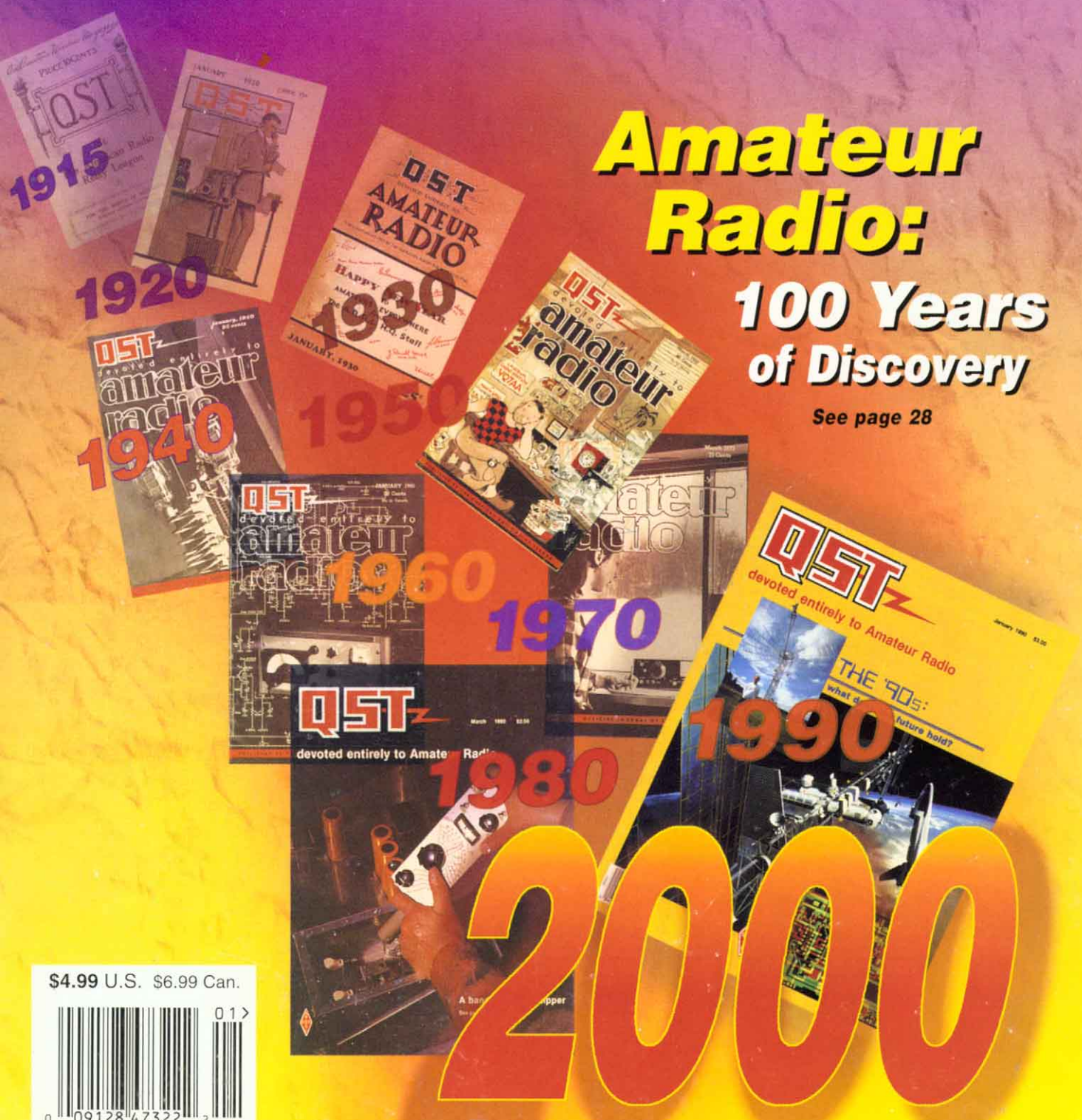
Official Journal of
ARRL
The national association for AMATEUR RADIO

QST

devoted entirely to
AMATEUR RADIO

January 2000



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See page 28

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SATELLITE	N/A	3000 + Miles	N/A	World Wide Digital	*1 3000 + Miles	*1 3000 + Miles	N/A	N/A	N/A	N/A	N/A	*2 3000 + Miles	*2 3000 + Miles
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– Passport to World Band Radio, 1998

IC-R10 (left) Advanced performance and features.

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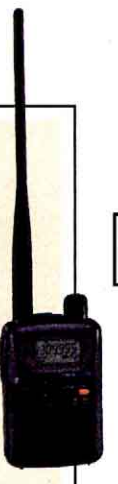

IC-R2 (right) Excellent audio, tiny package.

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News and Features

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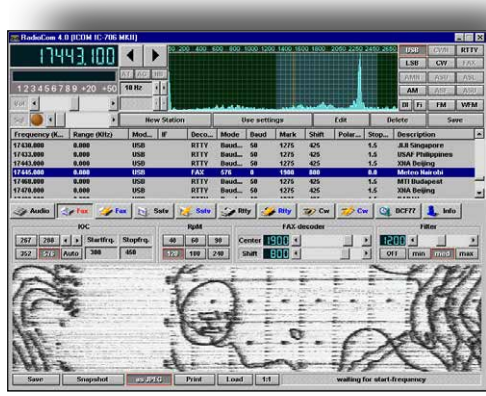
QST Workbench



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Operating

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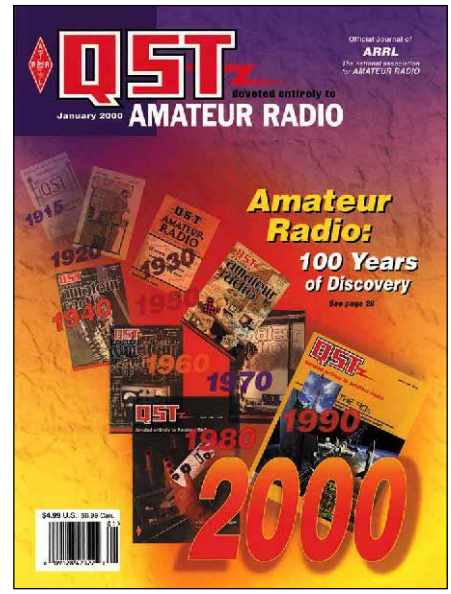

Our Cover

This month's colorful cover celebrates the Year 2000—and 85 years of *QST*!

Membership in the ARRL, including a subscription to *QST*, is available to individuals at the following rates: $34 per year in the US and possessions, $47 Canada, $54 elsewhere, payable in US funds. Age 65 and over, with proof of age, $28 (US only). Licensed radio amateurs age 21 and under may qualify for special rates; write for application. Life membership is also available. Membership and *QST* cannot be separated. Fifty percent of dues is allocated to *QST*, the balance for membership. Subscription rate for libraries and institutions: $34 per year postpaid in the US and possessions, $47 Canada, $54 elsewhere. Single copies $5 in the US.

Membership without *QST* is available to the immediate family of a member living at the same address, and to anyone who is legally blind, for $5 per year.

Foreign remittances should be by international postal or express money order or bank draft negotiable in the US and for an equivalent amount in US funds.

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"IT SEEMS TO US..."

A New Year and a "New" *QST*

The *QST* you see today is a somewhat different creature than the one you beheld last month. As you browse through the pages you'll see that we've tweaked their designs to improve the appearance of the magazine. More importantly, you'll notice that we've made a number of additions and alterations to *QST's* content.

Magazines usually approach change with a certain amount of trepidation. Unlike other media, most magazines exist on time scales that span weeks and months. Making a substantial modification to a large-circulation magazine is like turning a battleship—it isn't a task you undertake lightly.

The Profile of the Modern Amateur

Our editorial staff spent more than six months deliberating the future course of *QST*. We knew that *QST* was ripe for change because we sensed that the attitudes and interests of the ARRL membership were shifting in important ways, but we couldn't make decisions based on gut feelings alone. Instead, we sifted through extensive survey data, as well as comments gleaned from letters, e-mail and face-to-face discussions at hamfests and elsewhere.

Out of a mountain of data emerged a profile of today's hams as busy individuals who are often forced to balance their amateur interests with many other activities and concerns. This is a significant departure from hams of 20 and 30 years ago. For example, young amateurs fresh from college find it difficult to keep up with the hobby as they struggle to establish their careers (often under the weight of enormous tuition debt). Large numbers of middle-age hams are raising children and working long hours at demanding jobs. Senior amateurs defy the stereotype of the sedentary elderly. On the contrary, they are intellectually and physically active, embracing a variety of interests, of which Amateur Radio is but one.

Today's hams are as excited about the magic of radio as their predecessors, but it is an excitement tempered by the realities of life as it exists at the dawn of the 21st century. The lack of leisure time to devote to Amateur Radio is an important factor, but there are others. RF interference to and from electronic devices is a problem that seems destined to become worse. Antenna restrictions are reshaping the traditional vision of the Amateur Radio station. (Forests of aluminum fed with 1.5 kW amplifiers are becoming endangered species.) And in the midst of all this change, there is a longing to retain links to the technologies and traditions of our past.

New Columns to Meet the Challenge

Through your comments and survey responses you told us, in so many words, that you wanted a *QST* that offered information that was more relevant to the lifestyles of today's amateurs.

For example…

♦ You said that you wanted more coverage of low-power (QRP) operating, one of the fastest-growing aspects of our hobby. In a world where everyone seems to own a piece of RF-sensitive technology, hamming with 5 W or less has become an attractive option. (For many hams, it is the *only* option.) Our response is to expand our QRP coverage whenever possible, including the introduction of "QRP Power," a new monthly column by Rich Arland, K7SZ.

♦ You said that your interest in HF/VHF mobile and portable operating was stronger than ever because antenna restrictions are making it increasingly difficult to establish stations at home. Beginning with this issue you'll find "Radios to Go," a bimonthly column by Roger Burch, WF4N, that focuses on radio operating from cars, trucks, ships, aircraft and just about anywhere else.

♦ You indicated an increasing fascination with vintage radio gear. Radio collecting and restoration is yet another high-growth area. Each month John Dilks, K2TQN, will take you on a guided tour through "Old Radio."

QST Workbench

According to our research, *QST* readers have been attracted to the New Ham Companion section of the magazine because it offers simple projects, practical information and helpful features. Both new hams and veterans have told us, in overwhelming numbers, that they enjoy New Ham Companion because the information it provides can be digested and used quickly. Considering their more active lifestyles, this isn't surprising.

We've taken the successful New Ham Companion formula and focused it even more toward the needs of modern amateurs. The result is "*QST* Workbench." Each month in Workbench you'll find single-evening or single-weekend projects, reference information, the devilish "Test Your Knowledge!" quizzes by Ward Silver, N0AX, Hints & Kinks, The Doctor is IN, and a new column offering abbreviated hardware and software reviews that we call "Short Takes."

Your Input is Vital

Of course, a magazine's audience is a moving target. Your interests will change over time, and it will be our task to keep up with you. You can help by continuing to offer your comments and suggestions. Drop us a letter, or send e-mail to **qst@arrl.org**.

As we approach a new century and millennium it's an exciting time to be a ham. We'll share that excitement with you each month, and do our utmost to keep you up to date with the greatest hobby and service on Earth.—*Steve Ford, WB8IMY,* QST *Managing Editor*

We're At Your Service

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

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If all else fails, send e-mail to hq@arrl.org and it will be routed to the right people or departments.

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Subject: **Info Request**
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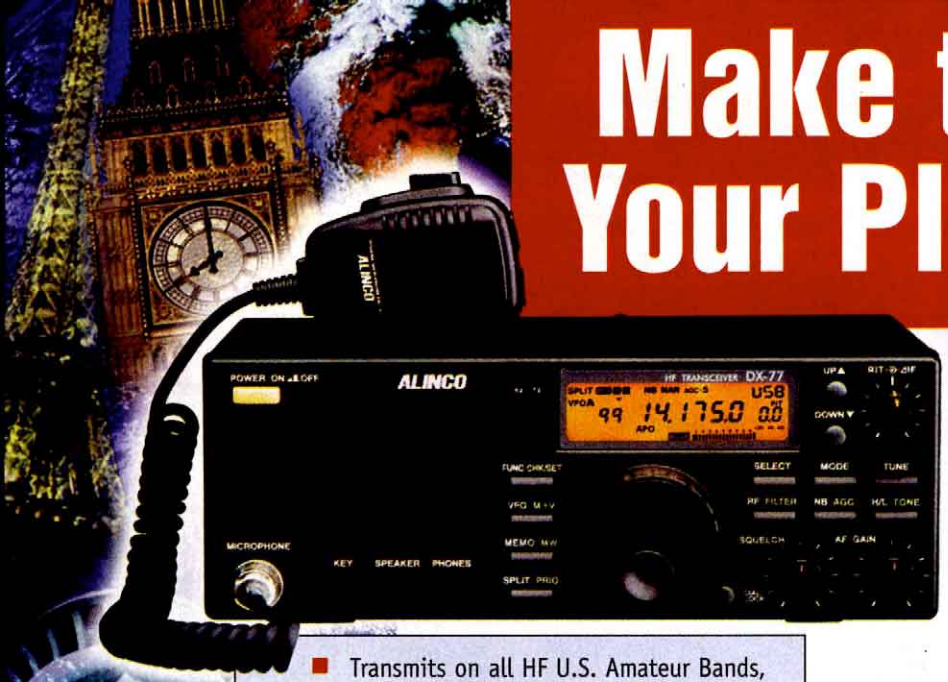

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—QST Product Review, June 1998

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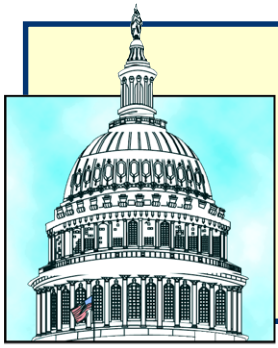

DC Currents

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.

Post-Y2K Congress Set To Take Up Where It Left Off

The second session of the 106th Congress was expected to convene mid-January. At that time lawmakers will take up the unfinished business left over from 1999, even as they begin to contemplate the opening days of the year 2000 election season. (For the uninitiated, each Congress lasts two years.)

While all the statistics weren't yet in when we went to press, a resume of Congressional activity through the end of October 1999 showed the Senate to have been in session 149 days and the House 122 days, vs. 153 and 132 respectively for the same period in the 105th Congress. Of the 1833 bills introduced in the Senate, 359 had passed, and 28 had been signed into law. 3184 bills had been introduced in the House, and 529 had passed there. Of those, 57 had been signed into law. During the same period in the 105th Congress, 49 Senate bills and 104 House bills had been signed into law.

There's nothing inherently bad about a Congress that passes fewer bills (indeed, some cynics call it an improvement). But, it suggests the degree of mutual suspicion that has bogged down this Congress as a spillover from the succession of polarizing issues that culminated in the impeachment effort at the end of the 105th Congress a little more than a year ago. In fact, many wary lawmakers on both sides of the aisle have actually been relieved by the comparative lack of drama this session.

House Critiques the FCC's Strategic Plan

♦ As business in the House wound down toward the holidays, the House Subcommittee on Telecommunications was conducting hearings on "Federal Communications Commission Reform for the New Millennium". All five FCC commissioners appeared before the Subcommittee.

Thomas Bliley (R-VA-7th), who heads the full House Committee on Commerce, opened the hearings with a challenge to the Commission, noting that "this Committee has pending inquiries into a number of recent key decisions made by the FCC. The FCC is vested with serious responsibilities in this era of competition, deregulation, and consolidation. But I intend to ensure that the FCC remains accountable to this Committee."

Subcommittee Chairman W.J. "Billy" Tauzin (R-LA-3rd) was no less conciliatory with his assessment of the FCC's timeline for reform. Tauzin suggested that the Commission condense its plan down to three and a half years rather than the proposed five-year timeline.

Commission Chairman William Kennard, however, defended the five-year plan, suggesting that the time frame reflected the evolving state of the telecommunications marketplace. "In five years, Kennard said, "we expect the United States communications markets to be characterized predominantly by vigorous competition that will greatly reduce the need for direct regulation." Kennard suggested that, regardless of market changes, one of the overriding functions of the FCC is going to continue to be spectrum management. "The Commission must constantly strive to improve the way it both allocates and assigns spectrum," Kennard said, "As part of this effort, the Commission must privatize functions where possible and promote an active secondary market to ensure that spectrum is being used for the highest value end use."

Commissioner Susan Ness suggested that "the FCC's ability to assess technology and efficiently manage the non-Federal government use of the spectrum will be increasingly important in the new millennium," and supported Chairman Kennard's proposal to hire more engineers and technologists to help in that task.

Commissioner Harold Furchtgott-Roth, who can be counted on to dissent from the other Commissioners, told the panel that, in his view, "the most important 'reform' that could occur at the agency…would be for the Commission to simply follow the law as Congress has written it." Furchtgott-Roth said that it was his belief that Congress, not the FCC, should make basic decisions about federal telecommunications policy. "Indeed," Furchtgott-Roth said, "if Congress did not make those fundamental policy choices, we would be faced with an unconstitutional delegation of authority."

The next step in the process may be to hear from a Telecommunications Subcommittee Task Force headed by Representative Paul Gillmor (R-OH-5th) charged with generating its own laundry list for improving the Commission. Gillmor's task force has apparently compiled a substantial list of recommendations, including ideas submitted by major industry groups.

Kennard Defends Race Track License Actions

● Recent allegations of impropriety on the part of the FCC concerning the temporary authorization for a low power television broadcast operation at a Texas automobile race track have caused Senator John McCain (R-AZ) to charge the commission with "licensing a pirate."

The issue stems from an FCC decision last April to permit the racetrack owner to continue a low power broadcast from his racetrack to the parking lot. The operator claims to have been unaware that a license was required, and subsequently applied for one, which was granted.

FCC Chairman Kennard said, "we made a pragmatic, common sense decision not to disrupt an ongoing 3-4 day racing event involving a low-power television broadcast from a stadium into a parking lot. I believe this decision was made in good faith by all those involved."

Presidential Veto Expresses Spectrum Auction Concerns

In his veto message to Congress on the Commerce, Justice, State and Judiciary appropriations bill at the end of October, President Clinton suggested that the bill (which also funds the FCC), needed to include a provision clarifying the law with regard to the disposition of "bid-for" radio spectrum currently tied up in bankruptcy. The President's message noted that the government stands to collect only a fraction of the $5.6 billion in spectrum licenses awarded to companies that then went into bankruptcy without paying for them. The President also expressed the concern that the bill did not contain sufficient funding for ongoing FCC operations. The bill vetoed by the President called for $210 million for the Commission.

Progress report on HR.783

♦ By the November break, HR.783 gained at least 131 cosponsors in the House, but had still not been taken up by the Commerce Committee or its Telecommunications Subcommittee. To try to help move the bill along, ARRL visited some 265 House offices in Washington during 1999, as well as 39 Senate offices seeking cosponsors. One very positive development: we expect a Senate companion bill shortly.

Although HR.783 had not yet moved by year-end, it was in good company. Indeed, during 1999, most telecommunications issues were ignored by the House and Senate Commerce Committees, which have jurisdiction over all telecommunications-related legislation. It's well to keep in mind that these two committees probably have the broadest jurisdiction of any in Congress, with telecommunications only a small part of their responsibilities. There were approximately 164 bills in the Senate Commerce Committee of which 31 had anything to do with telecommunications and about 692 in the House Commerce Committee, of which 69 seemed to be telecommunications-related. The only major telecommunications legislation to pass and be signed into law was the so-called "wireless 911" bill that designates 911 as the universal national emergency telephone number, although both houses made progress on legislation resolving issues on copyright restrictions of broadcast signals carried by satellite.

Cosponsors for HR.783
Introduced by Rep. Michael Bilirakis (R-FL-9th). The number in parenthese following state name indicates number of congressional districts in that state.

Alabama (7)
Sonny Callahan (R-1st)
Robert B. Aderholt (R-4th)
Robert E. (Bud) Cramer, Jr (D-5th)

Alaska (1)
(No cosponsors)

Arizona (6)
Ed Pastor (D-2nd)
Bob Stump (R-3rd)
Jim Kolbe (AZ-5th)
J.D. Hayworth (R-6th)

Arkansas (4)
Vic Snyder (D-2nd)

California (52)
George Miller (D-7th)
Barbara Lee (D-9th)
Fortney Pete Stark (D-13th)
Tom Campbell (R-15th)
Sam Farr (D-17th)
James E. Rogan (R-27th)
Grace F. Napolitano (D-34th)
George E. Brown (D-42nd)
Ken Calvert (R-43rd)

Colorado (6)
Bob Schaffer (R-4th)

Connecticut (6)
Sam Gejdenson (D-2nd)
Christopher Shays (R-4th)
Nancy L. Johnson (R-6th)

Delaware (1)
(No cosponsors)

Florida (23)
Dave Weldon (R-15th)
Porter J. Goss (R-14th)
Karen L. Thurman (D-5th)
Charles T. Canady (R-12th)

Georgia (11)
Sanford D. Bishop, Jr (D-2nd)
Johnny Isakson (R-6th)
Nathan Deal (R-9th)

Hawaii (2)
Neil Abercrombie (D-1st)
Patsy T. Mink (D-2nd)

Idaho (2)
Michael K. Simpson (R-2nd)

Illinois (20)
Luis V. Gutierrez (D-4th)
Danny K. Davis (D-7th)
Jerry Weller (R-11th)
Jerry F. Costello (D-12th)
Ray LaHood (R-18th)

Indiana (10)
Tim Roemer (D-3rd)
Stephen E. Buyer (R-5th)
Dan Burton (R-6th)
Baron P. Hill (D-9th)

Iowa (5)
James A. Leach (R-1st)

Kansas (4)
Dennis Moore (D-3rd)

Kentucky (6)
Ed Whitfield (R-1st)
Anne Northup (R-3rd)
Kenneth R. Lucas (D-4th)

Louisiana (7)
Richard H. Baker (R-6th)

Maine (2)
Thomas H. Allen (D-1st)
John E. Baldacci (D-2nd)

Maryland (8)
Wayne T. Gilchrest (R-1st)
Constance A. Morella (R-8th)

Massachusetts (10)
(No cosponsors)

Michigan (16)
Vernon J. Ehlers (R-3rd)
James A. Barcia (D-5th)
Debbie Stabenow (D-8th)
Dale E. Kildee (D-9th)
David E. Bonior (D-10th)

Minnesota (8)
Bruce M. Vento (DFL-4th)
Bill Luther (DFL-6th)
Collin C. Peterson (DFL-7th)

Mississippi (5)
Chip Pickering (R-3rd)
Ronnie Shows (D-4th)

Missouri (9)
James M. Talent (R-2nd)
Ike Skelton (R-4th)
Jo Ann Emerson (R-8th)

Montana (1)
(No cosponsors)

Nebraska (3)
Lee Terry (R-2nd)

Nevada (2)
(No cosponsors)

New Hampshire (2)
(No cosponsors)

New Jersey (13)
Marge Roukema (R-5th)
Frank Pallone, Jr (D-6th)
Steven R. Rothman (D-9th)
Rodney P. Frelinghuysen (R-11th)

New Mexico (3)
(No cosponsors)

New York (31)
Peter T. King (R-3rd)
Benjamin A. Gilman (R-20th)
Michael R. McNulty (D-21st)
Sherwood L. Boehlert (R-23rd)
John M. McHugh (R-24th)
Maurice D. Hinchey (D-26th)
Louise M. Slaughter (D-28th)

North Carolina (12)
Bob Etheridge (D-2nd)
Walter B. Jones, Jr (R-3rd)
David E. Price (D-4th)
Mike McIntyre (D-7th)
Charles H. Taylor (R-11th)

North Dakota (1)
(No cosponsors)

Ohio (19)
Tony P. Hall (D-3rd)
Michael G. Oxley (R-4th)
Ted Strickland (D-6th)
David L. Hobson (R-7th)
Marcy Kaptur (D-9th)
Deborah Pryce (R-15th)
James A. Traficant, Jr (D-17th)
Robert W. Ney (R-18th)
Steve C. LaTourette (R-19th)

Oklahoma (6)
(No cosponsors)

Oregon (5)
Greg Walden (R-2nd)
Earl Blumenauer (D-3rd)
Peter A. DeFazio (D-4th)

Pennsylvania (21)
Robert A. Borski, Jr (D-3rd)
Ron Klink (D-4th)
John E. Peterson (R-5th)
Tim Holden (D-6th)
Curt Weldon (R-7th)
John P. Murtha (D-12th)
Joseph M. Hoeffel (D-13th)
William J. Coyne (D-14th)
Michael F. Doyle (D-18th)

Rhode Island (2)
(No cosponsors)

South Carolina (6)
(No cosponsors)

South Dakota (1)
(No cosponsors)

Tennessee (9)
John J. Duncan, Jr (R-2nd)

Texas (30)
Max Sandlin (D-1st)
Pete Sessions (R-5th)
Nick Lampson (D-9th)
William Mac Thornberry (R-13th)
Larry Combest (R-19th)
Martin Frost (D-24th)
Ken Bentsen (D-25th)

Utah (3)
(No cosponsors)

Vermont (1)
Bernard Sanders (I-At Large)

Virginia (11)
Owen B. Pickett (D-2nd)
Norman Sisisky (D-4th)
Virgil H. Goode, Jr (D-5th)
Rick Boucher (D-9th)
Frank R. Wolf (R-10th)
Thomas M. Davis (R-11th)

Washington (9)
Richard "Doc" Hastings (R-4th)
George R. Nethercutt, Jr (R-5th)
Norman D. Dicks (D-6th)

West Virginia (3)
Nick J. Rahall (D-3rd)

Wisconsin (9)
Ron Kind (D-3rd)

Wyoming (1)
Barbara Cubin (R-1st)

American Samoa (1)
(No cosponsors)

District of Columbia (1)
(No cosponsors)

Guam (1)
Robert A. Underwood (D-delegate)

Puerto Rico (1)
(No cosponsors)

Virgin Islands (1)
Donna Christian-Christensen (D-delegate)

Media Hits

- Jerry Verduft, AD0A, directed our attention to an article in the Colorado Springs, Colorado *Senior Times* about friendships forged through Amateur Radio, as well as the many emergency communications services supported by ARES. The article mentions Dwight Wood, KE0KH, Karen Wood, N0QYZ, Phil Pearsall, KC5LXC, Mike Proctor, KB0IAP and Warren Hickey, W0YNE.

- Bill Husted, KQ4YA, continues to delight and inform the public about the pleasures of Amateur Radio (among other technology) in his syndicated column "Techno Buddy." We saw Bill's work most recently in the *Kentucky Enquirer* of Fort Mitchell, Kentucky, discussing how ham radio and shortwave help get a more complete picture of world events than what is available through commercial news sources.

