72 Ni-Cd Battery Pack (9.6 V, 1000 mAh), which can be recharged using a 13.8 Volt power supply while the radio is being operated.
- **TWO ANTENNA PORTS:** A "BNC" connector is provided on the front panel, and a type "M" connector on the rear panel, with Menu selection of which connector will be assigned for operation on HF, 50 MHz, 144 MHz, and 430 MHz.
- **OPTIONAL COLLINS® MECHANICAL FILTERS:** An optional filter slot is provided, accommodating either the YF-122S (2.3 kHz) 10-pole SSB filter or the YF-122C(500 Hz) 7-pole CW filter. You get "base station" performance even from a mountain top.
- **INCREDIBLE MEMORY RESOURCES:** You get a total of 208 memories, including 200 "regular" memories which may be separated into ten groups of up to 20 channels each. And you can append an Alpha-Numeric "Tag" to each memory to aid in channel identification.
- **A CW OPERATOR'S DREAM MACHINE:** You get a built-in Electronic Keyer with adjustable weighting, adjustable CW Pitch, CW Normal/Reverse frequency tuning, and you can even use the microphone's UP and DOWN keys to send CW via the Keyer.
- **BUILT-IN CTCSS AND DCS:** The built-in CTCSS and DCS Encoder/Decoder systems provide you with the versatility you need for repeater access or selective calling.
- **DUAL - COLOR LIQUID CRYSTAL DISPLAY:** Select from Blue or Amber display illumination, which can also be switched off to conserve battery life. And while you're away, the Spectrum Scope will provide you with a visual record of activity ±5 channels from your current operating frequency.

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FT-817

HF/50/144/430 MHz Multimode Transceiver

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Specifications subject to change without notice. Specifications guaranteed only within Amateur bands.Some accessories and/or options are standard in certain areas. Frequency coverage may vary in your country Check with your local Yaesu dealer for specific details.

Real Performance for the Real World!

Today's elite-class operators demand the best RF weaponry available. Yaesu's exciting new MARK-V FT-1000MP answers the call, with an expanded array of receiver filtering, 200 Watts of power output, and Class-A SSB operation capability for the cleanest signal on the band. Enhanced front-panel ergonomics on the front panel save you seconds in a pile-up or a contest "run," and Yaesu's HF design and manufacturing know-how ensures that no short-cuts have been taken in our effort to bring you the best HF transceiver money can buy. For more QSOs in your log, and more awards on your wall, there is only one choice: the MARK-V FT-1000MP from Yaesu!

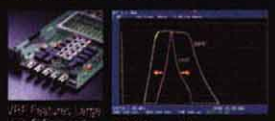
I. Interlocked Digital Bandwidth Tracking System (IDBT)

The IDBT feature greatly simplifies SSB operation by matching the bandwidth of the DSP (Digital Signal Processing) system to the net bandwidth of the 8.2 MHz and 455 kHz IF stages. The IDBT system accounts for the settings of the IF WIDTH and SHIFT controls, and automatically sets a DSP bandwidth which matches the analog IF bandwidth.

IDBT: A Breakthrough in Selectivity

II. Variable RF Front-End Filter (VRF)

Protecting the MARK-V's receiver components from strong out-of-band signals, the VRF system acts as a high-Q "Preselector," located between the antenna and the main bandpass filter networks, providing additional RF selectivity on the 160-20 meter Amateur bands for multi-operator contest teams, DX-peditions, or for operation near MW/SW broadcast stations.



VRF Features Large High-Q Coils and High-Quality Relays

VRF Typical Bandpass Response (9.5 MHz)

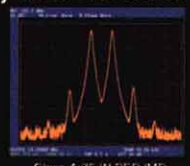
III. 200 Watts of Transmitter Power Output

Utilizing two Philips® BLF147 Power MOSFETs in a 30-Volt, push-pull configuration, the MARK-V's transmitter puts out up to 200 Watts of clean output power, thanks to the conservative design of the PA section.

T-Configuration Heat Sink

IV. Class-A SSB Operation

Exclusively available on the MARK-V FT-1000MP, a press of a front-panel button engages Class-A SSB operation of the transmitter, at a power output level of 75 Watts. Class-A operation produces incredibly clean signal quality, with 3rd-order IMD typically suppressed 50 dB or more, and 5th- and higher-order products typically down 80 dB or more!



Class A 75 W PEP IMD

V. Multi-Function Shuttle Jog Tuning/ Control Ring

The immensely-popular Shuttle Jog tuning ring, which is concentric with the Main Tuning Knob, has a new look in the MARK-V: it now includes the activation switches for the VRF (left side) and IDBT (right side) features, so you don't have to move your hand position to activate these important circuits during contest or pile-up situations!

Access VRF and IDBT Features via Shuttle Jog Dial

Features

■Frequency Coverage: (RX) 100 kHz–30 MHz; (TX)160–10 m Amateur Bands ■Dual In-band Receive w/Separate "S" Meters ■Ten Pole Collins® Mechanical Filter Built-in ■RX DSP Noise Reduction and CW Peaking Filter ■High-speed Automatic Antenna Tuner ■Two TX/RX Antenna Jacks plus RX-only Jack ■TX Microphone Equalizer ■RF Speech Processor ■Direct Digital Synthesis ■CW Spot and Two Key Jacks ■Two Headphone Jacks (1/4" and 3.5 mm) ■Low-Level Transverter RF Drive Jack ■Separate FP-29 Power Supply (30 V/13.8 V DC Output)

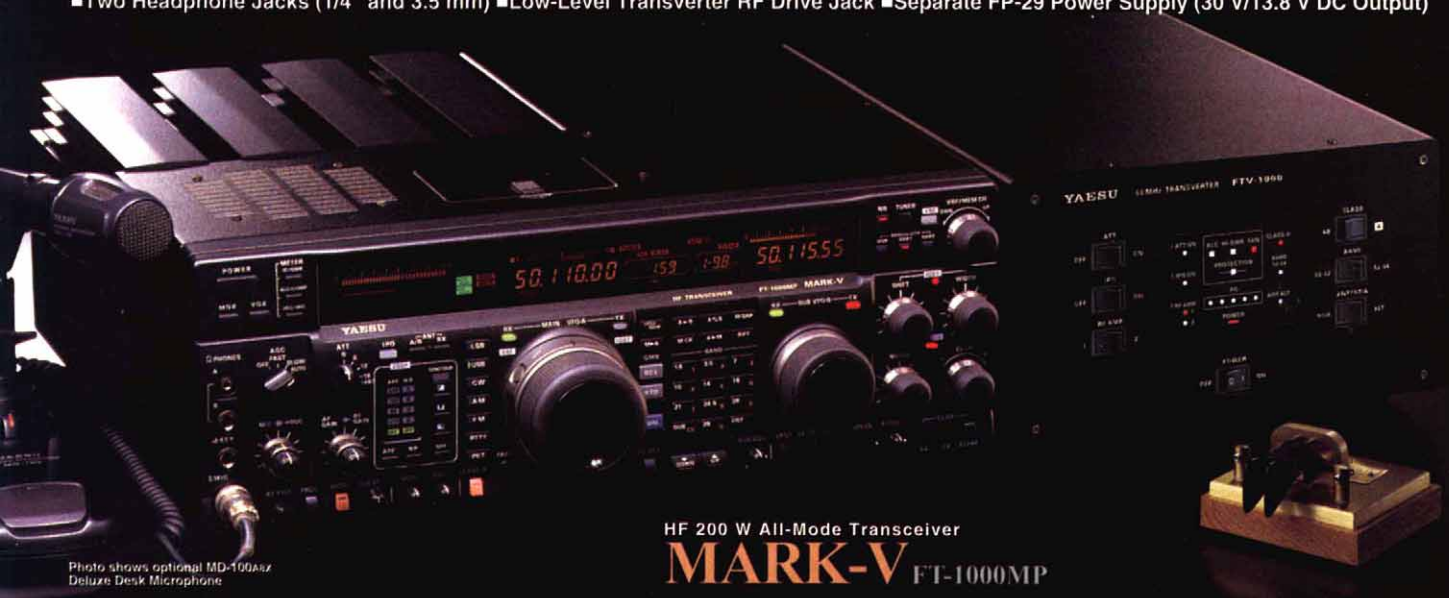


Photo shows optional MD-100A8x Deluxe Desk Microphone

HF 200 W All-Mode Transceiver

MARK-V FT-1000MP

EXPAND YOUR DX HORIZONS WITH THE FTV-1000 50 MHz TRANSVERTER!

- 50 MHz Transverter with 200 W PEP Power Output
- Class-A Bias Selection for Low TX IMD (PO: 50 W)
- High-Performance Receiver Front End
- Automatic, Effortless Operation with MARK-V FT-1000MP
- Upgrade to High Power with VL-1000 Linear Amplifier

Specifications

Frequency Range:	50-54 MHz
Antenna Impedance:	50 Ohms
Power Output:	200 Watts PEP
Spurious Emissions:	At least 60 dB down
Power Source:	DC 30 V and 13.8 V (supplied by FP-29 Power Supply of MARK-V)
Dimensions:	9.6" x 5.4" x 13" WHD (243.5 x 136.5 x 331 mm)

FTV-1000

200 W 50 MHz Transverter

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KEEPING THE NEIGHBORS HAPPY

♦ I enjoyed reading W6FY's experiences with RFI ("The Saga of Unshielded Wires") in the April 2001 *QST*. When I moved into an antenna restricted subdivision 21 years ago, I knew that setting up a ham station would not be easy. Today I run a kilowatt on HF with antennas "hidden" behind the house consisting of a Cushcraft R7000 multiband vertical, a long wire for 80 meters and two 40-meter phased dipoles switchable as an east-west beam. I get no more complaints from my neighbors. What did I do?

Well, I bought a lot of new phones and installed a lot of toroid choke filters on phone lines, TV cables, power cords and the multitude of computer cables and wires. With an extensive phone system in my own home and four personal computers, getting rid of all the RFI required choking off RF on almost every wire in the house, but it's worth it. Now I can run a phone patch on 15 or 20 meters while transmitting at 1000 W to the antenna and have no telephone interference.

One neighbor's phone was so sensitive to RF that only 5 W caused interference. I bought him a new phone and installed filters. Now he doesn't hear my kW signal. Most neighbors were delighted when I upgraded their phones. The nastiest neighbor told me to cease and desist or he would call the FCC. I showed him the FCC's position papers on RFI and offered to change out his phone and install filters. Two years later, I'm still waiting for his phone call taking me up on my offer. I guess he is just too stubborn to allow me to fix his problem. The rest of the neighbors are wonderful friends.—*Gene Preston, K5GP, Austin, Texas*

KEEP THE CHALLENGE

♦ I sit and chuckle to myself as I read all the hype in the correspondence portion of the *QST* about Morse code. I learned my CW at the age of 17 while serving with the US Navy in San Diego. At the time it was either swab decks or learn Morse code; I found the code was a lot more enjoyable. It is merely a language and anytime you learn another language it takes time and commitment to become fluent. I do about 95% of all my communicating by CW, but that is my preference. The real underlying reason for the dislike for CW seems to come from the fact that we want something for nothing these days. Learning CW is not hard, but it does take time and effort.

When I took the General written test, the FCC came to San Antonio from Houston every quarter to administer the code and written portions. No question pools. You had no idea what the test would contain, so you had to study all the material such as the rules, electronic theory and operating procedures if you expected to pass.

Today you are given the answers and the questions. You can probably spend a week studying the test and pass with flying colors without any prior knowledge of hamming.

The reason that the requirements were eased for ham radio is understandable. The commercial vultures were circling, and their interest in our bands forced the ARRL to recruit lots of members. With numbers comes strength (why do you think fish school?) to fight the money and power of the commercial giants. So far it is working because we have been able to keep most of our spectrum.

Perhaps we can make the written portion more technical, but if we are given the answers and the questions, what does that prove? Should we then remove the CW portion as well? In the midst of all these changes, what has happened to the concept of challenge?

When you went to college and decided on a field of study, the college gave you a list of subjects and classes you were required to pass before you could graduate. Any college graduate can remember having to slog through subjects that seemed to have no apparent relationship to the ultimate goal of becoming an engineer, doctor or whatever. Even so, we all remember the pride of accomplishment when we finally received our diplomas. The parallels to the process of obtaining an amateur license should be obvious.

Yes, CW is a dying art, but so is Latin and it is still used extensively. Come on, folks! Even a 7-year-old child can pass a 5-WPM code test. How much easier do you want the ham license to be?

Amateur Radio is a huge avocation with lots of different avenues and the amateur frequency spectrum is wide enough for all interests, modes and peoples. What is the real gripe? Amateur Radio is a hobby that spells fun in my book.—*Doug Gollihar, KA5KLU, San Antonio, Texas*

TIRED OF THE NAYSAYERS

♦ I am tired of Amateur Radio's naysayers—particularly the Amateur Extra hams licensed prior to April 15, 2000. Since then I have heard comments such as, "A monkey can be trained to pass the Amateur Extra exam now" and "Extras licensed after the new rules became effective are Extra Lights." There are those who wear name tags at hamfests that read "20 WPM Extra." Attitudes and actions like these are damaging and have no place in Amateur Radio.

Naturally, the assumption is that it's easier to quality for an Amateur Extra license now. This is not true! The written part of the Amateur Extra exam is more difficult now than it was prior to Restructuring. The most difficult parts of the previous Advanced and Extra exams were combined to make for a very tough test. The question pool is considerably larger. In my opinion, the reduced code requirements were offset by the greatly increased written exam. All Amateur Extra licensed hams have completed very difficult testing and should be proud of their accomplishment.

Times change and we need to change with the times. Change is beneficial; accept it and embrace it! I believe the best approach is to encourage all hams to upgrade as far as they can with Amateur Extra as their ultimate goal. This will foster activity by currently licensed hams and attract nonhams to take an interest in Amateur Radio. We need to protect our privileges by increasing our numbers.—*Roger Jefferson, AC4U, Graham, North Carolina*

THE GOOD OLD DAYS?

♦ In the good old days, we ran radioteletype (RTTY) with mechanical wonders that filled our stations with noise and the smell of hot oil. There were miles of yellow paper and paper tape. I probably still have oily little chads stuck in the corners of my basement.

Of course, things will never be as good as back then, but I am totally amazed at the quality of the software being given away for PSK31. I downloaded *DigiPan* and have marveled at the waterfall panoramic display and so many other features. I plugged the headphone audio into

the Compaq laptop and immediately started printing 80-meter PSK31 stations, and there are lots of them. It's hard to believe they can be packed into so little spectrum and all be 100% copy! The "Warbler" kit is on order and I've got to go string a new antenna.

I guess we'll never go back to the old RTTY days…and thank heaven for that! *—Ken Shubert, K0KS, Olathe, Kansas*

LARRY SCHEFF POINTS THE WAY

♦ Kudos to Larry Scheff for his outstanding "How to Maximize Your Receiver's Selectivity" articles in the February and March *QST*. I had wondered why I would ever want a control to "attenuate" a signal. Now I understand. I will re-read this article several times. I immediately used these practical ideas in my net operating.

I wonder why the makers and sellers of such a sophisticated piece of gear assume that we automatically know how to use them properly? The manuals don't adequately explain practical use of the filters, bandpass tuning and the differential use of RF and AF gain controls to isolate the desired signal and leave out most of the noise. Ten-Tec, Kenwood, ICOM, Yaesu and other makers of sophisticated HF gear: *listen up!* We would appreciate your product much more if the people writing your manuals would take the time to write about such practical management of the receiver controls.*—Eugene C. Clark, W4AYK, Albany, Georgia*

ARRL DUES INCREASE

♦ I received my March *QST* and read the "It Seems To Us" column about the new dues increase. Two words described my reaction: Don't apologize!

I was a member back when I was first licensed in the early seventies and I'm pleased to be a member again. In spite of the naysayers and the ever-present acrimony, the hobby is healthy and so is the ARRL. I also belong to some other organizations that promote and support my hobbies and interests, but none of them yield anywhere near the return for the dues invested that the ARRL provides.

I sometimes buy other Amateur Radio magazines, but *QST* always has the most information and the broadest coverage. The ARRL Web site is world class and a good spot for researching any ham radio topic that comes to mind. The Headquarters staff is always friendly and courteous when I call with an inquiry or order. And, I deeply appreciate having a watchdog function to look out for my Amateur Radio privileges in a world that is hungry for spectrum.

One need not agree with every position or function of the ARRL in order to support it. Diversity of interests and agendas is common to all organizations and the only acceptable response to any directional conflict is active participation and support for the overall mission. Apparently, many licensed American hams who are not League members don't understand this. That's a shame. They're benefiting from the actions of the ARRL anyway.

I won't be lying awake worrying about a few more dollars the next time I renew my membership. It's a bargain.*—F. Gordon Hubbell, WD4FGH, Charlotte, North Carolina*

THE VENETIAN BLIND ANTENNA

♦ I just read, with interest, about AA1DO's condo antenna farm (*QST* April 2001, page 64). My own situation is a ham's nightmare or challenge, depending upon how you look at it.

I live in a second-floor apartment and am unable to have any outdoor antenna or anything in the common attic space. This is a Senior Citizens apartment in a converted church building. I immediately tried to come up with a workable indoor antenna arrangement. What I devised has netted me 67 countries or so on 20, 17 and 15 meters CW and SSB.

The antenna is a simple bottom-loaded "inverted **U**" wire that is mounted in my second-floor window. It is supported on the venetian blind with cable ties. The blind slats are vinyl, not metal, of course. The window itself is 40 inches wide and 44 inches high, so the wire is 35 inches across the top and 40 inches on the two sides. A 27-inch piece of stranded insulated wire with an alligator clip on one end connects the one side of the inverted **U** to an airwound loading coil of 14 turns of no. 10 wire 2 inches in diameter. A short run of coax from my Yaesu FT-920 transceiver is connected to the bottom of the coil and a "ground plane" of random length 4-inch wide copper strap. Using the alligator clip I can resonate my Venetian Blind Antenna for 20, 17 and 15 meters with an SWR of less than 1.5:1. The built-in tuner in my FT-920 trims it down to a perfect match.

I'm pretty satisfied with its performance. I haven't been able to put in a lot of hours operating, but 67 countries in the limited time I have been on the air aren't bad. The one thing that amazes me, though, is this: The window my Venetian Blind Antenna is mounted in faces southwest. Contacts with Europe and Russia and Africa are most common and usually with the best reports (often S7 or better), yet my transmit signal has to go through the entire apartment building to exit toward those countries!

So, there is always hope for the "antenna disadvantaged" ham. Apartment dwellers, take heart!*—Ray Jenkins, W3MQA, Youngwood, Pennsylvania* QST

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3CX2500A3	4CX250B & R	4CX10000D	3-500ZG
3CX2500F3	4CX350A & C	4CX15000A	3-1000Z
3CX2500H3	4CX400A	4CX20000A7	4-125A
3CX3000A7	4CX800A	5CX1500A & B	4-250A
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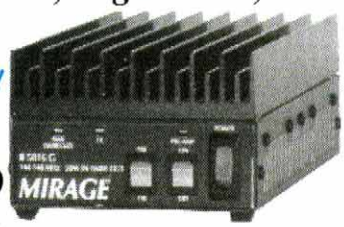

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Watts Out	*130*	*135*	*140*	*145*	*150*	*155*	*160*	*165*
Watts In	*20*	*25*	*30*	*35*	*40*	*45*	*50*	*55*

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Watts In	*¼*	*½*	*1*	*2*	*4*	*6*	*7*	*8*

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Watts In	*1*	*2*	*3*	*4*	*5*	*6*	*8*

- ***35 Watts Output on 2 Meters***
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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***
- ***Auto Band Selection***
- ***Auto T/R Switch***
- ***Full Duplex Operation***
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6 Meter Amplifier

FCC Type Accepted

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D-3010-N, $365 -- 100 W out/30 in. For 5 to 45 Watt *mobile/base*. **D-1010-N, $395**, 100 W out/10 in. *Dual purpose* -- for handhelds or mobile/base. **D-26-N, $269**, 60 W out/2 in, for *handhelds*.

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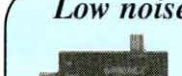

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144-148	KP-1/2M	KP-2/2M
220-225	KP-1/220	KP-2/220
430-450	KP-1/440	KP-2/440

1¼ Meter Amps (223-225 MHz)

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By Paulo N. Jorge, CT1EFL

The Spot Grabber

Catch all the DX action by tapping into what's happening on your local packetcluster—*without using your computer!*

In addition to hours of patience coupled with sharp operating technique, successful DX chasing requires a dedicated DXer to be completely informed of any ongoing or upcoming DX-station appearances. Recently, the widespread availability of DX packetclusters and the flexibility of the Internet have simplified the hunt for DX by informing us—often in real-time—of active rare stations. I'm referring, of course, to today's common DX-hunting procedure of connecting to a local packetcluster while simultaneously scanning the bands.

Of course, most DX-cluster eavesdropping is done with the help of your trusty shack PC. But *why*? Surely there has to be an alternative to tying up your PC just to monitor a few DX-spot transmissions! With that in mind, I decided to devise a PC-free system that would silently stand guard for interesting DX spots.

Having written programs for a range of Microchip's PIC microcontrollers, I wondered if one of them could be persuaded to perform the spot-monitoring tasks of the PC.[1] After a few busy weeks of code bashing and breadboard hacking, I conjured up a working prototype based on a 16F876 microcontroller. It's probably not the best microcontroller choice for the job at hand, but undoubtedly it's one of the least expensive; it's readily available and easily programmed.

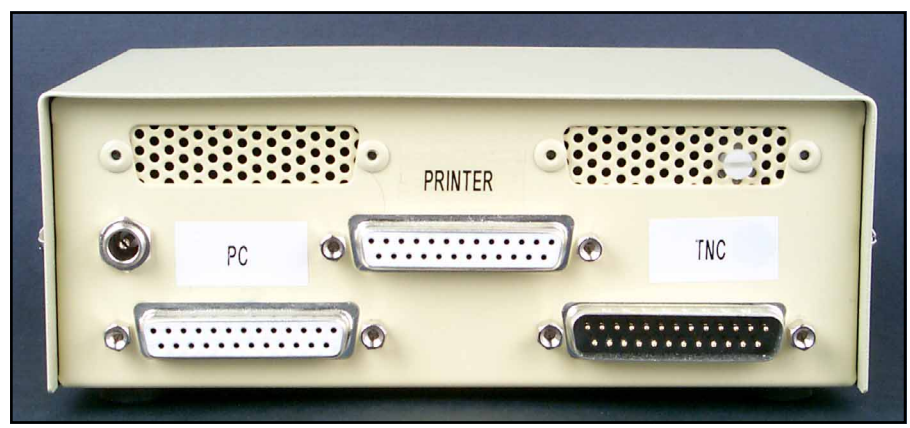
PHOTOS IN THIS ARTICLE BY JOE BOTTIGLIERI, AA1GW

The Early Bird Gets the Worm

Being one of the first on a DX op's listening frequency definitely improves your chances of working him. Getting to the party early is the key! You want to be there before the pileup grows and the big guns swamp your signal. Not so long ago, early warning methods were used to alert "the deserving" to any rare stations heard. Informing fellow hams on a local repeater or making chain telephone calls was fairly common. Nowadays, this task has been primarily replaced by the DX packetcluster network that gives everybody a chance to keep abreast of what's currently happening on the bands. Using the information acquired from the DX packetcluster correctly permits a lightning fast, surgically precise QSO enabling you to bag yet another needed country.

A few years ago, a small black box called the DX Peeper appeared on the market.[2] Connected to a radio, it would alert you to activity on all the DX spots that its built-in TNC monitored. Lacking a display, a CW generator announced the DX's call sign and frequency before placing that into one of its six memories. No spot filtering or printer output was available. Today, with the proliferation of home computers, DX-packetcluster monitoring is done almost exclusively using PC software.

As I'm writing this, my shack's Pentium PC, running logging software, is also standing guard for any juicy DX spots.[3] Most computer logging programs have the facility to connect to the local



Rear panel view of the Spot Grabber.

[1]Notes appear on page 35.

DX cluster and see the latest real-time DX spots. The program I use can check received spots against my station's log and a set of predefined filters to see if there's a needed entity. The program then alerts me accordingly. I don't even have to be connected to the cluster because, like the DX Peeper, as long as there are other stations connected to the cluster, it monitors their exchanged packet traffic.

Some of the newer VHF/UHF transceivers on the market have similar features.[4] These allow you to catch all the DX-cluster spot activity, thanks to their built-in TNCs—even while operating mobile or portable. Unfortunately, unlike the PC software utilities, they don't permit filtering for specific spots.

Does having a PC switched on just to monitor and process DX-spot exchanges seem a waste of energy and processing power? Perhaps you just want a mobile DX-cluster monitoring system but don't want to dish out yet more money on the latest TNC-equipped transceiver. If so, adding the Spot Grabber to your existing home or mobile station may be a good option. The Spot Grabber, as its name suggests, plucks DX spots from the ether and processes them according to your previously defined instructions. It combines the best of the formerly mentioned spot-monitoring systems. Spot Grabber features include a scrolling memory display, an audible alarm, spot filtering, hardcopy printing and full configurability. In fact, the only thing this first version can't do is check the received spot with your log's countries-needed list and tune your rig!

The Spot Grabber

The Spot Grabber is a standalone replacement for a PC seeking DX-cluster activity. Placed between your existing TNC and PC, the Spot Grabber can be switched to one of three modes. Refer to Figure 1.

S1 controls the Spot Grabber's three operational modes. When off, it is powered down and is effectively out of circuit. Its RS-232 ports are linked together so a normal TNC-to-PC link exists allowing classic operation.

When on, the Spot Grabber is powered up and the PC is switched out of the circuit. Since only the TNC port is connected, all packet information received is routed by S1 to the Spot Grabber. The unit analyzes the TNC's output for any DX-spot information. It does this by looking for a 75-character long string beginning **DX de** and ending in **Z**.

Example:

DX de DL6CM: 18069.5 CU8F
Flores Isl 1757Z

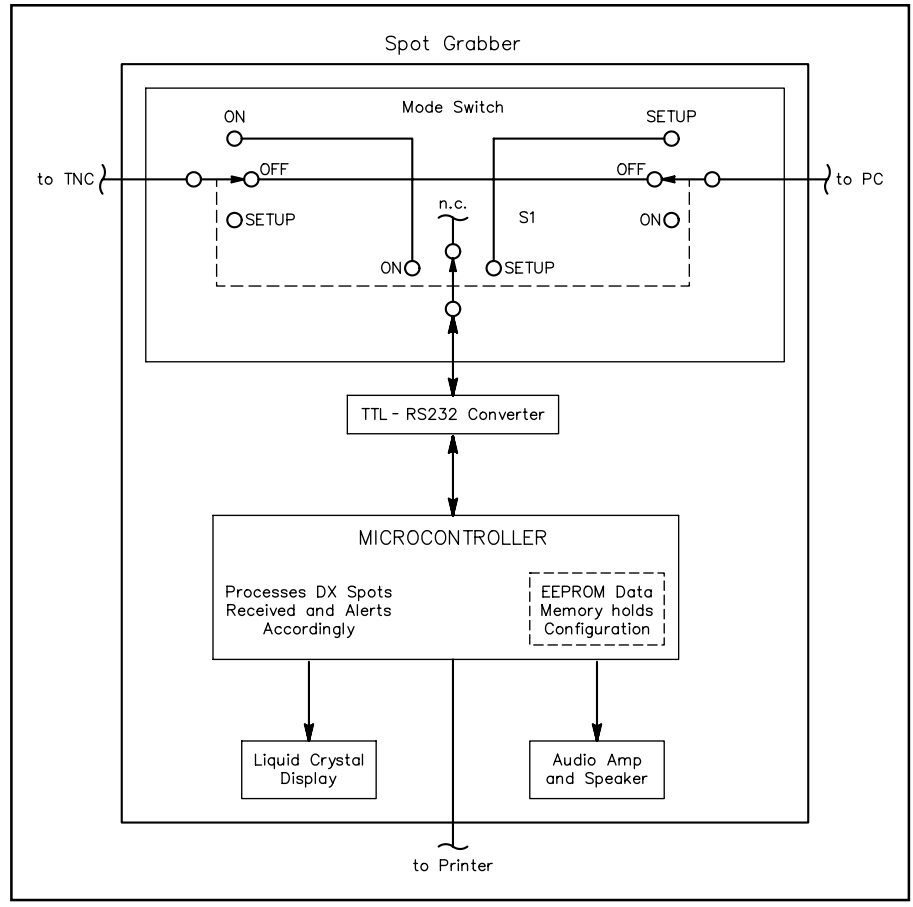


Figure 1—Block diagram of the Spot Grabber signal flow.

The call sign, frequency, time and any comment are then parsed out of the string for processing.

By switching S1 to **SETUP**, the Spot Grabber is also powered on, but placed in a configuration mode. S1 routes the PC port to the Spot Grabber ready for configuring by the Windows setup program.

The circuit can be analyzed by referring to Figure 2. All the heavy lifting is done by U1, a Microchip PIC microcontroller (see Note 1). The 16F876 is an enhanced version of the ubiquitous 16F84. It has 8 kB of flash program memory, simplifying firmware development and making it possible to upgrade to future Spot Grabber code versions.[5] Lots of RAM is available, which is essential in processing the many variable string arrays. Its three I/O ports provide 22 pins for interfacing to the outside world and like the 16F84, it has EEPROM data memory—albeit more of it—ideal for saving all of the program's configuration options. Microchip's 16F876 data sheet states that a minimum of 100,000 write cycles can be performed on each memory location of the chip's EEPROM data area and an unlimited number of read cycles. If you were to change the unit's setup once a day, this equates to a life span of over 270 years!

The Spot Grabber's gray matter is formed by the program code crammed into its 8 kB×14-word flash program memory. Of course, the 16F876 *must be programmed*. The latest Spot Grabber code is available on the Internet and by post.[6] There are many commercially available PIC programmers. For this project, your PIC-programming software should have HS oscillator type selected and the Watch Dog Timer enabled. If you consider building a PIC programmer from any of the designs available on the Internet, make sure it can program a 16F876. However, before deciding whether to build or buy a PIC programmer, ask around. With the widespread use of PICs in ham projects, someone at your local radio club may already have a 16F876-capable programmer.

Serial communications to the outside world takes place via U3, a MAX232. This IC converts the TTL voltages of U1 to and from the RS-232 voltage levels used by PC serial ports. Although the 16F876 can be made to talk directly to serial ports, using U3 ensures full RS-232 equipment compatibilty. A speed of 2400 baud with hardware flow control is employed. Therefore, five-wire serial cables, a correctly configured TNC and terminal

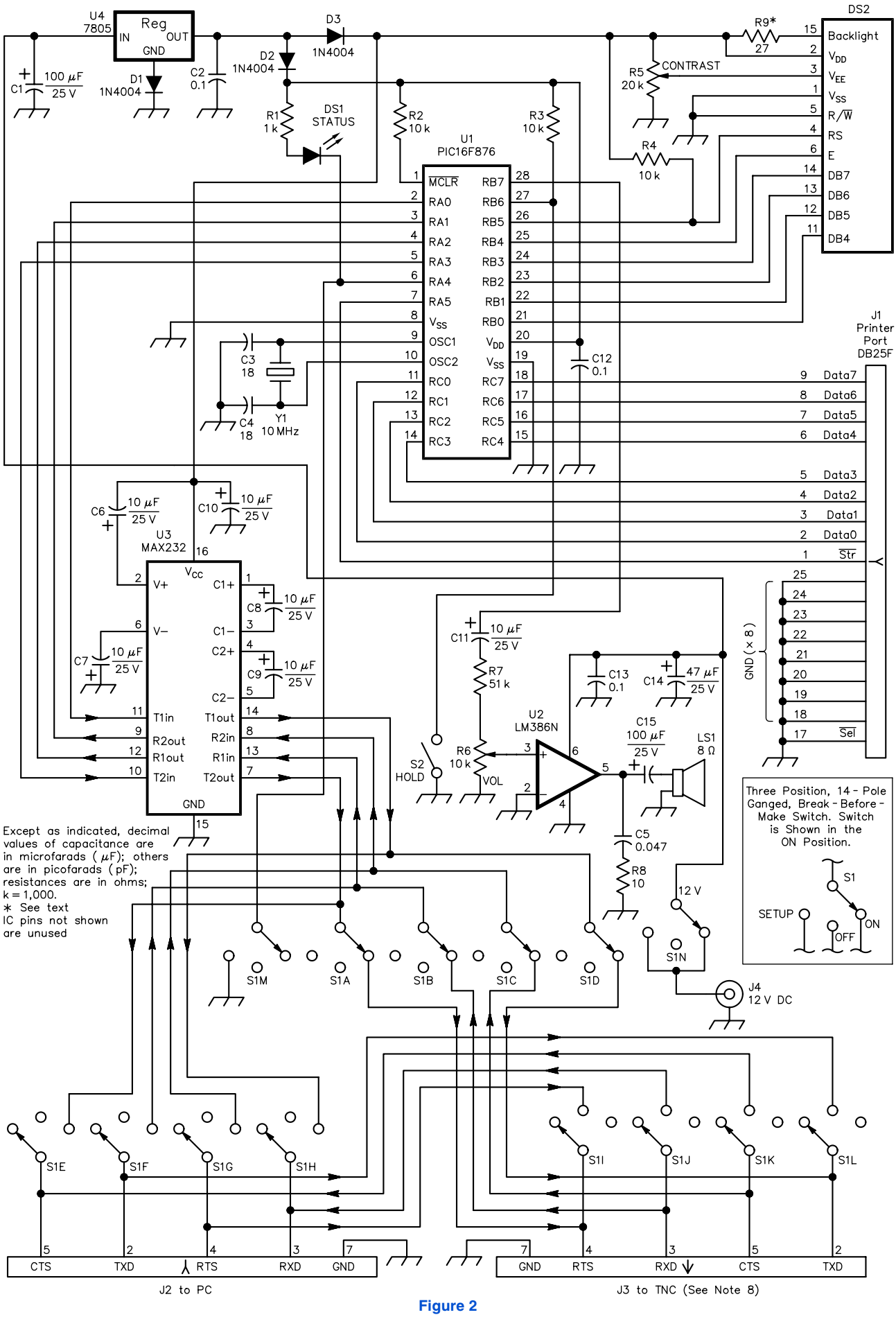
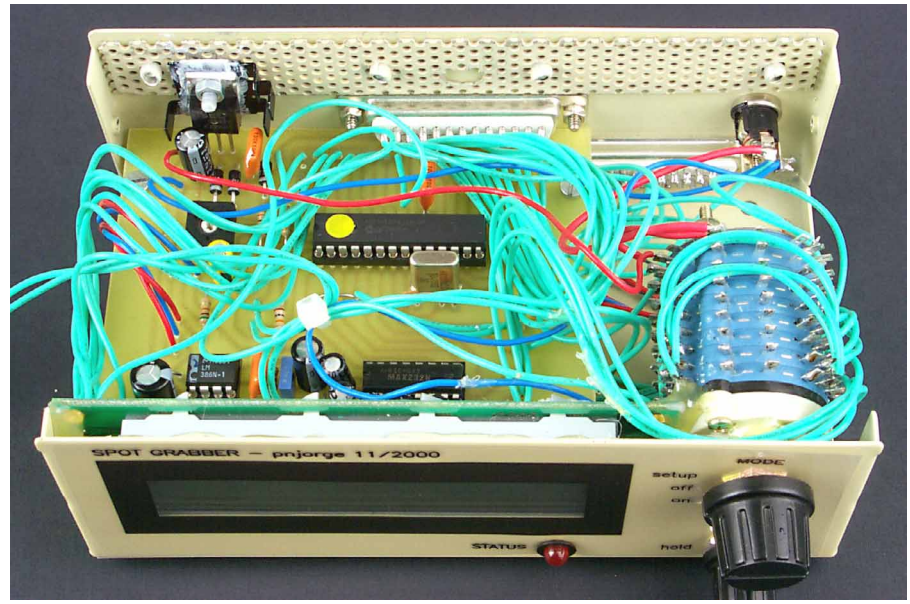

U4
7805
Reg
IN
OUT
GND
C1
100 µF
25 V
D1
1N4004
C2
0.1
D2
1N4004
D3
1N4004
R1
1 k
DS1
STATUS
R2
10 k
R3
10 k
U1
PIC16F876
MCLR
RA0
RA1
RA2
RA3
RA4
RA5
VSS
OSC1
OSC2
RC0
RC1
RC2
RC3
RB7
RB6
RB5
RB4
RB3
RB2
RB1
RB0
VDD
VSS
RC7
RC6
RC5
RC4
R4
10 k
R5
20 k
CONTRAST
R9*
27
DS2
Backlight
VDD
VEE
VSS
R/W
RS
E
DB7
DB6
DB5
DB4
C3
18
C4
18
Y1
10 MHz
C12
0.1
J1
Printer
Port
DB25F
Data7
Data6
Data5
Data4
Data3
Data2
Data1
Data0
Str
Sel
GND (× 8)
C6
10 µF
25 V
C10
10 µF
25 V
U3
MAX232
VCC
V+
V−
C1+
C1−
C2+
C2−
T1in
R2out
R1out
T2in
T1out
R2in
R1in
T2out
GND
C8
10 µF
25 V
C9
10 µF
25 V
C7
10 µF
25 V
C11
10 µF
25 V
R7
51 k
C13
0.1
C14
47 µF
25 V
U2
LM386N
R6
10 k
VOL
S2
HOLD
C15
100 µF
25 V
LS1
8 Ω
C5
0.047
R8
10
12 V
S1N
S1M
S1A
S1B
S1C
S1D
J4
12 V DC
Three Position, 14 - Pole Ganged, Break - Before - Make Switch. Switch is Shown in the ON Position.
S1
SETUP
ON
OFF
Except as indicated, decimal values of capacitance are in microfarads (µF); others are in picofarads (pF); resistances are in ohms; k = 1,000.
∗ See text
IC pins not shown are unused
S1E
S1F
S1G
S1H
S1I
S1J
S1K
S1L
CTS
TXD
RTS
RXD
GND
J2 to PC
GND
RTS
RXD
CTS
TXD
J3 to TNC (See Note 8)

Figure 2

Figure 2—Schematic of the Spot Grabber circuit. Unless otherwise specified, resistors are 1/4-W, 5%-tolerance carbon-composition or metal-film units. For part numbers in parentheses, DK = Digi-Key Corp, 701 Brooks Ave S, Thief River Falls, MN 56701-0677; tel 800-344-4539, 218-681-6674, fax 218-681-3380; www.digikey.com; JC = Jameco Electronics, 1355 Shoreway Rd, Belmont, CA 94002; tel 650-592-8097, domestic fax, 800-237-6948, international fax, 650-592-2503; info@jameco.com; www.jameco.com; MO = Mouser Electronics, 958 N Main St, Mansfield, TX 76063-4827; tel 800-346-6873, 817-483-4422, fax 817-483-0931; sales@mouser.com; www.mouser.com. Equivalent parts can be substituted; n.c. indicates no connection.

C1, C15—100 µF, 25V (DK P6633)
C2—0.1 µF monolithic, polyester or Mylar (DK P4593)
C3, C4—18 pF ceramic (DK P4015A)
C5—0.047 µF monolithic, polyester or Mylar (DK P4589)
C6-C11—10 µF 25 V (DK P6629)
C12, C13—0.1 µF monolithic, polyester or Mylar (DK P4593)
C14—47 µF, 25 V (DK P6632)
D1-D3—1N4004 (DK 1N4004MSCT)
DS1—LED (DK HLMP-4700QT)
DS2—20-character, two-line LCD with backlight, ie, a Wintek WM-C2002M, or Optrex DMC-20261NY-LY (DK 73-1062); see note 7
J1, J2—DB25F, panel mount (JC 15157)
J3—DB25M, panel mount (JC 15114)
J4—DC power jack, panel mount (MO 163-4001)
LS1—8-Ω miniature speaker (DK P9610)
R1—1 kΩ (DK 1.0KQBK)
R2-R4—10 kΩ (DK 10KQBK)
R5—20 kΩ trimmer (DK 3309P-203)
R6—10 kΩ panel mount, log taper (DK P3H8103)
R7—51 kΩ (DK 51KQBK)
R8—10 Ω (DK 10QBK)
R9—27 Ω (DK 27KQBK)
S1—Three-position, 14-pole ganged, break-before-make switch; see text
S2—SPST; see text (JC 72160)
U1—*Programmed* PIC 16F876-20/SP (DK PIC16F876-20/SP); see notes 5 and 6.
U2—LM386N audio amplifier (DK LM386N-4)
U3—MAX232 RS232 transmitter/receiver (DK MAX232ACPE)
U4—7805 positive 5-V, 1-A regulator (DK NJM7805FA)
Y1—10 MHz crystal (DK CTX057)



Inside view of the Spot Grabber from the front panel. The PIC is near the crystal at the left center of the PC board. The voltage regulator heat sink is secured to the rear panel at the left. In this view you can see the perforated metal strip used to cover the holes made by the removal of the two unneeded DB25 connectors.

software are essential.

A two-line, 20-character LCD, DS2, provides a visual indication of spots received. Trimmer pot R5 is adjusted for best LCD viewing contrast. R9 provides current limiting for the LCD's backlight LEDs. This backlight is essential when using the Spot Grabber in low-light situations, such as a mobile station at night.

Audio output is available on pin 28 of U1 and is sufficient to drive a small piezo sounder. However, U3, a common LM386N audio amp, is used to increase the PIC's audio output for use in noisier environments such as a vehicle. This increase in audio output is also useful for keeping you informed of received spots when you wander from the shack—or for waking you up when that specific DXpedition call is spotted in the middle of the night!

For hardcopy output, the 16F876's port C, pins 11 to 18, provide the Centronics port's data output and port A bit 5, pin 7, is used to strobe the printer. The printer's status is not checked, so make sure it's online with a full paper tray.

Pin 6 of U1, port A bit 4, provides two functions. As an output, it controls DS1, a red **STATUS** LED used to show important Spot Grabber conditions. As an input, when grounded by S1M, it switches the Spot Grabber to setup mode ready for configuring. S2 grounds pin 27 of U1 in normal operation and freezes the scrolling display when open. This **HOLD** switch can be ganged to the **VOL**ume potentiometer to save panel space.

The 5-V supply for U1, U3 and DS2 is derived from a 7805 voltage regulator, U4. The LM386N audio amp, U2, is powered directly from 12 V. S1N switches the 12-V supply to the unit. The middle (**OFF**) position is unconnected so that the Spot Grabber will power up in either **SETUP** mode or normal operation. U1's port A bit 4 is an input on power-up and when grounded by S1M **SETUP** mode is entered.

If the Spot Grabber is switched off but the printer left powered on, leakage current from the printer's Centronics port data and control lines would energize DS2 through U1, thus retaining the last-displayed characters. D2 prevents this from happening and ensures a clean display at turn-on. Because D2 drops about 0.7 V, the output of regulator U4 is raised to about 5.7 V by D1. D3 then brings DS2's supply voltage to a nominal 5 V. This way all IC supplies are kept within their recommended voltage levels.

Putting It Together

The unit's relatively small component count allows for construction on a small single-sided PC board (see Note 6). Mount the 16F876 in a 28-pin IC socket to facilitate removal in case of future firmware upgrades. Mount the microcontroller's 10-MHz clock oscillator crystal, Y1, and associated capacitors, C3 and C4, as close as possible to U1's pins 9 and 10. U1, U2 and U4's 0.1 µF supply decoupling capacitors should also be connected close to their respective ICs. The orientation of all electrolytic capacitors

connected to the MAX232 should be double checked, especially the unconventional polarity of C7. If a heat sink is used on regulator U4 (it doesn't need one), don't ground it. Remember that because the output voltage has been raised by D1, any heat-sink tab will not be at 0 V, but at about 0.7 V. Grounding the heat sink would short D1 and lower the IC supply voltages appearing at the cathodes of D2 and D3.

Only connectors, switches, the **VOLUME** control and display are mounted off-board. You can use any Hitachi HC44780-based two-line, 20-character LCD.[7] If opting for a backlit display, confirm the backlight pin connection and its supply requirements, then choose R9 accordingly. The Spot Grabber's volume level is controlled by R6, a 10 kΩ log-taper pot. Using a ganged switch for S2, to stop the scrolling display, will save on front-panel space.

The **MODE** switch, S1, is a 14-pole, 3-position, ganged, break-before-make rotary switch. Although available from the better electronic component suppliers, such a switch can be hard to find and be somewhat expensive. I opted for rescuing a switch from a 4-position computer data switch. These switch boxes are commonly used to interconnect a PC to two or more peripherals. The switch is actually a 25-pole, 4-position ganged switch but, for this application, 11 of the switch poles are unused and the fourth switch position is ignored. Use an ohmmeter to decipher all of S1's switch connections, then solder the appropriate wires to the Spot Grabber's DB25 serial connectors and board, according to the schematic.[8]

The cannibalized data-switch box isn't wasted: By carefully drilling, filing and repainting, it can house the Spot Grabber (see Note 6). Three of the data-switch's five original DB25 connectors are reused. The photos show the new front and rear panels of the revamped box. The unused top two DB25 cutouts of the rear panel are covered by a piece of thin metal sheet before repainting. Air flow through the box and the sound output is improved if perforated metal is used here.

Connect and install everything *except the ICs* and make sure there are no cold solder joints or bridges on the PC board. After double checking all connections and confirming that all is well, apply power and confirm the existence of 5 V at the cathodes of D2 and D3. You should measure 5 V at the supply pins of U1, U3 and DS2 (pins 20, 16 and 2, respectively). The voltage supply of U2, on pin 6, should be 12 V. If all checks out okay, install the ICs.

Operation

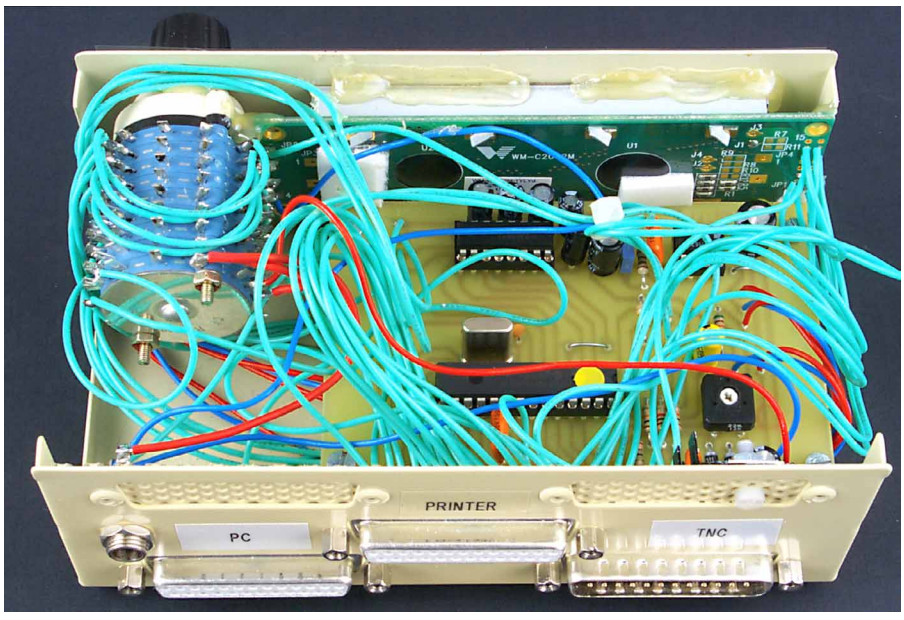
Make sure that your packet-terminal program options are chosen correctly and the TNC is configured correctly. Reliable serial communications to and from the Spot Grabber is achieved with an RS-232 speed of 2400 baud using hardware flow control. On my Kantronics KAM, **ABAUD = 2400** and **XFLOW = OFF** set the right speed and hardware flow control. Your TNC will have similar commands. Also ensure your TNC's **MONitor** is **ON**.

When switch S1 is in the middle (**OFF**) position, besides powering down the Spot Grabber, it also directly connects your PC to your TNC allowing conventional packet operation. This avoids the need to unplug the Spot Grabber every time you want to send messages, connect to your local BBS, see APRS traffic, download the latest DX bulletin, etc. If there is a lack of spot traffic because no one is connected to your local cluster, try connecting your station. Then switch in the Spot Grabber to monitor DX spots sent to you while you use the PC for something else.

When switched **ON**, the unit shows an introductory display and two CW **R**s are sounded, indicating that the configuration settings have been loaded from U1's on-chip EEPROM and all is well. If you have a printer connected and on-line, it will print a page title before standing guard for data from the TNC. The display then scrolls from right to left to show the last five DX spots. Obviously, at turn-on, no spots will have been captured and a **WAITING** message is displayed in place of the DX call sign. The display pauses at each displayed spot for a configurable amount of time, before sequentially scrolling to the next DX spot on the list. You can see which spot on the list is being displayed by the **dx#** field on the left-hand side of the display. The newest spot appears as **dx #1**, while the oldest is **dx #5**.

If a new spot is grabbed and found to comply with your chosen filters, the scrolling display is interrupted and this new spot displayed immediately. In this case the **dx#** field shows **dx nw**, the **STATUS** LED lights and an audible alert is also sounded if desired. Scrolling then recommences with spot **dx #1** in memory replaced by this new spot and all the others in the list move down one position. The oldest spot, namely what was **dx #5**, disappears, of course, since **dx #6** doesn't exist.

The Spot Grabber ignores non-ham-band, filtered-out and duplicate spots. Duplicate spots occur when the DX cluster transmits the same spot until all its connected users receive it. The Spot Grabber is sufficiently intelligent to detect these redundant spots and avoid repeated alerts for the same DX station. It compares the call of every new spot with the ones it already has in its five memories. If the call is already in its memory, it then compares the time of the spot. By ignoring spots whose call sign and time fields are already memorized, repeated alerts for the same spot are avoided. Checking the spot's call sign and time fields allows for any change of frequency by the DX station while still permitting spotting of DXpeditions working on more than one band. The chances of a DXpedition being spotted on more than



This inside view of the Spot Grabber is from the rear panel and shows the LCD panel meter glued to the rear of the front panel.

one band at exactly the same time are minimal. Ignored spots are indicated by the status LED flashing briefly for every one it discards. Usually, after a DX spot is grabbed and displayed, the **STATUS** LED flashes once for each connected DX cluster user, as the same spot is echoed to all of them in turn and ignored by the Spot Grabber. The status LED also flashes when it rejects spots that you have decided to filter out based on band, mode and chosen DX targets, or if a spot for a non-ham band is received.

The scrolling display can be stopped at any memory position by S2, the **HOLD** button. This is handy for giving you more time to read the display, open your log and tune your transceiver. When switched to **HOLD**, the red **STATUS** LED flashes once a second to remind you of the Spot Grabber's frozen display state.

Using a Printer

To obtain a permanent record of grabbed DX spots, connect a printer to the Spot Grabber's parallel port. If configured to do so, the unit will print each spot as it is grabbed. In addition to the call and frequency information shown on the unit's LCD, the printout shows any comments available. Any standard parallel/Centronics printer will do, so blow the dust of that forgotten dot-matrix printer you have lying in the corner and give it a new lease on life. Make sure it's on-line and full of paper because its status is not checked and any printer errors are ignored. When you're at work or just away from the shack, let the printer provide you with a list of spots received when you return. By filtering selected DX targets, a printout allows you to analyze the operating habits of DXpeditions so you can better predict the next best band and time to work them.

The Spot Grabber can be left to silently stand guard for any DX spots coming from your TNC. Day or night, it will alert you to DX spots received after previously filtering out ones which don't interest you. For example, if you're an HF CW operator working towards your DXCC CW Award, you can configure the Spot Grabber to alert you to only HF-band CW DX spots.

Configuring The Spot Grabber

When S1 of the Spot Grabber is switched to its top position, you'll see a brief introductory display followed by the Spot Grabber sending one CW **R** to inform you that you are in the setup mode ready to be programmed by the Windows Setup Interface. The code version is displayed and the status LED stays lit. Run the *SG.EXE* program, confirm that its version number is the same as the Spot Grabber's code version and that the correct PC COM port is selected. The 2400-baud data rate and hardware flow control are automatically set.

The setup interface allows easy access to all of the Spot Grabber's optional parameters by reading and writing these to and from U1's EEPROM. See its current configuration by clicking the **Read** button and load a new configuration with the **Write** button. Options chosen in the setup interface are saved upon exit to the file **c:\windows\ficheiro.ini** (assuming you're using drive C:), which the program then initially reads the next time it is executed. This way, you always start using the interface program from where you left off.

The setup interface's three tabs facilitate configuration. The **Filters** tab lets you configure the Spot Grabber to filter for any particular combination of bands and modes (see Figure 3).

For example, if you just want it to alert you to HF-band CW DX spots, only activate the CW-mode check boxes for every HF band. If you only want to be alerted to a specific DX station's spot, activate the DX-target option button and fill in the DX-target list. Up to three targets may be programmed into Spot Grabber. When this option is active, only spots that (after complying with the band and mode filters) are on the DX-target list will be announced. This is especially handy for grabbing only spots associated with particular DX stations such as ongoing DXpeditions.

With the **Alarm** tab selected, its option buttons and sliders let you customize the Spot Grabber's audible and visual alerts (see Figure 4). By choosing the **Beep** option, an audio tone will be heard. Use the associated slider to vary the tone's duration and the frequency slider to adjust its pitch. The **Repeat** slider is used to define how many of these beeps are sounded. Alternatively, choose the **Morse** option to have the Spot Grabber announce the call sign of the DX spotted. The CW speed can be adjusted, as can the **Tone frequency** and number of times the call is repeated. When the **Preamble** box is checked, an initial warning signal is sounded before any beep or CW call. This preamble signal is helpful for getting your brain into "CW gear" as it warns you that a CW call is about to be sent. Of course, the preamble can also be used with the beep option or even on its own by choosing repeat = 0. No audible alert is sent if repeat = 0 and the **Preamble** box is not checked. By clicking the **Read + Preview** button, you read the Spot Grabber's memory and then hear a preview of the audible warning configuration resident in U1's EEPROM data memory followed by a CW **R**.

The amount of time the scrolling display pauses at each DX spot is chosen by using the **Pause** slider in the **Visual**

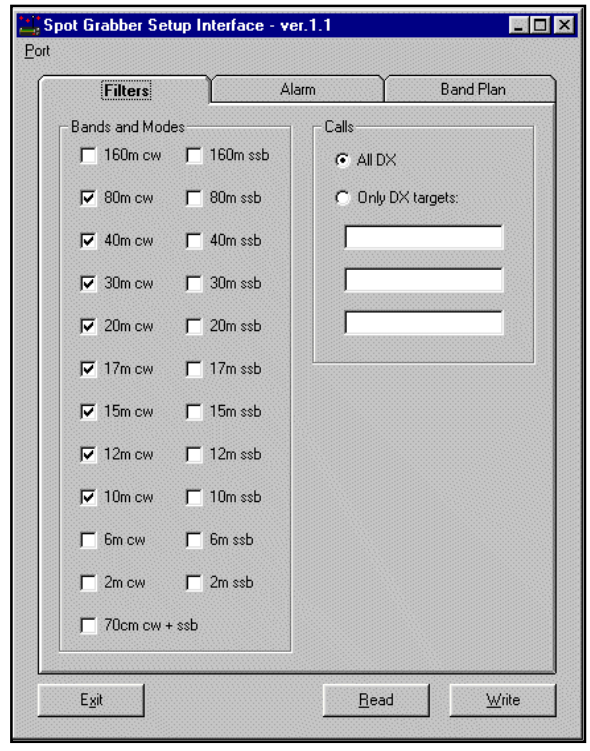


Figure 3—The setup interface's three tabs facilitate configuration. The FILTERS tab lets you configure the Spot Grabber to filter for your desired combination of bands and modes.

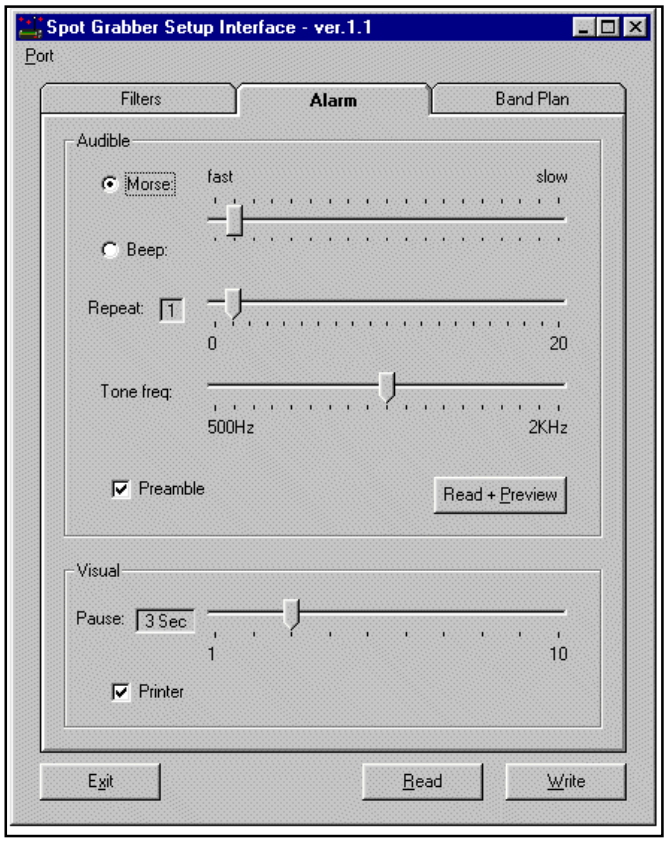


Figure 4—With the ALARM tab selected, its option buttons and sliders let you customize the Spot Grabber's audible and visual alerts.

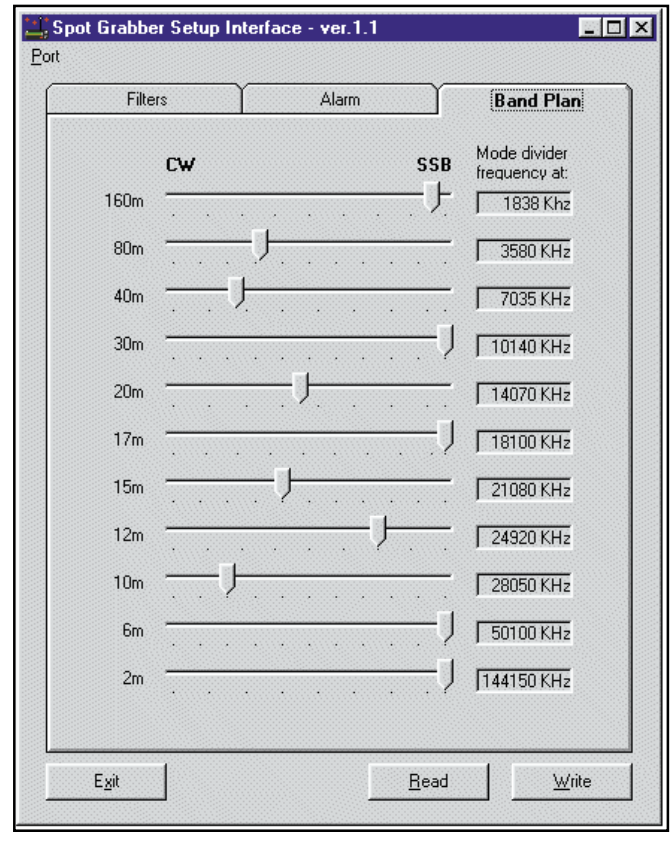


Figure 5—The BAND PLAN tab lets you choose the frequency that the mode filters use to differentiate between CW and SSB spots.

section of the **Alarm** tab. Here you can also enable or disable the Spot Grabber's printer output.

The **Band Plan** tab lets you choose the frequency that the mode filters will use to differentiate between CW and SSB spots (see Figure 5). If your main interest is working CW DX, most sliders should be at the low end of each band. For example, by setting a value of 14.065 MHz on 20 meters, no spots for digital-mode or phone stations are grabbed when the 20-meter CW box is checked in the **Filters** tab. If you want to grab CW and data-mode spots, but not SSB spots, a value of 14.100 MHz is more appropriate.

After defining all your spot filters, alarm options and band-plan frequencies, don't forget to load them into the Spot Grabber using the **Write** button. A successful write has the unit return two CW **R**s. To check the current Spot Grabber's configuration, use the **Read** button. After a read, the Spot Grabber returns a single CW **R** and displays its configuration on the setup interface utility.

Limitations

The PIC 16F876 provides us with an inexpensive, widely available, easily programmed microcontroller that presents a rapid and flexible development platform. The brains behind the Spot Grabber reside in the code in U1's program memory which, although fairly versatile, does have some limitations. The drawbacks for this application have mostly to do with U1's lack of multitasking capability, number of I/O pins and size of program memory. Choosing a higher-end PIC microcontroller would solve some of these limitations, but there's really no need for one.

True multitasking is not possible with the 16F876; this means that it can only do one thing at a time. For example, while a new spot is displayed and audibly announced, any new spots arriving cannot be processed. The Spot Grabber halts the flow of data coming from the TNC while it announces each new spot. Normally this isn't a problem because the TNC's buffer holds newly received data until the Spot Grabber is ready to process it for possible DX spots. However, if you configured the unit to accept all spots and announce each one twenty times in CW, that would take a lot of time. During these long audible alerts, more spots may be received by the TNC and fill up its output buffer. Once full, any newly received data is lost. Therefore, it's wise to keep audible announcements short if you're trying to grab everything. Filtering only for particular DX stations by selecting specific modes, bands and DX targets reduces the number of announced spots and helps the Spot Grabber keep up with the data flow.

Each spot in memory is paused on the LCD for a configured number of seconds. Because of U1's lack of multitasking, this delay between display scrolling can vary slightly. While it sequentially displays the spots it has stored in its memory, U1 divides its time by analyzing any new spot received. Every time data is received, U1 goes off to see if it's a valid spot. If it's not valid, the pause starts again. A few clever lines of code attempt to prevent the Spot Grabber from pausing too long between display scrolls and remaining close to the chosen pause value.

U1's crowded program memory—coupled with its already overtaxed I/O pins—meant that I had to take a few hardware and code shortcuts to accommodate all of the desired functions. First, because no more I/O pins are available, the printer port is unidirectional. No printer response is monitored making the Spot Grabber oblivious to any printer warnings. Second, to reduce program size, a simplified

code routine rejects any non-ham-band spots. Only the megahertz digits are checked, so some non-ham-band spots aren't rejected. For instance, spots for 10.000 MHz, 21.500 MHz and 29.900 MHz are displayed although they are not in our ham bands. This small inaccuracy, however, isn't a major issue as spots for non-ham activities are rare.

Finally, remember that the Spot Grabber merely *eavesdrops* on spots sent to already connected cluster users. If no one is connected to your local cluster, no spots are seen. On my local cluster, this usually occurs during office hours when everybody is working and late at night when everybody is sleeping. To catch every drop of DX action, you can first connect to the cluster yourself with your PC, then switch in the Spot Grabber.

A Little Knowledge is a Dangerous Thing

Using the packetcluster network to find DX is a great time saver. However, take care not to let yourself become a lazy operator by accommodating yourself to information gained solely from the DX clusters. Remember: Using spot information taken from the packetcluster is no substitute for the number one rule of DXing—*listening*! Scan those frequencies! It's amazing how many unannounced DX stations you'll find sending lonely CQs! Furthermore, to avoid confusion on the bands, all spot information must be verified. Hams are a helpful bunch who freely share information; however, there's no guarantee that this information is correct. The call sign the spot pertains to, its frequency and any comment, should be double-checked by always listening before transmitting. Furthermore, the ability to instantaneously follow the DX station's instructions and understand his system and style of working are essential to avoid pileup chaos and ultimately to notching up a new one. Take some time to brush up on the two main DXing languages—CW, if your speed is low, and English, if it's not your mother tongue.

Over the past couple of months the Spot Grabber has become my helpful DX-chasing partner. It wakes me up in the early morning hours so I can contact a needed DXpedition. Used mobile, it has me rushing home from work to QSO with a new DXCC country! When I'm out of the shack, it prints a record of interesting spots for me to read on my return. If you're like me and not blessed with several acres of antennas, a kilowatt of power and find that twenty-four hours in a day are still not enough, this kind of help is most welcome!

Notes

[1]Microchip Technology Inc, 2355 W Chandler Blvd, Chandler, AZ 85224-6199; tel 602-786-7200, fax 602-899-9210. You can see the full range of Microchip microcontrollers available and download their datasheets at **www.microchip.com**.

[2]For information about the DX Peeper by Sigmatech read the review by Glenn Swanson, KB1GW, "Sigmatech DX Peeper DX *PacketCluster* CW Decoder," Product Review, *QST*, Sep 1996, pp 73-74.

[3]Log-EQF logging software is available from Thomas Dandrea, N3EQF; **www.eqf-software.com/**.

[4]Kenwood's TM-D700 mobile and TH-D7 portable. You can read the transceiver specifications and download manuals from their site at **www.kenwood.net**.

[5]Two excellent articles can get you started in PIC development: John Hansen, W2FS, "Using PIC Microcontrollers in Amateur Radio Projects," *QST*, Oct 1998, pp 34-40 (see also Feedback, Feb 1999, p 72) and Steve Hageman, "PIC Development on a Shoestring," *QST*, Mar 1999, pp 49-51; **www.sonic.net\~shageman**.

[6]Programmed PICs and PC boards are available from FAR Circuits, 18N640 Field Ct, Dundee, IL 60118-9269; tel 847-836-9148 (voice and fax). Prices: *programmed* PIC $10 each; PC board, $5 each, plus $1.50 shipping for up to four boards only, four PICs only or a combination of four PICs and PC boards. Visa and MasterCard accepted with a $3 service charge; **www.cl.ais.net/farcir**.

You can download the operating software, source code and cabinet-drilling template as SPOT_GRABBER.ZIP from **www.arrl.org/files/qst-binaries/**.

[7]A variety of suitable displays are available from sources such as Digi-Key Corp, 701 Brooks Ave S, Thief River Falls, MN 56701-0677; tel 800-344-4539, 218-681-6674, fax 218-681-3380; **www.digikey.com**. In the original version of this project, I used a Wintek WM-C202M backlit LCD; **www.wintek.com.tw**.

[8]These pin numbers are correct for a KAM All-Mode TNC and pin designations are with reference to the PC. Confirm the pin numbers for your particular TNC make and model.

Paulo N. Jorge, CT1EFL, lived most of his life in England. He was first licensed there in 1985, and also holds the call sign G0MUW. He completed a three-year Marine Electronics and Radar Higher National Diploma at Wray Castle College with a view to becoming a Merchant Navy Radio Officer. Paulo has been living in his native country, Portugal, since 1991, working for Companhia Portuguesa Radio Marconi at their satellite earth station near Lisbon, where he is part of a team ensuring the smooth running of Eutelsat Tracking, Inmarsat and VSAT systems. On the ham bands, Paulo is usually chasing DX and "ragchewing" on HF CW: "I'm a big CW fan!" He also enjoys homebrewing, swimming and traveling. You can contact Paulo at Praceta Francisco Romero 32/26, Amoreira-Estoril, 2645-196 Alcabideche, Portugal; **pnjorge@mail.telepac.pt**.

NEW PRODUCTS

HAMCALC VERSION 48 NOW AVAILABLE

◊ George Murphy, VE3ERP, has recently released a CD-ROM containing his latest collection of math and design programs for radio amateurs and professionals.

Since *Hamcalc*'s introduction in 1993, it has become a popular tool for learning, reference and design. Most of the included programs can be used with metric or Imperial/US units of measure. The programs included in the collection are specifically selected for their ease of use by non-technical individuals.

Hamcalc 48 is priced at $7, including shipping and handling into the US. To obtain a copy, send a check or money order (no stamps or IRCs please) to George Murphy, VE3ERP, 77 McKenzie St, Orillia, ON L3V 6A6, Canada; **ve3erp@encode.com**.

KAM *XL* FROM KANTRONICS

◊ Kantronics has announced a new HF/VHF multimode TNC: the KAM *XL*.

The KAM *XL* looks like and emulates Kantronic's popular dual-port KAM Plus, and retains all of that unit's capabilities—such as cross-port digipeating, packet node switching and VHF/HF mailboxes.

Supported operating modes are AMTOR, PACTOR, ASCII, CW, GTOR, Packet, PSK31 and RTTY. Notable new features introduced in this unit are SMD circuit board construction, DSP-based modems, flash memory (to provide a convenient upgrade path for the internal software), a telemetry port and an auxiliary/GPS port. Ports for connecting external devices now include two DB-9 radio ports, a DB-15 telemetry port, a DB-9 auxiliary/GPS port and an RS-232 terminal port.

The KAM *XL* measures approximately $1^1/_2 \times 8^1/_2 \times 4^1/_2$ inches. The specified power requirement is 7 to 17 V dc at around 200 mA.

For additional information visit your favorite Amateur Radio products dealer or contact Kantronics Co Inc, 1202 E 23rd St, Lawrence, KS 66046; tel 785-842-7745; fax 785-842-2031; **sales@kantronics.com**; **www.kantronics.com**.

Next New Products

By Joe Carcia, NJ1Q

2001 W1AW HF Digital Run Results

Some software, a computer with soundcard and a couple of audio cables are all it took for hams to enjoy this event.

"These are great exercises!"

"I could receive clearly even during the 1-W test."

"When will you guys do this again? Maybe next time the power levels could be in milliwatts."

"Thanks for exposing me to this fun mode!"

These are but a few of the comments received with entries for the 2001 W1AW HF Digital Run that took place January 13-14, 2001. More than 300 amateurs from across the US, including some hams in Canada and Europe, submitted reception reports.

Judging by the entries , PSK31 proved to be the most successful mode at the 1-W power level. Quite a number of respondents stated that they were able to copy the PSK31 1-W transmissions better than the MFSK16 transmissions at the same power level. Of course, this doesn't necessarily make PSK31 the "winner" over MFSK16; this is not a scientific test. Even so, the results were intriguing.

What Software Were Listeners Using?

There are a number of PSK31 programs, and (as of this writing) one good MFSK16 program available. From what can be seen from the entries, the *DigiPan* was by far the dominant PSK31 software, although a significant number of amateurs were using *WinPSK* and some even employed the original *PSK31* program written by Peter Martinez, G3PLX. All the MFSK16 screen shots (or program descriptions provided by hams) were from Nino, IZ8BLY's program, *STREAM*.

This does not mean that one program may be better than another. From what I could gather from the comments, it would appear that some hams preferred having the additional "bells and whistles" associated with some programs. And still others preferred using just a straightforward package.

Was W1AW Off Frequency?

There were a few questions as to which exact frequencies W1AW was using for the tests. Some commented that W1AW appeared to be off frequency according to the list provided in the Digital Run announcement published in the January 2001 *QST*.

This was one of those issues that didn't seem to have a quick and easy answer. Should we have told hams where to set their receiver dials, with respect to the actual sideband used? Should we have indicated a dial frequency, but offset the transmit frequency here at W1AW? Should we have not given an exact frequency, but rather a range of frequencies to monitor for each band? Should there have been some discussion about dial frequency versus idle carrier frequency?

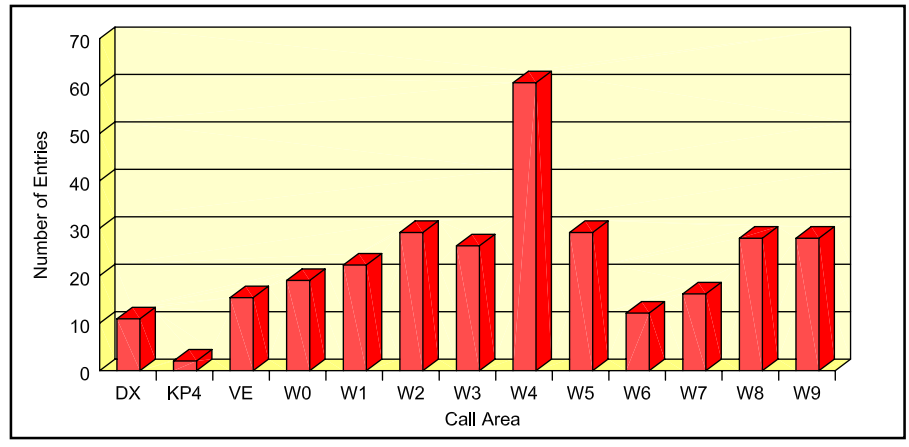


Figure 1—All PSK31/MFSK16 entries by call area.

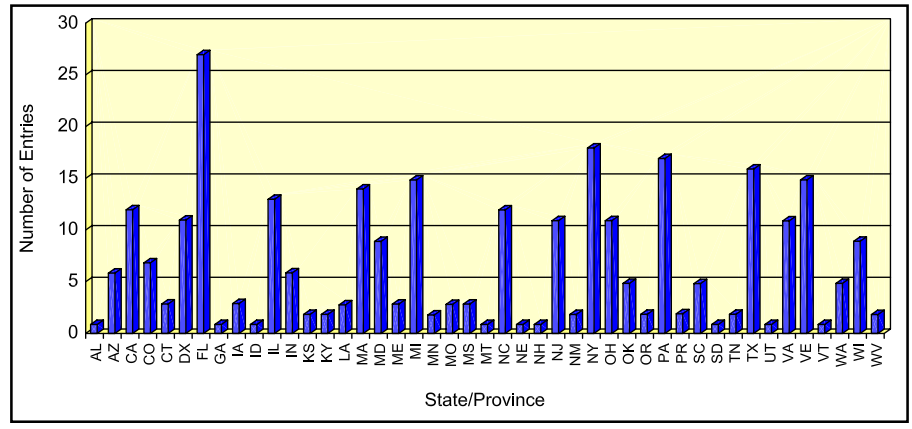


Figure 2—All PSK31/MFSK16 entries by state (includes DX, KP4 and VEs).

The fact is that no matter what may have been done, chances are very good that some level of "tuning" would need to have been performed anyway. A slight frequency drift, improper audio input levels to the sound card, interference and so on could attribute to an amateur not copying us 100% (at least at the very start of each transmission). Given that some level of tuning was expected, we opted to use a long "intro" transmission (nearly a minute in length) at the beginning of every transmission.

The frequencies shown in the January announcement were the "suppressed carrier" (dial) frequencies. We should have noted that fact in the list. Despite some confusion in the field, however, the good news is that the great majority of listeners were able to find our signals in time to copy all of the test transmissions.

Equipment used at W1AW

The transceiver used for the transmissions was the ICOM IC-756 Pro. The antenna lineup consisted of an 80-meter inverted **V** up 65 feet, a 3-element 30-meter Yagi up 65 feet; two 3-element 20-meter Yagis, one up 33 feet and the other at 65 feet, and a 5-element 10-meter Yagi at 65 feet. Power levels were adjusted and checked using a Bird 43 Wattmeter. The PC was a Gateway P5-133 with a 16-bit SoundBlaster card. The PSK31 software was *DigiPan*, Version 1.6c, and the MFSK16 software was *Stream*, Version 0.86. The texts used for the transmissions were taken from articles that appeared in 1950s and '60s issues of *QST* magazine.

The Results

The following graphs breakdown the entries into various categories. Among the state and call area graphs, the 4th call area is well represented, especially the state of Florida. Is this a statistical fluke, or do "four landers" have a particular passion for digital modes?

Interestingly enough, although the antennas at W1AW are beamed towards the US, there were at least 11 entries from Europe. And as can be seen by the graphs, MFSK16 was the mode of choice for participants outside the US.

What was most interesting was the high number of solid 1-W reception reports. If you needed proof that a mere watt is sufficient for the digital modes, you have it here.

PSK31 turned in an outstanding job on 30 meters. That's not a surprise. QRP CW operators have known this "secret" about 30 meters for years! MFSK16 was particularly successful on 80 meters. This mode seemed robust in the face of the noise that plagues 80 meters.

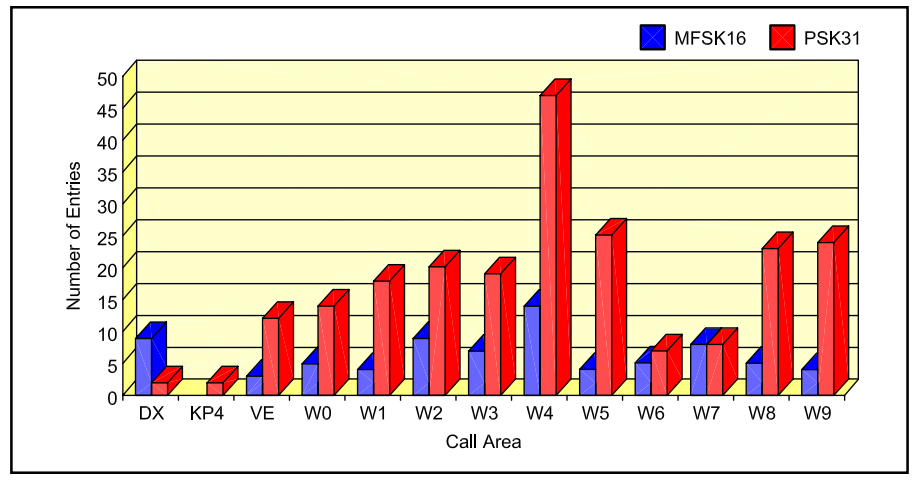


Figure 3—Mode monitored vs call area.

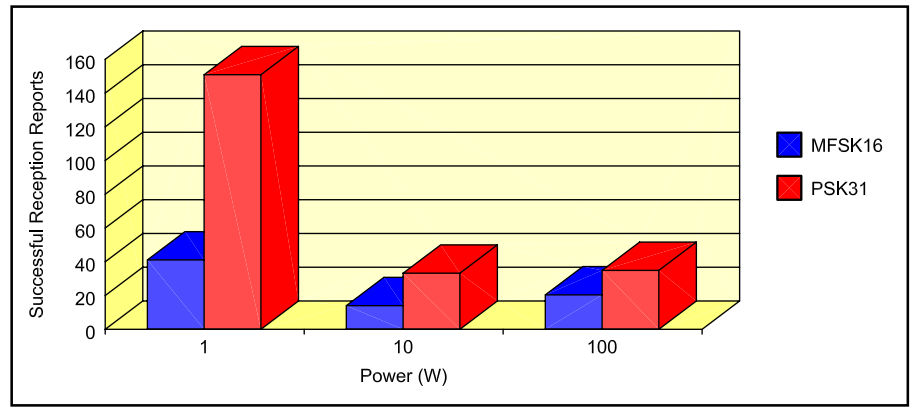


Figure 4—Number of entries for each power level (1, 10 and 100 W) per mode.

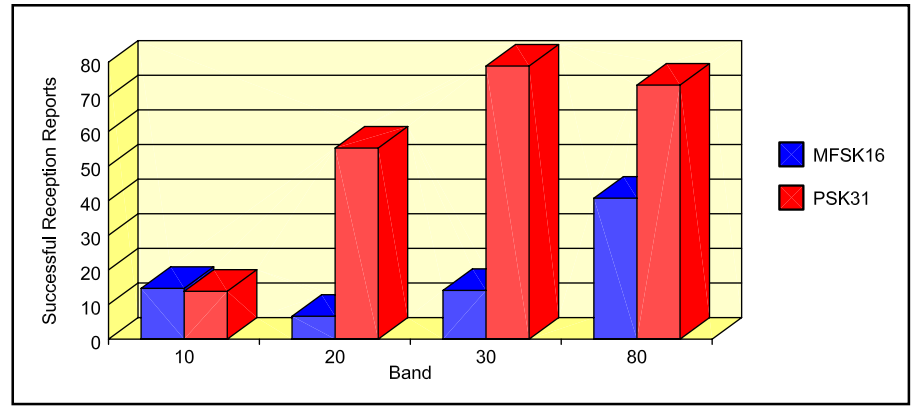


Figure 5—Number of successful reception reports for each mode per band.

Thanks!

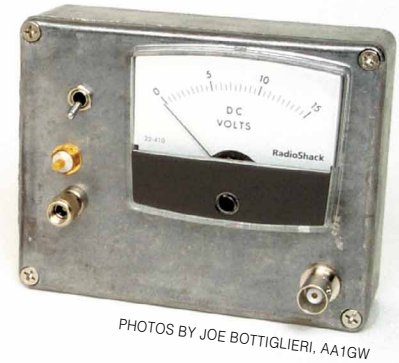
For those hams who participated in this event, we thank you. For those who are undecided about using these digital modes, I hope you'll give them a try. Many people reported that the W1AW HF Digital Run was their first experience with either PSK31 or MFSK16. No doubt it won't be their last.

A few of the entrants had asked if W1AW will ever do this again. Based on the success of this effort, you can look forward to more on-air tests like this from W1AW in the future. Just keep watching the pages of *QST!*

Joe Carcia, NJ1Q, is the W1AW Station Manager. You can contact him at 225 Main St, Newington, CT 06111; **jcarcia@arrl.org**.

By Wes Hayward, W7ZOI, and Bob Larkin, W7PUA

Simple RF-Power Measurement



PHOTOS BY JOE BOTTIGLIERI, AA1GW

Making power measurements from *nanowatts* to 100 watts is easy with these simple homebrewed instruments!

Measuring RF power is central to almost everything that we do as radio amateurs and experimenters. Those applications range from simply measuring the power output of our transmitters to our workbench experimentations that call for measuring the LO power applied to the mixers within our receivers. Even our receiver S meters are power indicators.

The power-measuring system described here is based on a recently introduced IC from Analog Devices: the AD8307. The core of this system is a battery operated instrument that allows us to directly measure signals of over 20 mW (+13 dBm) to less than 0.1 nW (−70 dBm). A tap circuit supplements the power meter, extending the upper limit by 40 dB, allowing measurement of up to 100 W (+50 dBm).

The Power Meter

The cornerstone of the power-meter circuit shown in Figure 1 is an Analog Devices AD8307AN logarithmic amplifier IC, U1. Although you might consider the

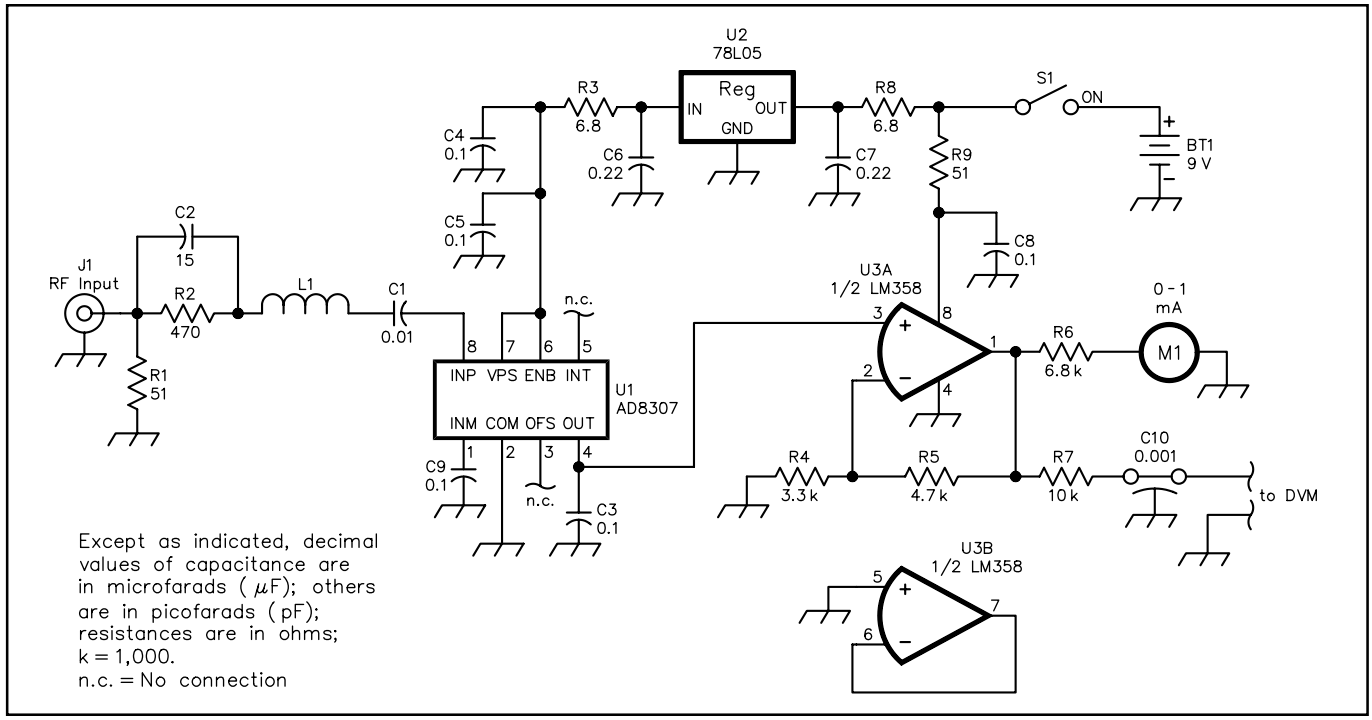


Figure 1—Schematic of the 1- to 500-MHz wattmeter. Unless otherwise specified, resistors are 1/4-W 5%-tolerance carbon-composition or metal-film units. Equivalent parts can be substituted; n.c. indicates no connection. Most parts are available from Kanga US; see Note 2.

J1—N or BNC connector
L1—1 turn of a C1 lead, 3/16-inch ID; see text.
M1—0-15 V dc (RadioShack 22-410); see text.
S1—SPST toggle
U1—AD8307; see Note 1.
U2—78L05
U3—LM358
Misc: See Note 2; copper-clad board, enclosure (Hammond 1590BB, RadioShack 270-238), hardware.

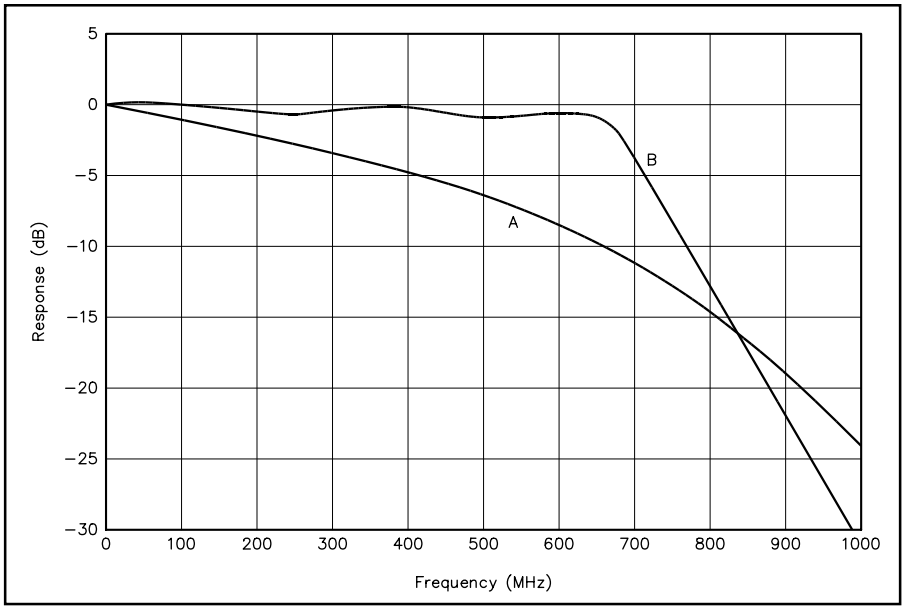


Figure 2—Response curves for the power meter before (A) and after (B) addition of R2, C2 and L1.

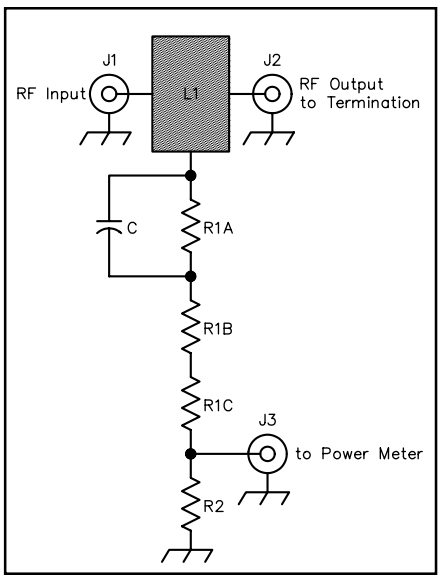


Figure 3—A tap that attenuates a high-power signal for use with the power meter. See the text and Figure 4 for discussion of the capacitor, C.
J1, J2—N connectors; see text.
J3—BNC connector
L1—1×1 1/2-inch piece of sheet brass; see text.
R1A-R1C—Three series-connected, 820-Ω, 1/2-W carbon film
R2—51-Ω, 1/4-W carbon film

IC as slightly expensive at about $10 in single quantities, its cost is justified by the wide dynamic range and outstanding accuracy offered. You can order the part directly from the Analog Devices Web site, which also offers a device data sheet.[1,2]

[1]Notes appear on page 43.

U1's power supply can range from 2.7 to 5.5 V. A 5-V regulator, U2, provides stable power for U1. U3, an op amp serving as a meter driver completes the circuit. U1's dc output (pin 4) changes by 25 mV for each decibel change in input signal. The dc output is filtered by a 0.1 µF capacitor and applied to the noninverting input of U3, which is set for a voltage gain of 2.4. The resulting signal with a 60 mV/dB slope is then applied to a 1-mA meter movement through a 6.8-kΩ multiplier resistor. When the circuit is driven at the 10-mW level, U3's output is about 6 V. U3's gain-setting resistors are chosen to protect the meter against possible damage from excessive drive.

U1 has a low-frequency input resistance of 1.1 kΩ. This combines with the resistances of R1 and R2 to generate a 50-Ω input for the overall circuit. R2 in parallel with C2 form a high-pass network that flattens the response through 200 MHz. L1, a small loop of wire made from a lead of C1, modifies the low-pass filtering related to the IC input capacitance, extending the response to over 500 MHz.

M1 is a RadioShack dc voltmeter. Although sold as a *voltmeter*, it actually is a 0-1 mA meter movement supplied with an external 15-kΩ multiplier resistor. The 0 to 15 V scale is used with a calibration curve that is taped to the back of the instrument to provide output readings in dBm. The dBm units can be converted to milliwatts by using a simple formula, although dBm readout is generally more useful and convenient.[3]

An auxiliary output from C10, a feedthrough capacitor, is provided for use with an external digital voltmeter or an oscilloscope for swept measurements.[4] We use the DVM when resolution is important. The analog movement can be read to about 1 dB, which is useful when adjusting or tuning a circuit. Enterprising builders might program a PIC processor to drive a digital display with a direct reading in dBm.

The first power meter we built did not include R2, C2 and L1. That instrument was accurate in the HF spectrum and useful beyond. Adding the compensation components produced an almost flat response extending beyond 500 MHz with an error of only 0.5 dB. The compensation network reduces the sensitivity by about 3 dB at HF, but boosts it at UHF. If your only interest is in the HF and low-VHF spectrum through 50 MHz, you can simplify the input circuit by omitting R2, C2 and L1. The responses before and after compensation are shown in Figure 2.

The power meter is constructed "dead-bug" fashion without need of a PC board. It is breadboarded on a strip of copper clad PC-board material held in place by the BNC input connector. R1 is soldered between the center pin and ground with short leads. U1 is placed about 3/4 inch from the input in dead-bug fashion (leads up) with pins 1 and 8 oriented toward J1. The IC is held to the ground foil by grounded pin 2 and bypass capacitors C3, C4 and C5. R2 and C2 are connected to the J1 center pin with short leads. L1 is formed by bending the lead of C1 in a full loop. Use a 3/16-inch-diameter drill bit as a winding form. None of the remaining circuitry is critical. It is important to mount the power meter components in a shielded box. We used a Hammond 1590BB enclosure for one meter and a RadioShack box for the other, with good shielding afforded by both. *Don't use a plastic enclosure for an instrument of this sensitivity*.

Higher Power

Transmitter powers are rarely as low as the maximum that can be measured with this power meter. Several circuits can be used to extend the range including the familiar attenuator. Perhaps the simplest is a resistive tap, shown in Figure 3. This circuit consists of a flat piece of metal, L1, soldered between coaxial connectors J1 and J2, allowing a transmitter to drive a 50-Ω termination. A resistor, R1, taps the path to route a sample of the signal to J3, which connects to the power meter. R2 shunts J3, guaranteeing a 50-Ω output impedance. Selecting the values that comprise R1 establishes the attenuation level.

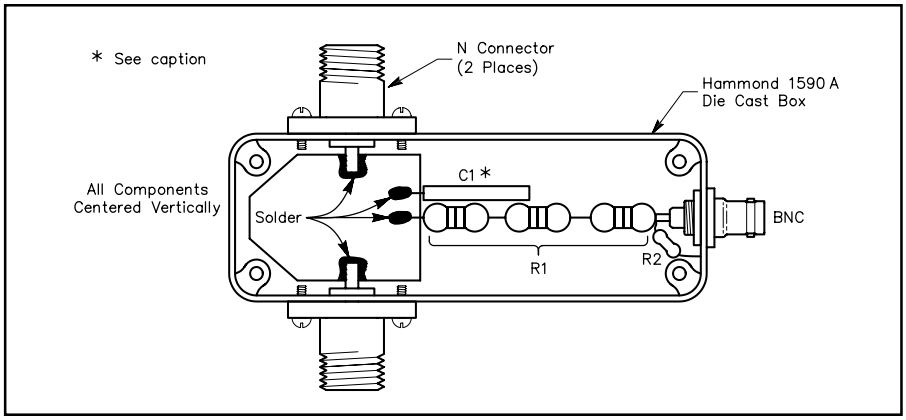


Figure 4—Drawing of the 40-dB power tap assembly shown schematically in Figure 3. The center conductors of the two N connectors (RF INPUT and RF OUTPUT) are connected by a 1×1½-inch piece of sheet brass with its corners removed to clear the pillars in the Hammond 1590A die-cast aluminum enclosure. C1 is made from a piece of #22 AWG insulated hook-up wire; it extends 0.6 inch beyond the edge of the tinned metal piece and almost rests against the two resistor bodies.

The tap extends the nominal +10 dBm power meter maximum level to +50 dBm, or 100 W. Power dissipation becomes an issue at this level, so R1 is built from three series-connected half-watt, carbon-film resistors.

The tap is built with the J1 to J2 connection configured as a 50-Ω transmission line as shown in Figure 4 and the accompanying photographs. Adjustments were performed with an HP-8714B network analyzer. The analyzer was used to adjust the value of C for an attenuated path to J3 that is flat within 0.1 dB up to 500 MHz. The tap can then be used with a spectrum analyzer or laboratory grade power meter.