- Gary Pearce, KN4AQ, Matt Sickles, W2BYV, and Reed Whitten, AB4W, discuss the emergency communications activities of the Raleigh, North Carolina Amateur Radio Society recently in a recent article in the *Cary News.* The article notes that, in addition to providing support for the state and county emergency operations centers, local hams also provide public service communication for many local events.

- William Wheeler, K2QQ, provided a thoughtful response in the letters-to-the-editor column in *The Buffalo* (New York) *News* recently when the paper highlighted a neighborhood dispute about RFI. He noted that "radio amateurs typically seek to assist their neighbors in correcting RFI problems."

- Terry Martin's DXing hobby was detailed in an article in the Worthington, Minnesota *Daily Globe*. Terry's call sign is N0VJN. The article conveys some of the excitement and pleasure hams take in reaching far away places, and ties-in the emergency communication capability.

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- **No traps**
- **No ground**
- **No tuning**
- **Handles 1500 Watts**

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The AV-620 covers all bands 6 through 20 Meters with no traps, no coils, no radials yielding an uncompromised signal across all bands.

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- Wide VSWR bandwidth

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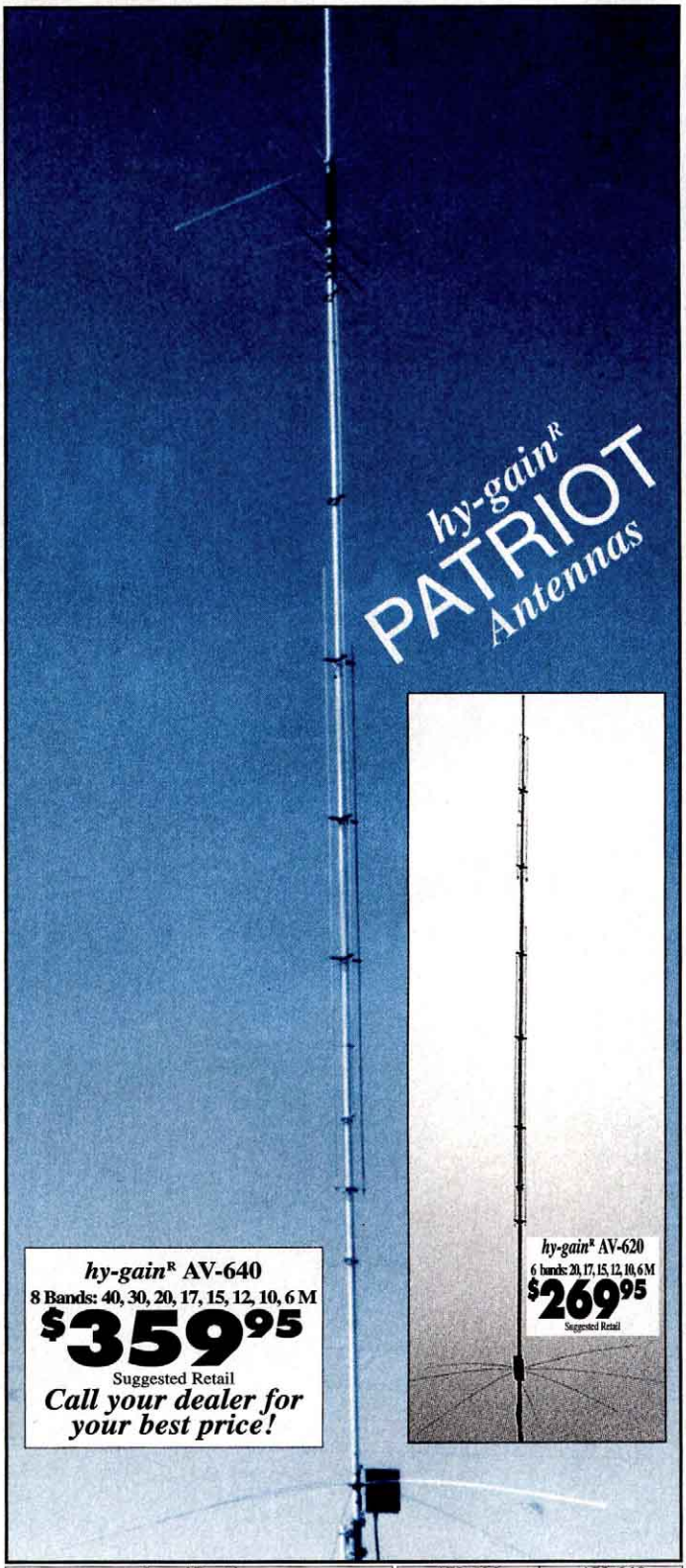


Specifications	AV-620	AV-640
Bands covered (meters)	6,10,12, 15,17,20	6,10,12,15, 17,20,30,40
2:1 VSWR Bandwidth (KHz)		
40M	N/A	150
30M	N/A	175
20M	500	500
17M	500	500
15M	500	500
12M	500	500
10M	1500	1500
6M	2000	1500
VSWR at resonance (typical)	1.5:1	1.5:1
Power handling (watts output) key down 2 minutes	1500	1500
Vertical radiation angle (degrees)	17	17
Horizontal radiation angle (degrees)	360	360
Height (feet)	22.5	25.5
Weight (pounds)	10.5	17.5
Wind surface area (square feet)	2.4	2.5
Wind survival (mph)	80	80

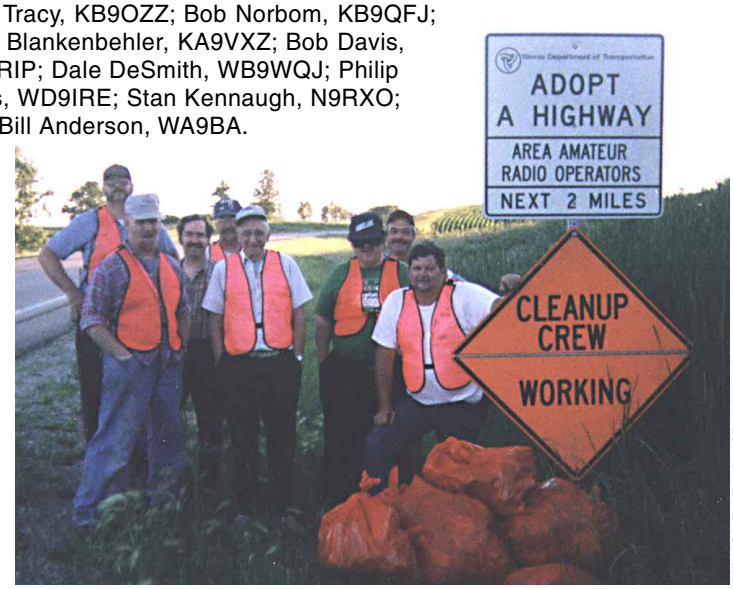
Beware the local Lilikoi. The aggressive vine has shown a preference for the Butternut vertical antenna owned by Scott, WH6CXW, in Honolulu, Hawaii. Although more than a quarter of the antenna has disappeared beneath the leaves, Scott says the Butternut's performance doesn't seem to be affected.

Communicating through amateur satellites is backbreaking work, but Mike, WB8ERJ, is willing to make the sacrifice. From East Harbor State Park on the south shore of Lake Erie Mike embarks on grueling expeditions to work OSCAR 27, the FM repeater satellite. It's a tough assignment, but someone has to do it.

A rare prefix indeed. When Mike, KF3CD, upgraded from General to Advanced last year, he decided to retire the old Amateur Radio call sign plate on his 1987 Buick in favor of a new, nonamateur vanity plate. Apparently someone at the Pennsylvania Department of Transportation assumed that "0260IN5" (zero to sixty in five) was an exotic DX call sign and issued an Amateur Radio plate accordingly!

When is a shirt not a shirt? When it's a QSL! Fred, K2QPM, of Mesa, Arizona crafted this eye catcher from a plain white golf shirt. The letters were iron-ons and the tower and antenna were painted on the fabric.

The Area Amateur Radio Operators are really cleaning up. The club joined the Illinois Department of Transportation's "Adopt a Highway" program and dedicated themselves to cleaning up a 2-mile stretch of 75 meters…er, state highway! From left to right: Tom Tracy, KB9OZZ; Bob Norbom, KB9QFJ; Paul Blankenbehler, KA9VXZ; Bob Davis, KB9RIP; Dale DeSmith, WB9WQJ; Philip Imes, WD9IRE; Stan Kennaugh, N9RXO; and Bill Anderson, WA9BA.



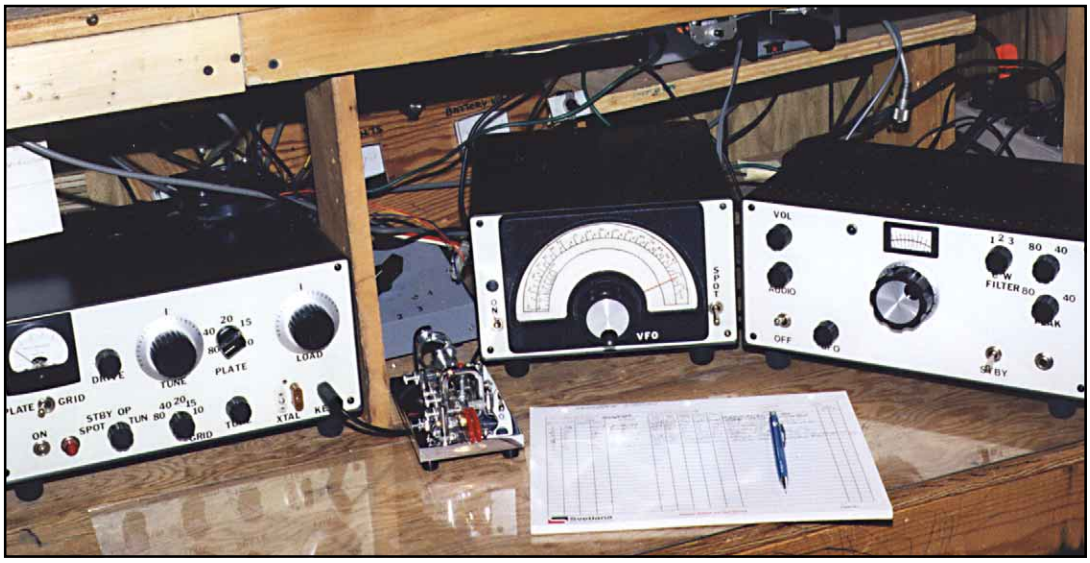
DENNIS DOYLE, WD9HCF

Two hobbies combined. Clarence, AB2BP, had little interest in Amateur Radio—until he realized that 70-cm ATV could add a new "viewpoint" to his other hobby of radio-controlled flying. Clarence entered the Technician ranks three years ago and now holds an Amateur Extra ticket.

News, news, news. Jennifer Hagy, N1TDY, ARRL Media Relations Manager, sorts through an impressive pile of newspaper clippings. These represent only 30% of the Amateur Radio "media hits" during 1999.

Heavy metal CW. Kevin, KV0E, crafted the body and thumb piece of this stylish paddle from chrome steel. The lever is brass and double bearings support the pivot post. Stainless steel springs complete the silky-smooth operation.

Do you see anything out of the ordinary in this photograph? Look closely. When Richard, WF7A, and his wife remodeled their kitchen they wanted to add a bit of whimsy. While considering tile designs one evening, his wife came up with a novel idea: She would encode a Morse message in tile! The tiled message wraps completely around the kitchen and reads: "Only dull people are brilliant at breakfast—Oscar Wilde."



A homebrew station—by the "book." Paul, WD4EBR, Ten-Tec service manager, built this homebrew station entirely from projects that appeared in *ARRL Handbooks* from the '50s and '60s. The 6146B transmitter (left) was featured in the 1967 edition. The "Simple Super Three Tube Receiver" (right) is a veteran of the 1959 *Handbook* and Paul added the VFO (center) from a design in the 1956 edition.

Last October at *Pacificon*—the ARRL Pacific Division Annual Convention—outstanding achievement plaques were awarded to FCC Special Counsel for Amateur Radio Enforcement Riley Hollingsworth, K4ZDH (left) and ARRL First Vice President Steve Mendelsohn, W2ML (right). Performing the presentation honors was John Ronan, K3ZJJ, president of the Northern Amateur Relay Council of California (NARCC).

You'll get a bang out of this truck! Andy, N6KAS, is a reserve officer with the explosives section of the Los Angeles Police Department. He waves the flag for Amateur Radio at every opportunity. When Andy displays this bomb truck at public events, for example, it becomes a traveling billboard for the amateur service.

FT-50RD
This durable, multi-featured 5 Watt Dual Bander is manufactured to rigid MIL-810 standards. Featuring wideband frequency coverage,* CTCSS/DCS operation, Dual Watch, 112 memory channels, and Digital Voice Storage.

FT-51R
This full-featured 5 Watt Dual-Band Handheld includes dual receive, 120 memory channels (80 if Alphanumeric), Auto Tone Search, Spectra Scope, and V/V, U/U and V/U operation.

VX-1R
The pocket-sized VX-1R is small in size only. Featuring Smart Search,™ DCS/CTCSS, Dual Watch, ARTS,™ wide-band coverage (76–999* MHz plus AM BC). The VX-1R provides 291 memory channels, and puts out ½ Watt (1 Watt w/optional E-DC-15 DC Adapter).

* Cellular Blocked

FT-11R
This compact 2M Handheld features 150 memory channels (75 if Alphanumeric), 10-memory DTMF Autodialer, Automatic Battery Saver (TX/RX), backlit Keypad, and are available in 1.5 Watt and 5 Watt versions.

FT-23/33R
These ultra-compact, 5 Watt VHF FM Handhelds feature rugged die-cast aluminum cases, 10 memory channels, optional CTCSS, and multiple scan modes. The FT-23R (2M) and the FT-33R (222 MHz) are easy to operate, and give outstanding performance.

FT-411E
The affordable FT-411E is compact and durable. This 5 Watt VHF FM Handheld features a die-cast case, 40 memory channels, 10 DTMF memories, built-in VOX, CTCSS, and multiple scan modes.

FT-10/40R
These single-band handhelds are manufactured to MIL STD 810 specifications, featuring either 30 or 99 memories, CTCSS/DCS operation, Dual Watch, and are available in 2.5 Watt or 5 Watt versions, with four keypad options.

VR-500
This miniature Handheld Receiver provides FM, AM, SSB and CW reception on 100 kHz–1300 MHz, with 1091 memory channels, Smart Search,™ versatile Dot Matrix display, Band Scope, and Dual Watch.

VX-5R
Although Yaesu's newest Tri-Band Handheld Transceiver is the world's smallest, it offers the performance of a full-size unit. The VX-5R operates on the 50 MHz, 144 MHz and 430 MHz bands with 5 Watts of power output, along with ultra-wide receive coverage of the VHF and UHF spectrum, plus AM medium- and short-wave broadcast reception. The VX-5R is military rated, so its durable, lightweight design allows you to take it anywhere. It is equally suited to walking through the concrete jungle as it is to forging the raging rivers of a real one. Along with a temperature display, the optional barometer pressure sensor unit gives a read-out of barometric pressure and altitude.

TOUGH GUYS.

When you're small, you get picked on. Isn't that how it goes? Well not in Yaesu territory, because not only do we design compact handhelds for efficiency, but we give these clever little guys plenty of muscle. Yaesu handheld transceivers have earned the bragging rights for being the smallest handhelds with the most durable water resistant casings ever created. And packed inside the brawn are engineering accomplishments in performance that are unmatched in the industry. Our high-tech handheld transceivers provide clean power output on the VHF and UHF bands and offer revolutionary features that allows these tough guys to continually outperform the competition. Learn more about Yaesu products on the web at www.yaesu.com

YAESU ...leading the way.

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

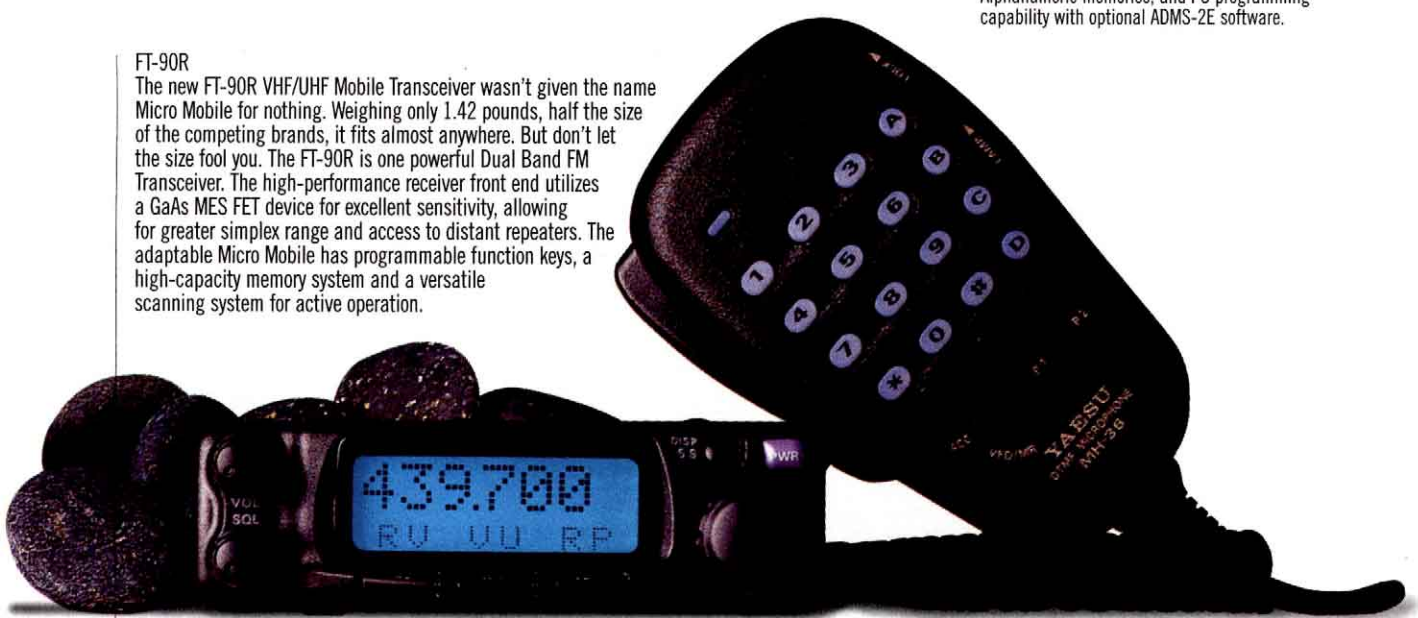
FT-100
This ultra-compact HF/VHF/UHF 100W Transceiver provides SSB, CW, AM, FM and AFSK coverage of the HF, 6M, 2M and 70 CM bands. Features include 300 memory channels, built-in Electronic Memory Keyer, DSP, IF Shift, IF Noise Blanker, and CTCSS/DCS.

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

FT-290RII
Ideal for base, vacation, or expedition use, this 25 Watt 144 MHz Multimode Transceiver is outstanding for emergency, travel, or weak-signal DX work. Optional battery pack allows over-the-shoulder portable use for search-and-rescue operation.

FT-2600M
This heavy-duty VHF FM Mobile is encased in a durable aluminum die-cast chassis/heatsink assembly, and manufactured to MIL-STD 810 requirements. Features include 60 Watt power output, 179 memory channels, direct keypad frequency entry from microphone, Alphanumeric memories, and PC programming capability with optional ADMS-2E software.

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



LITTLE BIG MOUTH.

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

YAESU ...leading the way.

CORRESPONDENCE

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

RETRO REMINISCING

♦ It was with great pride that I read "Regeneration and Crystal Control" by Dr Jerry Svoboda, KB2QIU, in the October 1999 *QST*. While our paths were slightly different, the trip down memory lane was super.

Jerry and I are about the same age, but I was licensed in November 1967 as WN2DIE. The interesting part is Jerry's discussion of his 6V6 transmitter. I built this same transmitter as a 15-year-old Novice by following the instructions in a 1949 *ARRL Handbook* that was given to me. I actually built the transmitter on an orange crate because I did not have enough money for a metal chassis. I scrounged all the parts and got the radio working. I used it for most of my Novice tenure and I learned many lessons from that experience.

In 1991 I got the bug to attempt to replace my old stations. I reconstructed the 6V6 transmitter. I did this because for my 25th anniversary as a ham I wanted to use my old Novice station to recapture the feeling of those bygone days.

Thanks for publishing such a great trip down memory lane. It helped me remember a time when I had very little money, a homebrew rig, and yet I still had the thrill of making a CW contact across the country.—*Mike Hudock, W3IE, Emmaus, Pennsylvania*

TOLERANCE AND COMPROMISE

♦ I read with interest the letter from Al Kaiser, N1API, in the October 1999 "Correspondence" ("Net Interference and Field Day"). I don't dispute anything that Al has to say. He and I were fellow club members at W1NRG when I worked in Connecticut in 1990-91. The Meriden (Connecticut) ARC is a fine group.

Yes, it's tough to hold regularly scheduled nets on contest weekends, but are these disruptions really that frequent? Field Day stands out as the "Big One" (even though it is not a contest per se), but there are many others, not all of which are sponsored by the ARRL. Taken as a whole, their share of time averaged over a typical year is really quite small. And let's not lose sight of the fact that contesters have just as much right to their activities as anyone else.

Al suggests that contests only be held in certain portions of the bands, leaving other portions free for nets and noncontest QSOs. This makes sense to me—and I consider myself a contester. But, if that particular solution should prove unworkable, may I offer an alternative suggestion to people who are stuck in Al's particular situation? How about arranging secondary frequencies for your nets and scheduled QSOs during the times when contests make the primary bands unusable? The 30, 17 and 12-meter bands are ideal for this purpose and I applaud the practice of the ARRL and many other contest sponsors who consider these bands "off limits" to contesting.

Whichever solution is implemented, the key is tolerance and compromise. —*Bob Mandeville, N1EDM,Brockton, Massachusetts*

CLUB CALL SIGNS SERVE THE PUBLIC

♦ Jay Craswell, W0VNE stated his opinion on club call signs in the October 1999 "Correspondence" ("Call Signs Run Amok"). Jay is a gifted writer and engineer, but I do not share all of his views on club call signs.

Our local repeater club has several call signs that are used for specific purposes in assisting the local EMA and the National Weather Service. Most public service agencies such as police, fire and rescue units are identified by a specific unit number or name.

K4CP is the call sign used for the rescue squad mobile-command post. Having a unique call sign for the operators to use in an emergency operation reduces confusion. For example, everyone knows that a call from K4CP is coming from the mobile command post.

W4EOC is the call for our ham operators who operate in the Emergency Management Agency Emergency Operations Center. Again, this is a unique call sign for the Emergency Operations Center. We have an active ARES and RACES group with training net every Tuesday night at 7:30 P.M. The EOC has HF, VHF and UHF gear in addition to the public service radio equipment.

Our local hams work with the National Weather Service during severe-weather events. Amateurs who work at the National Weather Service use K4OHX. The K4OHX call sign is unique to the NWS Office that serves this area. K4OHX is in the header of all bulletins from our local Weather Service Office. This call sign is used only if an active weather watch or warning has been issued.

W4HPL was a charter member and the senior member of our club when he died. We feel that this is a nice way to honor him by having his call sign for our net control operators to use when conducting our weekly training nets. This is the only time this call sign is used.

K4UAN, another Silent Key, was a charter member of the club as well. His call sign is used for emergency nets and weather nets by the net control operators. If K4UAN is on the air it means "heads up!"

All of these call signs have special meanings and specific purposes. Our club has four trustees, with only one holding an Amateur Extra license. It seems reasonable for all station grants to be usable in all parts of the all ham bands if a need arises. Therefore, one trustee holds all club call signs.

Our ham operators are not on an ego trip. On the contrary, we are trying to serve the public in an efficient manner.—*Sam Smith, KB4TEN, Algood, Tennessee*

NOT JUST A HOBBY

♦ When observing or participating in what I consider foolishness on the radio, I have often excused it by thinking or saying, "Oh well, it's only a hobby, something one does for fun." After using various radios to provide help in life-threatening emergencies, I began to re-think the matter. A quick search through my logs, notes, and memory generated a list of emergency or potential emergency situations in which I have used my radios in other than "hobby" applications. The list has been updated as further instances have occurred.

I can now catalog at least 40 situations spanning a seven-year period. The seriousness of each situation varied and included acquiring vehicle tows and repairs, reporting storm information, obtaining police aid, procuring and relaying medical information, and securing ambulances. Each instance was encountered incidentally rather than as part of an organized aid response group.

So far I have been involved in 88 public-service operations. I used CB radio during four of these operations, but the remaining 84 involved Amateur Radio. These operations included hams at base, mobile and maritime stations in five states and three nations (using two languages). Transmissions were on HF, VHF and UHF, employing voice and data modes. I was the aid recipient in five of the occurrences!

My experience illustrates that the need for similar action can (and will) come to any ham at any time. It follows that we should prepare ourselves in attitude, skill

and practice to respond as necessary.

It's helpful to recall the primary purposes of Amateur Radio as encoded in the regulations of many nations. They can be distilled to three points:

1. To serve the public, particularly in emergencies.

2. To advance technical and operational skills.

3. To promote international good will.

The laws justifying our privileges to manipulate the ether do not mention doing so for either fun or other inconsequential private purposes. At the very least hams ought to include within what they may deem a "hobby" preparation for, and deference to, the real rationales for existence of Amateur Radio.—*George Warren XE1/N9VIU, Chapala, Jalisco, Mexico*

THE JOYS OF HF

♦ Regarding the Op-Ed piece by Randy Pirtle, NR6N, in the September 1999 *QST* ("A Farewell to HF"), while cell phones can be superior communicators, they have limitation/deficiencies that HF doesn't. A cell phone conversation is private, even isolating. No one except the callers can hear all sides of the conversation. On HF we can all "read the mail," listen in and share thoughts during any conversation.

To establish a conversation on a cell phone, you must know whom you are calling, or at least the phone number. Many people recoil at the idea of accepting a phone call from someone they do not know, let alone just chatting with that stranger. Imagine dialing up a phone number at random and saying, "Hi. My name is Mike and I live in Alaska. What telephone are you using?" Never happen!

On HF, of course, you call CQ. You seek out people you have never met—strangers until you meet them on the air. You cannot meet new friends on a phone, but hams do it all the time, and on a global basis, on HF.

So "read the mail." Call CQ or answer those calls. Meet new friends and visit places you have never been and may never go physically—except via ham radio. Modern consumer technology has nothing that compares. *This* is why HF will never die.—*Michael Sakarias, KL7KE, Juneau, Alaska*

♦ I enjoyed NR6N's "A Farewell to HF?" and I think that all of the comparisons ring very true indeed. To be fair, I must say that I enjoy both HF and Internet exploration equally. The same magic that Randy refers to on the HF bands is also there on the Net.

I started as a SWL in 1965. To this day I still enjoy tuning through the landscape of HF and hearing signals that travel to my radio from the other side of the Earth. Of course, these days, I might actually transmit back!

But I also enjoy typing a URL into my Web browser and seeing what turns up. Even more, I enjoy that moment when I get my IP configuration exactly right, and it allows me to (perhaps) see images on my screen from (again!) halfway around the planet.

Learning the mechanisms of things like IP addressing and DNS is just as challenging, fun, and valuable as it was 20 years ago to learn the electronics necessary to obtain an FCC ham or commercial license.

To say that the Net as a hobby is not as challenging or as rich as HF is missing the point. The Net is a growing, adapting organism that reflects the uncertainty of every link along the way. It has its own "weather." Yes, it is far more reliable as a medium than HF. Both the Internet and Amateur Radio have a lot to offer a hobbyist—*Larry DiGioia, N8KU, Mt Gilead, Ohio*

HEARTS APART

♦ And you thought you'd run out of ideas on how to use Amateur Radio?

I was on temporary duty assignment with the Air Force in Port-au-Prince, Haiti during the summer of 1999. My wife and son were back at my home station at Eielson Air Force Base, Alaska. (That's near Fairbanks for those following along in their atlas.) My wife is KL0DD, a relatively new Technician and I am KL0AN, an Advanced operator having been licensed for a little over two years.

When Air Force members are deployed, most bases set up a program for the spouses called "Hearts Apart." The spouses are assigned a special code number to give telephone operators so that the operators will call the deployed members at no cost. The spouses are allowed two or three 15-minute calls each week.

Here's where it gets interesting. My wife was in town shopping in her Bronco when it just quit running. She got on her 2-meter mobile transceiver and, accessing the autopatch of the KL7KC repeater, called a friend and asked for assistance. When he showed up, there wasn't much he could do so my wife said, "Let me call my husband and see if he has any ideas." Well, she accessed the autopatch again, called the operator at the Air Force base, gave her the Hearts Apart number, and contacted me in Haiti!

When I heard her voice on the phone, I heard some scratchiness in the audio. I had to ask if she was using the 2-meter radio and she replied in the affirmative. I was truly amazed at her ingenuity!

I'm sorry to say that this story doesn't have a happy ending as far as the Bronco was concerned. I was fresh out of repair ideas. On the other hand, we've gained a new respect for the practical usefulness of Amateur Radio.—*Paul Jordan, KL0AN, Fairbanks, Alaska* QST

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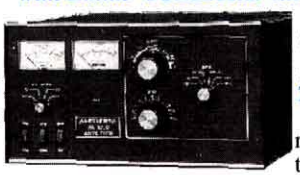

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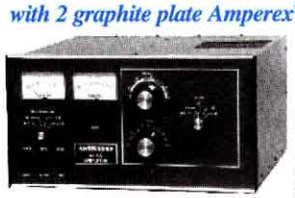

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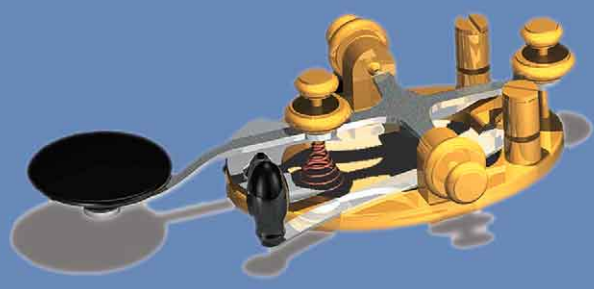
By Jim Maxwell, W6CF

Amateur Radio: 100 Years of Discovery



As we approach the new millennium, it's a happy coincidence that Amateur Radio is now almost exactly 100 years old. It seems appropriate to stop for a moment and take a thoughtful trip to our beginning years, and even before. Why should we bother, you ask? Well, for many this will be a pleasant and nostalgic look back to the early days, the early days, of course, being any day earlier than today! Moreover, as will be seen as we progress through the events of this past century, there is much to be learned from our history. As Confucius once said, "Study the past if you would divine the future."

This article deals, for the most part, with Amateur Radio in the United States. This restriction is not due to a lack of interest or a lack of importance of the broader topic of worldwide Amateur Radio, but purely for practical reasons. Consider that Clinton B. DeSoto's classic *200 Meters and Down* covers the history of Amateur Radio in the US only to 1936—but contains 184 pages.

The 1800s—Prehistory

The last few years of the 19th century set the stage for rapid development of commercial radio and established the foundations of Amateur Radio. There were numerous early contributors to the radio art, such as the great Oersted, Ampere, Faraday, Henry, and others. However, discovery really shifted into high gear in 1873 with the controversial work of the Scotsman James Clerk Maxwell (*not* related to the author of this article!). His work presented his theory of the electromagnetic field. Maxwell was the originator of those sublime equations loved so dearly by students throughout the world. (Heaviside also made major contributions to Maxwell's equations as they appear in modern textbooks, but that's another story.)

Those who came before him, especially Faraday, heavily influenced Maxwell's work, but many of Maxwell's contemporaries weren't convinced that his new theories were valid. It would take nothing less than rock-solid experimental effort to break down those walls of doubt. The German physicist Heinrich Hertz did just that, performing a series of classic experiments in the late 1880s during which he generated, detected, and measured the properties of electromagnetic waves predicted by Maxwell's equations. Hertz, though, had no particular interest in those waves except for the intellectual challenges their discovery provided. Development of radio for the use of mankind was left to others. The race was on.

One of the participants in the race to develop radio was the young Italian Guglielmo Marconi. He had a strong interest in physics and electrical science as a boy. He studied the subject in school and became aware of the possibility of using electromagnetic waves for communicating. In 1894 he started to work on the project in earnest. Two years later he was in England with what he felt was a useful radio device. During a demonstration before British officials Marconi managed to communicate over a distance of 2 miles without wires. It was an astonishing feat at the time and it launched Marconi's professional career. The rest, as the old saw goes, is history.

Who was the first Amateur Radio operator? We'll probably never know. Some would say it was Marconi. Marconi had a great fondness for Amateur Radio throughout his life, and considered himself an amateur at heart. Still, he chose to devote his life to competing in the commercial wireless marketplace; he never operated nor was licensed as an amateur.

Back to the original question, we'll probably never know who the first Amateur Radio operator was, but the Englishman Leslie Miller is surely a leading contender for that honor.

Leslie Miller has a solid place in amateur history as the first person to have published a description of a simple-to-build transmitter and receiver for an amateur (and he used that word) audience. His article appeared in the January 1898 issue of *The Model Engineer and Amateur Electrician*, published in London. Some of his readers clearly took the article to heart, for in the March 1898 issue "E. A." wrote that he had a 2-inch spark coil and three solid brass balls, but needed more construction details. (The three brass balls were called for in one of the transmitter designs given in Miller's article.) No fewer than three more letters on the subject appeared in 1899 issues of the little magazine. The Yanks weren't far behind, with a construction article in the *American Electrician* in July 1899. An explosion

In 1896 Marconi managed to communicate over a distance of 2 miles without wires. In 1901 he spanned the Atlantic.

of interest would occur over the next decade, but as the 19th century drew to a close, Amateur Radio was on its way.

The '00s—The Beginning

As the 20th century began, commercial development gained speed. Marconi spanned the Atlantic with wireless in 1901, using high power and giant antennas. Amateurs continued to tinker and experiment with their modest installations. A detailed construction article appeared in the Boston magazine *Amateur Work* in June 1902. It's clear that the experimenters at that time had already discovered the skill of scrounging that amateurs adhere to even today: one of the components recommended in that article was baling wire.

These early transmitters all generated RF by means of discharging a capacitor across a gap, creating an oscillatory spark. These early spark transmitters did produce RF, but were broadband by their very nature, making it difficult, and often impossible, for two neighboring stations to be on the air at the same time. Receivers were simple detectors, generally coherers, later giving way to the more sensitive galena crystal sets.

There was no regulation during those days, of course. Amateur call letters were self-assigned, and often consisted only of the operator's initials.

A hint of what the future held occurred in 1904 when the Englishman J. A. Fleming developed the first vacuum diode: the Fleming Valve. In 1906 Lee DeForest added a grid to a Fleming Valve to make the first triode, naming it the "Audion." Audions made very effective detectors, but were generally too expensive for most amateurs to use. It wasn't until some years later that it was realized that triodes could be made to generate RF. Meanwhile, crystal receivers and spark transmitters ruled the airwaves.

The '10s—Regulation

The range of an amateur station in the early 1900s was measured initially by yards, then by city blocks. As power increased and technology improved, ranges increased so that by 1912 a well-designed kilowatt spark station had a range of perhaps 100 miles. Those with more power could work several hundreds of miles. Higher power generally meant more interference and the clamor for regulation intensified.

Congress had actually been investigating problems related to wireless since 1910. In 1912, after agonizing appraisal of more than a dozen different bills, Congress finally approved the Radio Act of 1912. For the first time amateurs were to be licensed. The law also had a provision that at first was thought could bring the death of Amateur Radio: hams were restricted to the single wavelength of 200 meters. The general belief in those days was that long distance performance improved with longer wavelengths. The "short" wavelength of 200 meters was thought to be useless, and some expected that the amateurs, all crowded around this "useless" wavelength, would eventually give up and pursue other interests.

The plot didn't work. Although there was an initial drop in numbers following the Radio Act of 1912, Amateur Radio in the US started growing again. There were more than 6000 amateurs on the air by 1917.

Some hams had extended their effective range by relaying messages through others, but it took a Hartford, Connecticut ham, Hiram Percy Maxim, 1WH (later 1AW) to recognize that messages could be sent more reliably over long distances if relay stations were organized. So, in 1914, the American Radio Relay League was born, and by late 1915 *QST* started publication. The calls "1WH" and "1AW" look strange to some today, but they were the norm for the early years. Commerce Department rules issued in 1913 provided for amateur call letters, but prefixes were not defined or required. Prefixes came later, in the mid to late 1920s.

About that same time a miracle in receiver technology appeared on the scene. A New York amateur by the name of Edwin H. Armstrong invented the tube-operated regenerative receiver in 1913, and in 1915 its design became public knowledge. This new receiver had greater sensitivity than the crystal detectors then in use. Although vacuum tubes were expensive at the time, some amateurs started experimenting with Armstrong's design.

The year 1914 brought the madness of the Great War in Europe. By 1917 the US was fully involved and all ham operations in the US ended. The fact that amateurs formed a pool of trained radio operators didn't go unnoticed—Hiram Percy Maxim made certain of that!—and some 4000 hams eventually wound up in the service of the nation. The word "service" is important here, for it emphasizes one of the fundamental functions of Amateur Radio—to be of service to the public and to the nation.

The war finally came to a close on November 11, 1918. During the hostilities the Navy had been placed in control of all US radio. As hams in uniform streamed home they expected, quite reasonably, that the Navy would rescind the 1917 order that had closed them down. That was not to be the case. The Secretary of the Navy refused to permit amateurs back on the air. The future of Amateur Radio in the US was in doubt once again.

The Navy seemed determined to maintain control over all radio services, even in peacetime, with Amateur Radio seemingly not on their list of useful radio services. Legislation was written that supported the Navy's objectives. The ARRL and others objected strenuously to congress and also appealed to all

Editorials

DE AMERICAN RADIO RELAY LEAGUE

AT LAST!

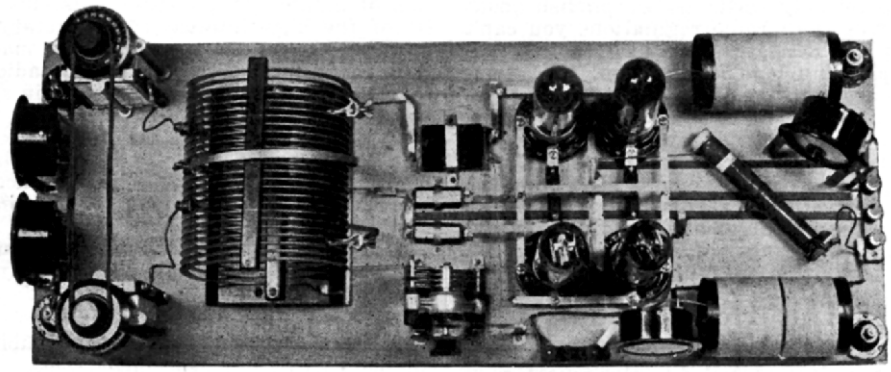
Just as we were ready to mail last month's issue, the word came from Washington that the Navy Department had cut the ropes and removed restrictions on amateur transmitting. After throwing everything within reach at the office boy, and finishing off by jamming the waste basket down over his head, we grabbed the telephone and told the printer for the love of Mike to make room for an emergency sheet to go into every QST, and that we would pound something out immediately and be over in ten minutes. Talk about Impulse Excitation! We were both impulsive and excited. It seemed like the coming true of a dream. To realize that we could call up and holler QRT and QRM and do all of the other things that we had been longing to do since April, 1917, made it difficult to focus properly.

The far reaching effect of the removal of the ban on transmitting cannot be estimated. Probably every amateur in the country got as excited as we did here in the editorial sanctum. Maybe they didn't throw things, but if they were real dyed-in-the-wool, blown-in-the-glass, all wool and a yard wide radio bugs, they wanted to. These amateurs are going to make the removal of the ban on receiving look like a half-inch spark coil that has been rained on. Receiving is all right, but it is not to be compared with receiving and transmitting. It is the transmitting that makes amateur radio what it is. The removal of the restrictions is going to be felt in every line of business from the lumber yard to the instrument maker. The Old Man's electrical supply store will have to order soldering paste by the barrel and the hardware stores are going to note a marked increase in the demand for everything from nails to copper wire.

But there is another side to this fair picture. A lot of us are going to find that some pet scheme is not going to work any where nearly as perfectly as we expected it would. Instead of radiating five amperes, it is going to be three-quarters of an ampere, or the tone is going to be ragged or the coupling has got to be looser, or the insulation about five times better. We are not going to have the air chock full of QRM right off quick. It is going to take time to get back, and a terrible lot of good hard work. But that is where we amateurs shine. All of the troubles will be gradually fixed up and transmitting distances that we never dreamed of are going to be matters of every day occurance. The days of real sport are at last with us. Come on, fellows, and get into the air again.

This editorial in the November 1919 *QST* celebrated the return of Amateur Radio privileges after the end of World War I.

hams and their families to write to their congressmen. The political pressure torpedoed the pending legislation, but the Secretary of the Navy still refused to permit the resumption of amateur operations. Finally, Representative William S. Greene of Massachusetts heard the call for help and interceded with a House Resolution *directing* the Navy to end the prohibition on ham operations. The Navy complied, the logjam was broken and Amateur Radio returned to the US in November 1919. This episode was a nearly textbook example of how the collective strength of thousands of amateurs can move mountains in Washington…sometimes.



The transmitter that spanned the Atlantic from 1MO on a wavelength of 110 meters.

The '20s—Discovery

As the nation entered the '20s, amateurs were solidly back on the air around their 200-meter wavelength. The ARRL relay network was up and humming, with records being broken regularly. One of the most impressive was a showing in early 1921 during which a message was transmitted from Hiram Percy Maxim, 1AW, in Connecticut to V. M. Bitz, 6JD, in California. *A return reply was received in only 6½ minutes, round trip!*

Still, few would have predicted the revolutionary changes that took place in Amateur Radio in only a few short years. If one had to point to a single most significant reason for those changes it would be the vacuum tube, accompanied by an almost insatiable curiosity by hams.

By the 1920s the price of vacuum tubes had fallen, which caused an upsurge in the use of Armstrong's sensitive regenerative receiver design. This development led to an increased range achievable by spark stations, for with the new receiver hams could hear weak signals that previously hadn't been detectable. Some advanced amateurs were also experimenting with the superheterodyne receiver, invented by Armstrong as well as the Frenchman Lucien Levy during the war years. Increasing numbers of amateurs also used tubes in their transmitters, generating uniform, continuous wave (CW) signals. The CW signals were narrow, scarcely 1% the width of a spark signal, reducing interference and making it possible to increase the number of stations that could be on the air at the same time.

1MO and his "Hay Wire" receiver, the one he used to work French 8AB in 1923.

As the range of amateur stations increased, thoughts turned to *real* DX. Transatlantic transmitting and receiving tests were kicked off in 1921 to see if low power amateur signals could cross the pond. The tests ultimately showed that they could, and they also showed conclusively that CW was far superior to spark. By 1923 Europe-North America two-ways seemed only a matter of time. All the preparations, sweat and tears finally paid off on November 27, 1923, when French station 8AB worked Connecticut hams Fred Schnell, 1MO, and John Reinartz, 1XAL, using CW on a specially authorized wavelength of 110 meters. Testing continued and by late 1924 a CW contact was made between England and New Zealand, almost halfway around the world. In 1926, Brandon Wentworth, 6OI, achieved what was considered by many to be the ultimate in DX prowess: he worked and confirmed all continents, from a station in a pasture on the Stanford University campus in California. The next year saw the beginning of the ARRL International Relay Party, the predecessor to the ever-popular ARRL International DX Contest.

Transatlantic transmitting and receiving tests were kicked off in 1921.

By the mid-1920s the value of short waves was clearly recognized by the government as well as commercial entities, due in large measure to the work of the amateurs themselves. By the end of the decade the wide open spaces were gone, but the amateurs did have harmonically related bands from 160 through 5 meters, plus a narrow band at 400-MHz.

Two other events in the '20s also deserve mention: First, the International Amateur Radio Union (IARU) was formed for the purpose of representing Amateur Radio within the international community. The IARU is still the single most important body for representation of Amateur Radio internationally. Second, the broadcast industry in the US was in chaos due to insufficient legislative authority for the Commerce Department to control it. As a result, congress passed the Radio Act of 1927 and the FRC (Federal Radio Commission) was created.

The '30s—Growth

As ham radio entered the 1930s, spark was a thing of the past (some would have said "good riddance!") and all amateurs were using vacuum tube transmitters and receivers. Phone operation wasn't as common as CW, but was gaining in popularity. A few years earlier, in Japan, Professor Hidetsugu Yagi had studied an array of dipoles that formed and directed a microwave beam. By the 1930s the design had been adapted to HF, and a few hams were experimenting with these new-fangled "Yagi" beam antennas. They were built with both wire and metal elements, but generally sported wooden booms. Some of the more technically sophisticated hams also continued to experiment on the 5-meter band and on even higher frequencies.

The ARRL Sweepstakes contest was introduced in 1930, and 1933 brought the ARRL Field Day. The ARRL DX contest continued to be popular with the DXers.

Almost unnoticed at the time, the small Los Angeles magazine *R/9* published a three-part article starting in the September-October 1933 issue titled *Single Sideband Transmission for Amateur Radiophones* by Robert M. Moore, W6DEI. Moore described a system of single sideband that he and others were experimenting with and had actually put on the air. The article didn't generate much interest, however, and it wasn't until 1947 that new experimental work was carried out on the ham bands.

The Radio Act of 1927 lasted only seven

The ARRL Sweepstakes contest was introduced in 1930...1933 brought the ever-popular ARRL Field Day.

years: in 1934 Congress passed the Communications Act of 1934. It had no immediate effect on hams, except that their affairs were henceforth handled by the FCC (Federal Communications Commission), which exists to this day.

The Old Man himself, Hiram Percy Maxim, one of the cofounders of the ARRL and the IARU, passed away in 1936. He was a man of many talents—leader, author, photographer, engineer, entrepreneur—Amateur Radio everywhere lost a friend.

Interest in DX continued to be high, and in 1937, after extended discussion of what should be called a "country," the DXCC program was announced by ARRL. The question of what kind of entity deserves to be credited to DXCC awards continues unabated today, over 63 years later.

In September 1939 war came to Europe once again. Amateur operations immediately halted in most European countries. Most of the British Commonwealth nations went off the air as well, including Canada. US hams continued operating, although DX pickings were mighty slim. Even with DX disappearing from the bands, the West Coast magazine *Radio* announced their first annual International DX Contest in 1939.

The '40s—War and Peace

The '40s arrived with US hams still active on the air, but DXing was essentially a thing of the past. By June 1940 the FCC issued an order prohibiting American hams from contacting foreign stations. Portable and mobile operations on frequencies below 56 MHz were also prohibited, although the FCC made a specific exception for Field Day, and later for the Amateur Emergency Corps.

Then came the Pearl Harbor attack on December 7, 1941; the US was suddenly at war. Amateur activity in the US screeched to a halt, although those on the home front kept their technical and operational skills honed on 112 MHz as members of the War Emergency Radio Service. This service was important and was taken very seriously by the participants, but it still lacked the freewheeling pleasures of normal ham operations.

At the start of hostilities some 60,000 Americans were licensed as radio amateurs. It has been estimated that approximately 25,000 of those served in the armed forces during WW-II. Another 25,000 served in critical war industries, or as instructors in military schools.

Unlike WW-I, ARRL stayed open for business for the duration. *QST* continued to be published, although with fewer pages than before as a result of wartime paper rationing. ARRL publications were used heavily for military and civilian training, and a special Defense edition of the ever-popular *Handbook* appeared in 1942.

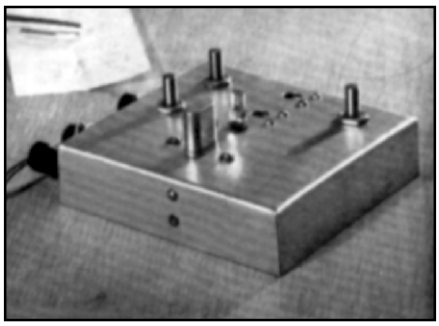
By the beginning of 1945 it was clear that it was only a matter of time until the war would draw to a close. Some hams in New York were so certain that peace was nearly at hand, and that ham radio would have a future following the war, that they kicked off a new magazine called *CQ* in January 1945. Hostilities finally ended on August 17 of that same year. Only four days later, amateurs were back on the air on VHF. By summer 1946 nearly all amateur bands were restored, from 3.5 to 30 MHz, with the old bands at 5 and 2.5 meters replaced by new bands at 6 and 2 meters. HF DXing was back, the DXCC program was restarted, and interest in VHF/UHF operations took a jump upward as surplus military gear became available at prices that were near giveaways.

HF operators weren't overlooked, of course. Surplus transmitters, receivers, power tubes, components—just about anything the heart desired was available from the friendly, local surplus emporium. Surplus also gave a big boost to a new mode, at least new to hams: RTTY. Many hams had worked with RTTY while in the military during the war, and when machines appeared as surplus, they quickly disappeared into ham shacks throughout the country.

By September, 1947 Mike Villard, W6QYT, and a group of student hams started experimenting with SSB.

As hams were joyfully getting back on the air, the public was just as joyfully buying TV sets; one of the greatest threats ever to ham radio arrived under the name of Television Interference, the dreaded *TVI*. The TVI "problem" has decreased over time, although it has never been completely solved. Interference to and from home entertainment devices continues to plague us to this day, but it doesn't seem to be as threatening as TVI was in those gloomy '50s.

Advertisements like these appeared in *QST* and other radio magazines during World War II.



This 2-meter CW transmitter, designed and built by K2AH in 1952, was among the first all-transistor amateur rigs.

Remember the 1933 *R/9* article on Single Sideband? Well, others did too, and by September 1947 Mike Villard, W6QYT, and a group of student hams started experimenting with SSB at Stanford University. It took a decade before SSB was a common sound on the bands, but it did ultimately displace dual-sideband AM phone, except for a relatively small number of AM aficionados. These folks, quite simply, enjoy operating the old rigs and enjoy the sound of a well-adjusted AM transmitter.

The '50s—Normalcy

The 1950s began with a bang: basic changes in the amateur license structure were announced in 1951. The Novice, Technician, and Amateur Extra licenses were announced by the FCC, along with name changes of the old class A, B, and C licenses to Advanced, General and Conditional, respectively. The Novice license was a one-year, non-renewable, ticket with CW privileges on portions of two HF bands, and phone on a portion of 2-meters. The Technician license was created in response to a clamor to accommodate those who wished to experiment on the VHF and UHF bands above 220 MHz, without taking a 13-WPM code test. Both of these new licenses required 5-WPM code tests. These new license classes were highly successful, if the number of new hams was any measure.

Scarcely a year later, in late December 1952, the FCC changed the licensing structure once again. No new Advanced licenses would be issued, and special phone privileges on HF for Advanced and Amateur Extra licensees were withdrawn. Privileges for the Novice and Technician licensees remained unchanged. (Technician licensees eventually gained privileges on 6 and 2 meters.)

Meanwhile, a gradual technical revolution was taking place—consumer products employing those strange creatures called *transistors* began appearing and construction articles using transistors began appearing in ham magazines. Just as the spark operators had to learn about vacuum tubes in the 1920s, now the tube buffs had to hit the books and learn about transistors.

Another hint of things to come occurred in January 1953 when Ross Bateman, W4AO, and Bill Smith, W3GKP, working together at Bateman's Falls Church, Virginia station, heard echoes of their own 2-meter signal reflected from the Moon. So began the era of moonbounce communications between amateurs.

The '60s—Incentive Licensing

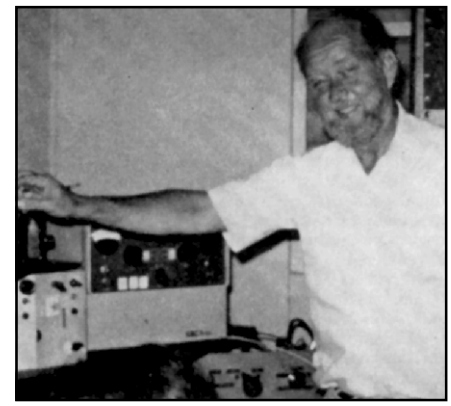
The 1960s were exciting times for Amateur Radio. The decade brought us amateur moonbounce, OSCAR satellites and FM repeaters. Still, the '60s will forever be remembered by old timers not for exciting technical achievements, but for something quite different: incentive licensing.

Back in 1952 the FCC had eliminated the incentive licensing system on HF; the General, Advanced, and Amateur Extra class licensees all were given identical privileges. As the years passed many hams came to believe that the lack of special privileges for higher-class licensees acted as a *dis*incentive for some to better themselves technically and operationally. As a result, and after months of debate within the pages of *QST* and other magazines, in club bulletins, at conventions, on the air and elsewhere, the ARRL petitioned the FCC to bring back incentives to amateur licensing. The filing, made in October 1963, asked for reinstatement of the Advanced license. No new privileges were proposed for Advanced or Amateur Extra class licensees, but it did propose that HF phone privileges for General licensees be phased out on the 80, 40, 20, and 15 meter bands. Growth of the US amateur service had been brisk, running at about 8% to 10% per year since the Novice and Technician licenses were created in the early '50s. Once the debate started, however, the growth rate fell sharply.

In July 1960 the first two-way contact via the Moon took place on 1296 MHz.

The debate continued until the FCC handed down its decision in 1967: incentive licensing was restored. Exclusive subbands on the 80, 40, 20, 15, and 6-meter bands were set aside for Amateur Extra and Advanced class licensees. Those subbands were withdrawn from use by General hams. Suffice it to say, most Generals were *very* unhappy.