It is not realistic to achieve 0.1-dB accuracy through UHF without a network analyzer for adjustment. However, if the tap is duplicated using the mechanical arrangement of Figure 4, you can expect the tap to be flat within about 1 dB through 500 MHz. The low-frequency attenuation is determined merely by the resistors, so can be guaranteed with DVM measurements. If the primary interest is in measurements below 150 MHz, you can replace the N connectors with BNC connectors. The tap is housed in a Hammond 1590A box.

Calibration

We read and use our meters in one of two ways. The DVM output is recorded and used with an equation that provides power in dBm. Alternatively, we read the panel meter and look at a chart taped to the back of the instrument. In both cases, we need a known source of RF power to calibrate the tool.

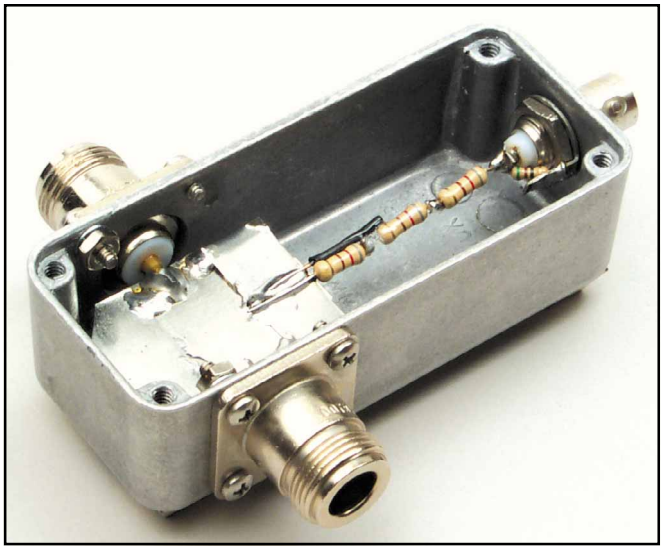
The easiest way to calibrate this instrument is with a calibrated signal generator. Set the generator for a well-defined output and apply it to the power meter. We did our calibration work at 10 MHz and levels of –20 and –30 dBm. The two levels provide a 10-dB difference that establishes the slope in decibels per DVM millivolt. One of the two values then provides the needed constant for an equation. The signal generator can be stepped through the amplitude range in 5- or 10-dB steps to generate data for the meter plot. Figure 5 shows a plot of DVM output Vs power meter reading. The meter plot is similar.

If you don't have access to a quality signal generator, you can calibrate the power meter using a low-power transmitter. A power level of 1 to 2 W at 7 MHz is fine. Attach the transmitter through the tap to a dummy load where the output voltage can be read directly using a diode detector and DVM as shown in Figure 6. If the power output is 1 W, the peak RF voltage will be 10 V. The detector output will then be about 9.5 V and the signal to the power meter is –10 dBm. Adding a 10-dB pad, as shown in Figure 6, at the meter input drops the power to –20 dBm for the second calibration point.

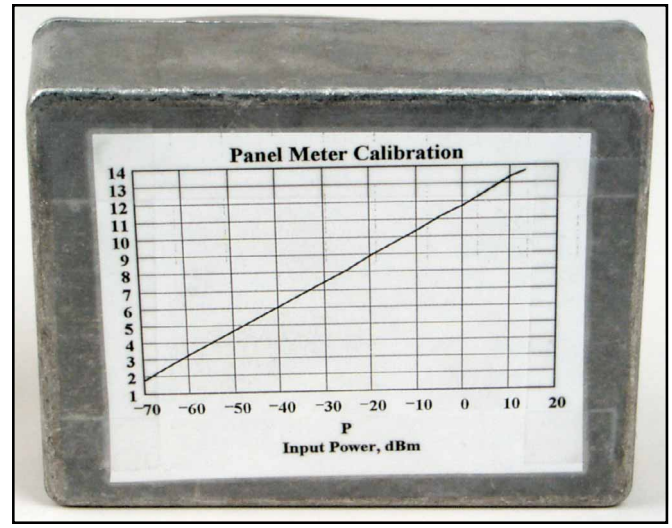
Applications

There are dozens of applications for this little power meter, a few of which are shown in the accompanying figures. Some applications are obvious and practical while others are more elaborate and instructive. Most of these measurements are *substitutional*, where the power meter is substituted for a load in a circuit. In contrast, most measurements with an oscilloscope are *in situ*, performed *in place* within a working circuit.

Figure 7A shows power measurement for early stages of a transmitter, very low power transmitters, or signals from other



An inside view of the simple attenuator shown in Figure 3.



The calibration curve taped to the back of the instrument provides output readings in dBm relative to the meter's 0 to 15 V scale.

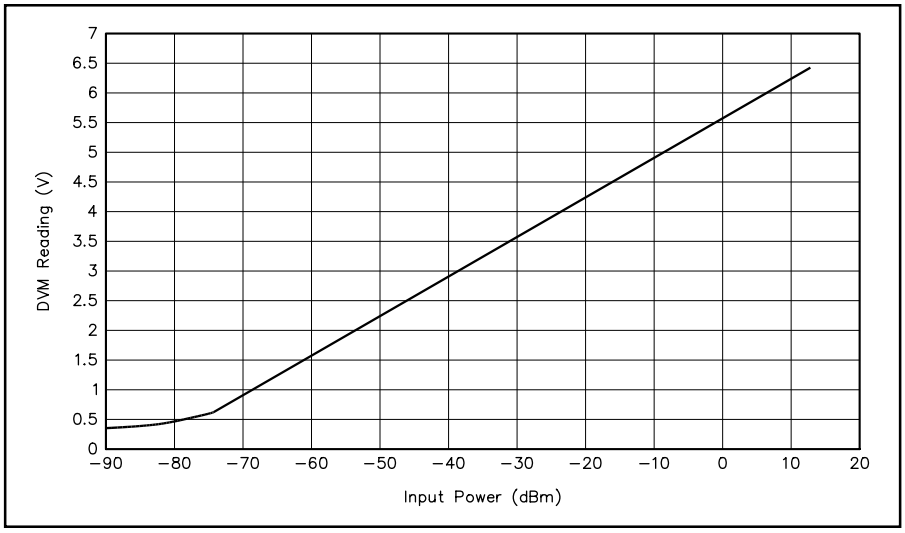


Figure 5—Plot of the DVM output versus generator power.

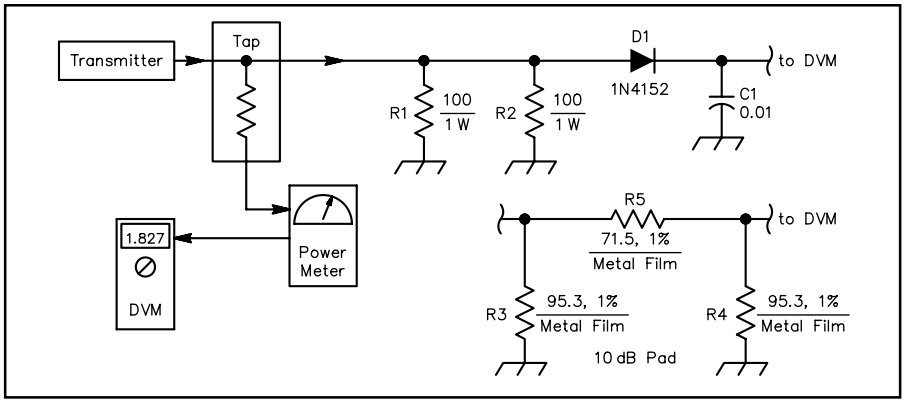


Figure 6—If a signal generator is not available, calibration can be done using a low-power transmitter. Resistor values for a 10-dB pad are shown.

C1—0.01 μF disc ceramic
D1—1N4152
R1, R2—100 Ω, 1 W
R3, R4—95.3 Ω, 1% metal film
R5—71.5 Ω, 1% metal film

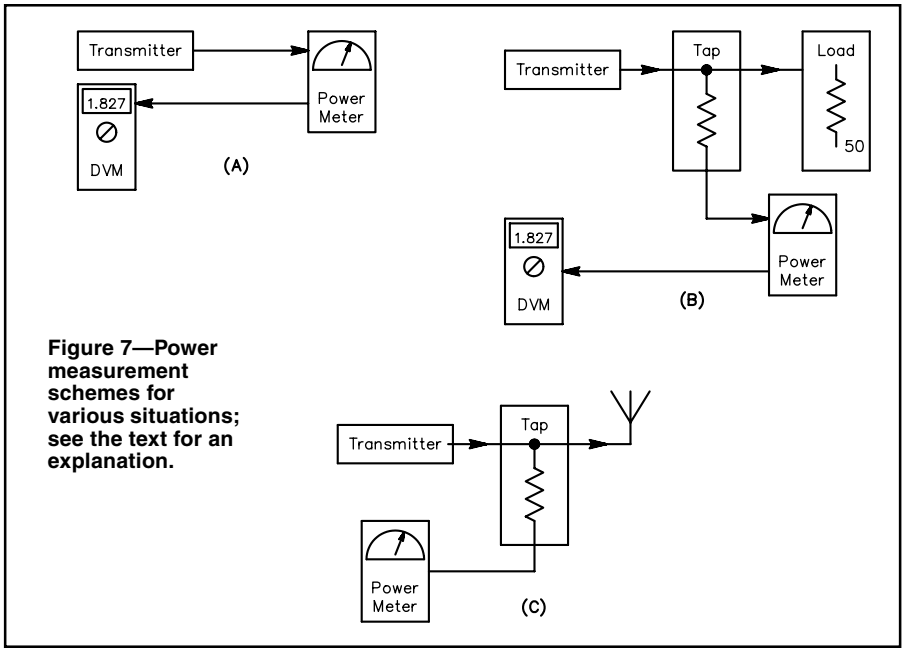


Figure 7—Power measurement schemes for various situations; see the text for an explanation.

sources. Among the most common is measurement of the power available from a LO system that will then drive a diode-ring mixer. The nominal maximum power for the meter is +13 to +16 dBm. We were able to perform measurements nearly up to +18 dBm at HF, but this is not maintained at the VHF. Careful calibration at HF was made by comparing our meters' outputs to those of an HP435A.

The tap of Figure 3 extends transmitter testing with the setup of Figure 7B. A good dummy load (termination) is placed on the tap output with the transmitter attached to the input. The power in dBm is now that read on the meter in dBm plus the tap attenuation in decibels.

We sometimes wish to measure power during an operating session. This can be done with the setup of Figure 7C. A typical application might be a QRP station where the operator experiments with significantly reduced, but variable power.

The power meter is useful for a variety of applications with bridge circuits. Figure 8 shows the meter as the detector for a return loss bridge (RLB) driven by a signal generator.[5] In this example, we use the system to adjust an antenna tuner. Because of the excellent sensitivity of the power meter, the generator need not have high output power. For example, we often make these measurements with a homebrew generator delivering +3 to +10 dBm.

The use of such low power can complicate the measurements, as we discovered when we tried the experiment of Figure 8. The exercise began without either of the filters shown. When the generator was turned on, the power meter indicated –4 dBm from the RLB. We tuned the matching circuit, but could only achieve –25 dBm, indicating 21-dB return loss.[6] No further improvement could be observed. This was the result of local VHF TV and FM broadcast interference. A bandpass or low-pass filter in the power-meter input eliminated the residual response, allowing us to achieve a 45-dB return loss with further tuning. But this was also a limit where no further improvement seemed possible. Adding a low-pass filter to the signal generator output reduced the harmonics there, allowing further improvement. We were eventually able to tune the system for an absurd 60-dB return loss (SWR = 1.002), generally impossible to measure with normal bridges using diode detectors.

The power meter is ideal for experiments with various RF filters as shown in Figure 9. A signal generator is attached to the filter input with the power meter terminating the output. The filter may then be tuned or swept. Temporarily re-

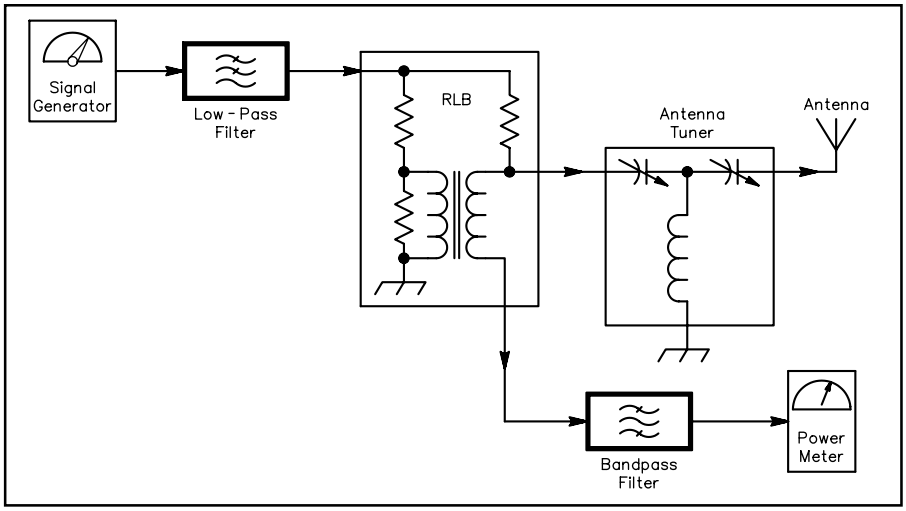


Figure 8—Using the power meter for bridge measurements.

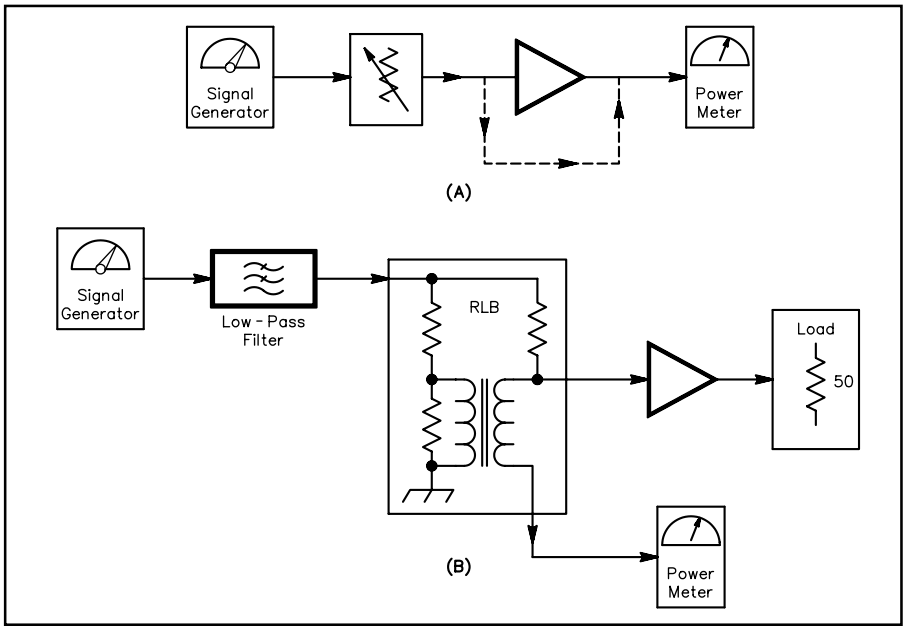


Figure 10—Amplifier measurements with the power meter. At A, making gain measurements. At B, a method to determine the input-impedance match. Reversing the amplifier terminals allows investigating reverse gain and output match.

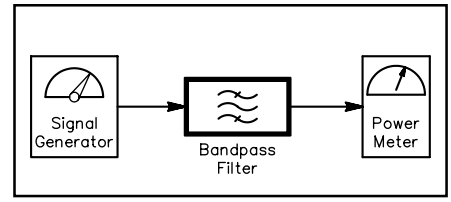


Figure 9—Filter measurements with the power meter.

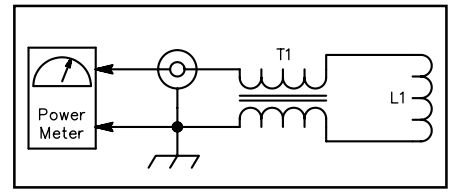


Figure 11—An RF sniffer probe that allows observation of relative RF levels. This probe allows you to see self-oscillation in amplifiers, or proportional responses in a receiver or transmitter.
L1—Two turns of insulated wire, 1/4-inch ID.
T1—Several ferrite beads on a length of coaxial cable; see text.

placing the filter with a coaxial through connection allows you to evaluate filter insertion loss. Both the power meter and the signal generator are 50-Ω instruments, so the filter will need matching networks if it is not a 50-Ω design.

As with the previous example, measurement anomalies can be observed when investigating filters. For example, after using the power meter to adjust a 7-MHz bandpass filter we were able to easily measure the second-harmonic content of the signal generator when tuned to 3.5 MHz.

Figure 10A shows the power meter used with a signal generator to study amplifier circuits. A step attenuator is shown with the generator, allowing the power level to be reduced while preserving a 50-Ω environment. Generally, a drive level of –30 dBm is low enough with typical circuits. The system is initially set up with a through connection, indicated by the dotted line. Then the amplifier is inserted and the output power is measured. The difference between the two responses, each in dBm, is the gain in decibels. An interesting and easily performed related measurement is that of amplifier reverse gain. Merely swap the amplifier terminals, attaching the generator to the *output* and the power meter to the *input*. The measured *gain* will now be a negative decibel number.

Amplifier investigation continues with the setup of Figure 10B where we use an RLB to measure the input impedance match. Although a simple bridge will not provide the actual input impedance, it will tell you how close the circuit is to a perfect match. Adjustments can be done to achieve a match. Again, reversing the amplifier allows examining the output. We included a low-pass filter in the generator output, a precaution that may also be useful with the gain-determination setup. The measurements of Figure 10 provide the information normally provided by a scalar network analyzer.

The power meter can serve as the detector for a number of simple instruments. Figure 11 shows a simple RF sniffer probe, handy for examining circuit operation. The probe consists of a small inductor attached to the end of a piece of coaxial cable (RG-58, RG-174, or similar). A few ferrite beads of about any type are placed over the outside of the cable near the coil. The probe can be placed close to an operating circuit to look for RF. The smaller the link diameter, the greater the spatial resolution can be. This is a scheme that actually lets you see self-oscillation in an amplifier, much more useful than a speculation that a circuit "might be oscillating."

The power meter can be used with other probes. One might be a simple antenna that would allow field-strength determinations. Another is a resonance-indicating probe that would provide traditional dip meter-like measurements, but with improved ac-

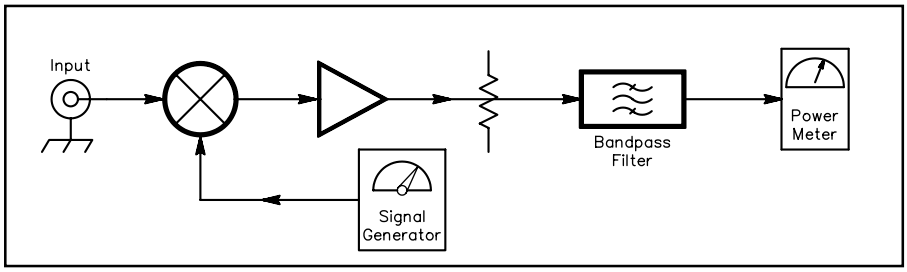
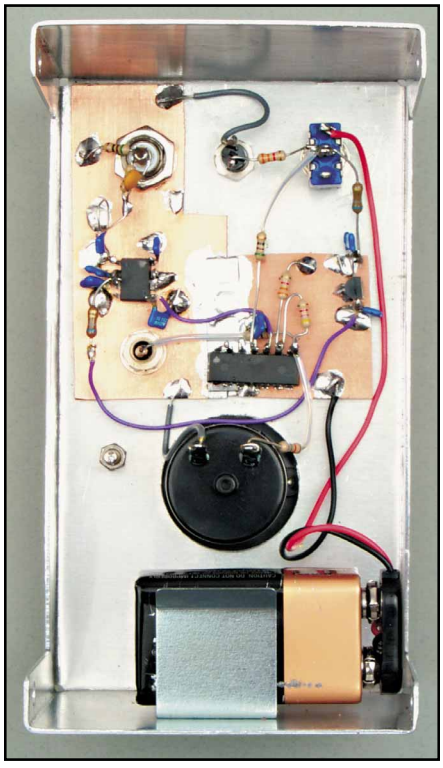
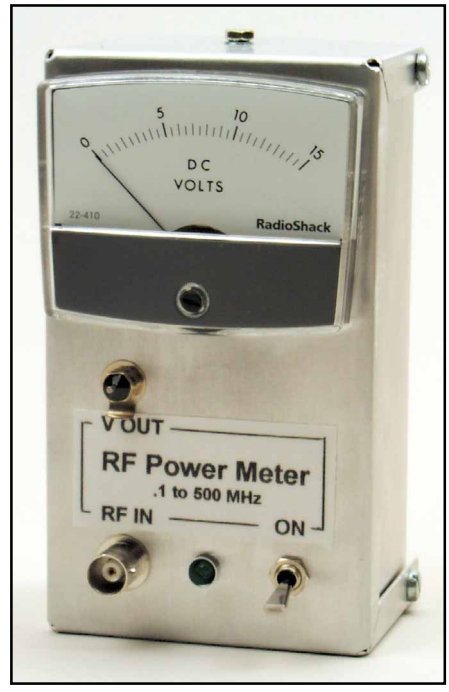


Figure 12—Adding a few components to a signal generator and the power meter creates a measurement receiver. The kinds of measurements possible depend on the filter used. See the text for some possibilities.



An inside view of the wattmeter showing its "dead-bug" construction and simplicity.



This version of the power meter is built in an inexpensive RadioShack utility box.

curacy and sensitivity.[7]

A recent *QST* project developed by Rick Littlefield, K1BQT, uses an AD8307 as a relative RF indicator.[8] That instrument, with the probe described in the sidebar by Ed Hare, W1RFI, is aimed at examining conducted electromagnetic interference (EMI). Our power meter should function well with that probe. There is great potential for small portable instruments for the study of both conducted and radiated EMI.

Figure 12 shows an example of some simple instruments that can be built using the power meter as a foundation. Here, the signal generator becomes the LO for a mixer such as the popular diode ring. This drives an optional amplifier and attenuator, followed by a bandpass filter. The power meter measures the filter output. The result is a custom measurement receiver.

We have built two variations of this project. The first uses a three-resonator LC bandpass filter tuned to 110 MHz, while the signal generator tunes from 50 to 250 MHz.[9] A Mini-Circuits MAV-11 is used for the amplifier. The resulting receiver can then be used to measure signals over the entire spectrum up to 360 MHz with sufficient resolution to examine transmitter spurious responses.

The second measurement receiver uses a homebrew 5-MHz crystal filter with a 250-Hz bandwidth. The signal generator is a homebrew unit with extreme tuning resolution, or bandspread. This instrument was used to measure SSB-transmitter carrier and sideband suppression and IMD, and for examining spurious output of experimental frequency synthesizers.

Concluding Thoughts

The traditional view of a power meter is as an instrument that examines transmitter output. But it can be much more than that. The AD8307 allows you to build a power meter that turns a common Amateur Radio station into the beginnings of a RF measurement lab.

Our thanks to Barrie Gilbert of Analog Devices Northwest Labs for providing the AD3807 IC samples.

Notes

[1]**www.analog.com**. The data sheet includes an extensive discussion of the theory of operation of the logarithmic detector and applications beyond the scope of this article.

[2]Kanga US offers a collection of most of the parts for this project, excluding the meter, copper-clad board and enclosure. For specifics, contact KANGA US, Bill Kelsey, N8ET, 3521 Spring Lake Dr, Findlay, OH 45840; tel 419-423-4604; **kanga@bright.net**; **www.bright.net/~kanga/**.

[3]$P_{mW} = 10^{dBm/10}$

[4]Feedthrough capacitors are available from Down East Microwave Inc, 954 Rt 519, Frenchtown, NJ 08825; tel 908-996-3584, fax 908-996-3702; **www.downeastmicrowave.com/**.

[5]See Wes Hayward, W7ZOI, and Doug DeMaw, W1FB, "Solid-State Design for the Radio Amateur," p 154, ARRL, 1977. Directional couplers are also useful in this application, such as that used in the classic W7EL power meter, Roy Lewallen, W7EL, "A Simple and Accurate QRP Directional Wattmeter," *QST*, Feb 1990, pp 19-23 and 36.

[6]A return loss of 21 dB corresponds to a SWR of 1.196, already a great match for most practical antenna situations.

[7]See Wes Hayward, W7ZOI, "Beyond the Dipper," *QST*, May, 1986, pp 14-20. Also, the signal-generating portion of that instrument is useful as a simple, general-purpose RF source.

[8]Rick Littlefield, K1BQT, "A Wide-Range RF-Survey Meter," *QST*, Aug 2000, pp 42-44; see also Feedback, Oct 2000, p 53.

[9]Wes Hayward, W7ZOI, "Extending the Double-Tuned Circuit to Three Resonators," *QEX*, Mar/Apr 1998, pp 41-46. The band-pass filter was then used in the instrument described in Wes Hayward, W7ZOI, and Terry White, K7TAU, "A Spectrum Analyzer for the Radio Amateur," *QST*, Aug 1998, pp 35-43; —Part 2, Sep 1998, pp 37-40.

Over the years, Wes Hayward, W7ZOI, has provided readers of QST, The ARRL Handbook and other ARRL publications with a wealth of projects and technological know-how. His most recent article, The Micro-mountaineer Revisited (which he wrote with K7TAU), appeared in July 2000 QST. You can contact Wes at 7700 SW Danielle Ave, Beaverton, OR 97008; **w7zoi@easystreet.com**.

Bob Larkin, W7PUA, is a consulting engineer for communication companies. His last article, "An 8-Watt, 2-Meter 'Brickette'" appeared in June 2000 QST. You can contact Bob at 2982 NW Acacia Pl, Corvallis, OR 97330; **boblark@proaxis.com**.

By Bob Clarke, N1RC

Gain without Pain—A Beam Antenna for Field Day

Stymied by lack of a tower or need an antenna for Field Day? By using low-cost PVC pipe, electrical wire, and coax you can build a variety of delta-loop-based beams that you can hang from a friendly tree. The cost? About $5 per dB![1]

Lacking space enough for a tower and possessing an over-active imagination, I've spent a fair amount of time over the last few years looking at various multielement directive arrays. I needed an antenna that could provide enough gain to be heard in DX contests, fit in my small back yard, meet the spouse's approval, and above all, be cheap.

Living here in New England, I only wanted gain in two directions: to the northeast to work Europe in DX contests and to the southeast to work the US in domestic contests; these two directions account for the bulk of the QSOs in these contests. For DX contests, I also wanted a decent front-to-back ratio (F/B) so I could hear Europeans while attenuating the loud signals that arrive from the Midwest as the HF bands open up to the rest of the US. Other directions could be filled in using my trap dipole.

Over the years, I've considered and rejected assorted ways of getting gain: pairs of phased verticals (too many radials), ZL specials (requires end supports in exactly the right directions), Bobtail curtains (again end supports) and phased Bobtail curtains (yet more end supports), and assorted others. I started looking at quads when K1DG gave me a vintage two-element tribander. Dissatisfied with the compromises in gain and F/B caused by using equal spacing for the 20, 15 and 10-meter bands, I started exploring ways of improving performance while keeping the spacing for all three bands the same. I came up with the idea of using phasing lines to turn a two-element quad into a two-element phased array using quad elements.

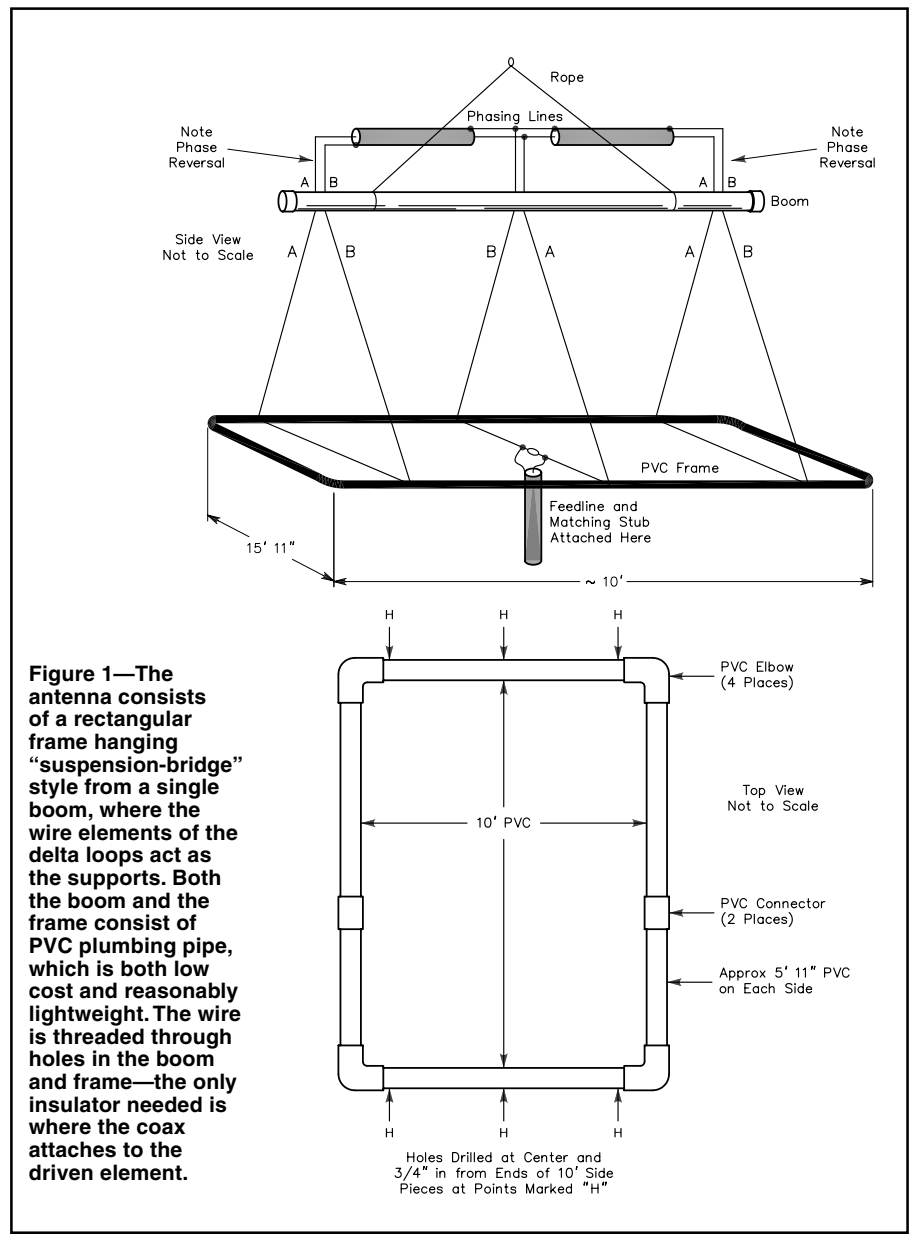


Figure 1—The antenna consists of a rectangular frame hanging "suspension-bridge" style from a single boom, where the wire elements of the delta loops act as the supports. Both the boom and the frame consist of PVC plumbing pipe, which is both low cost and reasonably lightweight. The wire is threaded through holes in the boom and frame—the only insulator needed is where the coax attaches to the driven element.

[1]Notes appear on page 47.

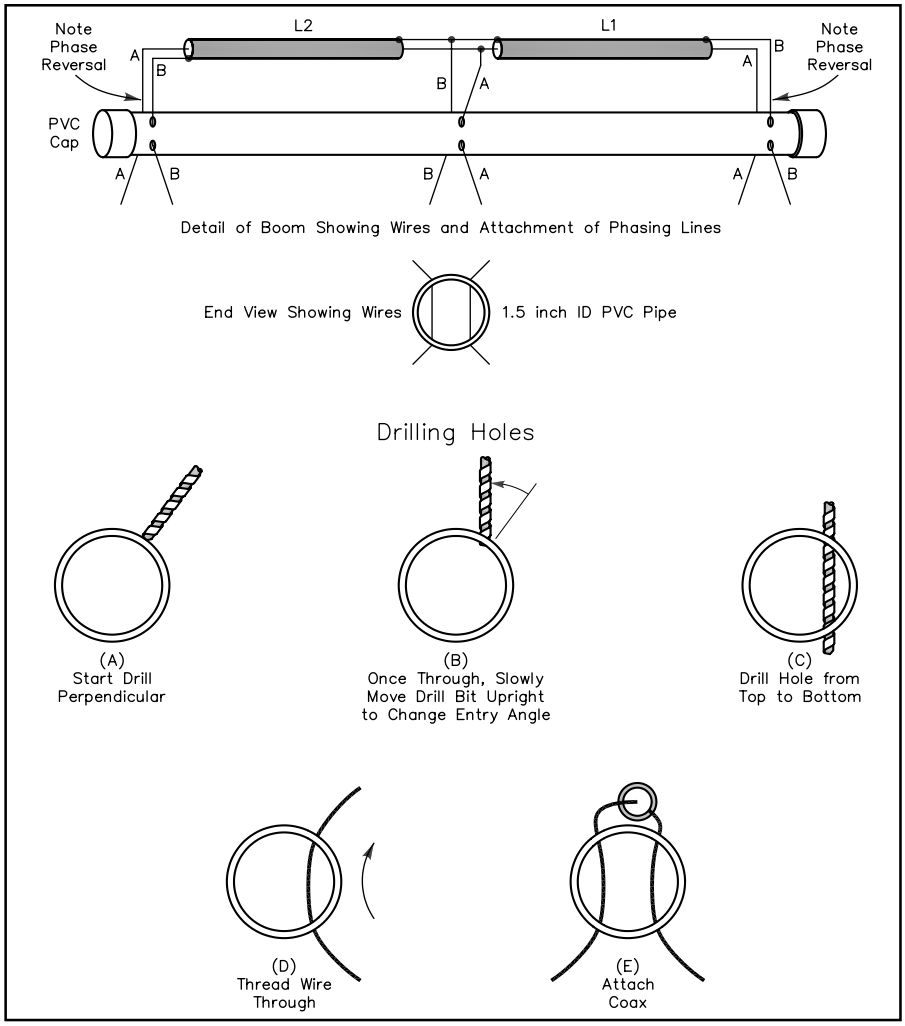


Figure 2—The two wires at the tops of the loops are threaded through pairs of holes in the boom. The bare ends are brought out at the top, where they connect to the two phasing lines. In the 3-element phased quads, the connections at the ends of phasing lines L1 and L2 are reversed at the outer elements to add an additional 180 degrees of phase shift.

What is a Binomial Array?

A Binomial Array has a current distribution among its elements that follows the coefficients of a binomial expansion. The current ratios for two, three, and four element arrays can be generated by using Pascal's Triangle, where each entry is the sum of the two entries immediately above it:

```
                1
            1       1
        1       2       1
    1       3       3       1
```

From rows two, three and four, the current ratios in the elements of a 2-element array are 1-1; in a 3-element array, 1-2-1; and in a 4-element array, 1-3-3-1. An ideal binomial array has no sidelobes.

An example of a binomial array in Amateur Radio use is the Bobtail Curtain. In this antenna, all the current flows through the center element and half flows to each of the outside elements through the quarter-wave phasing lines at the top to provide a 1-2-1 ratio.

I took this technique and extended it to delta loops (and quads!) by feeding the center element at the bottom and using phasing lines at the top to route half the current to each of the outside loops. The phasing lines also introduce a phase shift that causes the three loops to act as an end-fire array, that is, unidirectional. The phase shifts between elements were optimized for F/B. This type of antenna is formally known as "An End-Fire Array of Delta Loops with Binomial Current Distribution."

The 1-2-1 binomial array can also be thought of as a pair of two-element arrays with the center elements superimposed. Through a principle of antenna design called pattern multiplication, this squares the pattern of two 2-element designs but uses only three elements. The overall pattern is the product of three patterns: element gain (loop gain over isotropic radiator) × (two element array pattern) × (two element array pattern).

Now phased arrays[1] have some interesting pros and cons. Among the pros is that you can design one for reasonable gain and very high F/B with almost arbitrary spacing between elements. The con is that they can be narrow band, and the pattern can reverse when tuning from the low end to the high end of a wide band such as 15 meters. Generating the correct phase shifts can be tricky, since the transmission lines and the loads interact, and many articles have been written on this topic.[2]

To prove the concept of phased quads, I settled on phased delta loops, with the initial concept of using two equal-sized loops as a phased array hung from a single boom with a rectangular frame of PVC plumbing pipe spreading the bottom corners of the array. The boom could be hung from a tree branch by a single rope and rotated by a tag line or attached to a tower with a switchbox controlling the phasing lines to reverse the direction of the pattern.

The fact that you can arbitrarily set the spacing lets you design the antenna around available materials, in this case low-cost PVC pipe, which comes in 10-foot lengths. To simplify construction, I settled on a boom length conforming to the standard 10-foot length of pipe. As a CW operator, having to use a narrowband antenna wasn't a drawback.

My initial idea was to build a 2-element phased array but, as often happens in engineering, elegance crept in, this time on little *EZNEC*[3] feet (see the sidebar, "Delta Loop Arrays You Can Build"), and the two element concept morphed into a 3-element design with a binomial current distribution (see the sidebar, "What is a Binomial Array?).

As proof-of-concept antenna, I decided to build a 15-meter array with 3 elements on a 10-foot boom with the goal of using it the Fall 2000 CQWW CW DX Contest. Antenna jockeys will notice that 3 elements on a 10-foot boom is a bit cramped for 15 meters, and that 10 meters might have been a better choice for this boom length. This was a 3-way compromise: a 3-element design, 15 meters was the band that would provide the most payback in a DX contest, and a 10-foot boom to simplify construction. I did also simulate a version of this antenna on a 12-foot boom and found only a few tenths of a dB difference in gain—not worth the effort to extend the length of the boom and frame.

Many different antennas and antenna designs can be built using this method. Table A lists *EZNEC* analysis results and dimensions for several examples: the 3-element example described here; a pair of 10 meter arrays: one on a 10-foot boom and one on a 13-foot boom optimized for gain; and a pair of 2-element arrays: a

2-element 20-meter phased array on a 10-foot boom and a 2-element 15-meter parasitic array designed by N6BV. Note that there is no practical difference in the forward gain between the 3-element binomial array described in this article and N6BV's 2-element parasitic design; the parasitic design has a broader bandwidth but the binomial array has 10 dB better F/B.

Also note that Table A includes lengths and impedances for matching stubs, which attach to the driven element in parallel with the feed line. N6BV has found that the impedance of 450-Ω open-wire line is actually 405 Ω, so this value is used. The lengths of the phasing lines are critical—these are based on their impedance and velocity factor. The 53.5-Ω phasing line is created with RG8X or equivalent coax with a foam dielectric. The 202.5-Ω phasing line impedance for one of the 10-meter antennas is based on using two identical sections of 405-Ω open-wire lines in parallel. The 150-Ω phasing line impedance for the 20-meter antenna is based on using two 300-Ω TV type twinlead sections in parallel.

The matching stub itself simply attaches in parallel with the feed line. You can substitute another transmission line for the stub provided that it has the correct input impedance. The shortest stubs are open-wire line or 300-Ω twinlead due to their higher Z_0.

Analyzing the Delta Loop Array

The delta-loop arrays described here consist of two or three elements. Figure A shows the electrical configuration of the antenna. In Figure B you can see the *EZNEC* analysis results on various bands. Table A provides the analysis results in tabular format.

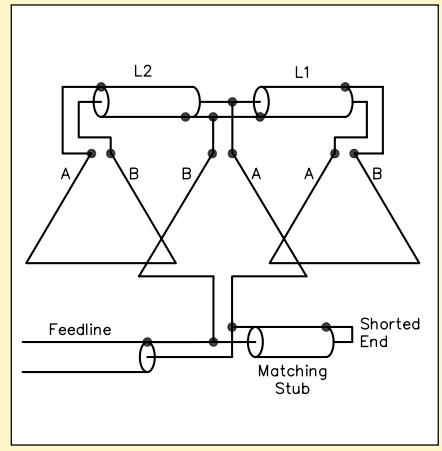


Figure A—The 3-element array of delta loops feeds all the current through the center element and then routes half to each of the outer elements via transmissions lines connected from the top of the center element to the tops of the outer elements to generate the 1-2-1 current distribution. These transmission lines also provide the necessary phase shifts to create the unidirectional or end-fire pattern.

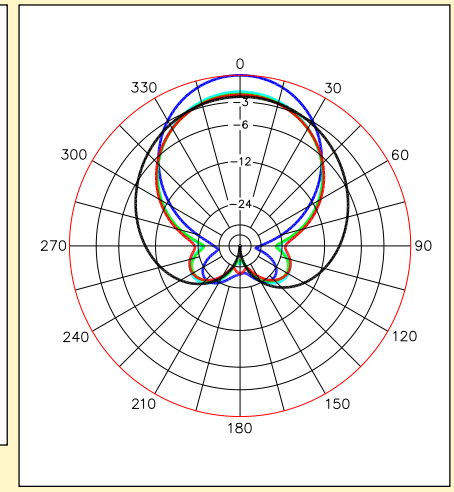


Figure B—*EZNEC* analysis results. The 2-element, 15-meter parasitic array pattern is shown in red. The black plot represents a 2-element, 20-meter phased quad on a 10-foot boom. The violet plot shows a 3-element 10-meter phased quad on a 10-foot boom. The green pattern is the product of a 3-element, 15-meter phased quad on a 10-foot boom.

Table A
EZNEC Analysis Results

Configuration	*Frequency (MHz)*	*Forward Gain (dBi)*	*F/B Ratio (dB)*	*Loop Length (feet)*	*Element Spacing (feet)*	*Phasing Line L1 (feet)*	*Phasing Line L2 (feet)*	*Phasing Line Z_0 (Ω)*	*Matching Stub (feet)*	*Matching Stub Z_0 (Ω)*
3 element phased 15-meter quad on 10-foot boom	21.050	6.86	39.94	47.76	4.95	10.25	23.25	53.5	9	405
3 element phased 10-meter quad on 10-foot boom	28.150	7.12	36.87	35.73	4.95	7.73	17.31	53.5	2	300
3 element phased 10-meter quad on 13-foot boom	28.050	8.85	30.77	35.82	6.25	15.9	18.9	202.5	2.2	405
2 element phased 20-meter quad on 10-foot boom	14.050	6.54	49.45	71.52	9.90	38.4	N/A	150	5.5	300
2 element parasitic 15-meter quad on 10-foot boom	21.050	6.77	29.34	47.76	7.00	N/A	N/A	N/A	2.3	405

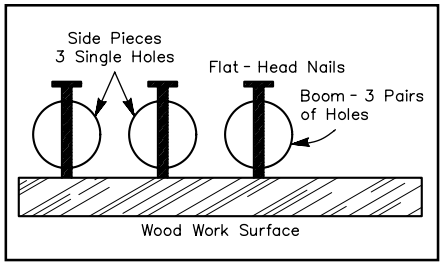


Figure 3—To align the holes in the PVC, first drill one hole in the end of each piece, about 1/2 inch from the end. Then insert a flat head nail though the holes and nail it about 1/2 inch into a piece of scrap wood to ensure than the nail and thus the hole are perpendicular to a level work surface. Do the same with the other three pieces. Now three pieces should be side by side nailed to the same piece of scrap wood. You can now drill the remaining holes and know that they will be parallel by drilling them perpendicular to your work surface.

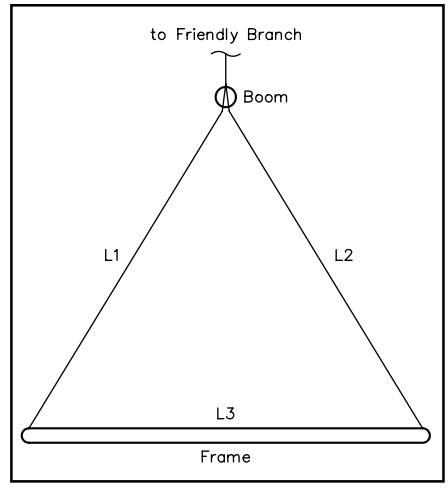


Figure 4—Hoist the entire antenna so that the frame is off the ground, but still low enough that you can comfortably work on it. Adjust the loops by moving the wires through the frame until the frame is level. Once the frame is level, the loops are equilateral triangles and your adjustment is done. Attach the feed line and matching stub and hoist the antenna into place. Enjoy!

The wire used for the antennas is not critical provided that it can support the weight of the PVC frame. For the 15-meter antennas, a 50-foot roll of 3-conductor, 14-gauge NMC (nonmetallic conductor) costs about $10 and provides the wires for all 3 elements for the 10- or 15-meter antennas—all you have to do is remove the outer sheath. The bare (ground) conductor can be used as the driven element since this requires the most soldered connections, and the insulated wires for the outer loops.

Finally, *EZNEC* lets you scale these antennas for different frequencies, such as 6 or 2 meters. But that's a future project!

Construction

Construction is simple: the antenna can be assembled and raised in a single afternoon by one person; no construction crew needed. What's more, it can be built so that it can be disassembled and moved, stored, or just used for contest weekends.

The antenna itself is built "suspension-bridge" style (Figure 1). A single PVC boom provides the top support and the elements are spread by a rectangular PVC frame that hangs from the boom, supported by the antenna wires. There are no insulators at the corners of the loops—the wire is threaded through holes drilled in the PVC. The only insulator is at the bottom of the center element where the feed line is connected.

As Figure 1 shows, you need one piece of PVC for the boom, two for the sides, and two each for each end, which are 15 feet 10 inches long for this 15-meter array. Each piece consists of one 10-foot section and a 5-foot, 10-inch section, joined and glued together by a PVC adapter. The corners consist of PVC elbows glued to the 10-foot sidepieces. When you assemble the frame, do not glue the end pieces. Instead, insert them for a snug fit and then drill a 1/4-inch hole completely through the pipe and elbow. Make a cotter pin by inserting a 6-inch piece of scrap wire through the assembled pipe and elbow and secure it by twisting the ends of the wire together. Removing these wires will allow you to disassemble and roll up the antenna for transport (to the Field Day site, for example) or storage between contests.

For the case of the 3-element Binomial array, you need to drill three pairs of holes through the boom, in parallel, from bottom to top, one pair for the two wires at the top of each loop (Figure 2). You also need to drill a corresponding single hole in each of the sidepieces. The easiest way to do this is to lay all three pieces side by side with the ends aligned and measure and mark all the holes (Figure 3).

Once you drill one end of the three pieces, drive a nail through each into a piece of scrap wood. This will ensure that you have the holes at the middle and far ends in alignment (Figure 4). You can also glue the elbows on at this point, ensuring that they are perpendicular to the entry holes for the wires.

To assemble the antenna, cut three equal lengths of wire (lengths are in the sidebar, "Delta Loop Arrays You Can Build") to form the loops. Thread each wire through each of the two sides first and then bring the ends up through the holes in the boom. Attach the phasing lines by soldering and insulating, paying careful attention to the sense of the connections (in some designs, the phasing lines may have a twist). Coil the slack in the phasing lines and attach the coil to the boom with electrical tape.

Once the antenna is assembled, you'll have to adjust the position of the spreaders on the loops to ensure that the wire in each loop forms an equilateral triangle. This is probably the trickiest part of the job! Do this by hoisting the antenna in the air until the spreader clears the ground. You can then slide the wire through the holes in the PVC side supports as necessary to ensure that the spreader is level (Figure 4). Once the spreader is level, the loops will be equilateral triangles. (Since the width of the frame is the length of one side, the only way for the frame to be level is for all three sides of the triangle to be the same length, that is, L1=L2=L3.) If the holes aren't too large, there should be sufficient tension due to the weight of the frame to keep the wires from sliding.

Performance

The performance of the prototype was delightful: European signals were several dB louder than on my trap dipole and QRM from US stations was negligible! I have the ability to raise and lower the antenna when not in use. Given the high winds at my location (about 1/2 mile from the ocean and a clear shot to the northeast), the ability to lower the antenna enhances its survivability! And if I want to use it at a different location, I only have to remove the wire "cotter pins" and roll it up for transport.

Notes

[1]My main reference in developing this design was "Chapter 4, Arrays of Point Sources" in J. D. Kraus, *Antennas*, McGraw-Hill, 1988, which discusses pattern multiplication, phased arrays, and binomial current distributions.

[2]See, for example, Roy Lewallen, "The Simplest Phased Array Feed System... That Works", *ARRL Antenna Compendium, Volume 2*

[3]*EZNEC 3.0* Antenna Design Software by Roy Lewallen is a wonderful toy. As N6BV commented, "How else can you build and debug an antenna in mid-winter without going outdoors?"

Bob Clarke was first licensed in 1973 as WN1RLI and has a BSEE from the Massachusetts Institute of Technology. In addition to experimenting with antennas, he collects and operates boatanchors. He currently works in new product marketing at Analog Devices, Inc. in Wilmington, MA where he is responsible for the definition of RF ICs. He can be reached at 301 Washington St, Gloucester, MA 01930-4815; **BClarke@alum.mit.edu**.

By Jean Wolfgang, WB3IOS

A Different Kind of Kid's Day

When we think of Kid's Day, we think of an activity involving only two people: an adult and a young person. Usually, that adult is a parent or family member of that young person.

Jim Zahrndt, KF9AU, and the Rockford Amateur Radio Association (RARA), decided to put a new twist on Kid's Day. They saw Kid's Day as an opportunity to introduce the Rockford Christian School in Rockford, Illinois and the entire community to Amateur Radio.

According to Jim, "We opened for business in a pseudo-Field Day environment. Demonstrations included HF voice, HF CW, Automatic Position Reporting System (APRS) and amateur TV. People started coming in as we opened the doors, and they kept coming. The overall operation lasted for just four hours, and there really weren't any breaks in the traffic. Radio maps and pins were used to indicate where contacts were made. As the children completed contacts, they located the cities, states or countries and pinned them accordingly. Smiles spanned the miles as the kids exchanged some basic information with other kids and adult operators. When a DX contact was made, yells of excitement caused groups to rush over to the operator handling that contact. Bragging rights took place there, too, as the children argued over who made the farthest contact. Even the adults who came with the kids had questions of their own.

"Chuck, N9QBT, set up an APRS station that enabled us to track the MIR space station. Of course, this display yielded many questions. The questions and answer graphically illustrated how Amateur Radio is more than just conversing with a microphone.

"The variety of modes involving computers triggered the interest of several kids. Gene, WB9MMM, launched a model rocket equipped with amateur television. Jeff, N9ZUT, worked both CW and voice while Shari, KB9SH, answered questions, and generally filled in wherever needed."

Whether you celebrate Kid's Day as a group or within the confines of your own home and family, don't pass up this opportunity to introduce the next generation to Amateur Radio!

Kid's Day Rules

Purpose: Kid's Day is intended to encourage young people (licensed or not) to enjoy Amateur Radio. It can give young people hands-on on-the-air experience so they might develop an interest in pursuing a license in the future. It is intended to give hams a chance to share their stations with their children.

Date: June 16, 2001.

Time: 1800 to 2400Z. No limit on operating time.

Suggested exchange: Name, age, location and favorite color. You are encouraged to work the same station again if an operator has changed. Call "CQ Kid's Day."

Suggested Frequencies: 28350-28400, 21380-21400, 14270-14300 kHz and 2-meter repeater frequencies with permission from your area repeater sponsor. Observe third-party traffic restrictions when making DX QSOs.

Reporting: Logs and comments may be submitted by e-mail to: **kids@contesting.com**. You can review submissions at **www.contesting.com/kids**. Those without Internet access can mail comments to the Boring Amateur Radio Club (see address below).

Awards: All participants are eligible to receive a colorful certificate (it becomes the child's personalized sales brochure for ham radio!). These certificates can be downloaded in Adobe PDF format at **www.arrl.org/FandES/ead/kids-day-cert.pdf**, or you can send a 9 × 12 self-addressed, stamped envelope to: Boring Amateur Radio Club, PO Box 1357, Boring, OR 97009. You'll find more information on the Web at **www.jzap.com/k7rat/**

Alex Lewek operates Kid's Day at the station of his father, Dave Lewek, N2ECC, in Scotia, New York.

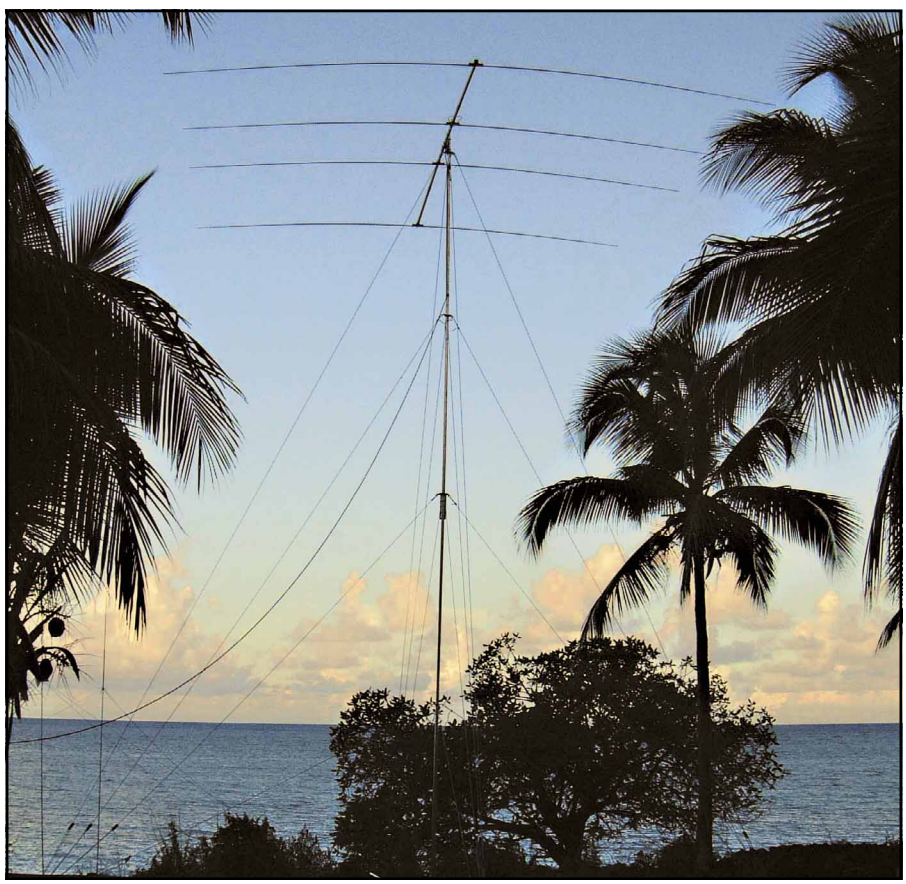
By Neville Cheadle, G3NUG

The D68C Story

"This group (D68C) was like the Energizer Bunny—they just kept going and going and going!"—*Carl, N4AA*

The D68C DXpedition to the Federal Islamic Republic of the Comoros in February 2001 broke many world records and established a new record of 168,722 QSOs. The initial strategy for this DXpedition was formulated after our return from the Spratly 9M0C DXpedition in February 1998. When we visited many UK clubs to present the story of the Spratly DXpedition we were very disappointed that most club members did not hear us and, if they did, they felt they would not have been able to break the pileups. This was despite the fact that 9M0C was at that time, the fourth largest DXpedition ever with 65,524 QSOs.

We decided that next time we must do better and that we must make a greater effort to work the QRP and weaker stations (the "Little Pistols").



D68C's 17-meter beam at sunset.

Our Strategy

The plan was to operate for at least 18 days including three weekends. This compared with 12 days and two weekends on Spratly. In addition:

✔ We would be loud everywhere and have at least six high-power stations (four on Spratly).

✔We would have monobanders for each of the HF bands and get them as close to the sea and as high as possible (mainly tribanders on Spratly).

✔We would ship all the kit in a container to the nearest port.

✔We would seek out a location with some reasonable accommodation so that we could concentrate on radio matters and not have to worry about life-support issues.

✔We would go in February 2001 with the target of making a record-breaking 100,000 QSOs.

✔We would base all our planning on the book *DXpeditioning Behind the Scenes*.[1]

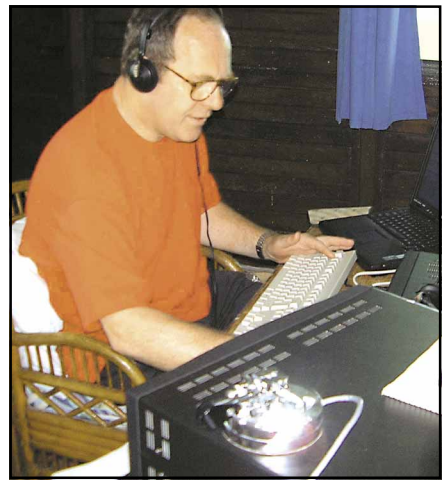
[1]*DXpeditioning Behind the Scenes*, edited by Neville Cheadle, G3NUG, and Steve Telenius-Lowe, G4JVG, offers, in the words of Wayne Mills, N7NG, "A comprehensive view of virtually all aspects of a major expedition for the traveler and DXer alike. From early planning through QSLing, this book offers a variety of thoughts and suggestions on every facet of the DXpedition. It is by far the most complete 'how to' reference available." All surpluses from the sale of the book will be used to sponsor future DXpeditions. The book is available from the ARRL. Call toll free at 888-277-5289, or order on-line at www.arrl.org/shop/.

Why The Comoros?

The Comoros lie between Madagascar and the east coast of Africa. Most activity from the Comoros in recent years has been by one or two-man "holiday" DXpeditions. Typically, they have been using a single 100-W transceiver to a multiband vertical antenna on the water's edge. This is fine for working relatively small numbers of European and Japanese stations, but it fails to make a significant impact in either North America, or even beyond the top level of DXers in Europe and Japan. There had been no major DXpeditions from the Comoros for many years.

For those who are into statistics, the Comoros stood at number 59 in the 1999 worldwide listing of Most-Wanted DXCC entities according to *The DX Magazine*. However, many of the countries ranking higher on the list had been very active since the survey was carried out, so in reality the standing of the Comoros was much higher. We believe that not too much credence should be put on the Most-Wanted lists, as only a statistically small number of DXers responds to the annual questionnaire. These tend to be those DXers on or near the Honor Roll, whereas in real life very many more DXers will call a DXpedition than would be imagined from its ranking on the Most Wanted lists.

The Comoros are the "dream islands" of the adventurer in all of us. From their shores, pirates, buccaneers and corsairs sailed out to prey on cargo-laden East Indiamen. Persian and Omani sultans once ruled the islands, amassing huge fortunes from their dealings in the infamous slave trade. Today the Comoros are still filled with an intrigue, mystery and allure that make them irresistible to many travelers. Le Galawa Beach Hotel is an ideal location for a family or Amateur Radio holiday. There are excellent water-sports—fishing, including big game fishing, snorkeling, scuba diving and sailing as well as island trips and dolphin spotting.



G3VMW working North America in the ARRL International DX CW contest.

Team Selection

We decided on a team of around 25, some of whom would not be able to stay for the full three weeks. This would give us a capacity of 450 operator-days compared with 144 on Spratly. The team was selected with great care; every team member was sponsored by a member of the core planning team and, in most cases, was known to at least two members of that team. We believed that this was very important; maintaining the cohesion of a team of 25 for a period of over three weeks would be vitally important—and we did not want any personality clashes!

Potential Sponsors

At this stage we opened discussions with our major potential sponsors and a business case was prepared titled *A Window of Opportunity*. This proved to be invaluable in attracting sponsorship from both the Amateur Radio and non-Amateur Radio corporate marketplace. The author flew to Japan in August 2000 to discuss possible sponsorship with Yaesu. The new FT-1000MP MkV had just been launched and our D68 DXpedition would be an ideal proving ground. We had used the MP and the VL-1000 Quadra linears on Spratly and they were extremely reliable. Discussions were also opened with Nevada, Force 12 and Titanex and various arrangements were formulated with these organizations.

Brochure

At this stage we produced an attractive brochure to be mailed to DX clubs worldwide. We set out our objectives as follows:

(1) To provide the possibility for every Amateur Radio station in the world—even those running QRP or simple antennas—to make at least one contact with D68C; and

(2) To enable top DXers to put D68C in their log on as many bands and modes as possible. We believed that it should be possible for top DXers active on all bands and on all main modes to work D68C on at least 20 band/mode slots.

In September and October 2000 this

Contact Totals by Band and Mode

(New records shown in **bold**.)

	Band (meters)											
Mode	*160*	*80*	*40*	*30*	*20*	*17*	*15*	*12*	*10*	*6*	*Total*	*%*
CW	1294	4311	10,607	9314	11,843	9477	13,117	10,356	13,925	238	84,482	50.1%
SSB	101	1680	3235	0	14,227	7525	17,093	10,852	20,617	167	75,497	44.7%
RTTY	0	0	0	0	1160	0	1390	0	1617	0	4167	2.5%
PSK31	0	0	0	0	157	0	524	0	431	0	1112	0.7%
MFSK16	0	0	0	0	0	0	2	0	4	0	6	0.0%
FM	0	0	0	0	0	0	0	0	3458	0	3458	2.0%
Totals	1395	**5991**	**13,842**	**9314**	27,387	**17,002**	**32,126**	**21,208**	**40,052**	405	**168,722**	
Previous record	XZ0A 2385	XZ0A 5554	ZL9CI 9518	ZL9CI 8814	4J1FS 31,193	A52A 13,368	A52A 23,769	FO0AAA 8644	FO0AAA 15,202	TX0DX 2500	ZL9CI 96,004	

Continents/Areas Worked

	Band (meters)											
	160	*80*	*40*	*30*	*20*	*17*	*15*	*12*	*10*	*6*	*Total*	*%*
Africa	20	49	85	38	187	92	180	109	179	29	968	0.6%
Antarctica	0	0	0	0	1	0	0	0	0	0	1	0.0%
Asia	196	608	1595	846	2738	1724	3306	1851	4007	101	16,972	10.1%
Europe	1039	3602	7786	5795	12,550	10,947	18,821	14,283	23,255	275	98,353	58.6%
N. America	134	1624	4149	2491	11,198	3983	9381	4823	12,181	0	49,964	29.8%
Oceania	5	42	63	45	338	160	199	58	167	0	1077	0.6%
S. America	1	66	164	99	375	96	239	84	263	0	1387	0.8%
UK	96	356	823	636	1679	1708	2727	2248	3416	0	13,689	8.2%

brochure was circulated to around 150 DX clubs throughout the world. This initiative was led by Steve, G4JVG, ably assisted by Taizo, JA3AER and Wes, W3WL.

The D68C Web Site

Nigel, G4KIU, started construction of our Web site. This site proved to be extremely effective as a marketing and information tool. All the sponsors and their logos were shown on the Web site together with links to their home URLs. The D68C Web site took a huge number of hits while we were on air. From February 8 through 28, the total number of individual pages viewed was 256,714; the best day was Friday, February 16, with 22,389 pages viewed.

Site Survey

An important next step was to undertake a site survey. Don, G3BJ (formerly G3OZF), flew to the Comoros for a week. The site survey had the following objectives:

✔To deal with many logistical matters once the container reached the island.

✔To prepare some preliminary plans for the antenna and station locations.

✔To consider various environmental considerations including security, flora and fauna, medical facilities, state of the hotel's generators, etc.

✔To finalize various issues with the hotel.

✔To prepare a scale drawing of the site and to scope the cable runs.

As a result of the survey, our initial plans changed considerably. We decided to operate well away from the main hotel location and use a number of small bungalows for the stations and for the server. There was much more room for our antenna farm in this area and it became possible to place a number of the beams very close to the beach (although we were not allowed to use the beach itself as this was public property).

45,000 Satisfied Customers

The Comoros DXpedition made more contacts than any other DXpedition in history. No doubt, the length of their stay, the number of operators, the extensive logistics and prior advertising contributed to the remarkable total. Of course, many of the contacts were "dupes" with DXers making numerous contacts on different bands and modes. Despite this, the D68C log shows over 45,000 different call signs, more than ever before.

As a DXpedition progresses, the rate of working new stations diminishes. In this case, according to John, G3WGV, the rate of new stations decreased up to a contact total of about 80,000. At that point, the rate leveled off at about 200 new call signs per 1000 contacts. That is, 20% of all of these QSOs were with previously unworked stations. This suggests that there may be more "DXers" out there than previously thought. Although some of these "new" call signs might be incorrectly copied or sent, the new-call rate is much higher than one would expect. According to Steve, G3VMW, many of these stations were relatively weak, and some seemed inexperienced. It may be that the gang at D68C found out how to reach out to the most elusive DXers of all. —*Wayne Mills, N7NG*

D68C Station Equipment

Yaesu transceivers:

- 6 × FT-1000MP MkV
- 2 × FT-920
- 1 × FT-847
- 1 × FT-900

6 Yaesu VL-1000 Quadra linear amplifiers

3 other linears

Patcomm PC16000 and PC9000 transceivers

14 networked PCs

Marketing

Don, G3XTT, led our marketing drive. The D68C marketing machine went into action with the issue of the first bulletin on September 4. This set out details of our objectives, timing, equipment and team. Four further bulletins were issued prior to our departure to an extremely wide audience that included all the major DX newsletters, the major DX reflectors, potential sponsors and a large number of individuals who requested information.

Logistics

The logistics of a major operation such as D68C can be considered under two headings—people and materials. Both involved a formidable amount of work lasting several months.

For the people logistics we had to deal with flights and the hotel arrangements. Both Le Galawa Beach Hotel on Grande Comore and Air Mauritius offered favorable group terms for which we were grateful.

As a starting point for the material logistics a very detailed inventory was prepared and circulated to the core planning team. Over 500 inventory lines were listed.

All the items were brought together over a period of four months at the author's home. During six weekends a number of "Antenna Fests" were organized during which we built all the an-

The D68C team represented 10 DXCC entities. From left to right: N7CQQ, W3EF, W3WL, M0BJL, 9H1EL, JA3AER, G3XTT, M0DXR, G3BJ, DL7AKC, G3NUG, PE9PE, SM5AQD, G3VMW, G3SED, G4TSH, GU4YOX, JA1RJU, G3WGV, G4KIU, G4JVG, G0OPB, UT8LL, G4VXE and 5B4AGC (5B4WN not present).

tennas, checked all the radios and fitted numerous PL-259 plugs to many lengths of coax totaling 4,000 meters. The Force 12 antennas, in particular, were a dream to build and, after testing, were broken down to just under 20-foot lengths so that they would fit inside the container. All 10 masts were built, five were 30-foot telescopic masts and five were 40-foot masts made of heavy alloy tube. All the guy sets were also made at this time and, where feasible, were attached to the masts. The emphasis of our work at this stage was to build and test everything in advance so that we could get on the air very quickly when we arrived on the island. We even made machines to reel up the cable at the end of the DXpedition!

The container was packed in early November. A number of heavy wooden frames were fitted inside the container so that the many antennas could be shipped in the roof space. This proved to be a very satisfactory arrangement and enabled us to optimize the use of space in the container. It took three weekends to pack the container securely. There were, of course, the inevitable last minute deliveries but nevertheless, we kept to the timetable set out several months previously and the container arrived at the hotel in Grande Comore about 2 weeks before the team.

During December and January we worked hard to attract funds from both the amateur and non-amateur market places; we drafted the DXpedition manual and formulated detailed installation plans for the stations, the computers and for the 20 antenna projects. It was interesting to note that although we started planning to have six stations, we ended up with ten, only one of which did not have a linear!

Technology

D68C pioneered a number of technical innovations, mainly based on server software developed by John, G3WGV. Ethernet connected all operating positions to a central server, providing each operator with information not normally available in a DXpedition situation. The logging software, which was part of the total system, also had fully integrated RTTY and CW facilities. So, without giving a full breakdown of the extensive system, imagine one of the DXpedition operators starting a spell after a much-needed rest. On logging on at an operating position, the CW keyer settings at that position immediately reflected his personal preferences. He was able to see, using simple commands, who was operating at each other position, and on what mode and frequency. As he worked the pileup, because the complete DXpedition log was constantly updated to the server, he was able to list all QSOs made so far by any station he worked, as well as being able to check not only his own run rate, but that of the DXpedition as a whole. A huge amount of other data was available to him from his operating position. We were all delighted with this system.

First Days On Site

Our journey to Grande Comore via Mauritius was uneventful and we arrived at the hotel in excellent spirits on Tuesday, February 6, in the early afternoon. The first task was to get customs clearance for the container, which had remained sealed for the whole of its journey. This took about 15 minutes and went very smoothly. Unpacking then started and the container was emptied in about 3 hours despite temperatures of 35+°C. Mike, G3SED, the "Antenna King," and Don, G3XTT, undertook a quick survey of the site and made some changes to the initial plans. These meant being able to put the 85-foot Titanex virtually on the beach and four monobanders within meters of the sea.

Various teams of four were formed to undertake the various antenna projects and at the same time two of the team installed the stations and a further two installed the computers and the network.

Everything went to plan and then the rain came down. It was like working in a car wash! It rained and rained and rained…for almost four days. We all got very wet but pressed on regardless and in the first 2½ days completed the installation of all the key antennas. Virtually everything was ready by late Thursday evening February 8 and we went on the air at midnight local time.

It had been a great temptation to go on the air after 1½ days when 3 to 4 stations and antennas were ready, but we resisted. We felt that once we started operating, we would never get the impetus back into the antenna projects. In the event we opened up with eight stations at the same time, the PacketClusters went mad and we worked 16,412 stations in the first 24 hours of operation, a new world record.

The Operation

Everything went very smoothly, the pileups were enormous and we all had great fun. We worked in four-hour shifts, each operator taking a minimum of two shifts each day. Two of us did all the operator scheduling—we scheduled approximately 50 shifts each day and tried to keep two days ahead. We devised a system whereby we met each operator's preferences in terms of bands, modes and target areas. Each operator got a fair share of day and night shifts and time off on request. Additional shifts were available on a volunteer basis and some operators put in a 16-hour day on occasions.

The pileups were incessant, right to the end, despite some DX clubs having said to us beforehand that D68C was not much

G4TSH peeks in the door of the Comoros "contest club."

D68C Totals

(Previous record source: OH2BU's Mega-DXpedition Honor Roll.)

Category	*Previous record*	*Held by*	*D68C Totals*
Mixed	96,004	ZL9CI	168,722
SSB	41,343	ZL9CI	75,497
CW	52,270	ZL9CI	84,482
FM	N/A	—	3458
RTTY	2,827	FO0AAA	4167
PSK	N/A	—	1112
Unique calls	36,109	4J1FS	45,315
First 24 hrs	14,000	FO0AAA	16,412
First week	N/A	—	92,728

D68C QSL Managers

Phil Whitchurch, G3SWH, 21 Dickensons Grove, Congresbury, Bristol, BS19 5HQ, England; **phil@g3swh.demon.co.uk**.
For shortwave listeners: Bob Treacher BRS32525, 93 Elibank Rd, Eltham, London SE9 1QJ, England; **brs32525@compuserve.com**.

D68C Sponsors

Corporate: Amateur Radio

- Array Solutions
- Cable X-perts
- CQ Ham Radio Japan
- Cushcraft
- Daily DX
- Dog Park Software
- Dunestar
- Force 12
- Funk Amateur
- Linear Amp UK
- Martin Lynch & Sons
- Nevada
- Patcomm
- UK Radiocommunications Agency
- Titanex
- Vibroplex
- World Space
- Yaesu

Corporate: Non Amateur

- Air Mauritius
- BAE Systems
- Bass Take Home
- Johnson Stevens Agencies
- Le Galawa Beach Hotel
- London Business School
- Nortel Networks
- Parfetts
- Raytheon
- Sofitour
- States of Guernsey Tourist Board

DX Groups

- Akita DXA
- Alamo DX Amigos RC
- Arkansas DXA
- British Amateur Radio Teledata Group
- Chiltern DX Club, CDXC
- Clipperton DX Club
- Danish DX Group
- Delta DXA
- Echelford ARS
- Eastern Iowa DXA
- European DX Foundation
- Far East DXploiters
- Fort Wayne DXA
- German DX Foundation
- GM DX Group
- Guernsey ARC
- Harlow & District ARS
- Horndean & Dist ARC
- Kermadec DXA
- Lone Star DX Group
- M2000A Team
- Magnolia DXA
- Nara DXA
- Northern California DX Foundation, NCDXF
- Northeast Wisconsin DXA
- Northern Ohio DXA
- OHDXF
- Oklahoma DXA
- Osaka DX Lovers Group
- Racal Amateur Radio Club
- Reading & District ARC
- RSGB DXpedition Fund
- RSGB IOTA Committee
- Shiga DXers, Japan
- Six Meter International Radio Klub
- Southeastern DX Club
- Virginia DXCC
- Western New York DXA

needed. Not by the hardened DX types, perhaps, but certainly by the wider audience. We were delighted to put D68C into the logs of Novices, QRPers and those with indoor antennas. From a propagation point of view, only a few bands were open during the middle of the day but around dawn and dusk especially, we had ten bands open simultaneously, fully justifying our decision to take so much hardware.

We really did make an effort to give everyone, even the "Big Guns," some new slots. Topband proved to be tough going, due to the constant tropical storms across the African continent. All the storms that hit Mozambique in February seemed to pass over the Comoros! However, we worked through to the Midwest of the US on several nights, and the other way into Japan as well as putting a couple of KH6 stations into the log. At the other end of the spectrum, 6 meters did not offer the big openings into Europe that we had hoped for, but nevertheless we were able to work many stations in Southern Europe and North Africa, as well as across into Japan, Hong Kong and other parts of Asia. We held back with RTTY, as demand on the other modes was so high but, once started, put over 4000 QSOs in the log (a good thousand or so higher than any previous DXpedition), along with over 1000 QSOs on PSK31. Many (over 3000!) enjoyed the novelty of an FM QSO on 10 meters. Eighty-meter SSB was a particular challenge. The only way to sort out those calling was to select a letter at random and ask for the "station ending in D." This reduced the pileup so that we stood a chance of hearing a call sign fragment. Sadly, we were unable to undertake satellite operation. This was mainly because our plans had been centered around AO-40, which was not available at the time of our DXpedition.

Operating Procedures

All team members were briefed to identify themselves at least every 2 to 3 QSOs. This seemed to work well and was particularly important as there were 12 other DXpeditions active at the same time. Persistence was another key message—keep on trying to get that station that you heard with a partial or full call into the log and ignore other callers until you have done so.

But most important of all was the way we worked split frequency. Even at the start with huge pileups we never used more than 15 kHz on SSB and much less on CW. Yet we heard other DXpeditions using 50-100 kHz and wiping out much of the band. This is poor operating and should be deplored. Most of our splits were 5 to 10 kHz and, if we found we were clashing with another DXpedition, we simply moved frequency and got on with it. With loud signals and the DXclusters, this was not a problem.

After a week or so, we sometimes listened on a single frequency and achieved rates well in excess of 200 QSOs per hour. We then started working simplex; it was interesting to note how the pileups then re-emerged. Many operators do not like working split frequency even if they have the kit (station equipment) to do so. We never worked by numbers. With good kit and good ears this is completely unnecessary and causes great frustration amongst the DX community. If you use radios designed for mobile working with poor selectivity then you will have problems dealing with a major pileup—it really is worth investing in a decent radio.

Yaesu Kit

We were all delighted with the Yaesu kit. We had six FT-1000MP MkVs, six Quadra linear amplifiers, two FT-900 transceivers and two FT-920s. They all performed superbly. The six main stations were on the air continuously for 18 days, a total of nearly 2600 hours of operation. The local power supply was unreliable with the voltage swinging up to 300 V at one point. The switch-mode power supplies coped with this admirably. Fantastic!

Nevada Comoros Trophies

As an encouragement to all established DXers throughout the world, as well as to newcomers to DXing, Nevada Communications of the UK sponsored 18 trophies—the Nevada Comoros Trophies. These trophies are for stations throughout the world (high power and low power), UK stations (high power and low power), UK clubs and shortwave listeners. They will be awarded to the stations that contacted us on the most band/mode slots. There has been great interest in these trophies, which we think will be well received; full details can be found on our Web pages.

Contests

We had an interesting debate as to whether we should participate in the ARRL CW DX contest on the second weekend. The issues included: Disruption to the main DXpedition, number of dupes, reaction outside the US and antenna and computer configuration issues. In the end we decided to make a serious entry. As a result, we are claiming a new African multi-two record of just under 3.7 million points, a 1 million-point increase on the previous record set in 1997 by V51Z. To our surprise, the 4554 contest QSOs also added over 1000 unique call

D68C Antennas

6-element 6-meter Yagi (Cushcraft)
6-element 10-meter Yagi (Force 12)
4-element 12-meter Yagi (Force 12)
4-element 15-meter Yagi (Force 12)
4-element 17-meter Yagi (Force 12)
3-element 20-meter Yagi (Cushcraft)
2-element 30-meter Yagi (Force 12)
3-element A3S 10/15/20-meter Yagi (Cushcraft)
3-element A3WS 12/17/30-meter Yagi (Cushcraft)
Pair of 30-meter Verticals
Pair of 20-meter Verticals (Force 12)
Pair of 15-meter Verticals (Force 12)
4-Square 40-meter (Gladiator)
4-Square 80-meter (Titanex)
85-foot Vertical for 160/80 meters (Titanex)
Beverages, Pennants and Rhombics for receiving.

Uniques and "Nine-Banders"

	QSOs	*Uniques*	*Nine-banders*
World	168,722	45,315	571
USA	45,668	12,953	43

A total of 11 US stations worked D68C on 20 band-mode slots or more:

K9SV	22	W3YX	20
WA9HMN	22	W1JR	20
W4JXM	22	W3GH	20
W4FIN	22	K5XX	20
WK3N	21	N8TR	20
N2LT	21		

There were 98 stations who achieved 20 or more band-mode slots worldwide!

Beaming to Europe on 17, 15, 12 and 10 meters!

signs to the D68C log, setting our minds at rest as to whether, by entering the contest, we would simply be working the same stations all over again. This initiative was led very effectively by Maury, W3EF/G0UHK.

Commitment Of Team Members

The commitment of the team members throughout the project was tremendous from the very start. Many, for example, gave up six weekends in order to be at the Antenna Fests. On site the support was tremendous and, even when the weather was very wet or very hot, the team members tackled their many tasks with enthusiasm. Two of the team made over 10,000 QSOs during the 18 days; they were Mark, M0DXR (11,680) and Jeff, 9H1EL (10,869). The team was very cohesive and everyone got on well together for the entire period. Many lifelong friendships were made.

Breaking Down

Breaking down took about 2½ days. This was carefully planned so that we maintained a presence on the "edge bands"—6, 80 and 160 meters—until the very last moment. Our last contact was early on Wednesday, February 28, when a huge thunderstorm passed over the island. The 85-foot Titanex vertical was one of the last antennas to come down. The container was fully packed by Thursday lunchtime and we all had an uneventful journey home—a tired but elated group!

Conclusions

Over 45,000 separate stations worked D68C. The pileups were still there when we left, and we know that there were many others still trying to work us. Our estimate of the potential number of amateurs who have an active interest in working DXpeditions is therefore much higher than the 45,000 we contacted. DXpedition destinations do not need to be very rare but DXpeditioners do need to put out strong signals. If you are only on the air for a single weekend and achieve around 20 to 30,000 QSOs, you will not be giving many stations an all-time new one (although hopefully some will gain some new band-slots). So in order to satisfy demand DXpeditioners need to:

✔Be loud, with the best antennas possible

✔Be on the right bands at the right time

✔Use good transceivers with excellent selectivity and sensitivity

✔Be on the air for the longest time possible, ideally for a period covering three weekends.

Feedback

In addition to the statement at the beginning of this article, there were two more quotes that the team really appreciated:

"Not just a DXpedition, more a phenomenon!"—*Wes, W3WL*

"What can you say about a group who has now provided over 160,000 Q's? With over 4000 RTTY; 1000 PSK31; 3200 FM, 80,000 CW and 70,000 SSB contacts in their logs, can there be anyone who has not been able to work them on any mode/band? Signals have been outstanding on all bands and the operators superb. The Five Star DXers Association has set so many DXpedition records, it would take a super-human effort to better the levels that they have set from Comoros. Congratulations to the Five Star DXers."—*Carl, N4AA*

Thanks

Our thanks to all those who called us. We had great fun—we hope you did too! Thanks also to our sponsors without whom D68C could never have happened. Thanks, too, to the support team and to our wives and girlfriends—some of us were away for almost four weeks. We will be sending Certificates of Appreciation to all those who supported the D68C DXpedition.

You can contact the author at Futher Felden, Longcroft Lane, Felden Hemel, Hempstead, Herts HP3 0BN, United Kingdom; **g3nug@btinternet.com**. *See the D68C Web site at* **www.dxbands.com/comoros**. QST

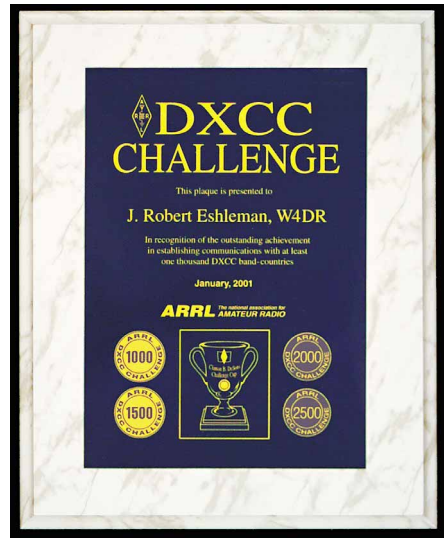
By Wayne Mills, N7NG

The DXCC Challenge

During the past decade, multiband activity in DXing really accelerated. You need only look at the statistics from recent DXpeditions to see this. In 1991, for example, the ZA1A team in Albania made 73,000 contacts with over 32,000 different stations. Recently, D68C made over 168,000 contacts during their widely worked expedition to the Comoros (see "The D68C Story" elsewhere in this issue)! The total number of DXpedition contacts has grown steadily over this period. One difference is quite clearly the increased activity on the "WARC" bands: 30, 17 and 12 meters.

The ARRL Challenges *You*

In order to recognize this increased activity, the ARRL has created the DX Century Club Challenge Award. The DXCC Challenge recognizes your combined total for nine DX bands from 160 to 6 meters. A minimum of 1000 band-entities is required. All contacts made and confirmed since November 15, 1945 may be counted for credit. Confirmations that have already been submitted to DXCC may be claimed as well, but only current entities count for this award. The "Chal" column on your DXCC Credit slip indicates your current Challenge total. You can find a list of those DXers who already have more than 1000 Challenge credits on the DXCC Web site at **www.arrl.org/awards/dxcc/**. When your total reaches 1000 band-entities, a letter of congratulations will accompany your submission results.



The first DXCC Challenge plaque was presented to J. Robert Eshleman, W4DR. Is there a Challenge plaque in your future?

The unique Challenge plaque is endorsable in increments of 500 and comes with the first endorsement "medallion." A distinctive lapel pin indicating your Challenge level is also available. Check the DXCC Web site for additional information and a printable order form. QST

NEW BOOKS

FROM BEHEMOTH TO MICROSHIP

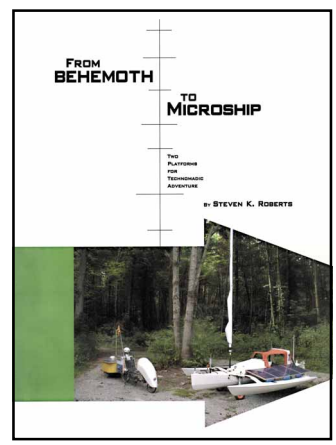
By Steven K. Roberts, N4RVE

Published by Nomadic Research Labs, 1313 Hagen Rd, Camano Island, WA 98282; 360-387-1440; **www.microship.com**. *Fourth edition, softcover, 8½ × 11 inches, 110 pages with black and white illustrations. $18 (Washington residents add 8% sales tax).*

Reviewed by Steve Ford, WB8IMY
QST *Editor*

Kirk Kleinschmidt, NT0Z, first introduced *QST* readers to Steve Roberts' nomadic vision in an article titled "Life on a Megacycle" that appeared in the April 1992 issue. The *Behemoth* was Steve's unique creation—a recumbent tricycle loaded to the gills with computer and communication gear, including Amateur Radio. With the *Behemoth* Steve toured the US, using its technology to remain connected to the rest of humanity. In effect, he had no permanent home to speak of; his home was the highway. And it was more than just a pleasure journey. Thanks to the technology contained in the *Behemoth*, Steve was able to maintain an active freelance and consulting business while on the road.

In *From Behemoth to Microship* we have the story of the evolution of Steve's "techno-nomad" ideal. The book is part hardware essay, part philosophy. Portions of the book reminded me of *Zen and the Art of Motorcycle Maintenance*, especially where Steve goes into detail about the concept of becoming a technological nomad. He sees his pursuit as the achievement of true personal freedom, a no-compromise approach to living the lifestyle you choose. In his case, he chooses to be in a state of almost constant exploration while still being entirely accessible thanks to the Internet, commercial communication and Amateur Radio.



From *Behemoth to Microship* chronicles the various designs he has tested and the technological hurdles he has overcome. Take power systems, for example. He relies primarily on solar energy and depends on human peddle-powered propulsion. To that extent, his nomadic vehicles are quite environmentally friendly. The latest project is the development of the *Microship* —a waterborne version of his tech-heavy cycle. Steve intends to take his roving lifestyle to the coastal and inland waterways. Among the technology on the *Microship* are a Globalstar satellite telephone, embedded *Linux* servers, video production tools, Amateur Radio and much more.

This book spins a fascinating tale, as uncommon as Steve's vision. As I finished, I couldn't help but feel a twinge of jealousy. Many people pay lip service to the notion of taking "the road less traveled," but Steve Roberts made it reality. You don't encounter that sort of focused passion very often, although having a foundation in ham radio no doubt helps! QST

By Colin Robertson, ZS2CR

ZS2AA: South Africa's Grand Old Lady of the Airwaves

Iris Hayes, ZS2AA, South Africa's first female radio amateur, was on the air until only days before her 95th birthday, when a sudden illness ended her remarkable life. Embracing the essence of the amateur spirit, Iris spent decades spreading cheer and goodwill worldwide.

PHOTOS BY PHIL SORENSON, ZS2NP

I got to know Iris upon my return to East London in mid-1994. I had great admiration for her many special qualities, not the least of which was her abundant charm. It is an honor for me to share with you some key points in her life and her Amateur Radio history.

In 1937, Iris was the first woman to qualify for her transmitting license, and since then her call sign has been heard on the air many thousands of times. After her husband died, ham radio became her lifeline, for without it, she said, she could never have lived alone.

Born in Queenstown, Iris was the great-granddaughter of Colonel John Maclean, Lieutenant-Governor of British Kaffraria in the 1850s. She trained as a nurse at Kimberley Hospital, qualifying in 1924. Two years later she married Samuel Hayes, who farmed at the picturesque Poplar Grove Farm at Whittlesea, near Queenstown.

Iris was chairman of the Whittlesea branch of the Red Cross for many years, and during the Second World War was a commandant of the SA Women's Auxiliary Association.

"My hobby as a radio ham started in a casual way. My children were at boarding school, my husband was busy on the farm and it was a little lonely for me. My husband bought me a new radiogram, and one day I heard three people having a conversation. One of them asked anyone listening to write in and give a report. I wrote and got a reply from Taffy Boyce, curator of the Durban Museum. He said it was the first time a woman had shown interest in ham radio and he challenged me to become the first in the country to qualify.

"I learned the Morse code with the help of a scout book. Later, I listened to hams giving slow Morse lessons for beginners. I qualified in 1937 and became the first YL operator in South Africa."

Through her hobby she "met" many people, a number of whom she has visited while traveling worldwide, and others she entertained as a gracious hostess at Poplar Grove or Kidds Beach.

Iris was proud to be a ham and declared, "I believe international friendships break down barriers and differences, as knowledge of others and understanding for them increases. I think we hams, with a close kinship, are an important link in fostering this much-needed goodwill around the world. We also become good ambassadors for our country.

"I recall a conversation I had with (the late) King Hussein of Jordan. A friend and I had been talking to a ham in Yugoslavia when I left to go to the kitchen. She called out that King Hussein was calling me. I shouted back, 'Don't be silly,' but I went into the shack and, sure enough, he was calling me. We had a super conversation—he was most charming. He told me that his wife was also a ham.

"I once exchanged pleasantries with a Catholic priest living in the Himalayas and, a little later, with a meteorologist on an isolated island. He was rather lonely and enjoyed our conversation."

Recipe for Revocation

One of her less pleasant experiences—yet one that she always laughed about—was losing her ham license for three months:

"In 1951 I worked many operators all over the world. South Africa had a weather station on Marion Island and I used to talk to the boys in the group every evening at 5 PM. Christmas came along and they asked me how to bake a Christmas cake, so I gave them the recipe and instructions. It turned out to be an excellent cake!"

Six months later, the Marion Island group returned home and, when the weather station staffers were interviewed by a Natal newspaper, they were asked about the highlights of their year on Marion Island. They mentioned several, including the cake recipe from "Mom."

"The story was headlined, 'SA woman mothers boys on Marion Island,' and not long afterwards I received a letter from the Postmaster General in Pretoria asking for an explanation of why I had contravened

Members of the Border Radio Club at social get-together at Iris' QTH. Standing: Wally Rivers, ZS2ELL; Iris Hayes, ZS2AA; Val Wood, ZR2VW; Colin Robertson, ZS2CR; Rosemary Robertson, ZR2RR, with son Andrew; Trevor Foxcroft, ZS2BV; Matt Fulton, ZS2MAT; Phil Sorenson, ZS2NP; Sitting (top step): Heather Holmes; Neil Holmes, ZS2AI; Neville Vroom, ZS2NV; (second step): Ken Wood, ZS2ACB; Nick Basson, ZR2NB; (first step): Elaine Fulton, ZS2ELF; Maria Fulton; Aloma Basson, ZR2AW; Stan Geer, ZS2KV; and Gerald Berlyn, ZR2GB. At the time of this photograph, Elaine Fulton, ZS2ELF, then age 12, and Iris, ZS2AA, were the youngest and oldest ZS YL hams.

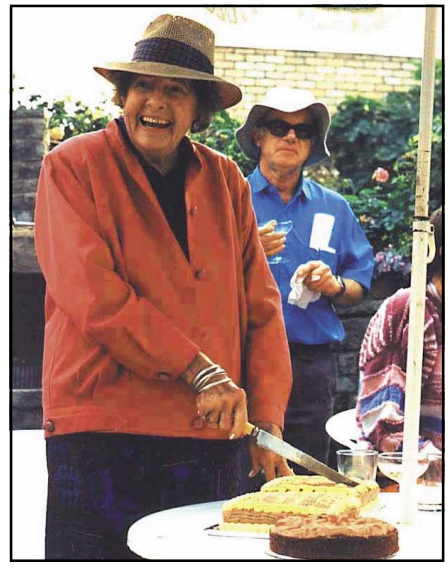
the Radio Regulations! I explained that there was no post or telephones there, but the Postmaster suspended my license for three months, which caused shock among hams in South Africa and elsewhere."

Iris was the first president of SAWRC—the South African Women's Radio Club. The SAWRC, which was affiliated with the SA Radio League, was very active in the 1950s and '60s, with more than 120 YL members. The group even had its own magazine, *YL Beam*, which regularly totaled more than 18 pages and featured a 30-page Christmas edition. It was always her wish that the SAWRC would be revived by the many YL hams now in South Africa.

In 1981, Iris spent three months in the United States and Canada, and was the guest of many hams and their families. She also hosted several enjoyable social get-togethers of the East London branch of the SARL, and later of the Border Radio Club in the colorful garden of her Kidds Beach home.

In October of 1993 she baked and iced her own birthday cake to celebrate her 90th birthday, which was attended by family and friends from many countries. On that occasion she received birthday greetings from the president of the Yaesu radio company.

In April of 1985 Iris was made an Honorary Life Member of the South African Radio League. In March of 1994 she was honored by the Port Elizabeth branch of the SA Radio League when it hosted the National Annual General Meeting of the SARL. She was guest of honor at the meeting and banquet, gave the keynote address, and presented the national awards. In 1996 she was unanimously elected as Honorary Life President of the Border Radio Club in East London.



Iris cutting the birthday cake on the occasion of her 90th birthday. In the background is Ken Wood, ZS2ACB.

While trying to verify that Iris was indeed the oldest active lady ham on the air for her 95th birthday in 1998—a claim that was not contested—numerous tributes were received from hams around the world, including this interesting one from Dr Bud Voortman, ZS1B:

"Iris introduced me to ham radio in 1947 when I was in sixth grade, and she encouraged me all the way thereafter. At that time I was in an isolation block for six weeks at the Frontier Hospital. I had scarlet fever—in the days before penicillin. Iris and 'The Early Morning Gang,' an elite group of hams in those days, I might add, used to call me every morning on 40 meters. That was in the days of AM when a schoolboy could listen to hams on a simple superhet!

"After leaving the hospital I developed complications that kept me in bed for another six weeks. After that Iris invited me to her farm to recuperate. She was utterly caring. She let me speak to her friends: W6PDB (the archery champion of the USA); John Allen McLean, W0COU (who was distantly related to Iris and whose grandfather was also John Allen McLean); and Alf Pittard, VK6AP. She even gave me her 1938 model two-and-a half-watt CW transmitter that ran off dry cell batteries. It used a series of type 19 tubes.

"I still remember the two huge rhombic antennas at Poplar Grove farm, and the 45-watt 807 rig with the SX-28 receiver—most impressive to a 14-year-old schoolboy! At that time I missed writing my Junior Certificate due to the three months' absence from school and am thus one of the few doctors who never passed the sixth grade!

"You can tell Iris that I still don't object to her calling me "My Boy"—even if I am now a 65-year-old grandfather! To me she is still the epitome of a true ham!"

Just a week before her 95th birthday, Iris suffered a serious health setback and was hospitalized. Until that time, Iris still drove her automobile and kept active on HF, thoroughly enjoying HF DX thanks to the new tri-band beam antenna on her tower.

Sadly, on May 31, 1999, Iris passed away. A celebration service was held in Beacon Bay, East London. The church front was adorned by dozens of flower arrangements, filled, of course, with many irises. With more than 400 people attending, including some 30 hams from all over South Africa, the church was overflowing. Tribute after tribute was poured upon this special person during a very moving service.

Iris Hayes, ZS2AA, was a grand lady and a wonderful example of true ham spirit. Her key may be silent, but happy memories of her will live far beyond her years in those who knew her.

Colin Robertson, ZS2CR, is a semi-retired bank manager who has been a ham for 22 years. Past Chairman of the Port Elizabeth and East London branches of the SA Radio League, Colin is a founding member and past chairman of the Border Radio Club in East London. ZS2CR is a VHF/UHF enthusiast who enjoys repeater development work and coaching young people for the RAE. His wife Rosemary and eldest son Brendan are also hams, ZR2RR and ZU1AAR, respectively. You can contact Colin at 9 Florence Ave, Vincent, East London, South Africa; **totts@webmail.co.za**.

By Jean Wolfgang, WB3IOS

2000 ARRL International Humanitarian Award Winner: Jerry Herman, N3BDW

Earlier this year, ARRL President Jim Haynie, W5JBP, presented the 2000 ARRL International Humanitarian Award to Hurricane Watch Net manager Jerry Herman, N3BDW, during the ARRL Florida State Convention. The selection of Jerry Herman as the 2000 recipient is appropriate when you consider that the International Humanitarian Award was created to recognize amateurs who are devoted to promoting the welfare of mankind. Few events endanger the welfare of so many than a hurricane.

Jerry Herman receives the award at the ARRL Florida State Convention. (Left to right) Mike Pilgrim, K5MP, Jerry Herman, N3BDW and Jim Haynie, W5JBP.

The Net Begins in 1965

According to Jerry, Gerald Murphy, K8YUW, formed the net in 1965 in the aftermath of hurricane Betsy. At that time, the Hurricane Watch Net wasn't formally associated with the National Hurricane Center as it is now. In the early days of the net, Layton Ruse, W4VBQ, who is still active with the Hurricane Watch Net, would gather the information at his Miami, Florida home and telephone it the National Hurricane Center. This situation continued for almost 15 years before Julio Ripoll, WD4JR, established a ham station at the Center in 1980 during hurricane Allan. As luck would have it, the National Hurricane Center lost communication with the Weather Service forecast office in Brownsville, Texas, but Julio was able to maintain a link with Amateur Radio. Needless to say, the officials at the Hurricane Center were quite impressed. From that point onward, Amateur Radio has been closely associated with Hurricane Center activities.

A Capable Network of Volunteers

Over the past 35 years, this network of volunteer Amateur Radio operators has provided valuable weather information from around the Caribbean, Atlantic, Central and South America to the Tropical Prediction Center/National Hurricane Center. When hurricanes come within 300 miles of land (278 times since 1965) Jerry and the Hurricane Watch Net go into action. The net sendsinformation from isolated islands, marine assets and other areas that are not part of the TPC/NHC routine communication network. This allows forecasters at the National Hurricane Center to more accurately prepare their advisories and predict the movements and size of storms. Many times the information is available only from this dedicated group of radio amateurs.

Max Mayfield, director of the National Oceanic and Atmospheric Administration, feels the "Hurricane Warning Program is much stronger as a result of the help of these volunteers. It is the best example of amateur radio serving in the public interest, convenience and necessity."

During the two most destructive storms of the 1998 hurricane season, hurricanes Georges and Mitch, the Net operated for days at a time on an almost around-the-clock basis. When the recovery efforts for hurricane Mitch began, the Net arranged Internet and radio links to assist in the health and welfare traffic into Honduras as well as providing aviation weather information for pilots flying relief missions into Central America.

Hurricanes Georges (1998) and Lenny (1999) both hit the Island of Saba, wreaking havoc with the island's telephone and electrical networks. Jerry arranged for a 2-meter repeater belonging to the ARRL to be sent to Saba on a loan basis. Thanks to the island-spanning coverage provided by the repeater, repairs proceeded quickly.

When He Isn't Managing the Net...

…Jerry also recruits and schedules operators, updates the Net's Web site and serves as the Net controller during many storms. He also conducts presentations around the country on the Net's mission and operations. Jerry organized and presented the 4th annual Amateur Radio Operators Hurricane Seminar, in conjunction with the National Hurricane Center in Miami, in February of this year, drawing operators from the Caribbean Islands as well as from the United States.

If you are interested in learning more about the Hurricane Watch Net, visit their Web site at **www.hwn.org/**.

You can also nominate a group or individual for the 2001 International Humanitarian Award. Please send e-mail to **jwolfgang@arrl.org** *for more information.* QST

By Brice Wightman, VE3EDR

VA3RAC: Canada's 35A Field Day Extravaganza

At one minute before Field Day 2000, 35 operators hunch over their equipment, nervously testing their mikes and keyer paddles… Moments later, the ether is alive with kilowatts of RF that straddle the spectrum from 160 meters to 3 centimeters. The story of this "dc to daylight" Field Day operation is sure to start your wheels turning!

It's Field Day 2000 in Canada's capital, and this is the first time this many stations have been put on the air in a 300-meter circle by one group. More than 150 amateurs from seven clubs have just assembled 15 tons of equipment in 24 hours, and spirits are high. But it didn't start like this—it started in apathy.

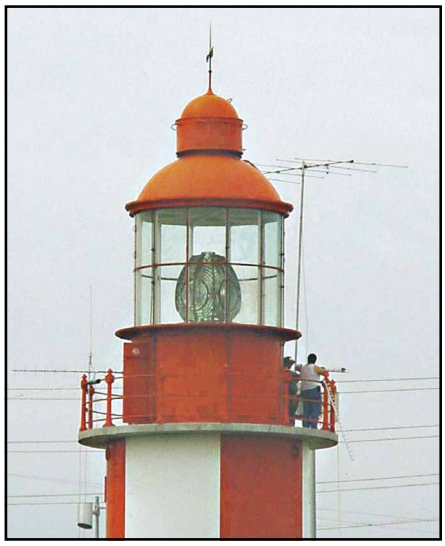
The VA3RAC crew begins setting up the first antenna.

The Beginnings

Like many clubs, the Ottawa Valley Mobile Radio Club (OVMRC) started its year without a Field Day Chairman. When President Sue Mogensen, VE3MOG, made an appeal, Glenn McLeod, VE3GLN, stepped into the breach. He'd helped to organize several other Field Days, including a multi-club effort for the whole of Newfoundland. So he not only took on the job, but aimed even higher. With the objectives of unifying the clubs of the Ottawa-Hull region and achieving increased participation, he aimed for at least 12 stations. He also envisioned that the event, based in an area that straddled the Ontario-Quebec border, would be bicultural and bilingual.

There were fewer than six months in which to organize. Glenn immediately started spreading the word at club meetings. As a result, 35 club representatives and individual hams showed up for an organizational meeting in January of 2000. Even at this early stage, the enthusiasm of the supporters started to enlarge the scope of the emerging operation. Ultimately, the members decided to take a shot at beating the existing record of 28 stations set by N1NH, although publicly we admitted to only "at least 12" for security reasons. The designation "FD2000" was acceptable to

Our 160-meter GAP vertical (left) and 10-meter monoband beam (right).



For VHF and UHF, you need all the height you can get. This lighthouse was the ideal spot for those antennas.

Jeff Milne, VE3EFF, makes adjustments to the VA3RAC satellite array.

both language groups. The Radio Amateurs of Canada (RAC), Canada's national Amateur Radio organization, allowed the use of its high-profile call sign, VA3RAC. An e-mail reflector was set up to facilitate communication. Some clubs put up seed money and many local businesses donated products and services. We were on our way.

One of the clubs was the Club de Radio Amateurs de Hull (Quebec). Representative Pierre Cyrenne, VE2GPF, immediately committed to supporting four stations. Pierre was chosen to be Co-Chairman in charge of the Quebec contingent. He also acted as Treasurer, put up a web site publicizing the event, raised numerous contributions from small businesses and arranged for the proclamation of Amateur Radio Week by three municipalities in the region. And by begging and bullying, he even persuaded a city councillor to pay for the food licence.

Glenn and Pierre both had military backgrounds, which served us well in this campaign. They pursued our goals aggressively and ensured that the troops were provided with everything they required. Glenn's specialty, logistics, was a big asset.

Although an attempt was made at the outset to form an organization with officers and assigned duties, the Co-Chairmen and the Secretary, Tom, VE3OFD, were the only formal officers. The organization, if you can call it that, was very casual. Everyone knew what the Field Day objectives were, however, and the participants carried out their assigned tasks on their own initiative. If someone brought up a need at the bi-weekly meetings, he was "volunteered" for the job on the spot. Fortunately, no feasibility study was done, as that would have definitely ended the project.

Getting Ready

From January to June we chased after equipment and operators and met every two weeks to compare notes. The venue chosen for the Field Day site was the park area in front of the Science and Technology Museum Canada. (The OVMRC operates Amateur Radio station VE3JW as an exhibit within the Museum; the call VE3JW belonged to Jim W. Cotter, Canada's first blind ham.) A comfortable 1000 feet was available in the east-west direction, but only about 750 feet was available running north-south. There were many obstacles (mostly outdoor exhibits), including a steel lighthouse, an Atlas rocket, a 200-ton locomotive on an elevated right-of-way, a large radar dish, a windmill, an oil well and a network of paved pathways. The west end was poorly drained and largely unusable, and the site was generally below the surrounding terrain. To make matters worse, the southern horizon was obscured by several high-rise buildings, and the perimeter on three sides carried primary electrical distribution lines—a hostile environment for RF. A survey by Ralph, VE3BBM, confirmed that the site was far from ideal.

At the back of everyone's mind from the beginning was how we were going to get 35 transmitters and receivers to function effectively in such a restricted area. The group had hoped to have Jack Belrose, VE2CV, an antenna guru of international reputation, lay out the antennas. But because Jack wasn't available, Brice, VE3EDR, was volunteered to do the job.

To prevent receiver overload we decided to shoot for a target isolation of 80 dB between antennas. If necessary, input pads could be switched in, and 60 dB of isolation might be tolerable. Our station layout strategy was to separate the "electrical footprints" of the antennas in the near field—an area big enough to swing a dipole in a complete circle. Next, we used three polarizations/orientations on each band: north-south and east-west (horizontal), and vertical. Finally, we lined up same-band antennas end-to-end so they operated in each other's pattern nulls. An anonymous ham arranged for the loan of 18 Dunestar band-pass filters, three for each HF band. These filters solved our out-of-band problems, so the main challenge was same-band isolation between modes.

The largest antennas went up first. The 160-meter CW dipole was strung east-west from the lighthouse. (The ARRL gave a dispensation to use this "permanent structure" for Field Day because it had not been built as a communications platform.) The 160-meter phone dipole was oriented roughly north-south. The 160-meter digital antenna was a vertical

in the far corner of the site.

Being on the northern fringe of Field-Day activity, we aimed our antennas to the south. To accommodate, our two 80-meter dipoles were arranged in an east-west line along the south side of the property, "in front" of all major obstacles. An 80-meter vertical was placed some distance away. The four 40-meter dipoles (including the Novice station antenna) were in a line behind this, as far back as obstacles would permit. Two 15-meter Yagis were interleaved with the dipoles to minimize coupling between 15 and 40 meters. The 20- and 10-meter Yagis were spread out over the remaining space and the 6- and 2-meter antennas were fitted into the cracks. Some *ELNEC* antenna modelling was carried out to quantify the isolation factors. Glenn accepted the plan, saying to Brice, "Come Saturday, I'll either kiss you or curse you."

The relatively compact layout was helped by the use of a RaiBeam tribander. The manufacturer, Chuck Smith, WA7RAI, showed this antenna at Dayton, and Doug, VE3XK, arranged for Chuck to ship an RB36X to us for testing and publicity. This beam can transmit and receive on three bands simultaneously. The RB36X was mounted on a tower in line with the 80-m dipoles.

The power system was designed and installed by Ernie, VE3EJJ, a professional engineer. The components were borrowed from the Communications Research Centre (CRC) and consisted of a quiet 60-kVA generator with a 48-hour fuel capacity, four three-phase armoured TEC cables ranging from 350 to 500 feet in length, and four distribution panels, each carrying six duplex receptacles with breakers. Ernie also fabricated the grounding system and enough angle-iron stakes with braided straps to be placed at the generator, the distribution panels, every tower and every station.

The Trump Card

The HF stations alone would make a respectable entry, but they wouldn't reach our target. What put us over the top in station count was the UHF-and-up complex assembled by Clare, VE3NPC, and Ken, VA3KA. At these wavelengths, EMC wasn't a problem, so all of these stations were located in one tent on the west side of the site with all antennas firing northwest, away from the HF antennas and the satellite station.

Who would we contact with these line-of-sight stations? Tom, VA3OFD, a member of the Ottawa Fire Department (OFD!), arranged for the use of a four-story smoke tower located at an OFD station about 750 meters outside our circle. Alan, VA2ADB, and Clayton, VA3CBJ, operated these stations as a 1B site. Alan, a no-coder, boned up on his Morse the night before and his *Field Day* contacts were his first on CW!

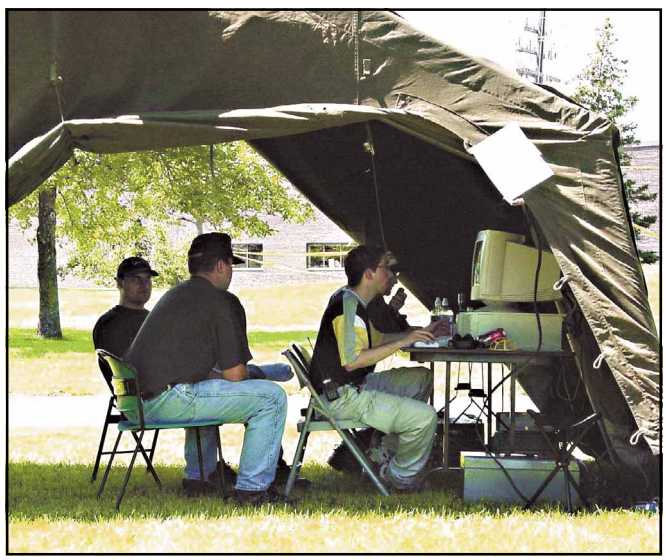
With no all-mode rigs for 220 and 440 CW, code oscillators were built for MCW operation. For the microwave bands, home-brew satellite receive converters were on hand, but transmitters were nowhere to be found. A home-brew signal generator (and several quickly assembled duplicates) was pressed into service. Power-supply keying resulted in severe chirp, so a circuit was lashed up to produce FSK modulation. All QSOs were made except for the 2.4-GHz station, whose signal was detectable but too weak to work.

Getting it All Together

During the last two weeks in June, Marc, VA3DRV, driving an 18-wheeler supplied by TransX, transported four loads of antennas, towers, tents, tables, chairs and other equipment to the site. This gear was staged inside a compound behind the Museum and outside the operating circle. Work parties assembled, tuned and labelled the antennas. The RaiBeam arrived just 24 hours before set-up time and was hastily assembled and tuned. Glenn had rescued several hundred feet of tower material—the remains of an old phased array—from the CRC. Ernie, VE3EJJ, spent an entire week transforming these into more than 20 towers. Single-handedly, he cleaned, disassembled and reassembled them into 33-foot towers, complete with base plates, head plates and, for those towers carrying rotatable beams, a pipe mount.

Ready to Go

At the final meeting, copies of the site plan were distributed to the station managers and set-up crews, Dunestar filters were signed out and Ralph, VE3BBM, briefed the station managers on the need for baluns, feed line chokes, power-line filters and station grounds. Hot feed lines, all emitting vertically polarized radiation, could defeat the isolation that had been designed into the antenna layout. Tom, VA3OFD, gave a training session on the *Writelog* contest-logging software that Ron Stailey, K5DJ,



Visitors look on as Mathieu Richer, VE2TLS and Michel Beaudry, VE2BCW, operate the 20-meter SSB station.

Tony Demers, VE2SOP (left) and Pat Fortin, VA2GPF, work 10 meters as twlight descends.

had donated to the cause.

Thursday night and Friday morning, Brice, VE3EDR; Doug, VE3XK; Harold VE3UNK; and Peter Crouse began staking out the site in the rain. Using a surveyor's tape and baselines provided by onsite landmarks, a red stake was driven to mark each tower, with green stakes marking each tent. Each stake was labelled with the band and station manager's call sign. The site perimeter was marked on the grass with environmentally friendly paint.

Fortunately, Friday was sunny. After lunch, vehicles were loaded at the compound and staged beside the Museum at a start line just outside the site perimeter. A pickup truck pulled a low-bed trailer loaded with towers. At the two-o'clock starting gun the pickup circled the perimeter and a crew dropped the towers at the staked positions. Another crew dropped more than 30 Canadian Forces tents.

Initially, Ernie, VE3EJJ, had two six-man antenna crews, mostly staffed by members of the Hull club. The first tower took more than an hour to set up—which meant that things weren't looking good. But with the two crews working as one, the workers soon developed a smooth technique that was a joy to watch. The synergy propagated a sense of teamwork that spread across the whole site. Rick, VE3KYG, used his four-wheel-drive ATV (with winch) to provide the power to set up the towers. The station managers followed, setting up the remaining parts of each station. By working until dark and coming back early Saturday morning, the job got done.

ARRL Contest Branch manager Dan Henderson, N1ND, addresses the crew.

At the two-o'clock starting gun the pickup circled the perimeter and a crew dropped the towers at the staked positions. Another crew dropped more than 30 Canadian Forces tents.

At 11 AM Saturday, the HF stations sent a round robin of transmissions at one-minute intervals while the other stations listened. There were no reports of interference. The EMC problem had been licked! A couple of mild cases of cross talk were later solved using in-rig attenuators. The RaiBeam users were skeptical about the antenna's isolation figures, so they carefully edged power outputs to maximum. They successfully transmitted and received in all possible combinations. Ironically, the only cross-talk was between the IF signal of one receiver and the front end of another.

At 1330, the crew and the viewing public assembled before the podium at the base of the Saturn rocket for the opening ceremony. There was an opening speech by Michael Binder, Deputy Minister from Industry Canada, the federal department regulating all radio operation in Canada. There were also greetings from Dan Henderson, N1ND, representing the ARRL; Debbie Norman, VE3RGM, from Radio Amateurs of Canada (RAC); Daniel Lamoureux, VE2KA, President of les Radio Amateurs du Quebec, Inc (RAQI) and our two Co-Chairmen. Just before the starting gun, Glenn announced that we would go on the air as 35 Alpha. With that, a cheer went up and the operators raced off to their tents.

On the Air at Last

There were few contesters among the operators, so many had never used logging software before. But every station had a computer with *Writelog* loaded and ready to go. Some resisted and wanted to use paper logs instead, but in the end, all of the HF stations and most of the VHF stations went with the computers. At one station, the computer's power plug got kicked out and 60 QSOs were lost. Even the most avid paper supporters had to admit that, in this computer age, logging software is the way to go. Rich, VE3IAY, did a superb job of correcting and combining the logs. Wrong times, bands and modes were fixed. Some lost QSOs were even recovered from rain-damaged laptops by using hard-disk utilities.

With more than three inches of rainfall, June had already been a very wet month, and our site had ankle-deep pools lying on some grassy areas. As if on cue, heavy rain started just after midnight Saturday, and soon became a cloudburst. Nearly two inches fell in a short period. The rain on the tent roofs was deafening. Some stations had been left unattended overnight, and leaks damaged some rigs and computers. Puddles turned into lakes. Operators continued in ankle-deep water. We thought we'd have to shut down the power, but Ernie assured us that the grounding was adequate.

Glenn had promised a lot of things for Field Day and had managed to deliver on all of them (to the disbelief of many), but a week before the event there were rumors that Glenn had a surprise for the 2-meter group. Jaws dropped and eyes popped when a Delupka Crane Rental crew showed up at the Museum with a 200-ton construction crane sporting a 200-foot extendable boom. Frank, VE3GID, had arranged for the loan of this unique 2-meter beam hoister. A 13-element beam and rotator were rigged to the end of the boom, along with the largest Canadian flag Frank could find. We had arguably the tallest tower in this year's competition. This antenna provided contacts as far away as upper New

York and southern Ontario.

Bob, VE3SUY, the chief instructor in the licensing course, managed the Novice station, which operated with the call sign of Patrick, VA2GPF, the grandson of Pierre, VE2GPF. Bob had built a trap dipole for 40-meter CW and 10-meter phone. Participation was disappointing. Operators included a young blind ham who had recently passed his Morse test.

Food and Field Day go together. But this was no barbecue-grill, coffee-urn and drink-cooler operation. A mobile kitchen provided by Loeb Foods was rolled into the middle of the site. Dan, VE3XDD, a veteran of many Field-Day cookouts, organized and operated the kitchen, assisted by Larry, VE3WEH. During the 48 hours the kitchen was in use, two hot breakfasts and a chicken dinner for 120 were served along with a steady flow of sandwiches, coffee, soft drinks and water. In all, more than 500 pounds of food and drink passed over the counter.

An HQ tent was set up near ground zero to house the command center, a first aid station and the APRS demonstration station. Carolyn, VA3CPC, a registered nurse, accepted medical histories from the participants and had any potentially necessary medications on hand. In addition, she handled the 2-meter simplex site communications. There was only a handful of casualties, none serious, which is surprising considering how much heavy equipment was handled by the crews.

Jim, VE3NVJ, and Keith, VE3DBG, originated the message to the SCM, passing it via a special schedule with the Kingsmere Traffic Net. As an additional publicity activity, not called for in the rules, Jim and Keith manned a 2-meter station in the reception tent and offered to put messages onto the NTS for the general public. A book of 10 messages — "Thank You" notes to our sponsors—was originated offsite by Steve, VE3SBC, on 2 meters and relayed by VA3CPC (in the HQ tent) to VE2GPF (who was mobile).

Jeff, VE3EFF, set up an elaborate satellite station that was housed in a tent near the visitors' entrance. "Non-traditional" modes were represented: ATV by Bill, VE3EKA; and APRS by Marc, VA3DRV. Ernie, VE3EJJ, operated the station that earned the alternate energy points, while "Mike on the Bike," VE3BUP, cranked a regulated generator supplied by the other "Mike on the Bike," VE3FFK. For this exercise, visiting hams who hadn't operated a Field Day 2000 station were pressed into service to go mobile and make the necessary five contacts.

Faced with the daunting task of disassembly, the shutdown signal was given at noon on Sunday. Even so, the crews were busy until dark. And back they came on Monday to return all the gear to its owners. Richard, VE3ZXX, Pierre's brother, and his clean-up crew left the site in perfect condition; there wasn't a single ground stake left for the mowers to cut the next day.

Taking Stock

Public exposure to Amateur Radio far surpassed the bonus point requirements. Three local municipalities officially proclaimed Amateur Radio Week, one to be an annual event. Print, radio and TV personnel (in both official languages) covered the event. One community newspaper did a cover article. The timing was the day after school let out, so many families visiting the Museum were led to the site on guided tours organized by Patricia, VA3PUR. The reception tent was near the museum entrance and was attended by RAC and RAQI representatives, as well as Peter, VE3BQP, of the Emergency Measures Radio Group, which had a station on display. Nearby, Jeff's satellite station was also a big attraction.

We aimed to set a new mark for the number of stations on the air at a single Field Day site—and to have a lot of fun. We succeeded on both counts.

Our score wasn't all that high. In fact, we didn't even place in the top 10. A high score, however, wasn't one of our objectives. We aimed to set a new mark for the number of stations on the air at a single Field Day site—and to have a lot of fun. We succeeded on both counts.

Two things everyone has agreed on: We had all made new friends and we had all learned something new about Amateur Radio. Many hams discovered digital modes. A moving example of this occurred in the 160-meter RTTY shack. This station didn't make any QSOs on the air, but an important eyeball QSO took place. A long-time ham who had given up the hobby because of hearing loss went away knowing he could get back on the air digitally.

We had succeeded in the objectives of bringing the region's clubs closer together and in getting greater Field Day participation. As to the objective of "B and B" (biculturalism and bilingualism), we were a microcosm of Canada—there was some friction from both sides, but the broad middle worked harmoniously. Pierre even had the Field Day rules translated into French and persuaded the ARRL to post them on its web site.

Considering all of our successes, would we do it again? Surprisingly—no! If we had known what lay ahead, we wouldn't have even tried such an ambitious undertaking. What did we learn? Start early—two years ahead—in your planning. Make sure everything works soon enough to repair or replace anything that's not up to snuff. Label everything. Rehearse the setup drills. Use more ATVs with trailers. Train the operators in Field Day procedures, including the logging software, and do frequent back-ups to diskette. Use consistent canned messages at all stations. Test rigs in the same tent for EMC. Have tarps at hand in case of rain—and use them. Give the photographer a radio-equipped assistant to scout for photo ops. Take some conventional and digital photos for publication and to preserve memories.

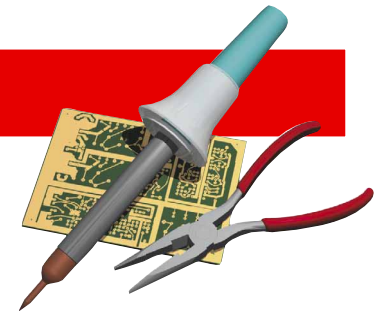
Surplus funds from the event were donated to the Defence of Amateur Radio Fund and to the Children's Hospital of Eastern Ontario. Surplus food was donated to the Shepherds of Good Hope soup kitchen.

Full details on our Field Day 2000 can be found at **corpweb.ott.igs.net/~fd2000/**. A comprehensive CD, which includes hundreds of photos, is available from Pierre at **ve2gpf@rac.ca**.

We'd all like to thank ARRL; the Radio Amateurs of Canada; les Radio Amateurs du Quebec Inc; The Federal Government and local Municipalities of Hull, Gatineau and Ottawa—without whose help this event would not have been possible. To the commercial sponsors who supported this public event in the spirit of true community, we owe you a debt we will never be able to repay. All of the groups involved in Field Day 2000 made significant contributions during the "Ice Storm of 98" emergency. Your participation is proof that emergency communications in Canada's national capital are in good hands.

Photos by Mike Hickey, VE3IPC.

You can contact the author at 505 St Laurent Blvd, #2204, Ottawa, ON K1K 3X4, Canada; **ve3edr@rac.ca**.



The Doctor is IN

Q Joe, WT7V, asks, "Over the past two years or so, I have received dozens of QSL cards from DX stations that I've never worked. In fact, many of these QSLs confirm contacts supposedly made when my rig was completely off the air for weeks at a time. Do you think someone could be bootlegging my call sign?"

A Bootlegging is always a possibility, but it is rare. If the cards seem to arrive in spurts, there is a more likely explanation.

It is not at all unusual for a call to be consistently misrecorded in contests. For example, K0NS gets several cards per year intended for K0DI, a very active CW contest operator. If you sound out the suffixes of both call signs in Morse, you can understand how someone could blur the two together. Early this year, NT1A inquired about some cards that were apparently meant for our own Dave Patton, NT1N, here at Headquarters. In the heat of a contest, missing or transposing the individual letters is easy to do.

Q Ken, KE6ZWN, asks, "The material in an NPN transistor consists of a positive layer (the base) surrounded by two negative layers (the emitter and collector). How do the manufacturers build transistors so that the current flows correctly between layers while at the same time keeping them insulated from each other?"

A See Figure 1. Transistors are made up of layers of material that are "doped" with impurities so that they are either "P" type (positive charge) or "N" type (negative charge). Now, these charges aren't quite like the ones in a battery—they exist in the form of an occasional extra electron or positive ion (an atom with an electron deficit) that are available as "current carriers."

Where two different layers of material touch, an exchange of current carriers takes place and a neutral (or near neutral) "depletion region" forms (an area where the net charge is depleted). In a bipolar transistor, the base-emitter junction depletion region is fairly thin, whereas the region between the base and the collector is rather thick.

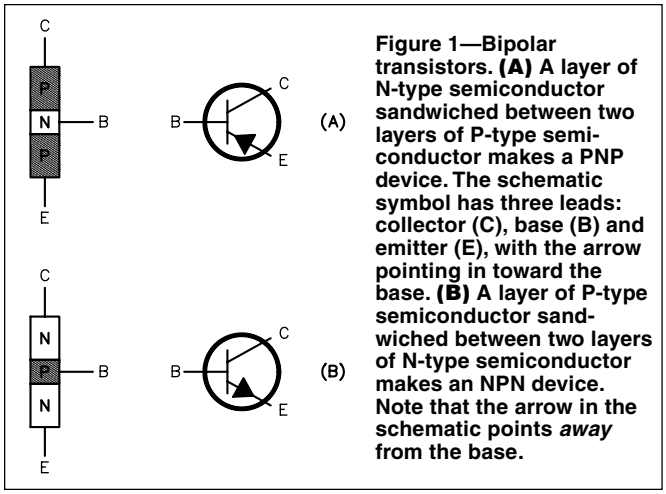


Figure 1—Bipolar transistors. (A) A layer of N-type semiconductor sandwiched between two layers of P-type semiconductor makes a PNP device. The schematic symbol has three leads: collector (C), base (B) and emitter (E), with the arrow pointing in toward the base. (B) A layer of P-type semiconductor sandwiched between two layers of N-type semiconductor makes an NPN device. Note that the arrow in the schematic points *away* from the base.

Q Can you offer some tips on chasing radioteletype (RTTY) DX?

A Glad to!

Like any other form of DXing, the quest for RTTY DX demands patience and skill. When a DXpedition is on the air with RTTY from a rare DXCC entity, your signal will be in competition with thousands of other HF digital operators who want to work the station as badly as you do. Sometimes pure luck is the winning factor, but there are a couple of tricks you can use to tweak the odds in your favor.

Let's say that you're tuning through the HF digital subbands one day and you stumble across a screaming mass of RTTY signals. On your computer screen you see that everyone seems to be frantically calling a DX station. Oh, boy! It's a pileup!

You can't actually hear the DX station that has everyone so excited, but what the heck, you'll activate your transceiver and throw your call sign into the fray, right? *Wrong!*

Never transmit even a microwatt of RF until you can copy the DX station. Tossing your call sign in blindly is pointless and will only add to the pandemonium. Instead, take a deep breath and wait. When the calls subside, can you see text from the DX station on your screen? If not, the station is probably too weak for you to work (don't even bother), or he may be working "split." More about that in a moment.

If you can copy the DX station, watch the exchange carefully. Is he calling for certain stations only? In other words, is he sending instructions such as "North America only"? Calling in direct violation of the DX station's instructions is a good way to get yourself blacklisted in his log. (No QSL card for you—ever!) Does he just want signal reports, or is he in the mood for brief chats? Most DX stations simply want "599" and possibly your location—period. Don't give them more than they are asking for. (A DX RTTY station on a rare island doesn't care what kind of weather you are experiencing at the moment.)

When DX RTTY pileups threaten to spin out of control, many DX operators will resort to working split. In this case, "split" means split frequency. The DX station will transmit on one frequency while listening for calls on another frequency (or range of frequencies).

A good DX operator will announce the fact that he is working split with almost every exchange. That's why it is so important to listen to a pileup before you throw yourself into the middle. If you tune into a pileup and cannot hear the DX station, tune below the pileup and see if you copy him there. If his signal is strong enough, he shouldn't be hard to find if he is working split. His signal will seem to be by itself, answering calls that you cannot hear. This is a major clue that a split operation is taking place.

Finally, don't neglect the other modes if you're hunting digital DX. An increasing number of DX stations are now using PSK31, so make sure you add that to your list of operating modes.

Q John, N9QC, asks, "I am currently running a Yaesu FT-901 transceiver with a Cushcraft triband Yagi antenna. I'm considering adding a long-wire antenna for 80 and 160 meters and upgrading to a more modern transceiver. Do you think the automatic antenna tuners included

with many of today's rigs would work for both antennas?"

A Most of the auto tuners incorporated into new rigs have limited tuning ranges. They'll only deal with SWRs up to about 3:1. That may be sufficient to extend your ability to use your tribander beyond its 2:1 SWR bandwidth on each band. Don't count on the built-in tuner having enough range to handle the long-wire, though. You will need a separate, wide-range tuner to load your long-wire.

Q George, AD5CQ, asks, "I have two low pass filters. If I put them both in series with my transmission line, will I get more reduction of harmonics or would the input losses be excessive?"

A The answers are "yes" and "maybe" respectively. The amount of loss would be double that of a single filter, but depending upon the filter design, it may be acceptable. I have seen filters with insertion losses as low as 0.25 dB and a 0.5-dB total loss would be quite acceptable to most folks.

The best way to check is to put a power meter in line after the filter. A 1-dB loss is about 21 W out of 100. If you don't have an external power meter, you can check the difference in receive signal strength. Find a strong steady signal like WWV or W1AW and try switching the filters in and out of line to see how much the S-meter changes. A 1-dB change would be just about noticeable in terms of meter movement (it's about $^1/_6$ of an S-unit by the old Collins standard—not that any modern rigs follow the standard, but it should be in the ballpark).

Q George, VE3LTU, asks, "When a beam antenna such as a Yagi or quad produces a major radiation lobe at, say, 35°, would the radiation angle be improved by tilting the boom 20° toward the Earth? Would the radiation angle with respect to the Earth now be 15°, resulting in improved DX performance?"

A The short answer is "no." An array as you describe has its major lobe aimed directly along the boom (0° elevation) when it is in free space. When ground is considered, it increases the elevation of the lobe. Therefore, it is the relation of the antenna to ground (height) that determines take-off angle.

We can look at it another way. The radiation pattern of an antenna is a summation of the radiation each of many antenna segments as they interact with each other and the ground below the antenna. We can visualize the result by imagining a mirror image of the antenna below the ground surface by a depth equal to the antenna's height above the ground. Thus, as we tip the antenna boom downward, the imaginary boom tips upward to counter it—we achieve nothing.

Q John asks, "I've just started studying for my Technician license and I have a question about the term 'meter' as it relates to the various labels used for amateur bands. Does the 'meter' of a given band correspond to the wavelength of the frequency of that band?"

A Not necessarily. When you're discussing Amateur Radio frequency bands, consider their metric labels in broad terms only. This will be easier to understand once you know the historical background. However, let's start by defining a "meter" in terms of wavelength.

To convert wavelength to frequency, the speed of light is used, as it is also the speed of radio waves. In metric, this is 300 million meters per second. So the conversion formula is:

F(MHz) = 300/wavelength

conversely,

wavelength = 300/F(MHz)

So, 6 meters is really 50 MHz; 2 meters is actually 150 MHz and 70 centimeters (0.7 meters) is 428 MHz. Notice that the frequency that corresponds to 2 meters is well above what hams consider to be "2 meters."

While some folks would like to have the bands named more accurately (2 meters would be 2.1 meters, for example), tradition runs deep in this hobby and the majority feel this tradition should be preserved.

In this day of computer-controlled rigs, it is easy to forget that radio technology was once crude indeed. Before the advent of vacuum tubes, there was no such thing as an amplifying oscillator with feedback to control it. Radio signals were generated via a spark gap.

Anyone who has listened to an AM broadcast radio when a thunderstorm is approaching knows that sparks generate wideband RF. The lightning discharges will create bursts of RF that cover the entire AM band. Thus it was in the early days of radio—transmissions were made by spark and the best one could do to limit the output bandwidth was to use an output filter made of a couple of inductors and capacitors along with a narrow-bandwidth antenna. This determined what "band" you were on and you could hear everyone else on the same band at the same time.

Yes, it was bedlam after a fashion, but the range you could work was quite short (a couple hundred miles was "DX") and there were far fewer operators then. The label for a particular band was broadly interpreted because the signals themselves were broad—and that legacy remains today. That's why we have a "20-meter band" at 14 MHz even though the true frequency equivalent of 20 meters is 15 MHz!

Q Jim, KW8T, asks, "Is there any way to patch the audio output of my transceiver into the car radio system without causing problems?"

A There are two ways you can do this. If your car has a cassette, you can buy an adapter from RadioShack (12-19999) that lets you play external devices (like a portable CD player) through the cassette deck (the adapter looks like a cassette).

The other way to do it would be to tap the audio at your transceiver's external speaker jack and send it to one of the car radio speakers. Of course, you'll need to switch the designated speaker between the car radio and the transceiver. A heavy duty DPDT (double pole, double throw) toggle switch will do the job. I'd suggest a switching arrangement that places an 8-Ω resistance on the *unused* audio line from either the transceiver or the car radio (see Figure 2). That way, if the car radio and transceiver happen to be on at the same time, they will both have loads for their audio outputs.

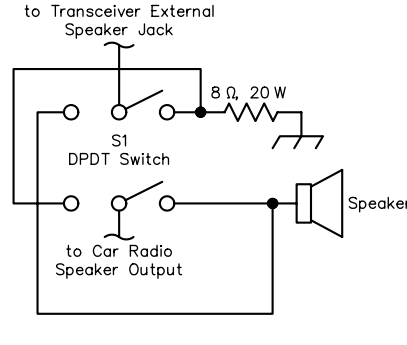
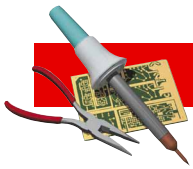


Figure 2—This simple switching arrangement allows you to share one speaker with a car radio and amateur transceiver.

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/. Also see, "The Doctor is On-line" at www.arrl.org/members-only/qst/doctor/.



SHORT TAKES

HEIL SOUND HS-706 HEADSET

Problem: You want to haul your ICOM IC-706 transceiver along for Field Day—or perhaps use it on a low-budget DXpedition, for a special event, or even while mobile—and you really need the convenience of hands-free SSB operation.

Solution: The Heil Sound HS-706 headset!

This lightweight yet rugged (and attractive) headset not only provides hands-free convenience but audio that's a few steps ahead of what you'll ever get out of the hand-held stock mike that comes with the radio. Using it is simplicity itself.

The HS-706 is specifically designed for use with the popular IC-706 radios—from the "classic" to the IC-706MkIIG—and Heil Sound does not recommend its use on other radios. Heil Sound says the HS-706 was developed to address what it calls ICOM's "history of very low gain" when using a dynamic microphone.

Hooking the HS-706 up to your IC-706 is plug-and-play. It comes equipped with a modular RJ-11 plug on the end of its five-foot cable that fits the IC-706 mike jacks on the radio's faceplate or rear apron. That's it!

Well, of course, you've also got to slip the HS-706 on your head, and when you do, you'll notice that it's pretty darn comfortable. The pad for the single headphone—you can swing the mike boomset 180° so you can listen with either ear (I happen to be left-eared)—reminded me of that "fine Corinthian leather" Ricardo Montalban used to talk about in those automobile ads. The headband expands to accommodate (we'd assume) any reasonable head size. A foam-rubber piece on the opposite end of the headband helps keep the whole business in place.

The built-in headphone seems to have excellent audio response and was able to handle fairly high audio-level settings without exhibiting any distortion. Since the HS-706 plugs into the mike jack on the IC-706 and takes its receive audio from that jack, the radio's internal or external speaker is not defeated and continues to operate. A blank plug or a set of headphones inserted into the front-panel phone jack can disable the speaker if desired.

Inserted in the cord about two feet from the headset is a PTT button with a handy clip that allows the user to snap it onto a shirt or belt.

The mike element itself, covered by a foam-rubber windscreen, sits at the end of a flexible boom that's approximately six inches long. Heil mike elements are the gold standard for many SSB contesters and DXers. Heil Sound says the HS-706 boasts a "new high-gain FET" (electret) microphone that produces "extremely articulate audio that will make your IC-706 come alive!" Advertising hype aside, the HS-706 does indeed make for excellent-sounding audio; it's perceptibly cleaner, more natural-sounding, and punchier, but not remarkably so. Some stations we worked could not tell much difference between the stock mike and the Heil, although recordings made by another station show the audio from the hand mike to be a bit flat-sounding when compared to that from the HS-706.

Heil Sound advises tweaking the radio's settings to optimize it for the HS-706. This is advisable. For my voice, the best arrangement seemed to include some compression and shifting the carrier frequency by up to the maximum 200 Hz above the filter's center frequency. Your mileage may vary.

But that's really only half the story. The convenience of the HS-706 really has to be considered a big part of its overall value. I found the best part of using it with VOX enabled on the IC-706 was that I could concentrate on keeping the log, tuning the radio, or possibly driving the car (this might draw unwanted attention from other drivers, and use of a headset device like this even might be illegal in some jurisdictions). One drawback: When you're using the HS-706 headset, you don't have the **UP/DOWN** buttons right in your hand as you do with the stock microphone.

In sum, I'd have to say that the HS-706 certainly was a joy to use. It could even cause an old CW-hound like me to get on SSB more often!

Manufacturer: Heil Sound Ltd, 5800 North Illinois, Fairview Heights, IL 62208; 618-257-3000; **info@heilsound.com**; **www.heilsound.com**. Price: HS-706 headset, $59. QST

Rick Lindquist, N1RL ♦ QST Senior News Editor

By David G. Byrd, KD7VA

The Arkansas Catfish Dipole

Fishin' for DX on your next ham radio outing? Whether Field Day or just for fun, this portable 20-meter antenna is easy to assemble and easy on your wallet. Go ahead—reel 'em in!

Two of my favorite pursuits are Amateur Radio and fried catfish. As a matter of fact, as I prepare this article, the odor of frying Arkansas Catfish envelops me from the nearby kitchen. That wonderful smell—and my favorite "fishing pole"— had a lot to do with the title of this article.

This past winter, I spent most of December and January in southern Arkansas helping to care for my wife's parents. Although we didn't have much warning before departure, I did pack my backup HF transceiver and 2-meter hand-held. I also took my MFJ-259B Antenna Analyzer so I could worry about the antennas after I had arrived and surveyed possible antenna sites.

Eight hours after we arrived, southern Arkansas was hit with the worst ice storm in more than 30 years. Because most of the tree limbs were broken and on the ground, all thoughts of hanging wire antennas from the remaining ice-burdened limbs went south (further south) for the winter. I decided to construct a 20-meter antenna that could be assembled indoors (during the bad weather) and erected later with minimal effort.

Necessity...

With no "ham store" in Magnolia, Arkansas, on-site hardware pickings were slim. The local Radio Shack stocked a few CB antennas and 50-foot lengths of RG-58 coax, but nothing ham-specific. The store normally carried 20-foot telescoping steel masts, but even these were out of stock. I would have to gather any remaining components from Ace Hardware and Wal-Mart.

I purchased the #20 enamel wire and the two 14-foot cane poles at Wal-Mart. The cane poles were varnished and separated into three five-foot (or less) sections for transport. The remaining parts were purchased at Ace Hardware but should be available at most hardware stores. There are many mast choices with widely varying lengths and costs, but after the ice storm had wiped out hundreds of TV antennas the previous week, I had to get creative and use a telescoping pool cleaning pole.

Assembly

See Figure 3. Insert the four-foot piece of plastic pipe through both sides of the compression **T** (see the parts list in Table 1) and center it. Make 2-inch cuts in each end of the plastic pipe to allow it to clamp down on the poles. Put a 1-inch hose clamp loosely on each end of the pipe. Insert the butt end of each fishing pole approximately 6 inches into the plastic pipe and tighten the clamp. Assemble the remaining sections of the fishing pole. This will provide an assembly with 15.5 feet on each side of center, or 31 feet total. Put a sheet metal screw into the plastic pipe about 1 inch on each side of the **T** support. The screws will be used to attach the wire elements to the feed line.

Each fishing pole has a loop at the tip to guide the fishing line. I used it as a tie point for the end of each side of the dipole. Feed the #20 wire through the loop and twist a couple of turns to secure it. Wind the wire in a slow spiral for the full length of the element. This spiral forms a distributed loading

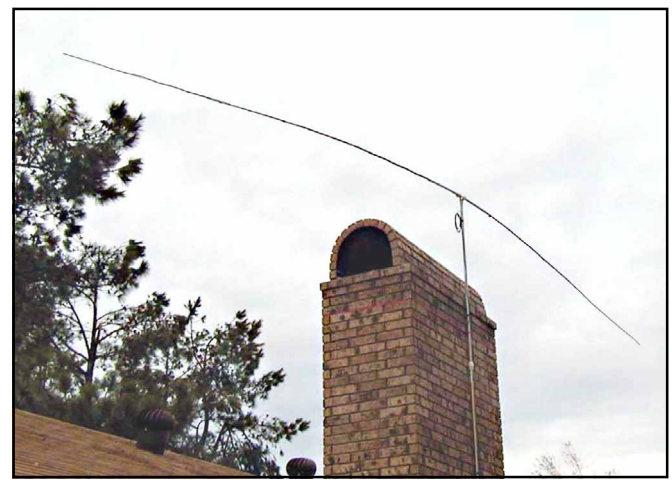


Figure 1—The completed "Catfish Dipole" was tied to the chimney with nylon rope and was rotatable from ground level.

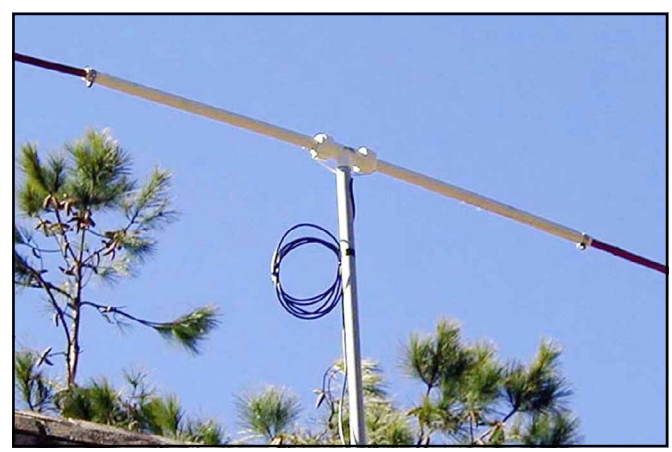


Figure 2—The center section of the dipole showing assembly details of the plastic pipe, compression T, mast, clamps and coaxial RF choke.

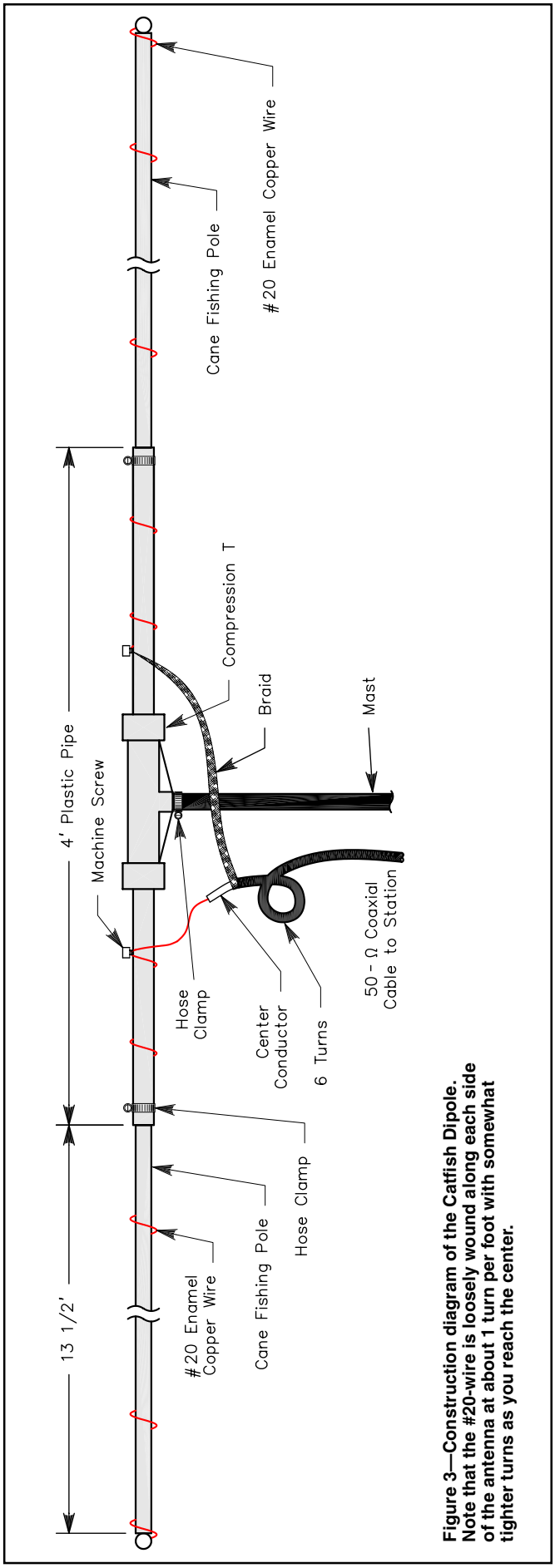


Figure 3—Construction diagram of the Catfish Dipole. Note that the #20-wire is loosely wound along each side of the antenna at about 1 turn per foot with somewhat tighter turns as you reach the center.

Table 1
Parts

Qty	*Description*	*Cost*
2	14-foot cane fishing poles	$ 9.90
2	25 feet of #20 enamel copper wire	$ 4.50
1	4 feet of 1-inch-OD schedule-40 plastic pipe	$ 2.00
1	Compression Ts (1 × 1 × ¾-inch pipe thread)	$ 2.95
1	Galvanized pipe nipple (¾ × 3-inch)	$ 0.69
3	1-inch screw-type hose clamp	$ 2.25
1	(optional mast) 16-foot pool-cleaning pole (telescoping)	$19.95
Total cost		**$42.24**

coil so don't overdo it. I used about one turn per foot over the length of the cane pole and added five closer-spaced turns around the plastic pipe on each side of center. Scrape the enamel from the wire and attach it under the sheet metal screw near the center **T**. Make the coax connections under the same two sheet metal screws and tighten. Do not over-tighten. I removed the close-spaced turns (ultimately all of them) one at a time until the resonant frequency was 14.2 MHz.

Wind six or seven turns of the feed line coax into an RF choke near the feed point. This will decouple the unbalanced feed line from the balanced dipole. Figure 2 shows a poorly wound coaxial RF choke. I later rewound it on a four-inch cardboard form and taped it up for improved appearance and performance. Tape the coil securely to the mast and weatherproof the coax connections.

Performance

The expected input impedance at the center of a ½-wavelength wire dipole is 72 Ω and should result in an SWR of 1.5:1 when fed with 50-Ω coax. I used the MFJ-259B Antenna Analyzer to measure the resonant frequency and SWR. The measured SWR at 14.2 MHz was 1.4:1, and didn't exceed 1.5:1 anywhere in the 20-meter band.

In the days after completion I made contacts with hams in Aruba, Slovenia and Chile—and even acted as net control station for the "Microcomputer Network" with coast-to-coast US stations, all with S-7 or better reports, while using a 100-W transceiver.

Future Plans

This antenna certainly served its purpose as an inexpensive temporary antenna, and it would be ideal for Field Day-type activities. For future projects, consider the following:

- Make the antenna even more portable by soldering the element wires to the metal ferrules that connect/separate the sections of the fishing pole. Taking the pole apart would also break down the wire elements.
- Wind multiband dipoles on the same pole (any frequency between 20 and 6 meters) and feed them from the same feed line.
- Build a half-size 40-meter dipole by adding loading coils on each side of the center plastic pipe.
- Add a suitably lightweight boom and another fishing pole assembly to make an inexpensive two-element Yagi.
- "Ruggedize" the design by switching to fiberglass fishing pole elements. You're moving into uncharted territory, but the thought is interesting, considering that inexpensive fiberglass poles are available at every Wal-Mart.

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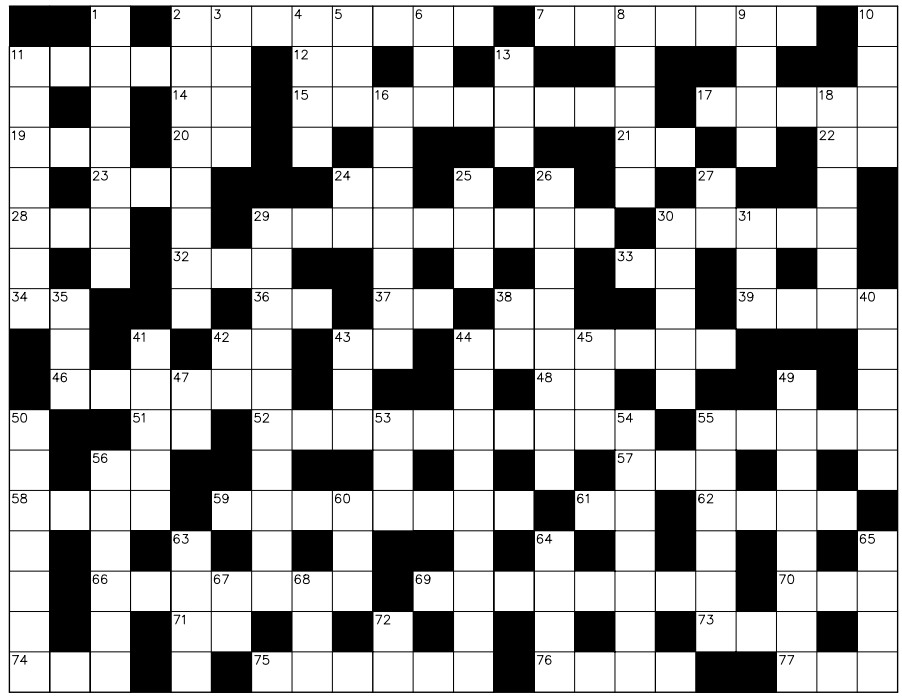
By H. Ward Silver, N0AX

Test Your Knowledge!

While the lines of cars creep slowly through the fleamarket gates, relax and try this hamfest-season crossword!

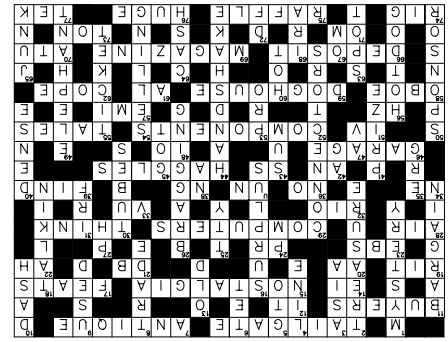


Across

2. What gear sits on in a station wagon
7. So old that it's valuable
11. The guys with the money
12. Gotta have____
14. Prefix for Ireland
15. Buy old stuff for this feeling
17. Accomplishments
19. Receiver Incremental Tuning (abbreviation)
20. Amateur Advanced (abbreviation)
21. Decibel (abbreviation)
22. Sigh of relief
23. Emergency Broadcast System (abbreviation)
24. Public Relations (abbreviation)
28. Get on the _____
29. As many of these as radios at hamfests
30. Before you buy, you'd better _____
32. Largest Brazilian city
33. Audio meters calibrated in these units
34. Abbreviation for both a direction and a state
36. Won't take your offer
37. Complete the call sign 4U1___
38. No Good (abbreviation)
39. A good buy at a low price
42. Article
43. Sweepstakes (abbreviation)
44. A buyer does this before accepting a price
46. Where all this stuff was before the hamfest
48. Input-Output (abbreviation)
51. Current-Voltage curve (abbreviation)
52. Good place to buy individual _____
55. Tall ones are told
56. Kilo-_____
57. Electromagnetic Interference (abbreviation)
58. Double-reed instrument
59. Where you'll be if you bring home too much stuff
61. Light metal (abbreviation)
62. Trying to deal with a situation
66. Money to hold a purchase
69. Buy old copies of these at hamfests
70. Automatic Tuning Unit (abbreviation)
71. Old Man (abbreviation)
73. This thing weighs a _____
74. Slang for radio
75. Game of chance
76. Size of Dayton
77. _____tronix

Down

1. Type of meat found at the food stand
2. A surprising and valuable find
3. Largest continent
4. Stand in this before you get in
5. Gate Turn Off (abbreviation)
6. _____ rode
8. Swap
9. Previously owned
10. The first ones through the doors make a mad _____ for the goodies
11. Good value
13. Not new
16. Uncle Sam doesn't need it
18. Frequency for directions
24. Phase Modulation (abbreviation)
25. Teletype (abbreviation)
26. The best kind of rights
27. Measure of acidity
29. Goes on the ends of cables
30. Directly heated vacuum-enclosing
31. Popular prefix for FET part numbers
35. Unit of energy
38. Not Applicable (abbreviation)
40. Heavy for the volume
41. Win this in a drawing
42. Silver (chemical symbol)
43. Greater than the _____ of the parts
44. The deal is sealed with a _____
45. Obtained
47. Audio-Visual (abbreviation)
49. These are white and not very useful
50. The organizer of the hamfest
53. Super____ receiver (model)
54. If you're buying, I'm _____
55. Must have one to get in
56. The favorite hamfest food
60. Hamfests outside in the summer are _____
63. Get there early to get a prime _____
64. What goes on the barrelhead
65. The spouse might think this stuff is _____
67. Meditative mantra
68. Type of retirement account
72. Direction Finding (abbreviation)



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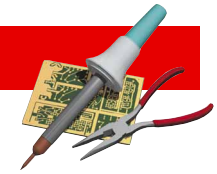
Vashon, WA 98070



A RADIO/DATA INTERFACE CONNECTION

◊ With the popularity of modes other than CW and voice, I have begun using the auxiliary connections on the back of my transceivers. In addition to using these connectors for connecting a PC to my radio, I also have used a variety of MCPs (Multimode Communication Processors). There is no connector standard for transceivers or MCPs. Whenever I acquire a new MCP, it seems like I have to build a new cable. When I'm fortunate enough to acquire a new transceiver, I have to build a new cable for each MCP I want to use.

In addition, switching among MCPs and the computer is a little tedious, requiring me to unplug one cable (which may go to multiple connections on the transceiver) and plug in a different one.

I've solved both problems by creating my own *standard*. I chose to use a DB9 connector for my standard. This allows for audio input and output lines with grounds for each, a common ground, PTT, FSK, CW and squelch. That seems to cover most common interface needs, but if you need more, you could use a DB15 or DB25. One advantage of using DB-style connectors is those connectors and cables are readily available and inexpensive.

To solve the problem of using multiple MCPs with a single transceiver, I connect the transceiver to a DB9 ABCD switchbox (see Figure 1). These boxes contain a 9P4T mechanical switch and usually have a metal cabinet. This allows me to leave up to four devices connected to the switchbox and easily switch among them.

To build the transceiver cable from a typical switchbox with an attached cable, I remove the DB9 connector and solder the wires from it to cables with the appropriate connectors for my transceiver. To avoid ground loops that might degrade the audio, I install 1:1 isolation transformers on both of the audio lines. If the transceiver has no way to adjust the audio levels, I install pots to do so (5 kΩ or 10 kΩ, the value is not critical). There's plenty of room for these in most switchboxes.

I install connectors on the back of the switchbox as needed to bring out any other useful signals that are carried by the cables between the switchbox and the transceiver. Usually, these are the CW keying input and a PTT output for a remote switch.

This makes connection of the MCPs a piece of cake. Start with a pre-made serial cable with DB9 male connectors on both ends (all switchboxes I have seen have DB9 female connectors) and cut it in half. This yields cables to wire two different MCPs.

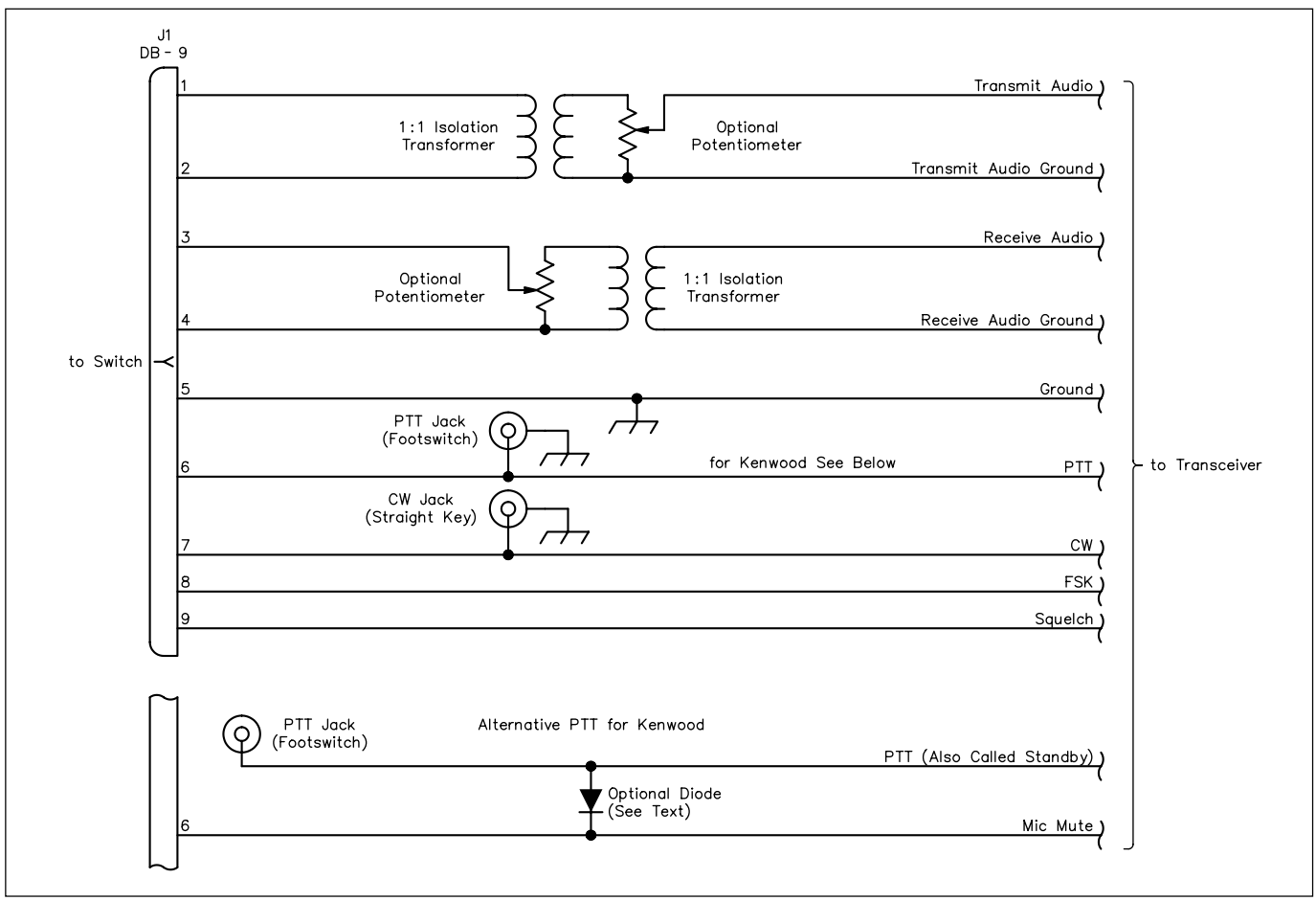


Figure 1—A typical radio/switchbox wiring diagram for N8ME's station.

Bob Schetgen, KU7G ♦ Senior Assistant Technical Editor

When I do get that new transceiver with a different pin out, all I need do is adapt one new switchbox. I can use my existing MCP cables.

To connect a computer to the radio, you may need to translate EIA-232 levels to TTL levels for the radio. I do this in a small inline box between the switchbox and the computer. You might choose to build that interface inside the switchbox.

A note on PTT switching on Kenwood radios: The **ACC2** jacks on Kenwood radios have a signal labeled **MIC MUTE**. Connecting this line to ground mutes any audio coming from a microphone connected to the radio. This is a nice feature. I have worked with two Kenwood models (TS-940 and TS-870) and have found that the handling of this signal is different between them.

On the '940, grounding the **MIC MUTE** signal mutes the **MIC** input, but does not cause key the PTT line. Therefore, I connect a 1N4001 (or similar) diode between the **MIC MUTE** and PTT signals for the '940 interface, as shown. The diode is necessary to prevent PTT activation from muting the mic when you do want to use the mic.

On the '870, grounding the **MIC MUTE** signal also keys the PTT line, so the diode is not required. I have discovered, however, that unless you cause the radio to transmit by grounding the **MIC MUTE** signal, audio supplied to the **ACC2** jack is not transmitted. I've not tried other Kenwood radios, but I suspect that one of these approaches should work.

A note on grounding: If your radio doesn't provide separate grounds for the audio lines, use the common ground instead. Also, if your MCP does not provide a separate audio ground, use the common ground instead.—*Mark Erbaugh, N8ME, 3279 Norton Rd, Grove City, OH 43123;* **mark@microenh.com**

RUBBER SKIRTS FOR SMALL KNOBS

◊ Fat fingers skinny knobs. For years, smaller radios with closely spaced knobs and the size of my fingers have formed a dilemma. To make matters less friendly, many knobs are now concentric, with a smaller inner knob that stands away from the front panel and a slightly larger knob that is set back against the radio face. The setting of the inner knob often gets disturbed when I try to turn just the outer knob.

My ICOM IC-746 fits this category. The radio is super in my estimation, but only when I don't try to turn just the outside knob in a concentric set. What I needed was a simple fix that could be undone so that another user or future owner would not have to be a part of my fix.

The solution is easy! I built a skirt for the outer knob using rubber washers! Every water faucet uses rubber washers, every garden hose as well. A trip to the local hardware store will uncover storage drawers of small parts, including rubber washers of every imaginable size. You need only measure the outside diameter of the knob closest to the radio face, and measure what you would like to have as its new outside diameter. I picked a size that is about the same as the printed dial markings on the radio.

At the hardware store, get to the rubber-washer drawer and match up your measured knob outside diameter with the inside diameter of the washer, and your desired outside size with the outside diameter of the washer. There are rubber washers available that are round like an inner tube (O-rings) and some that have flat faces with a sharper edge for your fingers. I prefer the latter.

With a trip to the local hardware store, I found that Servolite faucet adapters were available and that washer number FAWD 10 was right for my use. It is $^{3}/_{16}$-inch thick with flat faces, a $^{5}/_{8}$-inch ID and a $^{13}/_{16}$-inch OD. You may choose another size. The size you need varies for different radios or manufacturers.

Figure 2—K2OPQ uses washers to make concentric controls easier to handle.

I used just a touch of Wite Out on the surface to make a pointer. Then, I slipped the washers into place over the outside knob. Now I can turn the small inner knob, or widen my grip and turn the larger skirted knob. My problem is solved, for this radio anyway. To change the marker position or remove the modification, simply slide the skirt off the knob. Figure 2 is a picture of my dime-a-piece solution.—*David B. Perrin, K1OPQ, 1161 Penacook Rd, Contoocook, NH 03229*

MORE ON SOLAR-POWER TIPS

◊ I read the hint entitled "Solar-Power Tips" in *QST* (March 2000, p 61) and noticed that the author talks about a 14-V battery pack. He created this pack by combining a three-cell (6 V) and a four-cell (8 V) battery. This pack will indeed produce about 14.3 V under discharge conditions, but there weren't any cautions about using this battery during charging! An approximate "float" voltage for this battery would be 16.1 V (at 2.3 V per cell) and a "max charge" or equalize voltage would be 16.8 V (2.4 V per cell). The equivalent voltages on a 12-V battery would be 13.8 V and 14.4 V, respectively.

I realize that much modern 12-V equipment can operate at 16+ V, but this does exceed their ratings in most cases. Almost every radio I've seen is rated at 12-15 V dc. I think that a cautionary note is appropriate when talking about such a battery.—*Hartley Gardner, W1OQ,* 3602 N 31st St, Phoenix, AZ 85016-7009; **w1oq@arrl.net**

JC addresses the output voltages of solar modules and conditions where the charge for 12-V batteries may exceed 15 V under "Battery Charging." He recommends that we "Check the specifications on the battery and radio, but up to 15 V is usually fine and sometimes necessary."

I've operated a modern 100-W transceiver from a vehicle battery on Field Day and found that output was down about 30% unless the alternator was charging. Therefore, I think the 14-V battery suggestion is a good one. Nonetheless, I can see that there may be problems when the load current is not much greater than the charge current (as when receiving). Thanks for the cautionary note, Hartley.—*Bob Schetgen, KU7G, Hints and Kinks Editor*

A TWO-BATTERY SOLUTION FOR MOBILES

◊ Many of us use an RF high-power amplifier while operating mobile. In my case, I run an MFJ ALS-500 in my 1996 Chevy

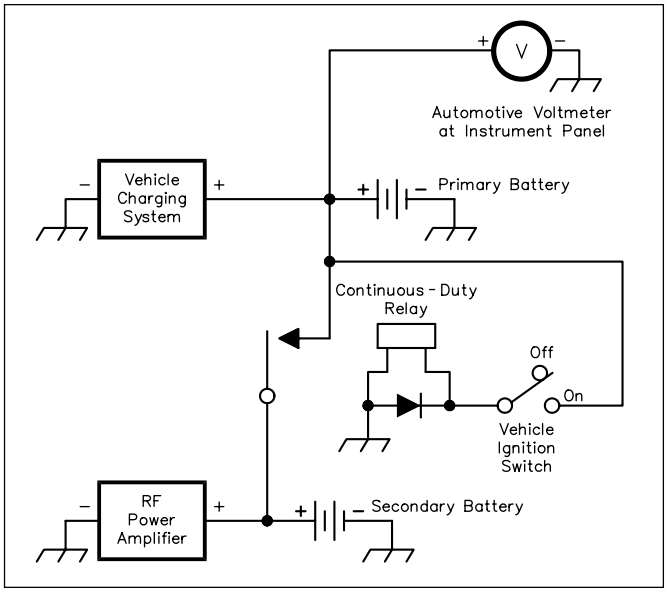


Figure 3—WK5S uses a continuous-duty relay to connect a second vehicle battery and a high-power amplifier to the vehicle primary battery and charging system only when the ignition is on.

Suburban truck. Until recently, I operated with two batteries separated by a 160-A battery isolator. Over two years, I had the alternator and the battery isolator fail twice. Let me tell you, this gets expensive!

I believe I have found the perfect solution! My friend Steve, at Texas Alternators of Austin, Texas (tel 512-836-6601) introduced me to an automotive continuous-duty relay. It looks very much like a starter solenoid, but it is designed for continuous duty—that is, *on* for *long* periods.

This relay is energized only when the engine is running. It then connects a second battery in parallel with the main engine battery. (See Figure 3 for a schematic.) The beauty here is that when the engine is off, the secondary battery is disconnected from the main battery; the batteries cannot discharge one another. When the engine is running, the alternator is in control and keeps current flowing to both batteries. The magnitude of the charge current depends on the charge level of each battery, current demands of the vehicle system and the alternator output limit. The point is that current flow is *into* the batteries, not *out* of them, unless there is a super-high demand by the system being supplied (the RF amplifier on speech peaks).

I have used this system for a while now and it seems to work perfectly. It is a lot less expensive than an isolator and far more reliable. The continuous-duty relay that I use is built by Accurate Parts Co of Kokomo, Indiana.[1] I understand from Steve that this system is being offered in the latest two-battery vehicles. This system does require that the engine run for both batteries to be connected while you are using your RF power amplifier—which is always the case for me. Hope this helps other QRO mobile operators!—*Steve L. Sparks, WK5S, 2701 High Country Blvd, Round Rock, TX 78664-6204*

ENGINE HOIST LIFTS TOWER EASILY

◊ About a year ago, I purchased an LM470 Tri-Ex motorized 70-foot tower, complete with a tilt-over fixture. I had planned to erect it at my new location in central Florida. I had purchased it from an old friend in southern Florida, rented a boat trailer and driven to his home to pick it up.

Quite a few local Ham Club members showed up to help get it on the trailer for us (I counted over fifteen). We pushed, pulled, shoved, lifted, slid, rolled and tried about everything in the book to get it up on my trailer—and we did succeed, but it took most of the morning.

This tower is massive to say the least, and it weighs in at over half a ton, not counting the separate tilt fixture that was over 200 pounds by itself.

After arriving at my new location, I had to return the trailer within 24 hours or pay a substantial premium. With two neighbors (we are each over 75 years of age), we began constructing a system of concrete building blocks and 4×4 planks across under the extended end of the tower. Then, using two auto jacks, we lifted the tower and added more blocks and planks under each end until the trailer could be pulled out from under the tower.

This left me with a beautiful tower sitting in my backyard, but after all of this I began to have doubts about using the same technique to move the tower 70 feet to the spot I had selected for it. After I had admired it for some months, my XYL didn't, and I placed some ads for its sale.

A chap in the Miami area called and wanted to buy it and said he could bring a trailer and a helper.

About then, I recalled I had used a hydraulic automotive engine hoist to remove a ground post left over from an E-Z Way tower I had once owned. I checked around and found that one auto parts chain loaned them free of charge! The hoists are fully portable (on wheels), come disassembled and fit in my station wagon. They can lift up to 4000 pounds and have sufficient height that a tower could easily clear the top of a trailer. Moreover, one person, with one hand, can handle the entire operation with ease. The hydraulic cylinder has a handle that moves with very little effort.

My buyer came, but his helper bailed out at the last minute. By using the hoist, the two of us easily placed the tower on his trailer—not once but twice, because we decided it would ride better turned 180°. The whole operation took about an hour and he was on his way back for a successful 300-mile trip home.

I returned the hoist the next day and got my deposit (about $275) back. They did not charge me a penny. That was a lifesaver! Thanks to Discount Auto Parts.

In speaking with the people at our local branch, I was told that they still offer this at some locations, but each individual manager decides whether to rent the units.—*Stephen C. Taber W4ITD, 25 Cunningham Dr, New Smyrna Beach, FL 32168;* **w4itd@arrl.net**

[1]I was unable to locate contact information for Accurate Parts, but I found a Web site for Electro Automotive **www.electroauto.com**. Electro caters to persons building electric-powered vehicles and sells a 12-V contactor (electrician talk for a power relay).

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

Ten-Tec Jupiter HF Transceiver

Reviewed by Joe Bottiglieri, AA1GW
Assistant Technical Editor

The evolutionary path that has led up to Ten-Tec's latest HF transceiver—the Jupiter—has followed an interesting course.

Ten-Tec laid the groundwork for the Jupiter in 1998. Drawing on experience garnered from developing DSP-based receivers for their commercial and government markets, they set out to create a low priced radio for their short-wave customers. This became the RX-320: a compact "black box" receiver that connects to a computer and is entirely operated through software (see "Product Review," *QST*, Mar 1999).

Their Pegasus—debuted at Dayton Hamvention '99—was a logical extension: add a transmitter to the RX-320 and market it as an amateur HF transceiver. Paul Danzer, N1II, shared his impressions of this computer-controlled transceiver in our February 2000 column.

The flexibility that's made possible by using software to control these radios is perhaps one of their most notable attributes. Since their releases, Ten-Tec has turned out several updated versions of their respective GUI (*graphical user interface*) software packages. These updates can be downloaded from Ten-Tec's Web site free of charge.

Computer-connectivity also allows Pegasus owners to download and install updates to the "firmware"—the algorithms used within the radio's internal processor—opening the door to even more significant post-purchase enhancements.

The cost savings that were realized by eliminating expensive display and control components allowed Ten-Tec to set the price of the Pegasus in what most consider the affordable range. Apparently, however, a significant number of Ten-Tec's customers and prospective customers have expressed a strong desire to fork over a few additional bucks for a standalone front-paneled version of the Pegasus.

Hail Jupiter!

Borrowing heavily from the earlier design work—and the parts bin in several instances—of its older stable mate, Ten-Tec engineers got down to business. They built up logic and keypad boards that would take over the assignments that the connected computer handles in the Pegasus system. They wrapped up the pieces in an all new enclosure and topped it off with a fairly stylish injection-molded front panel. The result? The Model 538, aka Jupiter.

The Jupiter is a "conventional" 100 W transceiver with general coverage receive from 0.1 to 30 MHz and transceive capabilities on the 160 through 10-meter amateur bands. The SSB, CW, RTTY (AFSK), AM and FM modes are included and there are 128 memories, dual VFOs, RIT *and* XIT, adjustable AGC, a built-in CW keyer, true QSK and a spectrum scope feature. The heart of the system—an Analog Devices AD2181 Digital Signal Processor—also delivers 34 DSP receive filter bandwidths, 18 transmit filter bandwidths, passband tuning, automatic notch and noise reduction, an adjustable noise blanker and a speech processor. A built-in automatic antenna tuner is not available, but Ten-Tec has recently added the LDG Electronics line of external automatic tuners to their product offering.

The dimensions of the Jupiter seem to have been intentionally tailored with convenient desktop operation as a primary objective. While it certainly isn't too large to take along on Field Day, it's unlikely that we'll be seeing it in many mobile installations. A peek under the covers reveals a cavernous interior populated by just a handful of PC boards. It appears as if this radio could have easily been compressed down to a fraction of its size.

Bottom Line

Ten-Tec skillfully grafts a front panel onto their Pegasus computer-controlled transceiver. The result—the Jupiter—is a standalone radio that still manages to retain much of the flexibility of its PC dependent sibling.

The front panel controls include 26 buttons and a rocker-type **POWER** switch. Only seven of these buttons perform more than one operation. The design team did a commendable job of providing direct front panel access to those functions that are used most often, and clearly labeling and carefully positioning all of the controls. The result is a transceiver that's easy and intuitive to operate. Settings that are varied less often, referred to as "set and forget" parameters in the *Operating Manual*, are adjusted via a single menu.

There are five rotary controls: the large main tuning knob, the filter **BANDWIDTH** knob, the **PBT** (passband tuning) knob, the **RIT/XIT** knob and the **MULTI** knob. The **MULTI** knob—true to its label—is used to vary several different settings. The control's active assignment is indicated in reverse video (light color text on a small dark background field) in the lower left corner of the display window. The relative level of the particular setting is represented on a linear scale along the bottom of the screen. The equivalent numeric value—displayed as a percentage—is shown to the far right. The **MULTI** knob is used to control the volume, the RF gain, the mike gain, the all-mode squelch, the RF power output level, the

Joe Bottiglieri, AA1GW ♦ Assistant Technical Editor

Table 1
Ten-Tec Jupiter (Model 538), serial number 12C10820

Manufacturer's Claimed Specifications	Measured in the ARRL Lab
Frequency coverage: Receive, 0.1-30 MHz; transmit, 1.8-2, 3.5-4, 7-7.3, 10.1-10.15, 14-14.35, 18.068-18.168, 21-21.45, 24.89-24.99, 28-29.7 MHz.	Receive and transmit, as specified.[1]
Power requirement: Receive, 1.5 A; transmit, 20 A; 12-14 V dc.	Receive, 1.2 A; transmit, 17 A. Tested at 13.8 V.
Modes of operation: SSB, CW, FM, AFSK, AM	As specified.
Receiver	**Receiver Dynamic Testing**
SSB/CW sensitivity, 3 kHz bandwidth, 10 dB S/N: 0.35 μV.	Noise floor (MDS), 525 Hz bandwidth: 1.0 MHz –121 dBm 3.5 MHz –127 dBm 14 MHz –135 dBm
AM sensitivity: Not specified.	10 dB (S+N)/N, 1-kHz tone, 30% modulation: 1.0 MHz 7.1 μV 3.8 MHz 2.2 μV
FM sensitivity: Not specified.	For 12 dB SINAD: 29 MHz 0.73 μV
Blocking dynamic range: Not specified.	Blocking dynamic range, 525 Hz filter: 3.5 MHz 113 dB 14 MHz 123 dB*
Two-tone, third-order IMD dynamic range: Not specified.	Two-tone, third-order IMD dynamic range, 525 Hz filter: 3.5 MHz 87 dB 14 MHz 85 dB*
Third-order intercept: +10 dBm.	3.5 MHz +11 dBm 14 MHz +7.3 dBm
Second-order intercept: Not specified.	+53.6 dBm.
FM adjacent channel rejection: Not specified.	20 kHz channel spacing: 29 MHz, 72 dB.
FM two-tone, third-order IMD dynamic range: Not specified.	20 kHz channel spacing: 29 MHz, 72 dB.
S-meter sensitivity: 50 μV at S9.	S9 signal at 14.2 MHz: 26 μV.
Squelch sensitivity: Not specified.	At threshold: SSB, 14 MHz, 0.14 μV; FM, 29 MHz, 0.36 μV.
Receiver audio output: 1.0 W into 4 Ω, THD not specified.	0.7 W at 4% THD into 4 Ω.[2]
IF/audio response: Not specified.	Range at –6 dB points, (bandwidth): CW-N (525 Hz bandwidth): 363-1000 Hz (636 Hz); CW-W: 286-2857 Hz (2571 Hz); USB-W: 200-2667 Hz (2467 Hz); LSB-W: 250-2667 Hz (2417 Hz); AM: 49-2985 Hz (2936 Hz).
Spurious and image rejection: 60 dB.	First IF rejection, 84 dB; image rejection, 82 dB.
Transmitter	**Transmitter Dynamic Testing**
Power output: SSB, CW, FM, 5-100 W; AM, 25 W (AM low power level not specified).	SSB, CW, FM, 1.3-105 W: AM 0-25 W.
Spurious-signal and harmonic suppression: ≥40 dB	46 dB. Meets FCC requirements for spectral purity.
SSB carrier suppression: ≥50 dB.	As specified. 60 dB.
Undesired sideband suppression: ≥60 dB, 1.5 kHz tone.	As specified. 65 dB.
Third-order intermodulation distortion (IMD) products: 25 dB below two tone.	See Figure 1.
CW keyer speed range: Not specified.	1 to 59 WPM.
CW keying characteristics: Not specified.	See Figure 3.
Transmit-receive turn-around time (PTT release to 50% audio output): <20 ms.	S9 signal, 20 ms.
Receive-transmit turn-around time (tx delay): Not specified.	SSB, 20 ms; FM, 9 ms. Unit is suitable for use on AMTOR.
Composite transmitted noise: Not specified.	See Figure 2.

Size (HWD): 5.12×12.75×14.35 inches; weight, 9 pounds.
Note: Unless otherwise noted, all dynamic range measurements are taken at the ARRL Lab standard spacing of 20 kHz.
*Measurement was noise-limited at the value indicated.
Third-order intercept points were determined using S5 reference.
[1]Transmit range extends a few kHz beyond the edges of each band (example 1797-2009 kHz for 160 meters). Receive sensitivity reduced below 1 MHz.
[2]Maximum volume.

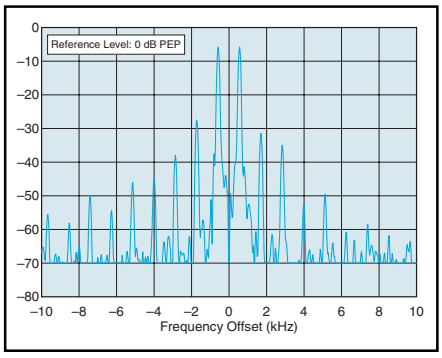


Figure 1—Worst-case spectral display of the Jupiter transmitter during two-tone intermodulation distortion testing. The worst-case third-order product is approximately 29 dB below PEP output, and the worst-case fifth-order product is down approximately 36 dB. The transceiver was being operated at 100 W PEP at 24.950 MHz.

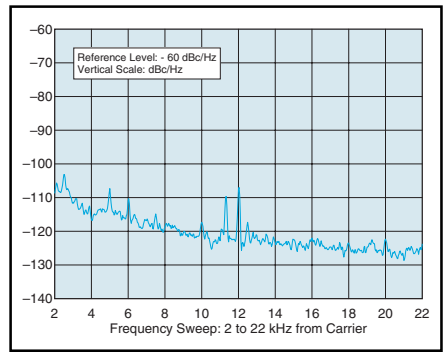


Figure 2—Worst-case spectral display of the Jupiter transmitter output during composite-noise testing. Power output is 100 W at 14.020 MHz. The carrier, off the left edge of the plot, is not shown. This plot shows composite transmitted noise 2 to 22 kHz from the carrier.

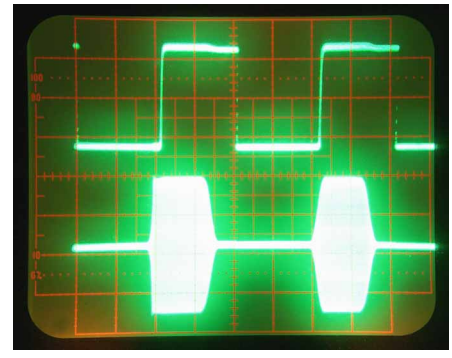


Figure 3—CW keying waveform for the Jupiter showing the first two dits in full-break-in (QSK) mode using external keying. Equivalent keying speed is 60 WPM. The upper trace is the actual key closure; the lower trace is the RF envelope. Horizontal divisions are 10 ms. The transceiver was being operated at 100 W output at 14.020 MHz.

CW keying speed, the transmit audio monitor volume and the CW sidetone volume. Just press the corresponding button first—**AF**, **RF**, **MIC**, for example—and then use the **MULTI** knob to adjust the setting to the desired value. When in the menu mode, this same knob is used to change the setting of the selected item.

The Jupiter's display is a 240×128-pixel dot-matrix LCD that measures about $4^{1}/_{2}\times2^{3}/_{4}$ inches. It's best viewed from head on, as extreme viewing angles and bright room lighting can make it difficult to read. The illumination level is fixed, but the contrast is adjustable.

A row of icons that show the state of the automatic notch filter, the DSP noise reduction, the squelch, the transmit audio monitor, the 20-dB attenuator, the VOX and the tune features are located along the upper edge of the screen. Enabled features appear in reverse video. The frequency of the main VFO is displayed just below. The digits are $^{5}/_{8}$-inch tall and in a stylized font. Just to the left—along the edge of the screen—is a column of icons that indicates the AGC setting (slow, medium or fast), transceive or split operation (**RXTX** when transceiving on the main VFO or **RX** alone when working split) the mode and the digital receive filter bandwidth (adjustable in steps from 300 to 8000 Hz). The selected tuning step size is shown near the right edge of the window.

Below the main VFO information is a smaller set of characters that show the frequency and mode of the sub VFO. When the radio is set up for split operation a **TX** icon appears to the left. An S meter is located to the right. On receive, the meter shows the relative signal strength graphically, and also displays the value numerically (ie **S9 + 20**). The same meter depicts the relative RF output power (or the SWR if desired) when transmitting, and this is also accompanied by a numeric value (**P 100** for power out or **1.6:1** for SWR for example).

A spectrum scope takes up a large portion of the lower half of the screen. Activate the *Sweep* feature and the receiver will rapidly scan through any of eight preset ranges from 240 Hz to 2.4 MHz and generate a plot of the signal strength vs frequency. Once the process is complete, a dotted-line cursor representing the current operating frequency appears at the center of the screen. You can then tune up and down through the spectrum snapshot and locate active or available frequencies. An *Autosweep* feature can be enabled that will automatically sweep a new range of frequencies should you tune off the edge of either end of the displayed plot.

The headphone, key and mike jacks are mounted along the left side of the front panel. The headphone and key jacks are $^{1}/_{4}$-inch. The key jack will accept a straight key, bug or paddles, and menu selections allow adjustment of the CW weighting, the QSK delay, the sidetone pitch and the sidetone volume. CW message memories are not included. The mike jack is a standard 4-pin style and provides a 9 V dc pin for powering electrets or amplified mike elements. The Jupiter does not come with a microphone, hand-held and desk models are sold separately. VOX operation is not possible when using the Ten-Tec hand mike, as the mike element is switched out of circuit when its PTT button is released.

'Round Back

The transceiver comes complete with a 6-foot dc power cord, an extra 2-pin Molex dc power connector, a male phono connector, a spare 25 A automotive-style fuse, a $^{1}/_{4}$-inch stereo plug and a 4-pin mike plug.

Ten-Tec also supplies a 6-foot ribbon cable with a 5-pin DIN connector on one end and four color-coded female phono jacks on the other. The DIN connector mates with the transceiver's rear-panel **ACC 1** socket. The phono jacks then serve as connection points for fixed-level audio out, line-level audio in and PTT (the fourth connector is a spare). This prefabricated cable simplifies wiring the Jupiter to a multimode TNC or computer sound card for digital modes such as PSK31, RTTY or SSTV.

A rear-panel 8-pin DIN **REMOTE** jack allows connection of Ten-Tec's optional 302J Remote Encoder/Keypad. This small desktop accessory—originally designed for use with the computer-controlled Pegasus—includes a main tuning knob, a keypad for directly punching in frequencies and three additional menu-definable function buttons.

There are six phono jacks mounted on the rear panel, including a pair of 13.5 V dc output jacks, an **EXT T/R** jack for controlling non-QSK amplifiers (+24 V dc/200 mA maximum), **TX EN**able and **TX OUT** jacks for sequencing QSK-equipped amplifiers and a **SPARE** jack. There's also a $^{1}/_{4}$-inch **EXT**ernal **SPEAKER** jack and a female DB-9 **SERIAL INTERFACE** connector.

Shared Talents

The Jupiter is capable of operating in a *Pegasus Emulation Mode*. Simply connect an appropriate cable between the **SERIAL INTERFACE** jack and a computer's COM port and fire up and configure Pegasus control software, and the PC will take over command. While in this mode, the radio's front panel controls are disabled and a message in the LCD display reads "**PEGASUS EMULATION MODE**." For

a detailed description of what it's like to operate the Jupiter in this configuration, have a look at the aforementioned Pegasus review. Memories and other settings that are programmed in through the front panel of the Jupiter cannot be copied or transferred to the Pegasus control software, or vice versa.

The Jupiter, just like the Pegasus, will accept firmware (internal software) updates. During the course of this review period, Ten-Tec made several revisions available on their Web site. Updates have included fixes for bugs that cropped up in earlier releases, but have also improved the accuracy of the S meter, extended the low frequency response of the mike audio and added a noise blanker, a speech processor and AM transmit capabilities. The current version is 1.09—there's no telling what new talents the Jupiter might develop through future revisions!

Updating the firmware is easy. All of the necessary files are contained in a small *EXE* file (version 1.09 is only 372 kB). It took under two minutes to download (using a 56k modem). The *EXE* file installed the firmware installation program and three text files onto my PC. The text files contained step by step instructions for performing the update and setting up and using the new features. The actual update process took about 25 seconds; a radio microprocessor reset is the final step. It sure was neat to see a few new features appear on the menu!

More Than Just an Operator's Manual

Ten-Tec did a particularly nice job with the Jupiter's *Operator's Manual*. It contains around 100 pages of mostly 8½ × 11-inch sheets, but it also includes several larger foldout pages with complete (and legible) schematics of the various PC boards. The actual operating instructions for the radio only fill about 20 pages, but the extensive additional information that's provided elevates this manual close to the level of a full-blown factory service manual. All of the material is well organized and thoroughly indexed and the programming instructions are clear and easy to follow.

On the Air

The Jupiter is a joy to operate. All of the rotary controls have a smooth action, and key presses are confirmed with a pleasant mechanical "click."

Overall, CW operation was pretty impressive. The built-in keyer works great and it's easy to adjust the speed on the fly. For those of you who haven't experienced Ten-Tec QSK, let's just say that it would be impossible to overstate the smoothness of its action. There's virtually no perceptible delay (at the shortest delay setting) and no clacking relays sounding along with the T/R switchover. I logged universally favorable reports on the CW transmit signal, but I did see a few messages on an e-mail reflector concerning a "raspy" sound to the note. I set up a second receiver and listened to the signal myself, and compared it to those of a couple of other rigs I own. The signal does indeed have a slightly different sound—not unlike that of CW signals *received* through DSP filters. I don't consider it particularly objectionable, but it *is* different. It's along the same lines as the difference between the sound of a digital and an analog telephone call. It sounds somewhat, well, digital.

SSB operation with the Jupiter is a unique experience. When the bands weren't very crowded, I found myself opening the receive filter bandwidths far wider than the 2.8 kHz or so that I'm limited to on my other equipment. This typically significantly improved the audio fidelity of the stations that I was listening to. When conditions were crowded, I'd crank the filter into more conventional 2.85 kHz and narrower setting to fight QRM.

The DSP (which works at the third IF) did a respectable filtering job with SSB and CW signals in most cases, but strong nearby signals can make it tough to copy weak ones. The passband tuning helps considerably if the interference is only on one side, though, and the automatic notch filter does an excellent job on carriers. The data in Table 1 points to receiver performance that's about on par with other mid-priced transceivers, and my on-the-air experience confirms this.

The SSB transmit signal consistently received nice audio reports. I experimented a little with local stations using the extreme transmit filter bandwidth settings, but got reports that more neighbor-friendly settings of 2.85 kHz sounded about the same. A fuller-range microphone element (and wider receive filters on their end) would probably help. The audio heard through the transmit audio monitor does not change when the bandwidth is varied.

Some Humble Opinions

There are a couple of controls on the Jupiter that I found myself constantly fiddling with, and I can't help but think that it may be worth it for Ten-Tec to consider revising them in future firmware updates. Let me preface this by saying that we all operate our radios differently, and what I might find to be an annoyance may not be perceived as such by others.

The first is the tuning action. The tuning steps can be set to seven different sizes from 1 Hz to 100 kHz for each step of the main tuning knob's rotary encoder. One revolution of the knob contains 120 "steps." Therefore, when the 1 Hz size is selected, it takes 25 turns of the knob to tune a measly 3 kHz. That's an awful lot of cranking—even when hunting signals in a busy CW sub-band! When you switch to the larger step sizes (as with all radios that use variable step arrangements) received signals—as you tune through them—take on the sound of a musical scale. When you encounter an interesting signal, you'll probably need to switch back to the 1 Hz setting for fine tuning. If you're the type of operator (like I am) that does quite a lot of tuning around and listening, you'll find yourself constantly playing around with the step setting. It would be more convenient if the *speed* of tuning was variable—not just the step size—especially if it could be made to be mode-specific (slow for CW and moderately fast for phone).

The second is the receive filter bandwidth setting. As is the case with all Ten-Tec radios, the available filter bandwidths are independent of mode—and this is a *good* thing. As you move from one mode to another, however (CW to SSB for example), you'll need to manually crank the filter bandwidth up to the wider setting. Switch back—SSB to CW—and you'll probably want to crank it back down. It would be nice if the radio would automatically recall the last filter setting used in a particular mode and revert to that setting. The filter bandwidth and the operating mode *are* retained in the memories, though, and the memories are tunable. This provides a suitable work-around: program several "starting" frequencies on the SSB, CW and the digital portions of each band—with the appropriate mode and bandwidth—in the memories, and then use the memory channels, in lieu of the **BAND** button or tuning knob, for hopping around. (Unfortunately, the tuning step size is not retained in the memories.)

Remember: The firmware used in this radio is updatable. If you've got suggestions of your own, be sure to share them with the friendly folks at Ten-Tec. You may just see your refinements turn up in a future revision!

A Work in Progress

The Jupiter is one harbinger of a change that we're seeing both in ham radio and consumer electronics. The ability for the end user to easily update firmware opens the door to the possibility of near endless evolution throughout a product's serviceable life.