Since 1967 there has been liberalization of privileges for Novice and Technician licensees, plus expansion of HF phone bands and modifications to the specifics of the exclusive subbands for Advanced, and Amateur Extra hams. Even so, the broad scheme set by that 1967 decision by the FCC is with us still. Today, some 33 years later, there are those who are still bitter about the outcome of the incentive licensing debate of the 1960s. Remember the quote from Confucius given at the beginning of this review? Applying Confucius' thoughts to the 1960s incentive licensing debate it's clear that a lesson has been learned: Never, *never*, **never** should anyone propose to *reduce* operating privileges!



Sam, W1FZJ, was one of the top amateur moonbounce pioneers in the 1960s.

Incentive licensing was by no means the only major event in the '60s. For example, in July 1960 the first two-way contact via the Moon on 1296 MHz was logged by the Rhododendron Swamp VHF Society in Massachusetts. It took place between station W1BU, spearheaded by Sam Harris, W1FZJ, and the Eimac Radio Club in California, led by O. H. "Hank" Brown, W6HB. Only a bit more than a year later Amateur Radio leaped into space in the form of a small, beeping, OSCAR (Orbiting Satellite Carrying Amateur Radio) satellite. It was the brainchild of a group of hams from the area now known as Silicon Valley. They arranged to have three more small satellites launched, and then passed the baton to AMSAT, the Maryland-based Amateur Satellite Corporation, still the principal satellite-specialized Amateur Radio organization in the US. The 1960s also saw the first move to amateur FM repeaters, destined to reshape the character of 2-meters and above.

The '70s must surely be remembered as the decade of the FM repeater.

The '70s—Repeaters and Packets

The '70s must surely be remembered as the decade of the FM repeater. Not because FM repeaters were "invented" in the '70s—they actually appeared much earlier—but because it was during this decade that amateur FM repeaters on VHF and UHF "took off" and literally reshaped the 2-meter, $1^1/_4$-meter and 70-cm bands.

The amateur FM repeater revolution had roots much farther back in time. Repeaters had been in use on 5 meters in the 1930s, but they were essentially experimental machines and never gained much popularity. In the 1950s AM repeaters started appearing, scattered throughout the nation. The repeater idea was sown.

It was the success of commercial FM repeater systems that gave amateur FM repeaters the greatest boost. After WW-II commercial users discovered the value of channelized FM for mobile use. Throughout the 1950s manufacturers churned out large quantities of equipment designed to satisfy that new demand. As the popularity of the new systems increased, so did congestion on their bands. In order to relieve that congestion the FCC finally required the commercial users to tighten up on their channel spacing. The commercials were obliged to do so, with the result that, throughout the 1960s, large quantities of outmoded (from the commercials' standpoint), but entirely serviceable equipment became available on the surplus market. Guess what? The gear operated on frequencies close to the amateur 6 and 2-meter bands, as well as 70-cm, and was easily converted from commercial to ham use. As the installed base of amateur FM repeaters grew, mostly built of converted commercial equipment, a demand for low-cost mobile and hand-held equipment grew and was satisfied by both domestic and foreign manufacturers. The era of the ham FM repeater was in full bloom.

While repeater systems were being brought on-line across the nation, a new kind of revolution was quietly underway, thanks to early work by some of our ham friends in Canada. This revolution was based upon the digital computer, which was attracting interest from many technically oriented hams. The Canadian experiments using packet techniques began in 1978. By 1979 Doug Lockhart, VE7APU, had developed a board capable of assembling and disassembling packets, and the board was offered to the ham community as kits. The kits sold briskly, and as the decade ended, so began the new gold rush—the rush to amateur packet radio. Unfortunately, ASCII modes weren't allowed under FCC regulations, so although experimentation was moving right along, US couldn't legally converse on packet with each other or with their Canadian counterparts.

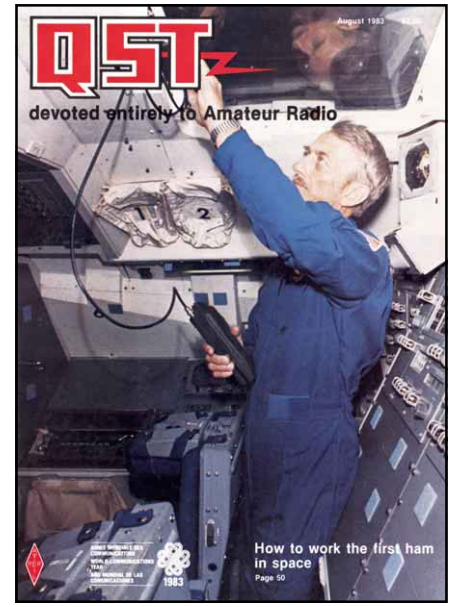
Another significant event in 1979 occurred in Geneva at the World Administrative Radio Conference. At the end of the conference, due in no small measure to superb planning and lobbying by the IARU delegation, hams had three new HF bands, at 10, 18, and 24 MHz.

The '80s—Space and Packet Radio

In March 1980, the FCC finally permitted ASCII modes in the US. This coincided with the sudden rise in popularity of affordable personal computers. That was all it took to ignite amateur enthusiasm for packet radio and other digital modes. Members of AMRAD (the Amateur Radio Research and Development Corporation) in the Washington, DC area represented one hard-core group of packet enthusiasts. They were responsible, in collaboration with AMSAT, for the first ARRL Amateur Radio Computer Networking Conference. Out west, in Tucson, Arizona, TAPR (Tucson Amateur Packet Radio) was formed. The TAPR group proceeded to produce a line of popular terminal node controllers, further fueling the packet conflagration.

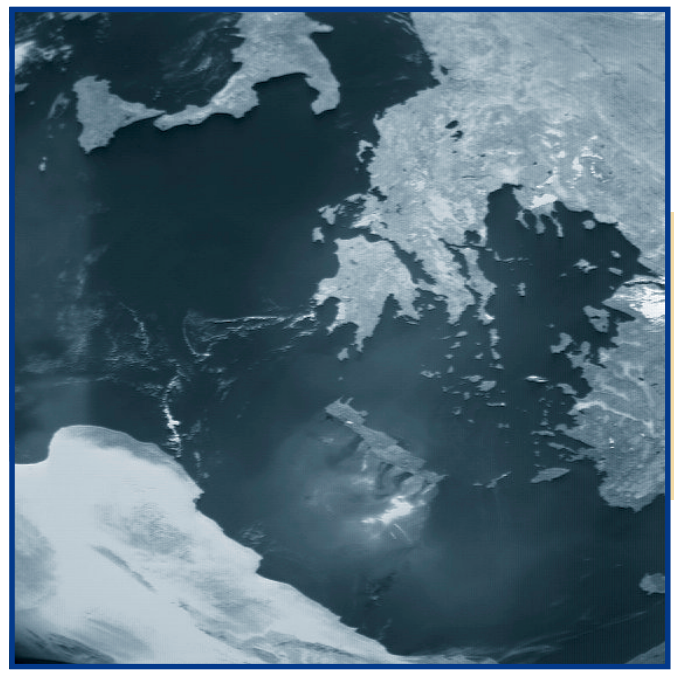
Digital activity blossomed on HF as well. In 1982 Peter Martinez, G3PLX, put the power of the personal computer to work, combining it with a modified version of the SITOR protocol to create AMTOR—the first amateur HF digital mode that offered error-free communication.

Meanwhile, the ham community was electrified in 1983 by the launch into space of Owen Garriott, W5LFL, an astronaut with the Space Shuttle program. Garriott carried a 2-meter rig with him, and passed out nearly 300 QSOs from space. Since that time ama-



The August 1983 cover of *QST* featured Owen Garriott, W5LFL, aboard the Space Shuttle.

The ham community was electrified in 1983 by the launch into space of Owen Garriott, W5LFL, an astronaut with the Space Shuttle program. He carried a 2-meter rig with him, and passed out nearly 300 QSOs from space.



Amateur satellites became more sophisticated in the '90s. Many carried digital cameras that captured amazing images like this one from TMSAT-OSCAR 31.

teurs have been included in the crew of virtually every Space Shuttle launch. In later years the SAREX program (Shuttle Amateur Radio Experiment), initially spearheaded by Roy Neal, K6DUE, has turned out to be a superb tool for helping students throughout the world develop an appreciation for the wonders of space and the space program. It has also been a boon for recruiting young, eager, new hams.

On the regulatory side, 1984 saw the launch of the highly successful Volunteer Exam Coordinator program. In addition, PRB-1 was issued by the FCC, which provided some measure of protection for hams from the arbitrary action of community planning commissions.

Last, but not least, in July 1989, the ARRL Board of Directors voted unanimously in favor of petitioning the FCC for a code-free ham license for use above 30 MHz. Many felt that its time had come.

The '90s—The Codeless License and the Digital Revolution

Even though the Morse speed requirement was set at 5 WPM for Technicians and Novices, Morse code continued to discourage many potential hams, who could point at the dwindling importance of Morse in military and commercial communications worldwide. Following intense debate in the amateur community the ARRL proposed that a new, code-free Technician license be created, with access to bands above 30 MHz. The FCC agreed in 1991 and growth of the amateur service took off again, reaching over 700,000 US licensees by the end of the decade. Amid predictions of doom by some, the "codeless Techs" went on the air, built repeaters, joined clubs and emergency organizations and took leadership positions.

And then came the Internet, dramatically reshaping our world in a few short years. In the early '90s some pundits claimed that we were entering an era that would see revolutionary changes in communication.

As we leave the '90s it's crystal clear that those early pundits were correct (they may have even understated their predictions). Who would have believed only a few years ago that telephone calls could be made across the entire US for five cents per minute, or that the price for calling the UK from the US would be only twice that? Who would have believed that something called the World Wide Web would change basic patterns of doing business that have existed for a century or more? All of this, of course, creates challenges for the Amateur Radio service. The fascination of computers and the Internet attracts many of the young, technically inclined people who in previous years had often found their way into Amateur Radio. This challenge, and others, has caused some to predict the death of our service at the hands of computers in general and the Internet in particular. Hams, though, seem to be taking it all in stride. Today the majority of ARRL members have Web access (ARRL Headquarters in Newington, Connecticut receives more than 1200 e-mail messages per day!), DXers use packet and Web-based spotting networks and users of the Automatic Position Reporting System (APRS) employ the Internet for long-distance relays. Amateurs have embraced cyberspace with a vengeance, using the Web to swap information and software. Hams sell used gear on Ebay and many other Web sites, and argue *ad nauseum* on USENET newsgroups.

The emergence of PSK31, the exciting new HF digital mode, was fueled by the availability of free software on the Web. DXpeditions are using the Web to publicly post log files within hours after contacts are made—even from remote locations (thanks to amateur satellites as well as PACTOR and CLOVER HF digital technology).

The computer is also leading Amateur Radio into exciting new areas of experimentation, such as harnessing computers to radios, making possible experimenting with new digital modulation techniques which would have been almost unthinkable only a decade or so ago. TAPR now has an active effort, for example, which will ultimately result in affordable spread spectrum gear, an appropriate follow-on to their pioneering work in terminal node controllers less than 20 years ago. It's clear that the "threat" of the Internet to Amateur Radio has been somewhat overblown. On the contrary, computers and the Internet have made Amateur Radio a richer avocation, even more interesting and absorbing than it was before.

Computers and the Internet have made Amateur Radio a richer avocation.

As the 20th century draws to a close, both the ARRL and the FCC have once again proposed changes to the US amateur licensing structure. The most contentious element of the ARRL proposal, predictably, is the idea of reducing the speed of the Morse code testing requirement for all HF licenses. As this article is prepared, the FCC's response to the ARRL's proposal and to the thousands of comments and counter-proposals hasn't appeared. When it does, history suggests that Amateur Radio in the US will be moving along a new road, but a road that is sloping upward, not down.

In Conclusion

I hope that you've enjoyed this romp through history. The shame of it all is that there is so much to say and so little space in which to say it! Many of the important individuals and developments of the past century have had to be omitted, as have many of the exciting new developments on the horizon. As only two examples, consider Pansat, an amateur spread-spectrum satellite, or the incredible Picosats. The list goes on and on.

A quote from Confucius was given at the beginning of this article: "Study the past if you would divine the future." What, you may now ask, are the lessons to be learned from the history of Amateur Radio?

Perhaps the most important lesson is that Amateur Radio's history over the past century has been one of adversity and change, inevitably followed by struggle, success and growth. Today, in the year 2000, a new era in communication technology is upon us. We have survived the technological challenges of the past by understanding new technologies and embracing those portions that would lead Amateur Radio forward. We have survived change and overcome adversity by *working together*.

When Amateur Radio began there was only one way for a ham to get started: learn Morse code, build a receiver and a spark transmitter, string up an antenna, and start tapping on the key.

Today we have a multifaceted Amateur Radio. We're on CW and phone; SSB and FM; packet and TV; PACTOR, PSK31 and RTTY, as well as other modes, bouncing signals off the ground, off the ionosphere, and off the moon, enthusiastically working bands from almost dc to daylight. We have ragchewers and contesters, public service communicators and experimenters, QRPers and more. Hams are active in nearly every country of the world, and at ages ranging from less than 10 years to more than 100.

Can any group with common interests be quite so diverse? In spite of that diversity, and in spite of the fact that the Amateur Radio service encompasses a very large number of special interests, it's important to understand that we all have one common, overriding interest: to ensure that Amateur Radio not only survives, but flourishes in the century ahead. With the support of all hams everywhere our future prosperity is assured.

My thanks to my wife Trudy, KC6NAX, and old friend Jack Troster, W6ISQ, for their helpful reviews of the final draft. Any errors of omission or commission, of course, are mine alone. My thanks also to Steve Ford, WB8IMY, for his thoughtful and careful editing.

Jim Maxwell, W6CF, is ARRL Pacific Division Director. You can contact him at PO Box 473, Redwood Estates, CA 95044; **w6cf@arrl.org**.

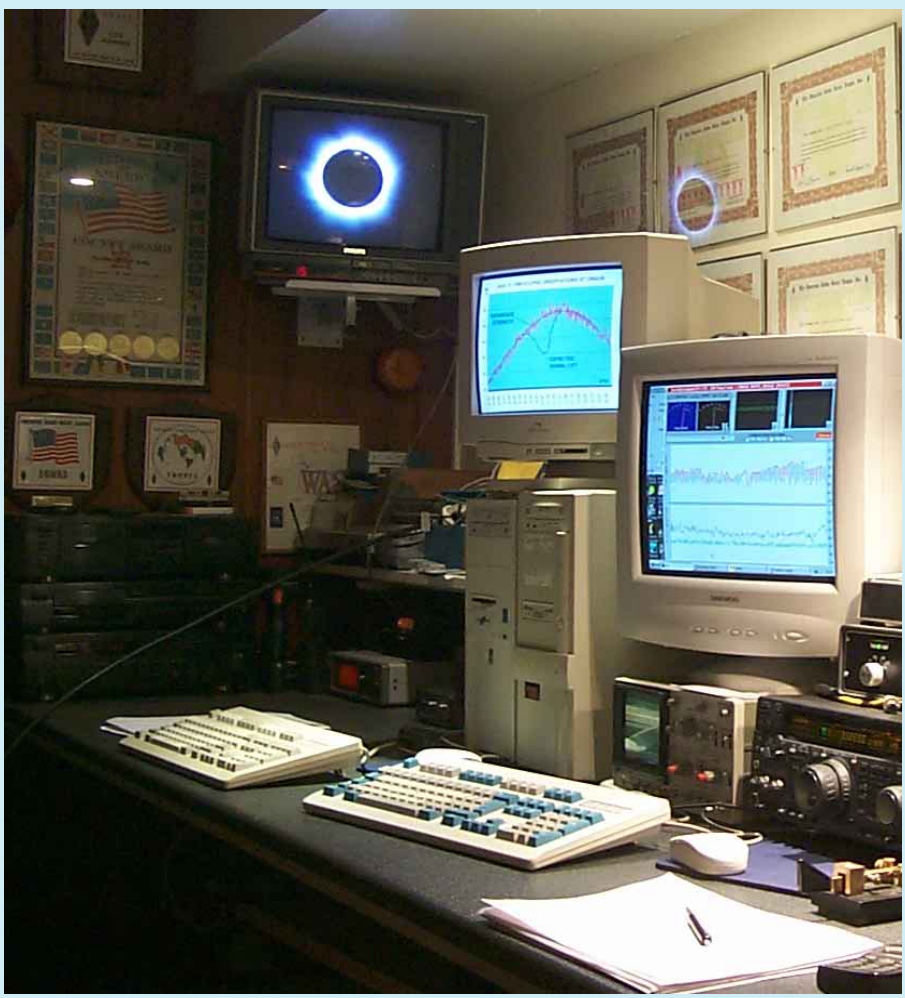
By John Devoldere, ON4UN

The 1999 Solar Eclipse and Amateur Radio

What effect would the August 11 solar eclipse have on the ionosphere and propagation? That's what a dedicated group of radio amateurs set out to discover.

Total solar eclipses occur quite regularly, but most often they're visible only from locations in sparsely inhabited or desolate areas or an ocean. The last total solar eclipse (when the sun is covered 100% by the moon) visible in Belgium dates back to the 15th century; the next one will occur in 2142. The 1999 eclipse began at 0826 UTC on August 11 near the US coastline. The center of the shadow, which was approximately 100 km in diameter, crossed the extreme southwestern tip of England (Land's End) at about 1012 UTC. At 1020 UTC, the shadow center reached the Normandy coastline and moved southeastward at a speed of not less than 3000 km/h. It crossed the extreme southern tip of Belgium, moved across Luxembourg, southern Germany, Hungary, Romania, Bulgaria, Turkey, Pakistan and north India, east of which the eclipse ended at 1236 UTC. At the center of the shadow, the total eclipse lasted about two and a half minutes. Away from the zone of total eclipse, coverage was still substantial. In northern Belgium, it reached approximately 97%, with similar coverage in southern England and across central Germany.

Although a partial eclipse cannot match the spectacular visual effect of total darkness at midday, there are nevertheless a number of scientific phenomena that can be observed and studied quite successfully outside the zone of totality.



Our Experiment

The Belgian IARU society (UBA) set up a study inviting radio amateurs to make signal-strength measurements of beacon stations on several frequencies within the lower HF amateur bands (160, 80 and 40 meters) during the eclipse. Radio amateurs were considered ideal to help collect the large quantities of data deemed beneficial for the Belgian Royal Meteorological Institute (RMI) study. Their input would be correlated with the results of ionospheric-sounding measurements made at the RMI ionosonde in Dourbes, Belgium. The UBA team that ran this program consisted of Gaston Bertels, ON4WF; Jacques Debouche, ON5OO; Pierre Cornelis, ON7PC; Jacques Flamand, ON1KJF; Stefan Dombrowski, ON1KSZ, and myself.

Evaluating the Mechanism

On a daily basis, the sun gradually ionizes the D layer at sunrise, with the sun's UV rays striking the D layer at a tangent angle with the Earth.[1] We know the effect of this mechanism as we witness it every day. During an eclipse, the sun's UV rays are prevented from ionizing the ionosphere

[1]See Ian Poole, G3YWX, "Radio Waves and the Ionosphere," *QST*, Nov 1999, pp 62-64 for general propagation information.—*Ed.*

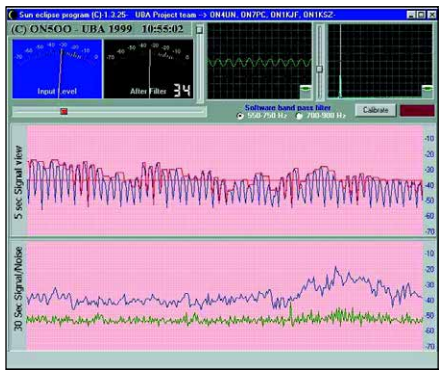


Figure 1—Screen shot of ON5OO's program that measures and records the audio signal from a receiver. The software has a built-in oscilloscope and spectrum analyzer, a narrow band-pass filter and two strip-chart recorders. The bottom chart shows the rise in signal strength (upper trace) over the background noise level (lower trace) during the eclipse.

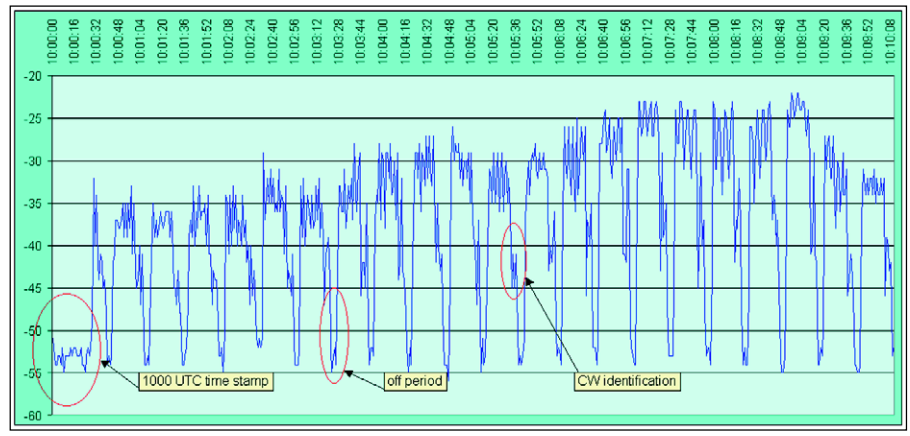


Figure 2—The raw measurement values (1 per second) are plotted in this graph. Both the off periods as well as the CW identification are quite visible. The 1000 UTC time stamp (one 30-second off period) is also clearly visible.

at about noon when the rays are striking the ionosphere at practically a 90° angle, a situation that is very different from what we experience daily around sunrise and sunset. That made this study and experiment unique.

Our plan was to record the signal-strength variations of the beacon transmitters on the 160, 80 and 40-meter bands and assess how the eclipse influences the ionospheric D layer. Ideally, we expected to observe the strength of a signal that would propagate with single-hop reflection taking place right above Dourbes.

Practical Setup

The RMI ionosonde at Dourbes is located close (roughly 20 km) to the northern edge of the zone of total eclipse. Amateur Radio beacon stations operating on 80 and 40 meters were set up near Arlon, Belgium, equally close to the edge of the totality zone and about 91 km southeast of Dourbes. Both beacon stations used relatively high-angle antennas (dipoles at 12 and 20 meters) to suit the prevailing vertical angle for the short distances involved (to Belgian observers, mainly), as predicted by propagation modeling.

Propagation versus Distance and Frequency

Various propagation and ray-tracing modeling programs told us that single-hop propagation on 80 meters would not be possible for a path between the Arlon beacon and the area covered by Belgium, because the frequency was too far below the critical frequency. There would likely be a combination of one to four hops, depending on a number of variables, such as distance.

Forecasts predicted erratic propagation conditions on 40 meters during the eclipse for the shorter distances involved between Arlon and all of the Belgian territory (a maximum of 250 km). Depending on the exact sunspot number (and hence the critical frequency and the MUF [maximum usable frequency]), propagation might almost be nonexistent during the night and during the eclipse. Stations much farther away (more than about 300 km) would not suffer from this phenomenon, and we assumed that signal strength would—at these or greater distances—be influenced only by changes in D-layer ionization during the eclipse. It was possible that close-in stations would not be able to observe the attenuation change caused by the D-layer ionization change, so we suggested that the Belgian hams use 80 meters in lieu of 40 meters.

If, as optimists predicted, we would enjoy high sunspot numbers at the time of the eclipse, the critical frequency would be high enough to enjoy perfect conditions on 40 meters for the test. The proximity of the operating frequency to the critical frequency would guarantee single-hop propagation—which would be ideal.

If we had access to any frequency outside the amateur bands (which we didn't), our best bet would have been to carry out the test on 6 to 6.5 MHz. That would have eliminated chances of the MUF being below 7 MHz for short-range stations. Only August 11 would tell what exactly would happen on 7 MHz.

Isolating the Effect of the Eclipse

To capture the influence of the eclipse from the recorded signal-strength values, it was necessary to perform a signal-strength recording during one or more "normal" days prior to the eclipse. (We would mathematically identify the difference in signal strengths between a normal day and the eclipse day.) Participants were urged to make reference recordings on 80 and 40 meters. For this reason, we put the 80- and 40-meter beacons on the air four days before the August 11 event.

We expected the D-layer absorption influence to be most pronounced on 160 meters. This band makes it difficult to obtain a pre-eclipse reference recording, because during a normal day, there is too much attenuation to allow reflection via the ionosphere at eclipse time (1030 UTC). At midday, propagation on 160 meters is normally limited to ground wave.

The 160-Meter Beacon and Experiment

We had installed a 160-meter beacon near Ghent, Belgium, 200 km northwest of the total-eclipse border (where the eclipse coverage was still almost 98%). That station's vertical antenna exhibited a main take-off angle of 25° to 30°. We simply wanted to see how the 160-meter beacon would be heard at long distances (we expected up to 1000 km away). Through various DX reflectors and the "top-band" reflector, the 160-meter community was invited to listen for the ON4UBA/B beacon and report their findings.

Measuring Techniques

We considered as error-prone any attempt to manually perform accurate signal-strength measurements over a prolonged period. Therefore, the UBA eclipse team developed software which, with the aid of a sound-card-equipped PC, displays and records the level of an audio signal, and does so with a dynamic range of approximately 70 dB. ON5OO wrote the program, which runs under *Windows* (16 and 32 bit). On-screen, the operator can follow the signal-strength evolution (see Figure 1). In short, the program records one measurement value every second to an ASCII file. Figure 2 depicts a graph generated with these one-second values. In this graph, the CW-identification and off-periods are clearly visible. The resulting ASCII file was used with another program for post-eclipse data processing.

To obtain valid data, we used an HF receiver adjusted for constant gain and exhibiting sufficient dynamic range (50 dB)

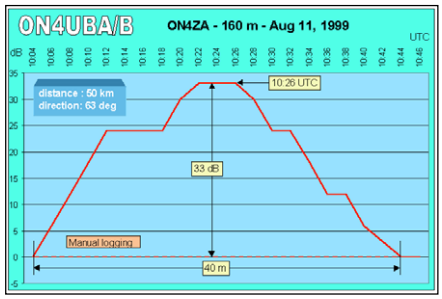


Figure 4—At 50 km from the beacon, the shape of the sky wave becomes very important; ON4ZA noted a signal lift of over 30 dB on 160 meters during the eclipse.

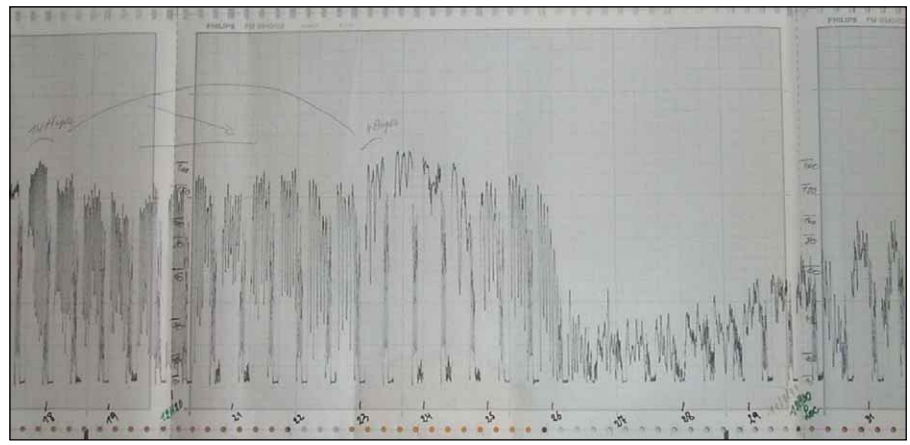


Figure 3—A very fast pen recorder made this plot of the 80-meter beacon during the eclipse. This depicts a time span of about 10 minutes. The fast fading, quite deep at times and almost nonexistent at other times, is clearly visible.

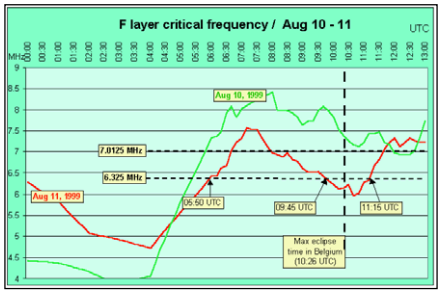


Figure 5—F-layer critical frequency measured at Dourbes, Belgium, on August 11 and previous days. Note the dip that coincides with the eclipse. The dip below 7 MHz was responsible for all 40-meter short-range propagation cuts where a steep angle, single-hop propagation mode is in effect.

to cope with the expected variations between daytime and nighttime signals.

Announcing the Project

The April and May/June 1999 issues of *CQ-QSO*, the UBA periodical, announced the project. So that everyone had plenty of time to become familiar with the software, we made it available as early as mid June. The UBA Web site (**http://www.uba.be**) described the program in great detail. A special Internet reflector (the August 11 eclipse reflector) was set up by the UBA to facilitate communication and information flow for this unique event. A total of 135 people subscribed to the reflector. No fewer than 1500 e-mail messages were exchanged related to the project!

The Beacons

Three beacons (on 1831.5, 3522.5 and 7012.5 kHz) used the call sign ON4UBA/B. Each transmitted an identical signal consisting of a 16-second-long carrier, followed by a 25-WPM CW identification and a six-second off period. Each beacon ran 600 W output and the 80 and 40-meter beacons were on the air from 0300 UTC to 1900 UTC August 7 through 10, and between 0330 and 1300 UTC on August 11, the day of the eclipse. The 160-meter beacon was on the air only during the eclipse day as reference measurements were impossible except at very short ranges (ground wave).

Table 1
Signal Reports Received from the Northwest

Call Sign	*Direction (Degrees)*	*Distance (km)*	*Peak Gain (dB)*	*Duration*
G4JNT	287	527	20 dB	2 h
GM7VXR	316	941	24 dB	1 h 12 m
GM3POI	338	986	19 dB	About 1 h

Data Logging

Ninety percent of the logs received were from observers who used ON5OO's software. The remaining observers used manual logging or another more- or less-sophisticated home-designed automatic system. ON6BG employed a fast pen recorder (with an acceleration of 7 g!) that delivered a wealth of detail, including the ever-changing fast fading that is quite visible during the 14-second key-down period (see Figure 3).

We received nearly 150 reports, the majority via e-mail. Once the logs were carefully analyzed, we sent all participants a report along with a graph generated using their data. The logs generated by ON5OO's measuring and logging program were then processed using another program that eliminates artifacts such as the invalid level measurements made during CW identification and the six-second off period. That program generated a new listing with the one-minute average values. These values were used to plot the accompanying graphs. This means that fast fading, with a period of less than one minute, is not discernable on these graphs.

160 Meters

Because of the extended 160-meter ground-wave coverage and the absence of propagation via ionospheric reflection during a normal day, we asked that only stations far enough away from the beacon station make observations on 160 meters. Hence, we received but two reports from Belgian stations, one located 50 km from the beacon, the other merely 14 km away. Surprisingly enough, both stations noticed a signal-strength increase during the eclipse.

At Ronny (ON5QH) Baert's station (14 km from ON4UBA/B), the signal increase was already 10 dB, which means that the *reflected wave* is, even at this short range, an important part of the signal received. (Ronny used a vertical receiving antenna that contributed to the strong ground-wave component.) Fernand Fleurbaey, ON4ZA, 50 km from the beacon, reported an almost incredible 30-dB signal increase at the peak of the eclipse! (See Figure 4.) It is normal that the enhancement he observed was much greater because his station was farther away from the beacon and thus received less ground wave.

Table 1 shows the reports we received from the northwest. From the southeast, Hans Buehler, HB9XJ, in Zurich (528 km away from the beacon) noted a peak signal enhancement of not less than 60 dB, and a lift duration of two hours! In Munich, using a portable Sony receiver and a piece of wire strung to a tree, Jonathan Rosner, WO9S, logged a lift duration of 40 minutes with a signal-strength lift of 42 dB. The Zurich path goes south from the Arlon beacon and crosses the totality corridor. The path to Munich follows the corridor entirely (Munich being located inside the corridor).

In an easterly direction, we received a

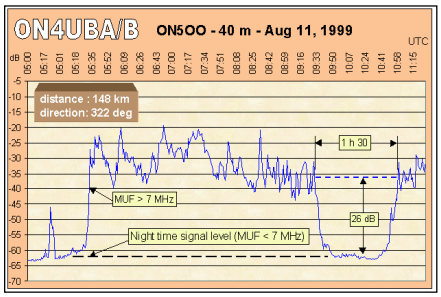


Figure 6—A typical 40-meter recording for August 11. Different components of the mechanism are clearly visible: the low signal level during the night, the sudden signal increase around 05:30 UTC (MUF exceeding 7 MHz), the gradual decrease in strength caused by increasing D-layer absorption and the sudden signal dropout due to the eclipse, starting at 09:45 UTC and lasting 85 minutes.

Table 2
Wave angles and Multipliers for Determining Critical Frequency

Wave angle (a)	90°	80°	70°	60°	50°	40°	30°	20°
1/sin(a)	1.0	1.02	1.06	1.15	1.31	1.56	2.0	2.9

Table 3
Signal-Strength Measurements from Five Stations Located Over 300 km from the 40-Meter Beacon

Call Sign	*Distance (km)*	*Direction (degrees)*	*Boost (dB)*	*Duration (m)*
DK1IS	439	90	10	30
G4JNT	527	287	7*	35
GM7VXR	752	315	22*	70
PA3CVS	333	9	25*	90
IK2SXW	673	139	5	60

Asterisks (*) indicate signal-boost reports from stations that used manual logging, the others used ON5OO's program.

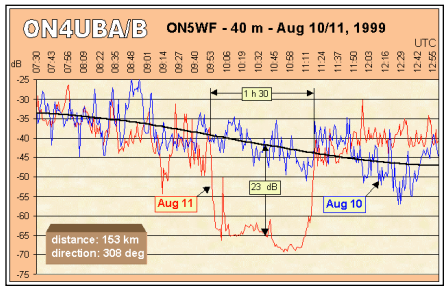


Figure 7—A perfect example of a reference recording made a day prior to the eclipse. Here, recordings of August 11 and 10 are superimposed and the best-fit line added to the August 10 curve.

report from Miroslav Bebjak, OM5RW (850 km distant), noting a signal lift of nearly 60 dB and a total lift period of 1 hour and 10 minutes.

Many 160-meter enthusiasts were active on the band during the eclipse. From the accounts published on the Internet, it appears that the enhancement was most pronounced on a north-south path, with the totality path somewhere in the middle. Long-distance contacts were possible only when using antennas that produce very low-angle signals. The use of low-angle vertical antennas apparently kept the wave *below* the absorbing D layer in regions far from the eclipse, while the same wave crossed the D layer near the totality zone where its impact was much lessened. Contacts were made over distances greater than 1000 km, eg, between southern Italy and Scotland or Finland.

40 Meters

Within Belgium, the signals were very weak during the night, the critical frequency being far below 7 MHz. This means that there was essentially no propagation between the beacon station and all of Belgium, because of the high-angle radiation resulting from the very short distances (less than 250 km). Nevertheless, most stations in Belgium still received the beacon about 5 dB above the noise.

Figure 5 shows the F-layer critical frequency as measured in Dourbes on August 10 and 11. The *critical frequency* is the highest frequency at which a signal transmitted straight up is returned to Earth after F-layer reflection. The highest frequency that can be used for a wave that is not transmitted at 90° is determined by dividing the critical frequency by the sine of the elevation angle (see Table 2). For a 65° wave angle (a typical wave angle for a distance of 125 km, assuming a reflection height of 250 km), the MUF is 1.1 times the critical frequency.

When the nighttime critical frequency is too low, there is no high-angle signal reflection. The wave penetrates the ionosphere and little reflection occurs because the operating frequency is clearly above the MUF.

We had hoped that the sunspots would be thriving by mid-August 1999, and that the critical frequency would be fairly high (8 to 8.5 MHz). It turned out that the provisional sunspot number was surprisingly low, ranging between 78 and 102 during the period of August 8 to 11.

Ninety-five percent of the observers (including all those located in Belgium) witnessed a signal blackout starting at approximately 0945 UTC and lasting until about 1115 UTC. It appears that these times correspond with the critical frequency crossing the 6.325-MHz line; see Figure 5. This is the same critical frequency that switched on the propagation around 0550 UTC. The blackout duration depends on the distance between the receiving station and the beacon transmitter, which influences the vertical angle and hence, the MUF. Compare Figures 5 and 6 and note how wonderfully the times match.

Some of the participants introduced recordings that could be perfectly overlaid to illustrate the signal evolution on a normal day as compared to that on eclipse day (see Figure 7). Note, too, that with all observers, the blackout seems to spread evenly on both sides of 1026 UTC, the time of maximum solar eclipse in Arlon (compare with Figure 5).

Signal blackout occurred at distances below about 300 km, where fairly steep propagation angles are in use. At greater distances, the picture becomes very different. Here, the radiation angle dropped into the 50°-60° region, resulting in an MUF 20% to 30% higher than the critical frequency. Even during the eclipse, when the critical frequency dropped to 6 MHz, the MUF stayed well above the 7012.5-kHz operating frequency.

Table 3 shows measurement results from five stations located over 300 km from the beacon. Signal boosts marked with an asterisk (*) are reports from stations that used manual logging, the others used ON5OO's program.

It is clear that the close-in stations (those stations in Belgium) did not witness the effect of lessening D-layer attenuation on 40 meters. This is caused by the drop in critical frequency during the eclipse that switched off propagation altogether.

80 Meters

During the night, the 80-meter-beacon signals were quite strong all over Europe (S9 to S9 plus). For all receiving stations in Belgium (at a maximum range of 250 km from the beacon), the signal strength on a normal day evolved in a sinusoidal manner. The 80-meter signal exhibited short-term strength variations (QSB) of typically 10 to 15 dB. These are probably due to multipath propagation.

Because the F-layer critical frequency never dropped below the nighttime value of about 4.7 MHz (see Figure 5) there *always* was more than one signal path present. Depending on the distance between the beacon and the receiving site, we experienced

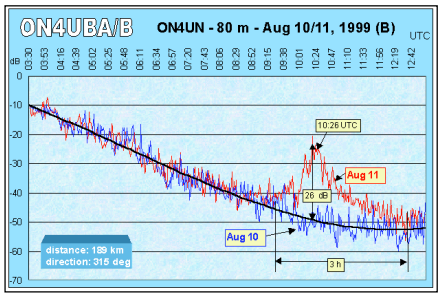


Figure 8—Superimposed 80-meter curves for August 10 and 11.

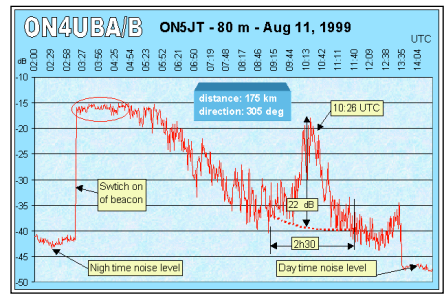


Figure 9—This plot reveals several signal levels and effects.

a combination of one to four or more hop paths on 80 meters. The higher-order hop modes are probably not bothering us very much because each time the signal travels through the D layer it is attenuated further, and each time it hits the Earth it suffers from reflection. It is likely that only the single-hop modes, and already to a much-lesser degree the two-hop modes, are playing a significant role in forming the signal we hear. Another mechanism that could cause fading is the simultaneous presence of E- and F-layer propagation. All of these possible causes and effects will undoubtedly be the subject of the thorough study planned by the RMI.

The large signal-strength excursions (10 to 15 dB) that we see in the graphs appear to be of a wild nature. At practically no time could we, during our preliminary analysis, discern a repetitive pattern in the fading, although we have often seen fading with a very distinctive periodic nature (often a sinusoidal shape or two superimposed sine waves, indicating a more or less stable multipath condition). The signal-strength variations of 10 to 15 dB (typically) all seem to be of a total random nature. But this, too, requires much more in-depth study and analysis. Despite the fast signal-strength swings, it was possible at all times to draw a best-fit curve through the wildly oscillating data values (one minute average data), as shown in Figure 8.

Figure 9 shows the different levels encountered during a recording:

- Nighttime noise level (prior to start of beacon)
- Nighttime signal level (before sunrise)
- Gradually weakening signal after sunrise (due to D-layer absorption)
- Effect of the eclipse
- Decrease of attenuation after midday
- Daytime band-noise level when beacon was switched off at 1330 UTC.

Many observers submitted data for various days so that the charts could be superimposed for utmost clarity. It is amazing to see how closely the curves for August 10 and 11 match, at least between 0300 UTC and 0900 UTC when the impact of the eclipse starts showing (see Figure 8).

Contrary to the phenomenon observed on 40 meters, the impact of the eclipse on 80 meters is gradual and peaked shortly (5 to 15 minutes) *before* 1026 UTC (maximum eclipse time for Belgium). This is true for *all* observers.

Acknowledgements

I thank Professor J. C. Jodogne of the RMI for his help, and my friends ON4WF, ON5OO, ON7PC, ON1KJF and ON1KSZ for running the project with me. In the preparatory phase of the project, Cary Oler (president of Solar Dispatch in Canada), Robert Brown, NM7M, and Roger Graves, VE7VV, all eminent experts in propagation matters, helped us understand what to expect, for which I am most grateful.

Although we expected to receive about 30 reports, we were pleased to receive almost five times as many from well over 100 different participants, making the project a huge success. I offer my sincere thanks to all contributors.

Conclusions

In-depth preparation told us what we could expect. We knew that 80 meters would give us the best results for studying the effect of the eclipse on the D-layer absorption in the lower-HF range. What is a bit of a surprise is that even at very short range, the effect of the eclipse was measurable on 160 meters. Maybe we should have put more emphasis on data collecting on 160 meters?

Although 40 meters did not yield much data on D-layer attenuation caused by the eclipse, it provided us with a wealth of information on the propagation mechanism on that band. The very close relationship between the critical frequency and the signal dropout is almost staggering—and very illustrative.

Whereas we asked our km-band enthusiasts to do some monitoring below 100 kHz, we received only a handful of reports including a very complete set of data from the CCRM (*Centre de Contrôle des Radiocommunications des services Mobiles*) covering not less than five VLF stations.

The public relations aspect was successful as well, with contributions on national radio, regional TV and in various national and regional newspapers.

We trust that the enormous amount of data supplied by the amateur observers (estimated at some 600 MB) will be useful to the RMI for its further studies on the various effects of the eclipse.

John Devoldere, ON4UN, holds an electronic engineering degree, has been a ham for almost 40 years and also holds a US Extra Class license, AA4OI. Author of ON4UN's Low-Band DXing, *John is well-known to DXers and contesters alike. He is also president of the Belgian IARU society (UBA). You can contact John at Poelstraat215, B-9820 Merelbeke, OV Belgium;* **john.devoldere@village.uunet.be**.

Photos by the author.

NEW PRODUCTS

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◊ Print Products International announces the availability of three new series of lab/industrial power supplies manufactured by Kenwood.

The PD series is a line of heavy-duty dc power supplies—intended for industrial applications—with output voltages ranging from 18 V to 110 V and output currents ranging from 3 A to 30 A. The manufacturer claims high stability, large capacity, low ripple and low noise. The supplies feature constant voltage and constant current operation, accurate voltage and current adjustment settings and a phase control preregulator that lessens internal current without excessive temperature rise. The PD series includes models that have either analog or dual digital displays.

The Kenwood PAC/PAC-R series are designed to provide a compact power supply package offering high performance and excellent reliability. The PAC/PAC-R series units can supply output voltages ranging from 20 V to 60 V and output currents ranging from 1 A to 6 A. Highlights include low ripple and low noise characteristics, simultaneous voltage and current display and floating output terminals.

The PAC-R models also offer remote control terminals, series/parallel operation and remote sensing terminals.

The third line is the PDS series. These models are specifically designed for high reliability and can be used as power supplies for reliability, endurance, aging and other electronics test applications. The PDS series are smaller and lighter in weight than more conventional models, but are still rated for output voltages ranging from 20 V to 120 V and output currents ranging from 6 A to 36 A.

Features include a high power factor and low noise and ripple levels. A master unit is capable of controlling two additional parallel units or one series unit. An optional remote control card is also available.

Prices for the PD series start at $1,080; the PAC/PAC-R at $210; and the PDS at $1,102.50.

For more information contact Print Products International, 8931 Brookville Rd, Silver Spring, MD 20910; tel 800-638-2020; fax 800-545-0058; **http://www.prodintl.com**.

Next New Product

By Rus Healy, K2UA

"Hot-Wiring" the Kenwood TS-690S and TS-450S

Add utility to these fine radios by providing the hooks for external receive antennas and VHF/UHF/microwave transverters.

Ever since I reviewed the TS-690S and TS-450S for *QST*,[1] I've wanted to own one of these radios. I recently came across a great deal on a clean TS-690S and bought it—it's an excellent complement to the TS-850S in my HF contest station and serves me well on 6 meters. It's also a great IF radio for home-station operation and for roving during the VHF contests. The TS-450S and TS-690S are basically identical except that only the TS-690S receives from 30 to 60 MHz and transmits on 6 meters. These rigs need a few basic modifications to accept a Beverage antenna for the low bands, and for use with external transmit/receive converters. Because I complained about the lack of these features in the *QST* Product Review, I thought I ought to do something about them.

I developed these modifications and performed them on my TS-690S. They're easily portable to the TS-450S. Further, the modifications presented here can provide you with ideas on the approach to take for making similar modifications to other radios. The key is to explore your radio's service manual, looking for clues about the best ways to add these capabilities.

Modification Design Goals

The high points of this project include:

• Adding connectors to break the receive circuit between the TR relay and the receiver input, and routing that loop to a pair of added rear-panel connectors. This allows connecting an external receive antenna, such as a Beverage, or a receive converter for VHF/UHF, into the receive line, while eliminating any chance of transmitting into the attachment.

• Providing low-level drive output to a rear-panel connector (a phono jack). Drive level at this jack is adjustable via the front-panel **CAR**, **PWR** and **MIC GAIN** controls and by the rear-panel ALC input. The drive level varies from less than 0 dBm (1 mW) to +13 dBm (20 mW) or more, depending on these control settings and the externally applied ALC voltage. Most transverters require a drive level of 0 to +10 dBm (1 to 10 mW), so this is a good fit for this application.

• Selectively disabling the HF and 6-meter final-amplifier stages while operating in transverter mode on any band below 50 MHz. This reduces current drain and eliminates the risk of damaging unterminated PAs.

• On 6 meters, enabling the TS-690S 6-meter PA and RF output connector as normal. This allows using the radio as a multiband IF and retains normal 6-meter operation by simply changing bands. No separate, external switching is required, and changeover between transverter mode and normal, full-power operation is quick and simple.[2]

• An optional modification: routing the amplifier key line to a phono jack connected in parallel with the key line available at the **REMOTE** DIN connector. This improves convenience in interfacing the radio to different external amplifiers and transverters. The added PTT jack is a phono jack that can mount in an existing heat-sink opening, or the line can be wired to one of the existing **DSP1** or **DSP2** phono jacks if you don't use the external DSP-100 option.

Risks

These modifications are somewhat intrusive, but not highly so. They involve cutting two small coax jumpers inside the radio, drilling two holes in the rear panel for the receive-antenna-loop jacks and, optionally, drilling holes for adding one or two more phono jacks for a PTT-line modification. If the existing **DSP1** and **DSP2** phono jacks are free, you can use them instead of adding connectors. This involves cutting the center conductor post of the jack and wiring it to different points in the radio. (There's not much room on the back of this radio for adding connectors—you just have to be a bit creative.)

Of course, you should be comfortable with modifying your radio and have some experience working inside densely packaged electronic equipment. Experience working on surface-mount equipment also helps. Like it or not, that's here to stay. I find it easy to work on surface-mount equipment, but I'm probably in the minority (except among the microwave crowd, which is where I got my experience in that area). That said, this radio is quite easy to work on because of Kenwood's excellent physical chassis design. Also, the modifications were relatively easy to develop because of the detailed service manual available from Kenwood for this radio.

In any case, if you feel that you're not up to making these modifications, please seek the help of a qualified person so that you don't wind up damaging your radio.

Performing the Modifications

Making these modifications requires adding just a few parts to the TS-690S: a few wires, two small relays, a couple of diodes, two resistors, two general-purpose transistors and two connectors for the back panel to break out the receive loop. (I used phono jacks.) The phono jacks are not required for the low-level transmit-output modification, but are needed to accommodate a separate antenna input for another receive antenna such as a Beverage. The separate receive-antenna modification is the simplest and least intrusive—it requires only adding two connectors.

Searching for modification ideas, I spent my spare time over a week-long business

[1]Notes appear on page 43.

trip looking at the schematics and board layouts in Kenwood's service manual for the TS-690S and TS-450S. Aside from locating the information I needed to most suitably modify the radio, I found this leisure reading quite interesting because it brought to light a number of subtle things about the radios' design. For one thing, it gave me the idea to steal a microprocessor output normally used to enable or disable the rig's internal amplifier-keying relay, and to use that output instead to put the rig into and out of "transverter" mode.

I highly recommend that you start any modification to any radio with the best available documentation from the manufacturer. You'll certainly learn some useful things in the process.

Adding Transverter Interfacing Capability

The amplifier-keying relay normally can be enabled when you're using an external amplifier, or disabled to keep the relay quiet when you're operating barefoot. The microprocessor enables this relay by driving a line high, which provides an open-collector transistor with the low-current drive to pull the low side of the internal control relay coil to ground. Another transistor controls this relay for transmit and receive. That part of the circuit I left alone; I didn't want to disable the relay itself—I need that for HF and transverter operation—but I wanted to use that microprocessor output elsewhere.

I enabled the amplifier-keying relay continuously by adding a jumper to its control transistor (Q42 on the X48-3090 IF Unit board) from collector to emitter, making the operating voltage to the relay available at all times. I then rerouted the microprocessor's control output from the base of Q42 to a new transistor that drives a small DPDT relay. This new relay (K1) reroutes the RF drive from the PA to the back panel and disables the PA control line when transverter mode is selected. (See Figure 1 for details.) Moving between transverter mode and full-power operation is a simple matter of toggling the start-up menu option that normally enables or disables the PA-keying relay.[3] The rig returns to full-power operation when I change bands to 6 meters, as discussed later.

Accessing Q42 is a bit tricky because it requires removing the IF board from the radio. Removing this board is tedious, as it involves unplugging a number of connections and carefully working the board out of its location. If you'd rather avoid this, simply wire the required single-wire control line to an unused pin on an existing rear-panel connector (pins 6, 7 and 10 of the **ACC2** connector are good candidates) or to another rear-panel jack. For maximum utility, you can do both, and put the control lines in parallel. Figure 1 shows how to do this. Simply ground the control line to put the radio into transverter mode.

Because of the limited clearance between the bottom cover and the board-mounted parts on the IF Unit, K1 must be small. If you have a subminiature DPDT, 12-VDC-coil relay, use it. RadioShack doesn't stock such relays. I used a RadioShack DPDT relay for K1, but had to install it carefully so that the relay sits under the protruding bottom hatch that provides access to the optional IF filters. Figure 2 shows how and where I mounted K1.

The second part of the transverter modification—necessary only in the TS-690S—maintains normal operation on 6 meters while transverter mode is enabled. That is, you have full transmitter output and transceive operation on your choice of the radio's two main antenna connectors. A second added relay, K2, (see Figure 1) opens the path to the coil of K1 when 6-meter operation is selected. To do this, K2 uses the rig's **50B** line, which goes to about +7.4 V when you're using the radio on 6 meters. Thus, regardless of the state of the transverter-mode control circuit, K1 drops out when the rig is set for 6 meters. A simple transistor/resistor combination controls K2 to minimize the current drain on the **50B** line. A contact point for the **50B** line is conveniently located at the collector of Q58, just below **CN5** on the top side of the IF Unit.