Manufacturer: Ten-Tec, 1185 Dolly Parton Pkwy, Sevierville, TN 37862; 865-453-7172; fax 865-428-4483; **sales@tentec.com**; **www.tentec.com**. Price: Jupiter (Model 538), $1189; hand-held microphone (Model 701), $28; desk microphone (Model 705), $89.95; Remote Encoder/Keypad, (Model 302J), $139.

Yaesu VR-5000 Communications Receiver

Reviewed by Rick Lindquist, N1RL
ARRL Senior News Editor

A ham friend spotted the VR-5000 sitting on a table next to my amateur station. "Hey! New transceiver?" he asked. "No," I said. "It's Yaesu's new dc-to-daylight receiver-scanner."

My friend seemed a little disappointed, and that's a common reaction among those who believe that anything in a box with a dial, buttons and a frequency display must also be capable of transmitting to have real value.

While it's true that many of us amateurs live to transmit there are occasions when *just listening* can be as much or even more fun.

The Yaesu VR-5000 communications receiver gives you access to a lot of wide-open listening spaces. It also includes some dandy features you probably don't have on any of your amateur transceivers.

A Quick Overview

What's in the little black box? Well, it's a general-coverage, multimode receiver that can help you get acquainted with the radio frequency real estate between 100 kHz and 2600 MHz (cellular excluded). This includes nearly all of the major Amateur Radio allocations as well as some potential bands we haven't yet acquired title to but might, such as 136 kHz and 5 MHz. The VR-5000 also can give you entrée to UHF bands your H-T or VHF-UHF mobile likely do not cover. For example, AO-40 (as of press time) was transmitting telemetry only on its 2.4 GHz beacon. Unfortunately for scanner fans, the VR-5000 lacks trunk-tracking capability, a desirable feature found in scanners within the same general price range.

Available modes for the main receiver include FM (narrow and wide), AM (narrow and wide), LSB/USB, and CW. The sub-receiver operates either in AM or FM.

Other goodies include 2000 regular memories, 50 band-edge memories, and five preset channels. With that many memories, you should not have a problem storing all of your favorite short-wave and public safety frequencies. Additionally, the 50 programmable search ranges allow setting up many discrete spectrum segments for searching. The five preset memories are great for quickly getting to those most special frequencies—the local repeaters, for example, or possibly the Amateur Radio on the International Space Station—or ARISS—2-meter downlinks. There's a sub-receiver that lets you make excursions from the main dial setting up to 20 MHz away.

Connectors on the rear apron let you hook up a coaxial fed antenna (there's an SO-239) or an unbalanced high-impedance antenna. Also on the back of the radio are a **MUTE** jack, a switch to select the antenna jack, A or B, an external speaker jack, a record jack (constant 8 mV) that provides output unaffected by the volume or tone controls; a +8 V jack for accessories, an IF output jack (10.7 MHz), and a nine-pin *Computer Aided Transceiver*, or CAT, serial (RS-232C) computer control jack.

The serial jack suggests the option of greater external control than is actually possible. PC control of the VR-5000 is limited to the main VFO frequency, receive mode and channel step.

One neat feature is called *Programmable Memory Recall*. PMR lets you set up the radio to monitor activity on up to 50 memory channels at the same time. Why would you want to do that? Glad you asked. Yaesu suggests that this capability could come in handy if you wanted to monitor traffic levels on several repeater sites. The PMR Board on the display gives a graphical representation of channel occupancy at a given time.

Another is the *Band Scope*. This lets you view activity on either side of your current operating frequency. Move the channel marker to a signal you spot, and you're there.

For prospective short-wave listeners (SWLs), Yaesu has thoughtfully programmed a block of popular international broadcast outlets, such as *Radio Nederland*, *Radio Australia* and *Deutsche Welle*. This is a great help to new hams who often cut their radio teeth as SWLs.

Bottom Line

The VR-5000 Communications Receiver opens the door to endless exploration in a nearly boundless range of radio spectrum—but don't forget to bring along the manual!

Using It

We amateurs tend to expect receivers to be uncomplicated devices that are simple to use. After all, there's no transmitter in the box—how hard could it be, right? Well, not so fast there, VOX breath! We determined that while the VR-5000 is pretty easy to hook up and get squawking, making it do what we wanted takes a bit more TLC.

Our resident scanner buff tried putting the *Operating Manual* aside to see how easy it would be to play with the features how much he could figure out on his own. "While I was able to operate in the VFO mode, it was not long before I had to hit the book," he reported.

In short, the VR-5000 is not always very intuitive to use, and on occasion it could get downright frustrating when you'd unintentionally back yourself into some nook or cranny by pushing a wrong button. There are a keypad and a lot of buttons, most of them with at least two discrete functions and not all obvious by their labels. On the other hand, some buttons that seemed to be obvious—weren't! Pushing the **BANK** key is supposed to select the desired memory bank. On all occasions, pushing this button took us to a setup menu that let the user modify the current memory bank or create a new one altogether.

It can take many keystrokes on the VR-5000 to reach a desired state or to program a block of channels. Going strictly by the book, it takes a dozen steps to set the handy on-screen world clock (with accompanying map graphic) that gives time reference to 66 different areas of the world. We found that it was easy to mess up on the steps, and that programming

Table 2
Yaesu VR-5000, serial number 0K030164

Manufacturer's Claimed Specifications	Measured in the ARRL Lab
Frequency coverage: 0.01-824; 849-870; 894-2600 MHz.	As specified.
Modes of operation: FM, WFM, AM, AM-N, WAM, USB, LSB, CW.	As specified.
Power requirements: 0.7 A (maximum volume), 13.5 V dc ±15%.	0.76 A (maximum volume, no signal), tested at 13.8 V dc.
Size (HWD): 2.8×7.1×8 inches; weight, 4.2 pounds.	
CW/SSB sensitivity (10 dB S/N): 0.2-0.5 MHz, 4.8 μV; 0.5-1.8 MHz, 1.0 μV; 1.8-4 MHz, 0.6 μV; 4-30 MHz, 0.3 μV; 30-2000 MHz, 0.3 μV; 2000-2600 MHz, 1.8 μV.	Noise floor (MDS): 1.0 MHz, –118 dBm; 3.5 MHz, –124 dBm; 14 MHz, –128 dBm; 50 MHz, –133 dBm; 144 MHz, –133dBm; 222 MHz, –125 dBm; 432 MHz, –133 dBm; 902 MHz, –128 dBm; 1240 MHz, –122 dBm; 2400 MHz, –128 dBm.
AM sensitivity (10 dB S/N): 0.2-0.5 MHz, 10.8 μV; 0.5-1.8 MHz, 4.0 μV; 1.8-4 MHz, 2.5 μV;4-30 MHz, 1.1 μV; 30-2000 MHz, 1.2 μV; 2000-2600 MHz, 1.8 μV.	AM narrow, test signal modulated 30% with a 1-kHz tone, 10 dB (S+N)/N: 1.0 MHz, 3.2 μV; 3.8 MHz, 1.2 μV; 53 MHz, 0.55 μV; 120 MHz, 0.53 MHz; 146 MHz, 0.7 μV; 440 MHz, 0.71 μV.
FM narrow sensitivity (12 dB SINAD): 28-30 MHz, 0.35 μV; 30-2000 MHz, 0.45 μV; 2000-2600 MHz, 0.8 μV.	FM narrow, 12 dB SINAD: 29 MHz, 0.33 μV; 52 MHz, 0.21 μV; 146 MHz, 0.24 μV; 222 MHz, 0.58 μV; 440 MHz, 0.23 μV; 906 MHz, 0.41 μV; 1296 MHz, 0.69 μV; 2400 MHz, 0.49 μV.
FM wide sensitivity (12 dB SINAD): 30-2000 MHz, 1.5 μV.	100 MHz, 1.8 μV.
Blocking dynamic range: Not specified.	CW mode: 3.8 MHz, 70 dB; 14 MHz, 70 dB; 50 MHz, 72 dB; 144 MHz, 69 dB; 222 MHz, 68 dB; 432 MHz, 76 dB; 902 MHz, 69 dB; 1240 MHz, 81 dB.
Two-tone, third-order IMD dynamic range: Not specified.	CW mode dynamic range and third-order intercept point *Frequency (MHz)* / *Dynamic Range (dB)* / *Intercept point[1] (dBm)* 3.8 / 61 / –32 14 / 63* / –35 50 / 63* / –38 144 / 62* / –40 432 / 65* / –36 902 / 60* / –38 1240 / 71* / –17
Second-order intercept point: Not specified.	+11 dBm.
FM adjacent channel rejection: Not specified.	20 kHz channel spacing: 29 MHz, 49 dB; 52 MHz, 48 dB; 146 MHz, 47 dB; 440 MHz, 47 dB; 906 MHz, 39 dB; 1296 MHz, 50 dB.
FM two-tone, third-order IMD dynamic range: Not specified.	20 kHz channel spacing: 29 MHz, 49 dB*; 52 MHz, 49 dB*; 146 MHz, 46 dB*; 440 MHz, 48 dB*; 906 MHz, 40 dB*; 1296 MHz, 51 dB*; 10 MHz channel spacing: 52 MHz, 72 dB; 146 MHz, 68 dB; 440 MHz, 65 dB.
Squelch sensitivity (threshold): Not specified.	At threshold: SSB, 14 MHz, 1.9 μV; FM, 29 MHz, 1.5 μV; 52 MHz, 1.0 μV; 146 MHz, 1.1 μV; 440 MHz, 1.1 μV; 906 MHz, 1.8 μV; 1296 MHz, 1.8 μV.
Audio output: 1.0 W into 8 Ω (THD not specified).	1.0 W into 8Ω (maximum output)[2]
IF/audio response: Not specified.	Range at –6 dB points, (bandwidth): CW: 174-2222 Hz (2048 Hz); USB: 174-2222 Hz (2048 Hz); LSB: 174-2222 Hz (2048 Hz); AM: 140-1326 Hz (1186 Hz).
Spurious and Image rejection: Not specified.	IF: HF, 40 dB; VHF, 39 dB; UHF, 13 dB; Image: HF, 86 dB; VHF, 87 dB; UHF, 81 dB.

Except as noted, all dynamic range measurements were taken using the ARRL Lab standard spacing of 20 kHz.

[1]Third-order intercept points were determined using noise floor reference.
[2]THD at max output was 50% with signal at maximum indication on S-meter (5 bars). Minimum THD was about 15%.

some features took a few tries to get right.

We were dismayed to discover that the VR-5000 is not computer programmable, although it's possible to use a PC to *control* some functions, such as the main VFO frequency. Our scanner aficionado says that the ability to use software to set up the memories would be extremely helpful; the VR-5000's manual approach translates into a lot of button-pushing. "This is one radio you'd get programmed and not fool with too much," he predicted.

Our scanner guy appreciated that the VR-5000 did not greet him with one of those cutesy messages that often confront owners of newer ham transceivers—or cellular telephones—these days. "When I power up, I like to get to work," he said. "The display, with adjustable brightness and contrast, is easy to see."

Unfortunately, the manual does not always describe some of the symbols and icons that popped up. An annotated display graphic would be a helpful and useful addition to the manual, which earned a "fair" rating. A radio at this level of sophistication, complexity and multiple features should have a better-detailed and more clearly written manual and a quick-reference card to avoid dog-earing the manual's pages through repeated look-ups. This manual was just not up to Yaesu's typically excellent standards.

Keeping It Simple

Hams are used to twisting dials and maybe pushing a button or two or even entering a frequency on a keypad. That's the place to start with the VR-5000, then work your way up into the more complex stuff like creating, programming and labeling memory banks. The VR-5000 lets you apply alphanumeric names to memory banks and to individual channels alike, and this is one feature that's simple and fun to take advantage of.

Fortunately, there is a nice little rubber-covered, detented tuning knob to twirl. Entering a frequency on the keypad is very simple too. So is moving around using the manual controls. Pushing the **F** key and then turning the dial moves you in 1-MHz steps; pushing the **F** key and the **>** or **<** button shifts your frequency in 10 MHz increments up or down. You can change the tuning step at the push of a button too.

Out of the box, the VR-5000 automatically selects the receiving mode based on the frequency the main receiver is tuned to. You can shift modes manually and override this feature, however.

The main and sub-receiver audio gain controls are simple rotary pots like the ones you'd find on the typical amateur mobile transceiver. Sharing the shaft with the main volume knob is the outer **SQL** (squelch) control. The sub-receiver volume control, which does not quite kill the audio completely when turned fully counterclockwise, is backed by a **TONE** knob that alters the receiver's audio response on both channels. Another surprise was that there is no way to squelch the sub-receiver, which limits the flexibility of having a sub-receiver to start with. If you don't want to hear the sub-receiver, the manual advises you to simply turn down the volume control.

Greater Complexity

Trying to set up and program a memory bank with discrete channels sent me scrambling for the *Operating Manual*. It takes a bit of patience to get a handle on this receiver, and you'll want to keep the manual close at hand. But there's lots of memory to fill (remember, 2000 of them plus 100 memory banks), and there are lots of things you can do in terms of memory operation.

We already mentioned the ability to apply alphanumeric tags to memories and memory groups (banks). You can choose from among 74 characters that include numerals, upper and lower-case letters, and several special characters. The VR-5000 gives you the capability to search for these labels; you also can sort memories by using their alphanumeric tags.

Speaking of sorting, it's possible to sort memory channels by frequency, by receive mode or by channel number—and you can delete vacant memories automatically.

Memories can be protected from inadvertent erasure or deletion. It's also possible to mask certain memory channels that you don't need to recall—and unmask them later if it turns out you need them in the rotation again. There's a priority feature that lets you monitor a memory channel while checking a priority channel every five seconds for activity.

Yaesu has included *Smart Search* in the VR-5000, a feature that's proven handy in its Amateur Radio products, including the very popular FT-817 transceiver (see "Product Review," *QST*, Apr 2001). Smart Search can take some of the pain out of loading the VR-5000's many memories, although it can load a strong signal into more than one channel, so you might have some cleaning up to do once you've let it do its thing.

Scanning comes in several flavors, but our scanner buff didn't like that the VR-5000 does not let you scan only selected memory banks. In general, you can scan memory channels only, scan while in VFO mode, scan according to S meter level (on an arbitrary scale of 0 to 255) or scan just to find voice channels. It's possible in VFO scanning to set the radio up to scan only a portion of the VFO's range instead of the whole radio. Using the programmable memory scan (PMS) feature, you can set up the VR-5000 to scan between up to 50 separate upper and lower-limit pairs. It's possible to reverse the scan direction in midstream by simply turning the **DIAL** knob one click clockwise (to scan upward) or counter-clockwise (to scan downward). The scan resume mode can be set to hold when the scanner encounters a signal longer than two seconds; delay or hold until the signal disappears, then resume after two seconds or another user-settable interval, or pause for a user-settable interval then resume.

Special Features

The VR-5000 offers some interesting and useful sideshow features. We've mentioned some already. Others include putting the receiver to use as a comparative field strength meter with a bar graph representation of test and reference signals. The receiver also can be set up to display audio waveforms on the LCD screen.

It's possible to clone memory data from one VR-5000 to another. The *Operating Manual* also includes the CAT (*Computer Aided Transceiver*) computer-control protocols.

A Word on Performance

While our scanner friend was happy with the VR-5000's performance on HF and VHF using mostly modest antennas, I was a little disappointed in the receiver's performance on HF. It's important to bear in mind that that the VR-5000 was never intended to serve as a second receiver in an HF contest station. The ARRL Lab test results bore this out. The radio's dynamic range measurements at the standard 20-kHz spacing were well below the numbers we typically see even on low-end amateur transceivers, but is in line with the level of performance we've observed in some of the other LF to microwave receivers. Intercept numbers were well into the negative range. Apparently, even at this price range, there are some trade-offs to be made. When purchasing a receiver like this you pay for wide frequency coverage and programming, scanning and memory features, not strong-signal performance.

One VR-5000 feature that's helpful in this regard is *RF Tune*, which lets you shift the RF passband to maximize sensitivity and minimize the impact of other nearby signals on what you're trying to hear. This is a sort of preselector, to use a term from an earlier era. I found using an antenna tuner ahead of the receiver was beneficial, too.

Random Thoughts

The world clock feature is very nice, but the VR-5000 lacks any kind of back-up battery for the clock, so you have to supply power to the radio at all times to preserve its time setting.

While we're on the subject of power: The radio operates on 13.8 V dc and comes complete with one of those "wall wart" supplies everyone loves to hate. A separate dc cord for hooking it up in your car or wiring to your existing station supply is also included.

The size and weight are easy to handle, so this is a receiver that could easily go mobile, although no bracket was supplied for mobile mounting.

There's plenty of audio from the little speaker, although it will distort pretty quickly at higher volume settings. An external speaker helps.

In general, while the VR-5000 offers many features, it might be a tad too busy for less experienced (or less adept) users who just want a decent receiver to play with. The multiplicity of keystrokes sometimes required to take advantage of certain functions tended to blunt the convenience of having those features in the first place.

Our thanks to Bill Moore, NC1L, and to Ed Hare, W1RFI, and Michael Tracy, KC1SX of the ARRL Lab staff for their assistance in preparing this review.

Manufacturer: Yaesu USA, 17210 Edwards Rd, Cerritos, CA 90703; 562-404-2700; fax 562-404-1210; **www.yaesu.com**. Manufacturer's suggested list price: $1099; Typical current street price: $890. List prices of selected accessories: DSP-1 Digital Signal Processing Unit: $119.95; DVS-4 Digital Voice Recorder: $47. QST

TECHNICAL CORRESPONDENCE

SOME THOUGHTS ON THE WORLD'S SMALLEST CODE-PRACTICE OSCILLATOR

By Sam Ulbing, N4UAU, 5200 NW 43rd St, Ste 102-177, Gainesville, FL 32606;
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◊ Following the publication of this popular project, I had a few thoughts on the World's Smallest Code-Practice Oscillator that might be of interest to the readers.[1] You can make the oscillator even more portable by replacing R1, the 1 MΩ resistor, with a 10 MΩ resistor. This done, you can key the oscillator simply by touching the two wires with your damp fingers. If you hold one of the key wires in one hand and tap the other wire as if you were using a straight key: You'll be sending code without the need for a bulky straight key. If you use a 3-V lithium battery and an ear-bud headphone, the entire package is so portable you can practice CW on the bus, waiting at the doctor's office, etc.

If the battery impedance is large relative to the circuit current demand, there will be a change in voltage to the circuit that pulses with the audio tone. This "noise" causes the tone frequency to change or even become squawky. You can reduce or eliminate the noise in any of three ways: Connect a decoupling capacitor (100 µF or greater) across the batteries; reduce the audio load using a higher-impedance speaker, or add a resistor in line with the speaker. A 10-Ω, 1/2-W resistor will halve the current requirement when using an 8-Ω speaker.

You can add a volume control by placing a pot in line with the speaker. I have used a 5-kΩ pot to control the volume. At settings of less than 100 Ω, the current flowing through the pot might be more than the recommended value, but I have not discovered any problems to date, possibly because of the intermittent nature of CW.

Some people have discovered that I titled the project "The World's Smallest..." because the parts *are* quite small. Although it's true that the parts are small, with practice, a steady hand and a magnifier, most people can build the oscillator. As I mentioned in the article, I recommend building a project first with larger parts. For those who cannot do it themselves, I'll solder up an oscillator for $5 including postage, but only if you promise to then use it to practice your code or better yet, to encourage someone else to consider ham radio as a hobby. If you've already bought a kit, you can return it with a check or money order for $6 and I'll assemble the kit and return it. If you'd like to purchase a preassembled and tested kit, the total cost is $11—$6 for the kit plus $5 for the labor. (Returned kits are $1 more because of the additional shipping charges involved.) For orders outside the US, please add 50 cents for either option.

[1]Sam Ulbing, N4UAU, "The World's Smallest Code-Practice Oscillator," *QST*, Feb, 2001, pp 39-41; see also Feedback, Apr 2001, p 84.

NEW DSP-10 SOFTWARE AVAILABLE

By Bob Larkin, W7PUA, 2982 NW Acacia Pl, Corvallis, OR 97330;
boblark@proaxis.com

◊ The new Version 2 "weak-signal" release of the DSP-10 software is now available for downloading from my Web site.[2,3,4] This version includes four new weak-signal-oriented modes that can be used for measurements and communication with signals well below the audible level. In addition, there are features for everyone that make the basic transceiver more useful with conventional CW, SSB and FM modes. Here's a quick summary of some of these features:

- Six additional audio filters for SSB and CW
- One audio filter that can be custom tailored from the screen
- 13-point audio equalizer from the configuration file
- New LMS Auto-Notch
- Greatly improved LMS de-noise operation
- Two selectable IF bandwidths
- Spectrum-analysis bandwidths of 2.3 and 4.7 Hz (in addition to 9.4 Hz)
- One new FFT windowing function
- Automatic EME Doppler correction of receiver frequency
- Doppler corrections accurate to a few hertz at 1296 MHz
- Fast push-to-talk without delay (some minor hardware changes needed)
- Improved dynamic range on narrow audio filters
- An S meter that is accurate from –140 to –25 dBm
- Ability to extend measurement to –180 dBm or lower (see LTI below)

The four new weak-signal modes are:

EME-2—Automated transmit/receive timing and Doppler correction for self-echoes on EME. A two-trace spectral display allows endless integration of signal and noise powers allowing echoes to be seen 30 dB below the audible levels.

LHL-7—A seven-tone FSK mode for communications that does not require precision frequency control. This permits automated transmit and receive of signals too weak for audible copy, but still visible on the waterfall display (EME compatible and corrected).

PUA-43—Forty-three tone FSK with adaptable "very long-term integration." This mode provides automated transmit and receive for communication by terrestrial or EME. This provides the extreme trade-off of data rate against signal strength. A number of experiments and QSOs have shown this mode to provide 100% copy on signals too weak to make a trace on the waterfall display!

LTI—Although called a "mode" in the DSP-10 operation, this is really a measurement tool. Transmission is essentially the same as CW. Reception uses the long-term-integration of EME-2 and PUA43 to extract spectral traces on extremely weak signals, limited only by one's patience! Overnight tests show –185-dBm signals with well-defined traces (that's a little over 0.0001 µV!). The display allows one to actually measure these signal levels to within a decibel or two. This has been a useful and fun tool for exploring propagation paths. Like the other modes, it can be operated with EME Doppler corrections.

Hardware Requirements

You need a DSP-10 transceiver with a frequency stability of about 1 Hz at the operating frequency. An amplifier is required for 2-meters or transverters with phase-locking for other bands. For details on this (and the software) see **www.proaxis.com/~boblark/dsp10.htm**.

The program works with any basic PC having DOS, a serial port and VGA

[2]Bob Larkin, W7PUA, "The DSP-10: An All-Mode 2-Meter Transceiver Using a DSP IF and PC-Controlled Front Panel," *QST*, *Part 1*, Sep 1999, pp 33-41; *Part 2*, Oct 1999, pp 34-40; *Part 3*, Nov 1999, pp 42-45.
[3]Bob Larkin, W7PUA, "An 8-Watt, 2-Meter 'Brickette,'" *QST*, Jun 2000, pp 43-47.
[4]**www.proaxis.com/~boblark/dsp10.htm**

graphics. A math coprocessor is not required, but having one speeds some operations quite a bit. Executable programs for the PC and DSP-10 are available now for *free*. You can download the programs from my Web site.

What is This?

Basically, this is a set of tools I've made available to anyone who wants to make *extreme* weak-signal contacts and perform such experiments. The package allows QSOs with stations that are much too weak to contact using conventional modes. An early example of success is the first PUA43 EME contact between W7SZ and W7LHL on January 9, 2001. Both stations were running about 40 W on 1296 MHz and using 10- and 12-foot-diameter TVRO dishes. The interesting thing is that copy was truly Q5 in the sense that the computer displayed 100% copy of calls, grid squares and a short message! Both stations fully expect to be successful at lower power levels. Last summer, the PUA43 code was used by W7LHL and W7PUA for a 665-km contact on 10-GHz microwaves. More examples are available on the Web site.

For those who have DSP-10 transceivers, the installation and operation information is on the Web site mentioned earlier. For those that don't yet have a DSP-10 transceiver, the project was published in the September, October and November 1999 issues of *QST*; a companion amplifier appears in the June 2000 *QST* issue. PC boards are available for both projects. Information and a link for the Shera high-stability GPS-lock frequency control system are also on the Web page.[5]

Have fun with this—and please report your experiences!

TRACKING DOWN NEIGHBORLY RFI

By David B. Holtkamp, K5KH, 509 Brighton Loop, Los Alamos, NM 87544; **k5kh@arrl.net**

◊ We live in a typical suburban setting and are blessed with wonderful neighbors. They didn't fuss when I put up my tower, and they are understanding and patient when my signal interferes with their phone, smoke alarm, TV, or whatever. Of course, it helped that area hams were very active during our recent disastrous fire, and they remember that emergency service.[6] But mostly, I try to go out of my way to solve their problems and that goodwill is reciprocated. Recently, I noticed that some man-made HF noise sources were not only stronger than ever before, but they were all over the bands from 160 through almost 10 meters! So, I did a bit of fox hunting and wanted to share the unusual noise sources that we found—with my neighbors' friendly cooperation.

The worst source of noise was intermittent (the *worst* kind!), but after logging the time and amplitude of the signal over several days, I noticed that it seemed to be temperature related: It would appear late in the morning, then disappear late in the afternoon. Using my tribander as a direction-finding tool (particularly the deep nulls off the ends of the elements), I was able to establish the bearing that pointed toward the neighbor down the block. Using a small shortwave receiver for final pinpointing, I found it. This source is a familiar one to rural residents who might live near ranchers—a high-voltage wire fence that's used to keep animals confined without having to put up a full-size barrier. In our case, the neighbor across the street had installed such a fence to restrain his German shepherd (an energetic digger). The fence didn't start to transmit until a recent snowfall buried part of the high-voltage wire in a snowdrift. This explained the diurnal variation in the noise signal: Only when the snow was melting during the warmest part of the day was it shorting out the fence. Moving a few shovels of snow fixed that problem. This neighbor was especially grateful because he had been seeing snow on his TV (particularly the lower VHF channels 2 through 5) for the last few weeks, and couldn't figure out where it was coming from! When we turned off his "dog wire," the snow immediately disappeared and his gratitude (and future cooperation) was assured.

But that wasn't the end of my noise problems. The next sources were isolated to a nearby neighbor, who has worked with me quite patiently in the past when *I* caused *him* problems. A strong (S9+10 dB) hashy noise was observed at 19.4 MHz and came from a paper shredder (Royal Model Orca-9512x). The noise may be generated by the LED sensor (it's continuously powered) that triggers the shredder when paper is inserted. But a worse offender was a NiCd/NiMH batter charger (Digipower Solutions, Model DPS-2000) that generated harmonics from 2 to 24 MHz every 160 kHz (each 10 kHz wide)! Because the signals drifted and were always present (his batteries are on constant charge), the signals were a constant source of background noise on many of the HF bands.

The lessons I learned: (1) Always be polite and actively helpful to solve your neighbors' RFI/TVI problems caused by your amateur operations; they might return the favor one day; (2) an HF beam and a portable shortwave radio can pinpoint sources and allow a demonstration for the neighbor when the problem originates in their home; (3) if possible, use the breaker box at the location of interest to help isolate the source(s); walking around with a portable radio can be very time consuming, particularly when you are a guest in a neighbor's house; and (4) those emergency communications activities can pay off in ways that go above and beyond the present emergency and generate goodwill in a community.

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

FEEDBACK

◊ Please refer to Jerry McCarthy, WA2DKG, "Yaesu FT-847 Power-Switch Fix," Technical Correspondence, *QST*, Apr 2001, p 84. I'd misinterpreted Jerry's correspondence to understand that he'd used the **MOX** switch as a replacement for the **POWER** switch. What he did was to wire the unused pole of the **POWER** switch in parallel with the defective one. The **MOX** switch is unaffected. I apologize for this error.—*Paul Pagel, N1FB*

◊ In the article "Get Your QSOs on Route 66" in the May 2001 *QST*, p 52, we neglected to mention that the certificate shown was designed by Dan Boone, KC7PRC.

◊ In the May 2001 *QST*, p 73, the Web address for the Rockwell Collins *PropMan 2000* HF propagation software package is incorrect. The correct address is **www.propman2000.com**. QST

[5]Brooks Shera , W5OJM, "A GPS-Based Frequency Standard," *QST*, Jul 1998, pp 37-44; see also Feedback, Oct 1998, p 81.

[6]Bob Cowan, K5QIN, "Wildfire!", Public Service, *QST*, Feb 2001, pp 96-97.

FCC Holds the Line on Amateur Restructuring

The FCC has declined to make significant changes to the way it implemented Amateur Radio "restructuring" on April 15, 2000. The Commission this April turned down several requests for changes in the Amateur Service rules contained in six petitions for partial reconsideration of its *Report and Order* (WT Docket 98-143), released December 30, 1999. The ARRL was among the petitioners.

In a *Memorandum Opinion and Order*, the FCC effectively denied all petitions for changes to its restructuring *Order*. It also made some minor housekeeping changes to the amateur rules.

Among the issues was a request from the ARRL and other petitioners that the FCC maintain records to indicate whether a Technician licensee has Morse code element credit. The FCC noted that its current Universal Licensing System software was modified after restructuring to display a "P" (for Plus) in the field that indicates former license class once a Technician Plus class license has been renewed. "This capability results in the amateur service database being able to provide a *de facto* Technician Plus licensee database," the FCC asserted in its *MO&O*. The FCC also refused to reinstate Technician Plus as a fourth license class.

The FCC did not address how its database would distinguish current Technician licensees who subsequently earn Morse (Element 1) credit. Such licensees have only a *Certificate of Completion of Examination* (CSCE), possession of which is never reflected in the database, even upon license renewal. The ARRL and other petitioners had said the inability to readily distinguish between Techs with Element 1 credit and those without credit could hamper enforcement.

The FCC also decided not to extend Element 1 credit to all past licensees who had ever earned it—something else the ARRL had asked for. Under current rules, the holder of expired Novice or pre-February 14, 1991, Technician licenses are eligible for Element 1 credit. In explaining its decision, the FCC reasoned that "most examinees" who ever held a General, Advanced or Amateur Extra ticket now expired also once held a Novice or a pre-February 14, 1991 Technician ticket. Left out in the cold by the FCC's decision is anyone who went directly to a higher class license such as Conditional or General class without ever holding a Novice—something once possible under FCC rules—and who now seeks Element 1 credit.

The FCC *MO&O* did not directly address the issue of extending permanent credit to Element 1 CSCEs held by Technicians to earn HF privileges. Such CSCEs are only good for 365 days for upgrading purposes. Beyond that time, such CSCEs confer only additional operating privileges for the Technicians holding them.

Since restructuring went into effect more than a year ago, the FCC said, "there does not appear to be any decline in the proper operation of amateur stations."

In addition the FCC denied various other petitions to modify the restructuring plan filed by Alan J. Wormser, N5LF, Frederick V. Adsit, NY2V, and Michael J. Dinelli, N9BOR; by Fred A Duran, W4NKI; by Millard H. Qualls, K9DIY; by Stewart Teaze, N0MHS; by Joseph Speroni, AH0A, and by others.

Two petitioners had asked the FCC to retain a 20 WPM, or at least a 12 WPM, Morse requirement for Extra. The FCC said it had eliminated the 20 WPM exam "because it was not in furtherance of the purpose of the amateur service and it did not continue to serve a regulatory purpose." Since restructuring went into effect more than a year ago, the FCC said, "there does not appear to be any decline in the proper operation of amateur stations."

The FCC also refused to ban the practice, as requested by Wormser *et al,* of allowing applicants to retake a failed examination element at a single test session simply by paying a second fee to the VE team. Nor did the Commission go along with requests in the Wormser *et al* and Qualls petitions calling on the FCC to set the total number of questions at 50 for the Technician and General class test and at 100 for the Extra test.

"We do not believe that the cumulative number of questions an applicant must answer correctly to obtain each license class is a particularly relevant measure of whether an applicant is qualified to be an amateur service licensee," the

Ham Radio Experiences Post-Restructuring Growth Spurt

Amateur Radio experienced a slight growth spurt in the aftermath of amateur license restructuring. FCC licensing statistics as of the end of March showed a net gain of approximately 6600 current licensees—or about 1%—from April 2000, when restructuring went into effect. Prior to that, the number of amateurs had remained relatively stable since 1998.

ARRL VEC Manager Bart Jahnke, W9JJ, says the full impact of license restructuring—including the elimination of the 13 and 20-WPM Morse exams—is slowly making itself felt. "For the first quarter of 2001, ARRL VEC test session statistics show that new and upgrading amateurs continue to earn licenses at a rate greater that that of first quarter 1999 and first quarter 2000," he said. "This is a positive trend that we expect will continue over the coming months."

As of the end of March, according to statistics compiled by Joe Speroni, AH0A, the FCC showed 684,359 current licensees on its books, although the number of active amateurs is believed to be far smaller. Speroni's figures show that more than 20,000 new amateurs entered the hobby over the past year, while attrition was on the order of 13,600.

With the change to a new, 50-question Extra class written element that combines material formerly covered in the 90 questions of the old Advanced and Extra elements, some predicted the Extra test would be easier to pass. That's not proving to be the case this year—at least at ARRL VEC-sponsored sessions, where the Extra pass rate has declined by nearly 7% from 1999. Technician and General pass rates at ARRL VEC-sponsored sessions this year have been up on the order of 10% to 12% from pre-restructuring rates, however.

Numbers compiled by Speroni show that the FCC issued nearly 5400 new licenses in the first quarter of this year. That compares with around 3730 new hams in the same quarter last year. For more information, visit Speroni's Amateur Radio Education Web Site, **ah0a.org/AH0A.html**.

Rick Lindquist, N1RL ♦ Senior News Editor

FCC said. The Commission said a greater number of questions does not "in and of itself" result in a more valid or meaningful amateur examination.

The FCC said it would not make any changes—at least for now—in the arrangement of mode-specific Amateur Radio subbands, as some petitioners had requested. Among these was Speroni's request that current Novice and Tech Plus or Technician with Morse credit licensees be allowed to operate CW in expanded subbands on 80, 40, 15 and 10 meters. The FCC said it believes the amateur community should reach a consensus on the issue before making any such changes. The Commission also declined to make changes to the Amateur Service sequential call sign assignment system.

Also denied were: Teaze's petition, asking the FCC to institute a new entry-level Communicator license; Duran's filing, requesting that the FCC elevate former "Class A" operators licensed prior to 1951 to Amateur Extra, instead of leaving them at Advanced class; and a QCWA petition, requesting Element 4 exam credit for any examinee who held a Conditional, General or Advanced ticket before November 22, 1968—when "incentive licensing" became effective.

ARRL, INDUSTRY GROUP SEEK FURTHER UWB RULEMAKING

The ARRL has joined an industry coalition that's calling on the FCC to issue a further *Notice of Proposed Rule Making* before it takes final action to authorize ultra-wideband (UWB) equipment under its Part 15 rules. In addition to the League, signatories to the March 27 letter, addressed to FCC Chairman Michael K. Powell, included AT&T Wireless Services, the Air Transport Association of America, QUALCOMM, Rockwell Collins, Lockheed-Martin, WorldCom and the US GPS Industry Council, along with several other major wireless-industry players. The signatories said a further NPRM is needed as "a matter of fairness."

The joint-industry group asked the FCC to provide an opportunity to comment on additional—and in some cases pending—test results and then issue a further rulemaking proposal.

In May 2000, saying the technology could have enormous benefits, the FCC proposed amending its Part 15 rules to permit the operation of UWB devices on an unlicensed basis. In comments filed last September, the ARRL advised the FCC to put its proceeding on hold until more evidence was available on UWB's interference impact.

UWB proponents claim the devices are capable of operating on spectrum that's already occupied by existing radio services without causing interference. Possible UWB applications include low-cost, high-speed wireless networking and devices that can see through brick walls.

UWB skeptics say test results to date suggest the potential for UWB interference to GPS, PCS and even some governmental and public-safety systems. They also say that, because the FCC has not proposed any specific rules, the technical characteristics of UWB devices that might be authorized remain unknown.

HELMS, VOSS, HANDLE ARISS CONTACTS WITH WIT AND GRACE

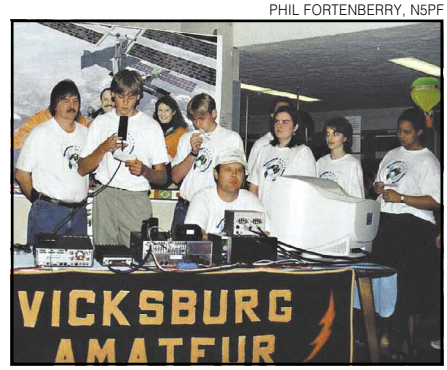
US Astronaut Susan Helms, KC7NHZ, got off to a running start—in a manner of speaking—in kicking off a series of successful Amateur Radio on the International Space Station, or ARISS, school contacts by the Expedition Two crew. As she explained to one youngster, however, it's not possible to walk in space, much less run. "It doesn't do me much good because my feet aren't touching anything," she said.

Wielding the NA1SS microphone on March 27, Helms handled more than two dozen questions put to her in rapid-fire order during a 10-minute contact by youngsters at the John B. Riebli School in Santa Rosa, California. The contact may have set a new record for the total number of questions asked and answered during an Amateur Radio contact between a school and space. Helms fielded each with exceptional skill and humor.

"We're just eating ourselves into little pigs," she replied to a typical question about the food aboard the ISS—prompting laughter from the audience.

Youngsters at the Woodford County Middle School in Versailles, Kentucky, showed up for school during spring break to ask questions of astronaut Jim Voss. His first outing on Amateur Radio from space got off to a shaky start because of difficult copy on Voss's part. A solid contact for the Southern Hemisphere pass via Tony Hutchison, VK5ZAI, in Australia, eventually was established as precious seconds ticked by. As a result, only eight students got to ask their questions. Students were telebridged with VK5ZAI via a telephone connection.

PHIL FORTENBERRY, N5PF



Six-foot-three Vicksburg High School senior Chris Withrow asks astronaut Susan Helms, KC7NHZ, about the height limitations for astronauts, while other students await their turns at the mike. Behind Withrow to the left is Vicksburg ARC President Eddie Pettis, N5JGK. Seated at the computer is Russ Tillman, K5NRK, another local ARISS committee member and the editor of the *AMSAT Journal*.

One student asked about research projects. "We grow crystals in space that help us to better understand the structure of crystals," Voss explained, adding that eliminating Earth's gravity makes certain research a lot easier.

Voss signed off by urging the students to work hard in school.

Helms spoke April 11 with Vicksburg (Mississippi) High School students. Two previous Vicksburg QSO opportunities had been scrubbed because of the crew's workload. Initially anticipating a direct contact, the Vicksburg Amateur Radio Club had installed antennas and equipment at the school. As it happened, the contact was telebridged through the Sacred Hearts Academy station in Honolulu, Hawaii.

Vicksburg students fired off 18 questions, ranging from the salary of an astronaut to the sensation of riding the shuttle to orbit. One student who happens to be 6 feet 3 inches tall asked about the height requirements for astronauts. Helms told senior Christopher Withrow that the height limit is 6 feet 4 inches. Withrow said he's still growing.

Voss took another turn at the NA1SS mike April 16 with youngsters at Admiral Moorer Middle School in his home state of Alabama. The contact was telebridged via ground station NN1SS at the Goddard Space Flight Center.

Youngsters managed to complete their entire list of two dozen questions. One youngster asked what Voss would do if he got sick during his stay aboard the ISS. He explained that he and Helms were the medical team during the Expedition Two crew mission and that if one became ill, the other would provide treatment.

The Expedition Two crew made its Hollywood debut March 25 during the Academy Awards ceremony. The 73rd annual Oscars program started with a weightless space station introduction of this year's host—actor, comedian and writer Steve Martin—albeit only a life-sized likeness. Helms referred to the occasion in her contact with the Riebli students.

For more information on the ARISS

program, visit the ARISS Web site, ariss.gsfc.nasa.gov

RESPONSE TO INTRUDER SURVEY "OVERWHELMING"

The response to ARRL's call last fall for reports of apparent unlicensed operation on 10 and 12 meters has been "overwhelming," according to Brennan Price, N4QX, administrator of the ARRL Monitoring System. The survey last October was initiated in response to an increasing number of complaints from the amateur community.

Price said that more than 400 reports, nearly all from US amateurs, detailed more than 1000 separate instances of apparent unlicensed operation. An analysis suggests that nearly half of the transmissions originated in the US. Of the remaining reports, most appeared to document transmissions originating in Latin America.

"The variety of languages, dialects and beam headings relating to these transmissions clearly indicates that this is a worldwide problem" Price said. Surveys by Monitoring-System administrators in other IARU Region 2 countries confirm that conclusion.

ARRL has shared its data with the FCC. Price points out that before the Commission can take any action, an offending transmission must be documented and its source found. "Given the changeable nature of 10 and 12-meter propagation, especially at the top of the sunspot cycle, this is not an easy task," Price said. He said the FCC cannot make its sophisticated HF direction-finding facility available for routine intruder-signal searches.

Price said the FCC relies on the Amateur Service to be self-policing and has indicated that it is most likely to act in suspected unlicensed operator situations when amateurs themselves document the cases.

Active use of the bands by licensees is the best way to discourage unlicensed operation, he said.

TWO ARRL HEADQUARTERS STAFF MEMBERS RETIRE

Veteran ARRL Headquarters staff members Chuck Hutchinson, K8CH, and Paul Pagel, N1FB, both retired in April.

♦ Hutchinson, 60, retired April 1. He began his ARRL career in 1981 as a technical editor. He served as membership services manager from 1991 until

FCC News

LOWER VANITY FEE PROPOSED

The FCC has proposed lowering the fee to obtain or renew an Amateur Radio vanity call sign from $14 to $12. The new fee, if approved, likely would go into effect sometime in September.

The proposed lower fee was contained in an FCC *Notice of Proposed Rulemaking for the Assessment and Collection of Regulatory Fees for FY 2001* (MD Docket No. 01-76), released March 29. The FCC said it estimates 8000 applicants will apply for vanity call signs in the current fiscal year.

Applicants for Amateur Radio vanity call signs will continue to pay the $14 fee for the 10-year license term until the FY 2001 fee schedule becomes effective. The effective date for the new FCC fee schedule will be announced later this year.

HOLLINGSWORTH PRAISES OFFICIAL OBSERVERS

FCC Special Counsel for Amateur Radio Enforcement Riley Hollingsworth has offered high praise for the work of the volunteer ARRL Amateur Auxiliary's corps of Official Observers. Long a strong supporter of the OOs, Hollingsworth's most recent burst of appreciation was inspired by investigative footwork done by an OO team that's assisting the FCC in an enforcement inquiry.

"It makes me realize that if it weren't for the OOs over the past 10 years, Amateur Radio would probably have imploded long ago and disintegrated from its own chaos," Hollingsworth said. "We really thank them very much for their work here."

The Amateur Auxiliary is composed of approximately 700 ARRL Official Observer volunteer appointees across the US. The program was developed as a result of a formal agreement between the FCC and the ARRL.

ARRL PHOTO

Riley Hollingsworth

OOs function as helpers and advisors, not enforcers. They monitor the bands and notify amateurs of technical and operating discrepancies as a service. In cases involving serious rule violations such as malicious interference, however, they are trained and certified to gather and forward evidence that can be used by the FCC in enforcement actions. All OOs must pass a comprehensive examination before they can be certified as members of the Amateur Auxiliary.

In recent months, Hollingsworth's office has been attempting to make greater use of the Amateur Auxiliary in tackling enforcement issues. He says the Official Observer program offers a way for amateurs to solve their own problems internally, without bringing in the FCC, but he notes that OOs often can provide valuable local perspective during enforcement inquiries.

The bottom line, according to Hollingsworth, is protecting the future of Amateur Radio for those who enjoy it. "Radio spectrum has extremely high visibility, and every time an operator gets on and degrades the bands, that operator is not only making Amateur Radio less enjoyable but endangering it as well."

FCC CONTACTS UTILITY IN HAM INTERFERENCE CASE

The FCC has written Cumberland Electric Membership Cooperative of Clarksville, Tennessee, in a case of suspected power-line interference to an Amateur Radio operator. Paul Fulk, N8ITF, of Springfield, Tennessee, said he first complained to Cumberland two years ago and is still trying to get the situation resolved.

The FCC now has put the ball back squarely into the utility's court. A Cumberland official told ARRL that the utility will fix the problem if it's at fault.

In a March 20 letter to Cumberland, Consumer Center Deputy Chief Sharon Bowers of the FCC's Consumer Information Bureau advised the utility to "locate the source of interference caused by its equipment and make necessary corrections within a reasonable time." According to the FCC, after Cumberland's efforts to take care of the interference failed, the utility told Fulk that if he or an ARRL representative could locate the problem, Cumberland would fix it.

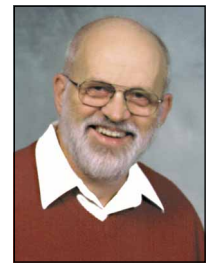
Bowers, however, told Cumberland that in cases of power-line interference "it is not possible for non-utility company people to safely perform all of the tests necessary to identify the source of the interference." And she reminded Cumberland that Commission rules require the operator of the device radiating interference to locate and eliminate the interference.

The ARRL Technical Information Service offers additional information on RFI and power-line interference on its

1998, when he moved into a part-time editorial role. Hutchinson had been working from his home in Michigan for several months leading up to his retirement.

"Our community is indebted to Chuck for the contributions he made to both the technical and the operating sides of Amateur Radio during his 20-year career with the ARRL," said ARRL Executive Vice President David Sumner, K1ZZ, who's known Hutchinson for many years. Sumner recalled that as a college freshman in Michigan in 1967 he was a frequent weekend guest of the Hutchinsons'. "I was delighted when, more than a decade later, Chuck decided to move his family to Connecticut and to join the ARRL staff," he said.

A long-time SWL and a ham since his late teenage years, Hutchinson was first licensed as KN8UDJ in 1960 and soon upgraded. He says the first thing he did after getting licensed—even before buying equipment—was to join ARRL. He's a Life Member.



Chuck, K8CH

Hutchinson remained active during his college years at the Michigan State University Amateur Radio Club's W8SH. "SWL and ham radio have been major influences on my educational and work careers," he said. "Those interests led me to major in telecommunications at MSU and played a part in every employment decision I've made."

Before coming to ARRL, Hutchinson worked for a couple of years as a studio engineer for international short-wave broadcaster HCJB in Quito, Ecuador.

When he applied for a position as a technical book editor at ARRL, Amateur Radio legend Doug DeMaw, W1FB, interviewed him for the position. Hutchinson believes an audio distribution amplifier he'd built and brought along helped clinch the deal. "They must have liked it," he said. "They offered me a job."

Hutchinson's first major project at HQ was editing the 1985 *Handbook*. Joel Kleinman, N1BKE—*QST* managing editor and former Book Team supervisor—worked with Hutchinson over the years. "The work Chuck did to enhance *The ARRL Handbook* and other publications—including *QEX* and the technical sections of *QST*—has had a lasting impact," he said.

As Membership Services manager, Hutchinson oversaw the early transition from paper to computerized DXCC records. He also reorganized contest rules into the present format and was responsible for reinvigorating the A-1 Operator Club. During his two decades at ARRL Headquarters, Hutchinson contributed dozens of columns and articles for *QST*.

Hutchinson developed a special relationship with the Spanish International Amateur Radio Union society URE (*Union de Radioaficionados Españoles*). He said he was gratified to see URE become the first international DXCC checkpoint in 1995.

Hutchinson says he and his wife, Sylvia, K8SYL—whom he married in 1961—are enjoying their new hilltop home in Michigan's Ionia County, where both are active in ARES. The couple has two sons, including Scott, N1DSF, who serves in the US Air Force.

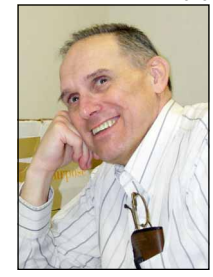
Hutchinson said he's looking forward to a continuing relationship with ARRL as he tackles special projects." One of those "special projects" will be a book on his favorite subject—antennas.

♦ Well-known *QST* technical editor Paul Pagel, N1FB, retired April 13. Pagel, 63, was on the HQ staff for nearly 22 years. In his capacity as a senior assistant technical editor, he prepared much of *QST*'s technical content for publication. He also handled the popular "Technical Correspondence" column each month.

QST Publisher Mark Wilson, K1RO, says the *QST* editorial team won't be the same without Paul Pagel. "He's helped countless authors polish their articles for the magazine," Wilson said. "He also helped train a number of ARRL technical editors over the years—including me. I still remember Paul's patient advice and guidance as I worked on my first articles for the magazine. We'll miss him."

A ham since 1958—when he went from ground zero to Conditional class (K1KXA) in one leap—Pagel says he can't remember when he was not interested in Amateur Radio. Growing up in New Britain, Connecticut, he taught himself the Morse code at age 16. "I got a J-38 key for $1 at a rundown radio-TV shop," he said, "and I learned the Morse code by listening to the clicks of the key, because I didn't have a code oscillator." This gave him a leg up when he joined the Air Force right out of high school and became a ground radio operator in Germany. While overseas, he also met his wife, Karin. The couple now lives in Enfield, Connecticut. Their son, Eric, is a police officer.

ARRL PHOTO



Paul, N1FB

Following the service, Pagel went to the FCC office in Boston one day and upgraded all the way to Extra in a single sitting. After graduation from Ward School of Electronics in Hartford, he went to work for IBM. Prior to coming to work in the old Technical Department at ARRL, Pagel spent 12 years as an engineer at a TV station.

His first assignment at ARRL was to take over the *QST* "Product Review" column. "That was scary!" he recalled. He remembers convincing then-ARRL General Manager Dick Baldwin, W1RU, to purchase state-of-the-art test gear for the ARRL Lab to conduct routine evaluations of products under review.

Pagel has enjoyed several facets of hamming over the years, including CW—his first love—AM, SSB, RTTY and

Web site, **www.arrl.org/tis/info/rfi-elect.html**.

Amateur Radio Enforcement

♦ **FCC issues $17,000 fine for unlicensed operation on ham bands:** The FCC has proposed levying a $17,000 fine on an East Palo Alto, California, man for transmitting without a license on amateur frequencies and for transmitting a false distress signal. The FCC issued a *Notice of Apparent Liability for Forfeiture* March 19 in the case of Joshie Yasin Nakamura Sr, who also is known as "Mervyn Ehambrave" and sometimes as "Marvin E. Barnes." Nakamura already was being held by California on unrelated felony charges, with bail set at $2 million.

As Ehambrave, Nakamura was among those receiving an FCC *Warning Notice* in March 1999 for allegedly operating without a license on the K7IJ repeater system in the San Francisco Bay area.

Following up last year on amateur community and Official Observer complaints that an unlicensed station was causing intentional interference and playing music, agents from the FCC's San Francisco Field Office on two occasions tracked the signals to Nakamura's residence. Signals were heard on both 2 meters and 70 cm. On one occasion, FCC officials monitored the international "SOS" distress signal being transmitted in Morse code. Station inspections revealed that Nakamura was operating without authorization, and he was presented with a *Notice of Unlicensed Radio Operation*, the FCC said.

The FCC said its guidelines called for a $10,000 fine for unlicensed operation and another $7000 forfeiture for causing malicious interference.

weather satellites. He also enjoyed building his own gear.

An ARRL Life Member, he's kept a much lower ham radio profile in recent years. He hopes to change that, now that he has more time and isn't involved with ham radio as a profession. "I don't think ham radio will ever leave my blood," he said.

HAM RADIO AIDS RESCUE ON THE HIGH SEAS

Amateur Radio operators again have assisted in a high seas rescue after pirates attacked a private sailing vessel March 20 off Venezuela and shot and wounded its skipper. The victim was identified as Bo Altheden, SM7XBH, of Bjärred, Sweden. Hams on the Maritime Mobile Service Net assisted Altheden and his wife, ViVi-Maj Miren, after Miren put out a call for help on 20 meters. Altheden was reported to be recovering.

The shooting was an eerie reminder of a similar pirate attack almost year earlier in the Caribbean. In that incident, March 28, 2000, armed marauders shot young Willem van Tuijl from The Netherlands, who was sailing at the time with his parents, Jacco and Jannie van Tuijl, KH2TD and KH2TE.

According to Coast Guard Lt Jose Diaz, KP3J, of the Rescue Coordination Center in San Juan, Puerto Rico, the 44-foot ketch *Lorna* was en route to Trinidad and Tobago when pirates—later described by Miren as six men in a fishing boat—pulled along side. Miren said the pirates shot Altheden once in lower back when he went to pull away from the other vessel.

The pirates ransacked the vessel and destroyed the VHF radio, but the San Juan Rescue Coordination Center spotted signals from the vessel's emergency position-indicating radio beacon—activated by Miren—and notified Venezuelan authorities. In the meantime, Miren managed to get the vessel's low-power HF radio, which the pirates had not spotted, on 20 meters. Her faint distress call was heard by members of the Maritime Mobile Service Net on 14.300 MHz. Among those hearing the call, Mike Pilgrim, K5MP, notified Miami Coast Guard, which relayed the information to Diaz in San Juan. Diaz tuned to 14.300 MHz, where Bobby Graves, KB5HAV, Dave Dalziel, N4ICE, and Jim Hirschman, K4TCV—a physician who had assisted in the van Tuijl pirate attack—already had activated an emergency net. Also monitoring was Eric Mackie, 9Z4CP, who alerted Trinidad and Tobago Coast Guard authorities. The amateurs on 20 meters were able to calm Miren, and Hirschman provided medical counseling.

A Venezuelan Navy vessel arrived on scene about the same time as a Trinidad Coast Guard cutter with a medical team aboard. Trinidad medical personnel and crew took control of the sailboat from the shaken and exhausted Miren. High seas made it too risky to move the victim, so the *Lorna* continued on to Trinidad with an escort.

Diaz credited amateurs with doing "a tremendous job" helping to keep Miren calm and to relay information for the US Coast Guard and for maintaining order on frequency.

In Brief

- **"Boing-Boing" Intruder Moves Off 12 Meters:** Some said it sounded like a squeaky spring; others said it sounded like marching. However one's ears interpreted the intruder on the 12 meter amateur band, it was gone by mid-March, thanks to successful direction-finding, identification and diplomatic efforts by the FCC. Acting on numerous amateur reports, the FCC utilized its HF direction-finding facility to isolate the transmissions to Honduras. It also promptly identified the transmissions as Coastal Ocean Dynamics Applications Radar (CODAR), an ocean current-mapping technology used in meteorological and commercial applications. "As is often the case in many intrusions, the operator dialed in the wrong frequency," said ARRL Monitoring System Administrator Brennan Price, N4QX. "Fortunately, the equipment provider and operator of the CODAR equipment were very cooperative and wanted to do the right thing."

- **Ham wins honorary Oscar:** Screenwriter-producer-director Ernest Lehman, K6DXK, has received an honorary Oscar "in appreciation of a body of varied and enduring work" from the Academy of Motion Picture Arts and Sciences. The award was made during the 73rd Oscar awards ceremony March 25 in Los Angeles. Lehman has been nominated six times for Academy Awards. Honorary awards in the form of Oscar statuettes are given for "exceptional distinction in the making of motion pictures or for outstanding service to the Academy."—*AMPAS*

- **NA1SS QSL routes:** QSL routes for W/VE stations working NA1SS aboard the International Space Station have been announced. US stations QSL to Margie Bourgoin, KB1DCO, ARRL, 225 Main St, Newington, CT 06111. Canadian stations QSL to Radio Amateurs of Canada, 720 Belfast Rd—Suite 217, Ottawa, ON K1G 0Z5. A self-addressed, stamped envelope is required to get a QSL in return. The ARISS international group has not yet finalized a QSL card design, so it could be a few months before cards become available.—*ARISS*

- **Vote on *QST* Cover Plaque Award:** The winners of the *QST* Cover Plaque Award for April was Frank N. Musso, WA5QHV, for his article "Laser Generated Antennas." Congratulations, Frank, for a great April Fool spoof! ARRL members are reminded that the winner of the *QST* Cover Plaque award—given to the author(s) of the best article in each issue—is determined by a vote of ARRL members. Voting takes place each month on the ARRL Members Only Web site at **www.arrl.org/members-only/qstvote.html**. As soon as your copy arrives, cast a ballot for your favorite article.

- **VE, UK amateurs to receive Transatlantic Challenge plaques:** For their efforts in completing two-way Amateur Radio low-frequency contacts between the UK and Canada, several UK and Canadian amateurs will receive special Transatlantic Challenge plaques. The plaques are dedicated to the memory of LF pioneer Peter Bobek, DJ8WL, and sponsored by the Deutscher Amateur Radio Club, the Radio Society of Great Britain and AMRAD. Larry Kayser, VA3LK, and Laurie Mayhead, G3AQC, on February 19 completed a two week-long QSO on 136 kHz using very slow-speed CW—called QRSS—and spectral software for receiving. At approximately the same time, Peter Dodd, G3LDO, Jack Leahy, VE1ZZ, and John Currie, VE1ZJ, took part in a joint effort February 12 in which Dodd and Leahy both transmitted around 136 kHz and Currie received Dodd's QRSS signal using spectral software and relayed it to Leahy via HF. A Transatlantic Challenge plaque went to Currie and Dave Bowman, G0MRF, for completing a crossband HF/LF QSO last September.

Amateur Radio—The Last Line of Defense

By Lynn Hilborn, VE3CSS, 352 Ridley Blvd, Toronto, ON, Canada, M3H 1L4
ve3css@rac.ca

VE3CSS PHOTOS

Lynn "Len" Hilborn, VE3CSS, at his remote portable station 75 miles north of Cochrane, Ontario.

"The Bear" can been seen peering above the brush.

The main cabin housed the portable radio room. The sleeping cabin, seen in the foreground, has the antenna tied to its roof post.

In planning our week of remote fly-in fishing, the idea of carrying in a battery powered Amateur Radio station was high on the list. In our case, it was the last line of defense… As four middle-aged fishing buddies, we found ourselves hostage to the advances of a 250 pound black bear for five uncomfortable nights.

We were located some 75 air miles north of Cochrane, Ontario, in the James Bay lowlands on a remote fly-in lake. Our intent was to enjoy a week's solitude with some serious fishing and a little Amateur Radio operation on the side. As the only licensed operator in the group, I had packaged together an Argosy II transceiver, a 12 volt battery, a Windom antenna and a launch system to get the wire well up into the trees. As a precaution before leaving Toronto, I noted in my logbook the telephone number for the Cochrane detachment of the Ontario Provincial Police and threw a can of Bear Guard pepper spray in my duffel bag.

Day One found us launching various weights and ropes to the heavens in an effort to get the antenna well located. This was followed by the wiring of the cabin's "radio room" for the power-up of VE3CSS portable. My other three companions would wonder with amazement how this suitcase of materials could communicate so far afield given the remote nature of our site. Soon the logbook had Scotland, Brazil, France and assorted W/Ks. Most important was my daily contact with the Trans Provincial Net on 7055 kHz, which allowed me to pass on some routine messages to the XYL in Toronto. All seemed normal until our bundle of fur arrived and refused to go away. Unfortunately the previous party at the site had left inviting food scraps in the bush between the main cabin and a smaller sleeping cabin, but more urgently between the outhouse and us!

The bear showed up on the first night around 9 PM with a warning huff and stood on its back legs staring down two of the cabin's inhabitants while the other members of the party were returning to the dock after an evening of fishing. A quick exchange of shouts gave warning, and soon we were all gathered in the cabin hostage to our newfound friend. For five nights, the bear returned spending much of its time about 10 feet from the cabin door and always leaving by 7 AM the following morning.

The third day, we found the plexiglass windows of the sleeping cabin punched out, a chewed fishing net and rod as well as the gas can removed from the boat. Clearly, the bear was in this for the long haul and was becoming more aggressive. On the fifth night, the bear was right at our cabin windows. In an effort to send it away, we banged pots, fired hand flares and blew whistles—only to get a somewhat bemused look in return.

It was at this time that we heard on the radio of the untimely death of biathlete Mary Beth Miller by bear attack in Quebec just a day earlier. Our concerns heightened and having failed to deter the bear's nocturnal advance, we finally resorted to a frontal assault by pepper spray. That night when the bear was some 6 feet from the window, the powerful spray was delivered full face. The bear meandered off leaving the cabin area only to appear on the dock where it once again removed the gas can from the boat and punctured it with its teeth. Running low on pepper spray and with no more deterrents at hand… our last line of defense was Amateur Radio!

Early the next morning, I called up on the Trans Provincial Net and through the efforts of VE3PIV and, gratefully, Paul VE2QR, of Montreal, I was able to pass on the telephone number for the Cochrane detachment of the Ontario Provincial Police with a request for assistance. Cochrane Air Services immediately dispatched a flight to deliver us a shotgun and 30.06 rifle. By 10 AM, the plane arrived, and the guns were handed over with the instructions to take them for personal defense when landing the boats and around camp. The bear was noted to have a tag on it which meant that it had been a

problem bear in the past, and it had been relocated (albeit too close to our site for comfort). Should we face any more destruction of property or fear for our safety, we now had the means to take matters in our own hands.

Luckily, the bear did not show the remaining two nights. I can only surmise that the pepper spray had at least some residual effect. We passed the guns to the party that followed us…however, their one shortcoming was the lack of a ham radio station—our last line of defense.

I want to express my appreciation to all the operators who helped us in dealing with the situation. Paul, VE2QR, recognized the urgency immediately and with his colleagues and the controllers on the Trans Provincial Net gave us all the assistance and support we needed.

Next year the list includes radio, pepper spray and … (well you can guess).

NTS Messages and Field Day

Field Day 2001 is not far off—it's June 23-24! Your Amateur Radio club or operating group may receive bonus points for handling formal messages (or radiograms). Here are the pertinent Field Day rules. See this ARRL Web page for more information on Field Day: **www.arrl.org/contests/announcements/rules-fd.html** or see the announcement in May *QST*.

7.3.5. **Message Origination to Section Manager**: 100 bonus points for origination of a National Traffic System (NTS) style formal message to the ARRL Section Manager or Section Emergency Coordinator by your group from its site. You should include the club name, number of participants, Field Day location, and number of ARES operators involved with your station. The message must be transmitted during the Field Day period and a fully serviced copy of it must be included in your submission, in standard ARRL NTS format, or no credit will be given.

7.3.6. **Message Handling**: 10 points for each formal NTS style **originated**, relayed or **received and delivered** during the Field Day period, up to a maximum of 100 points (ten messages). Properly serviced copies of each message must be included with the Field Day report.

What does a standard ARRL radiogram format look like, and how do you handle the message? The answers may be quickly found on *ARRLWeb* and in the Amateur Radio Public Service Communications page. This URL, **www.arrl.org/FandES/field/forms/#fsd-218**, helps to summarize all the necessary steps to originate and handle a formal message. *The ARRL Operating Manual* chapter on traffic handling does an admirable job on explaining all the details on traffic handling and the NTS.

See page 12 of *QST* for the name, address, and contact information for your ARRL Section Manager. To send your participation message, consider checking into your section's traffic net during Field Day.

Field Organization Reports

Public Service Honor Roll
March 2001

This listing is to recognize amateurs whose public service performance during the month indicated qualifies for 70 or more total points in the following 8 categories (as reported to their Section Managers). Please note the maximum points for each category:
1) Checking into a public service net, using any mode, 1 point each; maximum 60.
2) Performing as Net Control Station (NCS) for a public service net, using any mode, 3 points each; maximum 24.
3) Performing assigned liaison between public service nets, 3 points each; maximum 24.
4) Delivering a formal message to a third party, 1 point each; no limit.
5) Originating a formal message from a third party, 1 point each; no limit.
6) Serving as an ARRL field appointee or Section Manager, 10 points each appointment; maximum 30.
7) Participating in a communications network for a public service event, 10 points each event; no limit.
8) Providing and maintaining an automated digital system that handles ARRL radiogram-formatted messages; 30 points. Stations that qualify for PSHR 12 consecutive months, or 18 out of a 24-month period, will be awarded a certificate from HQ on written notification of qualifying months to the Public Service Branch at HQ.

1017
NM1K
491
WZ7V
475
WA5OUV
343
W7TVA
339
WA4GQS
333
K8PJ
316
N8IO
286
KK5GY
284
KV4AP
283
KB1AJ
263
KA2ZNZ
259
K9JPS
255
WB8SIW
249
AG4DL
239
WB5ZED
230
N9VE

222
KK3F
KB2VRO
220
N8OD
210
AF4NS
206
K8GA
200
N9FHI
199
W4CAC
W8YS
198
N5IKN
196
N2LTC
195
WB4BHH
191
WA9VND
190
N2CCN
KG4FXG
189
N2YJZ
185
W4ZJY
KB2EV
184
W5ZX
N2OPJ

183
K0IBS
181
KA4FZI
180
K8KV
179
W4EAT
177
W2EAG
175
KC2AHS
174
WB2UVB
172
KB1DSB
N5JZ
171
N2RPI
170
WB4GM
N5OUJ
KC5OZT
K2UL
169
W6DOB
168
WO0A
WX8Y
KA2GIV
167
WB5NKC

166
WN0Y
164
WA4QXT
163
N8FPN
162
WA5I
161
N2JBA
160
KB2RTZ
159
N9KNJ
W6QZ
158
N7YSS
157
W0OYH
154
N1LKJ
153
KG9B
K5NHJ
K4SCL
152
K4FQU
150
W2MTA
149
AC4CS
W3YVQ

148
KB0RUU
KD4GR
147
KG4FQG
KC2EOT
146
NR2F
145
K4IWW
144
N8BV
KC5QZZ
143
KC7ZZB
WA1FNM
KC8CON
142
KW1U
WB2ZCM
KB5W
K4RBR
KC4ZHF
141
W0LAW
KB8ZYY
AD4IH
KE4DNO
140
K3JL
WA4DOX
WD4JJ
KT6A
W7ZIW
WX4H

139
W3VK
N2AKZ
W5GKH
KA0DBK
N9BDL
138
N0SU
KI4YV
W3BBQ
W1PEX
W7GB
N2KPR
WD9FLJ
KB2VVB
AB4XK
137
KA1GWE
KE4JHJ
WB5NKD
136
KC2DAA
W1ALE
K4BG
134
WA2UKX
133
AD4XV
W2RJL
NN2H
132
K5IQZ
WB4TVY
W0WWR
K2DN
N2WDS
131
N5NAV
N3YSI
W9YCV
130
KC7SRL
NZ1D
K5VV
KA4UIV
W9CBE
KB5TCH
129
NC4ML
KB2ETO
WB2QIX
W7QM
WB2FGL
128
K5DPG
KD1LE
W4CKS
N3ZKP
N3WKE

K4YVX
WA0TFC
AF4QZ
WD8DHC
127
WB2GTG
126
KA4LRM
K9LGU
125
W2AKT
NY2V
W2FR
124
W4NTI
AA2SV
123
AA4AT
N3SW
W1QU
W4AUN
KE4UOF
AF4GF
122
N8EIZ
WR8F
WI2G
121
KY1B
KG4KCC
W3IPX
W3NNL
KE4JFS
N7AIK
KJ4N
K7MQF
120
N7DRP
N3EFW
K4BEH
K4WKT
WU4C
KT4PM
W7GHT
119
K7GXZ
N9TVT
W7LG
118
N8DD
K9GBR
K4MTX
WD0GUF
W3OKN
KA2DBD
KG2D
W4WXA
KA8WNO
N9MN

117
KK1A
AA8SN
116
WA2YBM
AF2K
115
W3CB
114
W4DGH
AB4E
W6JPH
113
WD9HII
KB2KLH
K0PIZ
N1JBD
112
W3HK
AG9G
K2PB
111
K8VFZ
K1FP
WW8D
110
KF4KSN
109
W1JX
N3WAV
W5AYX
KJ7SI
108
N3WK
WA8DHB
N3RB
107
KG5GE
K2BCL
KA2BCE
KB2WII
W2GUT
106
WA1QAA
KC8HTP
KV4AN
WA2GUP
K2DBK
KC5VLW
105
WA4EIC
104
K8QIP
WA8SSI
WA1JVV
W2LC
KG4EZQ

103
N1IST
AC5Z
KT4TD
WA2CUW
102
AA4YW
101
K5MC
N8EXV
100
KC3Y
W4CC
WA4GLS
N2GJ
99
K8LEN
98
KC7SGM
KC4VNO
W2JHO
97
KE4GYR
KA1VED
KA4HHE
K1JPG
96
KO4OL
95
W4XI
AA3GV
KE4PAP
W1JTH
KA2ZKM
N1CPX
AE4MR
KD4HGU
94
WB2IJH
KA2CQX
N2VQA
KG4CHW
KC6SKK
KF5A
KM5VA
93
KM5YL
W8SZU
92
K1YLB
91
KB2YUR
W5XX
90
WA2YOW
AA4BN
K6IUI
W5MEN

89
WA2EDN
WB9OFG
88
WB4UHC
W4SEE
87
WB4ZNB
K3UWO
86
AA8PI
KF4OPT
85
K8ZJU
WA4CSQ
W7NWP
AD6HR
84
NC1X
K2VX
WB7VYH
83
K1SEC
82
KR4MA
KJ5YY
WA4EYU
WB9GIU
80
K3TX
79
W7VSE
78
WB2LEZ
77
KJ3E
K3CSX
N1ARN
76
W7EP
K1STV
75
KE3FL
74
KF4NJP
N4CQR
KB4WBY
72
AF7PX
71
KE4WBI
N4JAQ
70
K8SH
K8AE
KA9FVX
KA7TTY

The following stations qualified for PSHR during the months indicated, but were not previously recognized in this column: (Feb) NM1K 882, KA1GWE 148, N7CEU 110, KA1VED 102. (Jan) KA4UIV 130, AF4QZ 128, KA4LRM 113, KG4FQG 108, K4BG 99.

Section Traffic Manager Reports
March 2001

AK, AL, AR, AZ, CT, CO, DE, EMA, ENY, EPA, EWA, GA, IA, ID, IL, KS, KY, LA, MDC, ME, MS, MI, MO, NC, NH, NFL, NLI, NNJ, NTX, NV, OH, OK, OR, ORG, SB, SC, SD, SDG, SFL, SNJ, STX, TN, VA, VT, WCF, WI, WMA, WNY, WPA, WV, WWA, WY.

Section Emergency Coordinator Reports
March 2001

The following ARRL Section Emergency Coordinators reported: AZ, ENY, EWA, CT, IA, IN, KS, KY, LA, MDC, NFL, NLI, NNY, OH, SB, SD, SFL, STX, SV (North), TN, VA, WCF, WMA.

Brass Pounders League
March 2001

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*
W1GMF	5	313	2086	5	2409
WX4H	11	965	1230	4	2239
NM1K	893	213	959	11	2076
W5SEG	111	973	977	0	2061
KB1AJ	34	964	858	131	1987
W1PEX	0	78	1373	21	1472
KK3F	14	544	504	40	1102
KT6A	2	544	533	0	1079
N2LTC	0	444	479	28	951
WB5ZED	33	462	383	38	916
WZ7V	0	445	32	414	891
W7TVA	0	111	333	94	854
N1LKJ	1	424	399	25	849
W0WWR	0	120	684	14	818
KW1U	0	407	369	4	708
W4EAT	0	338	337	1	676
W6DOB	0	317	330	26	673
KY1B	25	280	305	15	625
W9YPY	0	290	325	0	615
WA9VND	6	328	257	7	592
W9IHW	0	256	50	211	567
KA2ZNZ	15	278	171	100	564
N8IO	—	—	—	—	559
KF5A	10	250	257	10	527
KA1VED	9	243	243	8	503

BPL for 100 or more originations plus deliveries: K9GU 194, N9VE 194, K9JPS 174, WA5OUV 141, K8LJG 104. The following stations qualified for BPL in the months indicated, but were not previously recognized in this column last month: (Feb) NM1K 1942, W1GMF 1054. (Jan) W1GMF 648

The Pitcairn Islands—Could there be a New DXCC Entity Amongst Them?

The Pitcairn Islands (VR6) consist of Pitcairn, Henderson, Oeno, Sandy and Ducie. Pitcairn Island was discovered by Philip Carteret in 1767 and was first settled by the mutineers of the British ship *HMS Bounty*. It is the only island with a population of about 45 people of which 10 are Amateur Radio operators. Most of you are familiar with the Mutiny on the *Bounty* and will remember last year's DXpedition by Jukka Heikinheimo, OH2BR/VP6BR (see How's DX, Jan 2000, p 79).

Pitcairn Submits Application to Join IARU

In early March of this year veteran DXpeditioners Jacky Calvo, F2CW/ZL3CW, and Kan Mizoguchi, JA1BK, teamed up to visit the island of Pitcairn, which is located at 25° 04′ S and 130° 05′ W. Getting to this remote island is not easy and it's costly. There are only three possible ways on the island, and none include a plane, as there is no airport. The most common and cheapest way is by a container supply ship, which embarks from New Zealand and takes seven to eight days. Another way is to take an expensive cruise ship from Easter Island, but you can only stay one night. Kan and Jacky flew into Mangareva Island in the Gambier Islands; part of the French Polynesian Islands, then chartered a 42-foot yacht. It took two and a half days to sail to Pitcairn.

Originally the two had not planned to operate while on the island but rather only talk to the Amateur Radio operators on this tiny island about forming an IARU (International Amateur Radio Union) society. The IARU was established, in 1925, for the protection, promotion and advancement of Amateur Radio. This was not the first time the radio operators from Pitcairn have faced this topic. Kan and Jacky did get on the air as VP6BK and VP6CW.

Figure 1—It's always exciting when guests visit the Pitcairns but it's even more special when they are Amateur Radio operators. Jacky (left), F2CW/ZL3CW, and Kan (right), JA1BK, stay with their host Tom Christian, VP6TC, and Betty Christian, VP6YL.

Figure 2—Kan, JA1BK, and Jacky, F2CW, chartered this boat to take them to and from Pitcairn and Mangareva Island.

Tom Christian, VP6TC, called a meeting of the Amateur Radio operators of Pitcairn on March 10, 2001 to discuss the possibility of the creation of a society. The island already has a radio club, Pitcairn Amateur Radio Club (VP6PAC), and not all of the Amateur Radio operators are members. No decision was made on the first night. The group met again the following day, unanimously agreeing to join IARU Region 3.

An application was made and signed on March 11, 2001 by Tom Christian, VP6TC, President of the Pitcairn Island Amateur Radio Association (PIARA). Later Kan submitted the application to the IARU Region 3 office in Japan on March 22, 2001.

So what is the process for an application to join the IARU? Larry Price, W4RA, President of the IARU, informs, "The application goes to the Regional IARU secretariat." The Regional Executive Committee votes upon the application. Price continues, "If favorable, it goes then to the IARU Secretariat in Newington, Connecticut. Then if all is in order it is submitted for balloting by mail by all IARU societies in the world." This is a lengthy pro-

Figure 3—On March 11, 2001 Amateur Radio operators from Pitcairn Island voted unanimously to join the IARU. (Back row left-right) Michael, VP6AZ; Jay, VP6JC; Meralda (YL), VP6MW; and Kan, JA1BK/VP6BK. (Front row left-right) Tom, VP6TC; Betty (YL), VP6YL; Dennis, VP6DR; Dave, VP6DB; Terry, VP6TY; and Irma (YL), VP6ID.

Figure 4—An FT-100D was used by VP6BK and VP6CW. QSL VP6BK via VE3HO. QSL VP6CW via ZL3CW.

Bernie McClenny, W3UR ♦ 3025 Hobbs Rd, Glenwood, MD 21738-9728 ♦ w3ur@arrl.org

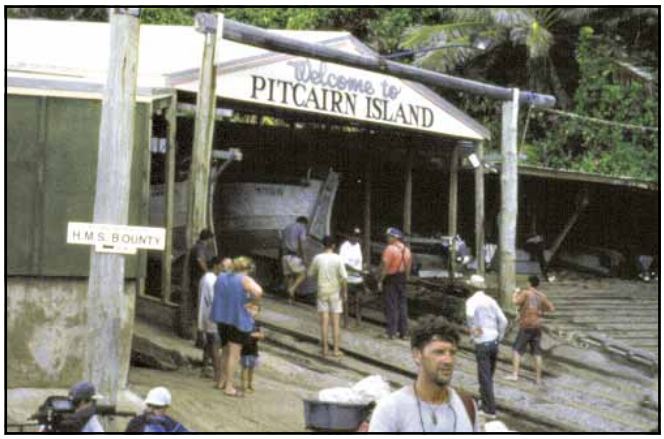


Figure 5—The islanders' only means of getting on and off Pitcairn Island is stored in this boat house.

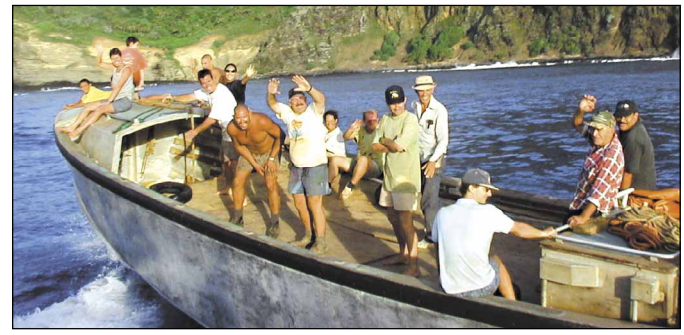


Figure 6—Some of the locals going out for a joy ride.

cess—it takes months to complete because of considerations by the members and there is a time period requirement based on the IARU constitution.

New DXCC Entity?

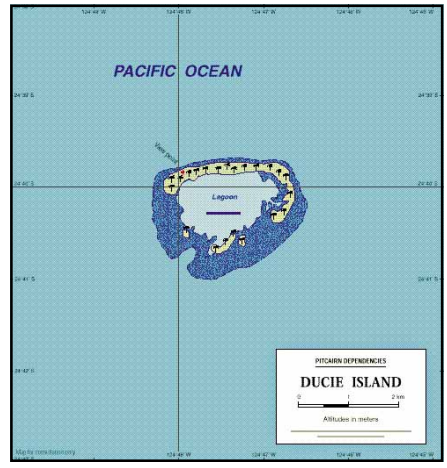
Currently, Pitcairn is a "Geographical Entity" on the DXCC list. Basically, this means Pitcairn is separated from its parent entity, England, by 350 kilometers or more (see DXCC rules at **www.arrl.org/awards/dxcc/rules.html**). If the PIARA does become an IARU society, then Pitcairn would become a Political Entity as stated in the DXCC Criteria. So what on earth does this have to do with a new DXCC Entity? If Pitcairn does become a Political Entity, that would mean Pitcairn Island is a parent entity. An island that is separated from the island of Pitcairn and any other islands that make up the DXCC Entity by 350 kilometers or more, would become a Geographical Entity.

The Discovery

Kan had been scanning the DMA (Defense Mapping Agency) maps, sailing charts and satellite photographs for a possible new DXCC counter. So what did he find? As we've mentioned, the Pitcairn Islands are made up of five islands. Oeno and Sandy Islands (OC-044) are located to the north, just over 100 kilometers from Adamstown, the capital town on Pitcairn. Henderson (OC-056) is the largest island, also just over 100 kilometers away, to the northeast. That leaves Ducie Island (OC-182), which is located at 24° 40′ S 124° 48′ W. This C shaped island is 540 kilometers east of Pitcairn, but more importantly it is approximately 354 kilometers east of Henderson Island, the closest island. If Pitcairn becomes a Political Entity, then Ducie would qualify as a Geographic Entity and would be added to the DXCC list.

Ducie Island

Captain Edward Edwards, who was sailing the *HMS Pandora* in 1791 in search of



Ducie Island (OC-182) is an uninhabited C-shaped island located approximately 354 km east of Henderson Island.

the *Bounty* mutineers, discovered Ducie Island. The island, which was named after Lord Ducie, measures just .7 square kilometer and is only 4-5 meters above sea level**.** Ducie is an uninhabited classic coral atoll with one large and three small islets around a lagoon. Acadia is the main island forming a C and the home of lizards, masked boobies, petrels, fairy terns, tropicbirds, frigate birds and the Polynesian rat. The vegetation consists of two hardy species of shrub and no palm trees. Ducie has had its share of shipwrecks including the *Acadia* in 1881. The island is 70% forested and has a shoreline that is 99% coral reef. Keep a close eye on your favorite DX bulletin for the latest word on the IARU status of the Pitcairn Islands.

DX NEWS FROM AROUND THE GLOBE

8Q—MALDIVES

Phil Whitchurch, G3SWH, announces he and his XYL, Jan will be in the Maldives between June 4 and 11. He has been allocated the callsign 8Q7WH. This will be the usual holiday type of operation and Phil will have an IC-706 and R-7000. He will be active on all bands from 10 to 40 meters, CW only as time allows. QSL to via G3SWH either direct or via the RSGB QSL bureau.

9Q—DEMOCRATIC REPUBLIC OF CONGO

Pierre, HB9AMO, is back in the Democratic Republic of Congo (formerly Zaire) until the end of June. He has been operating with the call he used back in 1997 (9Q5BQ). Look for him to be active on 10-40 meters CW only during his free time (evenings and weekends). He will be back in Switzerland in July. QSL via HB9AMO, Pierre Petry, 3 Hutins-des-Bois, 1225 Chene-Bourg, Switzerland.

SV9—CRETE ISLAND

Laurent, F8BBL, announced he'll be QRV from Crete Island (EU-015) from June 25 to July 2. He plans to be active on 6 through 160 meters CW and SSB as SV9/F8BBL. Equipment will include an IC-706 MKII running 100 watts and a long wire. QSL via F8BBL CBA.

VP8SGK—SOUTH GEORGIA

Mike, GM0HCQ, made a surprise visit to the South Georgia Islands in late March. He was QRV as VP8SGK for two days and was found on 14052 after 2000Z. This surprise operation reminds us "there is always a way." For those who were fortunate enough to work Mike you can QSL via GM0HCQ.

UPCOMING DX EVENTS

Don't forget DX Extravaganza will be held June 8-10 in Arlington, Texas. See last month's issue for complete details. The Northwest DX Convention will take place on July 20, 21 and 22 in Seattle. The Western Washington DX Club will sponsor this year's event. Additional information can be found at **www.wwdxc.org/convention**, or you may send an e-mail to **convention@wwdxc.org** or to WWDXC, PO Box 395, Mercer Island, WA 98040.

Wrap Up

Well that's all for this month. Thanks for all the letters, pictures and newsletters. This month a big thanks goes out to the following for helping to make this month's column possible: *425 DX News*, JA1BK, JI6KVR, OH2BR, OPDX, *The Daily DX* and VP6TC. Until next month, see you in the pileups! QST

Antenna and Tower Safety

Many amateurs enjoy building and installing their antennas and consider this one of the most enjoyable aspects of their hobby. Since antennas are generally outdoors, they are affected by such potentially hazardous weather as wind, ice and lightning. Learning about the potential hazards of towers and antennas and how to do antenna work safely will pay dividends.

Any heavy, large and permanent structure that fails or collapses can potentially hurt or even kill somebody. The complete installation *must* comply with all applicable structural and building codes. Professional engineers design towers to withstand code loadings—that is, dead weight, wind and ice loadings that are applicable to the environment at your particular location. The latest revision of the EIA-222 standard is the document from which professional engineers work to ensure that their tower designs are structurally safe.

To ensure structural safety and integrity, you must demonstrate that your tower has been designed by a qualified engineer to withstand EIA-222 loadings at your specific geographic area. Further, the tower, foundation, guys and anchors must be installed (and maintained) according to any drawings, instructions and specifications supplied by the professional engineer. Remember: A properly designed, installed and maintained tower should be as safe as a building or a bridge!

It is not feasible to discuss each type of antenna and tower in detail, so this section will include only highlights. For a full understanding of the specific hardware you will be working with, consult the manufacturer or supplier. You should discuss your antenna plans with a qualified engineer. The ARRL Volunteer Consulting Engineer program can steer you to a knowledgeable engineer.

When using slingshots or arrows to string up the antenna, be sure no one is in range before you launch.

In addition, your town or city will probably require that you obtain a building permit to erect a tower or antenna. This is their way to help ensure that the installation follows good practices and that the installation is safe. Wise amateurs realize that an independent review of drawings and site inspections are beneficial and can result in fewer problems in the future.

Towers must have a properly engineered support, both for the tower sections themselves as well as guy wire attachments. Sometimes towers are braced to buildings for added support. The Antenna Supports chapter of *The ARRL Antenna Book* covers this subject in greater detail. Towers are available commercially in both guyed and self-supporting styles, and constructed of both steel and aluminum materials. Masts may be wood or metal. One popular and inexpensive mast used to support small antennas is the tubular mast often sold for TV antenna use. These come in telescoping sections, in heights from 20 to 50 feet.

Aluminum extension ladders are sometimes used for temporary antenna supports, such as at Field Day sites. One problem with this approach is the difficulty in holding down the bottom section while "walking up" the ladder. Do *not* try to erect this type of support alone.

Trees are sometimes pressed into service for holding one end of a wire antenna. When using slingshots or arrows to string up the antenna, be sure no one is in range before you launch.

Tower Tips

- Towers have design load limitations. Make very sure the tower you consider has the capacity to safely handle the antenna(s) you intend to install in the kind of environment that is applicable to your location.
- The antenna must be located in such a position that *it cannot possibly tangle with power lines, both during normal operation or if the structure should fall.*
- Sufficient yard space must be available to position a guyed tower properly. A rule of thumb is that the guy anchors should be between 60% and 80% of the tower height in distance from the base of the tower.
- Provisions must be made to keep children from climbing the support.
- Soil conditions at the tower site should be investigated. The footings need to be designed around actual soil conditions, particularly on a rocky site.
- Beware of used towers. Have them professionally inspected and contact the manufacturer for installation criteria.
- Check with your local building officials.
- Liability may be increased with a tower installation. Check with your insurer to ensure your coverage is adequate.
- Make sure you have all the tools needed before starting. Some specialized tools (such as a gin pole) may be required.
- The assembly crew as well as those climbing the tower during erection must wear hard hats and use appropriate personal protective equipment including gloves, boots, climbing belt or harness. Don't forget that lifelines are needed when the belt is unattached from the tower while moving.
- Assign someone in the erection crew to monitor the use of safety equipment.
- After the tower is installed, keep the installation safe. Inspection and maintenance recommended by the tower's manufacturer should be carefully followed.
- If making attachments to houses or installations on roofs, have a qualified person determine that the method is adequate and the loading conditions are satisfactory.
- Avoid metal ladders if there are any utility lines in the vicinity. Assume that any line is energized—including cable television and telephone lines.

Power Lines

Hundreds of people have been killed or seriously injured when attempting to install or dismantle antennas. In virtually all cases, the victim was aware of the hazards, including electrocution, but did not take the necessary steps to eliminate the risks. Never install antennas, towers and masts near power lines. How far away is considered safe? Towers and masts should be installed twice the height of the installation away from power lines. Every electrical wire must be considered dangerous. If the installation should contact power lines, you or those around you could be killed! If you have any questions about power lines, contact your electrical utility, city inspector or a qualified professional.

If, for some reason your tower starts to fall, get away from it immediately. If it touches energized lines it may be a lethal hazard if you are in contact with the antenna. If a coworker becomes energized, do not touch the person. Instead, use an insulated wooden pole to knock the energized conductor away from them. Don't become a victim yourself! If the person is not breathing, immediately start CPR and call for emergency assistance.—*excerpted from the* 2000 ARRL Handbook QST

24-GHz EME is Next

This past March, Al Ward, W5LUA, was excited to hear his own 24-GHz echoes reflected from the Moon, after making several attempts over the past few years. He is probably only the second amateur to have accomplished this much, thereby raising expectations that a 24 GHz Earth-Moon-Earth (EME) contact will not be long in coming. Such a feat will add to a long list of distinguished EME contacts made since 1960.

W6HB and W1FZJ completed the first EME two-way nearly 40 years ago on 1296 MHz. Since then, EME contacts have been completed on all bands from 28 MHz through 10 GHz. Table 1 shows the initial EME contacts on each band at 50 MHz and higher. Initial QSOs on 5.7 and 10 GHz were made more than a dozen years ago. Can 24-GHz EME be far behind?

At least three stations worldwide are capable of 24-GHz Moonbounce. WA7CJO and W5LUA have both heard their own echoes. VE4MA has heard W5LUA off the Moon, but has not copied his own echoes yet. Several stations in Portugal, England, Germany and perhaps other countries have 24-GHz receivers and dish antennas capable of hearing reflections from the Moon. No doubt, some of them are working on amplifiers with enough power to make EME contacts.

Jim Vogler, WA7CJO

Jim first heard his own 24-GHz echoes several years ago while running about 12 W into a 4.8-meter dish. That is 400 wavelengths across—a relatively huge antenna with gain enough to confine 12-mm signals to less than a 0.5° 3-dB beamwidth, about the size the Moon presents from Earth. Signals were quite weak and considerably distorted, sounding something like aurora.

In early 2000, Jim put a new 100-W traveling-wave tube (TWT) on line and again heard his echoes. He noticed that signal quality changed noticeably depending on precisely where on the Moon his antenna pointed. Signals reflected from a crater-pocked area of the Moon had considerable multipath distortion and Doppler-like broadening. When he nudged the antenna toward a smoother part of the Moon, signal quality improved.

This phenomenon suggests just one of the several problems with microwave Moonbounce. Achieving relatively high antenna gain is not difficult, but when beamwidths are less than 0.5°, keeping the antenna aimed properly as the Moon traverses the sky is difficult. There is little room for error. A high-gain dish must be kept on the center of the lunar disk, as any signals that reach the Moon's outer margins will be reflected off to the side and not directly back to Earth.

Al Ward, W5LUA

Al heard his first 24.192-GHz echoes early in the morning of March 7. He was using an optimized 3-meter dish with a scalar feed, 10 W from a Varian VTU-6191 TWT and a 2.3-dB noise figure receiver with Agilent PHEMT devices on the front end. Al partially solved the Moon tracking problem by using *Realtrak*, a satellite-tracking program from Northern Lights Software written by Michael Owen, W9IP.

An additional problem Al overcame was the extreme Doppler shift from EME signals. The Moon is a moving reflector, and a returning 24-GHz signal can be shifted 50 kHz. The amount of Doppler shift also changes through time. In addition to providing the proper antenna heading, *Realtrak* and similar programs can calculate the expected Doppler shift at any frequency and at any moment. This piece of information is vital to knowing where to tune for a weak, badly distorted signal.

Barry Malowanchuk, VE4MA

Barry is an experienced VHF and higher operator with much EME success on the lower microwave bands. He has a 2.5-meter offset-feed dish on 24 GHz, an unusually quiet DB6NT designed receiver preamplifier with less than 1.6 dB noise figure and about 11 W from a TWT. Barry and Al attempted several 24-GHz EME schedules in March, but were both frustrated by wind and rain. Barry at least heard Al, but Al could not find Barry to make it a two-way.

Both Barry and Al have several TWTs capable of more than 100-W output, but they are having considerable problems getting them to work on 24 GHz. These are tubes purchased on the surplus market and not necessarily designed for operation on any amateur band. They require multiple voltages (as high as 10 to 20 kV), and they have been difficult to coax onto the 24-GHz band. Barry is confident that 24-GHz EME contacts should be considerably easier once they have solved the problems of obtaining an additional 10 dB of power from the TWTs.

Signal strength may resolve only part of the problem. Barry noted that it might be difficult to copy otherwise strong 24-GHz signals because they may be broken up and distorted by multipath effects and by libration. The rough surface of the Moon creates many paths of unequal length back to Earth. Signals returning via these various paths combine or can-

This Month

June 2	Region I 6-Meter Contest (1400-1400)
June 7	Arietids Meteor Shower Peaks
June 9-11	ARRL June VHF QSO Party
June 9-10	UKSMG Contest (1200-1200)
June 16-17	SMIRK Contest
June 16	Canadian VHF, UHF and Microwave Meeting (Etobicoke, ON)
June 24	Excellent EME conditions

Table 1
First EME Contacts by Band

Frequency	*Date*	*Stations*
50 MHz	1972 July 30	W5WAX, K5WVX—WA5HNK, W5SXD
144 MHz	1964 April 11	W6DNG—OH1NL
220 MHz	1970 March 15	WB6NMT—W7CNK
432 MHz	1964 May 20	KP4BPZ—W1BU
903 MHz	1988 Jan 22	K5JL—WA5ETV
1.3 GHz	1960 July 21	W6HB—W1FZJ
2.3 GHz	1970 Oct 19	W4HHK—W3GKP
3.4 GHz	1987 April 7	W7CNK, KA5JPD—WA5TNY, KD5RO
5.7 GHz	1987 April 24	W7CNK, KA5JPD—WA5TNY, KD5RO
10 GHz	1988 Aug 27	WA5VJB, KF5N—WA7CJO, KY7B

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cel each other, depending on their phase relationships. These phase relationships also constantly change with the movements of both Moon and Earth, creating a kind of short time-scale fading that can chop up a CW signal. In addition, the Moon wobbles and rings, creating additional Doppler components that distort the signal. These libration effects are more apparent at microwave frequencies than at VHF.

24-GHz EME Soon

A number of unique technical challenges make EME at 24 GHz the most difficult frequency yet attempted. Hardware problems are significant, but have largely been resolved. Building a sufficiently large antenna is not difficult in itself, but providing sufficient surface accuracy and an efficient feed system involves a good deal of precision work. Low-noise receiver devices, practical preamplifier designs and even complete preamplifier kits are available at reasonable prices. TWTs capable of generating more than 100 W are available on the surplus market, even though it still takes a good deal of skill and patience to get them working on 24 GHz.

Finding and copying EME signals Doppler shifted by 50 kHz and badly distorted by multipath and libration effects presents another sort of challenge. Satellite tracking programs can predict the expected frequency of the return signal within a few hundred cycles, but it will still be difficult to find a weak signal in a receiver bandwidth that may only be 100 Hz wide. The frequency of the received signal also changes over time, creating additional difficulties of keeping it within the receiver bandwidth. One of several computer-based visual DSP programs—now widely available at little cost—can probably solve this problem.

Poor signal quality may be a more difficult issue, as there does not seem to be any hardware or software that can decipher a badly distorted, Doppler-broadened, weak CW signal. Slow CW may be easier to copy by ear. Multipath effects might be reduced with even narrower antenna beamwidths that can be aimed at relatively smooth areas toward the center of the Moon, as seen from Earth. The tradeoff is that aiming problems increase and signal strength is unlikely to improve with beamwidths narrower than the apparent width of the Moon.

ON THE BANDS

Propagation around the equinox period of March 21 lived up to expectations and then some, as the sun briefly erupted into its highest levels of activity of Cycle 23. There was aurora and auroral E on several evenings, culminating in the extraordinary event of March 31. Worldwide 6-meter contacts—roughly north-south across the geomagnetic equator and east-west adjacent to the equatorial zones—were quite lively. Many country-to-country firsts resulted. The only other notable openings were one or two brief sporadic-E openings on 6 meters. Thanks to N1RZ, WB2AMU, WB2EZG, WA4LOX, W5UWB, K5SW, W8RU, K9AKS, G4UPS and XE2EED for their contributions, not otherwise mentioned in the summaries. Dates and times are in UTC, as is the usual custom.

Al Ward, W5LUA, stands next to the 3-meter dish he used to listen for 24 GHz echoes off the Moon from his home outside Dallas, Texas.

Severe Geomagnetic Storm

The sun had been unusually active during much of March, as marked by elevated solar flux, sunspot numbers and geomagnetic indices. Had this activity occurred in November or December, 6 meters would have probably been open for hours of transcontinental DX, even at high-northern latitudes. The solar flux exceeded 200 from March 24 to the end of the month and peaked at 274 on the 28th. The sunspot number peaked the same day at 352, the highest yet for Cycle 23.

Late in the month, sunspot group 9393, the largest seen in over a decade, crossed the solar disk. Coincidentally, a series of massive solar X-ray flares reaching X20 levels erupted as well, making them among the most intense ever observed. Finally, a massive coronal mass ejection hurled huge quantities of high-energy protons and electrons toward the Earth at the end of the month. During the early hours of March 31 UTC, the solar shock wave struck the Earth's magnetic field, triggering an extraordinarily severe geomagnetic storm.

The planetary K index jumped from 3 at 2100 March 30 to 6 at 0000 March 31, then in successive three-hour reporting periods the K index registered 8, 9, 6, 7, 7, 8 and 6. This was sufficient to induce massive auroral displays that were seen as far south as Los Angeles, southern New Mexico and Texas. News media reported the aurora was seen in Mexico as well. The effects on the VHF bands were equally impressive.

Aurora and Auroral E

There were several weak and short-lived aurora over March 4-5, 9-10, 19-20 and 21-22, prior to the big event on March 31. Only stations across the northern tier of states were able to make any use of the four earlier auroras. Those in the Northeast heard both the VE8BY and VE4VHF 6-meter beacons via auroral E after 0300 on March 5, but there was little additional activity on the band.

The aurora of March 31 made a sudden appearance soon after the change in the UTC day—late evening on the East Coast. Auroral 50- and 144-MHz signals spread rapidly across the country through the early morning hours, reaching as far south as Texas, New Mexico and Southern California. The most intense period seemed to occur in the early morning hours between 0400 and 1000 or so, when many of the southernmost contacts took place.

N7DB (CN85) in Oregon found WJ6T (DM05) in Southern California on 144 MHz around 0618, for example, for his best DX and most southerly contact of the session. K7ICW (DM26) in southern Nevada made a string of 6- and 2-meter aurora contacts to Washington, Oregon, Wyoming and Utah between 0615 and 0720. Mark Mandelkern, K5AM (DM62), worked north to Colorado from southern New Mexico on both bands. Andy Eddings, W4AME (EM75) in Tennessee was quite surprised to work KD5HPT (EM32) in Louisiana on 6 meters at 0649.

Perhaps the longest 2-meter contact of the session was K0GU (DN70) in Colorado to VE3AX (FN02) over a 2092-km path. Many operators reported signals were intense, but relatively few 222- and 432-MHz contacts made it into the reports. Contacts on these bands are not much more difficult than 144 MHz, and 10-W stations running single Yagi antennas have been successful as high as 432 MHz. Relatively few transcontinental 6-meter auroral-E contacts were reported either. Jon Jones, N0JK heard VE7DXG, KB7WW and N1RZ on both coasts around 0630, and K1TOL in Maine posted several VE7s.

Perhaps the most unusual aspect of this radio aurora was its duration. It lasted almost continuously from about 0130 to 2230 on March 31, during which the geomagnetic K index varied between 6 and 9, the maximum on the scale. It was quite unusual to make auroral contacts around noon, yet both 6 and 2 meters were as lively around 1700 as earlier in the morning and later in the afternoon, at least in the Northeast. The sustained nature of the geomagnetic disturbance was suggested by the high K index, which stood at 7 and 8 through midday local time.

Six Meters Worldwide

Much of the world within 30° or 40° of the geomagnetic Equator enjoyed extraordinary conditions on 50 MHz throughout March. Those in the southern tier of states had frequent openings to South America and across the Pacific to Australia and New Zealand. That left operators in much of the rest of the US and Canada struggling to make any intercontinental contacts. Here are the summaries.

The Americas

W4, 5 and 6 call-area operators worked PY, LU, CX, ZP and CE stations on many afternoons, often with strong signals. Bill Neylands, KF4EHP, was delighted to contact two LUs from Florida on the afternoon of March 18 with his home-brew 4-W transmitter and four-element quad antenna. George Clement, KF4ZKU, nabbed LU5VV on March 21 while running just 10 W into a three-element Yagi in northern Florida.

Veteran Al Olcott, K7ICW, found several LU, CX and CE stations during the month from his southern Nevada location. Bruce Sternstein, K2RTH/4 (EL95), also hooked up with South Americans on many afternoons. On March 11, signals from Argentina were quite loud, and Bruce heard European 48.250 video via skewed path toward Africa. He made an unusual contact with EH7KW via this skewed path and heard several other weak Europeans, including F5JKK.

Caribbean area stations also did well. Arnie Coro, CO2KK, found LU, CX and PY stations on the air most afternoons. K2KW, the operator of 6Y8A, made six LU contacts on March 2 during his brief stay in Jamaica. Julio Medina, WP4LNY, also worked the South Americans, Africans TR8XX, TR8KPJ and 3C5I, along with ZD8CSA (Ascension Island) in the south Atlantic and 3G0Z in the eastern Pacific.

Stations a bit farther south did even better. Reports from V29JKV (W6JKV operating) on Antigua are incomplete, but Jimmy worked into the Mediterranean as far as 4X1RF and west across the Pacific to YB Indonesia. YV1DIG also made contact with YB5QZ and VU2ZAP (India) on March 6. PY0FF and several other Brazilians logged VU2ZAP on the 26th. PY0FM (Fernando de Noronha) worked I, 9H, LZ, 5B and 4X among his March contacts. Several PY, LU, CX and CE stations also worked throughout the Mediterranean basin, including EH, I, 9H, SV, 5B, 4X and JY.

Easter Island and Juan Fernandez

Three expeditions to Easter Island (3G0Y and CE0Y/W7XU) and Juan Fernandez Islands (3G0Z) enlivened activity for operators in much of the rest of the world. Collectively, these stations worked widely throughout the US, South America, Europe, the Middle East, India and the western Pacific. They just happened to be in a favorable geographic location at a perfect time of year, fortuitously aided by the extraordinary solar activity.

A joint German-Chilean team operated 3G0Y on Easter Island from March 4 to 19. This was primarily an HF operation, but the team brought a five-element 6-meter Yagi and could put one of the IC-736 rigs on the air. The planning paid off, as 3G0Y made 251 contacts on 6 meters, including about a dozen US stations in Oklahoma, Texas, New Mexico, Arizona and Washington. The 3G0Y operators reported they were running only 2 W for some of these contacts.

N6CA, N6XQ and XE2EED operated 3G0Z from Robinson Crusoe Island March 27 through April 2. They put up a temporary Zepp antenna for 6 and 10 meters upon landing, and almost immediately heard 9H, SV and I stations on 50 MHz. 9H1CG was the first station in the log. The six-element Yagi went up at the hotel the next day, and the team put resident CE0ZIS on 6 meters with a IC-551 and five-element Yagi they planned to leave behind.

The two stations operated simultaneously. CE0ZIS concentrated on Europe on 50.200 MHz, while 3G0Z stayed around 50.106 MHz, mainly to look for Americans. Collectively, the pair logged more than 30 countries, including such catches as 5B, OD, 4X and JY in the Middle East. Most of the US contacts were in the 6 and 7 call areas, but there was good representation from W4, 5, 9, 0. K1TOL eked out a marginal contact with 3G0Z in the midst of a W6 and W7 run, the only station in the Northeast to make it. VE3AX, VE6TA and VE7XF were the lone Canadians in the 3G0Z log.

W7XU and N0QJM arrived on Easter Island March 29 and planned to stay through the first week of April. Early reports indicate that they too had superb conditions. CE0Y/W7XU worked into southern Europe, found VU2ZAP and other Indian stations with incredibly strong signals on several days and logged US stations from coast to coast. Further details follow in next month's column.

Europe

Europeans, especially those throughout the Mediterranean area, continued to enjoy excellent conditions to South America, Africa, the Indian Ocean and East Asia. In addition to contacts mentioned already, notable European catches included ZD7VP (St Helena), C56/DL7CM (Gambia), TN2FB (Congo), 5U2K (Niger), 9J2BO, FR1AN, S79MX (Seychelles) and D68C (Comoros). 3A2HB also worked South Africa, as Monaco just recently granted permission for 6-meter operations.

East Asia

JA1VOK reported that Japanese operators had several opportunities to work South America and to make long-path contacts into southern Europe after 2330. JAs also logged V63KX (Micronesia), 3D2AG/p (Rotuma), XV3JAA (Cambodia) and Z22JE (Zimbabwe). JS6CDB and others on Okinawa worked ET3VSC, for the first Japan-Ethiopia contacts on 6 meters.

VR2XMT and VR2LC led the keen

144-MHz Standings

Published 144-MHz standings include call-area leaders as of April 1. For a complete listing, check the Standings Boxes on the World Above 50 MHz Web pages at **www.arrl.org/qst/worldabove/**. To insure that the Standings Boxes reflect current activity, submit reports at least every two years by e-mail to **standings@arrl.org**. Printed forms are available by sending a request with SASE to Standings, ARRL, 225 Main St, Newington, CT 06111.

Call Sign	State	States	DXCC	Grids	Best DX (km)†
AF1T*	NH	50	28	—	2240
K1CA*	NH	50	104	—	—
K1MS*	MA	50	32	—	—
W1AIM*	VT	50	18	195	2276
K1UHF*	CT	45	22	232	2583
K1SIX*	NH	43	14	201	2501
WA1JOF*	ME	43	33	154	2534
K1TEO	CT	36	5	212	2265
W1REZ	ME	36	6	176	2491
W3EP/1	CT	36	3	173	2450
N1PM	MA	34	4	106	2380
W1LP	MA	30	5	110	—
K1AE	MA	29	3	—	2049
W1GHZ	MA	29	2	94	2363
N1RWY	ME	27	2	78	1947
WA1ECF	MA	26	4	88	2340
W2CNS*	NY	50	22	125	2367
N2WK*	NY	47	40	293	2298
K1NY	NY	37	4	151	2619
WB2CUT	NJ	37	2	149	—
K2OVS	NY	36	4	106	2812
WV2C	NY	33	4	138	2450
K1JT	NJ	30	3	85	2073
WB2VVV*	NJ	26	6	96	2080
W3HHN	NY	25	2	70	2024
K2KIB	NJ	21	2	45	1336
W2FCA	NY	21	2	59	1472
WA2ZFH	NY	21	3	47	2208
KI3W*	PA	50	61	337	2428
W3CMP*	PA	50	64	408	—
W3EME*	PA	50	26	151	—
WA2FGK	PA	40	25	187	—
AE3T	PA	37	3	—	2510
N3FA*	PA	37	17	122	2420
K3KEL	PA	35	2	123	2120
W3BO	PA	35	3	121	2200
WA3BZT*	DE	33	17	111	2418
WA3DMF	MD	32	4	55	2050
WA4LOX	FL	50	106	—	—
WA4MVI*	SC	50	44	—	2498
NB2T	FL	44	2	79	2270
K4MRW	AL	41	5	252	—
K4KAE	SC	40	6	194	2387
K4RF	GA	40	4	212	2147
W4DEX	NC	40	—	—	—
KD9KP	TN	39	3	151	2180
N4CH	VA	39	6	196	2600
W4MOS	FL	39	9	—	—
W4WTA	GA	39	4	169	2413
K4ZOO	VA	37	4	185	2315
N4LGY	TN	37	3	145	2821
WA4HFN	TN	37	2	157	—
AA4H	TN	35	3	154	1949
WB5APD	GA	35	6	162	1825
KC4QWZ	TN	34	3	154	—
WB2QLP	FL	34	6	214	2050
W4EUH	GA	33	3	111	2175
KU4WW	AL	31	1	117	2968
W4KXY	GA	28	2	101	—
KG4BMH	TN	23	2	77	1736
AD4DG	VA	22	2	49	1379
K5CM*	OK	50	—	—	—
N5KW	OK	50	—	—	—
W5LBT*	LA	50	130	325	—
W5LUA*	TX	50	—	—	—
W5RCI*	MS	50	23	272	2150
W5UWB*	TX	50	29	104	2197
W5ZN*	AR	50	37	305	2850
K5SW	OK	47	5	287	2269
W5HUQ*	AR	41	11	150	2735
WA5JCI	TX	36	5	188	—
AA5C	TX	34	2	174	2202
K5TN	OK	32	1	128	2025
WA5IYX	TX	32	2	110	2243
N5HYV	LA	28	1	105	—
WA5TKU	TX	27	—	80	—
W5OZI	TX	24	2	138	2268
K6AAW*	CA	50	46	301	3831
WA6PEV*	CA	50	52	—	—
K6PF*	CA	34	21	—	—
KV6J*	HI	26	16	84	400
K6QXY*	CA	23	8	—	3794
N6ZE*	CA	22	16	104	2600
N6YM	CA	21	4	142	3822
W7CS*	AZ	50	90	410	3776
W7HAH*	MT	50	90	501	—
W7RV*	AZ	50	29	257	2937
KL7X*	AK	49	36	169	—
WA7KYM*	WY	49	29	233	2359
AA7A*	AZ	48	47	387	2983
N7EIJ*	ID	39	25	194	2399
WA7GSK	ID	29	2	182	3032
NJ7A	UT	24	3	138	2104
K8BHZ*	MI	50	45	362	2278
W8PAT*	OH	50	34	123	1758
WA8WZG*	OH	46	21	196	2235
KE8FD	OH	41	5	249	2275
K8MD	MI	40	3	194	1362
WA8EOJ	OH	39	3	199	2198
K2YAZ	MI	38	2	162	2070
N8KOL	OH	38	2	150	2035
KB8O	MI	36	1	171	—
W8QXO	OH	36	1	—	2092
WA8NPX	OH	36	3	150	2103
W8WVM*	WV	35	29	86	1560
WA8LKD	MI	35	2	123	1961
WB8XX	OH	32	2	117	1759
N8NQS	MI	31	2	129	2042
N8VEA	OH	29	2	102	2223
N0AKC*	WI	49	21	222	2350
W9UD	IL	47	3	204	2000
KA9CFD	IL	45	4	220	2819
W9EME*	WI	44	18	—	2500
W9JN	WI	43	5	221	2261
W0UC	WI	41	2	185	2192
N9NJY	IL	38	3	105	2100
WA9PWP	WI	30	2	133	1940
K9YR	IL	29	2	110	1715
WC9C	IN	23	2	58	—
N9HF	WI	22	2	—	—
N9ISN	WI	20	2	92	2021
K0FF*	MO	50	34	267	2185
W0HP*	MN	50	84	—	—
W0LD*	CO	50	—	156	2378
K0PW*	MN	49	39	325	2362
W7XU/0	SD	48	2	243	2180
N0LL	KS	47	3	377	2378
K0SQ	MN	46	3	240	2804
N0QJM	SD	46	2	195	2180
W0GHZ	MN	46	2	167	2570
N0HJZ	MN	45	2	235	2500
W0OHU	MN	45	2	165	2040
K0CJ	MN	44	2	—	2330
KW0A	MO	44	2	239	2300
W0FY	MO	44	—	214	—
W0VD*	MO	44	26	263	—
KM0T	IA	43	2	135	2308
K0GU*	CO	42	37	278	2400
W0JRP	MO	42	3	214	2340
KD0PY	IA	41	2	206	2174
N0KQY	KS	41	2	187	2310
N0NZ	NE	39	2	153	2224
N0UK*	MN	38	2	152	2053
W0ZQ	MN	38	2	180	2610
K0AWU	MN	34	2	92	2095
KA0PQW	MN	34	2	—	2122
K0VSV	IA	33	2	149	1835
N0DQS	IA	33	1	120	2048
WY0V	IA	33	2	119	—
WA2HFI/0	MN	30	2	123	2057
K0RZ*	CO	26	2	108	2390
KR0I	MO	25	2	85	1595
VE1ALQ*	NB	50	68	228	—
VE3KH*	ON	50	52	300	1985
VE3AX*	ON	48	33	—	2225
VE6TA*	AB	42	25	170	2425
VE3FKX*	ON	41	7	—	—
VE3DSS*	ON	38	3	—	—
VE3TMG	ON	30	1	121	1973
VE3SXE	ON	27	2	90	—
VE9AA	NB	27	2	100	2500

*Includes EME contacts
†Terrestrial
–Not given

Hong Kong operators. VR2XMT logged ZP5HSB at 19,100 km, his longest QSO to date, among other South Americans. Like the Japanese, the Hong Kong operators made many of these contacts via the long path. BG7OH, just to the north of Hong Kong in Guangdong Province, caught ZP5YW for a new country. Other notable catches from Hong Kong during March included KH0/7N2KUH (Marianas), V63KZ, 3D2AG/p, P29BPL (Papua New Guinea), 9V1JA (Singapore), XV3AA, S79MX, FW5ZL (Wallis and Fortuna), VU2RM and VU2ZAP, A45ZN (Oman) and A61AJ (United Arab Emirates). That was quite a haul for one month!

Other notable contacts across the western Pacific and East Asia included YB0CBI (Indonesia) to HZ1MD (Saudi Arabia); DU1EV to WH0/W6STT and A45ZN; VU2ZAP to V73AT (new countries for both, of course) and A61AJ; H40RW (Solomon Islands) to V7 and JA; VK3OT to JY9NX and VK6RO to UK9AA (Uzbekistan). 5B4AGM and undoubtedly other Mediterranean and Middle Eastern operators worked India, Japan and Hong Kong as well.

VHF/UHF/MICROWAVE NEWS

Canadian VHF, UHF and Microwave Meeting

The Toronto VHF Society has announced its premier conference, scheduled for the evening of Saturday, June 16, at Humber College in Etobicoke, Ontario. Activities begin with a social hour at 5 PM, followed by a buffet supper and technical talks. For details, contact Bob Morton (VE3BFM) at 705-435-0689 or **ve3bfm@rac.ca**.

Foot and Mouth Disease Causes Cancellations of Amateur Activities in Europe

The tragic spread of Foot and Mouth Disease (FMD) throughout much of Europe and other places around the world has been a major economic and social setback. The disease spreads easily among cloven-hoofed animals through the air or direct contact with other animals and humans, and also indirectly from infected material (dung, urine) picked up by people, vehicles, equipment, dogs, scavenging animals and vermin.

Coming on the heels of the Mad Cow disease scare, it seems that cows have had their share of bad luck. Over two million cows and sheep have been slaughtered in Great Britain alone. Now hams in Europe are also feeling the effects of FMD. In Great Britain and Ireland amateurs are being urged to support the farming communities by staying out of the field and limiting remote operations to urban places or rural places that have been deemed safe by the respective government(s). The Radio Society of Great Britain (RSGB) has cancelled the portable sections of all its contests as well as Amateur Radio direction finding events, rallies, and maintenance visits to remote repeater, beacon and packet sites. These rules will remain in effect until the outbreak has been controlled. More information can be found on the Web at **www.maff.gov.uk/animalh/diseases/fmd/**.

Australia and the United Kingdom Announce New Information on Internet Repeater Linking

Australian amateurs received the green light from the Australian Communications Authority (ACA) to link repeaters via the Internet. After successful demonstrations of the process during Australia Day celebrations, the Wireless Institute of Australia asked the ACA for permanent rules allowing Internet repeater linking for both voice and data communications. The ACA granted WIA's request with several requirements including nonaccessibility by nonamateurs (software controls over the connection preclude access to nonamateurs, thereby creating a *de-facto* private line), not extending the access privileges of any amateur in Australia or elsewhere and not violating third party traffic rules or agreements with other countries.

In Great Britain, the RSGB announced that it has reached agreement with the Radiocommunications Agency on several additional channels within the 70-cm band where simplex Internet voice links may be licensed, and first-time availability of channels on 2 meters for the same purpose. More information may be found at **www.dcc.rsgb.org**.

Briefs

♦ Radio Society of Great Britain President Don Beattie has changed his call sign from G3OZF to G3BJ. He recently learned that a deceased relative had held the pre-World War II call sign, so he applied to the Radiocommunications Agency to take it as his own. He commented that G3BJ is a much better call sign to send on CW than G3OZF!

♦ Well-known contester and DXpeditioner Radivoje "Rasa" Lazarevic, YU1RL, has been named to serve as Yugoslav ambassador to Brazil. The 39-year-old Lazarevic has operated many times from Brazil and Fernando de Noronha. He had been scheduled to participate in the World Radiosport Team Championship 2000 in Slovenia, but had to cancel because it conflicted with his political party's congress (he is a founding member and vice president of New Democracy, a pro-European party).

♦ The Trinidad and Tobago Amateur Radio Society (TTARS) responded to the request of one of its local television networks to assist in reporting election results back to the station. Noel Donawa, 9Y4NED, TTARS President, reported that the amateurs successfully carried out their task with good signals from all areas of the country. One of the problems they encountered included election reporting forms that required too much information to be recorded and reported in a timely fashion back to the station. The length of the reports resulted in "pile-ups" of reports on the receiving end. More information on TTARS and its activities can be found at **users.carib-link.net/~ttars/**.

♦ Amateur Radio is alive and well in Thailand as evidenced by the number of call signs issued there. Thailand had run out of available HS1 call signs (metro Bangkok) and was assigned the prefix block E2 from the ITU to help the supply. E21 and E20 prefixes were used in the Bangkok area until those recently ran out and the government is now issuing E22, E23, E24, E25, and E26 call signs to amateurs there. New licensees in the other eight districts of Thailand are receiving the remainder of the HS block and will then share the E27, E28, and E29 prefixes. HS2 area hams are already receiving E27 calls. *Tnx K3ZO/HS0ZAR*.

♦ In 2000, the 75th year of the International Amateur Radio Union, the origin of the IARU's Worked All Continents award was revisited. With tens of thousands of WACs on shack walls around the world, the WAC has proven to be a very popular and attainable award. In 1926 when the award was created, working all continents was not something routinely achieved. Here is an excerpt from the April 1926 issue of *QST* that describes the new WAC Club:

"One of the most famous DX men in the country has proposed the formation of the W.A.C. Club—a club primarily international in its purpose and mode of operation; a club composed of brass pounding ether burners; an aggregation of key punchers collected from all parts of this old world. The Worked All Continents Club, hereafter known as the WAC Club, will serve to furnish some more adequate means of recognition for the gang of International DX hounds. The requirements for membership are few and brief. To become a member the applicant must have carried on two-way communication with at least one station in all six of the continents…Merely send in the QSL card from these [contacts]. The cards will be returned together with the Official WAC certificate endorsed by the Grand High Wacker himself. Until the WAC members get as thick as hen's teeth, the list of members of the club will appear in the I.A.R.U. News section each month. Hop to it gang." QST

OP-ED

Antenna Aesthetics

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In the February 2001 *QST*, an interesting article described techniques to visualize antenna installations prior to erecting them. Reading this caused me to consider issues of appearance and aesthetics. Much has been written to technically justify installing antennas as high as possible, choosing the highest gain available and maximizing performance, especially with the monster HF antennas used by DXers. But how do we address the appearance of antennas to someone not familiar with Amateur Radio?

There can be no question that CC&Rs often severely restrict antennas (if the antennas are permitted at all). Yet we have all seen antenna installations that are messy, present a poor image and only serve to raise the temperature of angry neighborhood association members. I, for one, would not look forward to living next door to someone with a junky-looking collection of antennas.

Of course, what offends one person may be beauty to another.

Most people do not understand the connection between efficient antennas and successful, enjoyable communication (and many couldn't care less). Our nonham neighbors can't easily put into words what they *don't* like about antennas, but they certainly can tell us when they are angry and unhappy with what we have erected!

There is fundamentally nothing wrong with trying to create a home environment that both our neighbors and we can enjoy and be proud of. Most people want to have some degree of control over the future of the homes they worked so hard to acquire. All the more reason to educate our homeowners' associations and community planners. But education alone may not be enough.

So I am raising the issue of keeping our antenna plans within reasonable bounds. There are several reasons why neighborhood associations, developers, and city planners may think our beloved antennas don't belong in residential communities:

✔ They fear that property values will nosedive and homes will become difficult to sell as the subdivision disintegrates. This, of course, is the major objection.

✔ To many, antennas are ugly.

✔ Antennas emit radio-frequency energy, which some believe is a potential health hazard.

✔ They may be afraid of antennas crashing into their homes in the middle of a big storm.

✔ They may be concerned about interference to their TVs, radios, telephones, home alarm systems, etc.

✔ In the opinion of most nonhams, large antenna farms don't enhance the visual tranquility many expect from their home settings.

Get the picture? Why would anyone ever want to live next door to an active amateur?

However, there may be room for compromise. Here are a few suggestions to constructively address or at least mitigate some of our neighbors' concerns:

✔ Be realistic in terms of height. Don't plan a 100-foot tower in a treeless residential neighborhood full of small lots.

✔ Accept greater challenges by not insisting on having the optimum set of antennas. If QRPers can enjoy radio communication with less power, we can certainly get by with modest antennas.

✔ Use good judgment when calculating the number of antennas you feel you need. Use multiband antennas where feasible.

✔ Make sure your antenna appears sound and solid.

✔ Consider wire antennas. They're much less visible than aluminum tubing.

✔ Keep antennas away from the sides of narrow lots whenever possible

✔ Plan antenna installations around building and lot features, especially the upper part of houses, trees or the back yard.

✔ Convince your neighbors that, although you like using radios, you are also interested in neighborhood tranquility and will willingly make compromises. Always have a "plan B" in your back pocket.

✔ Don't surprise people with antenna or tower installations. Instead, consider ways to help neighbors visualize what you are planning to install before beginning work.

✔ Consider doing a trial antenna installation. Temporarily put up an antenna for a long weekend and do a contest. Share the results with your neighbors.

The average ham doesn't like to give offense to their neighbors. Most hams are responsible, community-spirited, and hardworking citizens. When thinking of antennas, consider a modest type such as a dipole or other wire antenna. If you feel that you need a tower, see if you can be happy with a 40 to 50 footer.

When developers and city planners consider antenna restrictions, they may have in mind the far end of the spectrum; that is, the amateur who wants to have the most gain, the highest tower and the most elements. Developers and planners feel the public expects them to control and regulate antenna installations, keep property values up and maintain beautiful neighborhoods.

Become involved early—rather than whine after the fact. Consider how you can minimize objections about how antennas look by rethinking your next antenna project.

QST Op-Ed Policy

The purpose of Op-Ed is to air member viewpoints that may or may not be consistent with current ARRL policy.

1) Contributions may be up to two-thirds of a *QST* page in length (approximately 900 words).

2) No payment will be made to contributors.

3) Any factual assertions must be supported by references, which do not necessarily have to be included in the body of the article to be published.

4) Articles containing statements that could be construed as libel or slander will not be accepted.

5) The subject matter chosen must be of general interest to radio amateurs, and must be discussed in a way that will be understandable to a significant portion of the membership.

6) With the exception that the article need not be consistent with League policy, the article will be subject to the usual editorial review prior to acceptance.

7) No guarantee can be made that an accepted article will be published by a certain date, or indeed, that it will be published at all; however, only articles that we intend to publish will be accepted, and any article we have decided against publishing will be returned promptly.

8) Send your contributions to ARRL Op-Ed, 225 Main St, Newington, CT 06111. QST

Multilateral Reciprocal Agreements: CEPT and IARP

The ARRL Regulatory Information Branch receives many calls and e-mail messages from amateurs visiting exotic locales, and naturally they like to operate their Amateur Radio stations. ARRL has information that can help make the most of your trip. Amateurs traveling outside the US are not under FCC jurisdiction (except US citizens and US amateurs operating on boats of US registry in international waters). They are under the communications jurisdiction of the foreign government and must carry the proper documentation. The three types of reciprocal operating authority are: (1) a CEPT license, (2) an IARP and (3) a reciprocal permit from a country which does not participate in either of these two multilateral agreements. Bilateral agreements will be discussed in a future column. Always follow all of the communications rules of the country visited.

What is CEPT and how does it affect me?

Under CEPT (a French acronym for European Conference of Postal and Telecommunications Administrations) Recommendation T/R 61-01, amateurs can obtain documentation from their licensing authority for "short visits" to a "CEPT member" country or countries that have implemented this CEPT Recommendation without obtaining an individual reciprocal permit. US amateurs and citizens can operate in CEPT member countries by carrying:

- A valid FCC issued amateur license
- Proof of their US citizenship, like a passport, visa or a birth certificate
- A copy of the FCC's CEPT Public Notice

Identify using the appropriate ITU designator for the country separated by a fraction bar and followed by the home call of the amateur. On request, the license holder shall present the CEPT documentation to the appropriate authorities in the country visited. Only mobile and portable operation (including operation from the station of a permanent license holder) is permitted. There is no protection from harmful interference, and operation aboard aircraft is not allowed.

Which countries are CEPT member countries and what operating privileges do I have when there?

Currently, 34 European countries have implemented the Recommendation. A US amateur traveling to England must carry all three documents and identify as, say, M/N4QX, with M being the CEPT authorized prefix for that country. As an Amateur Extra, he has access to all amateur privileges in that country *but they may not exceed the privileges authorized in that ITU Region.* Amateurs outside ITU Region 2 have access only to 7.0-7.1 MHz. Amateurs can find information on CEPT on *ARRLWeb* at **www.arrl.org/FandES/field/regulations/io/#us**. Amateurs can see a detailed list of CEPT member countries by visiting the European Radiocommunications Office Web site at **www.ero.dk** and clicking "ERC-WG Activities," then "WGRR" and then on the "Special Area on Radio Amateurs." Information on the type of operating privileges the visiting amateur's license equates to in the country visited can be found by clicking "Documentation" then "ERO Recommendation." Scroll to "T/R 61-01." A Technician Plus, General, Advanced and Amateur Extra class amateur has CEPT Class 1 privileges and a US Technician class amateur (who has not passed the 5 WPM exam) has CEPT Class 2 privileges. Amateurs who have not demonstrated proficiency in Morse code may not operate below 30 MHz.

It is important to note that an amateur from a "non-CEPT" (a country outside Europe) participating country like the US may not operate in another "non-CEPT" country unless the two countries have made a special arrangement. "Non-CEPT" countries that have implemented the Recommendation include Canada, Israel, the Netherlands Antilles, New Zealand, Peru, South Africa and the USA.

What is an IARP?

An IARP is an International Amateur Radio Permit issued only to amateurs who are citizens and licensees of a country that is a signatory to the Inter-American Telecommunication Commission (CITEL), which authorizes IARP participation. It allows visiting amateurs to operate their stations temporarily for short visits in certain countries of the Americas. *An IARP is separate from a CEPT license. CEPT applies to amateurs visiting most European countries and an IARP applies to amateurs visiting certain countries in the Americas.* An IARP is issued by the national Amateur Radio society in the amateur's home country; for US amateurs, it's ARRL. IARPs are issued for one-year terms, or until the amateur license expires, whichever comes first. A new IARP can be obtained. It also contains the verbiage from the FCC CEPT Public Notice.

What privileges do I have when operating under an IARP and what ID procedure do I use?

As with a CEPT license, there are two classes of IARPs. A Class 1 IARP requires knowledge and proficiency in Morse code and is issued only to Technician Plus and higher class US amateurs. It carries *all* operating privileges. A Class 2 IARP is issued to amateurs with a codeless Technician license and provides all privileges above 30 MHz. When operating under IARP, an indicator consisting of the appropriate letter-numeral designating the station location must be included *before the call sign*.

How can an amateur obtain an IARP?

US amateurs must complete and send to ARRL HQ along with a photocopy of the applicant's amateur license, a copy of a legal photo-ID, a 1 inch × 1 inch (up to 1.5 × 1.5 inch) photo of the applicant (to be affixed to credentials), and the application fee (payable by check or money order to "ARRL," or by credit card). The application can be found at **www.arrl.org/field/regulations/io/index.html#iarp**, or by sending an SASE to ARRL HQ. The fee is $10 ($20 for rush delivery). Non-US citizens and amateurs must obtain an IARP from the national Amateur Radio society of their country.

What countries are part of IARP?

The following countries recognize an IARP: Argentina, Brazil, Canada, Peru, Uruguay, USA and Venezuela. QST

John Hennessee, N1KB ♦ Regulatory Information Specialist

Amateur Satellites and Field Day 2001

While you're reveling in burnt hot dogs, sticky soda cups and the RF tsunami of terrestrial Field Day signals, don't forget the satellite bonus points that will be screaming over your head at regular intervals. You'll have several opportunities during the weekend to bag some enjoyable satellite contacts. It's just a matter of knowing when the birds are coming and having the right equipment to reach them.

Predicting satellite passes is the easy part these days. You can jump on the Web and go to **www.heavens-above.com** to grab 24-hour pass predictions for all amateur satellites. Print the results before you dash off to your Field Day site and you're done. The other alternative is to take a laptop computer to your Field Day station and run satellite-tracking software to generate the predictions on the spot. You'll find a ton of satellite software on the AMSAT-NA Web site at **www.amsat.org**. They may not be free, but if you cough up the cash you'll have a program you can use to your heart's content and, by supporting AMSAT, you'll have done your good deed for the day.

RS-13

This venerable Russian satellite can be an SSB or CW Field Day workhorse. The satellite uses a *linear transponder*, which means that it repeats many signals at the same time across a specific *passband*.

When this column went to press, RS-13 was listening on 2 meters and 15 meters and repeating (downlinking) on 10 meters (see Table 1). If you want to uplink to RS-13 on 2 meters, I'd recommend a Yagi antenna. If you can only put up an omni antenna for 2 meters (such as a **J**-pole), you can still reach RS-13, but not as reliably. If you're omni-bound, I recommend using CW. You'll stand a better chance of being heard with CW than you will with SSB.

Speaking of antennas, wire dipoles are adequate for listening to RS-13's 10-meter downlink. Wire dipoles will also do a fair job of hitting the satellite on the 15-meter uplink.

The problem with RS-13 on Field Day involves the 15-meter uplink. If this uplink is active, the bird may be swamped with terrestrial SSB signals, particularly during the daylight hours. If this is the case, try working RS-13 at night.

RS-15

The RS-15 satellite is another Russian linear transponder bird like RS-13. The difference is that RS-15 listens for CW and SSB signals on 2 meters *only* and repeats on 10 meters. The satellite's power systems are only partially operational, so the signal from RS-15 is often weak. My suggestion would be to try CW with this bird.

UoSAT-14 and AMRAD-OSCAR 27

These two satellites are the ever-popular orbiting FM repeaters. If you have access to a dual-band (2-meter/70-centimeter) FM transceiver and a compact satellite antenna such as the Arrow (get on the Web and go to **hometown.aol.com/Arrow146/index.html**), you should be able to use either satellite to grab your Field Day bonus.

Well, at least that's how it *should* work.

Truth is, both UO-14 and AO-27 are utterly jammed on Field Day. Just imagine a terrestrial FM repeater with several stations attempting to talk simultaneously—even though the repeater can only handle one signal at a time. Now elevate that repeater to about 800 km above the planet where it can "see" *hundreds* of stations at once. Get the picture?

The politically correct thing for me to do is wag my finger at you and say, "You must not use more than 5 W on the 2-meter uplinks to these satellites. If we all play nicely and keep our power levels low, everyone will have a chance."

That's a fine ideal, but here is the painful reality: Victory on the FM birds during Field Day is a matter of survival of the loudest. The stations that will achieve consistent success will usually be the ones running 100 W or more and using sizable multielement Yagis. If you must run high power to capture a spot in the FM mob scene, at least be considerate. Once you've made a valid contact, *get off*. Don't attempt to monopolize the birds throughout their 15-minute passes.

Fuji-OSCARs 20 and 29

These two satellites are often neglected on Field Day because not everyone has access to 2-meter and 70-centimeter all-mode radios. The Fuji CW/SSB birds are outstanding resources just the same. They orbit at somewhat higher altitudes than RS-13 or the FM satellites, so you have a little more time to communicate during each pass, and greater range as well. The Fuji OSCARs listen on 2 meters and repeat on 70 centimeters. They use *inverting* linear transponders, which means that they repeat a reverse mirror image of what they hear on their uplinks. In other words, if you transmit on LSB, your signal will be repeated as USB. If you transmit in the *lower* portion of the uplink passband, your signal will appear in the *upper* portion of the downlink passband.

OSCAR 10

OSCAR 10 is our only *currently active* satellite that is capable of providing DX contacts over a wide area of the globe. It is a crippled bird that has a tendency to be unpredictable. Generally speaking, operating activities like Field Day are discouraged on OSCAR 10. Too many signals will overburden its anemic power systems. Besides, when OSCAR 10 is at maximum altitude, you'll need 100 W on 70 cm to at least an 11-element Yagi antenna to be heard. A long-boom Yagi and a receive preamplifier will be necessary to hear OSCAR 10's downlink on 2 meters.

What About AO-40?

Don't count on OSCAR 40 for Field Day. As this issue went to press, the controllers were still in the process of recovering AO-40 and figuring out what systems are still operational. Even if the SuperSat were available, the general opinion seems to be that it should not be used for operating events and contests. QST

Table 1
Field Day Satellite Frequencies

Satellite	*Uplink (MHz)*	*Downlink (MHz)*
RS-13	21.260—21.300 145.910—145.950	29.410—29.450
RS-15	145.858—145.898	29.354—29.394
UO-14	145.975	435.070
AO-27	145.850	436.795
FO-20	145.900—146.000	435.800—435.900
FO-29	145.900—146.000	435.800—435.900

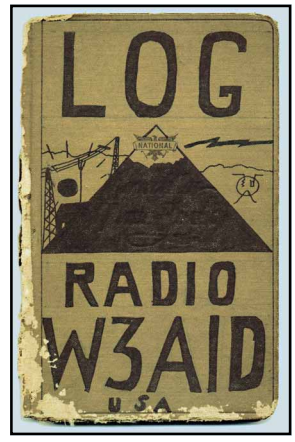
Steve Ford, WB8IMY ♦ QST Editor

Collecting History: Logbooks and *Callbooks*

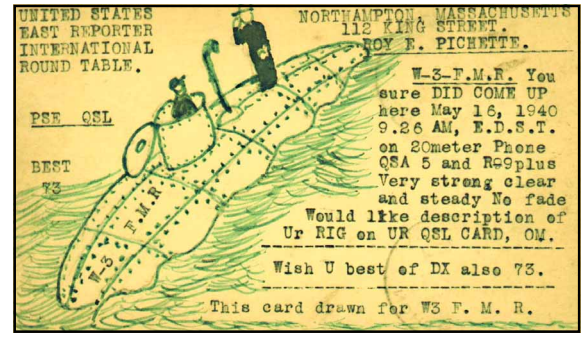
Old logbooks contain information about ham radio of the past. Many of these old logs have been lost, but some show up every so often. I have a small collection of station logs and find them fascinating. Many contain notes by the station operator, effectively creating a diary of early equipment and interests.

Old *Callbooks* contain the names and addresses of amateurs throughout the country. Using them in conjunction with logbooks increases your understanding of their activities and friendships. Sometimes you feel like you were there, operating those great rigs of the past.

Recently my friend Ray Chase, KA2JQG, purchased a quantity of antique Amateur Radio gear discovered in an attic in Trenton, New Jersey. The collection originally made up the station of William Burroughs Jr, W3AID, and included some nice early homebrew and commercially made radios, station accessories, magazines and books. He also found Burroughs' early logbooks and passed them on to me.



The station log of William Burroughs Jr, W3AID.



W3AID received this hand-drawn QSL card that depicted submarine activity—a subject on the minds of many as war enveloped the world in 1940.

From W3AID's 1930 Logbook

Bill Burroughs Jr received his license and started operating on August 11, 1930. His first transmitter was a single WX-112 tube oscillator in a TNT circuit. A Pilot Wasp receiver rounded out his station. His first call was a CW test on 80 meters at 8:45 PM. He noted that the transmitter was running cool and everything appeared to be okay. The next evening he tested again, this time on phone with his friend "Clyde," W3EM, also of Trenton.

For the rest of the month he contacted W3EM almost every night. On August 27 his power supply went bad and he substituted a 45-V battery. On the August 29 he was back on with a new power supply. Starting in September he worked stations in Pennsylvania, New York and Massachusetts.

On November 30 he noted that Robert Durrett, W2CEE, of Brooklyn "doesn't QSL, so that's that! GRRR!"

As he gained experience his station changed. January 1931 brought a new homebrew receiver to the shack, "Built A.C. Receiver, Screen-grid Detector 1 stage (227) impedance coupled audio F.B. all aluminum except doubler which is a copper box I constructed."

September's station included, "using TNT Oscillator using 201A. Antenna Hertz 134′ long end fed. W.E. Single Button 'Mike' 2-27 Speech Amp transformer coupled 2-71s in parallel as Modulators."

In January 1932 he noted, "Have rebuilt receiver. Now using 1 stage '24 untuned RF Shielded 1-'24 Det shielded."

In July 1932 his new transmitter was, "Built Tuned grid Tuned plate xmittr using '45 tube with about 250 V. Seems to be plenty of Soup in the outfit." At this point his log begins to indicate contacts with more distant states in the 1, 3, 4, 8 and 9 call areas.

The last two entries in this log were on January 26, 1934, "11:15 A.M. W2GGW, 5-8, 5-7. Had quite a QSO. Had to QRX a minute while guy was in insurance. 11:40 A.M. Signed off QRM heavy WX getting sunny and warmer." Even though there were many more empty pages, it ends here without explanation.

Ships and Coastal Stations Log

His other logbook chronicled his monitoring of ships at sea and coastal stations. It was started on December 20, 1937. Even though this is a SWL logbook, he indicated his call letters as W3AID, so I assume he was still active in ham radio. A typical entry read, "Call WTCH "Robert E. Lee" 600M, QSA 4-5, WX cool, 12:52A, Nice note."

On June 22, 1941 there is an interesting entry, "WCWM, name not listed, 600M, 5-8, WX hot, 4:00A, called WNW. Did not learn nature of distress at this time. While listening to this heard Germany declared War on Russia. Signed off at 4:34 A.M."

He continued listening almost every day until December 7, 1941 where he commented, "600M Listening with Clyde at 8:30. Nothing of Importance." Then he noted, "1st day of War."

On January 14, 1942 he reported the first of many war-related entries of "Sending SOS said ship torpedoed." On January 19 he reported another torpedoing.

January 29, "KUDQ 'Gulfwax' Reports SOS, 100 miles from Barnegat Light, being followed by low light heading 60 degrees true speed 12 knots."

April 4, "HPKT 'Halcyon' 34N20 59W16 being bombarded by Raider."

February 18, 1942 a sad entry, "KUTS 'Vacuum', SOS, being followed." Apparently the ship came under fire and the following comment was entered, "This was the 'Vacuum' and the op is my friend Paul Solomon, W3GRW." (I don't know if W3GRW survived the attack or not. There were no further entries about him.)

World War II

During WW-II many hams served as radio operators, both in the armed services and in the Merchant Marine. Many did not come home.

It is my assumption that W3AID was listening for SOS calls that might not be answered, so that he could assist in some way. His log, long forgotten in a dusty attic, is a personal testament of radio history. QST

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MARS Needs Women

The infamous B-grade science-fiction movie title notwithstanding, this column is about dedication, loyalty, reliability… just a few of the words used to describe the many YLs involved in public service with the ARRL Field Organization, SKYWARN and other groups. YLs are also very visible in ARES (Amateur Radio Emergency Service), especially when it involves providing communications at local events such as walkathons, marathons and bicycle rides.

One YL, Roni, N4ODI, is involved in MARS (Military Affiliate Radio System—you knew I had to sneak the title in somewhere!) and the YLISSB (Young Ladies International Single Sideband System)—organizations that many hams are not very familiar with.

Assumptions

I didn't think there were many YLs involved in MARS, and assumed that there were only women involved in YLISSB. I was wrong on both counts! I recently received an e-mail from a former newspaper colleague, Bill Sexton. After retiring 10 years ago, he was able to pursue an interest in Amateur Radio that went back to a favorite uncle who had been a Navy CW operator in World War I and a pioneer ham. Bill is now N1IN, and is very active in DX, emergency operations and MARS, working out of the Pittsfield, Massachusetts Emergency Management Agency. He hasn't lost any of his reporter's instincts and as AAA9PC (MARS publicity coordinator) writes news releases and participates in their activities. It was Bill who passed along the tip about Veronica Hicks, N4ODI. Veronica, or Roni as she likes to be called—a 60-year-old grandmother and very active MARS member in Luthersville, Georgia.

In Her Own Words

"My friends know me as Roni, and I was first licensed in 1986 as KB4SBZ and rapidly upgraded to Extra and received the call N4ODI, which I still hold. I joined the ARRL and ARES at that time. I also joined the YLISSB system. This is where my emergency operations experience began. I also belong to YLRL (Young Ladies Radio League) and just received my 15th year membership sticker.

"My husband was on disability for the last 15 years before he passed away in August of 1999 and after many years of being 'just a housewife and mother' I got a job at the 911 center in Coweta County, Georgia thanks to my ham radio experience. It was just part time, but they trained me to use computers and I became familiar with police, fire and medical terminology.

Roni Hicks, N4ODI

"Locally I help with the ARES nets and since tornados are no uncommon event in this state, SKYWARN is very active. My 911 operator experience helped. Another way I am getting training is through the ARRL Internet class on emergency communications that I am currently enrolled in.

"I became interested in MARS operations through a friend and joined them in 1991. We've been through tornados, hurricanes (Andrew in particular), flooding and MARS exercises. I'm glad to say I'm part of ARMY MARS and 'Proud, Professional and Ready.'"

As a MARS operator, Roni reported the Air National Guard crash near Unadilla, Georgia that killed 21 service members March 3. "She has an enviable record of participation in emergency and YL organizations," said Bill N1IN (AAA9PC). He said that same week MARS operators filed a record number of these reports, called EEI's (short for Essential Elements of Information), which included the earthquake in the state of Washington.

Alphabet Soup

It's easy to be confused about the many different emergency communications nets and organizations that hams participate in. The Military Affiliate Radio System (MARS) is sponsored by the Department of Defense. It was established as a separately managed and operated program by the Army, Navy-Marine Corps and Air Force. MARS members, who must be licensed hams, can operate on specially assigned military radio frequencies in SSB, SSTV and various digital modes of communications and use special call signs.

The Amateur Radio Emergency Service (ARES) is part of the ARRL Field Organization and is run by the local District Emergency Coordinator appointed by your ARRL Section Manager. SKYWARN is affiliated with the National Weather Service (NWS) and they run training programs where hams learn about weather and how to report it. There is also RACES (Radio Amateur Civil Emergency Service) which is usually coordinated with the Federal Emergency Management Agency (FEMA). And to further confuse you, the local ham in charge of ARES may also be a member of RACES and possibly schedule the SKYWARN training!

With all these choices, there is truly something for everyone in the alphabet soup of Amateur Radio public service and emergency communications! More information about the MARS program is available at **www.navymars.org**, and there are links for Army and Air Force MARS.

Each service has unique requirements, but all have a minimum age, class of license, equipment capable of going on MARS frequencies (2.0-30 MHz), minimum hours of participation and so on.

AWARD WINNERS

Congratulations to first place winners in the YLRL YL-OM contest last February: J43YL (SV3AGQ) Sitsa Tigaraki of Greece who came in first place SSB and Mary Popella, N3YL, of Tidioute, Pennsylvania who won first place CW. The top scorers are:

SSB

J43YL (SV3AGQ)	59,944 points (cup)
K0EPE	50,058
WA1ZZ	49,362
J37RO (K4UPS)	33,240
K5EY	27,104

CW

N3YL	16,896 points (cup)
WA9YPY	1,701
DF5ZV	712
DJ6US	561
KE4YBS	544

Diane P. Ortiz, K2DO ♦ PO Box 296, Bellport, NY 11713 ♦ k2do@arrl.org

ATLANTICON 2001

At the end of March, all eyes in the QRP community were focused on Atlanticon. The third annual QRP convention was held March 30, 31 and April 1, 2001, in Timonium, Maryland. George Heron, N2APB, and the New Jersey QRP Club put forth a Herculean effort to make this, the largest gathering of QRPers on the East Coast, a world-class event.

About 135 QRPers gathered at the Holiday Inn Select—Baltimore near the Timonium fairgrounds on Friday afternoon. A no-host dinner followed at about 5 PM at a local restaurant. The QRP Hospitality Hall was open for business by 7 PM. QRPers gathered to renew friendships, meet fellow QRPers, check out the latest QRP goodies for sale by vendors and engage in a QRP "Show 'n tell."

Saturday morning the stage was set for a series of forums. Atlanticon attracts some of the biggest names in the hobby as presenters. This year was no exception. Tony Fishpool, G4WIF and Graham Firth, G3MFJ, journeyed all the way from the UK to attend this year's event. Their lively and entertaining presentation on "Test Equipment (that doesn't cost a mint)" was timely and well received. The sudden upsurge of interest in PSK-31 is the biggest event in ham radio since the introduction of packet. *QST*'s Editor, Steve Ford, WB8IMY, presented an "Introduction to PSK-31" and how it has impacted the ham radio hobby. Chuck Adams, K7QO, entertained us with "Manhattan Building—Islands of Copper and Skyscrapers." His "hands-on" presentation detailed the history and current trends and techniques in home-brew construction. Joe Everhart's, N2CX, topic, "A Microvolt Signal Generator" show-

The Whitman Sampler Collection of John Cawthorne, KE3S, the 2nd place winner in the Open Competition of the building contest.

Marcus and Christine Gwillim, harmonics of Dave, KB2TQX, receive their Honorable Mention prizes for their Atlanticon Warbler Kit construction.

Chuck Adams, K7QO, and Jim Kortge, K8IQY, judge the entries (left and above).

Rich Arland, K7SZ ♦ 25 Amherst Ave, Wilkes Barre, PA 18702 ♦ k7sz@arrl.org

cased Joe's talents in designing and building simple test gear that is very useful in the construction and troubleshooting of home-brew equipment. In addition to being the MC, I spoke on the topic of operating QRP portable in the bush. The genius of Jim Kortge, K8IQY, was evident in his presentation, "The Genesis of the 4017 Transverter." Jim outlined the design process for his latest bicycle mobile dual-band rig. Next, Ron Polityka, WB3AAL, gave us insight into "Appalachian Trail Operating," with details on the Eastern Pennsylvania QRP Club's Appalachian Trail Awards Program. Finally, Dave Benson, NN1G, kept us focused on the PSK-31 topic with his presentation, "Taking the PSK-xx to Other Bands."

A special presentation was made by George Heron, N2APB to Dave Benson, NN1G, of Small Wonder Labs, for the "Most Outstanding Contribution to QRP." The plaque reads: "For innovative and pioneering design of simple, low-cost PSK-31 transceivers for the Amateur Radio community. Your dedication to the technology and contribution to the New Jersey QRP Club has been instrumental in bringing the PSK-31 communications mode to thousands of hams worldwide."

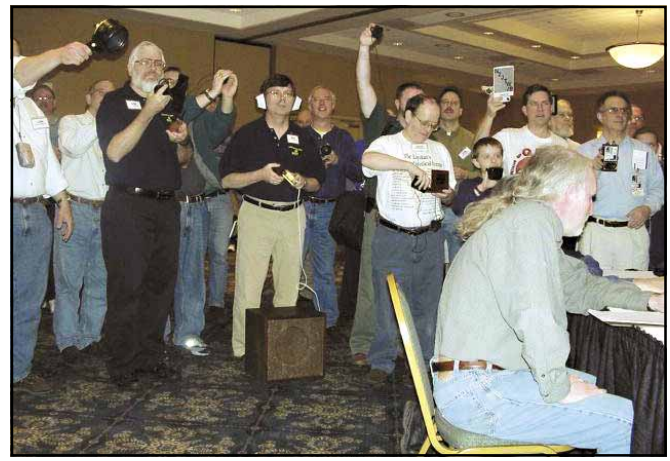
Saturday evening at the Hospitality Hall featured the judging of the building contest by Chuck, K7QO and Jim, K8IQY. I would not have wanted to trade places with either of these gentlemen, as the entries were outstanding examples of home-brew construction and the competition was intense. Winners of the Open Category building competition were: Larry Przyborowski, K3PEG, First Place, for his dazzling Manhattan-style construction of the 4017 Transverter, John Cawthorne, KE3S, Second Place, for his Whitman mint-tin sampler collection of circuits, and John Stratton, AA3SL (a high school student), Third Place, for his construction of a NorCal "BLT" Tuner kit. Who says we're not attracting young hams into our hobby?

Atlanticon attendees were presented with a PSK-31 tone generating kit prior to the event. This kit was the basis for this year's building competition. After the judging phase, competitors were assembled and the PSK-31 "audio warblers" were fired up in an attempt to show how the audio tones, with an embedded serial number, could be decoded with simple software on a laptop computer. After 15 minutes of "warbling," we were all ready for a break!

Beacon Contest winners were determined by a combined score of "construction quality" and "operating effectiveness." And the winners were: John Cawthorne, KE3S in First Place, and Mike Korejwo, Second Place. Honorable Mentions went to Christine (KB2TQX-A) and her brother, Marcus (KB2TQX-B) Gwillim, the harmonics of Dave Gwillim, KB2TQX. Both Christine and Marcus built a version of the Atlanticon PSK Beacon kit and they worked!

The evening concluded with a "pickin' 'n grinnin'" session featuring several well-known QRPers playing their banjos and guitars in an impromptu mini-country music festival. What a great time!

My thanks to George, N2APB, and the entire NJ QRP Club, who were instrumental in making Atlanticon 2001 an overwhelming success. The schedule was hectic but no one really noticed. All the attendees were caught up in the moment and the exchange of ideas was well worth the price of admission. If you missed it, there's always next year: Atlanticon 2002 is already in the planning phase. I hope to see you there. QST



The "Warbling Contest." All these QRPers have their audio warbler kits fired up and are trying to get a good copy on the computer screen. The winner, John Cawthorne, KE3S, is the QRPer with the ear protectors on—it was a very noisy event!

Let's see a show of hands. How many have operated PSK31 QRP?

VHF/UHF CENTURY CLUB AWARDS

Bill Moore, NC1L
Century Club Manager

The ARRL VUCC numbered certificate is awarded to amateurs who submit written confirmations for contacts with the minimum number of Maidenhead grid-square locators (indicated in *italics*) for each band listing. The numbers preceding the call signs indicate total grid squares claimed. The numbers following the call signs indicate the claimed endorsement levels. The totals shown are for credits given from February 10 to April 9, 2001.

The VUCC application form, field sheets and complete list of VHF Awards Managers can be found on the Web at **www.arrl.org/awards/vucc/**. Please send an SASE if you cannot download the forms online. If you have questions relating to VUCC, send an e-mail to **vucc@arrl.org**.

50 MHz
100

1110	KU4WD
1111	W4UFO
1112	N1GC
1113	YV1DIG
1114	KG5X
1115	K6HEW
1116	YV4YC
1117	KF6GYM
W2BZY	300
NQ2O	200
NJ2F	350
K3AX	475
W3EP	700
N3FA	150
W5RCI	385
W5CTV	200
N8II	250
N8AIA	300
KI8G	375
W8PAT	125
WM9M	125

144 MHz
100

592	KØPW
593	WA4HFN

222 MHz
50

W5RCI	100

432 MHz
50

289	NQ2O
290	WA4HFN
W5RCI	200

1296 MHz
25

K3AX	100
W5RCI	50

2.3 GHz
10

64	K1YV
K1TEO	20
W5RCI	15

3.4 GHz
5

K1TEO	10

10 GHz
5

108	K1TEO
WA1ECF	10

Satellite
100

99	W6ZQ
100	K5UIC
101	KE4AZN
102	W5ADC
K5OE	450
N5AFV	125
K9HF	225

QST

SILENT KEYS

It is with deep regret that we record the passing of these amateurs.

WA1IFN, Louis Constantine, East Freetown, MA
W1JOL, John P. Miller, Sarasota, FL
N1LSD, Roger A. Le Blanc, Lewiston, ME
KA1LZY, Hubert C. Cossett, Milford, CT
W1RAP, Gerard J. Rowen, North Andover, MA
W1YHQ, Robert E. Collins, Eastham, MA
ex-WA1YRW, Virginia B. Porter, Ottumwa, IA
N1ZZM, Thomas J. Lehmann, Hanson, MA
VE2AGF, Thomas M. Lott, San Mateo, CA
KC2DUX, William J. Schlosser, Olean, NY
WA2GGZ, William B. Fink, Saratoga Springs, NY
W2MIG, T. E. Berzin, Elizabeth, NJ
*KA2Q, Russell D. Smith, Diamond Point, NY
K2RAP, Joseph Di Filippi, New Monmouth, NJ
*KA2RCF, James L. Holmes, Holland Patent, NY
W2WSJ, Patrick M. Carretta, Verona, NJ
WB2ZOC, Gerald A. Martin, Caledonia, NY
W3GEF, Richard E. Hunt, Silver Spring, MD
W3GKU, John G. Obusek, Wilmington, DE
W3HTB, Melvin J. Keydash, Ocean City, MD
WB3IQP, Connie L. Schools, Baltimore, MD
KA3VCO, Joseph J. Bosak, Baltimore, MD
W3ZGW, Michael P. Roman, Northampton, PA
W4AH, T. C. Wood, Charlotte, NC
N4BFB, Ralph B. Ware, Fairhope, AL
W4BKP, Charles J. Menk, Waynesboro, VA
KU4C, Fred G. Ladd, Clearwater, FL
KI4DX, Omar E. Herndon, Macon, GA
W4EFR, Emmett F. Roberts, Pell City, AL
WD4ESP, John A. Colson, Charleston, SC
KO4FJ, Aubrey J. Douglas, Browder, KY
K4GM, Edgar D. Wipperman, Covington, KY
WA4GNA, David Richardson, Thomasville, AL
K4IWN, David H. Arens, Gardner, MA
N4IZ, Roy L. Balentine, Anniston, AL
KD4KNM, Mary T. Fernandez, Port St Lucie, FL
WB4LJU, James E. Scofield, Russellville, AL
WD4MOL, William R. Murrel, Fairhope, AL
WB4OER, Theo G. Vanlandingham, Collierville, TN
N4PBF, Richard Vahan, Miami, FL
WA4PGS, Robert J. Kates, Pinellas Park, FL
K4QKH, Archibald D. Owen, Charlottesville, VA
KE4SAA, Richard W. Kropat, Bushnell, FL
WB4SLL, Frederick J. Palmer, Webster, FL
KA4SWR, Larry Peterson, Birmingham, AL
WA4TYN, Charles W. Hoffman, Knoxville, TN
K4VRE, John M. Clark, Rutledge, TN
KA4WFX, Francis W. Augustine, Orangeburg, SC
K4WWQ, Harmon T. Sharp, Memphis, TN
KM5BF, H. W. Marshall, Las Cruces, NM
NB5B, Fred C. Minor, Harrie, TX
*WB5CYL, Charles J. Avery, Albuquerque, NM
WA5EXS, Keith Worrell, Greenwood, MS
K5HOK, Albert E. Brawley, Sun City Center, FL
*KA5IMT, Johnnie W. Strickland, Moselle, MS
W5KQG, Frances Bruemmer, San Antonio, TX
KC5KSR, Patricia Smith, Grants, NM
KM5MP, Melvin L. Moffitt, Farmington, NM
KB5UGY, John G. Garbarino, Las Vegas, NM
KA5ZHS, Lanny R. Mills, Port Lavaca, TX
N5ZW, Charles J. Grove, Las Cruces, NM
WA6AFS, Chester H. Beymer, Fresno, CA
WH6AF, Edmund O. Breatchel, Keaau, HI
KB6DSC, Betty B. Hogue, San Diego, CA
K6OJ, E. J. Real, Venice, CA
KC6PHD, Donald R. Smith, Phoenix, AZ
KE6QKQ, David A. Wood, Lower Lake, CA
W6QOS, Frederic J. Bertrand, Madera, CA
AC6TH, Robert A. Hartner, Clearlake Oaks, CA
W6TPO, Michael R. Evans, Rosemead, CA
KC6TXP, Paul Scanlon, Puyallup, WA
W6WET, Ralph N. Van Natta, Riverside, CA
KC6WYX, Jack R. Carter, Rancho Palos Verdes, CA
K6YT, Fred F. Canham, Los Altos, CA
AA7BR, August T. Karlson, Battle Ground, WA
KL7EGM, Donald J. Rollins, Shalimar, FL
KC7IE, Robert Mackie, Spokane, WA
W7JMT, George W. Cook, Scottsdale, AZ
W7JMW, Andrew V. Smith, Bellevue, WA
KF7KI, Robert E. Wenburg, Gig Harbor, WA
W7THB, Carl R. Suter, Hemet, CA
K8BIU, Joseph Maziarz, Avon, OH
W8DU, Edmond T. Mc Kenzie, Flushing, MI
WB8FER, Albert H. Morris, Ocala, FL
KB8MCS, Donald D. Kerr, Mingo Junction, OH
W8NMR, Nicholas M. Glaug, Amelia, OH
WD8PID, Clifford B. Miller, N Olmsted, OH
W8PWH, Angelo J. Ronci, Campbell, OH
*WB8RGI, David H. Hoebake, Willard, OH
WB8SCB, Robert A. Redmond, Cottonwood, AZ
KB8UDR, Earl Erickson, Plymouth, MI
*KB8VN, Ted R. Moneypenny, Canal Winchester, OH
WA9ADC, Francis J. Andrews, Washington, IL
KC9CO, Arnold Hokanson, Chicago, IL
WB9DFZ, Robert R. Tlachac, Nekoosa, WI
N9DMC, Harold A. Seltenright, Butler, IN
W9DOO, Staber W. Reese, Madison, WI
N9DVA, John E. Johnson, Elkhart, IN
KA9DZT, Kenneth C. Le Gros, Butler, WI
K9EJC, Donald J. Korous, Sun City, AZ
KJ9G, Woodrow O. Booher, New Castle, IN
WB9JEL, Kalevi T. Maenpaa, Dundee, IL
N9JOP, Charli W. Haltom, Crawfordsville, IN
W9JXZ, Daniel C. Borneman, Mapleton, IL
W9KKN, Dean F. Bunger, Rochester, IL
W9KRK, Edward O. Engebretsen, West Monroe, NY
W9KUR, Frank E. Zerwekh, Peoria, IL
W9MZ, William M. Mc Clintock, Orleans, IN
WA9OAY, William H. Kimble, Watertown, WI
W9QOQ, Robert L. King, Baraboo, WI
K9RUD, Robert G. Smith, Goodland, IN
*W9WM, William S. Moore, Ligonier, IN
KA9ZPX, Donald H. Moldenhauer, Pardeeville, WI
W9ZYR, Robert C. Gharis, Logansport, IN
KA0ATT, Basil R. Rowland, Menahga, MN
KC0CIZ, Vern R. Lee, St Paul Park, MN
K0CNV, Joe W. White, Arvada, CO
W0EJD, Bernard D. Miller, Spring Lake, MI
KC0FHB, Gary L. Kaldun, Inver Grove Heights, MN
W0HXV, Roy Hall, Minneapolis, MN
W0JY, Norval B. Davis, Littleton, CO
*KB0KD, David W. Bennett, Saint James, MO
KB0KYX, Donald E. Dailey, Great Bend, KS
N0ODL, Frederick Houseman, Cottage Grove, MN
W0QJY, George J. Skiadas, Crystal City, MO
WA0SIB, John E. Reichle, Manhattan, KS
WB0TAN, James L. Fuhlhage, Eureka, KS
W0TKV, Harold G. Smallfield, Elkton, SD
VE3DDR, Den Ratcliffe, Midland, ON, Canada
VE3KUL, Dennis Gough, Windsor, ON, Canada
*VE3TB, Douglas G. Hall, Guelph, ON, Canada
SP6XA, Tadeusz Matusiak, Wroclaw, Poland
SM6ANW, Sven Eklof, Molnlycke, Sweden
EA4AV, Javier Ledesma, Madrid, Spain

*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

NEW PRODUCTS

INTRODUCTION TO MICROCONTROLLER PROGRAMMING USING BASCOM

◊ Microcontrollers have taken command of a wide variety of consumer electronic devices and systems, but homebrewers and experimenters are often intimidated by the challenges encountered when attempting to program these tiny computers to do their bidding.

Jurij Mikeln, S52CQ, has authored a small book, *Introduction to Microcontroller Programming Using* BASCOM, which should be of great value to those who wish to add the power of processing to their own designs. The publication is primarily aimed towards developing a basic understanding of microprocessor programming for industrial automation and control, but the suitability of these devices for applications in ham projects is obvious. Many examples of simple control and data display tasks and detailed explanations of the programming steps used to achieve them are given.

BASCOM is a programming language that was first introduced in 1995. It is similar in many ways to *BASIC*. The software itself can be downloaded from pages linked to the author's company Web site.

BASCOM runs under *Windows 3.11*, *95* or *NT* and can be used to program a wide variety of microprocessors. A *BASCOM* Test Board, perfect for developing and testing your programming skills, and a tremendous selection of more advanced microcontroller boards is also available.

Introduction to Microcontroller Programming Using BASCOM is soft cover, spiral bound, 8×6-inches and has 128 pages.

Price, $10. For additional information contact AX Elektronika d. o. o., PP 5127, 1001 Ljubljana, Slovenija; tel +01-5491-400; fax +01-5285-688; **stik@svet-el.si**; **www.svet-el.si/english**. QST

Previous New Products

75, 50 AND 25 YEARS AGO

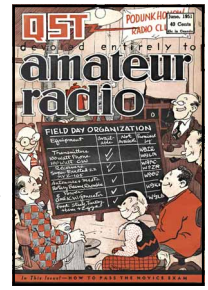
June 1926

◊ Clyde Darr, 8ZZ, uses his cover art to show an old-timer teaching a prospective new ham the Morse code. The editorial, "The problem of Deregulation," decries the need for better radio laws than the existing radio act of 1912. K. B. Warner assures the membership that the League is studying the situation to decide on its course of action in lobbying Congress for well-thought radio legislation.

Technical Editor Robert Kruse writes about "Polarized Transmission," setting down the results of an interview with Dr. E. F. W. Alexanderson. J. T. McCormick does a parody of the League's motto in "Of, By and For the Beginner," writing a half-serious and half-humorous story of himself as a new ham—for the benefit of other new hams. "High Adventure in the Northland" tells more about the radio gear used in the current Wilkins Expedition. More good information on crystal control is presented by John Wells and E. D. Tillyer, in "A Multi-Stage Crystal-Controlled Transmitter." Apparently the editor had some leftover material from the April issue, and publishes it this month in the article, "The Taurenwerfer Beam," by Morris Taurenwerfer, telling of things developed during his work in China.

Killian Lansingh describes "A.R.R.L. Standard Frequency Station 1XM," the experimental station of the MIT Radio Society. More news of ham stations coming on the air from points all over the globe are reported in the column, "International Amateur Radio." The lower-case rendering of the letters of the "intermediates" (indicating the country of the ham station) of station call signs produces a snag. Rhodesia uses a zero, but there is no lower-case zero—the call sign is listed as "o (zero) 1SR"! Also in that column, *all eight* hams who have earned the WAC award are listed.

June 1951



◊ The cover cartoon by Philip "Gil" Gildersleeve, W1CJD, shows the Podunk Hollow Radio Club getting organized for Field Day, with *everything* planned for. We'll have to wait for next month's cover to see if their planning was adequate. The editorial discusses military maneuvers planned for August in the Carolinas, and the military's necessity to use their HF communications gear inside the amateur bands. The military, FCC, and ARRL have been working together to minimize the disruption of normal ham operation, but both hams and the military will experience mutual interference.

R. K. Moore, W2SNY, discusses "Aurora and Magnetic Storms" and their effects of radio communication. George Grammer, W1DF, presents "Practical D.S.R.C. Transmitter Design" (double-sideband, reduced-carrier). "The Dallas Plan for TVI," by J. F. Skelton, W5MA, and E. M. Shook, W5IT, tells how the Dallas amateur community worked with the problems of television interference, and the good results that they had. Don Mix, W1TS, presents Part II of "The Novice One-Tuber," which describes the power supply, and how to tune and use the rig. In their ad in this issue, Niagara Radio Supply offers a kit of parts to build the Novice One-Tuber and its power supply for $15.95—complete with J-38 key, precut wood for the chassis, solder, antenna wire, and one Novice-frequency 80-meter crystal. [This columnist bought one of those kits when he was licensed as Novice WN4UWA in January 1952.—*W1AB*]

Also in this issue, Ed Tilton, W1HDQ, describes "A Low-Drain 2-Meter Mobile Transmitter" that can be powered by a 200-volt, 100-mA supply.

June 1976

◊ The cover photo shows a scene from the Olympic Games, where Amateur Radio once again helped out. The editorial, "Onward and Upward," urges US hams to follow the example of European hams in "adopting" various of the VHF-and-above ham bands and pushing for more usage of them.

Jim Fisk, W1DTY, describes "Helical-Resonator Techniques" for VHF and UHF. Margaret Koerner, WB0BEM, helps review material for prospective Novices in "Your Radio Signal—Short May It Wave." A novel minibeam is described by Cole Collinge, W0YNF, in "Linear Loaded 20-Meter Beam." In Part 1 of "His Eminence—the Receiver," Doug DeMaw, W1CER, explains the importance of dynamic range in the receiver, and builds a 160-meter receiver to demonstrate his ideas. Wes Hayward, W7ZOI, adds to Doug's efforts with "CER-verters," describing high-performance HF converters for the W1CER receiver.

Linda Cleveland, WB4CTR, tells a ham love story from her own experience, in "Odyssey." Elmo Knoch, K5YWL, describes a wrist-worn speaker and pocket Morse key that can open new horizons for deaf-blind individuals, in "Joint-Effort Communications Development." Bob Halprin, WA1WEM, tells how hams helped in earthquake-ravaged Guatemala, in "Terremoto—Ayuda!" QST

Al Brogdon, W1AB ♦ Contributing Editor

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	10 PM	11 PM	CODE BULLETIN				

W1AW's schedule is at the same local time throughout the year. The schedule according to your local time will change if your local time does not have seasonal adjustments that are made at the same time as North American time changes between standard time and daylight time. From the first Sunday in April to the last Sunday in October, UTC = Eastern Time + 4 hours. For the rest of the year, UTC = Eastern Time + 5 hours.

♦ **Morse code transmissions:**

Frequencies are 1.818, 3.5815, 7.0475, 14.0475, 18.0975, 21.0675, 28.0675 and 147.555 MHz.

Slow Code = practice sent at 5, 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 1992 *QST*, pages 9 and 81," indicates that the plain text is from the article on page 9 and mixed number/letter groups are from page 81.

Code bulletins are sent at 18 wpm.

W1AW qualifying runs are sent on the same frequencies as the Morse code transmissions. West Coast qualifying runs are transmitted on approximately 3.590 MHz by 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. Send a 9×12-inch SASE for a certificate, or a business-size SASE for an endorsement.

♦ **Teleprinter transmissions:**

Frequencies are 3.625, 7.095, 14.095, 18.1025, 21.095, 28.095 and 147.555 MHz.

Bulletins are sent at 45.45-baud Baudot and 100-baud AMTOR, FEC Mode B. 110-baud ASCII will be sent only as time allows.

On Tuesdays and Fridays at 6:30 PM Eastern Time, Keplerian elements for many amateur satellites are sent on the regular teleprinter frequencies.

♦ **Voice transmissions:**

Frequencies are 1.855, 3.99, 7.29, 14.29, 18.16, 21.39, 28.59 and 147.555 MHz.

♦ **Miscellanea:**

On Fridays, UTC, a DX bulletin replaces the regular bulletins.

W1AW is open to visitors from 10 AM until noon and from 1 PM until 3:45 PM on Monday through Friday. FCC licensed amateurs may operate the station during that time. Be sure to bring your current FCC amateur license or a photocopy.

In a communication emergency, monitor W1AW for special bulletins as follows: voice on the hour, teleprinter at 15 minutes past the hour, and CW on the half hour.

Headquarters and W1AW are closed on New Year's Day, President's Day, Good Friday, Memorial Day, Independence Day, Labor Day, Thanksgiving and the following Friday, and Christmas Day.

COMING CONVENTIONS

ATLANTIC DIVISION CONVENTION

June 1-3, Rochester (Henrietta), NY

The Atlantic Division Convention (67th annual Rochester Hamfest and Computer Show), sponsored by the Rochester ARA, will be held at the Monroe County Fairgrounds, Rte 15A and Calkins Rd in Henrietta, NY. Outdoor flea market runs continuously for the entire weekend beginning Friday at 6 AM; indoor exhibits open Friday noon to 5:30 PM, Saturday 8:30 AM to 5:30 PM, Sunday 8:30 AM to 1:30 PM. Features include outdoor flea market with 1200 vendors, 150 indoor commercial exhibitors with up-to-date radio and communications equipment, complete computer systems (components, software, shareware), awards banquet (Friday, 6:30 PM at the Marriott Thruway Hotel), full day and a half of programs (Friday and Saturday at the Dome Center), VE sessions (Friday afternoon at the hamfest site, Monroe County Fairgrounds, 2695 E Henrietta Rd; walk-ins accepted). Talk-in on 146.88. Admission is $7 in advance, $9 at the door, under 12 free. Outdoor flea market tailgate 10-ft × 20-ft spaces are $10 each. Contact Harold Smith, K2HC, 300 White Spruce Blvd, Rochester, NY 14623; 716-424-7184; fax 716-424-7130; **info@rochesterhamfest.org**; **www.rochesterhamfest.org**.

MIDWEST/DAKOTA DIVISION CONVENTION

June 15-16, South Sioux City, NE

The Midwest/Dakota Division Convention (Hamboree 2001), sponsored by the 3900 Club, will be held at the Siouxland Convention Center, 510 E 5th St, directly S of the Marina Inn parking lot; I-29 N and S, US Hwy 20 E and W. Doors are open for setup Thursday 6-9 PM, Friday 8 AM to noon; public Friday noon to 4 PM, Saturday 8 AM to 4 PM. Features include huge flea market, dealers, exhibitors, reserved tailgate stalls (parking area in front of convention center, $25 per day), 25th Anniversary festivities, Live Microwave Van demonstration, VE sessions, forums and seminars, QCWA luncheon meeting (Saturday), QRP programs, DXCC card checking, left foot keying contest, buffet dinner (Friday eve, $10), banquet (Saturday eve, $15), free parking, refreshments. Talk-in on 146.91. Admission is $6 in advance, $7 at the door, under 13 free. Tables are $10 and $15. Make checks payable to "Hamboree 2001" and send with SASE No 10 to Tom Brosamle, WB0YNX, Box 2332, Sioux City, IA 51106; 712-252-4107; **tands@pionet.net**; **www.3900club.com**.

SAN FRANCISCO SECTION CONVENTION

June 23-24, Ferndale, CA

The San Francisco Section Convention, co-sponsored by the Humboldt ARC, Redwood ARC, Farwest Repeater Assn, and Southern Humboldt ARC, will be held at the Humboldt County Fairgrounds, 1250 5th Ave; from US 101 take the Fernbridge/Ferndale Exit, Eureka is 20 miles N of Fernbridge; from Fernbridge cross the historic bridge over the Eel River, drive 5 miles to Ferndale. Doors are open Saturday 9 AM to 5 PM, Sunday 9 AM to 3 PM. Features include swapmeet, commercial dealers, exhibitors, vendors, ARRL forum, VE sessions, foxhunt, banquet (Saturday, 7 PM in Turf Room; keynote speaker ARRL Pacific Division Director Jim Maxwell, W6CF). Talk-in on 146.85, 147.09 (103.5 Hz). Admission is $3 in advance, $4 at the door; $2.50 (seniors), $5 (family). Tables are $15 (without electricity), $20 (with electricity), $25 (with phone jack). Contact Marci Campbell, KE6IAU, 1633 Mike Ln, Eureka, CA 95501; 707-442-3866; **marcidon@quik.com**; **www.humboldt-arc.org/harc/conv2001.html**.

CENTRAL DIVISION CONVENTION

July 7, Indianapolis, IN

The Central Division Convention, sponsored by the Indianapolis Hamfest Association, will be held at the Marion County Fairgrounds, 7300 E Troy Ave; at the I-74 and Southeastern Ave exits off I-465. Doors are open 7 AM to 3 PM. Features include ham radio, electronics, computers, and communications equipment flea market; commercial exhibitors; vendors; educational forums; ARRL forum; foxhunt (noon); VE sessions; overnight camping. Talk-in on 146.76. Admission is $5 in advance (special deal 10 tickets for $40), $7 at the door, under 13 free. Contact Rick Ogan, N9LRR, 5329 Lester, Indianapolis, IN 46208; 317-257-4050; **oganr@in.net**; **www.indyhamfest.com**.

May 26-27
Wyoming State, Casper*

June 1-3
Northwestern Division, Seaside, OR*

June 2
Georgia Section, Marietta/Atlanta*

June 8-10
West Gulf Division, Arlington, TX*

June 9
Eastern Pennsylvania Section, Bloomsburg*

July 12-14
10-10 International, Worcester, MA

July 13-15
Rocky Mountain Division, Bryce Canyon, UT

July 20-22
Montana State, East Glacier
Pacific Northwest DX, Everett, WA

July 26-29
Central States VHF Conference, Fort Worth, TX

July 27-28
Oklahoma State, Oklahoma City

August 3-4
South Texas Section, Austin

August 4-5
Eastern Washington Section, Spokane

August 5
Western New York Section, Williamsville

***See May *QST* for details.**

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

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 **June 1** to be listed in the **August** 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 (Russellville)—Jun 16;** set up Friday 7-9 PM, Saturday 7-9 AM; public 9 AM to 3 PM. *Spr:* Franklin County ARC. Russellville Recreation Center, 201 Ash Ave; from US Hwy 43 turn W on Underwood Rd, continue 3 blocks, turn right on Ash Ave, Center is 1/4 mile on left. Hamfest/Computer Show, flea market, dealers, VE sessions, refreshments. *TI:* 147.16. *Adm:* $2. Tables: $6. Christopher Arthur, NV4B, 606 Underwood Rd, Russellville, AL 35654; 256-332-2889; **nv4b@mindspring.com**; **www.qsl.net/fcarc**.

†ARRL Hamfest

California (Ferndale)—Jun 23-24, San Francisco Section Convention. See "Coming Conventions."

†**Colorado (Monument)—Jun 2,** 8 AM to 2 PM. *Spr:* Pikes Peak RA Assn. Lewis Palmer High School, 1300 E Higby; I-25 N, Exit 158 (Baptist Rd), right (E) on Baptist Rd for 50 ft, then N to Struthers Rd to Higby Rd, turn right (E) to school. Programs, operating stations, VE sessions. *TI:* 146.97 (100 Hz), 146.52. *Adm:* $5, under 18 free. Tables: $10 (includes one free admission). Robert Ryals, KI0GF, 3390 Blodgett Dr, Colorado Springs, CO 80919; 719-265-9950; **rryals@pcisys.net**; **www.qsl.net/ppraa**.

Gail Iannone ♦ Convention Program Manager

†**Connecticut (Goshen)—Jul 7;** set up 6 AM (drive into building); public 8 AM to 1 PM. *Spr:* Southern Berkshire ARC. Goshen Fairgrounds, Rte 63, 1/2 mile S of Rte 4 traffic circle. Vendors (bring your own tables at $5 per table space), tailgating ($5 per vehicle, includes 1 admission), VE sessions (9:30 AM, walk-ins accepted), free parking, refreshments. *TI:* 147.285. *Adm:* $3, under 12 free with adult. Tables: $10 (first 12-ft table, $5 each additional, power $2 in advance, bring your own chairs). Lee Collins, K1LEE, 5 White Hollow Rd, Lakeville, CT 06039; 860-435-0051; **lee@leecollins.com**.

†**Idaho (Rathdrum)—Jun 9.** *Spr:* Kootenai ARS. Lions Club, Hwy 53. Computer/Electronic Flea Market, VE sessions (11 AM, all classes), RV parking (no hookups), refreshments. *TI:* 146.98. Robert Pittsley, KC7RNT, 208-667-4915; **kc7rnt@icehouse.net** or **jmonroe@dmi.net**.

†**Illinois (Peotone)—Jul 8;** set up Saturday 6-8 PM, Sunday 6 AM; public 8 AM to 3 PM. *Spr:* Kankakee Area Radio Society. Will County Fairgrounds; I-57 to Exit 327 E. Air-conditioned building, vendors, electronics, computers, handicapped accessible, overnight parking ($10 with electricity), 35 acres of free parking, refreshments. *TI:* 146.94. *Adm:* advance $5 (double stub), door $6 (single stub), under 12 free. Tables: $10 (reserve). Send SASE and check made payable to KARS to Chip Moore, K9IOC, 289 S Euclid Ave, Bradley, IL 60915; 815-933-1323; **karsfest@yahoo.com**; **www.w9az.com**.

†**Indiana (Crown Point)—Jun 17;** set up 6 AM; public 8 AM to noon. *Spr:* Lake County ARC. Lake County Fairgrounds, Industrial Arts Building, 889 S Court St; I-65 to IN Rte 231, W to Court St, S to Fairgrounds. Hamfest/Computer Show, commercial vendors, indoor flea market, VE sessions (walk-ins), refreshments. *TI:* 147.0, 146.52. *Adm:* $5. Tables: $6. Lee Raue, WD9GQO, 6401 Kentucky Pl, Merrillville, IN 46410; 219-980-8030; **leeraue@msn.com**; **www.icongrp.com/~kb9mnq/lcarc/hamfest.htm**.

Indiana (Indianapolis)—Jul 7, Central Division Convention. See "Coming Conventions."

†**Maryland (Frederick)—Jun 17,** 8 AM. *Spr:* Frederick ARC. Frederick County Fairgrounds, 797 E Patrick St; I-70, Exit 55 (South St), follow signs to Fairgrounds. Vendors, VE sessions. *TI:* 146.64, 146.52, 147.06. *Adm:* $5. Tables: advance $10 (6-ft); door $15. Carolyn Moroney, N3VOK, 13597 Old Annapolis Ct, Mt Airy, MD 21771; 301-831-5060; **n3vok@erols.com**; **www.qsl.net/k3erm**.

Massachusetts (Cambridge)—Jun 17. Nick Altenbernd, KA1MQX, 617-253-3776.

†**Michigan (Midland)—Jun 16;** set up 6:30 AM; public 8 AM to 1 PM. *Spr:* Midland ARC. Gerstacker Fair Center on Midland County Fairgrounds, 6905 Eastman Ave; US-10 to Eastman Rd Exit, N to Airport Rd, W to Fairgrounds entrance. New and used amateur radio, electronics, and computer equipment; trunk sales; VE sessions; Friday night camping ($10); free parking; refreshments. *TI:* 147.0. *Adm:* $4. Tables: advance $6, door $8. Send SASE to MARC Hamfest, Box 1049, Midland, MI 48641-1049; Eldon Hall, N8STF, 517-643-5101; **marc-swap@juno.com**; **www.qsl.net/w8kea/**.

†**Michigan (Monroe)—Jun 17;** set up 6 AM; public 7:30 AM to 1 PM. *Spr:* Monroe County Radio Communications Assn. Monroe County Fairgrounds, 2 miles W of Monroe on M-50, at Raisinville Rd. Trunk sales ($6, 8-ft space; plus admission), indoor vendors, computers and equipment, distributors, VE sessions, overnight camping ($15, electricity included), free parking, handicapped parking, refreshments. *TI:* 146.72. *Adm:* advance $6 (with 2 stubs), door $6 (with 1 stub). Tables: $15 (8-ft, with 1 ticket); additional tables $10 each; electricity available in buildings, bring cords. Fred VanDaele, KA8EBI, 4 Carl Dr, Monroe, MI 48162-9319; 734-242-9487 after 5 PM; **ka8ebi@arrl.net**; **www.mcrca.org**.

†**Michigan (Petoskey)—Jul 7,** 8 AM to noon. *Spr:* Straits Area ARC. Central Elementary School, 410 State St, downtown; US 31/131 to Petoskey, W on Mitchell, S on Howard, go 2 blocks to school. Swap and Shop, commercial displays, VE sessions (1 PM, American Red Cross Building; Floyd Davis, KG8CS, 231-526-5503), refreshments. *TI:* 146.68. *Adm:* $4. Tables: $5 (splits OK). Tom Sorrick, W8IZS, Box 416, Pellston, MI 49769; 231-539-8459; or Cliff Rosebohm, KC8NVI, 231-526-5645; **peewee@freeway.net**.

†**Missouri (Houston)—Jun 16,** 8 AM to 3 PM. *Spr:* Ozark Mountain Repeater Group. Texas County Fairgrounds; from Springfield go E on Hwy 60 to Cabool, then N on Hwy 63 to Houston, then 1 mile N of Houston. *TI:* 146.85. *Adm:* $3. Tables: inside $5 each, outside space $5. Blanche White, N0FLR, 628 Cleveland Rd, Houston, MO 65483; 417-967-3000.

Nebraska (South Sioux City)—Jun 15-16, Midwest/Dakota Division Convention. See "Coming Conventions."

†**New Jersey (Dunellen)—Jun 16,** 7 AM to 2 PM. *Spr:* Raritan Valley Radio Assn. Columbia Park, near intersection of Rtes 529 and 28. *TI:* 146.625 (141.3 Hz), 442.25, 146.52. *Adm:* buyers $5, sellers $10. Doug Benner, W2NJH, 1020 Laurel Trail, Martinsville, NJ 08836; 732-469-9009; **wb2njh@aol.com**; **www.w2qw.com**.

†**New Jersey (Hackensack)—Jun 2;** set up 6 AM; public 8 AM to 2 PM. *Spr:* Bergen ARA. Bergen County Vocational School, 200 Hackensack Ave; Rte 4 W to Hackensack Ave, go S to School parking lot. Vendors ($10 per space, includes 1 admission, no reservations required; reservations required for limited number of spaces with electrical power at $20 per space), VE sessions (8-10 AM, Novice thru Extra), DXCC card checking, lots of parking, refreshments. *TI:* 146.79, 146.52. *Adm:* $5, wives and children free. Jim Joyce, K2ZO, 286 Ridgewood Blvd N, Washington Township, NJ 07676; 201-664-6725; **jjjoyce@cybernex.net** or **hamfest@bara.org**; **www.bara.org**.

†**New York (Cortland)—Jun 16.** *Spr:* Skyline ARC. Cortland County Fairgrounds; I-81 to Exit 12, follow signs to Rte 281 S; Rte 281 S to Fisher Ave, turn left onto Fisher Ave, right onto Fairgrounds Dr. VE sessions. *TI:* 147.18. *Adm:* advance $4, door $5, under 12 free. Andrew Slaugh, KB2LUV, Box 5241, Cortland, NY 13045; 607-753-0597; **kb2luv@arrl.net**.

New York (Rochester/Henrietta)—Jun 1-3, Atlantic Division Convention. See "Coming Conventions."

†**Ohio (Bowling Green)—Jul 8,** 8 AM to 1 PM. *Spr:* Wood County ARC. Wood County Fairgrounds, Poe Rd and State Rte 64; I-75 to Exit 181, go W through downtown Bowling Green, follow Rte 64 to Poe Rd, turn right to Fairgrounds entrance. Ham-A-Rama/Computer Show, trunk sales ($5 per 10-ft space), VE sessions (9 AM sharp), free parking, handicapped parking and accessibility, refreshments. *TI:* 147.18, 444.475 (77 Hz). *Adm:* Free. Tables: $5 (reserved tables by full prepayment only by Jul 2). Bob Boughton, N1RB, Box 534, Bowling Green, OH 43402; 419-354-1811; **hamfest@wcarc.bgsu.edu**; **wcarc.bgsu.edu/flyer.html**.

†**Ohio (Milford)—Jun 16.** *Spr:* Milford ARC. Live Oaks Vocational School, Buckwheat Rd; I-275 to Rte 28, right on Buckwheat Rd. Commercial vendors, tailgating, VE sessions, refreshments. *TI:* 147.345. *Adm:* $5. Tables: $5. Chris Reinfelder, KB8SNH, 3691 Charter Oak, Amelia, OH 45102; 513-753-5066; **kb8snh@cs.com**.

†**Pennsylvania (Bressler)—Jul 4;** set up Tuesday 6-9 PM, Wednesday 6 AM; public 8 AM. *Spr:* Harrisburg RAC. Emerick Cibort Park; I-76 or I-83 to I-283, Exit 1 (PA Rte 441), follow signs to hamfest. Flea market, commercial dealers, tailgating ($5 per space), VE sessions (nearby at 9 AM; free), overnight camping, refreshments. *TI:* 146.76. *Adm:* $5 (nonham spouses and children free); or bring a carload of people for $10. Tables: $12 each (before Jun 1), $15 each (on or after Jun 1). Pete deVolpi, K3PD, 408 Hillside Ave, New Cumberland, PA 17070-3036; 717-705-1370 (weekdays) or 717-938-8249 (eves 6-9 PM and weekends); **k3pd@arrl.net** or **w3uu@aol.com**; **members.aol.com/w3uu/**.

†**Pennsylvania (Pittsburgh)—Jun 8,** 8 AM to 2 PM. *Spr:* North Hills ARC. Northland Public Library, 300 Cumberland Rd; Rte 19 to Cumberland Rd. Vendors, tailgating (first space free, additional spaces $5 each). Tables: $15. *TI:* 147.09. *Adm:* Free. Tables: $15. Milton Moratis, W3XX, 681 Olive St, Pittsburgh, PA 15237; 412-364-0399; **mmoratis@juno.com**; **nharc.pgh.pa.us**.

†**Pennsylvania (Wilkes-Barre)—Jul 1;** set up 6 AM; public 8 AM to 3 PM. *Spr:* Murgas ARC. Luzerne County Fairgrounds; from I-81 take Exit 47B to Rte 309 N to Rte 415 to Rte 118 W. Hamfest/Computer Flea Market, dealers, equipment, computer hardware and software, tailgating (1 free space with admission), VE sessions (570-779-2981; **jcaffrey@microserve.net**). *TI:* 146.61, 146.52. *Adm:* advance $4, door $5. Tables: $14 (8 ft, indoors, with electricity; Frank, N3WPG, 570-824-7579; or George, K3ZK, 570-735-7794). Make check or money order payable to Murgas ARC and send to Frank Karcheski, N3WPG, 332 Madison St, Wilkes-Barre, PA 18705; 570-824-7579; **n3wpg@juno.com**.

Quebec (Sorel-Tracy)—May 26-27. Jacques Hamel, VE2DJQ, 450-743-0221.

†**Tennessee (Nashville)—Jun 16;** set up Friday noon to 11 PM (overnight security provided), Saturday 5-7 AM; public 8 AM to 5 PM. *Spr:* Nashville ARC. Factory Stores of America Shopping Area, 2434 Music Valley Dr, Suite 920, opposite Opryland Hotel complex; I-65 N to Briley Pkwy, take Briley Pkwy E to McGavock Pike, Exit 12, turn W to second traffic light, turn right at light and follow signs. Hamfest/Computer Show, vendors, High Speed CW and Left Foot CW contests, 2-Meter Transmitter Hunt, parking for self-contained RVs (Two Rivers Campground, 1 1/4 miles from hamfest), plenty of paved parking areas, refreshments. *TI:* 145.47. *Adm:* $6, under 12 free. Tables: $15 (reserve early). Murray Jones, K4ANH, 1044 Forest Harbor Dr, Hendersonville, TN 37075; 615-824-7216; **mj80917@aol.com**.

†**Wisconsin (Oak Creek)—Jul 7,** 6 AM to 2 PM. *Spr:* South Milwaukee ARC. American Legion Post 434, 9327 S Shepard Ave; from I-94 to Ryan Rd (Highway 100), E on Ryan to Shepard Ave, go N on Shepard Ave approximately 1 mile. Swapfest, limited overnight camping available, free parking, refreshments. *TI:* 146.52. *Adm:* $5. Verne Teske, W9RYA, c/o South Milwaukee ARC, Box 102, South Milwaukee, WI 53172-0102; 414-762-3235; **kastelic@execpc.com**.

Attention All Hamfest Committees!

Get official ARRL sanction for your event and receive special benefits such as free prizes, handouts, and other support.

It's easy to become sanctioned. Contact the Convention and Hamfest Branch at ARRL Headquarters, 225 Main St, Newington, CT 06111. Or send e-mail to **giannone@arrl.org**. QST

STRAYS

INTERNET ELMER GROUP

◊ A new e-mail list has formed on Yahoo that is dedicated to recently licensed amateurs. The HAM-ELMER group welcomes everyone with a genuine interest in ham radio. Old timers answer questions and give advice. You can join by sending an e-mail to **HAM-ELMER-subscribe@yahoogroups.com**.

QST Congratulates...

◊ Tim Spaulding, KA0YAA, who recently graduated near the top of his class from the US Air Force Academy with a BS degree in Physics with a minor in Math. He was commissioned as a Second Lieutenant in the Air Force the same day. Tim is the recipient of a Harry S. Truman Scholarship.

Next Strays

CONTEST CORRAL

W1AW Qualifying Runs are 10 PM EDT, Thursday, June 7, and 7 PM EDT, Friday, June 22. The K6YR West Coast Qualifying Run will be at 9 PM PDT on Wednesday, June 6. Check the W1AW schedule for details.