Depending on your needs, you can use an SPST or a DPDT relay for K2. K2's only mandatory function is opening the coil lead to K1 when 6 meters is selected, so an SPST relay works here. However, using a DPDT relay for K2 adds a convenient means of bringing the PTT line out to two separate connectors—one for MF/HF and the other for 6 meters. This is also shown in Figure 1. This modification, based on changes that Bill Rogers, K2TER, made to his TS-690S,

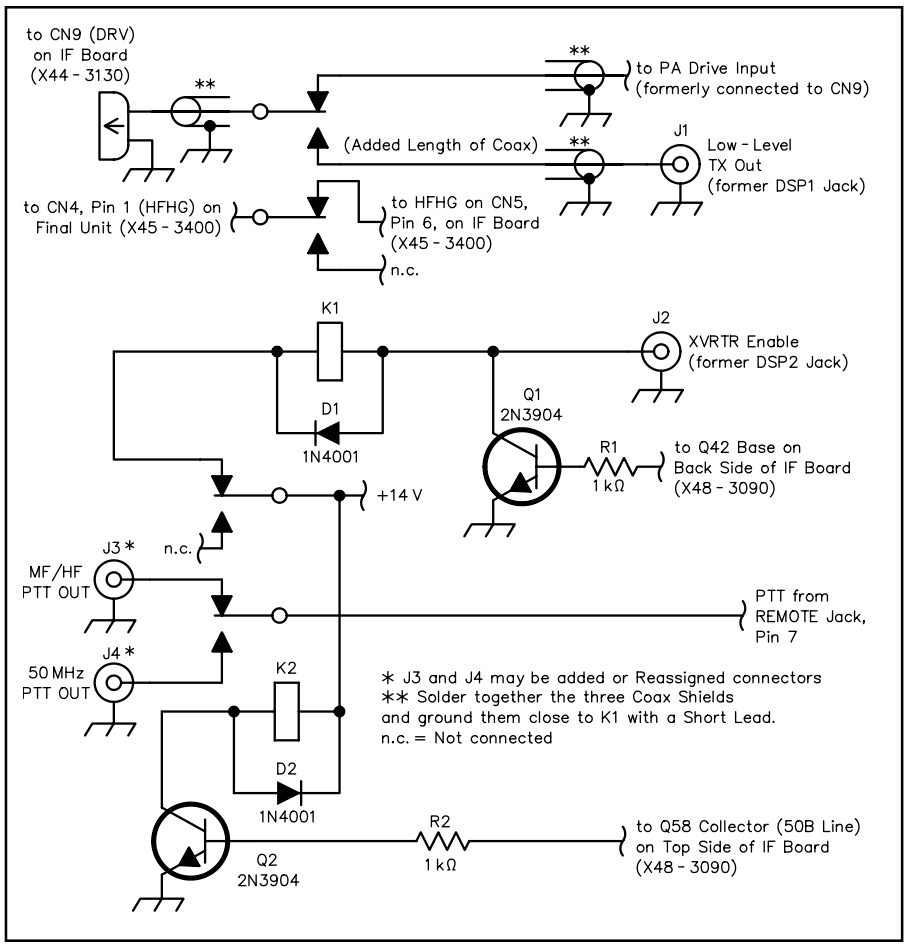


Figure 1—Schematic of the low-level transmit output modification for the TS-690S. Two options exist for placing the rig in transverter mode: (1) A power-up software selection, and (2) a ground at the new XRVTR ENABLE jack (or an unused pin on an existing connector). If you're controlling this via a wire to an external jack, you can omit the transistor and 1-kΩ resistor connected to K1A, and the connection to Q42 on the back side of the IF board. Unless otherwise specified, resistors are ¼ W, 5% tolerance carbon-composition or film units. Part numbers in parentheses are RadioShack. Equivalent parts can be substituted; n.c. indicates no connection.
K1—DPDT relay (RS 275-249) **K2—SPDT relay (RS 275-241)**

allows keying a 6-meter amplifier separately from an HF amplifier. It also eliminates the need for externally controlling the PTT output to keep a transverter or HF amplifier from being keyed when you're operating on 6 meters. Bill used pins available on the 15-pin Packet jack (**ACC2**).

TS-450S Transverter Mode

The TS-450S is much easier to modify than the TS-690S. Simply populate an empty relay socket (K1's slot on the 100-W HF final amplifier board) and use a transistor switch, or simply a phono jack on the back panel, to ground the low side of the relay coil during transverter operation. Then reroute the low-level RF output from the final amplifier board (at **CN7**, **50D**, on the final board) to a rear-panel jack. Jeff Ach, W2FU, performed this modification on his TS-450S several years ago. He simply inserts a shorting phono plug into the control jack when he wants to operate the rig in transverter mode. What makes the TS-450S easier to modify for transverter operation is that Kenwood uses the same PC board for the 100-W HF PA in the TS-690S and TS-450S, putting all the hooks quite conveniently in place for adding the low-level transmit drive modification.

ALC Action

There's some evidence that the radio's SSB linearity suffers when it's used in transverter mode[4] because the majority of the rig's ALC action occurs in the final-amplifier stages. This is true in many radios—certainly not just these. Fortunately, this issue is easy to overcome by applying a negative voltage to the rig's rear-panel ALC input, which is accessed at pin 6 of the **REMOTE** connector—the same connector used for the rig's amplifier key-line output. The simplest way to provide ALC action is to add a 9-V battery in series with a 10-kΩ potentiometer. Connect the pot wiper to the ALC input and the ends of the pot across the 9-V battery. Also, connect the positive side of the battery to the radio's chassis. Adjust the potentiometer until the ALC bar graph on the rig's display reaches the normal level shown in the manual when you're transmitting in transverter mode. If this reduces the rig's low-level output below what you need to drive your transverter, first try adjusting your transverter's IF attenuator; if you can't set it for the desired output, then reduce the ALC voltage applied to the radio. Nothing makes you a better neighbor on the bands than a properly adjusted, *linear* transmitter!

Once you know the required ALC voltage, you can build or buy a low-current power supply to provide the necessary voltage. I suggest building a small, adjustable inverter circuit on a scrap of PC board using an ICL7660, -7661 or -7662 voltage inverter inside the radio. Wire it to the ALC input and make provisions for automatically switching it in for transverter operation and out for normal MF/HF operation. That's a bit beyond the scope of this article. There are simpler options as well: Down East Microwave[5] makes an inexpensive, preassembled circuit board a little larger than a postage stamp, intended for use as a preamplifier bias board with adjustable bias voltage, that fills the bill nicely. Taking this a few steps further, Down East also manufactures the TIB (Transverter Interface Box), available as a kit or in finished form, that makes switching from normal MF/HF operation to transverter operation as easy as flipping a single toggle switch. The TIB includes adjustable ALC voltage as well.

Bringing Out the Receive Loop

This feature, standard in some radios, is unfortunately not available in most off-the-shelf radios in this price class. Fortunately, it's easy to add. I selected phono jacks for the receive loop since there's *j-u-s-t* enough room to add two of them to the rear panel (see Figure 2), and they allow easy integration into my VHF/UHF/SHF station and my Beverage antenna system. Had there been adequate room, I'd have preferred to use BNC connectors, but there's not much back-panel space on the TS-690S. The TS-450S is easier to work with in this regard because it has a blank panel where the 6-meter amplifier's heat sink exists in the TS-690S.

Carefully measure the locations of the receive-loop connectors, as there's not much room for error. *Remember to leave enough room between these jacks for the bodies of their mating male connectors*, or you'll be most unhappy when you discover your error! See Figure 3 for the mounting-hole locations. Drill two holes for the connectors and mount them to the chassis. I prefer single-hole-mount connectors, as they're easier to accommodate in cramped quarters and need but a single 1/4-inch hole for each one.

Next, find the point where the receive loop leaves the small board (the Filter Unit) just behind the antenna connectors, under the top cover. This cable is a small piece of gray coax that includes some extra length, so it's easy to bring it to the new connectors. Cut this cable about three inches from where it leaves the Filter Unit board and prepare both ends using a razor knife. Connect the Filter Unit side to the **RX ANT OUT** connector and the end going to the IF Unit to the **RX ANT IN** connector. Solder these connections care-

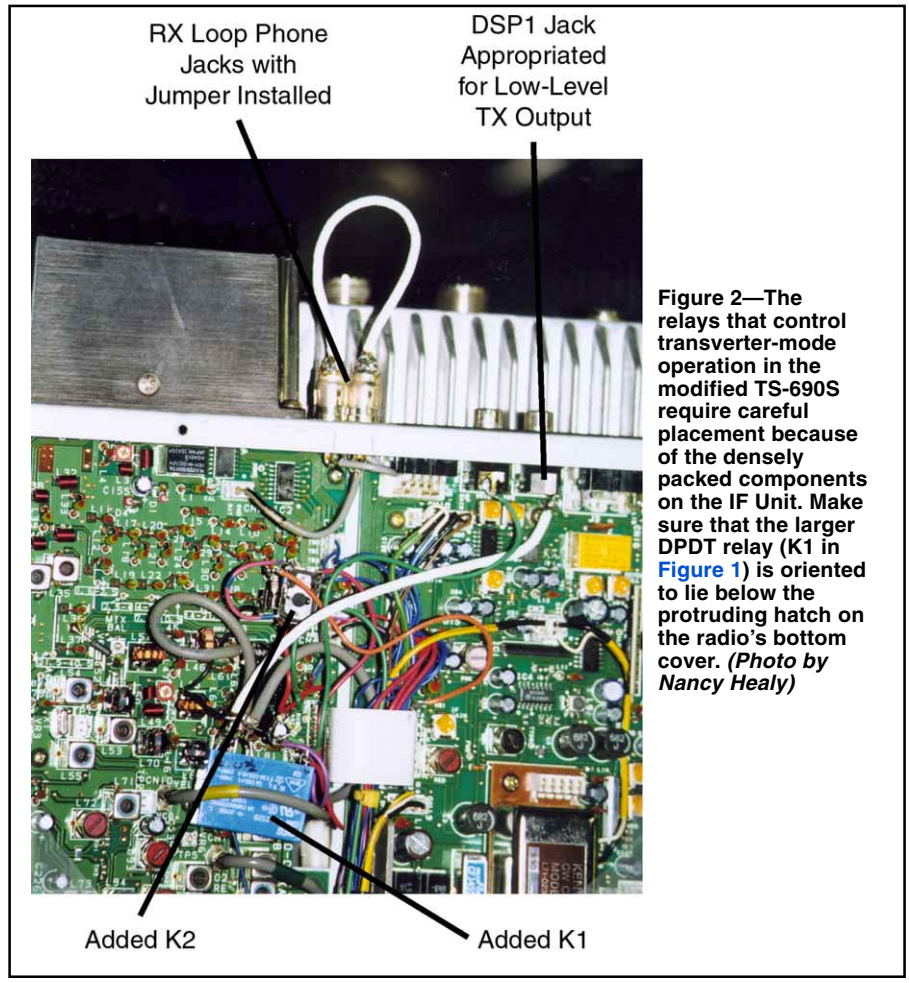


Figure 2—The relays that control transverter-mode operation in the modified TS-690S require careful placement because of the densely packed components on the IF Unit. Make sure that the larger DPDT relay (K1 in Figure 1) is oriented to lie below the protruding hatch on the radio's bottom cover. *(Photo by Nancy Healy)*

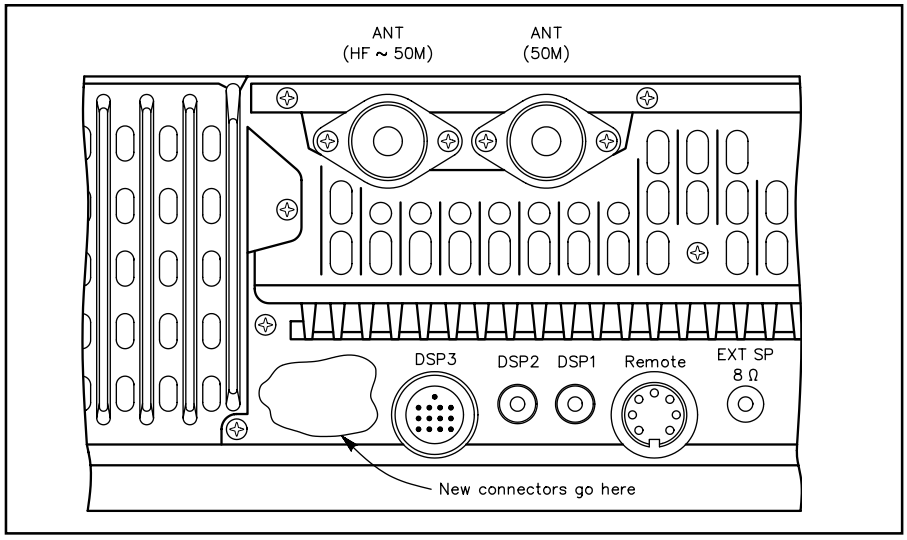


Figure 3—Drawing of the rear panel of a TS-690S. To allow breaking the receive-antenna loop and using a low-noise receive antenna or a receive converter, I added two phono jacks to the panel at the location shown. Measure the distance between the connectors carefully! (See text and Figure 2.) If you're not performing the transverter low-level drive modification and don't use the external DSP unit, you can appropriate the DSP1 and DSP2 connectors rather than adding connectors for the receive-antenna loop.

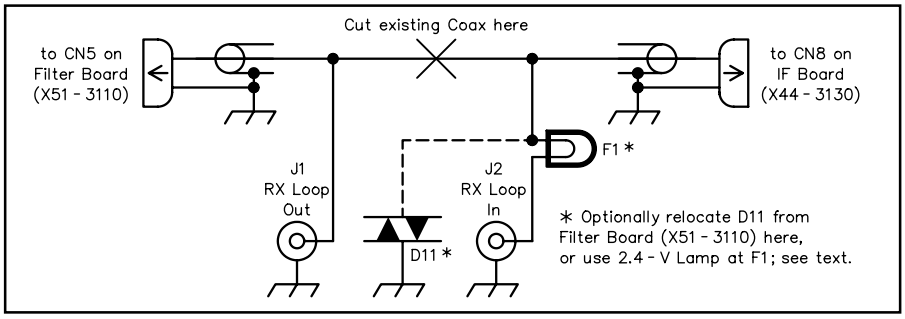


Figure 4—Making provisions for breaking the radio's receive-antenna loop is straightforward. Simply cut the existing cable and attach the cable ends to two rear-panel connectors. It pays to consider receiver surge protection, as discussed in the text. Two options are provided: Adding a low-voltage lamp as a fuse (F1) or relocating D11.
F1—2.4-V bulb (RS 272-1176) or relocate D11; see text.
Misc: lamp base for F1 (RS 272-358)

fully and quickly, using an appropriately sized soldering tip. The coaxial cable in this circuit is quite small (about half the size of RG-174) and has a solid-polyethylene dielectric, which melts quickly and at fairly low temperatures. Figure 4 shows the wiring changes required to add the receive loop.

Incidentally, I added a receive loop as described here to my TS-850S, using BNC connectors for **RX ANT OUT** and **RX ANT IN**, and to a TS-930S using the phone-patch connectors. This modification is easily performed on many other radios that lack this feature. You just need to find the point at which to break the receive side of the TR relay and wire it to two new connectors.

An Alternative

You can add an active receive loop to the TS-450S or TS-690S by adding a *third* relay and a single rear-panel connector. If you want only an added **RX ANT IN** connector, you can add an SPDT relay and transistor keying circuit like those shown in Figure 1. The relay's operating arm connects to the receiver input, **CN8** on the IF Unit. The normally open contact is attached to the added rear-panel **RX ANT IN** connector, and the normally closed contact is wired to the Filter Unit (TR relay) side of the circuit. I prefer the passive receiver loop (without the added relay). It provides the option of feeding out the radio's received signal to another receiver, which is useful during multioperator contests and other kinds of operation (for example, single operator, two radios in HF contests, and in VHF/UHF contests, for monitoring a particular frequency with an outboard receiver).

Receiver Protection

Breaking the receive loop and inserting a receive-only antenna or transverter output exposes the receiver directly to signals that it would not see in normal operation. This is because the Filter Unit board behind the main antenna connectors includes transient suppressors for the receiver input, which the receive loop removes from the circuit when the accessory receive port (**RX ANT IN**) is used. Therefore, it's best to add a small 2.4-V light bulb in series with the receiver-input line right at the new **RX ANT IN** connector (see Figure 4). The bulb acts as a fuse, opening if a very strong signal or impulse finds its way in on this connector. You may have to open the radio at an awkward time to replace the bulb, but that's far better than troubleshooting a "zorched" receiver front end! Alternatively, you could remove the radio's stock lightning-protection diode (D11) from the Filter Unit board, and connect it from the **RX ANT IN** connector to ground. This is easily done because D11 is a relatively large, through-hole part.

Summary

Publishing modifications for ham gear for special applications is almost a cottage industry. I find the modifications described here to be two of the most commonly necessary additions to an MF/HF radio. I hope I've given you some ideas you can use to improve the utility of *your* radio—be it a TS-450S, TS-690S or something else.

Notes

[1]Rus Healy, NJ2L, "Kenwood TS-450S and TS-690S Transceivers," Product Review, *QST,* Apr 1992, pp 67-71.

[2]Bill Rogers, K2TER, took this modification one step further in his TS-690S by adding automatic switching so that 6 meters and the MF/HF bands have separate PTT outputs for keying external amplifiers. See the text for more details.

[3]The menu option is #16, accessed by pressing and holding the **LSB/USB** key on the radio's front panel while turning on the power.

[4]Private correspondence with Steve Powlishen, K1FO.

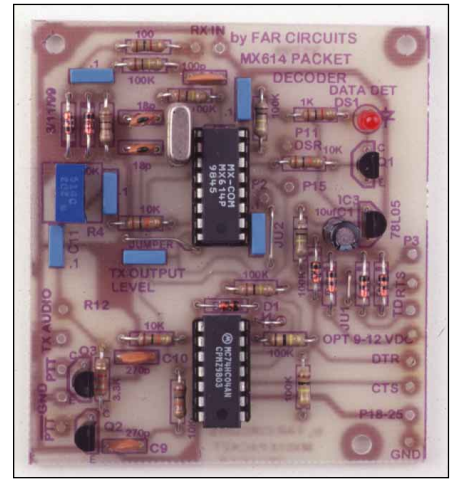
[5]Contact Down East Microwave, Inc, at 954 Rte 519, Frenchtown, NJ 08825; tel 908-996-3584, fax 908-996-3702, or visit their Web site at **http://www.downeastmicrowave.com**. The PC board that provides a low-current negative voltage required in this application is the PPS (preamp power supply). Be sure to specify that you want a 9-V regulator installed on the board, rather than the standard 5-V regulator.

Rus Healy, K2UA (ex-NJ2L), is an ARRL Technical Advisor, the Atlantic Division representative of the ARRL Contest Advisory Committee, and a life member of ARRL. He is very active in HF CW contests and in all of the ARRL VHF/UHF contests. Rus worked on the ARRL HQ staff as a Technical Editor from 1986 to 1993. He now works as an Engineering Group Leader for Adaptive Broadband Corporation (formerly California Microwave, a company founded by QST *and ARRL book author Dave Leeson, W6NL) in Rochester, New York. You can contact Rus at 5960 Canadice Hill Rd, Springwater NY 14560-9643;* **k2ua@arrl.net**.

By James A. Mitrenga, N9ART

An MX614 Packet Modem

Can't find a TCM3105 IC for your 1200-bps modem project? Try the MX614!



JOE BOTTIGLIERI, AA1GW

Between 1991 and 1998, VHF and UHF packet activity grew steadily, due largely to the availability of inexpensive TNCs and even less-expensive Bell 202 modem ICs for homebrewing. Software such as *Baycom*, *EZPacket* and *Poor Man's Packet*[1] provided the first-time packet operator a means to experience the mode without investing hundreds of dollars in hardware. All you need for these TNCs is the software and an inexpensive modem built around the Texas Instruments (TI) TCM3105 Bell 202 IC. Unfortunately, the TCM3105 chip is no longer available.

This may not seem like a great loss at first glance. Thanks to the Internet, most hams no longer use the traditional 1200-bps packet radio networks for e-mail and file exchanges. Even so, the simple 1200-bps software/modem solution remains attractive for applications such as DX PacketClusters. If a substitute for the TCM3105 modem was available, PacketCluster access would could be accomplished with almost any PC and a 2-meter FM transceiver.

A TCM3105 IC Replacement

Several articles in *QST* and *73 Amateur Radio Today* describe projects using the TI TCM3105 as a TNC interface.[2,3,4,5,6] In mid-1998, the source of this IC dried up: TI had canceled production of the part earlier that year. Wide use of the TCM3105 in commercial markets has kept the part from becoming available on the surplus market.

The good news is that a 16-pin DIP IC available from MX-COM (the MX614) performs the same functions as the TI TCM3105.[7] (The two parts are *not*, however, pin-compatible.) Additionally, MX-COM's MX604 is V.23 modem compatible and pin-compatible with the MX614. So you can have a Bell 202 or V.23 modem by simply changing the IC to switch between modes.

These similarities are shared by the TCM3105 and MX614:

Low-power operation (3.3 to 5 V)—This permits powering the IC from a computer's RS-232 port via the RTS, DTR and TXD lines.

1200 bps half-duplex Bell 202-mode operation—Allows compatibility with the 1200-Hz mark and 2200-Hz space-signal conventions.

Low-level analog input—External buffers and low-level amplifiers are not required. Audio taken from a radio's speaker or headphone output is all that is necessary.

TTL level I/O—Connects directly to computer interface for RXD, TXD, RTS and CTS lines.

The differences between the MX614 and TCM3105 include:

Reference oscillator—The MX614 uses a standard 3.579545-MHz color-burst oscillator crystal. The TCM3105 uses a not-so-easily-found 4.4336-MHz crystal.

Mode switching—The MX614 has an on-chip buffer stage. It also has a mode-selection input that requires switching between transmit and receive that can be controlled by the PTT line.

Alignment—The MX614 does not require critical receive-bias or carrier-detect threshold alignments as does the TCM3105 circuit.

Serial or parallel-port operation—The MX-COM part does not offer any component reduction with parallel-port operation, as does the TCM3105 Poor Man's Packet design.

Other IC features are available, but as they're not required for Bell 202 operation, they're not identified here.

Circuit Description

This project (see Figure 1) is patterned after Greg (N3PRT) Cerenzia's Basic Packet Modem (see Note 5). The modem is designed for use with software written to operate Baycom-style modems. PC boards and semi-kits for this project are available.[8]

The interface uses the serial-port DTR line for transmit data (TXD), the CTS line for received data (RXD) and the RTS line for PTT. Cerenzia's circuit uses one section of a hex inverter as a received-signal buffer. The need for that IC section is obviated by the MX614 because it contains a built-in buffer between pins 5 and 6. Two of IC2's inverters are used as translators between the MX-614's TTL levels and the computer's serial-port RS-232 levels. Two more of IC2's inverters interface the computer's RTS line and the radio's PTT line. A normally active-low PTT control is developed with Q2. Q3 handles active-high PTT lines. (Q3, C10 and R6 can be omitted if an active-high PTT control is not required.) Transmit audio level to the radio is controlled by R4. DS1 indicates when the MX614 is decoding a Bell 202 FSK-compatible signal.

Don't install DS1, Q1, R2 and R3 if the modem's power is derived from a computer's serial port. If an external power supply (ie, not a PC's serial port) is used to power the modem, there's no need to install D2, D3 and D4. Also, you can then use a standard TTL 7404 hex inverter in lieu of the CMOS version at IC2; the TTL version requires too much current from a computer's serial port. Mode controls (M0 and M1) for the MX614 are taken from two inverters tied in series (IC2A and IC2B).

Many new portable radios use an unique way to effect push-to-talk through external peripherals (such as remote microphones) without using a separate connection for the PTT line itself. They use the external microphone connector and a switch in series with the fairly low-impedance mike element. A bipolar transistor in the mike's audio path senses the lowered impedance when the external mike is switched in and

[1]Notes appear on page 46.

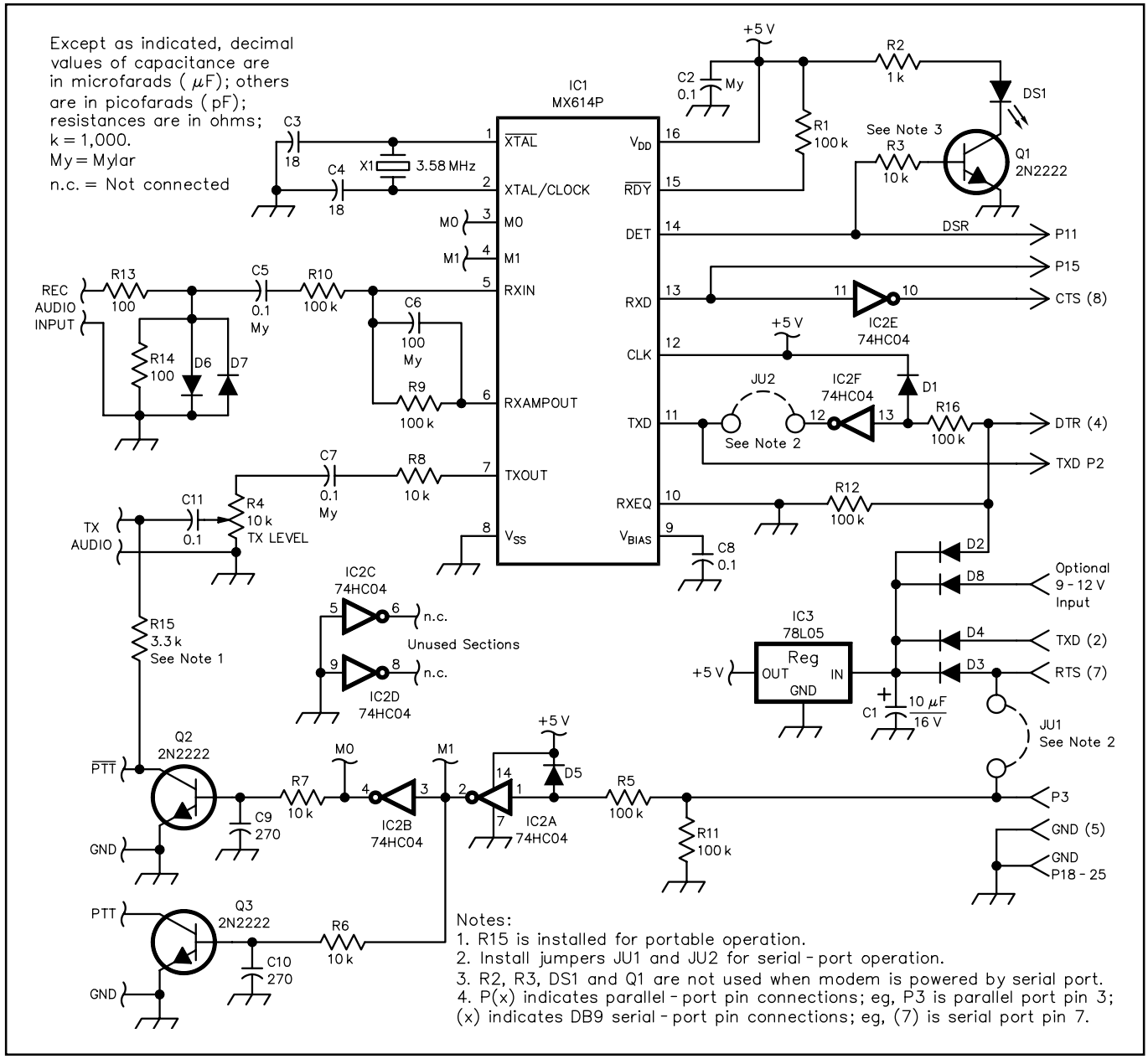


Figure 1—Schematic of the MX614 packet modem. Unless otherwise specified, resistors are ¼ W, 5% tolerance carbon-composition or film units. Equivalent parts can be substituted; n.c. indicates no connection. Two sections of IC2 are unused. Some component identifiers deviate from *QST* style to maintain compatibility with the existing PC board. For part numbers in parentheses, RS=RadioShack; 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; http://www.digikey.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; http://www.mouser.com/; CDI=Component Distributors, Inc, Ste 108, 710 E Park Blvd, Plano, TX 75074; tel 800-777-7334; http://www.compdist.com/; $25 minimum order.