June

2

QRP TAC Contest, The EPA QRP Club, 1800-2359Z June 2. CW, QRP. 80 40 20 15 10, Exchange Call, RST, Name and TAC (Telephone Area Code) or DX area code. DX Countries may use their Prefix. Pennsylvania stations will send an X after the prefix. There are 5 categories: QRP—5 W or less; QRPp—less than 1 W; Tactical—portable using temporary antennas; Homebrew—using a kit built from scratch; Newbie—if this is the first contest you have ever entered. You may enter up to 4 possible combination of categories. Score 5pts/per QSO 10pts/ per QSO with Pennsylvania stations. 500 points with each contact with N3EPA. Work stations on each band. Score equals QSO points x TACs plus 1000 pts for every category entered. Awards. Send logs by July 8 to PA QRP Club c/o Ron Polityka, 1155 Robeson St, 2nd Floor, Reading, PA 19604-2151; **n3epa@fast.net**; **www.n3epa.org/Pages/TAC-Contest.htm**.

9-11

ARRL June VHF QSO Party. See May *QST* page 114.

TOEC WW Grid Contest, sponsored by the Top of Europe Contesters. SSB 1200Z June 9, 1998 to 1200Z June 10. CW 1200Z August 26, 1998 to 1200Z August 27. Work any station once per band, 160 80 40 20 15 10 meters. Mobiles may be worked again if in another grid field (EM, FN, etc). Exchange signal report + grid field. Classes: Single operator (no packet); All band; Single band; Low power (100 W, all band only); Multioperator, all-band only; Single transmitter (10-minute band change rule applies); Multitransmitter; Mobile Single operator (All band only—may contact stations once per grid field operated from and must show grid fields operated from in log. /M and /MM stations permitted). Scoring: Fixed-station QSOs with other continents = 3 points; QSOs with your continent (and country) = 1 point. All mobile QSOs (and contacts with mobiles) = 3 points. Multipliers: Each grid field worked per band. Multiply QSO points x grid fields for total score. Send entries with a signed summary sheet to TOEC, Box 178, SE-83122 Ostersund, Sweden. All submissions must be e-mailed or postmarked within 30 days of the contest. **TOEC.contest@pobox.com**; **www.qsl.net/toec/**.

Digital Contest, sponsored by Australian National Amateur Radio Teleprinter Society. All digital modes, 0000Z June 9 to 2359Z June 10 (48 hours), 80 40 20 15 10 meters. Single Op one transmitter, Multioperator one transmitter and SWL. Single op and SWL may only operate 30 hours. Exchange RST, CQ zone and time (UTC), Multipliers are each ARRL DXCC entity. Each call district of VK (1-8), JA< VE, and W count as separate countries on each band. Each continent counts only *once* as an additional multiplier. Contacts with one's own country or call area counts for QSO points but not for multiplier credit. Final score is total QSO points x total multipliers x number of continents worked. Awards. Send logs by Sept 1 to Contest Manager, VK2BQS, Jim Swan, PO Box 93, Toongabbie, NSW 2146, Australia; **ctdavies@one.net.au**.

16-17

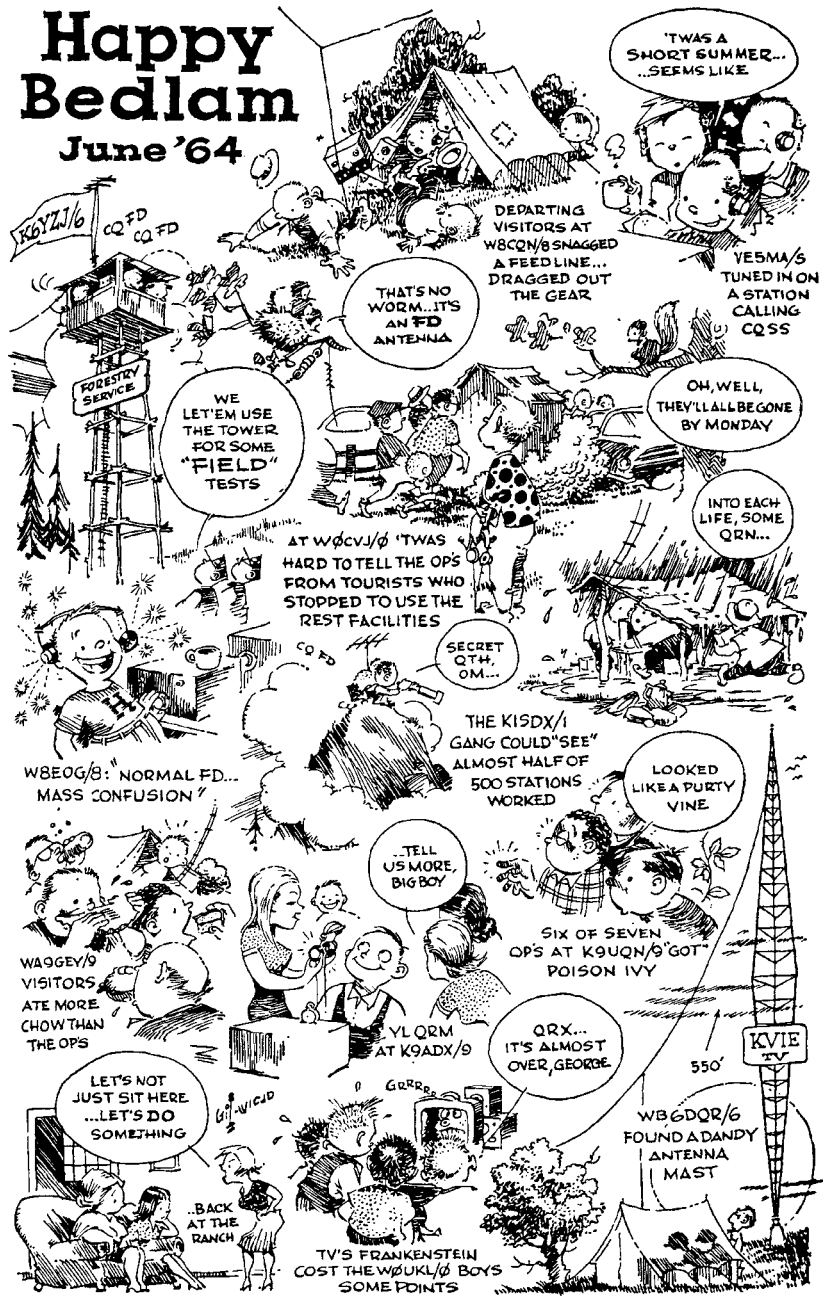
Kid's Day Operating Event, sponsored by the Boring ARC, from 1800-2400Z Jun 16. See the article on page 48.

SMIRK QSO Party, sponsored by the Six Meter International Radio Klub, from 0000 UTC Jun 16 until 2400 UTC Jun 17. 6 meters only. All phone contacts within the lower 48 states and Canada must be made above 50.150 MHz; only DX QSOs may be made between 50.100 and 50.150 MHz. Exchange SMIRK number and grid square. Score 2 pts/QSO w/SMIRK member and 1 pt/QSO w/ nonmember. Awards. Send entries by August 1 to Pat Rose, W5OZI, PO Box 393, Junction, TX 76849.

All-Asian DX Contest, CW, sponsored by the Japan Amateur Radio League, from 0000Z Jun 16 until 2400Z Jun 17 (phone contest will be Sep 1-2). 160 80 40 20 15 10 meters. Single op; single/multi-band; multiop multiband. Work Asian stations only. No crossband QSOs. Single ops may have only one transmitted signal at any time. Multiops may have a maximum of one signal per band. Send RS(T) and a two-digit number denoting the operator's age. Operators not wishing to disclose age may send 00. Score 1 pt/QSO w/Asian stations on 7 through 28 MHz, 2 pts on 3.5 MHz and 3 pts on 1.8 MHz. Final score is QSO pts x different Asian prefixes (WPX rules) worked per band. Awards. Mail logs to arrive by Sep 30 (Nov 30 for phone) to JARL, All Asian DX Contest, 170-8073, Japan. E-mail CW logs to: **aacw@jarl.or.jp** and phone logs to: **aaph@jarl.or.jp**. For more information see **www.jarl.or.jp/English/4_Library/A-4-3_Contests/AADX.htm**.

23-24

Field Day. See May *QST* page 112. QST



Previous Strays

George Fremin III, K5TR ♦ 624 Lost Oak Trail, Johnson City, TX 78636 ♦ k5tr@arrl.org

SPECIAL EVENTS

Patuxent River, MD: NAS Patuxent River Military Recreation Station, K3NAL, 1300Z **May 26** to 2300Z **May 27**, celebrating two days of military and recreational aircraft demonstrations at Air-Expo. 28.450 21.350 14.275 7.275. Certificate. K3EZ, 41389 Richneck Court, Mechanicsville, MD 20659.

Tupelo, MS: Tupelo Amateur Radio Club, KK5K, 1200Z **June 1** to 2200Z **June 3**, to honor Elvis Presley. 80 40 20 15 meters. Certificate. Wayne Cox, 116 Rd 1708, Saltillo, MS 38866.

Richfield, PA: Susquehanna Valley Amateur Radio Cub, W3VPJ, 1400Z **June 2** to 2300Z **June 3**, operating from the Bison Farm II during their Spring Bison Festival. Certificate. Chris Snyder, NG3F c/o SVARC, PO Box 73, Shamokin Dam, PA 17876.

Pierre, SD: Pierre Amateur Radio Club, W0PIR, 1500Z **June 2** to 1500Z **June 3**, commemorating the Lewis and Clark Expedition from La Framboise Island. 14.245 28.350. Certificate. Tim Gatje, AA0LY, 3660 Bond Pl, Pierre, SD 57501.

Tylertown, MS: Southwest Mississippi ARC, WB5ASP, 1600-2200Z **June 2**, during the Walthall County Dairy Festival. 7.270 14.270 21.370 28.470. QSL. Homer L. Richardson, 1545 Friendship Lane NW, Brookhaven, MS 39601.

Glasgow, KY: Mammoth Cave Amateur Radio Club, KY4X, 1500-2200Z **June 2**, during the International Highland Games. 28.400 14.250 146.940. Certificate. Mammoth Cave Amateur Radio Club, 213 Trappers Trail, Glasgow, KY 42141.

Laurel, DE: Sussex Amateur Radio Association, N3N, 1500-2100Z **June 2**, celebrating the 50th anniversary of the Delaware State Park System. 14.260 7.250 28.450. Certificate. Tom McDougall, 18572 Whaleys Corner Rd, Georgetown, DE 19947.

Olathe, KS: Johnson County ARES, KS0JC, 1800Z **June 2** to 2200Z **June 3**, honoring Morse code teacher Marshal Ensor, W9BSP. 28.400 18.150 14.250 10.125. Certificate. Dan Reed, 29545 West 152nd Terrace, Gardner, KS 66030.

Mississauga, ON: Mississauga Amateur Radio Club, VE3MIS, 1400Z-2000Z **June 2** and **June 3**, during the 29th Streetsville Founders Bread & Honey Festival. 7.230 14.240 28.340. Certificate. MARC, c/o Michael Brickell, 2801 Bucklepost Crescent, Mississauga, ON L5N 1X6, Canada.

Titusville, FL: Valiant Air Command Museum, KV4BU, 1200Z **June 2** to 2100Z **June 3**, operating from the *Tico Belle*, a C-47 aircraft used in the D-day invasion. 14.272 21.333 28.333 50.135. QSL. Dennis Sparks WB4NBE, PO Box 37, Alcoa, TN 37701.

Poughkeepsie, NY: Poughkeepsie ARC, Mt Beacon ARC, and the QSY Society, K2B, 0400Z **June 2** to 2200Z **June 3**, during the Dutchess County Balloon Fest 2001. 3.725 7.230 14.325 28.325. Certificate. Adam Nowik Jr, 1 Lawrence Rd, Poughkeepsie, NY 12601.

Wethersfield, CT: Central Connecticut ARC, W1W, 1400Z **June 2** to 2200Z **June 3**, during the Wethersfield Weekend Festival. 14.240 21.360 14.040 21.040. QSL. Walter M. Styslo, 35 Greenfield St, Wethersfield, CT 06109.

Baltimore, MD: Historical Electronics Museum ARC, W3GR, 1400Z **June 2** to 2100Z **June 3**, commemorating the role of radio in the D-Day invasion of Europe. 7.115 14.250 21.245 28.440. Certificate. HEMARC W3GR, PO Box 746, MS 4015, Baltimore, MD 21203.

Hutchinson, KS: RCKARA, W0C, 1500Z **June 2** to 0300Z **June 3**, promoting Amateur Radio at the Cosmosphere and Space Center. 14.250 21.350 28.400. QSL. RCKARA, PO Box 273, Haven, KS 67543.

Carbondale, IL: SIU Amateur Radio Club, KA9BSA, 1400-0000Z **June 3**, for National Trails Day on the River-to-River Trail. 7.273 14.273 21.250 28.375. QSL. Clarence Maise, KK9M, 106 South Brook Lane, Carbondale, IL 62901.

Grosse Ile, MI: Motor City Radio Club, W8MRM, 1400Z **June 2** to 2200Z **June 3**, during the annual Spring Island Festival from USIA island MI005R. 7.244 14.244 21.375 28.375. Certificate. MCRC Island Fest, PO Box 337, Wyandotte, MI 48192.

Omaha, NE: Heartland DX Association, N4B, 0000Z **June 2** to 2400Z **June 17**, during the College World Series. 28.450 21.350 18.150 14.280. QSL. Todd LeMense, KK0DX, 3603 South 89th St, Omaha, NE 68124.

Atkinson, NH: Atkinson Amateur Radio Association, K1D, 0400Z **June 2** to 0359Z June **17**, to promote Kid's Day. 14.270 21.380 28.350 3.895. QSL. Peter Schipelliti, 7 Dearborn Ridge Rd, Atkinson, NH 03811.

Washington, DC: FBIARA, K3FBI, 1400-1800Z **June 5**, operating from the FBI's Unity Festival. 7.280 14.280. Certificate. FBIARA, 27 Fox Run Lane, Fredericksburg, VA 22405.

Baton Rouge, LA: USS *Kidd* Amateur Radio Club, W5KID, 1500-2300Z **June 6**, commemorating D-Day. 14.060 14.240 21.340 28.440. QSL. W5KID, 305 River Rd, Baton Rouge, LA 70802.

Bedford, VA: Old Dominion Chapter #202–QCWA, WW2DDM, 1700Z **June 6** to 2400Z **June 10**, commemorating the dedication of the National D-Day Memorial in Bedford, Virginia. 7.250 14.240 21.330 50.222. Certificate. Charlie Beckwith, K4BSF, 563 Buzzard Rock Lane, Rocky Mount, VA 24151-4844.

Ann Arbor, MI: ARROW Communications Association, W8PGW, 2100-2300Z **June 8**. operating from the annual Northside Elementary School ice cream social. 7.225 21.300 146.96. Certificate. Ralph Katz, KB8ZOY, 605 Skydale Dr, Ann Arbor, MI 48105-1138.

Ashland, VA: Central Virginia Contest Club, W4L, 2100Z **June 8** to 1100Z **June 9**, during the American Cancer Society "Relay for Life." 7.270 14.270 21.370 28.370. QSL. Ronnie Bolton, 12491 Ashcake Rd, Ashland, VA 23005.

Peterboro, NY: Madison-Oneida ARC, W2MO, 1400-2000Z **June 9**, during the 9th annual Civil War reenactment weekend. 7.275 14.275 14.045. Certificate. MOARC, PO Box 241, Verona, NY 13487.

Vermilion, OH: United States Power Squadrons Amateur Radio Net, N3HOW/8, 1400Z **June 9** to 2200Z **June 10**, during National Safe Boating Week at the Inland Seas Maritime Museum. 7.267 14.267 21.367 28.367. Certificate. Donald Stark, 65 Stark Spur, Eighty-Four, PA 15330.

Laurel Bloomery, TN: JCARC-Johnson County Amateur Radio Club, KF4RBR, 1400-2000Z **June 9**, during the 9th annual Trout Rodeo and Free Fishing Day. 7.265 14.265. Certificate. John Hillsman, 614 Walnut St, Mountain City, TN 37683.

Charlton, MA: Melha Radio Club, W1GLM, 1400-2000Z **June 10**, during the Grand Masters Fair at the Masonic Home. 7.250 14.240 21.312 28.470. Don Johnson, W1UPH, 24 Allen Ct, Hampden, MA 01036.

Minden, NE: Hastings Amateur Radio Club, W0WWV, 1400-1700Z **June 10**, to celebrate the 48th anniversary of Pioneer Village. 3.950 7.250 14.250 28.350. QSL. Ron Blecha, 221 N Garber Ave, Minden, NE 68959.

Brooklyn, NY: Kings County Repeater Association, WA2ZWP, 1200-2000Z **June 10**, commemorating the 176th anniversary of Fort Hamilton, Brooklyn. 14.243 21.343 28.343. QSL. KCRA, PO Box 180312, Brooklyn, NY 11218.

San Francisco, CA: Boring ARC, K6D, 2100Z **June 10** to 2400Z **June 16**, for Kid's Day Awareness Week. 28.330 14.330 146.565 7.230. Certificate. Neil Fullagar, K6NCX, 401 Maitland Dr, Alameda, CA 94502.

Bell Buckle, TN: Radio Amateur Transmitting Society, W4PQP, 1300-2100Z **June 16**, during the RC Cola & Moon Pie Festival. 7.240 14.240 28.340. Certificate. K4AAL, 1065 Barnes Rd, Antioch, TN 37013.

Cincinnati, OH: Queen City Emergency Net, W8Q, 1300Z **June 16** to 0100Z **June 17**, celebrating the club's 60th anniversary. 7.240 14.240 21.240 28.420. QSL. Queen City Emergency Net, 720 Sycamore St, Cincinnati, OH 45202.

Lawrenceville, GA: Gwinnett Amateur Radio Society, W4A, 1600Z **June 16** to 2300Z **June 17**, for the Society's 25th anniversary and Amateur Radio Appreciation Week. 28.540 21.400 14.240 7.240. Certificate. Ade Wirth, W4ADE, 550 Running Fawn Dr, Suwanee, GA 30024.

Grantsville, WV: Calhoun Amateur Radio Club, WD8IRN, 1400-1900Z **June 17**, during the 5th annual Appalachian Bike Race. 7.247 14.299 28.373 50.130. QSL. Paul S Mollohan, 69 Valley Dr, Elkview, WV 25071.

Waco, TX: Texas State Guard, AF5J, 0800Z **June 23** to 0800Z **June 24**, honoring the beginning of the Texas war of independence. 3.863 7.230 14.228 28.426. Certificate. James Harris, 4004 N 24th St, Waco, TX 76708.

Salem, OR: Mid-Valley ARES, W7O, 1900Z **June 23** to 1900Z **June 24** during International Field Day. 3.800 7.200 21.300 14.200. QSL. Robert Boswell, W7LOU, 15662 Oakdale Rd, Dallas, OR 97338.

DeSmet, SD: Huron Amateur Radio Club and Lake Area Radio Klub, W0NOZ, 1600Z **June 30** to 0200Z **July 2**, for the 30th anniversary celebration of the Little House on the Prairie Pageant. 7.265 14.265 21.365 28.465. Certificate. Huron ARC, PO Box 205, Huron, SD 57350.

Garland, TX: Garland ARC, W5G, 2100Z **June 29** to 0400Z **July 2**, during the City of Garland's Star Spangled 4th Celebration. 7.274 14.274 28.474. Certificate. W5G c/o GARC, 1027B W Austin St, Garland, TX 75040.

Smiths Falls, ON: DX Hounds, VB3RC, 1600Z **June 29** to 2200Z **July 2**, celebrating 175 years of the Rideau Canal in Ontario, Canada. 14.258 7.258 21.258 28.328. Certificate. Robert J Calver, 419 Bates Rd, RR#3, Jasper, ON K0G 1G0, Canada.

Los Alamos, NM: Los Alamos Amateur Radio Club, W5PDO, 1800-2200Z **June 30**, operating from Fenton Hill Observatory for the Earthwatch Institute's Student Challenge Awards Program. 14.250 21.350 28.450. Certificate. Don Casperson, AA5PA, 984 Nambe Loop, Los Alamos, NM 87544.

Climax, MI: Southwest Michigan Amateur Radio Team, K8KZO, 1400-1900Z **June 30**, celebrating the invention of the wheat harvester and thresher (1836). 7.252 14.252 21.352 28.352. Certificate. SMART, c/o Village of Climax, PO Box 145, Climax, MI 49034. QST

George Fremin III, K5TR ♦ 624 Lost Oak Trail, Johnson City, TX 78636 ♦ k5tr@arrl.org

By Dan Henderson, N1ND
Contest Branch Manager

2000 ARRL Sweepstakes Results, CW

If you channel surf on the television, it won't be too long before you run into the "celebrity of the day" on the Food Network – Emeril Lagasse. Who wouldn't love some of the great dishes that this "hot chef" offers up. From country ham and red-eye gravy to smoked salmon and Irish stew, if you have a favorite, Emeril probably has a recipe. With a lot of great ingredients and a whole lot of "Bam!" he specializes in kicking it up a notch.

You find similarities in some of the great competitors in the annual ARRL November CW Sweepstakes. The top guys always have a strategy of "recipes" to take their contest results up another notch. A basic *stock* of equipment, a good *helping* of planning, a *dash* of knowledge, a *pinch* of propagation, and a couple of *tablespoons* of luck, and just like Emeril, they are able to come up with award-winning efforts.

People may attribute the success of the top contesters to some secret ingredient, but in the long run it is how you put the whole package together that makes the difference. Knowing when to make a band change or continue a successful run is just like knowing how long to preheat the oven or knowing when to stop whipping the batter. If there is a secret ingredient, perhaps it is experience. In Sweepstakes, the outcome depends on the difference in just a few QSOs or a single multiplier. This year, perhaps more than ever, this adage held true.

A total of 1236 competitive logs and 13 checklogs were received for the 2000 CW Sweepstakes—an increase of 6.6% from 1999. Achieving a Clean Sweep was a bit more challenging, with the addition of the West Central Florida section raising the total sections needed to 80. Even so, a total of 209 sweeps were reported this year, as opposed to only 72 in 1999 (when the week before SS a major hurricane passed through the Caribbean and limited activity).

One surprising development was the fact that Single Operator QRP entries outnumbered the Single Operator High Power entries 215 to 213. Single Operator Low Power remains the most popular category with 656 entries. The Single Operator Unlimited class accounted for 89 entries, while 54 Multioperator logs and nine School entries round out the field. Including the participants at multioperator stations, the logs indicate a total of almost 1400 amateurs involved in the contest.

Scott, W4PA, edged out Mike, K5NZ, in the Single Operator QRP category. Scott missed out on one multiplier but ended up with 18 more QSOs to win the category by 1126 points—138,566 to 137,440. Scott's score is a new mark for the Delta Division. New Division records in the category were also set by N9CIQ (Central), N0UR (Dakota), W8RU (Great Lakes) K7RI (N0AX, op) (Northwestern), and N6MU (Pacific).

In the second closest finish this year, Don, N4ZZ (ex-K4WX), edged Ken, K6LA, by four QSOs to win the Single Operator Low Power category. Don's final score of 185,120 does not quite set a new overall mark but Ken's score of 184,480 does set a new Southwestern Division record. Also setting a new category Division mark was N0AT (Dakota).

Rich, KE3Q, once again took top honors in the Single Operator High Power category from WP3R with his score of 242,720 breaking the overall category record. The WP3R score also stands as the Southeastern Division record. Tree, N6TR, using the W5WMU call and station took second place honors. Joining Rich in setting new Division records were AG9A operating at N0NI (Midwest) and N4AF (Roanoke). One interesting note: only 11 QSOs separated the seventh through tenth place overall finishers.

Dennis, K7BV, won in the Single Operator Unlimited category with the widest margin of victory in any of the categories, bettering Bob, W4MYA, by a score of 199,200 to 168,800. Dennis' score is a new Overall and Pacific Division record, while Bob set a new Roanoke Division mark. Division record setters in this relatively new category also include K9MOT (K9PW, op) (Central), K5MC (Delta), AA2FB (Hudson), WA0SXV (Midwest), K1NU (New England), W7OM (Northwestern), N2NL (Southeastern), and K5HP (West Gulf).

Nine entries were received for the School Club category, with the University of Arkansas' club station W5YM, operated by Kevin, N5DX, winning the second annual Mark Smith, KD4JLC, Memorial award presented to the top scoring School Club College or University entry.

Single Operator QRP

W4PA (at K4JNY)	138,566
K5NZ	137,440
KG5U	131,456
N9CIQ	130,080
N6MU	127,520
K7RI (N0AX, op)	116,688
K3TEJ	108,800
N0UR	108,576
N0SS	105,386
N7IR	105,228

Single Operator Low Power

N4ZZ	185,120
K6LA	184,480
NP2B	179,040
K7BG	176,800
WP2Z (NU0Q, op)	176,000
N0AT	175,520
K5WA	173,440
VE4VV	168,960
K0OB	168,640
K4XU	167,360

Single Operator High Power

WP3R (KE3Q, op)	242,720
W5WMU (N6TR, op)	223,680
N0NI (AG9A, op)	221,120
W0SD (WD0T, op)	219,360
N5RZ	217,120
K1TO	215,040
W4AN (K4BAI, op)	210,560
N2NT (N2NC, op)	210,240
N5KO (at W5KFT)	209,920
K6LL	208,800

Single Operator Unlimited

K7BV	199,200
W4MYA	168,800
N6ZS	162,400
AA2FB	160,844
K6RIM	149,920
K9MOT (K9PW, op)	146,240
K5HP	138,996
K9NR	137,904
KT0R	133,760
K5MC	132,480

Multioperator

N6VR	206,080
W1AW	206,080
K7UP	195,680
W6UE	191,520
KL7Y	190,560
W6YX	190,400
K8CC	190,240
N6KI	175,680
AB0S	171,588
K5MDX	169,120

School Club (All Classifications)

W5YM (N5DX, op)	168,480
N9UC (WO9S, op)	124,320
WA5BU	105,280
W7UQ (KL9A, op)	94,402
W7ASU (KC7EFP, op)	45,954
K2CC (KC2BGM, op)	27,872
K1PSC (AE1T, op)	18,460
NA4P	11,988
W5AC	2,838

A championship tie had never occurred in the 65 previous ARRL Sweepstakes. That changed in 2000, and it was a coast-to-coast feat to boot. Finishing in a dead heat in the Multioperator category were the operators at N6VR and W1AW. Both ended up with 1288 QSOs, all 80 Multipliers and a score of 206,080. Both stations also set new Division marks (Southwestern and New England), though falling short of the overall record. Joining them in setting a new Division record was the crew at KL7Y, who established a new Northwestern Division mark.

The Affiliated Club Competition is shaping up to an exciting climax. Will one of the traditional Sweepstakes powers dish up yet another victory or will some upstart dark horse cook up a surprise? Results for this year's club shootout will be reported with the Phone Sweepstakes results next month.

Plaque winners for the CW portion of Sweepstakes are included with this article. Unsponsored plaques may be purchased by contacting the ARRL Contest Branch. The cost is $60 each.

Seasonings change and experimentation in the kitchen occurs. Why not try some experimentation in your shack while planning for the 2001 running of the ARRL November CW Sweepstakes, scheduled for November 3-4? Make certain you don't fricassee a receiver or overcook an amplifier as you get ready. Who knows? With the right recipe you might blend up a great entrée for all to see.

SOAPBOX

K2 at 1 W with wire. Had to get on to outnumber the QRO guys (AA2VK)… It was good to hear some of the other University stations on the air. I was no competition, but I did manage to continue sharpening my CW skills (AA8UP)… This was my first ever sweep in nearly a decade of attempts! Thanks for a fun contest (AA9RR)… Only used 80 meters, got last few states for 5BWAS (AE0Q)… Lots of QRPers out there this year-worked 70 of them for 11.5% of my total (AE7EE)…Super conditions made a QRP Clean Sweep possible! (AF5Z)… Highlight was working WP2Z on 15 with 250 mW. Lowlight was grabbing the wrong end of the soldering iron just before the start of the contest. (AG0T)… Will I ever get a CW Sweep? Ugh! Spent 3 hours at the end looking for the last 10 mults. Only snagged 3 more (K0IL)… By the way, who the heck is Cabrillo? (K0TPY)… A Sweepstakes to remember! How often do you get to work *two* NWT/YT stations, and Palmyra Island for your PAC multiplier? (K1NU)… It was a great deal of fun representing the college during Sweepstakes (AE1T op at K1PSC)… Clean sweep for the first time in over 50 years of SS Contests. W4KFC said, "The Secret of winning contests is: Be young." I'm not young but had fun anyway. (K3CQ)… Lots of fun as usual. Just could not find that MAR multiplier (K3WU)… Our newborn son came home Saturday afternoon around 2 PM, so I spent more time in the house than in the shack. Missed VO1…heard VO1MP early on, but never again! (K4FB)… My best SS effort ever, even though I did miss YT and NL. (K4IE)… Highlight was KH8/N5OLS calling *us!* (K4IX/3)… Why don't we make Sunday afternoon a mandatory off time? (K4OGG)… This was my first sweep on CW. Didn't plan on it, but when I got down to only 2 left, I started looking! (K4WI)… My personal best. SS CW is still #1 (K5KA)… Thanks to N5TW for the use of his awesome station and for working with me to re-engineer for SO2R. Planned my time around an approaching storm, and wrapped up at 0130Z just in time. Sorry to those I QRMed Sunday afternoon. I discovered one of my rigs started transmitting 25 kHz off! (K5PI)… Always take the time to explain SS exchange when asked. Think of your two or three QSOs lost as an investment in the future (K5VG)… Nice to get back to this contest after missing last year—it's one of my favorites. Propagation seemed very good this year with lots of stations to work until very late in the afternoon Sunday (K5WO)… Nice to have such short skip on the high bands. Operating quality was very good this year. More people should join the fun! (K5ZD)… 76 sections on QRP. 'Twas better than last year on high power! (K6HRT)… One 20 year-old transceiver, one broken 58 year-old arm (K6KYJ)… Easily the best SS CW in the last 5 years. Having 10 and 15 wide open spread everyone out and even low power stations like mine could CQ with ease (K6PUD)… VE2 (QC) must have left for the weekend. 79 Sections! Like playing horse shoes (K7JJ)… Thanks to Tom, K7RI, for the use of his fine station and to the family cat, Oliver, for constant and wondering companionship throughout (N0AX)… Conditions were excellent, we just ran out of people to work. Very exciting to complete the sweep by 0715Z the first night (K8CC)… I ran in the QRP "Running of the Bulls" and called CQ for most of the 16 hours that I could muster around family needs—great fun to have people find my weaker signal and be rewarded with North Dakota! Let's do it again (K9IUA)… 73 to our friend K9YA who became an SK November 10. Bob, this one was for you [from many SMC logs—*Ed*].

Northeast Region
(New England, Hudson and Atlantic Divisions; Maritime and Quebec Sections)

K3TEJ	108,800	Q	
KM3V	99,520	Q	
N2JT	85,120	Q	
N1RL	81,744	Q	
K1RC	78,694	Q	
K3WU	161,002	A	
WE1USA	160,320	A	
W2TZ	158,400	A	
K1VUT	156,800	A	
N2GA	156,800	A	
N2NT (N2NC, op)	210,240	B	
K5ZD	200,480	B	
K3MM	190,548	B	
WC1M	178,400	B	
K1AM	177,592	B	
AA2FB	160,844	U	
K1NU	125,920	U	
K3WW	122,880	U	
K1HI	83,622	U	
K3SV	79,680	U	
W1AW	206,080	M	
K1TTT	159,040	M	
K2TW	158,720	M	
WR3L	149,120	M	
K4IX	136,320	M	

Southeast Region
(Delta, Roanoke and Southeastern Divisions)

W4PA (at K4JNY)	138,566	Q	
K9AY	103,200	Q	
N4ROA	95,480	Q	
NA4CW	86,580	Q	
N4IR	82,536	Q	
N4ZZ	185,120	A	
W5XX	163,680	A	
W4OC	158,560	A	
NA4K	156,960	A	
K4NO	152,480	A	
WP3R (KE3Q, op)	242,720	B	
W5WMU (N6TR, op)	223,680	B	
W4AN (K4BAI, op)	210,560	B	
N4AF	198,240	B	
W4MR (AA4NC, op)	197,280	B	
W4MYA	168,800	U	
K5MC	132,480	U	
N2NL	129,120	U	
W4NF	121,440	U	
W8ZA	121,028	U	
K5MDX	169,120	M	
K4TS	106,080	M	
W4ZYT	95,680	M	
W4WA	80,800	M	
W4ATC	108	M	

Central Region
(Central and Great Lakes Divisions, Ontario Section)

N9CIQ	130,080	Q	
W8RU	102,700	Q	
N8ET	95,004	Q	
WA8RJF	77,000	Q	
WA8RCN	64,600	Q	
VA3UZ	166,400	A	
K9TM	158,400	A	
N9CK	156,000	A	
K9IG	153,440	A	
WX9U	145,760	A	
N9RV	202,400	B	
N4GN	189,920	B	
W9RE	184,480	B	
K9NW (at N8NR)	177,440	B	
KE9I	171,840	B	
K9MOT (K9PW, op)	146,240	U	
K9NR	137,904	U	
WG9L	130,880	U	
AA8U	82,560	U	
K9CW	48,640	U	
K8CC	190,240	M	
KW9A	151,520	M	
K8JM	149,120	M	
W8EDU	147,520	M	
K8EE	80,364	M	

Midwest Region
(Dakota, Midwest, Rocky Mountain and West Gulf Divisions, Manitoba and Saskatchewan Sections)

K5NZ	137,440	Q	
KG5U	131,456	Q	
N0UR	108,576	Q	
N0SS	105,386	Q	
K5WO	101,948	Q	
N0AT	175,520	A	
K5WA	173,440	A	
VE4VV	168,960	A	
K0OB	168,640	A	
N0NR	165,920	A	
N0NI (AG9A, op)	221,120	B	
W0SD (WD0T, op)	219,360	B	
N5RZ	217,120	B	
N5KO (at W5KFT)	209,920	B	
WX0B (K5GA, op)	201,280	B	
K5HP	138,996	U	
KT0R	133,760	U	
WA0SXV	119,040	U	
K8EI	84,700	U	
N5ZC	50,320	U	
N6VR	206,080	M	
K7UP	195,680	M	
AB0S	171,746	M	
W7CT	168,800	M	
N5YA	161,120	M	
W5TM	150,540	M	

West Coast Region
(Pacific, Northwestern and Southwestern Divisions, Alberta, British Columbia and NWT/Yukon Sections)

N6MU	127,520	Q	
K7RI (N0AX, op)	116,688	Q	
N7IR	105,228	Q	
N3ZZ	90,480	Q	
K7QO	87,048	Q	
K6LA	184,480	A	
K7BG	176,800	A	
K4XU	167,360	A	
WO7Y	163,846	A	
N7OU	161,616	A	
K6LL	208,800	B	
W6EEN (N6RT, op)	206,400	B	
VA7RR	201,600	B	
K6KM (N6TV, op)	200,160	B	
W6AX (N6IG, op)	199,680	B	
K7BV	199,200	U	
N6ZS	162,400	U	
K6RIM	149,920	U	
K6III	127,360	U	
W6OAT	122,240	U	
W6VR	206,080	M	
W6UE	191,520	M	
KL7Y	190,560	M	
W6YX	190,400	M	
N6KI	175,680	M	

Q = Single Operator QRP; A = Single Operator Low Power; B = Single Operator High Power; U = Single Operator Unlimited; M = Multioperator

2000 CW Sweepstakes Plaques

Category	*Winner*	*Sponsor*
Overall		
Single Operator High Power CW	WP3R (KE3Q, op)	N5KO and W0UA
Single Operator Low Power CW	N4ZZ	
Single Operator QRP CW	W4PA (at K4JNY)	
Single Operator Unlimited CW	K7BV	ARRL Contest Branch
Multioperator CW	tie: N6VR and W1AW	
School Club College Division CW	W5YM (N5DX, op)	Mark Smith KD4JLC Memorial
Atlantic		
Single Operator High Power CW	K3MM	North Coast Contesters
Single Operator Low Power CW	K3WU	
Single Operator QRP CW	K3TEJ	Gary Hembree, N7IR
Single Operator Unlimited CW	K3WW	
Multioperator CW	WR3L	North Coast Contesters
Central		
Single Operator High Power CW	N9RV	In Memory of Richard Harper, W9RW by SMC
Single Operator Low Power CW	N9CK	In Memory of Mike Corke, N9AEJ by SMC
Single Operator QRP CW	N9CIQ	W9QOX Memorial
Single Operator Unlimited CW	K9MOT (K9PW, op)	In Memory of Robert Heytow, K9YA by SMC
Multioperator CW	KW9A	Don Haney, W9WW
Dakota		
Single Operator High Power CW	W0SD (WD0T, op)	Minnesota Wireless Assn
Single Operator Low Power CW	N0AT	Minnesota Wireless Assn
Single Operator QRP CW	N0UR	K0TO
Single Unlimited CW	KT0R	Minnesota Wireless Assn
Multioperator CW		Minnesota Wireless Assn
Delta		
Single Operator High Power CW	W5WMU (N6TR, op)	
Single Operator Low Power CW	N4ZZ	
Single Operator QRP CW	N4IR	
Single Unlimited CW	K5MC	
Multioperator CW	K5MDX	
Great Lakes		
Single Operator High Power CW	N4GN	North Coast Contesters
Single Operator Low Power CW	K9TM	Mad River Radio Club
Single Operator QRP CW	W8RU	
Single Operator Unlimited CW	AA8U	
Multioperator CW	K8CC	
Hudson		
Single Operator High Power CW	N2NT (N2NC, op)	
Single Operator Low Power CW	N2GA	
Single Operator QRP CW	N2JT	
Single Operator Unlimited CW	AA2FB	
Multioperator CW	K2TW	Stuart Silverstein, K3UEI, Memorial
Midwest		
Single Operator High Power CW	N0NI (AG9A, op)	
Single Operator Low Power CW	K0VBU	
Single Operator QRP CW	N0SS	
Single Operator Unlimited CW	WA0SXV	Kirk Pengelly, N0KK
Multioperator CW	AB0S	
New England		
Single Operator High Power CW	K5ZD	
Single Operator Low Power CW	WE1USA	
Single Operator QRP CW	N1RL	QRP Club of New England
Single Operator Unlimited CW	K1NU	
Multioperator CW	K1TTT*	
Northwestern		
Single Operator High Power CW	N4SL	
Single Operator Low Power CW	K7BG	
Single Operator QRP CW	K7RI (N0AX, op)	
Single Operator Unlimited CW	W7OM	
Multioperator CW	KL7Y	
Pacific		
Single Operator High Power CW	K6KM (N6TV, op)	
Single Operator Low Power CW	W6QD	Robert A. Wilson, N6TV
Single Operator QRP CW	N6MU	
Single Operator Unlimited CW	N6ZS*	
Multioperator CW	W6YX	
Roanoke		
Single Operator High Power CW	N4AF	
Single Operator Low Power CW	W4OC	
Single Operator QRP CW	N4ROA	
Single Operator Unlimited CW	W4MYA	
Multioperator CW	K4TS	Tidewater Morse Code Society
Rocky Mountain		
Single Operator High Power CW	W0ZP	
Single Operator Low Power CW	N0NR	
Single Operator QRP CW	K0FRP	
Single Operator Unlimited CW	K8EI	
Multioperator CW	K7UP	
Southeastern		
Single Operator High Power CW	K1TO*	
Single Operator Low Power CW	NP2B	
Single Operator QRP CW	K9AY	Bill Harding, K4AHK
Single Operator Unlimited CW	N2NL	
Multioperator CW	W4WA	
Southwestern		
Single Operator High Power CW	K6LL	
Single Operator Low Power CW	K6LA	Larry Serra, N6NC
Single Operator QRP CW	N7IR	Ray and Donna Day, N6HE & N6HTH
Single Operator Unlimited CW	K6ZH	
Multioperator CW	W6UE*	
West Gulf		
Single Operator High Power CW	N5RZ	
Single Operator Low Power CW	K5WA	
Single Operator QRP CW	K5NZ	
Single Operator Unlimited CW	K5HP	
Multioperator CW	N5YA	
Canada		
Single Operator High Power CW	VA7RR	
Single Operator Low Power CW	VA3UZ*	Don Haney, W9WW
Single Operator QRP CW	VA3SB	
Single Operator Unlimited CW	No Winner	
Multioperator CW	VE2/W2YC	

*Division plaque awarded to second-place finisher because the first-place Division winner also won an "Overall" plaque category.

Scores

CW scores are listed in descending order by entry category. Line scores list call sign, score QSOs, multipliers, hours, class (B = High Power, A = Low Power, Q = QRP, U = Single Unlimited, M = Multioperator, S = School Club).

CW

1

Connecticut

W1WEF	172,536	1092	79	24	B
K1WB	149,920	937	80	24	B
W1EQ	132,912	852	78	24	A
K1UQE	44,020	310	71	10	A
NX1Q	24,696	196	63	7	A
K1RO	24,308	206	59	3	A
W1INF (NT1N, op)					
	288	12	12	1	A
NT1N	98	7	7	1	A
W1QK	58,216	383	76	14	Q
W1RFI	9,374	109	43	16	Q
W1VT	72	6	6	1	Q
WS1F	15,836	107	74	8	U
N1MM	14,022	123	57	4	U
N1XS	13,640	124	55	5	U
N4XR	1,776	37	24	1	U
W1AW (NT1N,W9UR,N1ND,W1VT, ops)					
	206,080	1288	80	24	M
W1NRG (W1KKF,W1FD,WY1U,N1JEO, K1VDF, N1RMA,WA1TRY,KB1CIW, N1API, ops)					
	60,640	379	80	15	M

Eastern Massachusetts

W1AF (K3UOC, op)					
	132,132	847	78	22	B
K5MA	129,760	811	80	17	B
K1LU	129,636	831	78	23	B
WZ1K	87,318	567	77	23	B
K1SEC	29,440	230	64	7	B
N1AU	3,588	46	39	5	B
K1GU	3,168	48	33	4	B
K1VUT	156,800	980	80	24	A
W1WAI	122,766	777	79	22	A
K1HT	103,806	657	79	14	A
WA1OLV	97,960	620	79	23	A
K1XM	89,902	569	79	24	A
K1KG	76,314	483	79	19	A
K1NTR	69,300	450	77	13	A
K1TWF	47,854	337	71	5	A
N1DC	38,088	276	69	19	A
K1ZA	19,610	185	53	4	A
K1MC	14,940	166	45	11	A
W1CCE	14,224	127	56	7	A
NF1A	9,504	99	48	7	A
W1SR	3,200	50	32	2	A
KB1CJ	4	1	2	1	A
K1RC	78,694	511	77	21	Q
WG1Z	24,888	204	61	14	Q
K1NU	125,920	787	80	23	U
K1TH	24,840	207	60	5	U
WO1N	24,034	197	61	4	U
K1JE	14,036	121	58	7	U
N1GR (+AG1C,KA1VWX)					
	38,690	265	73	15	M

Maine

K1PQS	113,256	726	78	24	A
KX1E	97,968	628	78	23	A
NY1S	97,644	618	79	21	A
K1JB	51,538	353	73	6	A
W1M	920	23	20	4	A
N1MHB	680	20	17	2	A

New Hampshire

WC1M	178,400	1115	80	24	B
WE1USA	160,320	1002	80	23	A
KG1V	74,328	489	76	18	A
KC1F	63,804	409	78	8	A
KZ1O	54,576	379	72	10	A
K1TR	34,190	263	65	5	A
NN1R (K1RO, op)					
	28,350	225	63	5	A
K2HVN	15,600	100	78	7	A
AA1CA	47,400	316	75	17	Q
KS1N	15,000	150	50	10	Q
W1PID	4,488	66	34	24	Q
W1DAD	612	18	17	2	Q
K1HI	83,622	543	77	12	U
NM1W	15,372	122	63	6	U
KD1LZ	13,080	109	60	8	U
K1PSC (AE1T, op)					
	18,460	142	65	4	S

Rhode Island

K1AM	177,592	1124	79	22	B
N1SW	135,564	858	79	22	B
KM1X	139,520	872	80	24	A
K3IU	60,996	391	78	14	A
K1VSJ	34,060	262	65	7	A
AB1BX	19,690	179	55	10	A
W1RFQ	510	17	15	1	A

Vermont

W1ECH	147,520	922	80	23	A
W1SA	101,120	632	80	13	A
K1KD	95,472	612	78	22	A
K1LI	82,634	523	79	24	A
AA1SU	72,808	479	76	14	A
KM1Z	9,752	92	53	11	Q
WJ1Z (+AB1T)					
	95,784	614	78	20	M

Western Massachusetts

K5ZD	200,480	1253	80	24	B
KZ1M	118,080	738	80	21	A
W1TO	64,148	406	79	13	A
N1RL	81,744	524	78	22	Q
W1CSM	22,308	169	66	6	Q
K1TTT (+ W1MJ, K1WD)					
	159,040	994	80	24	M

2

Eastern New York

N2SQW	42,768	297	72	20	B
N2POS	23,312	188	62	10	B
K2UF	126,240	789	80	23	A
WA2BAH	52,050	347	75	24	A
W2XM	41,406	309	67	13	A
W2WC	34,400	215	80	24	A
W2ENY	28,116	198	71	14	A
WB2SPN	20,520	180	57	11	A
W2VS	15,872	128	62	3	A
W2NRD	13,286	91	73	10	A
WD2K	13,130	101	65	13	A
NW2D	912	19	24	7	A
K2DW	51,262	361	71	19	Q
N2IX	2,268	42	27	4	Q
K2SX	98,080	613	80	12	U
K2UG (KY2J, W2XL, WA2JQK, ops)					
	132,720	840	79	24	M

Northern New Jersey

N2NT (N2NC, op)					
	210,240	1314	80	24	B
K2APF	10,890	99	55	11	B
N2ZW	63,910	415	77	22	A
NA2AA	60,528	388	78	11	A
W2LRO	42,192	293	72	13	A
K2WA	33,580	230	73	13	A
KG2MV	19,344	156	62	9	A
K2TWK	18,924	166	57	12	A
W2YR	18,720	144	65	6	A
W2YWC	17,514	139	63	11	A
N2CG	17,100	150	57	10	A
W2ZK	14,100	94	75	6	A
WA2ASQ	12,700	127	50	5	A
W2TI	4,692	69	34	4	A
N2JT	85,120	532	80	22	Q
KF2HC	46,768	316	74	15	Q
N2NO	23,296	182	64	12	Q
W2JEK	7,200	80	45	3	Q
K2JT	1,512	36	21	1	Q
W2LE	79,040	494	80	14	U
N2ED	69,760	436	80	9	U
N2BIM	67,606	439	77	10	U
N2KJM	33,552	233	72	7	U
W2NO	30,450	203	75	11	U
AB2DE	12,600	90	70	11	U
K2TW (+W2GD)					
	158,720	992	80	16	M
KF2EW (+KC2GDT)					
	5,040	70	36	8	M

Northern New York

NT2W	60,192	418	72	13	A
W2IB	31,682	217	73	20	A
N4TW	21,252	161	66	6	A
N2USN	10,248	84	61	15	A
WZ2T	77,100	514	75	23	Q
N2JNZ	18,178	149	61	18	Q
K2NNY (K2CS, op)	16,560	138	60	12	Q
K2CC (KC2BGM, op)	27,872	208	67	10	S

NYC-Long Island

KD2RD	148,046	937	79	24	B
N2GC	143,200	895	80	22	B
N2GA	156,800	980	80	24	A
KA2D	43,890	285	77	16	A
W2KTF	28,566	207	69	6	A
N2NI	23,808	192	62	9	A
WA2PJI	23,250	155	75	13	A
WA2MAV	14,112	144	49	6	A
KQ2V	13,144	124	53	24	A
WW2G	7,200	80	45	8	A
W2HLI	51,652	349	74	20	Q
WB5GWB	9,604	98	49	4	Q
AA2VK	242	11	11	2	Q
AA2FB	160,844	1018	79	24	U
K2QMF	67,680	423	80	13	U
WO2N	32,376	213	76	14	U
N2FF	9,752	92	53	12	U

Southern New Jersey

N2OO	45,780	327	70	5	B
W2ZQ (K2QM, op)	23,320	220	53	8	B
NN2Y	4,864	64	38	14	B
W2MMD	82,002	519	79	19	A
KD2P	53,820	345	78	14	A
WA2VQV	46,800	300	78	16	A
NJ2DX	18,480	154	60	10	A
K2MK	18,056	148	61	3	A
W5KI	13,216	118	56	3	A
K2HPV	18,600	150	62	7	Q
N2CQ	17,556	154	57	6	Q

Western New York

N2CU	167,200	1045	80	24	B
K2FU	129,052	838	77	22	B
W6XR	127,040	794	80	19	B
N2MF	73,872	513	72	10	B
N2MG	58,800	392	75	8	B
K8FC	45,436	307	74	13	B
W2FU	27,872	208	67	5	B
W2FE	21,120	165	64	9	B
W2TZ	158,400	990	80	24	A
W2KA	131,360	821	80	24	A
N2RD	99,856	632	79	20	A
KU2N	85,920	537	80	18	A
W2TX	69,608	452	77	13	A
WA2EYA	57,572	389	74	15	A
W2EZ	56,100	374	75	21	A
N2XT	33,440	220	76	20	A
K2CF	22,656	192	59	15	A
KF2JC	11,610	135	43	12	A
AE2T	68,376	444	77	15	Q
W2EB	42,104	277	76	21	Q
K2CY	17,940	138	65	10	Q
N2DM	12,852	119	54	14	Q
N2WK	48,320	302	80	14	U
N2UM	24,236	166	73	9	U
W2RW (+WB2KAO)	60,528	388	78	9	M
K2YF (K2YEH, K2CDJ, op)	42,976	272	79	16	M
W2SEX (K2YW, K2ZR, WB2AIV, W2TPC, KB2VVD, KC2ALA, KC2FNG, KB2UZM, ops)	24,648	158	78	16	M
K2FA (KA2KQP, N2AWT, W2HQ, ops)	11,024	104	53	9	M

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Delaware

W3PP	145,600	910	80	19	B
NY3C	17,544	129	68	8	A
N9GG	7,920	88	45	3	A
N8NA	28,350	225	63	6	Q
N3KW	36,112	244	74	17	U
K4IX (+KT4P)	136,320	852	80	23	M

Eastern Pennsylvania

AA3B	173,958	1101	79	24	B
AA3TT	91,104	584	78	14	B
K3WU	161,002	1019	79	24	A
KC3M	125,440	784	80	20	A
WF3M	72,816	492	74	12	A
N2EY	62,678	407	77	15	A
W3KM	51,680	340	76	10	A
NU3Z	32,568	236	69	10	A
AG3G	26,838	189	71	11	A
W3AP	25,220	194	65	5	A
K3QIA	20,984	172	61	7	A
W3SD	20,068	173	58	4	A
N3RM	18,176	128	71	6	A
N3FA	17,908	121	74	8	A
N9AX	9,888	103	48	6	A
N3NZ	7,110	79	45	5	A
NE3H	6,560	80	41	2	A
W3SSS	1,656	36	23	4	A
K3TEJ	108,800	680	80	24	Q
WB3AAL	36,820	263	70	17	Q
N3RN	30,418	227	67	24	Q
WA2GBF	16,124	139	58	16	Q
KW3U	9,844	107	46	9	Q
K3WW	122,880	768	80	15	U
K3SV	79,680	498	80	14	U
W3FV	58,756	397	74	9	U
WY3T (+KA3EVA, W3DSX, N3JRW, W3BDR)	44,800	280	80	20	M

Maryland-DC

K3MM	190,548	1206	79	24	B
K3SA	160,800	1005	80	23	B
K2PLF	158,948	1006	79	24	B
W3HVQ	113,190	735	77	24	B
N3AM	113,100	725	78	13	B
W3AZ	65,208	418	78	18	B
W3GN	21,546	171	63	6	B
N3SB	107,492	698	77	22	A
W3CB	99,520	622	80	22	A
W2GG	99,040	619	80	17	A
NC3Y	92,880	645	72	22	A
N3II	85,488	548	78	15	A
NG3K	81,158	527	77	18	A
N1WR	66,834	423	79	11	A
K3KU	66,150	441	75	17	A
W3UT	62,850	419	75	18	A
K3TM	53,856	630	72	23	A
W3DAD	52,592	346	76	10	A
W3KX	50,008	329	76	12	A
W3CP	46,224	321	72	13	A
N3UN	38,448	267	72	17	A
NY3M	24,552	186	66	6	A
K3DSP	20,708	167	62	12	A
K3YDX	19,840	155	64	6	A
W3ERU	19,220	155	62	7	A
W3ZJ	18,620	133	70	9	A
K3TW	9,450	105	45	3	A
KM3V	99,520	622	80	18	Q
K3AJ	71,760	460	78	17	Q
WD3P	68,328	468	73	19	Q
K3GHH	31,602	229	69	13	Q
K4JSI	16,074	141	57	14	Q
N3WK	4,028	53	38	4	Q
K3DI	104,160	651	80	22	U
N3OC	66,612	427	78	12	U
K3RA	64,800	432	75	10	U
WX3B	62,456	422	74	10	U
N3HUV	5,208	62	42	6	U
WR3L (+K3FT,WR3Z, KA3TUL)	149,120	932	80	24	M

Western Pennsylvania

WA3SES	142,428	913	78	24	A
WA3HAE	136,480	853	80	23	A
N3IXR	109,810	695	79	21	A
AD8J	43,956	297	74	10	A
AA3ML	35,770	245	73	15	A
W3IA	28,140	210	67	18	A
NB4J	25,200	180	70	7	A
N3YEA	10,848	113	48	11	A
K3JHT	10,192	104	49	7	A
W3BBO	74,568	478	78	20	Q
K3CR (KB3AFT, op)	11,016	108	51	2	Q

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Alabama

K4NO	152,480	953	80	21	A
KC4TEO	105,028	682	77	23	A
W4NTI	103,806	657	79	22	A
K4WI	84,160	526	80	19	A
WX4I	23,712	152	78	22	A
W5DLM	17,464	148	59	6	A
W4UTI	13,568	128	53	6	A
KS4L	65,712	444	74	20	Q
W4DEC	61,800	412	75	19	Q

Georgia

W4AN (K4BAI, op)	210,560	1316	80	24	B
W4BTZ	117,920	737	80	22	B
K4AAA (W4AN, op)	81,120	520	78	8	B
K4OGG	150,416	952	79	24	A
N8LM	85,880	565	76	20	A
N4DU	71,258	451	79	12	A
AE4Y	60,768	422	72	13	A
K4SB	51,324	329	78	12	A
NJ8J	31,548	239	66	13	A
W4SAS	360	15	12	2	A
AA4LR	252	14	9	1	A
K9AY	103,200	645	80	23	Q
W4QO	40,464	281	72	24	Q
W4DU	25,024	184	68	9	Q
K4GSX	18,468	162	57	18	Q
AF4PP	16,080	134	60	10	Q
W4AQL (N4QX, op)	15,616	128	61	11	Q
KW4E	13,920	116	60	4	Q
W4WA (+K4BI,K4IDX,AA4GA, ops)	80,800	505	80	13	M

Kentucky

N4GN	189,920	1187	80	24	B
K4IU	38,448	267	72	11	B
N4XM	21,080	170	62	5	B
K4IE	116,736	768	76	24	A
KG4BIG	115,024	728	79	22	A
N4UL	70,152	474	74	18	A
AA2GS	66,528	432	77	18	A
K4FXN	44,352	308	72	6	A
N4JRG	36,190	235	77	13	A
KO4OL	28,368	197	72	11	A
KF4GQN	14,904	108	69	11	A
W4DES	8,176	73	56	13	A
K4AVX	10,600	100	53	6	Q
AG4CZ	10,584	98	54	7	Q

North Carolina

N4AF	198,240	1239	80	23	B
W4MR (AA4NC, op)	197,280	1233	80	24	B
N4CW	157,440	984	80	23	B
K4MA	144,452	938	77	24	B
K2AV	78,624	504	78	11	B
KS4XG	28,600	220	65	11	B
W4AGI	2,268	54	21	2	B
W2CS (at KI7WX)	150,720	942	80	24	A
WJ9B	132,444	849	78	24	A
K4QPL	130,034	823	79	24	A
N2NFG	127,680	840	76	24	A
N4YDU	121,502	769	79	22	A
N4MO	108,420	695	78	22	A
W4IDX	93,024	612	76	19	A
NW6S	91,482	579	79	16	A
AD4IE	49,096	323	76	14	A
KZ2I	27,144	174	78	11	A
KS4S	8,096	92	44	3	A
K4NC	1,600	32	25	4	A
N2WG	41,040	285	72	21	Q
KO4PY	39,760	284	70	11	Q
AE4IC	37,520	268	70	23	Q
AE4EC	7,110	79	45	11	Q
K3KO	108,480	678	80	14	U
NT4D	29,394	213	69	7	U
W4ZYT (+W4SD,KC4VZK,W8RJL, AF4CD,N8CH,KU4EC)	95,680	598	80	24	M
W4ATC (WW4M,KF4RDN, ops)	108	9	6	1	M
NA4P	11,988	111	54	7	S

Northern Florida

W9IOP (W3TMZ, op)	30,888	234	66	5	B
NU4Y	96,538	611	79	14	A
NF4A	75,816	486	78	13	A
W2EJG	32,412	219	74	16	A
K4LDR	26,792	197	68	7	A
KB4N	26,586	211	63	8	A
WB4IHI	20,020	154	65	8	A
KN4Y	11,036	89	62	9	A
NO4S	58,350	389	75	14	Q

Puerto Rico

WP3R (KE3Q, op)	242,720	1517	80	24	B

South Carolina

W4OC	158,560	991	80	21	A
WA8OJR	52,650	351	75	13	A
W8PC	39,858	273	73	17	A
AF4OX	20,532	177	58	5	A
K0COP	8,084	94	43	24	A
N4EE	2	1	1	1	A

Southern Florida

K1PT	157,920	987	80	23	B
AD4TR	40,848	276	74	22	B
W4SAA	34,716	263	66	23	B
AE4SW	37,350	249	75	8	A
W4QV	23,392	172	68	13	A
KN4JN	18,270	145	63	10	A
WD4JR	12,204	113	54	5	A
WA4RRB	10,804	74	73	9	A
N4CU	4,872	58	42	7	A
NA4CW	86,580	555	78	21	Q
W4FMS	38,216	281	68	22	Q
NM2A	8,000	100	40	7	Q
N2NL	129,120	807	80	21	U

Tennessee

W4CAT (K1KY, op)	178,382	1129	79	23	B
K0EJ	155,360	971	80	24	B
K4LTA	144,254	913	79	24	B
K4AMC	93,760	586	80	12	B
K4RO	54,896	376	73	7	B
N4ZZ	185,120	1157	80	24	A
NA4K	156,960	981	80	24	A
W9WI	143,360	896	80	21	A
N4DW	133,352	844	79	24	A
N4ZI	131,456	832	79	21	A
WO4O	124,640	779	80	23	A
K3CQ	99,698	631	79	17	A
K4BEV	54,750	365	75	22	A
K4BX	53,960	355	76	20	A
W4HZD	52,744	347	76	22	A
W4DAN	32,964	246	67	13	A
W4TYU	27,462	199	69	9	A
K4YZ	24,160	151	80	19	A
N4PQV	19,404	154	63	14	A
W4YGE	19,278	153	63	20	A
W4RK	18,480	140	66	9	A
W4NI	14,160	120	59	10	A
KE4OAR	7,560	84	45	7	A
W4OGG	3,500	50	35	2	A
WA4HLV	1,080	30	18	6	A
W4PA (at K4JNY)	138,566	877	79	24	Q
N4IR	82,536	543	76	18	Q

Virgin Islands

NP2B	179,040	1119	80	24	A
WP2Z (NU0Q, op)	176,000	1100	80	24	A
KP2/K0DI	152,470	965	79	24	A
KP2D (KP2N,NP2E,NP2W,NP2DJ, ops)	33,552	233	72	22	M

Virginia

K4TX	108,888	698	78	24	B
KT3Y	84,512	556	76	10	B
W4RX	81,432	522	78	15	B
W4BQF	75,320	538	70	12	B
W3YY	74,690	485	77	14	B
N4MM	71,840	449	80	23	B
N4PD	46,860	330	71	14	B
AE4IX	28,290	205	69	16	B
N6MW	12,324	78	79	6	B
K7SV	106,880	668	80	17	A
W4YE	100,330	635	79	17	A
K5VG	66,868	458	73	16	A
K4ZW	64,160	401	80	12	A
KK4R	48,488	319	76	10	A
W4VG	48,100	325	74	13	A
K4JK	40,256	296	68	16	A
K4OAQ	31,590	243	65	6	A
K4FPF	28,182	183	77	8	A
K4UVT	27,492	174	79	12	A
K4MX	25,916	209	62	4	A
AA4KD	21,710	167	65	12	A
N3MA	19,800	150	66	7	A
AL7HW	14,946	141	53	4	A
W4PW	14,630	133	55	11	A
W4DC	14,616	116	63	6	A
N4ST	10,272	107	48	4	A
WD4ELJ	9,720	90	54	6	A
K3MT	8,428	86	49	4	A
N3TG	1,240	31	20	1	A
N4ROA	95,480	620	77	24	Q
N4GU	75,306	489	77	21	Q
W4PRO	74,690	485	77	19	Q
AF3T	52,950	353	75	12	Q
K4UK	39,664	268	74	17	Q
KC4TVN	17,748	153	58	11	Q
WB4JJJ	13,056	128	51	7	Q
W4IM	6,970	85	41	9	Q
K1FR	480	20	12	1	Q
W4MYA	168,800	1055	80	24	U
W4NF	121,440	759	80	19	U
W4HJ	31,552	232	68	11	U
WR4I	26,460	189	70	11	U
K4TS (NR4M,K4GMH,K1SE, ops)	106,080	663	80	20	M

West Central Florida

K1TO	215,040	1344	80	24	B
N4AO	173,120	1082	80	24	B
K4OJ	152,000	950	80	19	B
K4LQ	109,178	691	79	22	B
W1CW	60,000	400	75	14	B
W1YL	2,700	50	27	2	B
K4WCF (WD4AHZ, op)	131,840	824	80	24	A
K5KG	86,702	563	77	16	A
W4MVZ (K8XF, op)	45,072	313	72	17	A
K1SSH	40,754	287	71	10	A
K4FB	40,500	270	75	14	Q
N4PK	6,480	72	45	6	Q
W4STX	836	22	19	3	Q

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Arkansas

W5ON	72,964	493	74	14	B
W5HUQ	18,960	158	60	6	B
KM5G	142,240	889	80	24	A
WA5BDU	93,852	594	79	17	A
KJ5WX	36,150	241	75	12	A
W0LK	16,500	150	55	8	Q
K5JH	9,212	98	47	7	Q
KK5IB	2,024	44	23	7	Q
W5YM (N5DX, op)	168,480	1053	80	24	S

Louisiana

W5WMU (N6TR, op)	223,680	1398	80	24	B
AA5AU	122,720	767	80	19	A
WA5JWU	32,760	210	78	12	A
KC5R	47,742	327	73	14	Q
N5IB	29,304	222	66	17	Q
WD5CBL	10,100	101	50	17	Q
K5MC	132,480	828	80	23	U

Mississippi

W5XX	163,680	1023	80	24	A
N5UE	60,672	384	79	24	A
KB5IXI	16,688	149	56	5	A
K5MDX (WQ5L,W5UE,N5PA, ops)	169,120	1057	80	23	M

New Mexico

N6ZZ	134,932	854	79	15	B
W5JOV	15,080	130	58	4	B
W5YZ	68,640	429	80	13	A
N5CU	10,752	112	48	8	A
N5UL	4,760	70	34	2	A
N0QT	43,776	304	72	24	Q
K5BNZ	20,224	158	64	15	Q
K7IA	6,750	75	45	6	Q
K7UP (+AA5B)	195,680	1223	80	24	M

North Texas

WX0B (K5GA, op)	201,280	1258	80	22	B
K5RX	150,880	943	80	18	B
N5PO	113,286	717	79	17	B
N5RG	112,022	709	79	22	B
N8SM	105,612	677	78	13	B
N5KM	16,640	104	80	7	B
WQ5W	144,096	912	79	21	A
W5MYA	104,880	690	76	15	A
WD5K	102,720	642	80	17	A
NN5T	84,214	533	79	18	A
K5QX	72,996	462	79	15	A
KE5C	65,832	422	78	21	A
W8FN	59,200	400	74	9	A
W3DYA	43,056	299	72	9	A
W5RYV	28,676	214	67	17	A
K5RA	22,848	168	68	9	A
WA5MS	18,000	150	60	10	A
N5JB	17,360	140	62	3	A
W5KAU	14,364	126	57	9	A
K5CEM	11,286	99	57	11	A
K5WO	101,948	662	77	24	Q
WA8ZBT	52,950	353	75	19	Q
W5RYA	32,200	230	70	15	Q
NM5M	23,392	172	68	6	Q
N4JIU	14,178	139	51	10	Q
WD5ICQ	12,920	95	68	15	Q
K4NR	12,772	103	62	5	Q
KC5NT	5,934	69	43	13	Q
NR3E	4,026	61	33	4	Q
W5GN	12,896	124	52	3	U
N5YA (+N5UM,N5KR)	161,120	1007	80	23	M
WA5BU (K5LH,N5VHO, ops)	105,280	658	80	24	S

Oklahoma

K5KA	175,040	1094	80	23	B
N5NA	142,400	890	80	18	B
K5YAA	136,828	866	79	18	B
K8FU	62,928	414	76	24	A
N5XE	54,168	366	74	24	A
N5DY	21,528	156	69	13	A
WD0GTY	19,460	139	70	24	A
N5OT	360	15	12	24	A
WA5RAT (N5OT, op)	50	5	5	24	A
K5DP	19,600	175	56	7	Q
K5AAR	14,490	115	63	10	Q
K5HP	138,996	891	78	24	U
W5TM (+W5AO)	150,540	965	78	24	M

South Texas

N5KO (at W5KFT)	209,920	1312	80	24	B
K5PI	177,750	1125	79	24	B
AD5Q	174,880	1093	80	24	B
W5ASP	151,200	945	80	20	B
W5RQ	138,092	874	79	20	B
W5XD	95,608	629	76	13	B
K5WA	173,440	1084	80	23	A
N5TU	144,640	904	80	24	A
W5IX	93,220	590	79	16	A
N2LA	82,680	530	78	24	A
AJ4F	81,928	539	76	16	A
KA5KLU	69,600	464	75	19	A
NO5W	65,604	426	77	20	A
AC5AA	59,280	390	76	12	A
WA5SNL	51,264	356	72	21	A
N5AF	45,552	312	73	13	A
K5EJL	34,992	243	72	10	A
KG2BI	26,838	213	63	9	A
K5NZ	137,440	859	80	24	Q
KG5U	131,456	832	79	24	Q
AF5Z	88,160	551	80	21	Q
N5IW	14,630	133	55	24	Q
NO5B	11,400	114	50	13	Q
W5EB	6,600	75	44	10	Q
K5YQF	420	15	14	6	Q
K5CWR	12,800	80	80	24	U
AD5A (+AB5EB)	145,992	924	79	22	M
N5XU (N3TNN,W5JLP,KB5LBN,KT5I, WM5R, ops)	39,900	285	70	22	M
W5AC (KD5GNO,KD5JBS,W1AGG, AG5U, ops)	2,838	43	33	6	S

West Texas

N5RZ	217,120	1357	80	24	B
N5DO	41,180	290	71	5	A
NZ5M	1,200	30	20	3	A
N5ZC	50,320	340	74	8	U

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East Bay

N6RO	193,280	1208	80	24	B
WA6O (at K6ZM)	156,160	976	80	24	B
W6BSY	93,600	585	80	22	B
W6RJ	10,856	118	46	3	B
N6UUG	5,418	63	43	7	B
W6GKF	108,704	688	79	24	A
N6PN	103,488	672	77	20	A
KF6RIP	95,018	617	77	23	A
NF6S	88,006	557	79	15	A
K7GT	71,136	456	78	14	A
K6SRZ	48,438	351	69	10	A
K6XV	37,488	284	66	6	A
K6SV	31,360	224	70	9	A
K6LDX	30,016	224	67	9	A
WB6AAJ	9,696	101	48	24	A
WA0YQM	920	23	20	3	A
W6AGS	50	5	5	4	A
N6WG	15,288	147	52	13	Q
AD6JY	2,432	38	32	11	Q
W6RGG	111,360	696	80	21	U
K6AUC	93,016	604	77	19	U
W6OSP (+AD6E)	129,760	811	80	24	M

Los Angeles

K6LA	184,480	1153	80	24	A
W6KC	112,160	701	80	21	A
N6GL	57,252	367	78	21	A
W3SE	52,360	340	77	17	A
N7KFL	50,768	334	76	14	A
K6ZCL	24,156	183	66	18	A
WO6M	15,616	128	61	8	A
K6NT	12,744	118	54	7	A
WA6BOB	11,554	109	53	6	A
W6HU	30,806	211	73	10	Q
W6RCL	13,794	121	57	6	Q
NK6A	8,928	93	48	7	Q
N6XJG	32	4	4	3	Q
N5BF	76,156	482	79	20	U
N6KZ	52,614	333	79	16	U
W6SW	44,700	298	75	15	U
W6UE (KA6SAR,N6VI,W4EF,W6GRV, ops)	191,520	1197	80	24	M
N6XTT	10,416	93	56	13	M

Orange

W6EEN (N6RT, op)	206,400	1290	80	24	B
K6NR	45,144	297	76	8	B
N6ER	31,460	242	65	4	B
N6HC	161,120	1007	80	24	A
AA6PW	145,392	932	78	24	A
N6BM	93,444	599	78	21	A
WA6OGO	24,308	206	59	24	A
WA6GFR	23,232	176	66	18	A
W6NT	13,000	125	52	17	A
W6ZL	11,880	108	55	4	A
W6TKV	11,330	103	55	10	A
K6EY	6,612	87	38	3	A
KQ6Q	6,080	76	40	8	A
K6HRT	60,800	400	76	19	Q
K6CTW	11,550	105	55	7	Q
W6HT	6,864	88	39	4	U

Pacific

KH6ND/KH5	149,468	946	79	20	B
KH6/KS1F	98,406	639	77	19	A
KH6/KT7G	7,990	85	47	9	A
KH7L	4,864	64	38	6	A
KH6B	286	13	11	8	Q

Sacramento Valley

K6KM (N6TV, op)	200,160	1251	80	24	B
W6AX (N6IG, op)	199,680	1248	80	24	B
K6TA	184,640	1154	80	23	B
W6EU	106,414	691	77	13	B
W6IXP	54,112	356	76	21	B
W6QD	134,880	843	80	23	A
KU6J	90,376	572	79	18	A
W6NKR	78,780	505	78	20	A
K6KYJ	76,472	484	79	23	A
K6LRN	40,296	276	73	9	A
NA6E	26,160	218	60	12	A
KJ6CA	25,200	200	63	7	A
K6BPB	22,444	181	62	15	A
N6FR	14,268	123	58	7	A
K6FO	12,936	98	66	10

Santa Barbara

N6BV	180,800	1130	80	24	B
W7CB	48,944	322	76	14	B
WA6FGV	69,616	458	76	14	A
K6SB (W6GL, op)					
	81,054	513	79	21	Q
N6WS	11,424	112	51	6	Q
KQ6NO	1,092	26	21	4	Q
W6TK	67,860	435	78	11	U
N6VR (+AC6T,KR6X,N6DX,AD6C)					
	206,080	1288	80	24	M

Santa Clara Valley

AE6Y	179,200	1120	80	24	B
N6XI	174,400	1090	80	24	B
K6XX	167,322	1059	79	24	B
AJ6V	158,720	992	80	24	B
W0YK	157,760	986	80	24	B
W6CYX	153,734	973	79	20	B
W6NL	133,600	835	80	16	B
N6ZB	122,608	776	79	23	B
K6GT	118,974	753	79	21	B
K6RB	110,504	727	76	14	B
K6AW (at W6NL)					
	103,026	669	77	10	B
NU6S	98,434	623	79	17	B
W6ISQ	79,680	498	80	14	B
AA6W	77,924	506	77	15	B
W6XB	64,950	433	75	10	B
K6IF	50,320	340	74	8	B
K6MIG	34,950	233	75	18	B
W6CF	11,074	113	49	1	B
N6NF	124,956	801	78	19	A
KX7M	91,048	599	76	21	A
N6YD	39,824	262	76	15	A
W6CT	29,680	212	70	13	A
W1SRD	22,656	177	64	9	A
W9MAK	17,400	150	58	4	A
W6PRI	17,172	162	53	24	A
WD6DX	13,104	126	52	8	A
N6IV	576	18	16	4	A
N3ZZ	90,480	580	78	23	Q
W6IO	74,892	474	79	19	Q
W4NJK	11,024	106	52	8	Q
K6III	127,360	796	80	23	U
W6OAT	122,240	764	80	21	U
K6PUD	56,672	368	77	18	U
AK6L	38,250	255	75	18	U
K6EP	32,708	221	74	18	U
N6ST	29,808	216	69	13	U
W6YX (N7MH,W6LD,N6DE, ops)					
	190,400	1190	80	24	M
N6IJ (+AE0M,AA6EG)					
	143,680	898	80	22	M

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Alaska

KL7WP	32,430	235	69	12	A
KL7FAP	1,150	25	23	4	A
KL7GN	17,516	151	58	10	Q
KL7AC	3,600	60	30	4	Q
KL7Y (+WA2GO)					
	190,560	1191	80	24	M

Arizona

K6LL	208,800	1305	80	24	B
N7FO	151,996	962	79	18	B
W7ZR	147,378	957	77	20	B
W7ZMD	95,628	613	78	19	A
W7YS	91,680	573	80	19	A
NN7A	63,990	405	79	17	A
K7XN	63,294	411	77	19	A
KC7V	54,750	375	73	7	A
N3AIU	37,088	244	76	18	A
N7MAL	24,440	188	65	5	A
W2HTX	20,700	150	69	7	A
K7HP	18,582	163	57	5	A
KJ7WY	13,680	120	57	4	A
N7IR	105,228	666	79	24	Q
K7QO	87,048	558	78	24	Q
W1XT	69,454	451	77	18	Q
K7RE	68,550	457	75	22	Q
AC7A	29,380	226	65	13	Q
N7JXS	24,552	198	62	10	Q
NQ7X	24,552	186	66	10	Q
K7ON	100,562	653	77	15	U
N7UJJ	38,482	271	71	18	U
W7ASU (KC7EFP, op)					
	45,954	333	69	13	S

Eastern Washington

W9LT	113,400	756	75	24	A
WS7V	36,570	265	69	18	A
W7WMO	30,464	238	64	9	A
W7GB	8,800	100	44	2	A
KC7WUE	840	21	20	3	A
K7BFL	9,200	100	46	5	Q
W5ZL	24	4	3	1	Q

Idaho

K7QD	126,150	841	75	16	B
K0TO	93,000	620	75	24	B
WO7Y	163,846	1037	79	24	A
W7ZRC	152,460	990	77	22	A
KK7A	11,660	106	55	3	A
W7QDM	62,400	416	75	14	Q
AB7YB (+ KI7RO)					
	59,130	405	73	20	M
W7UQ (KL9A, op)					
	94,402	613	77	12	S

Montana

KS7T	111,750	745	75	22	B
K7BG	176,800	1105	80	24	A
AC7GM	9,870	105	47	13	A
K7JM	9,292	101	46	8	A
AB7CE	13,452	118	57	12	Q
K7ABV	38,088	276	69	6	U

Nevada

K7NV	188,640	1179	80	24	B
N7ON	37,288	236	79	15	A
K5RC	4,992	64	39	1	A
K6GNX	36	6	3	24	A
WD7Y	10,500	105	50	12	Q
K6CNE	6,348	69	46	10	Q
K7BV	199,200	1245	80	24	U

Oregon

W7HWR	18,304	176	52	5	B
K4XU	167,360	1046	80	23	A
N7OU	161,616	1036	78	24	A
W7GG	78,588	531	74	9	A
K7PJT	60,952	401	76	20	A
N7NS	53,808	354	76	14	A
K7FU	39,480	282	70	10	A
K7DM	6,164	67	46	6	A
W7IZ	1,518	33	23	1	A
K7LOW	63,680	398	80	16	Q
K7EL	17,664	138	64	13	Q
N7VS	13,200	120	55	10	Q
N7CQR	3,604	53	34	7	Q
KK7GG	288	12	12	1	Q

Utah

W7UT	143,148	906	79	20	B
KO7X	137,776	872	79	16	B
N7IF	60,828	411	74	15	A
W7GT	44,640	310	72	12	A
W7HS	35,850	239	75	18	A
KE7NS	23,520	168	70	9	A
W8EQA	9,984	96	52	5	A
KI7KA	5,418	63	43	9	A
K6EIL	82,688	544	76	22	Q
K8EI	84,700	550	77	17	U
W7CT (+NC7W)					
	168,800	1055	80	24	M

Western Washington

N4SL	155,064	994	78	24	B
N7ETC	104,052	667	78	19	B
K6KR	38,080	272	70	5	B
N7DOE	12,096	112	54	9	B
W7RM (KK7GW, op)					
	156,780	1005	78	23	A
K7QQ	152,160	951	80	21	A
N7LOX	146,640	940	78	24	A
N7WA	136,136	884	77	24	A
AE7EE	93,852	594	79	24	A
AB7RW	77,376	496	78	19	A
W7QN	75,544	497	76	16	A
KN7T	49,280	352	70	8	A
W7IJ	37,204	262	71	12	A
KB7N	32,428	242	67	10	A
NA7R	29,784	219	68	18	A
W7POE	24,824	214	58	8	A
W7BYK	15,120	140	54	8	A
KD7LJ	14,352	138	52	9	A
KD7GTI	13,780	106	65	11	A
W6SGJ/7	12,078	99	61	6	A
K7RI (N0AX, op)					
	116,688	748	78	24	Q
KX7L	45,582	321	71	13	Q
W7/JR1NKN					
	26,398	197	67	24	Q
N7RVD	21,120	192	55	10	Q
W7EAI	2,688	42	32	4	Q
W7OM	107,124	678	79	16	U
N7PP (NN7L, W7BUN, ops)					
	53,600	400	67	14	M

Wyoming

W7TSM	89,550	597	75	24	A
W7CA	9,898	101	49	3	A

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Michigan

N8EA	144,000	900	80	21	B
WD8S	90,012	577	78	24	A
K8BZ	89,920	562	80	17	A
K8RDJ	86,250	575	75	22	A
K8SB	75,682	479	79	17	A
W8UE	67,914	441	77	16	A
NU8Z	66,528	432	77	12	A
K8GT	59,752	388	77	20	A
N8MR	55,132	358	77	19	A
K8MW	49,096	323	76	13	A
N8IA	46,664	307	76	12	A
K8IR	45,900	306	75	12	A
K8KU	45,732	309	74	14	A
KC8FXR	42,140	301	70	13	A
W8EGI	38,640	276	70	13	A
WA8YPY	38,324	286	67	15	A
N8MG	38,038	247	77	15	A
WB8GUS	32,944	232	71	17	A
KB8PGW	32,232	237	68	15	A
NX8K	25,600	200	64	17	A
KC8GMT	25,530	185	69	16	A
N8VEN	24,310	187	65	20	A
K8AE	23,058	183	63	16	A
KC8KAM	22,784	178	64	13	A
WA8FRD	21,090	185	57	14	A
N8ZFH	19,716	159	62	12	A
W8KZM	18,522	147	63	14	A
W8EKR	18,300	150	61	9	A
N8CBA	17,400	145	60	7	A
N8XMS	15,080	130	58	10	A
N8NX	14,000	125	56	4	A
K8SIA	13,860	126	55	3	A
W8DBH	6,726	59	57	11	A
W8WVU	4,160	65	32	1	A
W8HNI/M	3,780	70	27	6	A
AA8UU	2,640	44	30	6	A
KT8X	1,224	34	18	1	A
N8FYL	714	21	17	5	A
W8RU	102,700	650	79	24	Q
K8CV	31,050	225	69	8	Q
N8KV	11,900	119	50	9	Q
WB8RCR	8,648	94	46	8	Q
KA1DDB	8,448	96	44	9	Q
WA8WPI	8,096	92	44	12	Q
AB8DF	504	18	14	3	Q
AA8U	82,560	516	80	17	U
ND5S	43,766	277	79	11	U
AA8TC	16,950	113	75	11	U
N8JM	8,330	85	49	7	U
K8CC (+W8MJ,WX3M)					
	190,240	1189	80	24	M
K8JM (+K8MM,K8DD)					
	149,120	932	80	24	M
KC8CNN (WB8EEJ, N8XTM, WB8WJV, op)					
	13,392	124	54	12	M

Ohio

K9NW (at N8NR)					
	177,440	1109	80	24	B
K8ND	168,800	1055	80	24	B
K8DX	155,040	969	80	23	B
KU8E	134,880	843	80	16	B
W8AV	114,708	726	79	24	B
W8GN	93,280	583	80	16	B
K8MR	44,968	308	73	4	B
AC8E (+K8MR)					
	44,548	301	74	5	B
K8RM (K8RM, op)					
	43,026	303	71	4	B
K8MAD (K8MR, op)					
	42,624	296	72	3	B
W8AJ (K8MR, op)					
	40,256	296	68	4	B
N8TR	38,624	272	71	4	B
K8LN	3,162	51	31	3	B
K9TM	158,400	990	80	24	A
W8CAR	138,560	866	80	23	A
KV8Q	121,028	766	79	24	A
NI3S	111,072	712	78	24	A
K8BL	103,200	645	80	14	A
K8FH	101,100	674	75	21	A
N8BJQ	88,000	550	80	14	A
N8AA	79,040	494	80	10	A
W8PN	68,222	443	77	18	A
K8CI	60,676	394	77	10	A
W8IDM	60,150	401	75	13	A
N8CPA	54,362	353	77	20	A
KF8UN	45,648	317	72	24	A
AA8UP	40,004	274	73	8	A
W8DHG	37,152	258	72	9	A
NS8O	35,728	232	77	12	A
KC8HYI	28,798	187	77	16	A
K8RJW	20,224	158	64	9	A
KB8GAE	12,750	125	51	5	A
W8XS	8,428	98	43	10	A
W8FAX	6,240	80	39	4	A
AF8C	3,384	47	36	4	A
N8ET	95,004	609	78	22	Q
WA8RJF	77,000	500	77	18	Q
WA8RCN	64,600	425	76	15	Q
W8VE	41,538	301	69	14	Q
N8IE	31,416	204	77	18	Q
WB8ZWW	13,200	120	55	10	Q
K8ZT	12,096	112	54	7	Q
KF8JW	8,320	104	40	10	Q
W8XU	3,250	65	25	6	Q
K4LT	31,840	199	80	6	U
W8EDU (AF8A,W8WTS,W8RZ, ops)					
	147,520	922	80	24	M
K8EE (+KC8IOO)					
	80,364	543	74	18	M

West Virginia

N4ZR	180,640	1129	80	24	B
K8KFJ	22,848	204	56	6	B
K5IID	109,920	687	80	20	A
K3JT	80,264	508	79	15	A
KG8GW	43,070	295	73	8	A
WA8WV	16,530	145	57	3	A
W8QP	16,520	140	59	7	A
W8DL	66,682	433	77	24	Q
W8ZA	121,028	766	79	23	U

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Illinois

K9XD (K9PG, op)					
	169,760	1061	80	24	B
K9DX	169,376	1072	79	24	B
K9BGL	148,678	941	79	24	B
KI9A	133,280	833	80	23	B
K9UQN	53,534	377	71	12	B
N9QQK	50,312	331	76	16	B
KS9W	18,240	160	57	4	B
KG9N	17,818	151	59	3	B
WX9U	145,760	911	80	24	A
N9CO	139,040	869	80	24	A
K9UIY	133,760	836	80	24	A
KG9X	129,718	821	79	22	A
AA9D	79,000	500	79	17	A
K9CS	77,064	494	78	13	A
K9QVB	74,024	487	76	11	A
K9YA	72,450	483	75	17	A
K9KM	68,096	448	76	11	A
N9TK	65,440	409	80	11	A
K9GY	58,752	408	72	14	A
W9SZ	44,304	312	71	6	A
AA9NF	44,198	287	77	14	A
W9EBY	41,550	277	75	16	A
N9NT	40,150	275	73	17	A
WD9CIR	36,294	263	69	12	A
WV9T	36,168	274	66	6	A
N9BOR	34,816	256	68	20	A
K9ZA	32,830	245	67	24	A
WA9AQN	31,960	235	68	8	A
N9NA	29,520	205	72	24	A
N9LGP	27,040	208	65	7	A
K9PL	26,536	214	62	24	A
N9MSG	26,112	204	64	12	A
W9LNQ	25,920	180	72	6	A
KX9DX	24,426	207	59	14	A
AA9F	24,288	176	69	9	A
KU9Z	22,360	172	65	9	A
K9AHH	19,836	174	57	12	A
WA9Z	18,522	147	63	15	A
W9QFV	18,178	149	61	10	A
K9PPW	15,276	134	57	3	A
AA9LS	14,148	131	54	12	A
K9HS	13,720	140	49	20	A
W9LYA	13,200	120	55	8	A
K9MS	11,856	114	52	7	A
N9KHR	9,306	99	47	8	A
N9LCR	8,148	97	42	13	A
W9AX	7,200	75	48	24	A
WB9EEE	7,144	76	47	3	A
W9OF	4,800	80	30	3	A
KD9XP	1,152	24	24	6	A
KB9CRY	1,092	26	21	3	A
N9BT	1,080	27	20	3	A
WK9O	32	4	4	1	A
K9ZO	58,560	366	80	11	Q
WB9HFK	22,048	212	52	15	Q
AA9KH	12,614	119	53	8	Q
NW9S	10,368	108	48	4	Q
KA9NZI	7,954	97	41	11	Q
WB9MII	3,570	51	35	2	Q
K9MOT (K9PW, op)					
	146,240	914	80	24	U
K9NR	137,904	884	78	24	U
WG9L	130,880	818	80	22	U
K9CW	48,640	304	80	10	U
AD4OS	18,084	137	66	19	U
KW9A (K9JE,K9MMS,K9LU, ops)					
	151,520	947	80	24	M
KE9MOT (KY0O, K9PPW, ops)					
	80,068	541	74	23	M
W9DA (KB9KTC,W9YO, ops)					
	66,300	425	78	16	M
N9UC (WO9S, op)					
	124,320	777	80	18	S

Indiana

N9RV	202,400	1265	80	24	B
W9RE	184,480	1153	80	24	B
KE9I	171,840	1074	80	24	B
K8JP	149,280	933	80	23	B
W9SN	17,666	121	73	5	B
N9QX	17,228	146	59	12	B
K9IG	153,440	959	80	24	A
KJ9C	140,160	876	80	24	A
W9AU	102,336	656	78	19	A
WT9U	87,764	593	74	14	A
K9WX	77,824	512	76	24	A
K9BG	74,844	486	77	11	A
K9JWI	64,676	437	74	16	A
N4TZ	62,320	410	76	13	A
W9BS	50,688	352	72	19	A
NX9B	50,100	334	75	22	A
W9SMC (KE9R, op)					
	48,240	335	72	16	A
KC9TV	26,400	200	66	6	A
WA0JTL	25,530	185	69	24	A
K9VV	19,456	152	64	2	A
K9RU	11,070	123	45	5	A
KF9UP	9,600	100	48	10	A
K9XV	6,640	83	40	6	A
KC9FC	4,240	53	40	9	A
W9CM	2,784	58	24	3	A
N9SE	51,684	354	73	18	Q
WN9O	32,026	239	67	10	Q
W9FHA	23,780	205	58	7	Q
WA9SLM	11,500	115	50	11	Q
W9IU	25,056	174	72	14	U
WB9ZEZ (+KB9KEG)					
	2,204	38	29	24	M

Wisconsin

WI9WI	155,788	986	79	24	B
W8LQ	141,760	886	80	24	B
KA9FOX	64,532	442	73	7	B
WE9V	52,272	363	72	8	B
NF9V	32,568	236	69	5	B
WD9GWH	20,184	174	58	9	B
N9CK	156,000	975	80	23	A
N9UA	114,036	731	78	18	A
W9XU	98,592	632	78	21	A
W9LO	97,636	634	77	24	A
N9AU	90,896	598	76	20	A
K9QC	78,986	541	73	17	A
N9XX	75,900	506	75	12	A
W9WUU	71,918	467	77	19	A
K9LGU	45,436	307	74	11	A
W9XT	36,210	255	71	5	A
W9KHH	26,334	209	63	12	A
W9FBC	17,700	150	59	9	A
WA9GON	13,824	108	64	8	A
KB9KEG	4,340	62	35	5	A
KB9UKE	4,128	48	43	24	A
N9CIQ	130,080	813	80	24	Q
WA1UJU	59,782	421	71	17	Q
AE9K	42,000	300	70	15	Q
AF9J	20,178	171	59	10	Q
WU9F	20,020	130	77	13	Q
W9ISC	6,020	70	43	11	Q
AA9RR	45,662	289	79	15	U

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Colorado

W0ZP	154,998	981	79	24	B
KF0QS	70,420	503	70	13	B
KJ0G	46,644	299	78	24	B
KF0LA	14,440	95	76	24	B
N0NR	165,920	1037	80	24	A
W0ZA	81,504	566	72	24	A
W0ETT	80,216	542	74	24	A
N4VI	61,740	441	70	12	A
W0LQ	54,670	385	71	16	A
W0AZ	43,112	317	68	24	A
K0MF	36,960	280	66	5	A
AE0Q	32,382	257	63	24	A
K0LMD	30,820	230	67	24	A
KA0N	27,440	196	70	24	A
WA0ZTI	15,544	134	58	24	A
NY0Q	12,272	118	52	8	A
K0UK	1,972	34	29	24	A
K0FRP	93,980	635	74	24	Q
K0RI	76,752	492	78	24	Q
AB0GO	47,888	328	73	24	Q
K0CV	40,800	300	68	12	Q
N0TK	25,610	197	65	11	Q
WU0L	15,812	134	59	24	Q
K0CO	8,036	82	49	24	Q
KI0II	5,850	65	45	24	Q
WV7T (+N0QJS)					
	10,812	106	51	14	M

Iowa

N0NI (AG9A, op)					
	221,120	1382	80	24	B
WB0B	55,624	409	68	13	A
NE0P	55,132	358	77	24	A
AA0AI	22,484	154	73	24	A
AD0H	11,880	110	54	5	A
N0AAA	10,100	101	50	4	A
KE0FT	1,134	27	21	24	A
N0AC	95,116	602	79	24	Q
W0PWE	15,476	146	53	12	Q
WB0IUQ	288	12	12	7	Q
K0INR	29,016	186	78	24	U

Kansas

K0VBU	102,560	641	80	24	A
W0NXS	76,800	512	75	24	A
W0EB	53,144	364	73	24	A
KG0UA	43,512	294	74	24	A
K0RY	41,580	297	70	24	A
W0UY	40,600	290	70	24	A
KB0GUS	21,976	164	67	24	A
N0NB	10,920	105	52	24	A
WB0YJT	26,880	210	64	24	Q
AB0S (+K0WA, K0BJ, W0CEM)					
	171,746	1087	79	24	M
KA0BHO (KC0IUY,KC0IUW, KA0BAT, ops)					
	10,878	111	49	16	M

Minnesota

K0HB	158,560	991	80	24	B
K0AD	156,936	1006	78	24	B
K0CAT	118,184	748	79	24	B
WA0MHJ	92,554	601	77	24	B
N0XB	63,072	432	73	24	B
KI0F	9,016	92	49	24	B
N0AT	175,520	1097	80	24	A
K0OB	168,640	1054	80	24	A
NA0N	164,952	1044	79	24	A
WA2MNO	128,232	822	78	24	A
K0PC	126,204	809	78	24	A
W0UC	122,240	764	80	24	A
W0ZQ	107,800	700	77	24	A
W0PI	99,528	638	78	24	A
W3FAF	80,560	530	76	11	A
K3WT	79,310	515	77	14	A
K0MPH	58,350	389	75	24	A
W0OR	57,232	392	73	10	A
WJ0M	47,376	329	72	24	A
K0TG	39,032	287	68	24	A
AC0W	34,362	249	69	24	A
K0KGS	30,618	243	63	24	A
K0JA	30,150	225	67	24	A
WB0UKI	27,900	225	62	11	A
K0IHG	25,252	214	59	4	A
K0JE	24,640	176	70	24	A
K0QC	20,904	156	67	24	A
N0HJZ	18,354	161	57	24	A
WA0WWW	12,480120	52	24	A	
K0NY	11,232	104	54	24	A
WB0TRA	2,646	49	27	24	A
N0UR	108,576	696	78	24	Q
N0IJ	92,976	596	78	24	Q
AA0ZZ	57,652	406	71	24	Q
K0RC	47,740	341	70	24	Q
KB0R	42,194	289	73	24	Q
NF9K	15,792	141	56	7	Q
KR0HN	200	10	10	3	Q
KT0R	133,760	836	80	24	U
WR0DK	9,384	68	69	24	U
WG0M	7,154	73	49	24	U

Missouri

K0OU	161,440	1009	80	24	B
K0DEQ	131,976	846	78	17	B
W0TT	14,456	139	52	24	B
WA0OTV	3,162	51	31	2	B
K0GN	92,588	586	79	24	A
WA0IYY	85,800	550	78	24	A
N9HDE	45,500	325	70	13	A
K0TPY	42,300	282	75	24	A
N0AJ	33,528	254	66	24	A
K0CA	31,974	219	73	24	A
WB0IUN	29,808	207	72	24	A
KS0M	27,068	202	67	24	A
KA0P	4,536	63	36	4	A
N0SS	105,386	667	79	24	Q
WA0SXV	119,040	744	80	24	U
NM0X	45,296	298	76	24	U

Nebraska

W8TM	64,386	441	73	18	A
K0IL	39,900	285	70	24	A
AB0FX	30,020	190	79	24	A
K0NC	25,134	177	71	11	A
K0DG (+W0DB)					
	141,600	885	80	24	M
WY0L (+N9JF)					
	131,930	835	79	24	M

North Dakota

WB0O	163,372	1034	79	24	B
K0VX	14,850	135	55	24	A
K9IUA	36,660	282	65	15	Q
AG0T	1,296	27	24	24	Q

South Dakota

W0SD (WD0T, op)					
	219,360	1371	80	24	B
KE0Z	97,432	641	76	24	Q

VE

CANADA

Maritime

VE9FX	18,088	133	68	16	B

Newfoundland-Labrador

VO1MP	61,620	395	78	11	A
VO1GO	40,612	286	71	14	A

Quebec

VE2AWR	95,942	623	77	20	A
VE2FFE	22,050	175	63	9	A
VE2/W2YC (+WA2NPD)					
	54,954	387	71	17	M

Ontario

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SECTION NEWS

The ARRL Field Organization Forum

Field Organization Abbreviations

ACC	Affiliated Club Coordinator
ARES	Amateur Radio Emergency Service
ASM	Assistant Section Manager
BM	Bulletin Manager
BPL	Brass Pounders League
DEC	District Emergency Coordinator
DXFR	DX Field Representative
EC	Emergency Coordinator
LGL	Local Government Liaison
NCS	Net Control Station
NM	Net Manager
NTS	National Traffic System
OBS	Official Bulletin Station
OES	Official Emergency Station
ORS	Official Relay Station
OO	Official Observer
OOC	Official Observer Coordinator
PBBS	Packet Bulletin Board Station
PIC	Public Information Coordinator
PIO	Public Information Officer
PSHR	Public Service Honor Roll
SGL	State Government Liaison
SEC	Section Emergency Coordinator
SM	Section Manager
STM	Section Traffic Manager
TCC	Transcontinental Corps
TA	Technical Advisor
TC	Technical Coordinator
TS	Technical Specialist
VC	Volunteer Counsel
VCE	Volunteer Consulting Engineer
VE	Volunteer Examiner

ATLANTIC DIVISION

DELAWARE: SM, Randall Carlson, WB0JJX—"Amateur Radio just isn't the same anymore. Back when I first got my license...." If you hang around the ARRL booth at a hamfest, you are bound to hear those words at least once during the day. Well I for one am glad that not all things are the same as they were. One only has to look at the ads and articles in a recent *QST* to realize that we now have some really cool toys and new modes to play with that just were not available "...back when". Don't get me wrong, we need to remember where we came from and traditions are important. But it's also important to dream about the possibilities of the future. But isn't that what Amateur Radio has always been about, using the knowledge of the past to push forward to better things in the future. Maybe things today are not quite so different as "back when" after all. So how about it? Look to the future! Get involved with something new even if it's something "old". Traffic (March) DTN QNI 186 QTC 39 in 22 sess. DEPN QNI 41 QCT 5 in 5 sess. K3JL 37 N3HMQ 7. 73 Randall.

EASTERN PENNSYLVANIA: SM, Eric D. Olena, WB3FPL – SEC: Michael O. Miguelez, N3IRN. ACC: Steve Maslin, N3ORH. BM, Fredric Serota, K3BHX. OOC Alan Maslin, N3EA. STM: Paul Craig, N3YSI. SGL: Allen Breiner, W3ZRQ. TC: Lawrence Thomas, AA3PX. ASMs: Robert Josuweit, WA3PZO, Dave Heller, K3TX, George Law, N3KYZ, James E. Bear, WB3FQY, Harry Thomas, W3KOD. In the April article, I listed some of the vacancies that existed on the E. Pa. Staff. Among those vacancies was the Section level appointment of Official Bulletin Manager. I was more than pleased when Fredric Serota, K3BHX, stepped forward and volunteered his services. Without a doubt, Fred will be a great asset to the E. Pa. Staff. The rest of the staff and I welcome Fred. As a result of attending the March 28th meeting of the RF Hill ARC Kevin Woolard, KD3KZ, volunteered to become the DEC for Bucks, Chester, Delaware and Philadelphia Counties. Kevin's experience and willingness to take on a heavily populated district will be a great asset to that district. I felt honored to be asked to attend the RF Hill ARC meeting, and it was a great thrill to meet everyone. Another great thrill was to be able to attend the Pottstown ARC and present them with their Affiliated Club Certificate. Since the Pottstown ARC is a neighboring club, it was nice to be able to present their certificate as one of my first official public duties. After attending the Timonium Hamfest, it became obvious why I must be watched carefully. I drove away from there with my car somewhat heavier and my wallet somewhat lighter. Nonetheless, it was great to see so many people from E. Pa. at the Hamfest. We are still looking for a DEC for the southwest corner of the section as well as a few ECs for Adams, Dauphin, Juniata, and a couple other counties. If you are interested, contact SEC, Mike, N3IRN or myself. After I sent out the final copy of last month's article to ARRL HQ. I was looking it over and found that, in the interest of article length, I left the article with an incomplete thought. Most of us already knew that computers have come to play a big role in our hobby. However, section level volunteers soon find out that we are able to handle a larger amount of paperwork in a much smaller amount of time. Hence, the computer has become indispensable. You will notice that nothing of my spelling ability was mentioned. Tfc: N3YSI 423, N3EFW 249, W3IPX 240, W3HK 172, K2BCL 128, W3UAQ 106, N3SW 101, W3NNL 84, K3TX 66, W3JKX 47, W3TWV 32, K3ARR 19, AD3X 19, KB3CEZ 17, N3IRN 16, KA3LVP 13, N3AS 10, KB3DCT 10, KB3CVO 7, N8JSO 5, KB3BBR 5, W3BNR 4, KB3CKD 4, W3ROQ 1, N3ZXE 1. Net Reports: EPA 260, EPAEPTN 174, PTTN 95, SEPPTN 14, PFN 14, D3ARES 5, LCARES 2, MCOES 2.

MARYLAND/DC: SM, Bill Howard, WB3V, 410-551-6775 wb3v@arrl.org — MDC Section Web homepage http://users.erols.com/wb3v/mdc. ANAR EC N3QXW reports 42 members, 4 net sessions of the ANAR ARES Net which meets on 147.805 with liaison to NCAC, MEPN, and BTN. On 3 February W3VVN, N3UXD, N3WOF, N3SEP, KO4A and N3QXW assisted the Boy Scouts of America's Klondike Derby in ANAR with routine communications. ANAR OES reports: N3QXW, NU3D, and W3VVN. FRED EC N8AAY reports 10 members, 4 net sessions of the FREDERRICK COUNTY ARES NET meeting on 147.06 with liaison to MEPN. A joint ARES/RACES registration form is being mailed to all 765 licensed Fredrick County hams. Up coming Public Service Events include the Multiple Sclerosis Walk to be held on April 22, a March of Dimes Walk on 29 April, and the Mountain Club of Maryland-Hike ACROSS Maryland on May 5. CHAR EC W3TOM reports 29 members, 4 net sessions of the Charles County Amateur Radio Emergency Service Net which meets on 145.390 MHz, with a PL 186.2 Hz, and with liaison to the MEPN, 1 drill, 1 meeting. In conjunction with the February RACES COMEX, a Section-Wide HF net was conducted on 3920 kHz with W3VK as NCS. Health & Welfare-Local Stations (HWLOC's) from each jurisdiction were asked to check in. In addition, our ECs and ROs were asked to send a piece of traffic to WA1QAA through their HF liaison stations. Seven pieces of traffic were handled on this net. The following stations, representing the counties indicated, participated: N3ZOC, ANAR; WA3TOY, ANAR; N3WKE, BALT; N3ZNU, BALT; WA3WRT, BALT; WA3GYW/MARS, BALT; W3VK/NCS, CARR; KE3FL, CARR; W3COU, CECI; NR9P, FRED; N3VNG, FRED; K3EF, HOWA; W3CCI, HOWA; K3GK, HOWA; WA3YOO, MONT; K3YGG, NIH/Bethesda; KD3JA, PRGE; W3YD, PRGE; W5BTC, STMA; W3CWC, WASH; and WA4GGH, WICO. With the nets: Net/NM/QND/QTC/QNI: MSN/KC3Y/31/50/315, MDD/WJ3K/62/202/647, MDD top brass AA3SB AA3GV 151, K3JL 150. Tfc: KK3F 1102, AA3GV 93, W3YVQ 89, WB4FDT 80, KC3Y 52, N3DE 49, KJ3E 48, N3WKE 48, N3WK 39, W3CB 36, N3KGM 30, WJ3K 18, W3VK 16, K3CSX 15, WA1QAA 15, WA3WRT 10, N3ZKP 9, WA3GYW 2, KE3FL 2, Feb WB4FDT 93. PSHR: KK3F 222, W3YVQ 149, W3VK 139, N3ZKP 128, N3WKE 128, W3CB 115, N3WK 108, WA1QAA 106, KC3Y 100, AA3GV 95, KJ3E 77, K3CSX 77, KE3FL 75.

NORTHERN NEW YORK: SM, Thomas A. Dick, KF2GC—http://www.northnet.org/nnyham & http://www.geocities.com/nnyara. Email: kf2gc@arrl.org. ASMs: KD2AJ, WZ2T, WB2KLD, N2ZMS, WA2RLW. ACC: WZ2T. BM: KA2JXI. OOC: N2MX. PIC: N2SZK. SEC: WN2F. STM: N2ZGN. TC: N2JKG. The NNYARA - Lake Placid Hamfest Committee met at the Red Cross Building in Saranac Lake, NY on March 24th, 2001 at 11 AM - 1:00 PM. First, I want to thank all those in attendance at this very important follow up meeting. Those in attendance were, Roland Patnode-WA2RP, Thomas Dick-KF2GC, Alvah Haggett-KB2LML, Ted Champagne-N4TW, Walter Brady-N2YMY, Hugh Brown-W2IB, Claude Premo-WB2YDT, Neil Rancour-KC2GOA, Bernie Jakobetz-KC2ALG, John Duquette-N2RUL and , Paul Moriarity-KC2FDK. NNY-Clubs represented were SLVRA , NCARC, DOERS, OARC, OVARC, TLARC, CVARC, MVARC, PSARC, and NNYCC. The meeting began at 11:00 AM and we discussed, topics on enlisting corporate sponsors, Special Event Station "N2Y" and the call in station. Bernie is going to work on the art work and certificate that will be available. Moreover raffles may need to be held to defray costs. We would like to have the tickets ready for our clubs at the next meeting which will be held May 5th. This next meeting will be a combined NNYARA general Section Meeting and Hamfest Committee report and advisement. Our Hamfest 2001 "early bird tickets" will be $3.00, $4.00 at the gate, $5.00 for vendors and children under 16 admitted free. Our section is preparing for Field Day 2001 and our clubs will doing various PR with the area to encourage a record turn out for Field Day this June. Let's make this the best Field Day ever! www.geocities.com/nnyara.73, Thomas Dick, KF2GC.

SOUTHERN NEW JERSEY: SM, Jean Priestley KA2YKN (@K2AA) e-mail ka2ykn@voicenet.com. ASM: W2BE K2WB W2OB N2OO N2YAJ N2XYZ. SEC: KC2GID. STM: K2UL. ACC: KB2ADL. SGL: W2CAM. OOC: K2PSC. TC: W2EKB. TS: W2PAU. WB2MNF AA2BN KD4HZW WB3IJB WA2NBL N2QNX N2XFM. We welcome Joe Cramer, N2XYZ, as ASM for public relations for the Battleship New Jersey. As you read this, most communication systems on the New Jersey will be put back together (again). BNJARS is newly formed with 15 charter members. The Battleship (the other woman) is bringing SNJ clubs and hams together with a potential to unite North and South (NJ) Cape May County ARC mourns the lost of Silent Keys Tom Petruzzi, WA2QZG, and Walter Gabriel, W2HRF. DVRC has received N2HQX as a memorial call for the club. Ernie, N2HQX, was a founding father of DVRC. NTS: QNI-NJM 117 WA2OPY NJN (E) 209 AG2R NJN (L) 176 AG2R NJPN 228 W2CC NJSN 170 K2PB JSARS 376 K2ATQ SJTN 74 KB2RTZ SJVN 304 WB2UVB. SAR: WA2CUW 222, K2UL 177, AA2SV 84, KB2RTZ 81, WB2UVB 43, K2UL-4 37, N2VQA 27, WJ2F 21, W2AZ 21, KB2VYZ 11, KB2YJD 6, W2MC 6, KA2CQX 4, N2WFN 4, N2ZMI 3, WA2NDA 2, KB2VSR KB2YBM KC2ETU. PSHR: WB2UVB 174, K2UL 170, KB2RTZ 160, AA2SV 124, WA2CUW 103, KA2CQX 94, N2VQA 94, KA2YKN 59, KB2YJD 53, N2WFN 52, N2HQL 19.

WESTERN NEW YORK: SM, Scott Bauer, W2LC—Congratulations to the Chemung County ARES "Man of the Year" award winners: Barry, N2EUS, and David, KC2FNZ, who created a portable tower and repeater system for use during communications emergencies. The system consists of 2 Kenwood radios, a repeater maker, a 60 foot crank-up tower, and a trailer for transportation. Now that's impressive; nice job guys! New officers for Chenango Valley ARA; pres Bob WA2TDO, VP Joe KA2ZFM, Sect Fred K2FRD, Treas Chuck KC2BXO. Welcome new Official Bulletin Station (OBS) N2RHL. Welcome new Emergency Coordinator (EC) for Oswego County Tom W2TQF. Almost 100 percent DEC and EC reporting in March, nice job to all! WNY Hamfests: June 1,2,3 Rochester Hamfest, ARRL Atlantic Division Convention, at Monroe County Fairgrounds, Route 15A and Calkins Rd; June 16, Cortland Hamfest, Skyline ARC, at Cortland County Fairgrounds. July 15, Batavia Hamfest, Genesee Radio Amateurs; July 21, Utica Hamfest, Utica ARC. March Net Summaries:

Net	NM	Sess	QNI	QSP
BRVSN	N2OYQ	31	122	1
CNYTN	WA2PUU	31	351	78
ESS	WI2G	31	446	126
NYPON	N2YJZ	31	478	152
NYS/L	W2YGW	31	297	207
NYSCN	W2MTA	4	17	0
OARC	N2KPR	4	45	5
OCTEN/L	KA2ZNZ	21	728	220
STTHN	KC2AWA	8	58	4
WDN/E	N2JRS	31	471	104

Net	NM	Sess	QNI	QSP
CHN	W2EAG	31	166	81
EBN	WB2IJZ	22	477	0
NYPHONE	N2LTC	31	346	352
NYS/E	WB2QIX	31	354	194
NYS/M	KA2GJV	31	207	50
NYSPTEN	WB3CUF	31	380	47
OCTEN/E	KA2ZNZ	31	1621	252
STAR	N2NCB	31	287	18
TIGARDS	W2MTA	4	30	4
WDN/L	W2GUT	31	441	116

Traffic (March 2001), * indicates PSHR, #indicates BPL: N2LTC#* 951, KA2ZNZ#* 564, WB2IJH* 352, NN2H* 320, W2MTA* 310, KA2GJV* 307, WI2G* 167, KB2KOJ* 131, W2GUT* 129, W2FR* 118, WB2QIX* 111, KA2DBD* 104, N2CCN* 104, KG2D* 82, N2KPR* 81, KC2EOT* 72, W2LC* 64, NY2V* 63, KB2ETO* 42, AF2K* 40, KA2BCE* 28, N2WDS* 25, W2PII* 23, K2DN* 20, WA2GUP* 17, WA2UKX* 16, W2RH 12, KB2WII* 9, KG2HA* 1, Digital; Stn Rx/Tx: KA2GJV 21/0, N2LTC 195/174.

WESTERN PENNSYLVANIA: SM, John Rodgers, N3MSE. ASM: N3MYZ. SEC: N3SRJ. ASM-ARES: WB3KGT. ASM-Packet: KE3ED. OOC: W3ZPI. PIC: W3CG. STM: N3WAV. TC: WR4W. DEC-SO: KD3OH. DEC-N1: N3QCR. DEC-N2: KA3UVC. DEC-S1: KA3HUK. DEC-S2: N3BZW. DEC-Rapid Response: N3HJY. DEC-OES: K3TB. This month, I would like to recognize and thank the many men and women that take part in the National Traffic System here in Western Pennsylvania. These dedicated individuals volunteer countless hours of time to handle the messages into, out of, and through our section. Just a look at the numbers presented here will indicate their dedication. Thank you from all of us. The following nets have reported their activities for the past year.

WPAPTN	QNI 6035	QTC 1164	Sess 366
WPACWTN	QNI 1988	QTC 1149	Sess 366
NWPA2MTN	QNI 10291	QTC 450	Sess 40
WPA2MTN	QNI 1753	QTC 301	Sess 349
EAMBN	QNI 2958	QTC198	Sess 251

The individuals that have met the qualifications for the Public Service Honor Roll are as follows. N3WAV 1386, WA3HJC 1272, W3OKN 1145 and N3KB 596. These individuals have filed monthly station activity reports: W3NGO 1019, W3OKN 882, N3ON 801, WA3HJC 740, WA3QNT 703, N3WAV 520, N3KB 417, W3GJ 305, KC3NY 235, WA3UNX 201, N3IBT 130, W3QOS 117, AA3ML 110, N3PBD 96, N3HBB 72, WB3ING 42, N3RDV 22, KA3CQM 10, AD4XV 4, AA3TH 2.Anyone interested in more information on traffic handling may contact the section traffic manager N2WAV or myself. 73 de John Rodgers, N3MSE, WPA-SM, n3mse@arrl.org

CENTRAL DIVISION

ILLINOIS: SM, Bruce Boston, KD9UL—SEC: W9QBH. ACC: N9KP. STM: K9CNP. PIC: N9EWA. OOC: KB9FBI. DEC-Central: N9FNP. DEC-S/W KB9AIL. Long-time ARRL volunteer and section cabinet member Edward Doubek, N9RF, became a Silent Key on March 17. Ed served as the section's Technical Coordinator for many years, and was well respected for his vast knowledge and experience. His understanding of RFI was tremendously valuable to the ARRL and the Illinois Section. He will be missed. The Sangamon Valley RC plans to donate a book on Amateur Radio to Springfield's Lincoln Library. The club is also looking into the possibility of offering a radio course through the community college. A recent edition of the North Shore RC newsletter featured several pages of DX QSL cards received by their members. *Radioactivities*, the newsletter of the Argonne ARC, contained an interesting article on the first LF QSO with Europe. The Rockford ARA has named former IL Section Manager, Shari Harlan, N9SH, the RARA Ham of the Year. She had previously received the award in 1981. Lake County RACES has been working on plans to organize a CPR class for its membership. They also provided assistance for the MS Walkathon. In May, they held a three-week license class that met twice per week. The group holds a net each Monday evening at 8 PM., and a regular club meeting on the first Monday at 7:30 PM in the Lake County EOC in Libertyville. Central DEC N9FNP reports that several

Continued on page 122.

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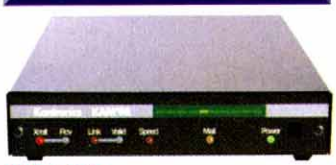

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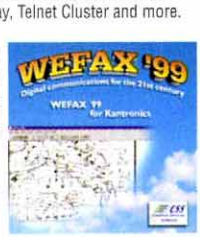

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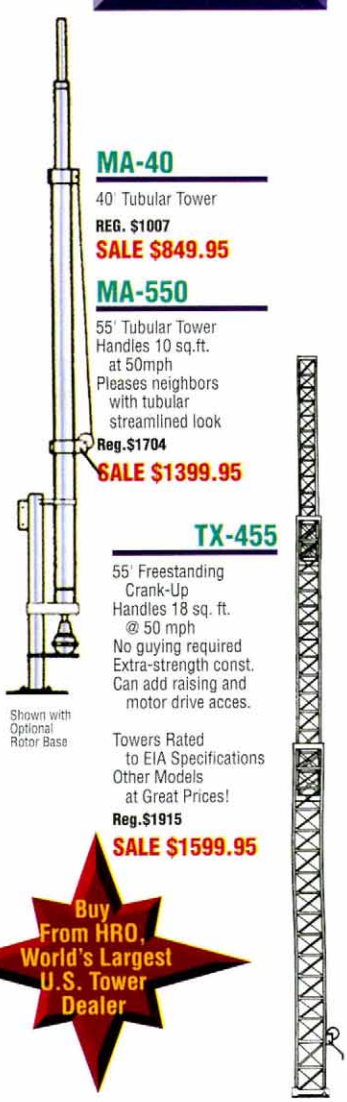

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- Cool dual display
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- CTCSS encode/decode w/ tone scan
- Remote head capable
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FULL COLOR LCD DISPLAY

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Mounting Kit Included

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- Auto repeater

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IC-718 HF Transceiver

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Dual Bands at a Single Band Price!

- 2M/70CM
- 70 alphnumeric memories
- 6W output
- CTCSS encode/decode w/tone scan
- Auto repeater
- Easy operation!
- Mil spec 810, C/D/E*1

IC-T2H 6W, 2M Transceiver

Commercial Grade Rugged

- 6W output
- 40 alphnumeric memories
- Customizable keys
- Auto repeater
- PC Programmable
- CTCSS encode/decode w/tone scan
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IC-T81A 4 Band Transceiver

Worlds First 4-bander HT

- 6M, 2M, & 70CM @ 5W
- 1.2 GHz @ 1W
- AM, FM, WFM
- 124 alphnumeric memories
- CTCSS encode/decode w/tone scan
- RIT and VXO for 1200 MHz
- Auto repeater

LOW PRICE

IC-Q7A Dual Band Transceiver

- 2M/70CM
- Wide band receiver - 30 to 1300 MHz**
- 200 alphnumeric memories
- Auto repeater
- Includes AA Ni-Cad's & charger
- CTCSS encode/decode w/tone scan
- Mil spec 810, C/D/E*1

LOW PRICE

IC-W32A Dual Band Transceiver

- 2M/70CM
- 5W @ 13.5 V
- 200 alphnumeric memories
- CTCSS encode/decode w/tone scan
- True dual band with V/V, U/U
- Auto repeater
- Mil spec 810, C/D/E*1

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- 300 Memories

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- Alphanumeric Display
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- Compact, Mobile Meter
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40M-70cm Mobile Antenna

40/*20/15/10/6/2M/70cm
* optional coil

A 6M/2M/70cm whip that accepts 1,2 or 3 HF coils for up to 6 band operation. Simply screw on any combination of HF coils you choose.

Standard PL-259 connector allows easy mounting. Convenient fold-over hinge for entering garages, parking structures, etc...

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Max Pwr: 150W	Max Pwr: 150w
Conn: PL-259	Conn: PL-259

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The first aftermarket gain antenna for the YAESU VX-5 and the ICOM T8A.

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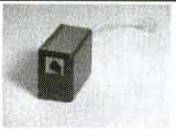

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MA-40	40	21'6"	2	242	3"sq.	4 1/2"
MA-550	55	22'1"	3	435	3"sq.	6"
MA-550MDP*	55	22'1"	3	620	3"sq.	6"
MA-770	71	22'10"	4	645	3"sq.	8"
MA-770MDP*	71	22'10"	4	830	3"sq.	8"
MA-850MDP*	85	23'6"	5	1128	3"sq.	10"

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TX-438	38	21'6"	2	355	12 1/2"	15"
TX-455	55	22'	3	670	12 1/2"	18"
TX-472	72	22'8"	4	1040	12 1/2"	21 5/8"
TX-472MDP*	72	22'8"	4	1210	12 1/2"	21 5/8"
TX-489	89	23'4"	5	1590	12 1/2"	25 5/8"
TX-489MDPL*	89	23'4"	5	1800	12 1/2"	25 5/8"

* TX-472MDP includes heavy duty motor drive with positive pull down. MCL-100 required.
TX-489MDPL comes with heavy duty motor drive with dual level wind and positive pull down.
MDPL models include fully operational limit switch packages.

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Will handle 30 sq. ft. antennas at 50 MPH winds.

MODEL NO.	HEIGHT MAX.	HEIGHT MIN.	NUMBER SECTIONS	WEIGHT POUNDS	SEC. OD Top.	SEC. OD Bot.
HDX-538	38	21'6"	2	600	15"	18"
HDX-555	55	22'	3	870	15"	21 5/8"
HDX-572	72	22'8"	4	1420	15"	25 5/8"
HDX-572MDPL*	72	22'8"	4	1600	15"	25 5/8"
HDX-589MDPL*	89	23'8"	5	2440	15"	30 5/8"
HDX-689MDPL*	89	23'8"	5	3450	18"	37 1/8"
HDX-5106MDPL*	106'	24'8"	6	3700	15"	37 1/8"

* Includes heavy-duty motor drives with dual level wind and positive pull down. MDPL models include fully operational limit switch packages.
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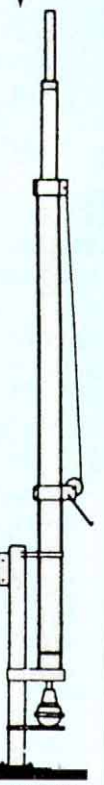
MODEL NO.	HEIGHT MAX.	HEIGHT MIN.	NUMBER SECTIONS	WEIGHT POUNDS	SEC. OD Top.	SEC. OD Bot.
TMM-433SS*	33	11'4"	4	315	10"	18"
TMM-433HD*	33	11'4"	4	400	12 1/2"	20 7/8"
TMM-541SS*	41	12'	5	430	10"	20 7/8"

* Rotators must be top mounted



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counties operated nets during the annual tornado drill in March. At last report, the STARS 146.640 repeater was back on the air high above Blue Island. The group holds a weekly net each Tuesday at 7 PM. This year marks the 25th anniversary of STARS. According to the Egyptian RC newsletter *Podunk News*, the club is considering whether or not is should maintain an HF station. The Fox River RL has named Bud Tweed, N9FWM, Ham of the Year. Bud has been active with JOTA, the club's 75th anniversary special event, and the Lighthouse Weekend event. He received the award previously in 1989. The Western Illinois ARC is preparing to assist with the Grand Prix of cart racing in Quincy on the weekend of June 2. Operators will be used to ensure the racers' safety by providing radio communications at all corners of the track. The Schaumburg ARC reports that its public service work in the year 2000 totaled 418 hours over seven different public service events. Well done! March traffic: K9CNP 137, NN9M 50, WB9TVD 36, N9DT 36, NC9T 16, KA9IMX 11, W9FIF 11, WA9RUM 6, WD9F 6, WA9APQ 4. 9RN cycle 1 & 2 report de KF4UBX sessions 62, traffic handled 226, average per session 3.64, total of 738 minutes of net time, rate of transmission 3.26, 85% of IL traffic handled by W9HLX, N9PLM, NN9M, N9GZ. ISN Report from WB9TVD QNI 242, QTC 95, Sessions 30. 9RN C4 report de W9FC traffic 236, sessions 62, time 340 min, average 3.80, rate .694, rep 95% QNI — ILN K9CNP NS9F KF9ME. W9VEY Memorial Net report de K9AXS 6 with 186 check-ins.

INDIANA: SM, Peggy Coulter, W9JUJ—ASM for Resources & Recruitment, W9IH. SEC: K9ZBM. ASEC: WA9ZCE. STM: WA9JWL. SGL: K9JZZ. PIC: KB9LEI. TC: W9MWY. BM: KA9QWC. ACC: N9RG. There were no SK reported to me this month. At the 13th Hoosier Science and Engineering Fair the IN ARRL as part of the Hoosier Young Amateur Radio Working Group was able to locate funding for awards and offered them to the HSEF group for this year competition. Judging for our awards were John Grino, KF9UH, Dennis Young, W9CYU, Jim Rinehart, K9RU and Chuck Crist, W9IH. This year for the first time four awards were presented for Electronic and Amateur related HSEF participants. We have been invited to participate next year. For more info you can get it on the IN web page. Congratulations to Clark Co ARC Amateur of the Year Amanda Harl, KB9THQ, and to the Elmer of the Year Joe Myer, N9UGP. Also to Dave Littlejohn, N9FMD, receiving this year's Brentlinger award presented by the Wabash Valley ARA. There was a great deal of participation in the Annual Statewide severe Wx test. The largest number of QNI was in Central IN. Activity reported by N9GDR, the afternoon session had 140 base units and 80 mobile. The evening session had 199 base units and 79 mobile. Total man hours reported was 782.53. ECs reporting their activity in this drill were; N9IOD, KB9BBI, WA9DOL, KA9QIG, N9YNF, N9GDR, K9DIY, N9MOX, WB9VQK and KA9SWI. We appreciate their dedication. We have another change in Staff. Roger, W9FU, has resigned as STM. Frank Dick, WA9JWL, has accepted the position. Please help him with his duties. Please send VHF net reports to him at end of month. If you are not an ORS, maybe consider becoming one. Send him your application. We also are in need of an OOC. Betty, KC9V, had to resign due to illness. If interested, let me know. NMs ITN/, QIN/ K9PUI/KJ9J, ICN/K8LEN, VHF/WA9JWL.

Net	*Freq*	*Time/Daily/UTC*	*QNI*	*QTC*	*QTR*	*Sess*
ITN	3910	1330/2130/2300	2761	181	1646	90
QIN	3656	1430/0000	251	105	1097	58
ICN	3705	2315	70	22	333	22
Hoosier VHF nets(9 nets)			489	26	723	36

D9RN total QTC 226 in 62 sessions represented by K9GBR, N9KNJ, WB9QPA, W9UEM, WA9JWL, KB9NPU, K9PUI and W9FU. 9RN Total QTC 236 in 62 sessions represented by K9PUI, KO9D, WB9OFG, WB9UYU and W9FC. Tfc: W9FC 312, KO9D 145, K9PUI 131, WA9JWL 101, N9KNJ 55, K9GBR 44, W9JUJ 42, KA9QWC 39, W9FU 35, WD9HII 34, KA9EIV 34, W9UEM 31, WB9OFG 30, K9RPZ 22, WB9QPA 15, KB9NPU 14, K8LEN 13, K9ZBM 10, W9EHY 9, AB9AA 5, AB9A 5, K9DIY 5, WB9NCE 4, K9CUN 4.

WISCONSIN: SM: Don Michalski, W9IXG—BWN 3985 0600 W9RCW. BEN 3985 1200 KE9VU. WSBN 3985 1730 K9FHI. WNN 3723 1800 KB9ROB . WSSN 3645 1830 N9BDL. WIN-E 3662 1900 WB9ICH. WIN-L 3662 2200 W9UW. With deep regrets, I inform you that Stu Gurske, K9EYY, passed away. He ran the Lodi, 147.225, repeater. Also, Doug Maas, WB9OCV, member of RRRC, is a Silent Key. Frederick Kohn, WA9OMC, is a Silent Key. Congratulations to Nels Harvey, WA9JOB, for receiving the exclusive ARRL A-1 Operators award. Well deserved! Stan Kaplan, WB9RQR, presented to KB9IME and K9IK the prestigious Emergency Communications Commendation award for exceptional service. 9RN report for March shows 100% Wisconsin participation! The popular Emergency Communicator course is now open for 2-3 day classroom instruction! Certified instructors are needed. If interested in becoming an instructor or student, please contact me. Fee for the course is $20 for members. Experienced, qualified, members may elect to just take the test for only $5. AB9BB is the new SKYWARN manager for South Central Wisconsin. Many enjoyed visiting with Jim Haynie, president of ARRL, at the AES Superfest! His input at the OO meeting was greatly appreciated. 73, W9IXG. Tfc: WZ7V 891, W9YPY 615,W9IHW 567, K9GU 422, N9VE 420, N9TVT 398, K9JPS 382, W9CBE 331, K9FHI 210, KG9B 169, N9BDL 107, K9LGU 106, N9KHD 100, W9YCV 66, AG9G 58, KE9VU 56, W9UW 46, KB9ROB 39, W9BHL 35, KA9FVX 35, AA9BB 30, KN9P 24, WB9ICH 20, WD9FLJ 16, W9RSX 10, N9JIY 7, W9PVD 5, W9RCW 3.

DAKOTA DIVISION

MINNESOTA: SM, Randy Wendel, KM0D—Summer is here and our flood threats are behind us and Field Day is just around the corner. A reminder that your Field Day report can be sent to the Section Manager or Section Emergency Coordinator. In case you don't know who that is, this *QST* issue page 12 lists the SM, and the SEC is Gary Peterson, N0ZOD. You may submit the report on the ARRL Section Net. Relayed reports are also worth extra points. I recently told you about our new ACC Frank Karnauskas, N1UW. He received his new call shortly after the appointment, so also make note of his new e-mail address, n1uw@arrl.net. Please send Frank your club newsletters to help him become more familiar with your

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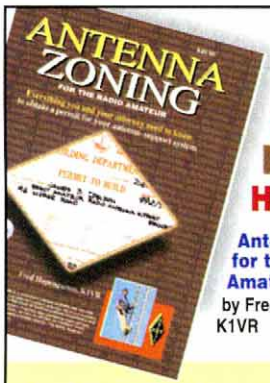

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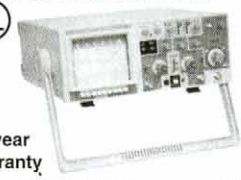
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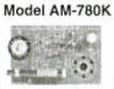
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- -12V ±5% @ 1A
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Function Generator:
- **Waveforms:** Sine, Square, Triangle, Complimentary Square
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Requirements include a track record of achievement in managing marketing/sales operations, knowledge of the Amateur Radio industry, and managerial experience. Experience in membership promotion with nonprofit organizations, print advertising sales, or direct marketing is desirable.

To be considered for this position, send a resume, cover letter and salary expectations to:
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club and activities, noteably ARRL affiliated clubs. A note to spotters, visit the Metro SKYWARN Web page at http://www.skywarn.ampr.org. The SKYWARN Central home page also hosts a link to EZboard SKYWARN chat which Lara Rodriguez, WX0GRL, has created. For other informative tidbits related to Amateur Radio in Minnesota, check in to the ARRL Section Phone Net held daily. Oscar Sanden, K4EH, is relocating from Grand Marais to New Hampshire. Oscar was our Cook Co ARES EC and will be missed. We look forward to hearing Oscar on the air from the east! Reminder, TwinsLAN tailgate is being held Sat June 2 again at STP Tech College.

Net	*Freq*	*Time*	*QNI/QTC/Sess*	*Mgr*
MSPN/E	3860	5:30 P	647/202/31	W0WVO
MSPN/N	3860	12 P	400/65/31	WA0TFC
MSSN	3710	6 P	N/A	vacant
MSN/1	3605	6:30 P	223/71/21	K0WPK
MSN/2	3605	9:50 P	N/A	K0PIZ
PAW	3925	9A-5P	2898/125/94	KA0IZA

Tfc: WO0A, WA0TFC, KB0OHI, KB0AII, K0PIZ, K0WPK, W3FAF, KB0AIJ, W0HPD, K0PSH, KC0HAW, KN9U, WA0YSL, N0JP.

NORTH DAKOTA: SM, Kent Olson, KA0LDG – New Section web site designed specifically for ND hams. Check it out at: http://home.earthlink.net/~qtipf16/. Mark your calendar for these upcoming events: Combined Dakota and Midwest Division Convention to be held this year on June 15-16 in South Sioux City Neb., Field Day June 23-24, and Peace Gardens Hamfest July 13-15. The Superlink connection is back up into Dickinson. Thanks to those who made this possible. Congratulations and thanks to Dwayne Allen, KB7JVO, for becoming a new TS and Steve Carbno, KC0JCT, for becoming a new PIO for the Section. Two new Amateur Radio Spectrum Acts HR 817 and S 549, have been introduced into Congress. Please write Senators Conrad and Dorgan, and Representative Pomeroy and ask them for their support. Feb. Tfc: HF NM KE0XT reports Goose River Net, 8:30 AM Sunday 4/57/0; WX Net 8:30 AM Mon to Sat 49/943/14; Data Net 6:30 PM daily 28/712/16. Mar Tfc: N0RDJ 2. HF Goose River Net, 4/49/0; WX Net 50/1001/8; Data Net 28/719/20.

SOUTH DAKOTA: SM, Roland Cory, W0YMB—South Dakota had 1568 hams at the end of last year to rank 48th of 50 states with only more than North Dakota and Delaware. We have 248 Extra Class, 250 Advanced Class, 372 General, 177 Tech Plus, 418 Tech Class, and 103 Novice Class based on the 2000 census figures. South Dakota has more hams per capita than 20% of the US. The Dakota Chapter 102 special event station in Feb resulted in 281 contacts and request for 86 certificates. The Black Hills ARC at Rapid City had their annual auction that resulted in an approximately $600 for their club. New officers at Sioux Empire Club at Sioux Falls are pres Will Gravning, KE0Z, vp Ray Gustafson, WB0HHM, sec Rich Ballieu , WJ0S. They are looking into having a special event station on the USS Battleship Memorial in Sioux Falls this summer and also getting a new radio for their club station. The South Dakota Novice net meets on 3700 at 7 PM Central Time. Give it a try. Total traffic reported for March was 399.

DELTA DIVISION

ARKANSAS: SM, Bob Ideker, WB5VUH—Hard to believe first half of yr is coming up. So many activities going on within our section. Hope you're participating. With FD around the corner, lets be reminded of a few things associated with it. First, and foremost, please be careful and exercise safety! Our goal: no one hurt. Next, have fun. Volunteer to help set-up and take-down site. Make it a group effort. Being hot time of year, drink lots of fluids and don't overload or overheat your bodily systems. Share your knowledge. Excellent event that will bring club members together to share future memories. That's the most fun. Section will ask for Amateur Radio Week to be declared with Ark Governor. Proclamations to be mailed out to participating clubs. Take lots of pictures and submit to local newspaper along with advertising where you'll be set up. I will be traveling & hope to make your site. Make lots of contacts & finally, have lots of good food cookouts. Section Leadership staff coming together soon for retreat to discuss objectives and goals. Sign up on e-mail distribution list through www.qth.net and look for "All-Arkansas" from pull down screen. Subscribe and get emails regarding activities on-going in our section. Stay active and hope you will volunteer for activities within your clubs. Tfc 97% representation. QNI-3626; QTC-135;QTR-2,185min;lead by KC5TMU 158, K5BOC 93, K7ZQR 61, AD5AM 28,W5RXU 25, KA5MGL 8, AD5BV 4. Great job.

LOUISIANA: SM, Mickey Cox, K5MC —ACC: KM5YL. OOC: WB5CXJ. PIC: K5IQ. SEC: AC5TM. STM: KG5GE. LCW NM: W4DLZ. LTN NM: WB5ZED. Congratulations and good luck to KD5BPW as the new EC for St. Bernard Parish. Weather experts are predicting 2001 to be another intense year for storm activity. With possible hurricanes in the southern half and tornadoes particularly in the northern part of our section, LA amateurs should be prepared to provide emergency communications if called upon. If you're not already a member of your local ARES group, please contact AC5TM for information on how you can play a role in enhancing the public service record of our hobby. Hats off to WB5CXJ and all of our OOs for the great job they do in helping us keep our stations and operating practices in order. Thank yous are due to both the LA Council of Amateur Radio Clubs and the Southwest LA Amateur Repeater Club for donating $200 each for WARC 2003. Perhaps our other clubs can match these generous donations. Recently, I've learned that our state has the lowest percentage of amateurs in the country, only 1.52 hams per 1000 people. Two nearby states, AL and AR, have 2.38 and 2.60 hams per 1000 people, respectively. Looks like we need to do a better job of "selling" our hobby to attract new blood. Tfc: WB5ZED 916 (BPL), K5IQZ 124, K5MC 84, K5DPG 35, KM5YL 27, KG5GE 18, N0KWA 9. PSHR: WB5ZED 239, K5IQZ 132, K5DPG 128, KG5GE 107, K5MC 101, KM5YL 93. Net Reports: sessions/QNI/QTC. LTN: 31/362/100. LCW: 31/183/41.

MISSISSIPPI: SM, Malcolm Keown, W5XX—Section Web Site: www.arrlmiss.org—Web Master: K5IBM at k5ibm@arrl.net. DEC: KD5CKP, KD5EWB, K5IMT, WB5OCD, W5OXA,

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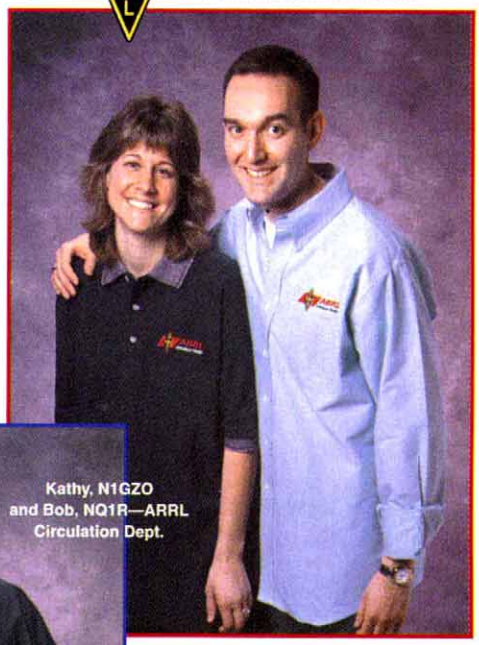

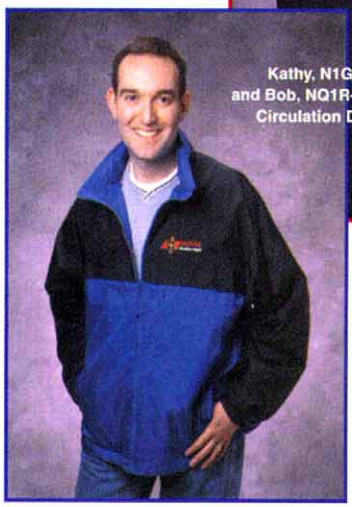

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AB5WF, N5ZNT. EC: NN5AF, KD5CKP, KB5CQX, W5DJW, KB5DZJ, KD5FUO, WD5IMP, KD5KXJ, N5MZ, N5NQ, WB5OCD, W5PES, KB5RQK, WA5TEF, KC5TYL, KM5WX, K5XC, KB5ZEA, N5ZNT. The Jackson NWS issued a Test Tornado Warning for Northeast Louisiana at 10:31 on March 7th as part of Tornado and Severe Weather Awareness Week. KB5RQF reports that the Bluff City ARC Emergency Net (which services part of NE La) was operational in two minutes after the message was received. Good Job! KB5HAV, as an NCS of the Maritime Mobile Service Net, helped to coordinate the rescue of the wounded captain of a private sailing vessel after being attacked by pirates off the coast of Venezuela. Well Done, Bobby! W5OXA reports that the West Jackson County ARC made a contribution to the ARRL Mississippi Scholarship Fund in memory of N5XGI. A similar gesture would be a worthwhile consideration for any club or individual in Mississippi wishing to support the Scholarship Fund. The Meridian ARC set up an information table promoting ham radio as part of Community Day at Bonita Lakes Mall. Don't forget the Pascagoula hamfest, June 1-2. Contact NN5AF for more details. Regret to report the passing of KC5YXP of Vicksburg. OO Rpt: K5XQ. PIO Rpt: W5KWB. DEC/EC Rpt: NN5AF, KD5EWB, N5NQ, WB5OCD, W5OXA, KB5RQK, KC5TYL, AB5WF. Net Reports: sessions/QNI/QTC. MSPN 31/3704/73, MTN 31/129/80, MSN 31/1510/11, PBRA 31/776/2, Jackson Co ARES/RACES 29/454/5, MSSN 22/119/4, West Coast MS ARES 13/281/6, JARCEN 5/88/0, Bluff City ARC 5/142/0, Attala Co ARES 5/60/3, MLEN 5/89/0, MCARA 4/38/0, MBHN 4/34/0, NW MS Skywarn 4/17/0, LARC 4/81/0, Stone Co ARES 4/32/0, Central MS Skywarn Linking Net: 1/48/0. PSHR: KB5W 142, K5VV 130, W5XX 91, KJ5YY 82. Tfc: KB5W 464, K5VV 145, KJ5YY 33, W5LEW 28, W5XX 11.

TENNESSEE: SM, O.D. Keaton, WA4GLS—ACC: WA4GLS. ASM: WB4DYJ. PIC: KE4CES. SEC: WD4JJ. STM: WA4HKU. TC: KB4LJV. Both the Kerbela and Tullahoma hamfests were successful, thanks to the hard work of both groups. Due to the great need for Amateur Radio in the aftermath of the Indian earthquake, CARC will donate radio equipment to Baroda ARC for its use in that emergency. RCARS is gearing up to assist in the Cherokee Trails Performance Rally later this month. BMRC/KARC 2001 officers: KE4GUT- pres; KF4RLG-BMRC vp; KC4VSN-KARC vp; KA4TNN-BMRC sec/treas; N7LY-KARC sec/treas; KF4YAY-activities mgr; KG4DTW-F.D. captain; KG4DTX-editor; KE4SYP-comm dir and assistant S Co EC and repeater tech; KC4LKG- chaplain; N4NRI-S Co EC; KE4IFP- H. Co EC; K4LN-repeater trustee; WB4JKB-tech con; AC4QX-NM. MARC News gives very good instructions on the operation of an emergency net. Thanks, Tom, KM4ES. The March issue of SPARKS contains a good article on the handling of QSL cards for credit for the ARRL programs. If you are unable to pick up a copy of SPARKS and need QSL information, get in touch with Terry Cox, KB4KA, who is one of TN's QSL card checkers. Phone 901-854-4191 or e-mail tacox@concentric.net. Thanks to the RACK members who assisted the Knoxville Track Club's Smoky Mountain Half Marathon and 5K races. DRN 5 report: sess 62, QTC 747, TN rep 73% by KE4GYR and W4OGG. Net sess/QTC/QNI: TMPN 31/55/2788; TEMPN 22/45/880; TEPN 27/79/3882; TSCWN 28/29/190. Tfc: N4PU 145, KE4GYR 92, W4SQE 70, WA4HKU 31, W4SYE 28, WB4DYJ 27, KI4V 12, K4QQ 6, WA4GLS 6, WD4JJ 5, W4HZD 4, WA4GZZ 3.

GREAT LAKES DIVISION

KENTUCKY: SM, John D. Meyers, N4GNL—The Section Cabinet will only be posted every other month as to try and bring as much news to the section as possible. If you club, ARES group is looking for a good project consider Field Day. What a way to introduce new hams to the world of radio. Congratulations to Jake McHendrix, WD4PBF, of Florence, Ky, on 23 years of service as an EC. Silent Keys this month; W4UX, John A. (Bill) Bryant, and WB4LJU, Jim Scofield. All clubs in Ky and/or their PIOs are requested to update your information with Steve McCallum, W2ZBY, at w2zby@juno.com. This information is needed in order to make sure the local news media can be made aware of the happenings in your area. Activity for March 2001 in the KY Section. KSN 256/53/31/KO4OL; KTN 1/1146/ 35/31/K4LID; KTN 2/1145/56/31/ KB4VKS. KYN 309/ 38/31/K4AVX; KEN 104/22/5/KA4MAP; WTPEN 48/ 2/4/KO4OL; 1ARES 51/4/9/KE4JFS; 7DARN 68/8/ 4/WD8JAW; 13ARES 39/0/5/N4CQR; K4MSU/45/2/4/ K4JFD. Tfc: KO4OL 45, KE4JFS 39, K4AVX 26, WB8BJN 25, WB4ZDU 3.

MICHIGAN: SM, Dick Mondro, W8FQT (w8fqt@arrl.org)—ASM: Roger Edwards, WB8WJV (wb8wjv@arrl.net). ASM: John Freeman, N8ZE (n8ze@arrl.net). SEC: Deborah Kirkbride, KA8YKK (ka8ykk@arrl.net). STM: James Wades, WB8SIW (wb8siw@arrl.net). ACC: Sandra Mondro, KG8HM (kg8hm@arrl.net). OOC: Donald Sefcik, N8NJE (n8nje@arrl.net). PIC/SNE: David Colangelo, KB8RJI (dcolangelo@ameritech.net) SGL: Ed Hude, WA8QJE (edhude@juno.com). TC: Dave Smith (DSmith@smithassoc.com). Youth Activities: Steve Lendzion, KC8MCQ (kc8mcq@arrl.net). BM: Thomas Durfee, Jr.,WI8W (wi8w@arrl.net). Congratulations to the new officers of the Genesee County Radio Club Pres. Ron Dutro, KF8VG; Treas. Verle Winningham, K8VW; Sec. John Kroll, K8LJG; Dir. Louie Hardy, WB8RJW; Trustee: Carl Miller, KF8Y. Are you ready for Field Day 2001? Let's not forget to publicize the local events with newspaper articles and an information table to let the public know what we do for our communities and to exhibit our capabilities. Invite some local school or youth groups or scouts to come out and learn about radio communications. Let them talk to someone across the country or in a foreign country. What a great way to kindle an interest in our hobby. By now our severe weather season is well under way. If you have not attended a training session this year, try to familiarize yourself with the proper net procedures. Have you made plans yet for our Annual Michigan ARPSC Family Outing yet? This year's theme is Education and Training and Youth Activities. July 5-8. Reservations are required via kc8mcq@arrl.net. Traffic reports for March 2001: K8GA 438, KB8ZYY 276, N8FPN 246, N8EIZ 242, W8RTN 240, WX8Y 129, K8LJG 115, W8RNQ 110, W8RF 98, WB8SIW 90, AA8SN 70, WI8K 65, K8AE 63, K3UWO 59, K8ZJU 43, WA8DHB 36, N8EXV 35, K8UPE 31, N8UN 30, KA8DDQ 26, KI8GR 17, W8YIQ 16, K8AMR 15, K8JN 14, KN8LD 11, N8TDE 7, N8EXS 2, N8JAT 2. Deadline 5th of the month. Please support the following Section Nets:

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"FLEXIBLE" 9913 STRD BC CNTR FOIL + 95% BRAID 2.7dB@ 400MHz NC/DB/UV JKT	.60/FT	.58/FT	.56/FT
LMR 400 SOLID CCA CNTR FOIL + BRAID 2.7dB @ 450MHz WP/UV JKT	.64/FT	.62/FT	.60/FT
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LMR 600 (OD.590") SOLID CCA CNTR FOIL + BRAID 1.72dB @ 450 MHz WP/UV JKT	1.27/FT	1.25/FT	1.23/FT
LDF4-50A Andrew 1/2" Heliax® 1.51 db/1530 watts @450 MHz 450 MHz	2.38/FT	2.33/FT	2.25/FT

COAX (50 OHM "HF" GROUP)

	100FT/UP	500FT	1000FT
RG213/U STRD BC MIL-SPEC NC/DB/UV JACKET 1.2 dB/2500WATTS @ 30MHz	.40/FT	.38/FT	.36/FT
RG8/U STRD BC FOAM 95% BRAID UV RESISTANT JKT 0.9dB/1350WATTS @ 30MHz	.34/FT	.32/FT	.30/FT
RG8 MINI(X)95% BRAID UV RESISTANT JACKET 2.0dB/875 WATTS @ 30MHz	.18/FT	.16/FT	.14/FT
RG58A/U STRD CENTER 95% TC BRD UV RESISTANT JKT 2.6dB/350 WATTS @ 30MHz	.19/FT	.17/FT	.15/FT
RG223/U SOLID SC 2 95% BRD NC/DB/UV JKT 2.0 dB/600 WATTS @ 30 MHz	.69/FT	.62/FT	.56/FT
RG214/U STRD SC 2 95% BRD NC/DB/UV JKT 0.925 dB/2500WATTS @ 30MHz	.25FT/UP	1.75/FT.	
RG142/U SOLID SCCS 2-95% SILVER BRAIDS *Teflon®* JKT 8.2dB/1100WATTS @ 400MHz	.25FT/UP	1.75/FT.	

COAX (75 OHM GROUP)

	100FT/UP	500FT	1000FT
RG11/U STRD BC (VP-66%) 95% BRAID NC/DB/UV JKT 1.3dB/1000WATTS	.44/FT	.42/FT	.40/FT
RG6/U CATV FOAM 18GA CW FOIL + 60% ALUM BRAID	.20/FT	.13/FT	.11/FT
RG6/U CATV FOAM 18GA CW FOIL *QUAD SHIELD*	.25/FT	.18/FT	.16/FT

ROTOR & CONTROL CABLES

	100FT/UP	500FT	1000FT
5971 8/COND (2/18 6/22) BLK UV RES JKT. Recommended up to 125ft	.22/FT	.20/FT	.18/FT
1618 8/COND (2/16 6/18) BLK UV RES JKT. Recommended up to 200ft	.37/FT	.36/FT	.34/FT
1418 8/COND (2/14 6/18) BLK UV RES JKT. Recommended up to 300ft	.49/FT	.47/FT	.45/FT
1216 8/COND (2/12 6/16) BLK UV RES JKT. Recommended up to 500ft	.80/FT	.76/FT	.72/FT
1806 18GA STRD 6/COND PVC JACKET Recommended for Yaesu Rotors	.25/FT	.23/FT	.21/FT

ANTENNA WIRE (Uninsulated)

	100FT	300FT	500FT	1000FT
14GA 7 STRD *"HARD DRAWN" (perfect for permanent Dipoles etc.)*	15.00ea	36.00ea	40.00ea	60.00ea
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	100FT	250FT	500FT	1000FT
3/32" DOUBLE BRAID *"POLYESTER"* 260# TEST WEATHERPROOF	7.00ea	15.00ea	22.50ea	40.00ea
1/8" DOUBLE BRAID *"POLYESTER"* 420# TEST WEATHERPROOF	10.00ea	20.00ea	35.00ea	57.00ea
3/16" DOUBLE BRAID *"POLYESTER"* 770# TEST WEATHERPROOF	15.00ea	30.00ea	50.00ea	80.00ea
5/16" DOUBLE BRAID *"POLYESTER"* 1790# TEST WEATHERPROOF	20.50ea	42.50ea	70.00ea	130.00ea

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12GA (rated:20 amps)	50FT $10.50	100FT $19.00	250FT $42.50
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1/2 INCH x 6FT Copper Plated Ground Rod w/clamp		$20.95/3 pk (sold in packages of 3 only)	

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50' $33.95 25' $22.95 15' $20.95 10' $18.95 6' $13.95 3' $11.95 1' $10.95

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RG8/U strd BC foam 95% braid UV resistant JKT. 0.9dB 1350 watts @ 30MHz.
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Double Silver Braid Shields, High Power Teflon® Dielectric & Jacket

PL259 ea end: 1ft $10.95 ea, 3ft $13.95 ea, 6ft $18.95 ea, 9ft $22.95 ea, 12ft $27.95 ea, 18ft $37.95 ea • "N" male ea end: 1ft $14.95 ea, 3ft $19.95 ea, 6ft $22.95 ea • 3 ft jumpers $20.95 ea: RA BNC male-"N" male, RA BNC male-"N" female, SMA, male-BNC female, SMA female-"N" female, RA SMA male-"N" female, SMA female-"N" male, SMA Male-"N" male.

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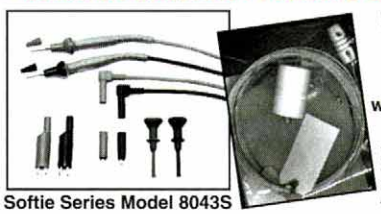
Jake's Featured Products of the Month



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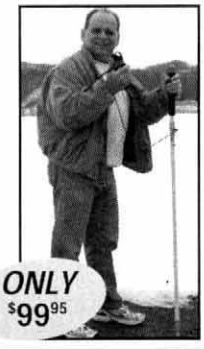

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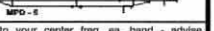

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Net	QNI	QTC	Sess	NM	Freq	Time	Day
MACS	237	65	31	W8RNQ	3.953	11 PM	Daily (1 PM Sun.)
MITN	483	403	31	N8FPN	3.952	7 PM	Daily
UPN	1277	43	35	AA8SN	3.921	5 PM	Daily (Noon Sun.)
GLETN	504	107	31	WB8ICN	3.932	8:30 PM	Daily
SEMTN	313	109	31	WI8K	145.330	10:15 PM	Daily
WSSBN	760	53	31	K8CPW	3.935	7 PM	Daily
MI-ARPSC	84	4	4	W8FQT	7.232	5 PM	Sunday (Alt. 3.932)
VHF	334	8	8	KB8ZYY	Var.	Var.	

OHIO: SM, Joe Phillips, K8QOE, Fairfield, (to contact me, see page 12)— In March, the Ohio Section lost its Technical Coordinator, Mike Brown, W8DJY (sk), Middletown. A lifelong ham and also a physics professor at Miami University, Mike loved demonstrating electronic theories with simple, household products most notably confirmed in 1999's demonstration of the Faraday pail (electromagnetic theory) at the Ohio Section Conference. We will miss him. Ohio's biggest public service event is the Great Ohio Bicycle Adventure (GOBA) 17th to the 23rd. This year it will cover the central and southeast part of Ohio. Contact SGL Jeff Ferriell, K8ZDA, for details. And don't forget Field Day Weekend is the 23rd-24th. Where it is possible, it is wise to have the public watching. Invite the local media; invite persons living near your Field Day site. Yes, sharpening our emergency skills is topic number one, but public acceptance of our work comes right after that. Which leads us to last March 28th, when our SKYWARN programs completed an Ohio Tornado Safety Drill. The National Weather Service activated its alert system across the entire state, not only us but the commercial radio and TV stations. Over 1000 amateur radio operators in the Ohio Section manned their radios, the 6-meter backbone operations was set up with the NWS offices so that reports could be sent in from the districts if the need arose. SEC Larry Rain, WD8IHP, Mansfield, was extremely pleased with the manner amateurs throughout Ohio proved their readiness. Newsletter editors - the 10th annual Ohio Section Newsletter Contest is on. Contact Scott Yonally, N8SY, Mansfield, the PIC for the rules and your entry. OHIO SECTION CONGRATS TO (A) Jerry Wheeler, KG8RN, Alliance, (B) Lela McClaren, KB8YPD, Salem, and (C) Colleen Roth, N8TNV, Lucas County; who all won Ham of the Year from their respective clubs. Especially Colleen, a sightless ham who every day is on active duty at ARES net time in the Toledo area. OHIO JUNE HAMFESTS; Goodyear ARC, Akron (10) and Milford ARC, Cincinnati (16) de K8QOE. Now for the March traffic reports:

Net	QNI	QTC	QTR	Sess	Time	Freq	NM
BN (E)	159	71	293	31	1845	3.577	WD8KFN
BN (L)					2200	3.577	NY8V
OSN	140	56	509	31	1810	3.708	WB8KQJ
OSSBN					1030, 1615, 1845	3.9725	KF8DO
OH Section ARES					1700 Sn	3.875	WD8IHP

Tfc: N8IO 559, K8PJ 423, N8OD 338, WN8SIO 338, WD8KFN 295, WB8KVM 254, KD8HB 263, N8BV 209, NS8C 143, W8STX 142, N8TNV 128, WA8SSI 117, KC8HJL 99, N8DD 94, N8YWX 80, K8OUA 68, N8CW 62, KC4IYD 61, KD9K 58, N8IBR 56, K8QIP 54, KX8B 51, W8PBX 47, KC8HTP 46, N8IXF 46, K8JMP 46, W8RPS 44, NS8C 42, KC8JKE 38, N8RRB 34, KI8O 22, WB8IOW 13, KB8SBK 11, N8RAK 6, W8JTJ 2, KB8TIA 1.

HUDSON DIVISION

EASTERN NEW YORK: SM, Pete Cecere, N2YJZ— STM: Jim Peterson, K2CSS. SEC: Ken Akasofu, KL7JCQ. ACC: Shirley Dahlgren, N2SKP. SGL: Herb Sweet, K2GBH. PIC: John Farina, WA2QCY. BM: Ed Rubin, N2JBA. OOC: Hal Post, AK2E. TC: Rudy Dehn, W2JVF. ASM: Tom Raffaelli, WB2NHC. ASM: Bob Chamberlain, N2KBC. ASM: Andrew Schmidt, N2FTR. ASM: Richard Sandell, WK6R. ASM: Phil Bradway, KB2HQ. Net Reports (March 2001) Check-ins (QNI)/Traffic handled (QTC+QSP): AES 60/6 CDN 316/123 CGESN 42/6 ESS 446/252 HVN 670/241 SDN 480/176 NYPHONE 346/710 NYPON 478/308 NYS/E 297/423 NYS/M 207/104 NYS/L 354/398 NYSPTEN 380/94. Field Day is almost here. Are you ready? Visit the ARRL, Division and ENY Section Web pages today, there is a LOT of info there. Join in on an emergency/traffic net. It's not too early to plan for our SET event. A very special thanks to Rob, KR2L, for all his efforts and service as SM, good luck Rob. I'm looking for your thoughts and suggestions. Feel free to contact me at n2yjz@arrl.org. Again, thanks to all for the good wishes. 73 de N2YJZ. PSHR: N2YJZ 189, N2JBA 161, WB2ZCM 142, KC2DAA 136,W2AKT 125, WA2YBM 116, W2JHO 98, KB2YUR 91. Tfc: N2JBA 103, N2YJZ 96, KC2DAA 60, W2AKT 47, N2TWN 46, WB2ZCM 39, W2JHO 22, WA2YBM 12, K2AVV 12, N2AWI 11 WA2BSS 11, KB2YUR 6, KL7JCQ 1, KC2BUW 1.

NEW YORK CITY / LONG ISLAND: SM, George Tranos, N2GA. ASM: KA2D, N1XL, K2YEW, W2FX, KB2SCS. SEC: KA2D. ACC: N2MUN. PIC-East: N2RBU. PIC-West: K2DO. TC: K2LJH. BM: W2IW. OOC: N1XL. STM: WA2YOW. SGL: open. The NY State PRB-1 bill (Assembly Bill A-1565A & Senate Bill S-2893A) is making headway through the legislature. We need your help and support now! Please write a letter or send an e-mail to your Assemblyman and State Senator asking them to support or cosponsor this bill. More info and sample letters are on both the NLI and Hudson Division Web sites. Field Day is THIS month - June 23 & 24. The NLI Staff will be accompanying me on a tour of club Field Day sites again this year. Please contact me and let me know your club's plans! Are you ready? Plan now, get the new FD2001 rules, invite your public officials and send out your press releases. Plan for a demonstration of digital modes for those extra points. The monthly NLI Section e-happenings newsletter has been a success and is being e-mailed to all ARRL members in the section who have subscribed to Division / Section bulletins. If you have not received this newsletter, go to the ARRL Web site (www.arrl.org) and update your profile. Check the box that indicates you want Division / Section bulletins. Previous newsletters are available on the NLI site. Please e-mail me with your club's information, and I will get it in the newsletter! June Events: HOSARC Hamfest at Hall of Science in Queens is Sunday, June 3. LIMARC Hamfest at Briarcliffe College in Bethpage is Sunday, June 10. KCRA special event stations for 176th Anniversary of Fort Hamilton is Sunday, June 10 - WA2ZWP will be QRV on 14.243, 21.343,

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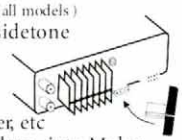

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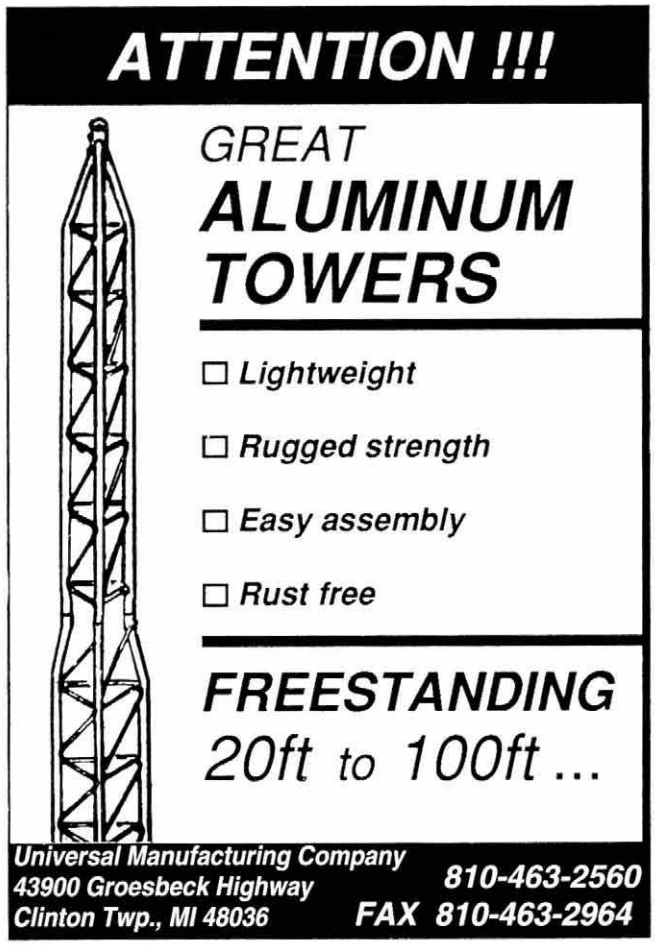

28.383. Shelter Island 10k run is June 9 - Contact Don Fisher, N2QHV, at 631-765-2757. Tour-de-cure Bikathon is June 10 - Contact Bill Scheibel, N2NFI, at 631-929-0126. EC/AECs, the public service calendar is full of activity. Remember to submit your manpower reports after the event. The event is not over until the report is filed. Volunteer Exam session, club listings, upcoming events and more are available on the NLI Web site - www.arrlhudson.org/nli. Report all changes to N2GA before the 12th of the month. Tfc: WB2GTG 443, N2AKZ 200, W2RJL 102, KB2KLH 45, WA2YOW 31, KA2YDW 22, KC2FWD 22, WA2VZK 13, KA2UEC 8, KA2D 6, N2TEE 2.

MIDWEST DIVISION

IOWA: SM, Jim Lasley, N0JL—ASM: N0LDD—SEC: NA0R. ACC: N0IJP @ KE0BX. BM: K0IIR @ W0CXX. SGL: K0KD. STM: KB0RUU. I know this takes space... but I do have e-mail and... "Why is the sky blue? Of course for an oscillating electric dipole, the radiated energy is proportional to the square of the charge acceleration, and since the polarization of air is directly proportional to the applied electric field, then the charge acceleration density is proportional to the second time derivative of the electric field, which is obviously proportional to the square of the frequency for an incident EM wave of a given energy density. Thus the dispersed energy is proportional to the fourth power of the frequency and EM waves in the 375 nm range are scattered by the atmosphere 16 times as much as EM waves in the 750nm range." As Buzz would say 'Oh, me.' We are losing hams on the edges and the middle! Note the loss of W9RI, KB0ZBK, and WB0LOB. Siouxland ARES/Skywarn is now incorporated. Next step is 501 (c) 3! Looks like DX has been good. Hello Summer, hello noise. Time for FD. Let's go work 'em. Let me know where. 73. Newsletters were received from OARC, GCARC, DARC, SCARC/CARC, TSARC, CVARC, EIDXA, DMRAA, FMARC, SAS, ICARC, NIARC. Traffic: KB0RUU 179, W0SS 177, N0JL 33, WB0B 16.

KANSAS: SM, Orlan Cook, W0OYH, ASM/ACC/OCC: Robert Summers, K0BXF. SEC: Joseph Plankinton, WD0DMV. STM: Ron Cowan KB0DTI. PIC: Scott Slocum, KC0DYA. Please welcome Mike Afton, K0PY, as our new Net Manager of our NTS QKS Kansas CW tfc net. Also welcome new Emergency Coordinator, Scott Mentzer, KB0WPY, of Dist 3 Zone 40 Sherman Co. Kevin Reich, KB0YGL, has resigned as DEC of Dist 2 and John is filling out the application for the position? Congratulations are in order to Preston, W0WWR, who has made BPL 3 consecutive times in a row to earn his medallion. I wish to take this space to give recognition to our ARRL KS Net managers Louie, WB0YWZ, of the KS Morning and evening Weather net; Bill, N0KFS, of the KS Phone net and KS Sideband net. Jay, AB5PA, of the Central States Tfc Net. Mike, K0PY, of our QKS CW tfc net 3610 kHz 7 & 10 PM dy. Ron of our QKS-SS slow speed CW tfc net. See KAR newsletter for more on nets. Feb. Kansas Nets: sessions/QNI/QTC, KSBN 28/1184/118 KPN 20/315/26 KMWN 28/696/513 KWN 28/993/639 CSTN 24/1888/ 108 QKS 54/262/131 QKS-SS 10/34/7 SEC 68/825/19 QNS KB0AMY N0BTH KB0BXF KC0CFL KC0CIG WD0DDG WD0DVM AA0IQ N0LJK W0PBV KB0QGX WA0SRR KB0WEQ Joseph, WD0DVM, SEC. TEN 360msg 56 sessions Kansas 95% w/AA0FO KX0I K0PY W0WWR, NB0Z, WB0ZNY, W0SS/Mgr. BBS AA0HJ received 0 W1AW Bulletins48, Personal 2 NTS. KS tfc W0WWR 818, W0OYH 52, KB0ODT 37, NB0Z 14, W0FCL 12, OBS-WA0DTH 15 and lots of room 4 UR report.

MISSOURI: SM, Dale Bagley, K0KY— I am looking forward to visiting with the Amateur Radio operators attending the North Central MO Hamfest in Macon, MO on June 9th, and at the Ozark Mountain Repeater Club's Hamfest in Houston, MO on June 16th. Cliff Ahrens, K0CA, the MO Section DXCC Card Checker will be at the NCMO Hamfest for those needing to get or upgrade their DXCC award. Robert Gill, KC0GHY, Kennett Middle School Radio Club sponsor, lead his students on a field trip to Larry Anthony, WB0VAM's QTH to learn more about Amateur Radio. In Gidion, MO, School Radio Club sponsor William Piatt Jr., N0JHW, has his students building antennas, participating in the School Club round-up and learning the Morse Code. Thanks to these fine teachers and all the others through out the MO Section, a new generation will be introduced to the wonderful world of Amateur Radio. Hannibal MO ARC has been officially renewed as a Special Services Club according to the Affiliated Club Coordinator Keith Haye, WE0G. There are a number of benefits to a club the being an SSC and it would be a good idea for more clubs to seek that honor. Many Section Radio Clubs are producing a Web based version of their monthly newsletter. Because of the rising cost of mailing and publications this is the only way some clubs have to reduce expense. One of the best Club Newsletter I receive via e-mail is produced for the St. Charles ARC by Craig Bennett, N0IIM and Lois Bennett, KC0ESK. Their use of photographs and format for the newsletter is outstanding. I will be spotlighting several other outstanding newsletters in upcoming Section News reports. Thanks to ABC printers, owned by Paul Poteet, AB0C and Jackie Hearrold, N0OID, I will have scratch pads to give out at Section Hamfests. This is the second year that they have donated the notepads which make a nice addition to the ARRL table. Tom Tishken, KD4WOV, of Springfield, MO has successfully passed the Amateur Auxiliary to the FCC Compliance examination and has been appointed an Official Observer for the MO Section. Nets: N0ATH Rptr 4/74/2; MTN 31/512/100; Rolla Billboard30/328/7; Jackson Co ARES 7/80/; MTN (CW) 58/159/51. Tfc: WA0YJX 26, KE0KS 14.

NEBRASKA: SM, Bill McCollum, KE0XQ—ASM: W0KVM, N0MT, WY0F, WB0ULH & WB0YWO. It is with deep regret to inform you that Paul, KC0SX, and Jewell, WB0JIE, have become Silent Keys. Paul was a member of the AKSARBEN ARC. Jewell and his wife were killed in a head on auto crash. Jewell was active on several Nebraska Nets. It was good seeing many of you at the Nebraska State Convention. I am pleased to announce that there are two recipients of the "Nebraska Ham of the Year" award - John "Mac" McKinney (W0AP) of Dannebrog and Gerry Bennett (W0WKP) of Roca. These gentlemen have been licensed for many years and have made many contributions to our hobby. Congratulations, Mac and Gerry! I am pleased to announce that Dick, W0HXL has been appointed Net Manager of the AKSARBEN ARC Informal Net. Net Reports: MID NE ARES: QNI 313, QTC 2 & 31 sessions. NE Storm Net: QNI 1042, QTC 10 & 31 sessions.

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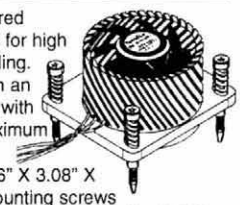

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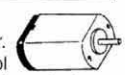

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NE 40 Meter Net: QNI 539, QTC 6 & 30 sessions. Lincoln/Logan ARES: QNI 21, QTC 2 & 3 sessions. Tfc: K0PTK 121, KE0XQ 20, WY0F 8, WA0ZCN 7, KA0DBK 6, W0UJI 6, WA0ZCM 4, W0BMT 3, W0EXK 2, WB0ART 2, PSHR: KA0DBK 139.

NEW ENGLAND DIVISION

CONNECTICUT: SM, Betsey Doane, K1EIC—BM: KD1YV. OOC: W1GC. PIC: W1FXQ. SEC: WA1D. SGL: K1AH. STM: K1HEJ. TC: W1FAI. Well, I missed the Southington Hamfest and missed you all because my Florida trip (where it was supposed to be warm) left me with a bad cold at about that time. Will look for you at the next hamfest. It saddens me very much to report that Phil, W1KSC, is a Silent Key. Phil was terrific-always at a hamfest, always keeping up with what's new and just a marvelously enthused op. He was also active in QCWA. We'll sure miss him. Congrats to everyone involved in the Trinity Science Fair Exhibit with special thanks to W1FXQ, W1AGP and K3UFG. Lots of young people learned about our hobby! Recruiting is already beginning for next year's event. Don't forget The Big E in September-Al, N1JWF, and Walt, KA1DFH, will be team captains this year. Amazingly, Field Day is just around the corner. Joe, N1KHB, is compiling a list of FD sites which we can make available to help publicize your effort. Unfortunately, I will not be available that weekend because my nephew is getting married. Gosh, I silently gasped when I learned that that wedding was really FD weekend! It was nice to visit FARA members last month; they're running a General license class and looking forward to various events including operating at The Dogwood Festival and Field Day. The Wireless Ops of Winsted and CQ Clubs had speakers from local Red Cross at their annual banquet and are enthused about training with Red Cross and training for emergency comms in the Torrington/Winsted area. Ed, K1UQE, reports that ECARA had a very successful hamfest in March-best ever! C u on the air-73. Net sess/QNI/QTC/NM: ECTN 31/298/198/WA4QXT; NVTN 29/151/33/KB1CTC; WESCON 31/274/72/KA1GWE; CPN 30/240/108/N1DIO; CN 22/74/46/N1AEH; BOMN 27/280/353/NM1K; CT NTSD 1455 total/W1WCG. Tfc: NM1K 2976, KA1VED 593, WA4QXT 382, KA1GWE 197.

EASTERN MASSACHUSETTS: SM, Phil Temples, K9HI—ASMs: WA1ECF, N1GTB, WA1IDA, N1UGA, AA1MO. ACC: N1DHW. BM: N1IST. OOC: K1LJN. PIC: N1PBA. SGL: K3HI. STM: NZ1D. TC: N1UEC. (SEC: open) e-mail list: ema-arrl@qth.net, Web: http://www.qsl.net/ema-arrl. AA1MO has been appointed as a new ASM. WF1F was featured on Boston's WHDH-TV news discussing MIR. Sturdy Memorial Hospital ARC members garnered press coverage on "Cosmonautics Day" by attempting to contact the Int'l Space Station from N. Attleboro High School. Two newspapers and Channel 6 covered the event. W1QWT spoke at a recent South Shore RA license class about the Amateur Auxiliary program. Speaking of speaking, ACC N1DHW has been making the rounds at many clubs in the section. Congrats to the Framingham ARA and Norwood ARC for renewal of, and new approval for Special Service Club status, respectively. Marconi RC members operated from their home stations for the recent the Int'l Marconi Day event. Patriot DX Assn. has experienced renewed activity of late. Spring is here, and with it the return of many walkathons and public service events. If you're new and wish to volunteer, check out http://purl.org/hamradio/publicservice/nediv. Boston ARC's recent tech class produced seven new hams. From SGL K3HI: "Please write your state legislators and ask that S. 1217 (and/or other similar bills being considered) be amended to explicitly mention that the new anti-cellular laws are not meant to apply the Amateur Radio service." K1WUV spoke about Phase 3D at a recent Algonquin ARC meeting. N1CPE reports that recent improvements have been made to the Wellesley ARS 2m and 440 MHz repeaters. Norwood ARC is making plans to conduct a 2 m Morse code practice net. EMA ARRL Web site of the month: The Cape Ann ARA has a redesigned, professional-looking site at http://www.qsl.net/w1glo. MA VOAD and its member organizations were active during the recent flooding in EMA. KB1CSB was among those who volunteered to make phone calls to affected citizens. Kudos to W1EC and W1DL: ARRL members for 50- and 60 years, respectively! Falmouth ARA's flea fest will be held shortly. Pentucket RA will conduct a fox hunt in Maudley State Park in Newburyport. This SM has visited several clubs in recent weeks, including the HP/Agilent ARC, the Minuteman RA, and the Cape Ann ARA. 73, K9HI. Tfc: W1GMF 2409, KB1AJ 1987, N1LKJ 849, KW1U 780, KY1B 625, W2EAG 443, NZ1D 241, KD1LE 213, N1AJJ 134, WA1FNM 104, K1HTN 96, K1SEC 75, WA1LPM 63, N1IST 56, K8SH 53, K1BZD 49, KB1EB 40, NC1X 32, N1TDF 12, N1TPU 10, N1ZFF 7, NK1L 1.

MAINE: SM, Bill Woodhead, N1KAT—ASMs: WA1YNZ, KA1TKS. STM: N1JBD. BM: W1JTH. SGL: W1AO. ACC: KA1RFD. OOC: N1RY. PIC: KD1OW. SEC: N1KGS. Asst. Dirs: W1KX, KA1TKS, K1NIT. Web Site: N1WFO. The Can-Am Crown Dog Sled Races held in March in Ft. Kent were very successful, due to the help of the following amateurs: N1UYA, N1PMS, KB1EBE, WA1YNZ, KA1COX, KC1SE, KA1OOW, N1HSQ, N8VJM, N1QMC, N1CGV, KW1C, WA1ZQH, N1FCW, KA1VTW, N1JHT, KB1EBG, N1KGS, N1ZLA, N1ZHQ, N1ZBX, N1JHD, N7GLR, N1CHF, and with the addition of VE1PIN, this was truly an international event. Congratulations and thanks to all for a job well done. So much for Global Warming - the 18+" of snow that greeted the attendees of the ARRL Maine State Convention in Lewiston was not a welcome sight. However, the Andy ARC was able to dig itself out enough to try it again another year. 250 hearty Hams braved the weather to support Amateur Radio. My sincere thanks to: KD1OW, K1GUP, N1RY, AL2Q, W1ME, N1NAF, N1RWY, N1WTQ, and K1TWF for making this year's convention a very memorable experience. 73, Bill, N1KAT. Tfc: W1KX 181, N1JBD 55, W1QU 49, W1BLT 43, W1JX 35, KA2ZKM 33, W1JTH 27, KA1RFD 24.

NEW HAMPSHIRE: SM, Al Shuman, N1FIK (n1fik@arrl.org)—NH Web site (www.nhradio.org). As I write this column in early April, the snow is finally melting. Special thanks to all the ARES & SKYWARN members who responded to the many activations this past season. Interested in being a better communicator? Sign up for the online Amateur Radio Emergency Communications Course. ARECC is a new training tool offered by the League. Having completed the course this month,

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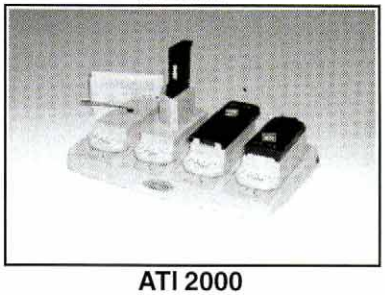

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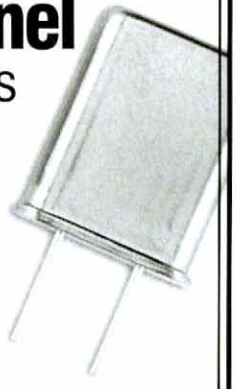

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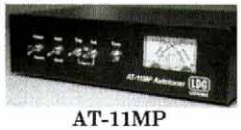

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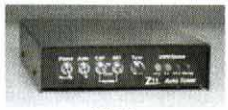

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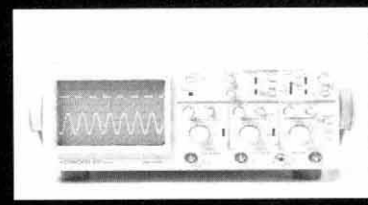

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I can attest that it is well worth it. Sad to report the passing of Harry Smith, K1JNJ, known here and in RI. Harry was a good friend and will be greatly missed. The N H Section Manager's Award has been redesigned. This colorful and classy award will be given to members of Amateur Radio community who have served with distinction on behalf of the public good. This award may be viewed on the NH Website. If you know of someone who is deserving of recognition, please contact me. The license plate bill failed to pass by the NH House Transportation Committee by a vote of 18-2. Go to the New Hampshire Website to find out how they voted and remember! 73- Al, N1FIK, 487-3333. Net NM/Sess/QNI/QTC: GSFM N1RCQ 31/232/46; GSPN WB1GXM 31/147/87; VTNH WA1JVV 31/130/107. Tfc: W1PEX 1472, WA1JVV 119, W1ALE 92, N1NH 75, WB1GXM 32, K1STV 21, N1CPX 19.

RHODE ISLAND: SM, Armand Lambert, K1FLD— A recent meeting of the BVARC featured an impressive presentation by Bob Seega, the VP for Narragansett Electric Co on the reasons for the power problems with California and how we on the East coast differ to resolve problems.// Meanwhile the PVARC and OSARG team up to provide outstanding radio coverage for the Burrillville canoe race held on St Patrick's day this year. Kudos to Ken, KB1AWV, and Judy, KC1RI, and all the volunteers that teamed up to make the event possible./ / Tri-city radio club reports ordering PSK-31 transceiver kits featured in *QST* to join in on this popular mode sweeping Amateur Radio world wide and the software is free for the down loading available on the ARRL home page. Just type psk31 into the search engine and browse the many articles./ / Riley Hollingsworth recently praised the Amateur Auxiliary and the OOs for their dedicated service to our favorite hobby/ service.// This month brings Field Day, a chance to have fun while operating under emergency conditions. Often times magical things happen to radio operators during this captivating weekend, so join your favorite club and operate. This year, yours truly will be out of the area and Bob, W1YRC, the ASM for RI will be touring the club FD sites. Give Bob a big welcome. He is anxious to meet all of you. 73 till next time, Armand, K1FLD.

WESTERN MASSACHUSETTS: SM, William C. Voedisch, W1UD, w1ud@arrl.org—ASM: N1MAP. ASM (digital): KD1SM. STM: W1SJV. SEC: K1VSG. OOC: WT1W. Ed, WT1W, entertained and informed the MTRA group on techniques used in the LF and ELF bands. We are anticipating the allocation of two frequencies in that band (136 and/or 176 kHz). He brought recording of his monitoring the 70 Hz frequency. Some of the sounds were astounding and bewildering until Ed explained what they were and what produced them. MARA's meeting was devoted to Field Day preparations. Mt. Wachusett will be the site again this year. They have recruited a City of Leominster official to visit the site. Considering that the mountain is closed to vehicle traffic, it should be an interesting experience getting to the top. They plan to operate QRP throughout the weekend. Other clubs have formulated similar plans. NOBARC has a Newcomer's Net at 7:30 PM Monday night and a Near Net for club discussion at 8:00 PM on Sunday night. Join, it should be interesting. Tfc: K1TMA 215, N1WAS 175, N1IBS 27, KD1SM 8, W1BMK 6, W1UD 307. 73 until next month.

NORTHWESTERN DIVISION

ALASKA: SM, Kent Petty, KL5T – Alaska PRB-1 Bill passed Senate and introduced in House. Anchorage Amateur Radio Club completed purchase of motor home. Volunteers needed to engineer and reconfigure for communications command post. State Girl Scout encampment upcoming at Palmer Fairgrounds June 14-17. Many activities planned for over 2,400 expected campers. Teresa Nunes (KL0WW) and Gerianne Thorsness (WL7RY) coordinating and need assistance. HF nets: Sniper's Net 3920 1800 AST, Bush Net 7093 2000 AST, Motley Group 3933 2100 AST, and Alaska Pacific Net 14292 M-F 0830 AST. **ALL HAMS** – Please report communication drills and exercises, emergency communication activations, and public service activities via our online interactive FSD-157 (Public Service Activity Report) form at: http://www.qsl.net/aresalaska/fsd157/public_service.html.

EASTERN WASHINGTON: SM, Kyle Pugh, KA7CSP— On April 21, STM Don, W7GB, and others will be part of a CW demo along with the Spokane Morse Telegraph Club in Ritzville in conjunction with a historic SPS 700 steam locomotive pulling a special train round trip from Portland to Spokane. Originated messages from Ritzville will go to the National Traffic System. There's a local repeater in Moses Lake now on 146.70, PL of 100 Hz. Field Day is this month, please get involved with your local groups. See you at the Wenatchee Hamfest on June 9-10 at the Dryden Gun Club. Also the KARS hamfest in Rathdrum, ID, is June 9. In Memoriam: George Schee, W7ULL, of Spokane, and Elmer Merle, AB7LC, of Kettle Falls, became Silent Keys. 7 out of 10 OO stations reported monitoring activity for March. 73/KA7CSP. Net Activity: WSN: QNI 942, tfc 193; Noontime Net: QNI 9220, tfc 407; WARTS: QNI 3611, tfc 85. Tfc: W7GB 181, K7GXZ 134, KA7EKL 76, K7BFL 70, KK7T 19. PSHR: W7GB 138, K7GXZ 119.

IDAHO: SM, M.P. Elliott, K7BOI — OOC: W7ZU. SEC: AA7VR. STM: W7GHT. Idaho has a PRB-1 law. HB232a breezed through the House and Senate. Governor Dirk Kempthorne has signed the bill into law (effective 07.01.01). Thanks to Rep. Max Black and Sen. Grant Ipsen, and Rep. Margaret Henbest, KB7WWT. The biggest thanks goes to John Cline, K7BDS, and the crew at IBDS. This was John's idea and he gathered the forces to make it happen. Must report that after years as OOC, Bob Swain, N7GHV, has resigned due to health. Bob did a great job and will be missed. Bob's replacement is long-time OO Bob Haggerty, W7ZU. Thanks for stepping up Bob! 73 - Mike, K7BOI. Tfc: W7GHT 295, KB7GZU 74, WB7VYH 56, W6ZOH 12. PSHR: W7GHT 120, WB7VYH 84. Nets: FARM-31/ 2939/35/W7WJH; NWTN 31/1250/65/ KC7VAH; IDCD 22/440/10/WB7VYH; IMN-31/562/210/ W6ZOH. http://id_arrl.homestead.com/mainpage.html.

MONTANA: SM, Darrell Thomas, N7KOR—There was considerable activity during the month of March in the Montana Section with Amateur Radio clubs meeting with emergency service agencies in preparation for what may be another major fire season. The Hellgate Amateur Radio Club in Missoula and the Flathead Valley Amateur Radio Club in Kalispell both renewed and updated their ARES programs. The Great Falls Area Amateur Radio Club has been contacted by the County

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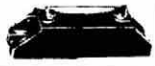

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OREGON: SM, Bill Sawders, K7ZM—ASM: KK7CW. SEC: WB7NML. STM: W7IZ. SGL: N7QQU. OOC: NB7J. ACC: K7SQ. It's convention time, again! SEAPAC takes place June 1st, 2nd, and 3rd, in Seaside, of course. Featuring one of the northwest's largest flea markets, SEAPAC will host hundreds of Amateur Radio operators from throughout the pacific northwest and west coast. The Saturday night banquet also promises to feature a great dinner as well as a premier program. Don't be left out. You can still register by calling Will Sheffield, N7THL, at 503-642-7314. Another great surprise guest from ARRL headquarters in Newington will be present. Let's give him a great northwest welcome! The Lincoln County ARC voted to go ahead with a booth in the Lincoln County Fair, July 19-22. This is a great opportunity to show people what Amateur Radio is all about, and how much fun we have! Hopefully, this super idea will spread to other communities to help increase our numbers. Good going LCARC ! The Umpqua Valley Amateur Radio is holding regularly scheduled "fox hunts". In the "old days" we used to hold these on 80 meters...and you still can. But, with the popularity of 2 meters, it is much easier to use direction finding loops, yagis, and quad antennas. Another great idea for your club from the folks in Roseburg! Needless to say, this is the month for Field Day, June 23-24. Don't forget to get a message to your Section Manager during the event, and earn those extra "bonus points." I hope to work you in this year's event, and keep in touch. NTS traffic totals for March: N7DRP 198, W7IZ 155, N7YSS 114, KC7ZZB 87, W7VSE 50, KC7SRL 43, K7NLM 31, KC7SGM 30, KK1A 2.

WESTERN WASHINGTON: SM, Harry Lewis, W7JWJ—Kudos to Marina Zuetell, N7LSS, and DEC for Medical Services and the team that put together another successful weekend at Communications Academy at the old Sand Point Naval Base. Congratulations are also in order to Jerry, W7TVA, with a traffic count of 854 which qualifies him for BPL. Here are the reports from other traffic handlers: N7AJ 41, W7LG 109, K7MQF 171, W7NWP 36, W7QM 321, KA7TTY K uno one, KJ7SI 24, N7YSS 114 and W7ZIW 80. Please welcome a new Technical Specialist for the Western Washington Section, Scott Douglas, W7XC. Accumulated reports gleaned by SEC N7NVP indicate that the Whatcom Co Races/ARES members used the RACES/ARES ComVan to provide search communication for Deputy Sheriffs, 4x4 Group, Coast Guard and 2 private helicopters. The 2 day even, looking for 2 kayakers, was coordinated by RO John Rogstad, KB7PKL, with the assistance of KC7CAA, W7EKM, W7DAR, KD7CRA, KB7QHG, KC7OAS, and KC7IJH. District one DEC John Rollman, KJ7SI has recruited Ken Koster, N7IPB, to be the Skagit Co EC. Also Laura Boles, KD7FRE, has accepted the role of OES with Bob Dickerson, KD7ITV, replacing her as EC for San Juan County. Our thanks to Laura. Ed Brown, W7VNT, shared his neighborhood preparedness training at the Clallam Co ARES meeting and Al Dawson, W7YLV, conducted training on the increasingly difficult task of changing frequency and tone on ones HT. Clark Co presented a certificate to Jack Ellis, K7SUQ, for his excellent work as Net Manager and AEC these past years. The Clark Co group also took part in a SAR exercise with 15 participants, and an additional 5 members in the standby mode. 73.

PACIFIC DIVISION

EAST BAY: SM, Andy Oppel, N6AJO—ASMs: NJ6T, KE6QJV. SEC: KE6NVU. DECs: KE6QJV/Alameda County, 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. SARS welcomed new member WB6HAZ. EBARC expects 10 new Technicians in May from its current class. They have a very active education program. CCCC also has a Technician class running. ORCA RACES plans to participate in the April 18 county-wide exercise. VVRC welcomed new members N6AJR and KG6DZC. HRC has been opening their club shack the 1st Saturday of each month, and of course, band conditions have been cooperating. March tfc: W6DOB 673, KE6QR 14. PSHR: W6DOB. BPL: W6DOB. Tfc nets: NCN1/3630/7 PM; NCN2-SLOW SESSION/3705/9 PM; NCN-VHF/145.21/7:30 PM; RN6/3655/7:45 PM & 9:30 PM; PAN/3651/7052/8:30 PM. Your check-ins are always welcome.

NEVADA: SM, Jan Welsh, NK7N—ASM: W6OLD. SEC: NN7B. NV Assemblyman Bob Beers, WB7EHN, sponsorship of AB61 generated MANY E-mails, mail and phone calls to our assembly people. I thank you all for your support, which kept it alive. Sections on existing CCRs were removed but amended bill is going to full assembly. W6OLD is the person who has kept most of NV informed. April 16 is the final assembly day and hopefully we'll have succeeded in part. May 12 is Reno's Spring Ham Swap day, at KNPB Channel 5 in Reno courtesy Reno Area Metro Simplex ARC Kk7ih@nvrams.org for info. July 28 is the Sierra Nevada ARS hamfest at IGT, 9295 Prototype Dr., Reno. K7nhp@arrl.net for info. It was good to seeing S NV 'hams' as I worked Baker to Vegas relay race this past weekend, hope they show up Field Day at Clark County Govt center in downtown Las Vegas. Affil Club Coord Melissa Flanagan's address:2851 Esaw St Minden, NV 89423, e-mail melissa@libelle.com. Thanks N7CPP for transcript of AB61. My e-mail is nk7n@aol.com address 59 Constitution Ave, Henderson, NV 89015. 73, Jan, NK7N. Tfc: W7VPK 98, N7CPP 19, W7TC 12, NV7YL 5, W7YDX 4, K7NHP 1.

PACIFIC: SM, Ron Phillips, AH6HN— Ron Pitts (Maui ARC) reports the club Web site is closer to reality. The big issue is reincorporating the club to satisfy our bank and the State of Hawaii. Several years have passed since the proper papers have been filed, so some catch-up is necessary. WH6KO, WH6CWD and AH6GR have volunteered to be the committee that oversees the establishment of a non-RACES statewide repeater network being setup by Rick Ching, tentatively set for 146.34-94. This will be an open repeater. Greg, WB6FZH, Koolau ARC announced he will be leaving as the editor of the newsletter and the Web page. Many thanks for your past contribution and good luck. The KARC news data is available on the Web. Dean, KH6B, reports the Hilo ARC and HI QRP Club meets daily at Jack in the Box. Also, please welcome

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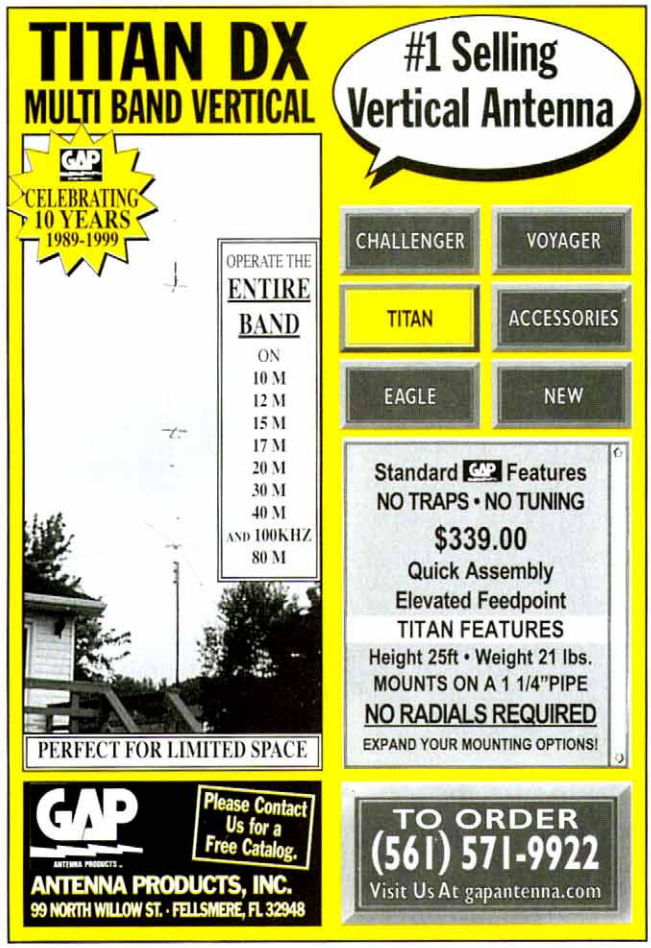

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aboard Dean as the new ASM for the section. Dean has agreed to assume the responsibility to interface with ARRL on all issues concerning the section. Thanks, Dean, for your help. Dale, AH7D, reports the stats for the Emergency ARC (Diamond Head Rpt 146.88 and 444.5) for Mar 2001, are Number of check-ins: 186; Total net time: 325 minutes. Lee Wical, KH6BZF, reports that the Honolulu Chapter #206 of QCWA met for their March monthly meeting. The Koolau ARC met at Kaneohe's Hoomalahia park and KARC continues to spearhead the up coming "Hawaii State Amateur Radio Convention" on Saturday, Oct 13 at Pearl Harbor's Rainbow Park. Walt, AH6OZ, is this year's convention chairman and president of the Koolau ARC. Kevin Bogan, AH6QO, is the convention's vice chairman and president of the Emergency ARC. BIARC will soon have a 2 meter repeater. Mahalo & 73.