C1—10 μF, 16 V (RS 272-1025, Mouser 140-XRL16V10)
C2—0.1, 63 V Mylar (RS 272-1069, Mouser 1430-1104)
C3, C4—18 pF disc (Mouser 141-500N5-018J)
C5, C7, C8, C11—0.1 μF, 63 V Mylar (RS 272-1069, Mouser 1430-1104)
C6—100 pF, NP0 (Mouser 140-100N5-101J)
C9, C10—270 pF disc (Mouser 141-CD50S6-271)
D1-D7—1N914 RS 276-1620, Mouser 610-1N914
D8—1N4001 (Mouser 583-1N4001)
DS1—LED (RS 276-011, panel mount; RS 276-1622, PC-board mount)
IC1—MXCom MX614P (CDI)
IC2—74HC04 CMOS hex inverter (Mouser 511-M74HC04)
R4—10-kΩ, ⅛-W pot (Clarostat 363P or 363M series, Bourns 3386p series)
R15—3.3 kΩ, ¼ W (RS 271-028, Mouser 271-3.3K); see Note 1 of Figure 1
Q1-Q3—2N2222 (RS 76-2009, Mouser 511-2N2222)
X1—3.579545-MHz crystal, HC-9/U holder (Mouser 559-FOX036S)
Misc: PC board (see Note 8); enclosure, connectors and hardware.

turns on. When this PTT-switch transistor saturates, it provides the radio a PTT signal via internal connections. The beauty of this design is that only a pair of two-conductor miniature plugs is needed to provide connections for a remote speaker, a remote microphone and a remote microphone PTT.

The packet-modem design adds low impedance across the mike audio line in the form of a 3.3-kΩ resistor (R15) through the emitter-collector junction of Q2 to ground. This just simulates what would ordinarily be the external mike element in series with an SPST PTT switch. Obviously, the other side of the mike element completes the path to ground. For home-station use, the series resistor is not necessary if you provide a separate PTT connection.

Configurations

If desired, this modem can be operated from the computer's parallel port. Programs such as *EZPacket* and *Poor Man's Packet* are written to use printer ports (LPT1 and/or LPT2). Although *Poor Man's Packet* and other parallel-port packet programs can be configured to run a Baycom-style modem via the serial port, parallel-port operation is required if a serial port is not available. No parts-reduction advantage is realized using the MX614 circuit as would be seen with the basic *Poor Man's Packet* circuit because hex-inverter sections are employed to effect IC mode selection.

The *Poor Man's Packet* configuration of Figure 1 uses the computer's parallel port for data and control and the computer's serial port to power the modem. Points labeled P(x) indicate connections to a DB25 connector for the parallel-port interface. In the *Poor Man's Packet* configuration, don't install jumpers JU1 and JU2.

The *Baycom* configuration uses the computer's serial port *only*. Serial-port transmit and receive data is routed via the DB9 connector pins 8 (CTS) and 4 (DTR). The modem is powered from the computer's serial port using summing diodes connected to serial-port pins 2 (TXD) and 7 (RTS). Remember to make connection to the serial-port's GND pin (5), too.

If you decide to power the modem from the computer's serial port, do *not* install the **DATA READY** indicator circuit consisting of R2, R3, Q1 and DS1. Install jumpers JU1 and JU2 for serial-port operation.

Construction

My prototype of this project was haywired into an existing box already complete with connectors. Use an enclosure and the connectors and cables that suit your needs. The enclosure size you select will depend primarily on the size and number of the connectors you use. A single DB25 connector could be used for all the I/O lines, but a more-flexible approach might use phono connectors for the **REC AUDIO INPUT**, **TX AUDIO**, **OPTIONAL 9-12 V INPUT** and the PTT line and a DB9 connector for the serial-port connections.

Alignment and Operation

The only adjustment this modem requires is setting the transmit modulation level using **TX LEVEL** control R4. If the transmitter's deviation can be measured, setting the tones for about 80% full system deviation (±4 kHz on 2 meters) should be adequate. If no means of measuring the deviation is available, simply adjusting R4 to obtain tones that sound similar to those other packet operators are using should be acceptable.

Summary

The circuit proved to be "build, plug and play" on the FAR Circuits board. We found no surprises with the MX-614 Baycom-style modem. Transmit tones are quite clean and do not exhibit any trailing chirps or squeaks. Give this modem a try!

Notes

[1]All of these programs (*BayCom* V 1.5, *PMP* V 1.1 and *EzPacket* V 1.4) can be found at: **ftp://ftp.funet.fi/pub/ham/Simtel.msdos.packet/**. The BayCom site URL is: **http://www.baycom.org**. An updated version of *EzPacket* (V 2.0) can be found at: **ftp://ftp.hzeeland.nl/pub2/hamradio/funet/packet/terminal/**.

[2]Tony Marchese, N2YMW, "An Easy Path to Packet: the IMP," *QST*, Dec 1995, pp 36-37.

[3]F. Kevin Feeney, WB2EMS, and Andy Payne, N8KEI, "Poor Man's Packet," *73 Amateur Radio Today,* Aug 1991, pp 8-14.

[4]Dexter Francis, KD6CMT, "Packet On The Mac," *73 Amateur Radio Today,* Oct 1992, pp 8-14 and 85.

[5]Craig Rader, N4PLK, John Krohn, KJ4GP, Sam Baine, W4KUM and Mike Zinicola, WD4PUS, "TCM 3105 Modem for the Digicom >64," *73 Amateur Radio,* Feb 1989, pp 42-43.

[6]Greg Cerenzia, N3PRT, "Basic Packet Modem," *73 Amateur Radio Today*, Feb 1996, pp 24-31.

[7]MX-Com, Inc, 4800 Bethania Station Rd, Winston-Salem, NC 27105-1201; tel 800-638-577, 336-744-5050, fax 336-744-5050; **www.mxcom.com**.

[8]PC boards are available from Far Circuits, 18N640 Field Ct, Dundee, IL 60118-9269, tel 847-836-9148 (voice and fax); **www.cl.ais.net/farcir/**. PC Board only, $5, plus $1.50 shipping for up to four boards; semi-kit consisting of the PC board, MX614P IC and crystal, $15, plus $3 shipping for up to two semi-kits. Visa and MasterCard accepted with a $3 service charge.

Jim Mitrenga, N9ART, received his Technician Class license in March of 1979; he upgraded to Amateur Extra Class in 1981. Jim's wife, Sandy, is KB9MXF; their son, Gregor is KG9DF, an Amateur Extra Class licensee who received his Novice ticket on his 10th birthday. They're all active on VHF and UHF FM for family communication. HF CW is Jim's favorite mode, but he's active on AM, FM, SSB, SSTV, RTTY and Packet and enjoys Amateur Radio electronics design. Jim's other interests include fishing, hiking, bicycling, gardening, computers, audio recording and broadcast engineering.

Jim is employed as a program manager at Motorola, Inc, in Schaumburg, IL, where he started as an RF design engineer in 1979. Currently he concentrates on digital communications audio quality. You can contact Jim at 1013 Chippewa Dr, Elgin, IL 60120; **sstv@hotmail.com**.

NEW PRODUCTS

AT-11MP AUTOMATIC ANTENNA TUNER

◊ LDG Electronics has recently added the AT-11MP to their lineup of automatic HF antenna tuners.

The unit is designed for use from 1.8 to 30 MHz at power levels between 5 and 150 W. The tuning circuit employs a switched L-network controlled by a Motorola 68HC11 microprocessor. Power requirements are 11 to 14 V dc at between 15 and 500 mA. (Average current consumption is estimated at 250 mA.)

A dual cross-needle meter on the front panel provides an indication of forward and reflected power and SWR. An optional control head is available that allows remote mounting of the tuner unit while still retaining control and visual display of the state of the antenna match.

While the MP will operate with nearly any HF radio, this model features special interface capabilities with ICOM's IC-706. Connection with these transceivers enables use of the '706's front panel **TUNE** button for initiating the tuning operation.

The AT-11MP is available assembled or in kit form. Fully assembled and tested units are $239. A complete kit with enclosure sells for $199—without the enclosure: $169.

The Remote Head option, assembled and tested, is $39. In kit form, $29. A balun impedance matching transformer is also available. This allows use of the AT-11MP for tuning end fed, long wire and random length type antennas. Price for the balun is $30 assembled or $25 in kit form.

For additional information contact LDG Electronics Inc, 1445 Parran Rd, St Leonard, MD 20685; tel 410-586-2177; fax 410-586-8475; **ldg@ldgelectronics.com**; **http://www.ldgelectronics.com**.

2000 *POLICE CALL* EDITIONS NOW AVAILABLE

◊ The 2000 editions of these popular scanner listener frequency guides are now available. Nine different regional volumes total over 500,000 listings. These list frequencies for police and fire agencies and 18 addition categories of mobile radio users and now include many trucked system talk group ID codes. Also covered are radio codes, maps, frequency allocation tables and more.

Price: $12.99 each. The 2000 editions of *Police Call* are sold by selected retail electronics dealers and mail order firms and are published by Hollins Radio Data, PO Box 35002, Los Angeles, CA 90035.

Next New Product

By Lew Malchick, N2RQ

The Fourteenth Annual School Club Roundup (2000)

It doesn't matter if you're a newly licensed amateur or a veteran ham. The Roundup is fun for everyone!

SCR—the School Club Roundup is sponsored by the Council for the Advancement of Amateur Radio in the New York City Schools (CAAR/NYCS), the ARRL and its Hudson Division Education Task Force to foster contacts with and among school radio clubs. The Roundup isn't just for schools or school students, though. A ham of 27 years, WO8L, who operated SCR while mobile, wrote: "Love this 'contest.' What a great bunch of young people to talk to. And what wonderful teachers! Hams were most friendly, taking time to chat with the kids instead of just saying 5 by 9, good-bye."

The SCR has its most powerful impact on students. Charlie, WD9ITM, at the Memorial Park Middle School, said, "We concentrated on getting as many students as possible to make QSOs. We heard more schools on the air last year than ever before." Schoolteacher James, AA0XJ, wrote: "I think I had more fun than the students as I could see the magic of radio light up in their eyes."

The Roundup provides an opportunity to help young people who may be struggling with "mike fright." Very often new operators are intimidated by the fear of not knowing what to say to the stranger on the other side of the radio. The SCR exchange info helps to overcome this fear in a low pressure contest format. Operators are encouraged to take time to chat beyond the contest exchange.

The SCR also is a good PR event. John Lovering, KC1XG, sponsor of Triton Regional School Amateur Radio Club reports: "On the final day of the Roundup we set up our operating station in the main lobby of our school where more than 1450 students and faculty passed by during the day. At times we were answering so many questions about amateur radio that we couldn't hear our calls."

Barbara Pederson, KE4JZM, sponsor of the Phillips Middle School Amateur Radio Club, in Chapel Hill, North Carolina, proudly lines up with her students who took part in School Club Roundup: Graham Shepherd, KG4BQA; David Christopher, KF4YTV; Nate Miller, KF4YTU; Ben Austin, KF4YSL; and Chris Glazner, KF4OAG.

The School Club Roundup is an educational event, where students learn map skills, communications skills and more. Students in last February's event received on-the-air "lessons" from the FBI and the NASA Johnson Space Center. Russ Harris, KC7QXN, resource teacher and faculty advisor of K7WMS, wrote: "Although we were only on the air a short time the students were very excited talking to K3FBI and W5RRR."

Both students and parents become involved in the activity. Peter Kemp, KZ1Z, advisor of KA1KD, the Bethel Educational Amateur Radio Society, said, "Parents came by to watch their children participate and to bring all-important snacks, just in case any growing boys and girls may starve while operating. The QSL cards rolled in. Students logged them in and checked them out on the map. Activities like this certainly demonstrate the practical application of many subject areas, such as, technology education, social studies, math, language arts."

In response to several teachers' requests and suggestions, the time of day restriction for SCR was changed in 1998 to a limit of 6 hours in any 24-hour period. Award certificates will be issued for separate Elementary, Middle/Intermediate/Junior High School, High School and College/University levels for USA and DX entries.

Roundup Rules

1. Object: To make as many complete exchanges as possible, especially among school clubs.

2. Contest Period: Monday through Friday in the second full week in February. **This year's Roundup will start at 1300 UTC on Monday, February 14, and end at 0100**

UTC on Saturday, February 19, 2000. Operate no more than 24 of the possible 108 hours (with a maximum of 6 hours in any 24-hour period). Logs must clearly show on and off dates and times. Off periods must be at least 30 minutes.

3. Entry Classes (single transmitter only):

(I) Individual or Single Operator (nonclub)

(C) Club or multi-operator group (non-school)

(S) School club or group (grades K-12, colleges and universities). This category includes any station operated at a school for the contest period, including any group formed for the sole purpose of participating in the SCR.

4. Exchange: Call sign; RS(T); entry class (I, C or S); US State or DX country. For example, W2CXN answers N2RQ's CW call by sending: N2RQ DE W2CXN 579 S NY. (Multi-operator group stations must choose one and only one call sign to use for the whole contest).

5. Scoring: Stations may be contacted once each on phone and CW (packet, RTTY and other data modes count as CW). No repeater contacts permitted except satellite and real-time packet. One point for each phone QSO. Two points for each CW QSO.

5.1. **Multipliers:** US States and DXCC entities ×1; contacts with class "C" stations × 2; contacts with class "S" stations × 5. In addition, a contact with Marty, KA2NRR, will count as a ×5 multiplier. (KA2NRR was the founding Chairman of the CAAR/NYCS and creator of the contest that became the SCR.)

5.2. **Final Score:** Multiply total QSOs by multipliers. *Please use our summary form to avoid errors*, especially if this is your first time in the SCR. (See item 7 below.)

6. Suggested frequencies: All amateur bands except 30, 17 and 12 meters are permitted. On VHF and UHF, repeaters are not to be used. Only recognized FM simplex frequencies may be used, such as 144.90-145.00; 146.49, .55, 58; and 147.42, .45, .48, .51, .54 and .57 MHz. The 2-meter national calling frequency, 146.52 MHz, may not be used.

Mode	*Frequencies (kHz)*	
CW	1800-1810	Novice CW
	3530-3580	3685-3705
	7030-7080	7110-7130
	14,030-14,060	
	21,050-21,080	21,110-21,130
	28,050-28,080	28,110-28,130
Phone	1855-1865	Novice
Phone		
	3850-3880	
	7225-7255	
	14,250-14,280	
	21,300-21,330	
	28,550-28,580	28,350-28,400

7. Reporting: Sample log and entry forms are available for a large self-addressed, stamped envelope (SASE). The latest version of *SCR-LOG* written by AD8B for PCs or Macs can be obtained by e-mail request to: **caarnycs@aol.com**. It is also available for download from: **http://www.onelist.com/community/SCR-L**. SCR software developed by KC7MOD is available on the Web at: **http://www.hayden.edu/-ham.**

Logs must include exchange information, bands used, and the signatures of all operators (and authorized club officials or trustees). Indicate the number of operating hours (and operators/loggers) along with the type of school and entry class.

Dupe check sheets are *required* for entries over 100 QSOs. (Computer entries on disk are appreciated. Use *SCR-LOG* software or follow the ARRL Suggested Standard File Format. Please include a printed summary sheet and instructions as to the disk file names and formats. (If you are not sure if we can handle your electronic files, check with us well in advance.)

Entries should be mailed to: School Club Roundup, c/o Lew Malchick, N2RQ, Brooklyn Technical HS, 29 Fort Greene Place, Brooklyn, NY 11217. Entries must be postmarked not later than 30 days after the end of the contest (March 20, 2000).

8. Awards: 8.5 × 11-inch certificates will be awarded to the top three entries in each class. The school club class will be divided into elementary, middle, high school and college/university. DX will be listed separately at the end of US entries in each category. A certificate is issued for any station contacting ten or more school clubs. Send a large (9 × 12 inch) SASE, or a mailing label and sufficient postage or IRCs, for complete results. (Note: We have always sent a certificate for each entry. We will try to continue that practice, but because of increased participation and the associated workload, those who do not send appropriate postage or IRCs and an envelope or mailing label cannot be assured of receiving a certificate.) QST

The Myrtle Grove Amateur Radio Club, N4G, made an outstanding effort to gain second place in the middle/intermediate/junior high school category.

NEW PRODUCTS

EZ-HANG WIRE ANTENNA SUPPORT LAUNCHER

◊ Getting support lines for wire antennas into trees can be a challenging proposition. Climbing high enough for effective antenna performance or to position the antenna wire above obstructions in its path requires skill, caution and physical prowess. Even then, the temptation to climb up onto thin branches near the top of the tree can be a real danger to the over-enthusiastic ham.

EZ-Hang comes to the rescue with their slingshot/fishing reel combination tool that can launch a 1-oz lead weight, connected to 300 feet of 10 lb test monofilament line, over trees up to 100 feet tall. Attach your support rope and reel it back in over the tree and you're half way there.

Price: $49.95 plus $4.95 shipping. (The EZ-Hang is a "slingshot" device. Before ordering, check your local laws with respect to possession and/or use.) For more information contact E-Z Hang Inc, 8645 Tower Drive, Laurel, MD 20723; tel 540 286-0176; **ezhang@ezhang.com**; **http://www.ezhang.com**.

Next New Product

STRAYS

I would like to get in touch with...

◊…any amateurs who served at the USA Field Station in Berlin, Germany, from 1971-1973. Harry Arsenault, K1PLR, #295, 24 East Ave, New Canaan, CT 06840.

◊…Radio Operators who were aboard the USS *Shenandoah*, AD-26, from 1958 to 1960. Please contact Dan Caesar, NI9Y, at **NI9Y@arrl.net**. QST

Next Stray

By Keli Tarp

The Oklahoma Tornado Outbreak

Thanks to years of preparation and a system of linked, wide-coverage repeaters, hams in Oklahoma were able to help save many lives in the midst of life-threatening weather and dozens of tornadoes—some with wind speeds of more than 250 miles per hour.

May 3, 1999, is a day many Oklahomans will never forget. Even longtime residents of central Oklahoma's "tornado alley" were shocked at the devastation caused by the powerful tornadoes that ripped through the highly populated suburbs of Oklahoma City and several smaller communities throughout the state.

Severe weather had been predicted earlier in the day, but no one knew just how widespread the outbreak would become. Ten hours after the ominous supercell thunderstorms began to form, a record-breaking 74 tornadoes had ripped through neighborhoods, city centers, schools and mobile home parks, killing 42 people and injuring almost 800. Damage from the storm may top a billion dollars.

One tornado peaked at an incredible F5, the highest documented rating on the Fujita wind damage scale. The immense funnel cloud stayed on the ground for almost an hour and a half, destroying thousands of homes and businesses in a 38-mile path through the communities of Bridge Creek, Moore, south Oklahoma City, Midwest City and Del City.

Researchers estimate that without warnings, as many as 700 people could have lost their lives that day. Fortunately, National Weather Service forecasters in Norman, Oklahoma, with help from numerous storm spotters transmitting reports via Amateur Radio, issued early and accurate warnings. In fact, Amateur Radio operators played a vital and critical role before, during and after the tornado outbreak.

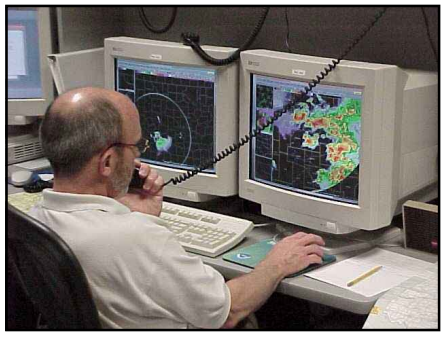
Spotter Reports are Important

When severe weather threatens Oklahoma and the North Texas, reports from SKYWARN storm spotters are a key part of the warning decision-making process, according to Dennis McCarthy, KC5EVH, Meteorologist-in-Charge of the National Weather Service Forecast Office in Norman.

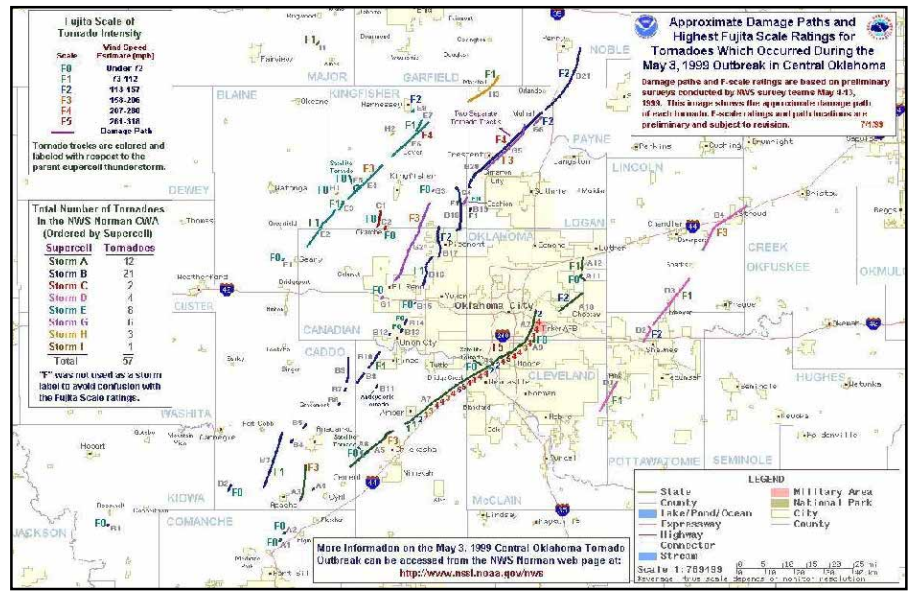
"With Doppler radar, we can 'see,' in a remote sense, the structure of a storm, but we don't see the cloud base features. These hard-working spotters add details and verify the rotation we see on radar," he said. "It's nice to get that confirmation. Real-time reports are so important."

Information from spotters can help forecasters predict the magnitude of certain storm events. For example, hail reports can help determine the strength of a storm's updraft.

Also, these reports convey the seriousness of a threat to the public. "When a spotter reports a funnel cloud, it adds credibility and urgency to the warning,"



Dennis McCarthy, KC5EVH, mans the base station, coordinating with spotters while working through radar data on one of the AWIPS workstations. *AWIPS* is an acronym for Advanced Weather Interactive Processing System. These workstations are now in use at all NWS offices.



The NOAA "track map" showing the paths of the devastating tornadoes.

This used to be a pickup truck—before a tornado wrapped it around a tree.

McCarthy said. "And the beauty of ham radio is that everyone can hear it."

Vital Links

Amateur Radio is an excellent way to get real-time reports from spotters to forecasters. The wide-area amateur repeater systems maintained by hams throughout the Norman forecast region provide the vital communication links used by spotters and forecasters.

"We don't participate directly in the numerous local spotter networks," McCarthy explained. "Instead, we stay in one place giving radar updates and receiving spotter reports from local networks through three linked systems that cover large areas. People know we're always on these three primary frequencies that are linked to others," McCarthy said.

The three radios for these links are frequently staffed by National Weather Service employees who are licensed hams working as volunteers. They pass along outlooks, watches and warnings as they are issued, as well as radar reports of where storms are located.

"To get to the National Weather Service at Norman, spotters know to go through a specific link system," McCarthy said.

The first link was set up in 1992 by the Southwest Independent Repeater Association (SWIRA). It includes two primary repeaters from the Red River to north of Lawton to Norman. Although the Norman forecast office initiated the plan, the SWIRA link evolved as people contributed equipment and funds to expand it. Eventually, tower space was donated by KSWO-TV in Lawton. The first repeater in Cyril, Oklahoma, was provided by Terry Mahorney, KB5LLI. Technical support for the link is provided by Troy Fehring, N5VIN.

"What we had set out to do—our philosophy for the system—was to provide a path for the National Weather Service to receive and disseminate weather information to southwest Oklahoma and north Texas," Mahorney said. "We were trying to reconnect our part of the world with the National Weather Service."

McCarthy explained the forecasters' interest in setting up a link from the eight counties in northern Texas covered by the Norman office in central Oklahoma. "The big motivation was so that as headquarters began to phase out the Wichita Falls National Weather Service office in 1993, we could maintain real-time communication with the spotters in North Texas," he said.

Several years later, formation of the Buffalo link was led by Martin Vinson, KN6UG, and J. D. Jordan, WG5B, with the help of several groups, including the Arbuckle Amateur Radio Club and Mid Oklahoma Repeater, Inc. It includes repeaters from 14 communities along I-35 in central Oklahoma and northeast to Tulsa.

Construction of the third link, which runs from Norman north to Edmond and west to Woodward, was led by Lee Vaughn, KA5WIS (and the Edmond Amateur Radio Society), and Bill Wyatt, N5WO (with the Tri-State Amateur Radio Club).

All three links were used during the May 3 outbreak, as tornadoes touched down in many different parts of the state.

Into the Fray

When forecasters announced their daily thunderstorm outlooks via Amateur Radio in the morning and just after lunch on May 3, they stressed the fact that the outlook had been upgraded to a moderate risk. Armed with this information, everyone was prepared as storms began to form later in the day.

Between 3:30 and 4 PM, as he does on many spring days, McCarthy got on the radio and gave a radar report to spotters, who told him how rapidly storms were growing in southwestern Oklahoma.

The first severe weather noted in McCarthy's log was a report of hail at 4:20 PM. Soon thereafter, spotter Jeff Piotrowski, KC5GLA, reported the first rotating wall cloud. This information confirmed what forecasters were seeing on radar, and the first tornado warning of the day was issued at 4:47 PM.

About that time, Mahorney, net control operator for the SWIRA link, declared a formal severe weather net, limiting non-emergency talk on the repeater. Initially, all storm-related traffic was on that link, McCarthy said. As the storms moved into central Oklahoma, however, traffic moved to the two remaining linked systems.

For several hours, McCarthy was alone in handling traffic on the three radios at the forecast office. "It was pretty overwhelming," he said, putting it mildly. Several times throughout the evening as many as four tornadoes were on the ground at the same time.

Meanwhile, his usual helper, Warning Coordination Meteorologist Jim Purpura, KB5YHT, was at the local hospital with his pregnant wife Terry, KC5IDB, who had begun contractions. When the hospital sent them home to wait, Purpura made sure his wife was safe with his mother before he drove to the office to help. The two hams handled reports from countless spotters as forecasters issued 116 county warnings in a 10-hour period.

Moore Emergency Manager Gayland Kitch, KC5MMU, whose community was hit by the strongest tornado, said he values the information provided by Dennis and other forecasters. "It gives us folks in the field an opportunity to hear firsthand what the National Weather Service is saying," Kitch said. "Most of us have been to weather training, but there is no substitute for having the pros tell you what's going on."

Hams Support Relief Efforts

After May 3, the Amateur Radio links were used by law enforcement officers and relief organizers because of their reliability. For example, sheriff's deputies from Pottawatomie County, east of Oklahoma City, used the Buffalo link to communicate with their dispatcher as they provided rescue and security operations for several weeks in the devastated community of Bridge Creek, 45 miles to the west.