SACRAMENTO VALLEY, SM, Jerry Boyd, K6BZ—June and July are good months for me to visit clubs as I am not teaching school during the summer. Any clubs in the Section needing a "guest speaker" during this period please contact me. I would be honored to make a brief presentation on current Section activities. Good article in a recent GEARS Newsletter regarding "J Pole" antennas. It was nice to see so many fellow DX'ers at Visalia this year. It is a good time to say thanks particularly to those who visit rare and exotic DX entities so that us DX addicts can benefit from their journeys. Field Day is just around the corner. Remember there are some new rules in effect this year, so check them out on the ARRL Web site. Thanks to those who have submitted applications for field appointments. I guess people read this column after all since the applications followed several announcements regarding the need for some new appointees. The El Dorado County Amateur Radio Club newsletter discussed a trip to the Virginia City, NV Radio Museum. Sounds like an interesting place to visit! The League's EMCOMM continuing education course remains very popular with multiple classes filling up in a hurry. Level II is going to be offered in the very near future, so if you have completed Level I and enjoyed it standby for even more interesting material. Until next month, 73 de K6BZ.

SAN FRANCISCO: SM, Len Gwinn, WA6KLK—ASM: KH6GJV. SEC: KE6EAQ. San Francisco Section Convention to be held June 22-24 in Ferndale, Humboldt County. RV sites will be available at the fairgrounds location. The SAREX/ARISS telebridge station at the Santa Rosa Junior College assisted the Reibli Elementary School in Santa Rosa make the first school contact to the ISS for the second crew. A record 26 questions were asked and answered of Astronaut Susan Helms. The Reibli teacher who applied for the contact for her class was Kristie Weber, KD6LSZ. The SRJC telebridge operators and school mentors were Tim Bosma, W6ISS, Herb Sullivan, K6QXB, and Bill Hillendahl, KH6GJV. The Empire Amateur Radio Society in Santa Rosa just graduated another Technician class in late March. There were 15 students with half of the class being youngsters, the youngest being 10 years old. The instructors for the class were Bill Hillendahl, KH6GJV, John Breckenridge, WB6FRZ, and Rick Reiner, K6ZWB. The youngest graduate, Darin Wick, participated in the Reibli School contact with the ISS on 3/27 and got the second to last question in to Astronaut Susan Helms. The class members will be taking the exam in April. Humboldt County recently acquired eight new hams thru classes also. San Francisco Radio Club was active during the Seattle earthquake. Much good information was learned in the Seattle activation. Contact them about the campout being planned also. Red Oak Victory ARC is planning tours of the reserve fleet. Check with them about seeing these wonderful ships of WW II. See you all in Ferndale!

SAN JOAQUIN VALLEY: SM, Donald Costello, W7WN—Hello all. Skywarn was put to the test on Saturday April 7. I was attending a Boy Scout fair in Atwater. The skies were filled with dark fast moving clouds and Kent LeBarts, K6IN, called in a funnel cloud noted near the Dos Palos area at about 11:00 in the morning. He called for the NWS weather net, which was on standby due to the weather, and reported the funnel cloud. I returned home with the 147.03 Turlock ARC repeater programmed into my HT and proceeded to put up a new egg beater antenna I have recently purchase from Mike Staal, K6MYC, at M2 antennas in Fresno. The WX was getting much worse so, I climbed down the tower. A couple of my neighbors were looking off to the west of Hwy 99. There it was, yet another funnel cloud in the late afternoon. I called this one into the NWS net and was instructed to keep watch. The funnel cloud lasted for some time elongating and then thinning out and finally, fortunately, dissipated. Meantime Richard Burns, KE6RGB, drove up just as the NWS was asking for mobile spotters to follow the two merging cells to the Merced-Madera County line. Richard took up the challenge as well did another local ham, Howard Watson, N3TNQ. The National Weather service was able to garner ground information to coordinate with their radar. Good work fellows. Scott Borgioli, KE6ITF, is the radio officer at NWS and has been doing a great job of keeping spotters notified of standby alerts and general operation of the Skywarn program. If you would be interested in training to be a spotter, contact Scott at ke6itf@yahoo.com.

SANTA CLARA VALLEY: SM, Glenn Thomas, WB6W— Field Day is fast approaching. A source of 100 FD bonus points is the SM message. The details are in the FD rules in May *QST*. After FD, I will list the calls and club names from all of the messages I actually receive in this column. Watch for it in August *QST*. The Foothill College Electronics Flea market will be meeting again on the 2nd Saturday of each month. Yours truly spoke at the Cupertino ARES meeting on transmitter hunting. CARES meets at 7:30 PM the first Thursday of each month at Cupertino City Hall, 10300 Torre Avenue. The Santa Cruz County ARC had "show & tell" night at their March meeting. Visit their Web site at www.k6bj.org for more info. The West Valley ARA newsletter (The Heterodyne) has a new editor, Glen, KC3FH. Thanks to outgoing editors Chuck AD6CL and Eleen, KF6SPE, for the wonderful job they did as editors over the last two years. WVARA meets on the 3rd Wednesday of each month at 7:30 PM in the Mary Campbell room (Q-84) at the Campbell Community Center. Check out their Web page at www.wvara.org...The Palo Alto ARA meets on the first Friday at 7:30 PM in the Menlo Park Recreation Center, 700 Alma Street, Menlo Park. The Lockheed-Martin ARC has a club net every Wednesday night at 8 PM local on the linked club repeaters, WA6GFY (224.28- 100 Hz, 443.775+ 100 Hz, 1283.7- and 145.62 Simplex). For more

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info contact WB6PVU/Terry, tnak@pacbell.net. The Garlic Valley ARC meets on the LAST Saturday of each month, at the Little House Restaurant in Gilroy on Monterey Avenue. The meeting follows breakfast at 8 AM. For information, contact Tony Armendariz, AD6ID, 408-683-2025. - See you next month! 73 de Glenn, WB6W. Tfc: W6PRI. 2.

ROANOKE DIVISION

NORTH CAROLINA: SM, John Covington, W4CC—SEC: KE4JHJ. STM: N0SU. BM: KD4YTU. TC: K4ITL. PIC: KN4AQ. OOC: W4ZRA. SGL: AB4W. ACC: http://www.ncarrl.org. I have enjoyed meeting with many hams across our state at the 17 or so hamfests we have each year. I can't always make every single one of them, but I make as many as I can. If your club is sponsoring a hamfest, I encourage you to seek ARRL sanctioning. This is free and an easy process which will give you a detailed listing in *QST* and on ARRL's Web site, some door prizes and some ARRL literature for your hamfest attendees. Apply as soon ask you know the date and location of your hamfest. I'll make sure that I, or some other League official, attends your show. Field Day will be here very soon. If you publicize your event or conduct it in a public place, make sure your group has someone designated to handle questions from the press or the public. If possible, this should be that person's only job during the event. Field Day is a great opportunity to educate others about what we do, and let's make the best impression we can. Just letting folks walk by while we are preoccupied calling CQ FD won't be enough to get their interest. We offer something unique – we can make worldwide friendships, explore science and technology, and be of service to our community, all at the same time. Whether it's at Field Day or any other event where Amateur Radio is visible, the impression we leave with the public can greatly impact us down the road, in both the legislature and in our neighborhoods. Think about it. Sad to report some Silent Keys: Lee W4NJJ, Fred WA4MSM, Bob W4MHF, Brant KF4WZY, Gail W4GGC. March Traffic: W4EAT 676 (BPL), AB4E 419, NC4ML 361, AA4YW 218, KE4JHJ 161, KI4YV 152, K4IWW 135, W4IRE 117, AD4XV 105, W3HL 49, N0SU 42, KE4AHC 34, WA2EDN 34, W4CC 34, AE4HJ 21, WA4SRD 20, NT4K 11, KC4PGN 9, N8UTY 7, KB8VCZ 6, KE4YMA 6, KT4CD 6, N4NTO 4, KG4MBQ 2.

SOUTH CAROLINA: SM, Patricia M. Hensley, N4ROS — The month of June begins summer vacation for students. It can also be the opportunity for developing a new interest for students: amateur radio. Young people learn best when they are actively involved in a project, and now is the best time to plan for this type of hands-on training. Each of your diverse interests (packet, DX, VHF, QRP, PSK31, etc.) can be shared with a youngster which will contribute to stimulating a desire to learn more about the hobby. Learning is curtailed by isolation, but it is developed by participation in an atmosphere of interaction and inquiry. Your mentoring should not only include experiments and investigations but also exploration in an expanded world. This may encompass listening to stories, meeting other amateurs, learning about new places and developing a mutual respect between adults and children. Needless to say, an invitation to Field Day this month certainly meets all of the above criteria. Also, another Kid's Day on-the-air will be conducted shortly and details can be obtained in this issue. Students require this type of guidance if they are going to become a part of amateur radio and its future. Note: Please listen to the SC ARES/RACES and SCSSB nets for updates on the June pre-hurricane seminar. Tfc: AF4QZ 145, KA4LRM 89, K4BG/KA4UIV 44, KG4FQG 27, WD4BUH 20, K3LM 15. PSHR: KG4FQG 147, K4BG 136, AF4QZ 128, KA4LRM 126, KA4UIV 130.

VIRGINIA: SM, Lynn Gahagan, AF4CD—ASM: KC4ASF. SEC, OOC: KR4UQ. STM: W4CAC. ASM/A: KE4NBX. ASM/B: W4TLM. ASM/C. TC: W4IN. ASM/D: KF4LGV. PIC: W2MG. Well, with summer just around the corner, that means Field Day isn't far away. Get active with your group or club and help prepare the last minute plans for this fun outing. Invite the neighbors or perhaps some old friends along to your Field Day site this year. You may just recruit some new blood into our great hobby! There are plans being made now for another Virginia ARES/RACES training session to be held at the McBryde Hall auditorium at the Virginia Tech. Campus in Blacksburg. This is the same location that was used in the '99 session and seats 560 so that should accommodate the audience. Our D13 DEC and crew are hosting this event. Confirmation on the auditorium reservation has been received. The event will take place on Saturday July 28. For more information contact W4PAJ. I have recently made the following appointments to our Field organization. WD5DBC, Howard Cunningham Jr. has taken the EC position for Fairfax Co. in District 2 and after several months of supporting the various Va. NTS nets KV4AN, Steven Krumm, receives the ORS appointment. Steve is located in District 8. Thank you both for volunteering your time and supporting the Va. Section activities. The Old Dominion Chapter #202 QCWA and other area clubs will operate the Special Call Event Sign WW2DDM - (W)orld (W)ar 2 (D)-(D)ay (M)emorial commemorating the dedication of the National D-Day Memorial in Bedford, Va. Look for operations during 1700-2400Z June 6 to June 10. 7.050, 7.250, 14.050, 14.240, 21.050, 21.330, 28.050, 28.350, 50.222, and 144.222. For additional information see www.usit.net/~pob/qcwa. Do you want to learn more about CW and meet new friends active in this mode? There is a program designed to promote the use of Morse in operation alive and well! It's the "International Morse Preservation Society" - better known as the FISTS CW club. The club has three straightforward goals: Further the use of CW. Engender friendships among members. Encourage newcomers to use CW. There are over 5600 members in the US and Canada alone, with membership worldwide. For more information see www.qsl.net/w4fcr DX IS 73 de AF4CD. Tfc: W3BBQ 344, KV4AP 210, WA4DOX 208, K4YVX 126, K4MTX 121, AA4AT 97, W4CAC 93, K0IBS 86, WB4ZNB 62, KV4AN 55, KE4PAP 54, N4ABM 46, KR4MA 33, KB4CAU 22, KU4MF 22, W4SEE 20, W4YE 18, WB4UHC 18, W4MWC 10, WD4MIS 8, K4JM 8, W4JLS 8, K4IX 6, N4FNT 2.

WEST VIRGINIA: SM, O.N. (Olie) Rinehart , WD8V— STM: KC8CON. SEC: W8XF. ASEC: KA8ZOO. SGL: K8BS. TC: K8LG. OOC: N8OYY. ACC: WD8MKS. APRSC: W8XF. PIC: N8TMW. Two weeks vacation to Florida and the Bahamas, and too tired to do a report this month. HI HI. All joking aside,

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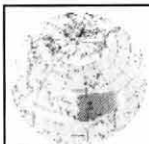

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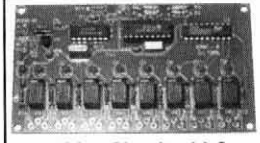

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not really anything new to report. Busy with hamfests. If I have not seen you by the end of the season, feel free to contact me and I'll arrange a visit to your club. 73. "SEE YOU ALL AT THE MILL" Tfc: KA8WNO 339, W8YS 195, WD8DHC 168, KC8CON 79, W8WWF 77, WW8D 61, N8BP 10, N8NMA 9, KC8OJN 6, N8FXH 10, N8BP 11. PSHR W8YS 199, KC8CON 143, WD8DHC 128, KA8WNO 118, WW8D 111. WVFN 1206/183/1002 KC8CON; WVMDN 866/16/500 WW8D. WVN E 94/73/225 W8WWF; WVN L 102/83/317 W8WWF; ARES/RACES 76/1/96.

ROCKY MOUNTAIN DIVISION

COLORADO: SM, Tim Armagost, WB0TUB—ASM: Jeff Ryan, N0WPA. SEC: Mike Morgan, N5LPZ. STM: Mike Stansberry, K0TER. ACC: Ron Deutsch, NK0P. PIC: Erik Dyce, W0ERX. OOC: Karen Schultz, KA0CDN & Glenn Schultz, W0IJR. SGL: Mark Baker, KG0PA. TC: Bob Armstrong, AE0B. BM: Jerry Cassidy, N0MYY. The Colorado Council of Amateur Radio Clubs (CCARC) held its semi-annual meeting on April 7 in Bailey. The hosts were Padre, W0WPD and the Park County Radio Club, and they put on quite a spread. Thanks to them for their hospitality. The CCARC delegates re-elected Glen Cascino, WN0EHE as vice-chairman, and Mike Wisch, WB0LGC as treasurer for a two-year term each. Congrats to them, and thanks for volunteering to serve. See the Web page at www.ccarc.net for news and information. I hate to admit it, but it was my first time in Bailey. The drive back to the Springs took me through the Buffalo Creek area where nearly 12,000 acres of forest suffered a wildland fire in 1996. Even amidst the still charred landscape, you can see the beauty of this part of our state. The same day held a 'garage sale' swapfest sponsored by the Longmont Amateur Radio Club. I didn't make it, but our SM, Tim, reports it appeared to be very successful with a good turn-out. The National Traffic System (NTS) TCC/Cycle 4 has a new director. Jerry VerDuft, AD0A has been elected, succeeding Don Calbick, W7GB. Congrats Jerry! As I write this in early April, a replacement is needed for the NTS position Jerry vacated: TWN/Cycle 4 Net Manager. Contact Rob K6YR, if interested in the job. 73, de N0WPA. NTS tfc: K0TER 110,AD0A 105, W0ZZS 61. CAWN: W0WPD 715, K0HBZ 461, K4ARM 457, W0LVI 444, WB0TYT 410, WB0VET 403, AA0ZR 322, N0NMP 320, W0GGP 290, AB0PG 271, W0NCD 259, KI0ND 251, WD0CKP 194, N0DKK 154.

NEW MEXICO: SM, Joe T. Knight, W5PDY— New Mexico Roadrunner Net handled 109 msgs with 1459 checkins. New Mexico Breakfast Club handled 236 msgs with 1078 checkins. Yucca Net handled 29 msgs with 698 checkins. Caravan Club Net handled 3 msgs with 50 checkins. SCAT Net handled 14 msgs with 628 checkins. Four Corners Net handled 25 msgs with 350 checkins. GARS Net handled 9 msgs with 46 checkins. Rusty's Net handled 75 msgs with 763 checkins. Valencia County Net handled 15 msgs with 25 checkins. Deming ARC Net handled 10 msgs with 48 checkins. Our thanks to K5QQ for an excellent presentation on PSK-31 & RTTY at the ABQ DX ASSC mtg. running about 35 watts. He sparked a renewed interest in digital radio by working a Russian station with a mag mount antenna from the roof of his truck, while in the restaurant during the meeting with a 599 sig. rpt. The Valencia County ARC is receiving lots of good PR from their excellent newsletter with NM5RC as editor. The Flagstaff AZ (Ft Tuthill) Convention will be held July 27-29. The NM ARRL State Hamfest has lots of exciting plans for the later part of August. Alamogordo ARC has planned a nice Hamfest for Saturday, Sept 1st. Sixty New Hams from last month are exercising the airwaves. The Ruidoso ARES/RACES group have performed well during the Ruidoso Fires. Sorry to report the passing of W5UKA & KJ5UW. They will certainly be missed. Check out the NM Section Web Page at "qsl.net/nmsac". Tnx to N5ART for his fine efforts. Vy best73, W5PDY.

UTAH: SM, Mel Parkes, AC7CP—We had a great RACES Workshop, April 14, and I would like to express my appreciation to Brent Thomas, AC7CP, Bob Craven, N7GTE, and Patrice Thomas for all their hard work organizing this special event. Maralin Hoff; Jim Rudnicki, NZ7T; Matt Moody, WD7N; Jeff Pitman; Hall Blankinship, KC7RAF; John Mabey, W7CWK; Jeff Ballif, KB7VSJ: and Doug Nielson, N7PPW all gave excellent presentations at the workshop. Thanks to each for the preparation and work to make this a very successful event. Get with your club or favorite group and enjoy ARRL Field Day, make a commitment this year to participate even if you operate as a single station from your home. Don't wait too long, 7 June is the last day to get your early registration in for the Utah Hamfest, register early to take advantage of the pre-registration and make your accommodation reservations now so you are not disappointed. Plan now to attend Utah Hamfest 2000 July 13-15 at Ruby's Inn. For hamfest info and hotel or campsite reservations also see the Web site at http:\\www.utahhamfest.org. 73 de Mel, AC7CP.

WYOMING: SM, Bob Williams, N7LKH—The summer schedule is beginning to fill up. The Wyoming State Hamfest, May 25-26, will be going on in Casper, just about the time this issue is delivered. The Glacier-Waterton International Hamfest will be held July 20-22, the Willow Park campout in the Big Horns from August 16-18, and the Yellow Pines/ High Plains Roundup over the weekend of the 8th and 9th of September. We have been requested to provide communications support for two bicycling events this summer: the Ride Around Wyoming, June 17-22, and the Tour de Wyoming, July 22-27. The Ride Around Wyoming will be a "hub and spoke" ride, based in Cody. The Tour de Wyoming, sponsored by the Governor's Council on Physical Fitness, will be a loop ride this year, beginning and ending in Gillette. Overnight stops will be in Wright, Newcastle, Sundance (2 nights), and Moorcroft. Repeater coverage is pretty thin out that way, and there aren't many hams in the area, so we need volunteers. Communicators are invited to camp with the group (usually at schools), and it's a chance to have fun while performing a public service. Finally, we regret the passing of Robert B. Dryer, KE6ZBM, of Laramie, and extend our condolences to his family.

SOUTHEASTERN DIVISION

ALABAMA: SM, Bill Cleveland KR4TZ — ASMs: W4XI WB4GM KB4KOY. SEC: W4NTI. STM: AC4CS. BM: KA4ZXL. OOC: WB4GM. SGL: KU4PY. ACC: KV4CX. TC: W4OZK. PIC: KA4MGE. With the start of Hurricane Season and Field Day, June is Emergency Communication month in the Alabama Section. Please prepare your station for emergency

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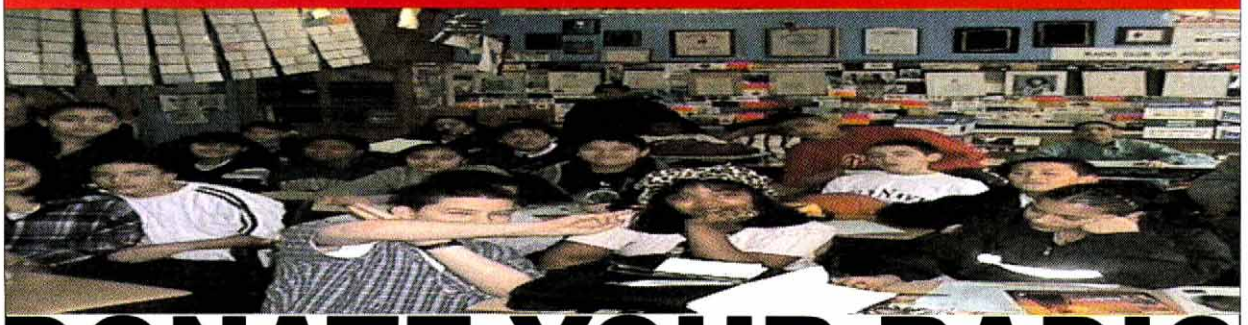

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0503G	1-5	10-50	6	15/0.7	LPA	208
0508G	1	170	28	15/0.7	Standard	367
0510G	10	170	25	15/0.7	Standard	319
0550G	5-10	375	59	15/0.7	HPA	524
0552G	20-25	375	54	15/0.7	HPA	486
144 MHz						
1403G	1-5	10-50	6	15/0.7	LPA	163
1405G	1-2	100	14	15/0.7	Standard	295
1410G	5-10	160-200	28	15/0.7	Standard	328
1412G	25-45	160-200	22	15/0.7	Standard	286
1450G	5-10	350+	56	15/0.7	HPA	572
1452G	10-25	350+	52	15/0.7	HPA	525
220 MHz						
2203G	1-5	8-35	5	14/0.8	LPA	168
2210G	5-10	130	20	14/0.8	Standard	346
2212G	25-45	130	16	14/0.8	Standard	316
2250G	5-10	225	40	14/0.8	HPA	579
2252G	10-25	225	36	14/0.8	HPA	537
2254	75	225	32		HPA	494
440MHz						
4405G	1-5	15-50	9	12/1.2	LPA	309
4410G	10	100	19	12/1.2	Standard	367
4412G	15-30	100	19	12/1.2	Standard	355
4448G	1-5	75-100	25	12/1.2	HPA	429
4450G	5-10	185	35	12/1.2	HPA	585
4452G	25	185	30	12/1.2	HPA	547

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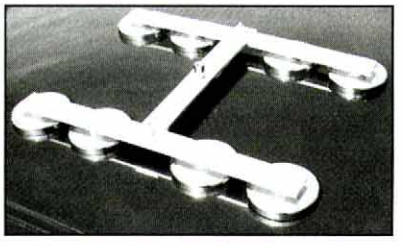

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SP-7000	70cm	<.9	20 Adj.	500/100W	249.95
SP-23	1296	<.9	18	100/10W	359.95
SP-13	2304	1.2	18	50/10W	379.95
LNA	144	<.4	18	NA	219.95
LNA	432	<.5	18	NA	219.95
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operation by stocking up on batteries, NTS traffic forms, and other emergency supplies. Crank up your generator and make sure its in running condition. Become active in your local ARES group, and help your ARES Emergency Coordinator develop a plan on what needs to be done during a local emergency. You can test your group's preparedness by operating during Field Day on June 23-24. Don't forget to use Field Day to educate the general public on Amateur Radio's role during an emergency. June also means the beginning of Hurricane Season. We were blessed by having no major hurricanes hit Alabama last year. I hope our luck remains the same this year, but just in case we all need to prepare ourselves for the possibility of a hurricane this year. Don't let the lack of hurricanes tempt you into not remaining prepared! Hurricanes affect the entire Alabama Section, so regardless where you live please plan to take action. The number of check-ins into the Alabama Emergency Net (AEN) is growing! The AEN operates every Tuesday night after the Alabama Traffic Net Mike (around 7:30 PM) on 3965 kHz, and is the official emergency net of the Alabama Section. All area emergency operations will operate on 75 meters at 3965 kHz, or if band conditions warrant 40 meters at 7243 kHz. (Both frequencies are +/- 5 kHz). God Bless & 73, Bill Cleveland, KR4TZ.

GEORGIA: SM: Sandy Donahue, W4RU—ASM/South Ga: Marshall Thigpen, W4IS. ASM/Legal: Jim Altman, W4UCK. Asst SM/IT: Mike Boatright, KO4WX. SEC: Lowry Rouse, KM4Z. STM: Jim Hanna, AF4NS. SGL: Charles Griffin, WB4UVW. BM: Eddie Kosobucki, K4JNL. ACC: Susan Swiderski, AF4FO. OOC: Mike Swiderski, K4HBI. TC: Fred Runkle, K4KAZ. PIC: Matt Cook, KG4CAA. Web site www.qsl.net/arrl-ga. Congrats to mega-DXer Bob Allphin, K4UEE, who has been inducted into the CQ Magazine DX Hall of Fame. The Atlanta Hamfest is June 2 and ARRL HQ is sending Brennan Price, Ga Tech grad and ARRL employee who will be checking DX cards at the hamfest and talking about regulatory and interference problems at a forum. The hamfest is at Jim Miller Park in Cobb County and talk in is on the 146.22/82 repeater. Ga Section condolences go to the family of Blant Addison, WA4NVU, Toccoa, who became an SK on March 25. Albany ARC is resurrecting their hamfest/tailgate on June 9. The Lanierland Hamfest in the very cool Ga. Mountains Center is July 11. The ACC, OOC and I went to the Paulding ARC in late March and gave an ARRL presentation. My staff and I are always open to a club program that I occasionally title "The Gospel According to the ARRL". Clubs in Atlanta or a reasonable distance from Atlanta can have us for nothing. Let me know. 73, Sandy. Tfc Feb: AF4NS 257, WB4GGS 238, W4WXA 204, KG4FXG 165, KE4R 141, K1FP 109, K4WKT 88, K4BEH 70, WU4C 68, KE4HHE 40, W4AET 35, AF4PX 27, K4ZC 15, K4BAI 3.

NORTHERN FLORIDA: SM, Rudy Hubbard, WA4PUP. ACC: WA4B. BM: N4GUU. OOC: KD4NLV. PIC: KF4HFC. SEC: WA4NDA. SGL: KC4N. STM: WX4H. TC: KO4TT. PACKET: N4GMU. George Thurston III, W4MLE, became a SK on March 21, 2001. His funeral was March 24th. George was issued the first Extra Class License to someone not working for the FCC. Earlier in his Amateur Radio days, he wrote the first Radio Amateur's Operating Manual for the American Radio Relay League. This process went through four editions and numerous printing, and is reported to have sold over 100,000 copies. Of course writing the operating manual was a natural for George, as he has published several books. He also represented or worked for various newspaper as investigative reporter. To give him proper recognition and credit for his newspaper reporting would require many pages. Therefore, I will devote these comments to the Amateur Radio. . He was well known for this CW "fist." In fact, it is reported he did not have a microphone until about 1990, when appointed as DEC for the Capital District. In 1984, I was appointed as SEC for the Northern Florida Section, and needed a DEC for the Capital District. John Hills, KC4N, recommended George, but hastily remarked George did not own a mic. Of course, when George as appointed DEC, it was with the requirement he would have a mic to meet nets involved in emergency conditions. Getting a mic was probably one of the most dreaded things for him. After my election as Section Manager, George was a natural for the SEC position. His expertise, enthusiasm, professionalism, and dogged determination, the Emergency Communication Plan and Operations began to take on a new meaning. His devotion to recruiting the best-qualified volunteers for the DEC and EC position could not have been better. He always listened to ideas, as he wanted the best solution for improving any given situation, and that the Northern Florida Section be second to none. Due to his efforts, the Section has received compliments as having one of the best Emergency Plans and Operations in the Nation. We have lost a dear friend. de WA4PUP. Tfc: WX4H 2239, KE4DNO 522, AG4DL 348, NR2F 335, K8KV 164, KE4PRB 153, KD4GDB 147, K4DMH 130, AF4PU 130, K1JPG 120, KB2EV 111, N9MH 104, KD4EZO 73, AF4GF 65, N4JAQ 61, KF4WU 59, WB2FGL 59, WD4IIO 46, WA1VOP 39, K4JTD 37, AB4PG 33, W5MEN 29, W8IM 27, KB4DCR 25, W4KIX 24, KM4WC 14, KC4HBN 12, KJ4NS 11, WX4J 11, KD4VJL 10, WA4EYU 9, WB9GIU 6, WD4ILF 5.

PUERTO RICO: SM, Víctor Madera, KP4PQ -- Están de pláceme los "Contesters", buenas condiciones de propagación y más competencia. Puerto Rico se sigue escuchando en las bandas durante concursos. Felicitamos a KP2BH, KP3A, WP3A y KP4LNY por sus participaciones en concursos recientes. La FRA celebró un hamfest en Naguabo. Próximamente otro en San Germán con concurso de CW y DX en HF. Ya hay anunciados dos Field Days, uno en Bacardi (PRARL) y el otro en Plaza del Caribe en Ponce (FRA). La Cruz Roja del área oeste celebrará un Congreso de Comunicaciones de Emergencia en Mayagüez. Felicitamos a NP3CV por la organización de dicha actividad. Los exámenes en toda la isla que auspicia el PRARL y el ARRL/VEC han sido un éxito. Se han roto todos los records de asistencia. En Puerto Rico se ofrecen sesiones acreditadas por el ARRL/VEC y W4VEC/VEC. El PRARL esta organizando clases de telegrafía en el aire. Más noticias próximamente. Las clases preparatorias para "Technician" están programadas para comenzar la segunda semana de julio en la UPR en Río Piedras. Siguen los preparativos para el curso de "Amateur Auxiliary". Tenemos un pequeño retraso debido a inconvenientes en la preparación de material en la imprenta. La fecha y lugar se anunciará próximamente. Interesados comuníquense con el Section Manager por correo regular, teléfono o vía email a kp4pq@arrl.org.

SOUTHERN FLORIDA: SM, Phyllisan West, KA4FZI —SEC: W4SS. STM: KJ4N. ACC: WA4AW. PIC: W4STB. OOC: K4GP. BM: KC4ZHF. SGL: KC4N. DEC/ASM: N4LEM, WB9SHT, AA4BN, KD4GR, WB2WPA. Web Page: http://www.sflarrl.org. Thanks to the Collier, Dade, Ft Myers, Indian River, Orlando, South Brevard, Vero Beach Clubs, and ECs for the newsletters and activity information. For JOTA this year, we have a brave volunteer, Sal Ippolito, N4YQU, taking on the task of coordinating activities in SFL. If you know scout troops or radio clubs that would be interested in taking part, please send all pertinent information to Sal. E-mail: N4YQU@arrl.net or US Mail: 1521 NW 9th St., Boca Raton, FL 33486. Amateurs from the Titusville ARC, Brevard ARC, and North Brevard joined forces to aid in the Red Cross 100-mile bike tour as well as separate 33 and 66 mile tours. They manned 6 aid stations and 4 rovers. It was 13-year-old KG4MCU's first public service event. Next is the Cancer Society Relay covering an 18 hour all-nighter. The new SBARC callsign is now officially K4SBA. Broward hams are planning FD and SET activities with KD4GR. Indian River supported the Multiple Sclerosis Walk on Cocoa Beach with 11 hams and are gearing up for the Cancer Society Run-for Life this month. Lee Co. continues refurbishing the ambulance (SRU-2) as a second response unit with 800 MHz trunked, VHF/UHF including CAP, Coast Guard and fire units, and 11 Meters. Martin Co. ARES repeater antennas were relocated from the old to the new Martin County tower. The Osceola ARES emergency response team continues to grow. Okeechobee is sending reps to the Hurricane Conference as they renew their ties-ins to the EOC. Palm Beach Co. ARES is adding classes on CPR and Net Etiquette to their usual hurricane prep activities. Good idea! March Traffic by STM, Jan, KJ4N: WA9VND 592 KA4FZI 329, KB4WBY 237, KD4GR 170, AA4BN 125, KJ4N 124, K4FQU 104, KC4ZHF 103, KE4UOF 98, KD4HGU 92, KD4JMV 79, K4VMC (club) 72, WA4EIC 64, KE4WBI 53, W8SZU 49, KT4XK 40, WA4CSQ 36, WB4PAM 35, W6VIF 30, KG4CHW 27, AF4NR 14, K4ENA 12, W4WYR 11, KG4GZL 10, K4OVC 7, KN4JN 7, W3JI 6. 73, Phyllisan West, KA4FZI.

VIRGIN ISLANDS: SM, John Ellis, NP2B, St. Croix, ASM: Drew, NP2E, St Thomas. ASM: Mal, NP2L, St John, Sect. Internet Mgr (SIM): Jeanette, NP2C, St Croix. SEC: Duane, NP2CY, St Thomas. PIC: Lou KV4JC, St Croix. ACC: Debbie, NP2DJ, St Thomas, NM Bob, VP2VI/W0DX Tortola. Very sorry to report the passing of a good friend, Pastor Eric Gaskin, NP2CV on March 12. The St Croix Club is to meet on the second Saturday of each quarter at 1:30 in the afternoon at the Deep End Bar at Tamarind Reef Hotel at Green Cay Marina. Lunch for those interested starts at about noon. St Croix triathalon to take place on May 6, this is now a prequalifier for the Ironman in Hawaii. Longer than ever before, hams who have already signed up include Merv W9UKK, Bob KP2CG, Chuck WP2AAA, Lou KV4JC, Jeanette NP2C, Hilroy NP2IT, Ivan NP2LI, Jim NP2LK, Bill NP2EF, Cleo NP2BW, Chris NP2EL and John NP2B. The race committee greatly appreciates the help from the hams as it provides race officials with a quick and direct communications link where and when they need it most. St. Thomas Club meets each Tuesday at Hook, Line and Sinker in Frenchtown (near the Seaplane Shuttle) for lunch. Local repeaters St. John 146.63, St. Thomas 146.81 & St. Croix 147.25. Section Web site http://www.viaccess.net/~jellis and e-mail to section manager at np2b@atthehelm.com or np2b@arrl.org. 73 all, John, NP2B.

WEST CENTRAL FLORIDA: SM, Dave Armbrust, AE4MR, ae4mr@arrl.org, http://www.wcfarrl.org— ASM: NA4AR. ASM-Web: N4PK. ASM-Legal: K4LAW. SEC: KD4E. TC: KT4WX. BM: KE4WU. STM: AB4XK. SGL: KC4N. ACC: AC4MK. PIC: AB2V. Field Day is June 23-24. ASM NA4AR and myself will be visiting field day sites through out the section. This year there will be a Section Manager's Field Day trophy awarded. Be sure to help out and help your club win this trophy. TS N9AWP reports the Charlotte 421.250 MHz ATV repeater is now complete with an input of 434 MHz and ERP of 500 watts on sync tip. Sarasota ERC was active all 10 days of the Sarasota Fair and was running ATV, SSTV, APRS and other conventional modes including CW. Gary Hammel, AF4UD, was seriously injured in an auto accident and is looking at a long recovery. Gary is very much in our thoughts and prayers. The section's K4WCF repeaters have added 146.760 MHz in Pasco County to the 145.430 MHz and 442.950 MHz repeaters. All use a 100 Hz tone. SEC KD4E reports an increase of 8 ARES members for a new total of 411, 35 Nets, 16 Ops, 6 public service events and 623 total hours for March. March: Net report is available on the section's Web page. PSHR: K4SCL 153, K4RBR 142, AD4IH 141, AB4XK 138, W4AUN 123, KT4PM 120, KF4KSN 110, KT4TD 103, AE4MR 95, KF4OPT 86, WB2LEZ 78. Tfc: K4SCL 271, AB4XK 240, AD4IH 164, KT4PM 56, K4RBR 37, KF4KSN 36, W4AUN 23, KT4TD 21, AA4WJ 9, AE4MR 6, KF4OPT 5, WB2LEZ 3. 73, Dave AE4MR.

SOUTHWESTERN DIVISION

ARIZONA: SM, Clifford Hauser, KD6XH—It is time for Field Day. Yes, this is the month when we show the world that we can communicate during any emergency situation. When you set up your Field Day operation, invite the public and make sure the local news media is also informed and invited to participate during this event. This is also a great way to show young people what Amateur Radio is all about. The Fort Tuthill hamfest, scheduled for 27-29 July, will cost you a dollar ($1.00) entrance fee for the weekend. This move was necessary due to the increase cost of the grounds and rule change by the Coconino Co Board of Supervisors. Also, the county campground in the back of the fairgrounds has removed the outside pay showers. This will only effect the people who dry camp using tents. If you have not made any room reservations, do so quickly as the motels fill up because this is the tourist season. ARCA has set aside several rooms at the Econo Lodge for people who want to stay there. The DeVry hamfest in Phoenix was nicely done and well attended event. It rained on Thursday and Friday morning, but Saturday was very nice with sunshine and weather in the low 60's. If you are in to emergency communications preparedness, the state has an emergency net every Sunday morning at 0800 on 3990 kHz and PIMA County has an emergency communications preparedness net at 0845 on 3995 kHz every Sunday. Other counties also have this type of communications preparedness so no matter where you live within Arizona. We can

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"As I got older, my high frequency hearing loss was destroying my ham radio for me . . ."

-- Martin F. Jue, K5FLU
President and Founder
MFJ Enterprises, Inc.

I know I'm not the only ham who can't understand all the speech in a QSO caused by high frequency hearing loss. I developed a solution that I want to share with my fellow hams.

I almost gave up my ham radio hobby

I have been a passionate ham radio operator for over 40 years ever since I was a teenager. I loved every minute of it. Still do, but I almost had to give it up.

As I grew older (I'm 56 now) I found myself asking "*What did you say?*" so often it got downright embarrassing. I can hear pretty good most of the time. I just can't always understand what people are saying and my left ear is weaker than my right ear.

It got to where I was having trouble carrying on QSOs. I could hear, but I just couldn't quite make out all the words.

My hearing problem almost put a stop to my lifelong hobby.

There was no way I was going to give up ham radio . . .

Research showed me what to do

I searched the literature and spoke to hearing and speech experts.

According to their research on the intelligibility of speech in hearing English words:

1. The frequencies important for speech intelligibility are the consonant sounds from 500 to 4000 Hz. They contribute 83% of word intelligibility.

Frequencies from 500 to 1000 Hz contributes 35% of word intelligibility and 35% of sound energy.

Frequencies from 1000 to 4000 Hz contributes *48% of intelligibility* but has *only 4% of sound energy!*

2. In contrast, frequencies from 125 to 500 Hz contributes 55% of sound energy but only 4% to word intelligibility.

***In** other words, nearly half the speech intelligibility is contained in 1000 to 4000 Hz frequency range with only 4% of the speech sound energy.*

On the other hand, the low frequencies 125 to 500 Hz have most of the speech energy but contribute very little to intelligibility.

How I improved my ability to hear and understand QSOs

The research showed me what to do.

First, drastically increase the speech energy above 500 Hz where 83% of intelligibility is concentrated.

Second, drastically reduce the speech energy below 500 Hz that contributes only 4% of intelligibility.

Amateur radio communications limit audio to about 300 to 2700 Hz.

I split the audio band into four overlapping octave ranges centered at 300, 600, 1200, 2400 Hz.

I could boost or cut each range by nearly 20 db to give me full control. This let me maximize speech intelligibility for most kinds of frequency loss.

My left ear is weaker than my right ear so I split the output audio into left and right channels with separate 2½ watt amplifiers. A balance control lets me equalize the perceived loudness to each ear. *Now both ears help in improving speech intelligibility!*

I couldn't believe my ears!

I built one and hooked it to my rig.

I boosted the high frequencies, cut the low frequencies, set the volume and adjusted the balanced control so I could hear each side equally loud.

I couldn't believe my ears! Speech that I could hear but barely understand before was now highly understandable. I got my ham radio back!

With this concept, you'll *understand* QSOs better and enjoy ragchewing and contesting more, even if you don't have high frequency hearing loss.

It helped me so much I wanted to share this with my fellow hams

I developed this into an accessory that any ham can use.

I made it immune to RFI, added a front panel phone jack, on/off speaker switch, two selectable transceiver inputs, a bypass switch for in/out comparison and built it into 10Wx2½Hx6D inch aluminum enclosure. Needs 12 VDC.

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Replace your rig's audio section for superb audio. Eliminate hum, buzzes, poor frequency response, low audio power.

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become prepared to provide communications during any emergency. The Arizona web site is alive and doing well. Tom Fagan, WB7NXH, has developed this web site for the Arizona section and is always providing new material and updating it every day. The address is www.qsl.net/arrlaz/. The 2001 ARRL SW Convention will be in Riverside at the Holiday Inn. Start reserving this time slot and make the necessary arrangements before you forget. I just finished making my reservations at the hotel and sent in the convention necessary paperwork. Call, write, or e-mail me if you need help or questions answered. 73, Clifford Hauser, KD6XH. Net: ATEN 947 QNI, 47 QTC, 31 sess. Tfc: W7EP 64.

LOS ANGELES: SM, Phineas J. Icenbice, Jr., W6BF –ARRL, Section information for Los Angeles, is on our Web site: www.qsl.net/arrlsw/lax. TRY IT! You might like it! We have a "speakers list" and other good info just for you, including email and / or telephone numbers. Michael Regan, KK6WO, is our Web Master. Michael has provided a link to the LAACARC, the Repeater Coordinators and many other ARRL Web sites. – Our super active ASM, Al Hart, W6UBM, has been busy helping the kids that are interested in Ham radio. Al takes old tube equipment to his able and talented "Telco" buddies, for refurbishing and distribution. We have received donations from some very generous local Hams and we would like to relay our deepest appreciation from these young recipients. We think that this is a great program to get our younger generation involved with Amateur Radio. Bill Leslie, WA6POK, our Club Coordinator has ARRL tapes available. This is a free loan program. These videotapes are great for clubs to use as teaching aids and short programs. wa6pok@arrl.net. If you are interested in ARRL news or comments about the latest activities in this Division, tune in on Sunday mornings at 8 AM on 3.965 MHz and talk to our Director or any of the Section Managers. Love your neighbor, you may need help some time. 73, de Phineas, W6BF

ORANGE:SM, Joe Brown, W6UBQ, 909-687-8394— ASM: Riv Co. Brett, 790-346-9291. ASM Orange Co. Art, W6XD, 714-556-4396. ASM: SB County, Jeff KD6NXD, 909-886-3453. The Inland Empire Council of Amateur Radio Organizations presents 2001 ARRL SW Division Convention, Riverside Convention Center and the Holiday Inn. Visit the Web site. www.qsl.net/arrl-2001swdc/. From the Circle City. Save energy, take a nap, monitor 2 meters with a crystal set. The Board of Directors voted to dedicate this year's Field Day to Angel, W6ZPR. He became a SK. He helped build this club. He was truly an Amateur Radio Elmer. Huntington Beach answers the call following the Feb 28 Seattle earthquake. HB RACES offered their services to city employees who were trying to contact family member in the Northwest RACES is an integral part of the beach city's emergency communications plan. "Ham" radio operators, with their worldwide connections that are available when all systems fail, are good to keep in mind. This comment from the CERT Newsletter: TASMA News Chairman's message. Following my election, I embarked on a search to find willing qualified members and a chairman for the Tech Committee. If you want to be part of TASMA, Get involved. Contact Bob Dengler at 909-396-0991 or Jim Fortney, 805-491-3916. WPSS Newsletter and pres Linsay KD6EB welcomes pres Jerry WA6ZZK, VP & NM Dick, KF6EW, and treas Ron K6SFB. The Inland Empire ARC reports new Officers of 2001: pres Joe KG6GCQ, VP Mike WB6MJQ, Sec. Sue KG6FEN, Liz WD9CKM Treas. From the Orange SM, folks the best way to get your club activities publicity is to insure that your ARC Newsletter gets to the Section Manager. All info on SMs is listed on page 12 of *QST*. NTS report. Tfc:W6JPH 196, K6IUI 182, KC6SKK 154, W6QZ 68, K6CTW 66. W6QZ NTS BBS QTC 249. PSHR: W6QZ 159, W6JPH 114, KC6SKK 94, K6IUI 90. SCN/V NM W6JPH reports 23 sess, QNI 134 QTC 62, Avg Net time12 mins. 73, Joe Brown, W6UBQ.

SAN DIEGO: SM, Tuck Miller, NZ6T—619-475-7333; Field Day, always the last full weekend of June, falls on June 23 - 24. If you have never worked Field Day, you have no idea what you are missing. It is not supposed to be a contest, but rather an exercise in emergency preparedness. On a sad note, for over 30 years, ARES has been meeting at the Normal Heights Methodist Church. On April 14, the last meeting was held at that location. The men of the church had been providing a pancake breakfast for a very modest price for all these years. Unfortunately, the cook has passed on, and a couple of other folks have recently been confined to wheel chairs. Thus, providing a breakfast for our group is no longer an option. We are extremely grateful that the church has been our host for these many years. By the time you read this, we will have decided on a new location. Congratulations goes out to Pat Bunsold, WA6MHZ, former San Diego Section Manager for obtaining the rank of Lecturing Knight for the El Cajon Elks Lodge 1812. Pat became active with the Elks organization about 2 years ago and immediately got involved. Speaking of Lodge 1812, they recently became part of the San Diego Amateur Radio Council. Congrats Elks!! Not too early to think about the SWD convention coming up in Riverside in September. Go to the Southwestern Division home page at www.qsl.net/arrlsw and follow the links to the Southwestern Division convention homepage. Sign up for the members only Web site for the League, and get a weekly newsletter from the SM. Traffic: KT6A 1079, KD6YJB 246, KF6YVQ 36, KO6BU 6, WA6IIK 1. BPL KT6A 1079. PSHR: KT6A 140 KD6YJB 55, KO6BU 29.

SANTA BARBARA: SM, Robert Griffin, K6YR (k6yr@arrl.org or k6yr@arrl.net)—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: Warren Glenn, KM6RZ. (wglennrz@ix.netcom.com). ASMs: Ventura, Don Milbury, W6YN (w6yn@arrl.net). San Luis Obisipo, Bill Palmerston, K6BWJ, (bpalmers@fix.net) & for Internet, Jack Bankson, AD6AD (ad6ad@arrl.net); & DECs: Santa Barb-Dave Lamb, WA6BRW (wa6brw@arrl.net); SLO-Bill Peirce, KE6FKS (ke6fks@arrl.net) & Ven-Dave Gilmore, AA6VH (aa6vh@arrl.net). ARRL HQ is looking for volunteer Level 1 Amateur Radio Emergency Communications Course Certification Instructors & Certification Examiners for in-person courses. Contact: Dan Miller, K3UFG@arrl.org. Make plans to attend the 2001 SW Division Convention coming up on Sept 7-9 in Riverside, CA. Contact: w6ybs@arrl.net. FREE instant Sec-

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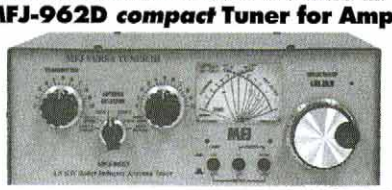

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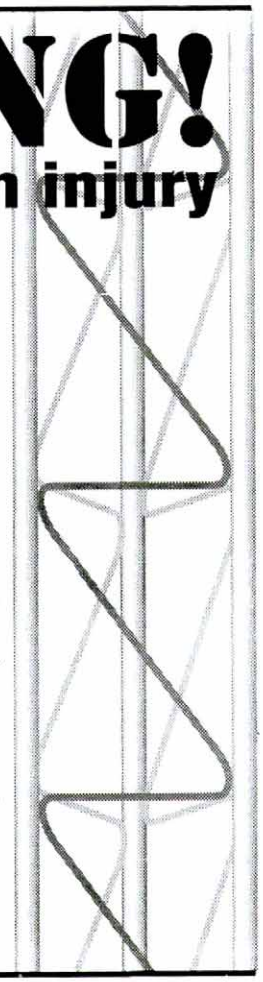

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WEST GULF DIVISION

NORTH TEXAS: SM, Larry Melby, KA5TXL—By the time you have read this HAMCOM will have passed. Hope you were able to have made this and stopped by for a visit at the League booth. Congratulations to the folks out at the Irving ARC on the renewal of the Special Service Club designation. Those folks are quite active out there. Speaking of being active, I would thank David, N5DHG, and the folks up in the Wichita Falls area for their work in ARES last year. Just in Skywarn activities alone, they donated over 1000 man-hours to their local community. I would like to thank the following folks who are staying on with the section staff: ASM, TC: Don, KB5YAM. SEC: Bill, K5MWC. ACC, OOC: John WN5PFI. STM, BM: Carolyn, KC5OZT. SGL: Tom, N5GAR.

OKLAHOMA: SM, Charlie Calhoun, K5TTT—ASMs: N6CL, W6CL, W5ZTN. SEC: KA7GLA. ACC: KB5BOB. PIC: N7XYO. OOC: WB9VMY. SGL: W5NZS. STM: K5KXL. It's that time of year. Field Day is almost here. Be sure and read the rules as there are some changes that may affect you and your scoring this year. I haven't heard from many of you so I don't know what my plans are yet. Stay tuned to the section list server for updates on Field Day activities. I will be posting information on all the sites I hear about there. To subscribe send an email to majordomo@qth.net with SUBSCRIBE ARRL-OK in the BODY of your message. I will be changing ISPs, so the location of the section Web site will also be changing. I'll announce the new location in next month's column. So far we have had no real severe wx, but the spotters have been out a few times. Mark, N7XYO, reported some minor damage to his home in Mounds recently. The Owasso club is trying to get active again, for information on meeting times and events check out their Website http://www.qsl.net/oarc. I sure enjoyed seeing everyone at the Mooreland hamfest hosted by the Tri State Amateur Radio Group. The Tulsa Repeater Organization participated in the 2nd annual National Symposium on Mitigating Severe Weather Impacts, sponsored by the University of Oklahoma's International Center for Natural Hazards and Disaster Research. They had a booth dedicated to displaying the importance of Ham Radio in disaster relief and received an excellent response. That's it for now. 73, Charlie. Tfc: KF5A 527, KK5GY 400, WA5OUV 385, WB5NKD 217, WB5NKC 205, KE5JE 189, K5KXL 116, KM5VA 106, KI5LQ 80, WA5IMO 59, W5REC 28, N5FM 3.

SOUTH TEXAS: SM, Ray Taylor, N5NAV—ASMs: KS5V, N5WSW, W5GKH, K5DG, N5LYG, WA5UZB, KK5CA, K5EJL, W5ZX, WA5TUM, KB5AWM, WA5JYK, K5PFE, K5PNV, and K5SBU. STM: W5GKH. SEC: W5ZX. ACC: N5WSW. TC: KJ5YN. BM: W5KLV. OOC: AK5Z. SGL: K5PNV. June has a lot happening. First and foremost, it's time for Ham Com 2001 in Arlington, Texas. This is a great time to meet your ARRL officials. Kay Craigie, Wayne Mills, and Steve Ewald will be there from Hq. Jim Haynie, Coy Day, David Woolweaver will be there. Be sure and stop by the ARRL booth, and you will still have time to renew your membership or sign up for membership for the first time at the reduced rate, before the price goes up July 1. The best deal is the five year plan. Jim Haynie has some interesting things in his key note speech. I would recommend for all those that can to attend the ARRL's Amateur Radio Emergency Communications Course. You will be able to buy the very latest or the very oldest ham gear. You just may find something you can't live without. I hope to see you all at Ham Com 2001. The next big event is Field Day 2001. This should be one of the best. I hope a lot of the groups will set up in parks, malls, schools grounds, and fair grounds. Places that will attract the interest of the public. Just a suggestion, you might send messages to their friends. Take the messages to one of the nets. Be sure to make it 25 words or less. Use the ARRL short form numbered system. Let them know that it is a free service provided by Ham Radio System. This will give your group training in traffic handling, it may come in handy some day. July 14 is the Texas City Hamfest, more on that next month. Several of the clubs are sending me their newsletter by e-mail instead of regular mail. I thank you and I much prefer the e-mail newsletter, it stores easily and I can refer to it easily. Have a good month. Tfc: W5SEG 2061, W5TUK 158, W5KLV 156, KA5KLU 140, N5OUJ 130, W5ZX 84, W5GKH 79, N5NAV 70, K0YNW 68, W5ZIN 42, KD5GM 19.

WEST TEXAS: SM, Clay Emert, K5TRW— I regret to inform you that due to heart problems, I will not be a candidate for the S M position which will be listed for next month. On the advice of my doctor, I am not able to leave town for a while and if I cannot travel then I cannot do the job of Section Manager. I feel that I cannot take the position if I cannot do the job, and that I would let the Section and all of you down. I will be available to assist the new manager whoever that may be in every way that I am able but at this writing that does not appear to be a great deal. I offer my thanks to all who took the time to assist me. Best 73 - Clay, K5TRW

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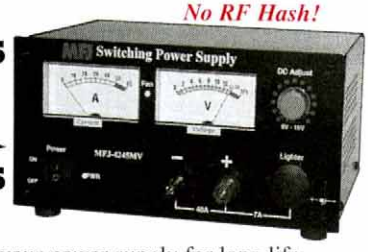

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A massive 19.2 pound transformer makes this power supply super heavy duty! It delivers 35 amps maximum and 30 amps continuous without even flexing its muscles. Plugs into any 110 VAC wall outlet.

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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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MFJ-1117
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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.

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- Unique "Crossed-X" tuning indicator displays M/S in FSK and CLOVER, and frequency center in all modes
- Flash memory for easy software and firmware updates
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- DSP filtering and Motorola microprocessor control
- Connects to computer with a standard DB9 serial cable
- Radio connections made easy with phono connectors

The DXP38
DSP HF Radio Modem

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Everything bad can and does happen to your HF signals, especially during a contest. Selective fading, noise, interference, and poor tuning indicators all conspire to let that rare DX get away. Track it down with the DXP38.

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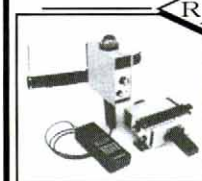

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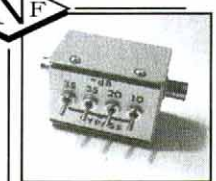

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10 Bands -- 1 MFJ Antenna!

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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.

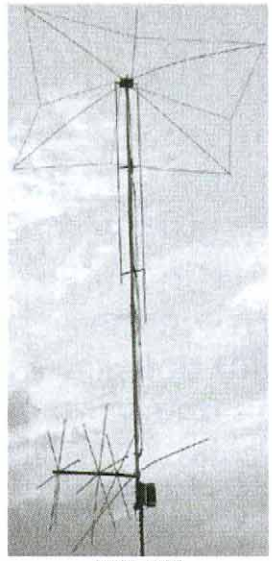
Full size performance also gives you exceptionally wide bandwidths so you can use more of your hard earned frequencies.

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

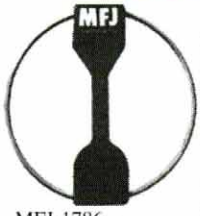
The feedline is decoupled and isolated from the antenna with MFJ's exclusive *AirCore*™ high power current balun. It's wound with *Teflon*® coax and can't saturate, no matter how high your power.

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.*

Each plate in MFJ's tuning capacitor is welded for low loss and polished to prevent high voltage arcing, welded to the radiator, has nylon bearing, anti-backlash mechanism, limit switches, continuous no-step DC motor -- gives smooth precision tuning.

Heavy duty thick ABS plastic housing has ultraviolet inhibitor protection.

NEW! **MFJ-1788, $429.95.** Same as MFJ-1786 but covers 40 Meters-15 Meters continuous. Includes super remote control.

MFJ-1782, $339.95. Like MFJ-1786 but control has only fast/slow tune buttons.

MFJ-1780, $249.95. *Box Fan* Portable Loop is about the same size (2x2 foot) as a box fan, complete with handle. Covers 14-30 MHz. Control has fast/slow tunes.

MFJ Portable Antenna

MFJ-1621 **$89.95** Ship Code A

MFJ-1621 lets you operate in most any electrically free area -- apartment, campsite, hotel, the beach, etc. DXCC, WAZ, WAC, WAS have been won with MFJ-1621! Work 40, 30, 20, 17, 15, 12 and 10 Meters with a telescopic whip that extends to 54 inches. Mounted on a sturdy 6x3x6 inch cabinet. Built-in antenna tuner, field strength meter, and 50 feet of RG-58 coax cable. Handles 200 Watts.

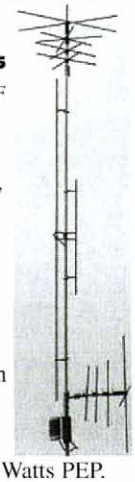
MFJ's G5RV Antenna

MFJ-1778, Ship Code A **$39.95**

Covers all bands, 160-10 Meters with antenna tuner. 102 feet long, shorter than 80 Meter dipole. Use as inverted vee or sloper to be more compact. Use on 160 Meters as Marconi with tuner and ground. Handles full legal limit power. Add coax feedline and some rope or other nonconductor and you're *on the air!*

MFJ halfwave vertical

6 bands: 40, 20, 15, 10, 6, 2 Meters . . . No radials or ground needed



MFJ-1796
$209.95
Ship Code F

Only 12 feet high and has a tiny 24 inch footprint! Mount anywhere -- ground level to tower top -- apartments,small lots, trailers. Perfect for vacations, field day, DXpedition, camping.

Efficient end-loading, no lossy traps. Entire length is always radiating. Full size halfwave on 2/6 Meters. High power *air-wound* choke balun eliminates feedline radiation. Adjusting 1 band has minimum effect on others.

MFJ-1792, $169.95. Full size 1/4 wave radiator for 40 Meters. 33 feet, handles 1500 Watts PEP. Requires guying and radials.

MFJ-1793, $189.95. Like MFJ-1792 but has full size 20 Meter 1/4 wave also.

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Only MFJ gives you tunable and programmable "brick wall" DSP Filters

MFJ's *tunable* super DSP filter automatically eliminates heterodynes, reduces noise and interference *simultaneously* on SSB, AM,CW, packet, AMTOR, PACTOR, RTTY, SSTV, WeFAX, FAX, weak signal VHF, EME, satellite.

You get MFJ's *tunable* FIR linear phasse filters that minimize ringing, prevent data errors and have "brick wall" filter response with up to 57 dB attenuation 75 Hz away.

***Only* MFJ gives you 5 *tunable* DSP filters. You can tune each lowpass, highpass, notch, and bandpass filter including optimized SSB and CW filters. You can *vary* the bandwidth to pinpoint and eliminate interference.**

***Only* MFJ gives you 5 *factory* pre-set filters and 10 *programmable* pre-set filters that you can customize. Instantly remove QRM with a turn of a switch!**

MFJ's *automatic notch* filter searches for and eliminates *multiple* heterodynes.

You also get MFJ's advanced *adaptive noise reduction*. It silences background noise and QRN so much that SSB signals sound like FM.

The *automatic* notch and *adaptive* noise reduction can be used with *all* relevant tunable pre-set filters.

***Automatic gain control* (AGC) keeps audio level constant during signal fade.**

U.S. Patent D374,010
MFJ-784B
$249.95

Tunable bandpass filters

Narrow band signals like CW and RTTY jump out of QRM when you switch in MFJ's exclusive *tunable* FIR bandpass filters.

You can tune the center frequency from 300 to 3400 Hz, and vary the bandwidth from 30 Hz to 2100 Hz -- from super-tight CW filters to wide razor-sharp Data filters.

You can use two tunable filters together. For example, tune one to mark, one to space and set bandwidth tight for a super sharp RTTY filter.

Tunable highpass/lowpass filters

You can tune the lower cutoff frequency 200 to 2200 Hz and the upper cutoff frequency 1400 to 3400 Hz. This lets you create custom filters for voice, data and other modes.

Signals just 75 Hz away literally disappear -- they are reduced 57 dB!

Automatic notch filter

MFJ's automatic notch filter searches for and eliminates multiple heterodynes in milliseconds. It's so fast, that even *interfering* CW and RTTY signals can also be eliminated.

You can *selectively* remove unwanted tones using the two *manually tunable* notch filters -- an MFJ exclusive. Knock out unwanted CW stations while you're on CW.

Adaptive Noise Reduction

Noise reduction works in all filter modes and on all random noise -- white noise, static, impulse, ignition noise, power line noise, hiss.

The LMS algorithm gives you up to 20 dB of noise reduction. Noise reduction is adjustable to prevent signal distortion.

15 *pre-set* filters -- factory set or you custom program

You can select from 15 *pre-set* filters. Use for SSB, AM, CW, packet, AMTOR, PACTOR, RTTY, SSTV, WeFAX, FAX or any mode.

If you don't like our pre-set filters, you can program your own -- an MFJ exclusive! Save center frequency/bandwidth, lowpass/highpass cutoffs, auto/manual notch, noise reduction -- all filter settings -- in 10 programmable filters.

Plus more . . .

A push-button bypasses your filter -- lets you hear the *entire* unfiltered signal.

2½ Watt amplifier, volume control, input level control, speaker jack, PTT sense line, line level output. 9½x2½x6 inches.

Plugs between your transceiver or receiver and external speaker or headphones. use 12 VDC or 110 VAC with MFJ-1315, $14.95. Cable Pack, MFJ-5184, $7.95, includes receiver cable, DC cable, 2 open-end TNC cables.

New Features

MFJ's exclusive *tunable Spotting Tone*™ -- accurately tunes even the narrowest CW filter.

MFJ's exclusive *Adaptive Tuning*™ -- tuning rate automatically becomes finer as you narrow bandwidth -- makes narrow filters easy-to-use.

MFJ's exclusive *FilterTalk*™ -- sends precise filter settings in Morse code.

Has automatic notch with variable aggressiveness, new quieter 2½ Watt audio amplifier, new speaker switch keeps phones always active.

Manual and automatic notch can be used together. Noise reduction, automatic notch and custom filter you saved in memory is selected.

You get an accurate easy-to-use input level indicator, improved manual notch in the CW mode, adjustable line level output, more Mark-Space frequencies and baud rates for data filters and automatic bypass during transmit for monitoring CW sidetone, voice or data by sensing the PTT line.

Firmware Upgrade

For MFJ-784, order **MFJ-55, $29.95**. Gives you most features of the MFJ-784B.

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 because interference much stronger than your desired signal can be completely removed without affecting your signal.

It works on *all modes* -- SSB, AM, CW, FM -- and 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. You can null out a strong interfering signal or peak a weak signal at a push of a button.

Easy-to-use! Plugs between transmitting antenna and transceiver. To null, adjust amplitude and phase controls for minimum S-meter reading or lowest noise. To peak, push reverse button. Use built-in active antenna or an external one. MFJ's exclusive *Constant Amplitude Phase Control*™ makes nulling easy.

RF sense T/R switch automatically bypasses your transceiver when you transmit. Adjustable delay time. Uses 12 VDC or 110 VAC with MFJ-1312B, $14.95. 6½x1½x6¼ inches.

MFJ-1025, $159.95. Like MFJ-1026 less built-in active antenna, use external antenna.

Add DSP to any Multimode

MFJ-781
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Add "brick wall" DSP filtering to any TNC or multi-mode data controller. Copy signals buried in noise and QRM. Under severe QRM, DSP greatly improves copy of Packet, AMTOR, PACTOR, GTOR, Clover, RTTY, SSTV, WeFAX, FAX, CW -- nearly any digital mode. Automatic gain control, On/Off Bypass switch. Plugs between transceiver and multi-mode. Uses 10-16 VDC or 110 VAC with MFJ-1312B, $14.95. 4½x2½x5 inches.

DSP for your MFJ-1278/B

Plug a MFJ-780 "brick wall" DSP filter into your MFJ-1278/B multi-mode and you won't believe your eyes when you see solid copy from signals completely buried in QRM! MFJ-1278/B automatically selects the correct DSP filter for Packet, AMTOR, Pactor, RTTY, ASCII, FAX, Color SSTV, Navtex or CW. Plug in a MFJ-780 and copy signals that other multi-modes can't. *Some soldering needed.*

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Station Grounding

by Allan Kaplan, W1AEL

Many problems relate to the lack of RF ground, as contrasted with a safety ground connection. We recommend bonding all equipment chassis together with short wide metal braid or strap. Make these connections from chassis ground lug to chassis ground lug and connect the last piece in the chain to a good earth ground. This lead needs to be as short as possible. Lengths near 1/4 wavelength on any band used are particularly troublesome when the far end is connected to earth.

The impedance-inverting property of a quarter-wavelength line complicates RF grounding matters for a multi-band HF installation. An ideal lead length to an effective earth ground would be short relative to a quarter-wavelength on 10 meters but a quarter-wavelength on 10 meters is only 8.5 feet! A half wavelength on ten meters, 17 feet, may be a feasible length for some stations, and it reproduces its terminating impedance, so it can make a good connection to an effective earth ground. On 20 meters though, the 17-foot length is now a quarter-wave impedance inverter that will try to isolate the transmitter chassis from ground. The recommendation is to add a well-insulated 17-foot counterpoise attached to the chassis at one end and unconnected at the other end. There are now two quarter-wave lines attached to the chassis on 20-meters. The grounded wire presents high impedance to the equipment, but the ungrounded one short-circuits it by presenting low impedance at 20 meters where it is a quarter-wave inverter. On lower frequencies, both wires are shorter than quarter wavelength and should not be troublesome.

Because the counterpoise wires act as tuned circuits, and because their environment will affect the tuning, this approach is not guaranteed trouble-free on all bands, but it is worth a try if your station has "hot-chassis" or "RF feedback" problems.

Allan Kaplan, W1AEL, joined Ten-Tec as an RF engineer after retiring as Senior Staff Engineer at Raytheon, Falls Church, VA., where he designed high-performance receivers. He holds a MSECE degree from the University of Massachusetts.

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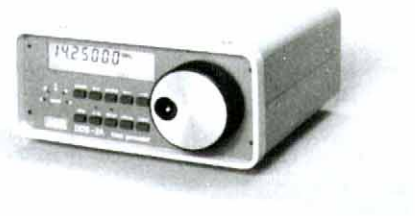

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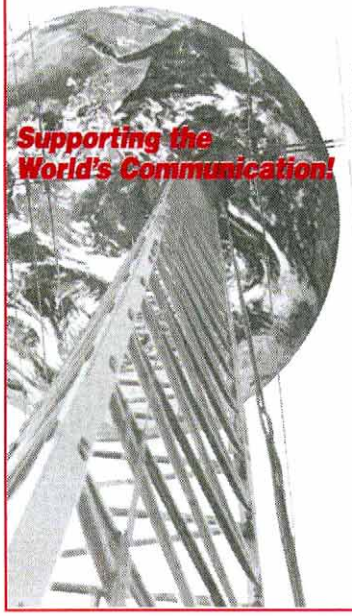

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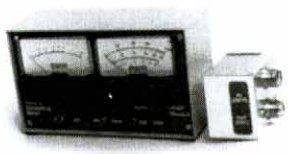

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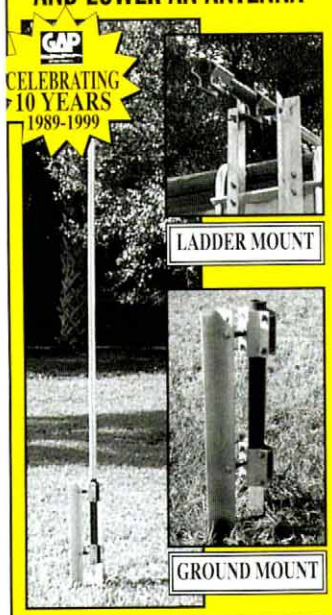

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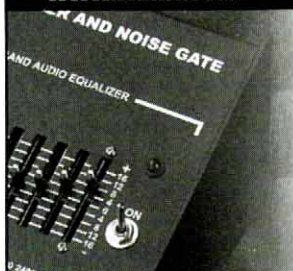

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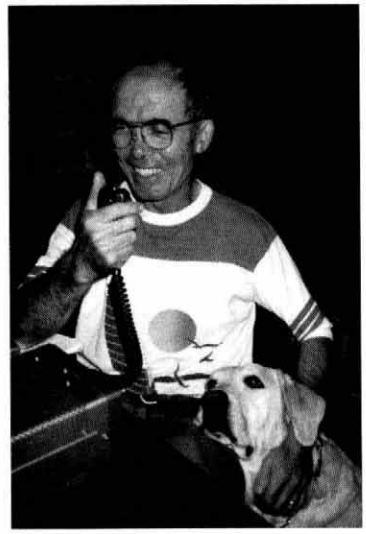

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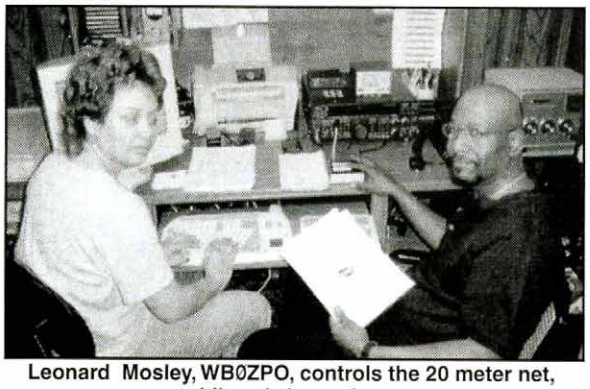

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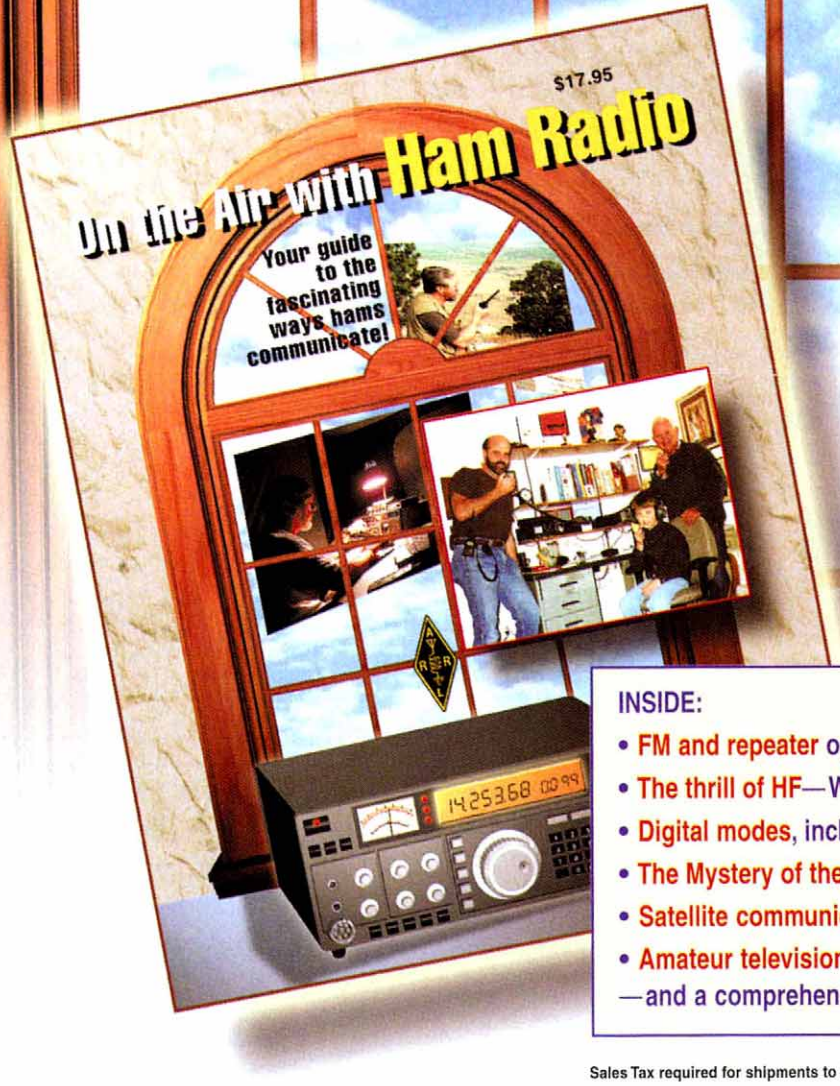

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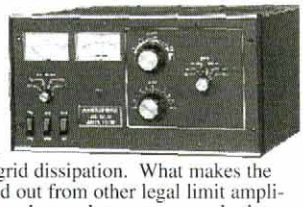

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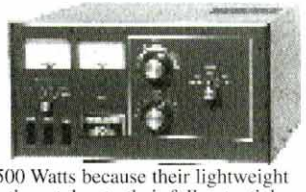

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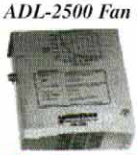

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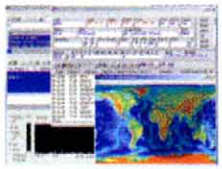

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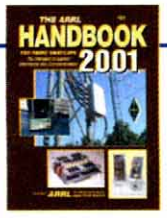

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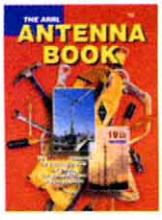

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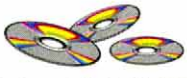

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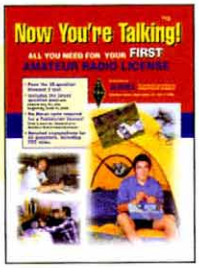

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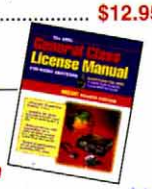

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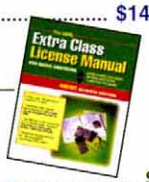

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Bearing Assembly/How many	Tripl race/138	Dual Race/96	Dual race/48	Dual race/12
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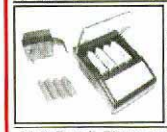
FNB-38	5W NiMH pk.	9.6v	700mAh	$39.95
For YAESU FT-530 / 416 / 415 / 816 / 76 / 26 etc.:				
FNB-25x	NiMH pk.	7.2v	1000mAh	$28.95
FNB-27x	5W NiMH pk.	12.0v	1100mAh	$39.95
For YAESU FT-411 / 470 / 73 / 33 / 23 etc.:				
FNB-17x	NiMH pk.	7.2v	1100mAh	$29.95
FBA-10	6-Cell AA case			$14.95



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(4) Automatic shut-off at end of charge!
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Your customers are reading.....*QST!*

July Issue:	Deadline: May 22 , 2001	Ships Mid June 2001
August Issue:	Deadline: June 18 , 2001	Ships Mid July 2001

SAVE BIG ON ANTENNAS, TOWERS & CABLE

TELESCOPING ALUMINUM TUBING

DRAWN 6063-T832		1.250"	$1.55/ft
.375	$.70/ft	1.375"	$1.75/ft
.500"	$.80/ft	1.500"	$1.95/ft
.625"	$.90/ft	1.625"	$2.25/ft
.750"	$1.00/ft	1.750"	$2.50/ft
.875"	$1.10/ft	1.875"	$2.75/ft
1.000"	$1.20/ft	2.000"	$3.00/ft
1.125"	$1.35/ft	2.125"	$3.50/ft

In 6' or 12' lengths, 6' lengths ship UPS. Call for 3/16"& 1/4" rod, bar stock, and extruded tubing.

CUSHCRAFT ANTENNAS

X7/X740	$679/229
XM240	$719
R6000/R8	$319/469
A50-3S/5S/6S	$95/159/259
AR2/ARX2B	$49/69
AR270/AR270B	$85/99
ARX270N/ARX-450B	$219/65
13B2/17B2	$139/249
26B2	$389
A270-6S/A270-10S	$75/99

Please call for more Cushcraft items

FORCE 12–MULTIBAND

C3	10/12/15/17/20m, 7 el	$599
C3E	10/12/15/17/20m, 8 el	$649
C3S	10/12/15/17/20m, 6 el	$539
C3SS	10/12/15/17/20m, 6 el	$559
C4	10/12/15/17/20/40m, 8 el	$759
C4S	10/12/15/17/20/40m, 7 el	$679
C4SXL	10/12/15/17/20/40m, 8 el	$979
C4XL	10/12/15/17/20/40m, 9 el	$1119
C19XR	10/15/20m, 11 el	$959
C31XR	10/15/20m, 14 el	$1299

Please call for more Force 12 items

TRYLON "TITAN" TOWERS

SELF-SUPPORTING STEEL TOWERS

T200-64	64', 15 square feet	$1099
T200-72	72', 15 square feet	$1299
T200-80	80', 15 square feet	$1499
T200-88	88', 15 square feet	$1769
T200-96	96', 15 square feet	$2049
T300-88	88', 22 square feet	$1989
T400-80	80', 34 square feet	$1939
T500-72	72', 45 square feet	$1879
T600-64	64', 60 square feet	$1799

Many more Trylon towers in stock!

BENCHER / BUTTERNUT

Skyhawk, Triband Beam	$1129
HF2V, 2 Band Vertical	$219
HF5B, 5 Band Minibeam	$429
HF6VX, 6 Band Vertical	$299
HF9VX, 9 Band Vertical	$349
A1712, 12/17m Kit	$54
CPK, Counterpoise Kit	$129
RMKII, Roof Mount Kit	$159
STRII, Roof Radial Kit	$125
TBR160S, 160m Kit	$119

More Bencher/Butternut–call

M2 VHF/UHF ANTENNAS

144–148 MHz

2M4/2M7/2M9	$89/109/119
2M12/2M5WL	$149/189
2M5-440XP, 2m/70cm	$159

420–450 MHz

440-470-5W/420-450-11	$129/89
432-9WL/432-13WL	$169/219
440-18/440-21ATV	$119/139

Satellite Antennas

2MCP14/2MCP22	$169/219
436CP30/436CP42UG	$219/259

ROHN TOWER

25G/45G/55G	$89/189/239
AS25G/AS455G	$39/89
GA25GD/45/55	$68/89/115
GAR30/GAS604	$35/24
SB25G/45/55	$39/89/109
TB3/TB4	$85/99
HBX32/HBX40	$349/439
HBX48/HBX56	$589/699
HDBX40/HDBX48	$549/699
BXB5/6/7-8	$39/49/59/59

Please call for more Rohn prices

US TOWER

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MA770/MA850	$2359/3729
TMM433SS/HD	$1139/1379
TMM541SS	$1499
TX438/TX455	$1069/1599
TX472/TX489	$2649/4599
HDX538/HDX555	$1379/2399
HDX572MDPL	$6329

Please call for help selecting a US Tower for your needs. Shipped factory direct to save you money!

COMET ANTENNAS

GP15, 6m/2m/70cm Vertical	$149
GP6, 2m/70cm Vertical	$139
GP9, 2m/70cm Vertical	$179
B10NMO, 2m/70cm Mobile	$36
B20NMO, 2m/70cm Mobile	$49
SBB2NMO, 2m/70cm Mobile	$39
SBB5NMO, 2m/70cm Mobile	$49
SBB7NMO, 2m/70cm Mobile	$75
Z750, 2m/70cm Mobile	$55
Z780, 2m/70cm Mobile	$69

Much more Comet in stock–call

M2 ANTENNAS

50–54 MHz

6M5X/6M7JHV	$199/239
6M2WLC/6M2.5WLC	$419/449

10/12/15/17/20m HF

10M4DX, 4 Element 10m	$379
12M4DX, 4 Element 12m	$379
15M4DX, 4 Element 15m	$419
17M3DX, 3 Element 17m	$379
20M4DX, 4 Element 20m	$499

More M2 models in stock–please call

GLEN MARTIN ENGINEERING

Hazer Elevators for 25G

H2, Aluminum Hazer, 12 sq ft	$359
H3, Aluminum Hazer, 8 sq ft	$269
H4, HD Steel Hazer, 16 sq ft	$339

Aluminum Roof Towers

RT424, 4 Foot, 6 sq ft	$159
RT832, 8 Foot, 8 sq ft	$229
RT936, 9 Foot, 18 sq ft	$389
RT1832, 17 Foot, 12 sq ft	$499

Please call for Glen Martin info

UNIVERSAL ALUMINUM TOWERS

4-40'/50'/60'	$519/739/1049
7-50'/60'/70'	$939/1369/1789
9-40'/50'/60'	$729/1049/1469
12-30'/40'	$559/869
15-40'/50'	$969/1399
23-30'/40'	$869/1289
35-30'/40'	$979/1509

Bold in part number shows wind-load capacity. Please call for more Universal models. All are shipped factory direct to save you money!

DIAMOND ANTENNAS

D130J/DPGH62	$79/139
F22A/F23A	$89/119
NR72BNMO/NR73BNMO	$39/54
NR770HBNMO/NR770RA	$55/49
X200A/X3200A	$129/210
X500HNA/700HNA	$229/369
X510MA/510NA	$189/189
X50A/V2000A	$99/149
CR627B/SG2000HD	$99/79
SG7500NMO/SG7900A	$75/112

More Diamond antennas in stock

MFJ ANTENNAS

259B, Antenna Analyzer	$219
269, Antenna Analyzer	$299
941E, 300W Antenna Tuner	$109
945E, 300W Antenna Tuner	$99
949E, 300W Antenna Tuner	$139
969, 300W Antenna Tuner	$169
986, 3kW Antenna Tuner	$289
989C, 3 kW Antenna Tuner	$309
1796, 40/20/15/10/6/2m Vert.	$189
1798, 80–2m Vertical	$249

Big MFJ inventory–please call

COAX CABLE

RG-213/U, (#8267 Equiv.)	$.36/ft
RG-8X, Mini RG-8 Foam	$.19/ft
RG-213/U Jumpers	Please Call
RG-8X Jumpers	Please Call

Please call for more coax/connectors

TIMES MICROWAVE LMR® COAX

LMR-400	$.59/ft
LMR-400 Ultraflex	$.89/ft
LMR-600	$1.19/ft
LMR600 Ultraflex	$1.95/ft

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3/8"EE / EJ Turnbuckle	$11/12
1/2"x9"EE / EJ Turnbuckle	$16/17
1/2"x12"EE / EJ Turnbuckle	$18/19
3/16" / 1/4" Preformed Grips	$5/6

Please call for more hardware items

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5 FTx .12" / .18"	$45/75
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15 FT x .12" / 15 FT x .18"	$105/175
20 FT x .12" / 20 FT x .18"	$135/225
10 FT x .25" / 20 FT x .25"	$175/335

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Challenger Counterpoise	$29
Challenger Guy Kit	$19
Eagle DX	$299
Titan DX	$329
Eagle/Titan Guy Kit	$29
Voyager DX	$409
Voyager Counterpoise	$49
Voyager Guy Kit	$45
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Please Call for Delivery Information

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9106	6m	9115	15m	9130	30m
9110	10m	9117	17m	9140	40m
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All handle 600W, 7' approximate length, 2:1 typical VSWR ... $24.95

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4BTV/5BTV/6BTV	$149/189/209
G6-270R, 2m/70cm Vertical	$169
G6-144B/G7-144B	$129/179

Hustler Resonators in stock–call

ANTENNA ROTATORS

M2 OR-2800PDC	$1099
Yaesu G-450A	$249
Yaesu G-800SA/DXA	$329/409
Yaesu G-1000DXA	$499
Yaesu G-2800SDX	$1089
Yaesu G-550/G-5500	$299/599

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R61 (#20)/R62 (#18)	$.28/32
R81/R82	$.25/.39
R83/R84	$.52/.85

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HPTG2100I	$.59/ft
PLP2738 Big Grip (2100)	$6.00
HPTG4000I	$.89/ft
PLP2739 Big Grip (4000)	$8.50
HPTG6700I	$1.29/ft
PLP2755 Big Grip (6700)	$12.00
HPTG11200	$1.69/ft
PLP2558 Big Grip (11200)	$18.00

Please call for more info or help selecting the Phillystran size you need.

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IC-775 DSP.. New Lower Price!
The Icom IC-775DSP is a competition class HF transceiver featuring 200 watt RF output, digital signal processing, automatic antenna tuner, true dual RX, CW memory keyer, CTCSS tone encode, twin pass band tuning, dual antenna inputs, 101 memory chanels, built-in power supply, and much more. Supplied with AC power cord.

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The Icom PW-1 is a 1000 watt solid state linear amplifier for HF and 6m operation, featuring a high power automatic antenna tuner, built-in power supply, and a removable front control panel, and more.

IC-746 ..... Icom Special!
The Icom IC-746 is an all mode transceiver covering HF/6m/2m. The radio features digital signal processing, 100 watt RF output on all bands, twin PBT, a 4.9"multifunction LCD display with band scope, automatic antenna tuner, and more. Supplied with a hand mic and DC power cord.

IC-756 PRO ..... New!
The Icom IC-756 PRO is an all mode HF/6m transceiver featuring DSP, automatic antenna tuner, 100 watts RF output, digital twin PBT, a 5" multifunction LCD display with band scope function, and more. Supplied with hand mic and DC power cord.

FT-1000MP MARK-V ..... New!
Competition class HF transceiver with DSP, auto tuner, 200W output, and more!

FT-1000D ..... In Stock!
Great competition class HF XCVR with dual RX, auto tuner, and 200W output.

FT-920 ..... Yaesu Special!
Nice all mode HF/6m transceiver with DSP, automatic tuner, and more.

Quadra System ... Lower Price!
Solid state 1 kW amplifier with auto tuner. No-tune HF and 6moperation!

FT-847 ..... Yaesu Special!
The Yaesu FT-847 is an all mode transceiver covering HF/6m/2m/70cm! The radio is perfect for satellite operation. Features digital signal processing, built-in RS-232 interface, built-in CTCSS tone encode/decode module, optional ATAS-100 mobile screwdriver type antenna, and more. Supplied with an up/down hand mic and DC power cord.

FT-840 ..... Great Low Price!
Great entry level HF XCVR featuring built-in CTCSS tone encode, noise blanker, IF shift, 100 memories and more. With hand mic and DC power cord.

IC-706MK2G ..... Icom Special!
The Icom IC-706MK2G is a compact HF/6m/2m/70cm all mode transceiver with digital signal processing, automatic repeater offset, built-in CW keyer, built-in CTCSS tone encode/decode/scan, 107 memory channels and more. A detachable front panel offers convenient mounting, even in compact vehicles.

IC-718 ..... Great Low Price!
The Icom IC-718 is an all mode HF transceiver featuring a front panel mounted speaker, IF shift, optional DSP module, multiple scanning modes, noise blanker, RIT, and more.

IC-2800H ..... Icom Special!
The Icom IC-2800H is a 2m/70cm dual band mobile FM transceiver with a 3" color TFT display. The radio features a separate control face, video input, bandscope display, 9600 bps Packet jack, CTCSS tone encode/decode/scan, 232 memories, cross band duplex, and more. With DTMF hand mic, mounting brackets, and power cord.

IC-910H ..... New, In Stock!
The IC-910H is a dual band 2m/70cm all mode XCVR with true dual band operation, featuring dual data jacks, optional 23cm band module, optional DSP, and more.

FT-90R ..... New!
Ultracompact 2m/70cm mobile XCVR with removeable face, extended RX, and more.

FT-7100M ..... New, Please Call!
Great 2m/70cm dual band mobile, 45/35 Watts, removable front panel, and more!

FT-1500M... New Lower Price!
Tiny 2m mobile XCVR with 50W output.

FT-2600M ..... New, Please Call!
Rugged 2m mobile with intermod free RX.

FT-100D ..... New!
Ultra-compact all mode XCVR for HF/6m/2m/70cm. Features DSP, CW keyer, tone encode/decode, 200 memories, VOX, and more. Supplied with a DTMF hand mic, power cord and mounting bracket.

FT-817 ..... Now In Stock!
A truly tiny self-contained all mode HF/6m/2m/70cm QRP XCVR featuring DSP, tone encode/decode, 200 memories, VOX, and more! Supplied with a hand mic, DC power cord and duck antenna.

IC-W32A ..... New Lower Price!
IC-Q7A ..... Icom Special!
IC-T7H ..... Icom Special!
IC-T81A ..... Quad Band HT!
IC-T82A ..... New Tri Band HT!
IC-T2H ..... Amazing Low Price!

IC-207H ..... Great Low Price!
Great 2m/70cm dual band mobile XCVR with CTCSS tone encode/decode, 182 memories, removable face, and more.

IC-2100H ..... Icom Special!
Rugged 2m mobile XCVR at a great price.

IC-PCR1000 ..... Icom Special!
IC-R8500 ..... In Stock!
IC-R75 ..... In Stock!
IC-R2 ..... In Stock!
IC-R3 ..... Video RX, In Stock!
IC-R10 ..... Icom Special!

G-2800SDX $1089
Heavy duty antenna rotator handles 34 sq. ft. of antenna load, and features 450° rotation, preset and variable speed.

G-1000DXA $499
G-800SA/DXA $329/409
G-450A $249
G-5500 ..... $599
G-550 ..... $299

VX-5R ..... Now In Stock!
Tiny 6m/2m/70cm HT, with CTCSS tone encode/decode/scan, long life Lithium-Ion battery pack, extended RX, and more.

FT-50RD ..... In Stock!
VX-1R ..... Please Call!
VX-150 ..... New, In Stock!

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Simultaneous Reception

VHF/VHF | UHF/UHF | VHF/UHF

A New Dual-Band Engineering Milestone:

Introducing the Dual Band Mobile for the 21st Century's Active Ham!

The Yaesu Engineering Team has done it again! The exciting new FT-7100M Dual Band Mobile brings you the ruggedness and operating ease of our single-band mobiles, and the convenience of remote-head mounting capability (optional YSK-7100 Separation Kit required), in an all-new 144/430 MHz Dual Band design!

Providing 50 Watts of power output on 2 meters, and 35 Watts on 70 cm, the FT-7100M has power to spare when you're in a fringe area. For repeater access or selective simplex calling, you get built-in encoder-decoder circuits providing 50 CTCSS tones and 104 DCS (Digital Code Squelch) codes. And the FT-7100M's huge 262-channel Memory System lets you store up to six Alpha-Numeric characters, for easy channel identification.

Operation of the FT-7100M is simple and straightforward, with separate Volume and Squelch controls for each band during dual-band reception, and eight single-function front panel keys provide the easy feature access you need during mobile operation. What's more, you also get three user-definable keys on the microphone to use for important control functions.

Rugged, reliable, and versatile, the FT-7100M provides the highest cost-performance available among Dual Band FM Mobiles. See your Yaesu Dealer today for a test drive!

FEATURES

- Frequency Range: TX 144-148, 430-450 MHz RX 108-137 MHz (AM), 137-180 MHz, 320-480 MHz, 810-999.99 MHz (Cellular blocked)
- VHF/UHF, VHF/VHF, and UHF/UHF Dual Receive operation*
- Channel Steps: 5/10/12.5/15/20/25/50 kHz/step
- Power Output: 50 Watts (144 MHz) 35 Watts (430 MHz)
- Power Amplifier Type: 2SK3478 Power MOS FET
- Efficient Cooling System: Direct-flow heat-sink and thermostatically-controlled fan
- 262 Memory Channels: 120 "regular" memories, 5 pairs of band limit memories, and one "HOME" channel on each band
- Alpha-Numeric Memory Labels: 6 Characters on lower display field, 5 Characters on upper
- Smart Search™ Automatic Memory Loading System
- 50 CTCSS Encode/Decode Tones
- 104 DCS Encode/Decode Codes
- CTCSS and DCS Search
- ARTS™ (Auto-Range Transponder System)
- Automatic Repeater Shift (ARS)
- DTMF Microphone (U.S. version): Includes 16-memory Auto-dialer, and Direct Frequency Entry
- Band Scanning, Band-Limit Scanning, and Memory Scanning
- Three Priority Channel Modes: VFO, Memory, and Home Channel Priority
- RF Squelch: Opens at user-defined signal level
- Tx Time-Out Timer (TOT)
- Automatic Power-Off (APO)
- 1200/9600 bps Packet Compatible
- Battery Voltage Meter
- Compact Size: 5.8" x 1.9" x 6.9" WHD
- Large (0.9" x 2.3") Liquid Crystal Display
- Cloning Capability: To other FT-7100M Transceivers
- Optional YSK-7100 Separation Kit
- Optional CT-39A Packet Cable

*Simultaneous reception on two different Frequencies, in-band or Cross-Band. Cross-band Repeater Function not available.

144/430 MHz FM Dual Band Mobile Transceiver

FT-7100M

Actual Size

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

Vertex Standard
US Headquarters
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For the latest Yaesu news, visit us on the Internet: http://www.vxstd.com

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

Throughout the years, Kenwood has engineered many significant feature and hardware advancements that earned us the nickname "Pacesetter in Amateur Radio". Kenwood continues to show this leadership in advanced design and technology with the TH-D7A(G) handheld and the TM-D700A mobile dual-banders. Not only do our radios perform all the functions of any other radio, but you can also explore the exciting digital world of APRS™, which has become the fastest growing and most dynamic part of the hobby. Most Disaster Communication organizations use APRS™. Identifying someone's location with APRS™ can save a life.

The TH-D7A(G) and the TM-D700A are the only radios ever produced that have both built-in TNC and APRS™ operating software, allowing you to send and receive exact GPS positions. You can even send text messages over 144.390 MHz, an international APRS™ frequency. Position reports and two-way messaging can also be achieved over the Internet, across the country or around the world. Street level mapping can also be employed using a PC, palm device or GPS. And yes, the TM-D700A is great for receiving satellite packet!

Venture into the future of Ham radio today and experience Kenwood's "Dynamic Digital Duo". They may just be the excitement and enjoyment you have been waiting for!

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