With only unreliable telephone service and 150,000 people without electricity, hams provided vital emergency communications through the night of May 3-4. That help was extended to emergency relief agencies such as the Salvation Army and American Red Cross for several weeks following the event.

Many local hams had experience with disasters, including relief efforts after the

ARRL West Gulf Division Director Jim Haynie, W5JBP (right), and Vice Director Coy Day, N5OK (left), present an ARRL Certificate of Merit to Dennis McCarthy, KC5EVH.

Storm-Related Web Sites

Oklahoma Amateur Radio Links

Buffalo InterLink System—**http://www.buffalolink.org**

Radio Amateur Scientific Society—**http://www.rass.org**

Weather

Norman National Weather Service Forecast Office— **http://www.nwsnorman.noaa.gov**

Tulsa National Weather Service Forecast Office— **http://www.nwstulsa.noaa.gov**

Wichita National Weather Service Forecast Office— **http://www.crh.noaa.gov/ict**

Storm Prediction Center— **http://www.spc.noaa.gov**

National Severe Storms Laboratory— **http://www.nssl.noaa.gov**

WSR-88D (NEXRAD) Operational Support Facility— **http://www.osf.noaa.gov**

National Weather Service Southern Region Headquarters— **http://www.srh.noaa.gov**

National Weather Service Headquarters— **http://www.nws.noaa.gov**

National Oceanic and Atmospheric Administration— **http://www.noaa.gov**

1995 bombing of the Murrah Federal Building in Oklahoma City. Frank McCollom, N5FM, coordinated the network of ham volunteers for the Salvation Army's Arkansas/Oklahoma Emergency Communications Group. More than 70 volunteers provided emergency communication for the area command center and 50 canteens throughout the damage path for 10 days. In addition, about 15 hams in vehicles transported whatever was needed to the various locations and unloaded food and donations from 18-wheelers.

Years of preparation paid off for McCollom and the Salvation Army's ham volunteers, who set up the radio station at the Oklahoma/Arkansas headquarters 13 years ago and practice their emergency operations once a month with the national headquarters in Atlanta.

"This was the big one I knew was going to hit one day," he said. "The big secret is having it ready—people know what to do and how to do it."

Hams from other communities also supported local relief efforts. While driving through the Oklahoma City area just after the tornadoes struck, Trish Scott, KC8KNR, an Ohio truck driver for Schneider Specialized, offered her help to the Salvation Army communications team. For a week and a half she used her truck to move trailers at the warehouse and drove a forklift to unload and load trailers. In addition, she rented a car and, with a borrowed radio, hauled food around the city.

Hams Survive Storm

Many hams could not support the relief effort after the storm because they were busy picking up the pieces of their own lives. South Oklahoma City residents Donald "Mac" McDonald, K2GKK, and wife Judy, KA5BJS, experienced the F5 tornado firsthand. That evening while eating dinner, they were watching television coverage of the tornadoes southwest of Oklahoma City. Knowing that the storms were heading in their direction, McDonald decided to take precautions "just in case."

An electronic technician, Mac has always taken an engineer's approach to problems. Using a heavy wooden step-ladder, a wooden card table and their washer and dryer, he set up a shelter in the laundry room—complete with a battery-powered light and a nine-inch television—about 20 minutes before the tornado struck. When the tornado was closer, the McDonalds entered their shelter, covered themselves with a mattress and continued to watch the tornado coverage on television.

After hearing large hailstones hit the house, they heard the tornado's roar. Then the power went out. Thirty seconds later the tornado struck, ripping the roof off and destroying their home. Afterward, their travel trailer was in a tree, their truck was destroyed, their 60-foot retractable antenna tower was reduced to 11 feet—and a neighbor was dead. Fortunately, thanks to McDonald's ingenuity, he and Judy were okay.

"I've been going to storm spotter classes for 27 years, and this is the first time I've been on the receiving end for assistance," he said. "We consider ourselves very fortunate—we lived."

Another local ham, Hal Miller, KB1ZQ, who serves as president of the Central Oklahoma Radio Amateurs, Inc, and his wife Linda, N1LPN, survived damage to their house in Del City, a half-mile north of the McDonalds'.

McCarthy Recognized by ARRL

Hams who helped during and after the May 3 disaster got together in July during Ham Holiday, an annual event for Amateur Radio enthusiasts held in Oklahoma City. During the event, West Gulf Division Director Jim Haynie, W5JBP, and Vice Director Coy Day, N5OK, presented an ARRL Certificate of Merit to McCarthy in recognition of his ongoing work with Amateur Radio operations in Oklahoma and his contribution to saving lives and property during the tornado outbreak.

"The intention of the ARRL is to recognize people who contribute to our efforts in public service," Haynie said. "Our relationship with the National Weather Service has been good, and Dennis has been a part of that."

McCarthy currently serves as president of the South Canadian Amateur Radio Society in Norman and has worked with amateurs and ham communications for more than 15 years.

Tornado Records Broken

The 74 tornadoes that spawned on May 3 and 4 set a new state record for the month of May (the preliminary total was 87), shattering the previous monthly record of 61 that hadn't been eclipsed since 1960. In addition, the outbreak helped make 1999 a record year for Oklahoma, surpassing the previous annual tornado record of 107 set in 1957. The National Weather Service has been keeping detailed records since 1950.

"Hams made a difference for our community, both during and after this terrible natural disaster," McCarthy said. Whether relaying spotter reports or providing emergency communication, hams helped save and rebuild lives during the largest tornado outbreak to ever hit Oklahoma.

You can contact the author at 1200 Westheimer Dr, Room 101, Norman, OK 73069; **keli.tarp@noaa.gov**. *Ms Tarp is a Public Affairs Coordinator with NOAA Weather Partners.*

By Murray Greenman ZL1BPU

Let's *See* You in *Hellschreiber!*

It is old or new? Digital or analog?

When you need to send text by radio the common method is to use software to assign strings of bits (1s and 0s) to represent each letter of the alphabet, as well as numbers and punctuation. The software shuffles this data into whatever coding scheme you decide to use and a soundcard or modem translates the result into frequency- or phase-shifting audio tones. Apply these tones to a transceiver and they become RF signals.

At the receiving end a modem processes these signals back into data. Software interprets the data and "decides" which characters will be displayed according to the constraints of the code.

PACTOR, Clover, G-TOR, PSK31, packet and RTTY all use variations of this fundamental approach to transmitting and receiving information. But, as the proverbial saying goes, there is more than one way to skin a cat!

Hellschreiber—Seeing is Believing

Let's begin with text, but instead of assigning groups of 1s and 0s to represent the characters, the actual *shapes* (fonts) of the characters themselves are translated into tones (as well as precisely timed intervals of silence). At the receiving end the software merely decides whether the pixels on a particular area of the screen should be dark or light, thereby "painting" the text on the monitor as it is received. The eyes and brain of the operator perform the final interpretation.

Sounds like an advanced technique, doesn't it? Would you believe that this method of text transmission was invented more than 70 years ago?

Hellschreiber (a German-language pun[1]) was the name Rudolf Hell[2] gave to his invention in 1929, and it was soon in widespread use for press, diplomatic and military traffic. The equipment was simple, and at the time, both cheaper and more reliable than 5-level code teleprinters. A military version, the *Feldfernschreiber*, or field teleprinter, was widely used during World War II by the Germans, and later by the Swedish and Czech forces. The *Feld-Hell* machine was very simple, required nothing more than a CW transmitter and receiver for radio use, and performed well with the low-power transmitters and broad receivers of the time.

But surely Amateur Radio is all about developing new technology. We should be exploring new modes, rather than revisiting this old stuff, right? Well, yes, and no. Of course there are plenty of new techniques to be explored (PSK31 is a current example), but old technology should also be understood and appreciated—and improved upon. After all, Morse is still in widespread use, and it dates from 1838!

Hellschreiber has some important features, and we have recently added Digital Signal Processing (DSP), to elevate Hellschreiber to a high-performance DX mode. The most common type of Hellschreiber in use on the amateur bands today is Feld-Hell. Feld-Hell characteristics include on-off keying, quasi-synchronous operation, a double printing strategy

[1]Notes appear on page 54.

Picture of a 1944 Feldfernschreiber, thanks to Dick, PA0SE.

What is a Fuzzy Mode?

A Fuzzy Mode is specially designed for human readability, using digital, analog or DSP techniques. For best performance, a Fuzzy Mode must:

- Be *uncoded*. That is, each character or symbol must be sent complete.
- The equipment *must not make timing decisions*.
- The equipment *must not make state decisions*.

An uncoded mode like Hell is not affected greatly by noise because the redundant information in the complete character ensures that it will be recognized. Coded modes such as RTTY can lose synchronization or have one character changed to another by noise or interference.

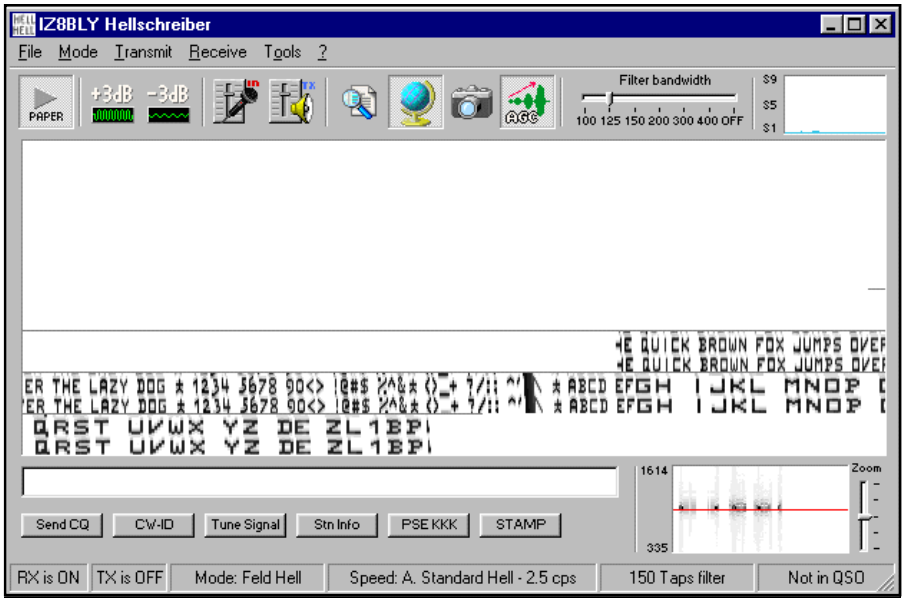
Data should be presented as it is received so that incorrect timing decisions are avoided. The transmission path will cause the signal phase to vary, and often the transmitter signal phase is unknown. In computer Hell this is achieved by oversampling.

A Fuzzy system will present the user with an indication of the probability of each element (e.g. as a gray-scale), rather than make hard (yes/no) decisions. This allows the eye or ear to assess each element in conjunction with the others more effectively.

HF FAX (ignoring the starting sync pulses) is a Fuzzy Mode—so are Feld-Hell, MT-Hell and Duplo Hell. Can you think of any others? Experts consider Morse to be a natural language, rather than a code. This makes Morse a Fuzzy Mode!

Figure 1— Illustration of multi-path reception—3.5 MHz, 300 km range.

Arie, PA0AOB, using a 1944 Feldfernschreiber.



The IZ8BLY display screen with tuning indicator (bottom right corner).

Jim K6OYY transmitting C/MT-Hell using the G3PLX MT-Hell software.

to counter signal phase and speed uncertainty. The special text font, readable under poor conditions, was designed for minimum bandwidth.

Feld-Hell transmits text in a similar manner to the printing of a dot-matrix printer. Where a black dot is required, the CW transmitter is keyed, while nothing is sent for white. The timing needs to be reasonably accurate. The characters are built by scanning up each column of the character from left to right. If the speed is slightly off, the text will climb uphill or slide downhill, because there is no synchronization. The characters occupy approximately a 5 × 5 dot area in a 7 × 7 field. The dot rate is 122.5 baud, a leisurely 2.5 characters/second or about 25 WPM. The transmitter duty cycle of this simple facsimile/digital mode is about 21%.

Soon after the war, Dutch and German amateurs discovered that Feld-Hell equipment was very simple to operate, and performed better than RTTY on the lower bands. Unfortunately few machines survived the war, so although there was a surge in interest in the '80s, due in part to magazine articles[3] and the appearance of personal computers,[4] it was only the dedicated Europeans who kept the mode alive. Now, however, the new breed of PC equipped hams have revived and enhanced this interesting, high-performance mode.

Software

The first *DOS* PC software for Feld-Hell, by Sigfus LA0BX,[5] is still widely used, particularly by those who choose to use older PCs or operate portable. Recently it was realized that DSP could transform Hellschreiber into a highly sensitive mode, resistant to many forms of interference. I have to take some of the blame for this, and I was the one who coined the term *Fuzzy Modes* to describe radio modes that are not really digital, nor completely analog, but provide important advantages of both by being human readable.[6]

The first important improvement to Hell was to use a gray-scale display (rather than strictly black-on-white) for reception. This significantly improves weak-signal readability. Doug, N1OWU and Peter, G3PLX used the Motorola DSP56002EVM evaluation module for DSP signal processing, while software for PC soundcards by Lionel, G3PPT and Nino, IZ8BLY now performs DSP inside the PC.

Not for Technophobes!

What do we use DSP for? Let's follow the receiving system in the IZ8BLY software. First the receiver audio is digitized by the PC sound card, and the data is filtered in software using a Finite Impulse Response (FIR) bandpass filter with adjustable bandwidth (down to 100 Hz), centered on 980 Hz (the operating tone frequency). The signal is then down-sampled and demodulated, using modulus addition and division, to provide an averaged and denoised sample representing the actual signal power at four times the dot rate. The sample is represented on the screen as a gray-scale picture element, giving the text a vertical resolution of 28 picture elements (pixels). The signal power also operates a digital AGC system, which controls a multiplying factor applied to the incoming train of sample data. The digital AGC has adjustable attack and decay. Finally, the signal is tuned in on a Fast Fourier Transform (FFT) waterfall plot tuning display.

On transmit, the signal is generated as a series of wave-table sounds. Each dot is phase synchronous, and generated mathematically as a 980 Hz sine wave. The program generates and stores the wave sounds for each character in the character set, letters, numbers, symbols and a few small graphics. Any *Windows* font can be used, even high-resolution fonts with rendered corners (yes, the software actually transmits gray-scale dots!). Special Hell fonts are carefully designed to transmit dots in a time interval no shorter than 8 ms, which limits the bandwidth while retaining higher resolution. The wave sounds for these Hell fonts are passed through a raised cosine envelope shaper, (multiplying the sine wave samples with a raised cosine) which shapes each group of dots to limit the keying bandwidth.[7] During transmit, characters from the keyboard buffer cause the appropriate wave sounds to be written to the sound card where they are timed and restored to analog form for transmission. The transmitter software runs at the same time as the receiver software, so the system can operate *full duplex*.

Now who said Hell wasn't high tech?

Performance

Fortunately, you do not need to understand how it works to enjoy this mode. Simply install the software, connect up your rig (probably the same cables you use for PSK31 and SSTV), set the signal levels and away you go! Hell is a rag chewer's mode—and a delight to use. It is as slick to operate as RTTY or Morse. It is not quite as sensitive as PSK31, but is much easier to tune, and is tolerant of drift. I hesitate to compare the performance with Morse, but I know brass pounders who appreciate Hell because it gives them the same operating feel that Morse does—you can see and hear the signal interacting with the ionosphere. (I am careful to say "Morse," not "CW," because Feld-Hell is *also* CW!)

For digital modes, HF operating presents a variety of challenges: interference, poor propagation, fading, multi-path, noise, lightning static, polar flutter and high transmitter duty cycles. HF is a challenge for Feld-Hell, too, but not to such a great extent.

For example, Hell is reasonably sensitive; it is resistant to most interference except zero-beat carriers. It is readable through fades thanks to gray-scale display, sensitivity and the human ability to recognize characters in noise. Unlike RTTY it cannot print wrong characters or lose synchronization on noise or lightning static.

Is Hellschreiber Permissible Under Part 97?

FCC regulations are normally straightforward in terms of classifying amateur transmission modes. One need only determine the emission designator and then review Section 97.3(c) to determine which emission type applies: CW, data, image, MCW, phone, pulse, RTTY, SS or Test. Discussions with FCC staff concerning the legality of Hellschreiber resulted in the following classification, as described here by Paul Rinaldo, W4RI, based on the determination of the proper emission designator. The legality of other amateur modes should be determined by the same method.—Chris Imlay, W3KD, ARRL General Counsel

Is Hellschreiber a facsimile or a direct-printing telegraph system?

The 1929 Hellschreiber (now known as "Feld-Hell" or "Field-Hell") is a facsimile device for transmitting text, originally to be printed on tape. It can be transmitted using the emission designators A1C (Double sideband, a single channel containing quantized or digital information without the use of a modulating subcarrier, facsimile), F1C (Frequency modulation, etc, as above), or J2C (Single sideband, suppressed carrier, a single channel containing quantized or digital information with the use of a modulating subcarrier, facsimile). While permissible within Part 97 Rules as facsimile operating on frequencies where "image" emission is authorized (where phone, SSTV or fax is permitted), this may not be welcomed by other amateurs using the rather narrow frequencies normally used for image communications.

An alternative is to consider Hellschreiber as a direct-printing telegraph system and operate it in the RTTY/data segments of the HF bands (where it is already in use). It can be operated under these emission designations: A1B (Double sideband, a single channel containing quantized or digital information without the use of a modulating subcarrier, telegraphy for automatic reception), F1B (Frequency modulation, etc., as above), or J2B (Single sideband, suppressed carrier, a single channel containing quantized or digital information with the use of a modulating subcarrier, telegraphy for automatic reception.)

The multi-frequency versions of Hellschreiber can be operated under the above emission symbols F1C, J2C, F1B and J2B. Because only one frequency is transmitted at a time and there is only one stream of information, the second character 7 (for two or more channels containing quantized or digital information) does not apply. A1C or A1B would not be usable because these designate simply on/off keying. F1C or F1B would be possible if the different tones caused different frequency shifts.

Bottom line: US amateurs may transmit Hellschreiber in the RTTY/data segments using single-sideband transmitters. J2B is the appropriate emission symbol.—*Paul Rinaldo, W4RI, ARRL Technical Relations Manager*

Hell is also immune to the effects of polar flutter.[8] And thanks to the low duty cycle, the transmitter stays cool!

Getting Started

Visit the Fuzzy Modes Web site[9] and download the software that suits your computer. There is good software for *DOS* and for *Windows 95/98/NT*. There is even software for the Macintosh.[10] I recommend the IZ8BLY software,[11] which is the most advanced and offers all other "Fuzzy" modes as well. On the Web site there is a wealth of information about operating this software, how to make the cables, and other operating advice.[12] The IZ8BLY program even has help files in English, German, Italian, Czech and Spanish.

Need an Elmer to help you on the air? Check out the Hell Call Book[13] for a Hell user near you. There is also a Hell e-mail reflector (mailing list)[14] where you can ask questions or set up skeds. Small pictures of received signals are often exchanged, which is something you can't do with RTTY!

Operating

The best place to get started is on 80 meters at night, where you can learn to operate, give and receive advice. Here signals are strong, but the noise is even stronger! Hell performs very well on 80 meters, typically around 3.580 MHz, and you will see plenty of ionospheric effects—fading, multi-path reception and lightning noise. DX isn't bad either—1000-km contacts are routine, and 3000-km not unusual. From the eastern US, transatlantic contacts should be possible.

At present most of the DX is on 20 meters, from 14.063 MHz upward. Other frequencies to look at are 7.035, 10.135, and 21.063 MHz. On 20 meters DX is excellent and copy is very good. Most stations run about 50 W, and many even less. High power and expensive antennas are not required.

Other Options

I mentioned that there are other Hell modes. Most of these are older modes that offer no advantage over Feld-Hell. One interesting mode demonstrated in 1937[15] used seven concurrent tones to portray different horizontal line segments making up each character.

Peter, G3PLX, improved this mode, using 16 tones and an FFT receiver. We now call it Concurrent Multi-Tone Hell, or C/MT-Hell. It is less sensitive than Feld-Hell, but the FFT receiver is remarkably immune to all kinds of interference, since reception is in the frequency domain and most interference is in the time/amplitude domain. C/MT-Hell works well on the lower bands, is narrow band (200 Hz) and free of keying sidebands because the keying is at column rate rather than dot rate.

Another multi-tone system, Sequential Multi-Tone Hell or S/MT-Hell, is a relative newcomer. It is like a combination of Feld-Hell and MT-Hell. The dots are sent in a pattern, like Feld-Hell, but each row of dots is sent with a different tone frequency. The FFT receiver is able to reconstruct the characters without them looking excessively dotty. The biggest advantage of S/MT-Hell is that it can be transmitted with a Class C (nonlinear) CW transmitter, whereas all the other modes require a linear SSB transmitter. It is a challenge to transmit S/MT-Hell with good clarity, because the keying sidebands become visible within the character matrix.

The latest "designer" Hell mode is IZ8BLY's Duplo-Hell. This mode is closely related to Feld-Hell, but two columns of dots are transmitted at the same time, using two different tones. The same typing speed as Feld-Hell is achieved by sending the dots for twice as long. This has two important effects: (1) The noise rejection is enhanced even further, and (2) the multi-path echoes are reduced by a factor of two. Duplo-Hell is great for low-band DX. The received signal looks as sharp and clear as Feld-Hell, but can have a slight dotty effect due to selective fading. The spectrum of Duplo-Hell is little wider than Feld-Hell.

You can contact the author at 94 Sim Rd, Karaka, RD1 Papakura, New Zealand; **as149@detroit.freenet.org**.

Notes

[1]Hellschreiber is a pun devised by Rudolf Hell based on his last name and the nature of the mode itself. Hellschreiber translates to "light writer" (and "helles Schreiben" means "bright writing").

[2]A biography of Rudolf Hell is available on the Web at: **http://www.lhag.de/company_int/rudolf.html**.

[3]"The Hellschreiber—a Rediscovery" by Hans Evers, PA0CX, *Ham Radio Magazine*, Dec 1979. Numerous articles in Dutch by Dick Rollema, PA0SE, and others, 1979-1982.

[4]An Apple II Hell program developed by Klaas, PA0KLS, in 1980.

[5]*HS-V9709.ZIP* by LA0BX is available at **http://www.qsl.net/zl1bpu/FUZZY/software.html**.

[6]See the sidebar "What is a Fuzzy Mode?".

[7]If the envelope of a dot has a cosine shape, there is only one pair of keying sidebands.

[8]Disturbance of the ionosphere near the poles causes phase, frequency and amplitude flutter on signals passing through it.

[9]**http://www.qsl.net/zl1bpu/FUZZY/software.html**

[10]**http://www.blackcatsystems.com/software/multimode.html**

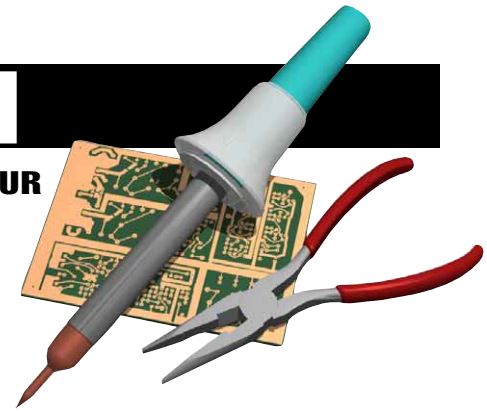
[11]Nino's Web site is **http://www.freeweb.org/varie/ninopo/radio/Hell/index.htm**. The software is also available at **http://www.qsl.net/zl1bpu**.

[12]See "Getting Started" at **http://www.qsl.net/zl1bpu/FUZZY/starting.html**.

[13]**http://www.freeweb.org/varie/ninopo/radio/Hell/callbook.htm**

[14]**http://www.onelist.com/subscribe.cgi/Hellschreiber**

[15]"Seven Frequency Radio Printer", Devaux and Smets, *Electrical Communication* 1937. (Available in edited form at **http://www.qsl.net/zl1bpu/FUZZY/LMT.html**.)



The Doctor is IN

Q Bob, W3GD, asks, "I recently bought several hundred feet of stranded #14 Teflon insulated wire to construct a double-extended Zepp antenna on 3.8 MHz. I plan to run the antenna through the trees in my yard. Is Teflon weatherproof and UV-resistant? I'm concerned about durability. My previous antenna was made from a single #18 copper-clad steel military surplus field-telephone wire and it broke after a year or two in the trees."

A Although not all Teflon cables are UV-resistant rated, the material is generally very good for antenna building. However, many folks have used inexpensive plastic-coated wire successfully as well, so I suspect the problem you had with your previous antenna was due chiefly to fatigue in the wire that developed after playing tug o'war with your trees. For runs of up to 150 feet or so, #14 is adequate (neglecting the "tree factor" for the moment. For longer runs, #14 may be usable, but I would recommend #12 or #10 preferably (twisting two lengths of #14 should also suffice). Two-conductor #18 zip-cord would probably fail in 5-6 years.

Q I've heard of ATV repeaters, but is there such a thing as a slow-scan TV (SSTV) repeater?

A SSTV repeaters do exist, although they are really simplex repeaters by definition, not duplex systems that transmit and receive at the same time. SSTV repeaters receive images, store them briefly, then retransmit—often on the same frequency.

Some SSTV repeaters are controlled through a tone-access system. You transmit a 1750-Hz tone to get the repeater's attention and, if the frequency is not already in use, the repeater will send a Morse "K" back to you. This means that you have about 10 seconds to begin transmitting your image. When you've completed the transmission, the repeater will retransmit the image in the same mode it was sent. In other words, if you used Martin 1, for example, the repeater will retransmit in Martin 1.

There are some SSTV repeaters that are open at all times and do not use a tone access system. They will accept and retransmit images whenever the frequency is clear. Most SSTV repeaters also send ID beacons at regular intervals. You can learn more about SSTV repeaters on the Web at **http://www.mscan.com/mscan/repeaters.html**.

Q I've been shopping for a new station computer and recently I've seen advertisements in the newspaper for Pentium III PCs selling at $600 or less. I knew computer prices were falling, but this seems incredible. What am I missing?

A You're missing that famous axiom: "If it sounds too good to be true, it probably is."

Yes, prices have been falling and will continue to fall. Basic Pentium III systems hit the market initially at about $2500, but they've since dropped to around $1500 at the time this column was written (late 1999). So how can someone advertise an $600 Pentium III without violating truth-in-advertising laws? There are a number of ways to do this, all of them devious.

The PC in question may have a Pentium III processor, but what kind of motherboard is it using? Chances are the seller has installed the processor in an "older" 66-MHz motherboard, which effectively chokes off any speed advantage you would gain from the Pentium III processor! A 100-MHz motherboard is the only way to go with a Pentium III, but they cost more, of course.

What sort of memory is on the motherboard? I'm willing to bet that the seller has installed older (read: "slower") chips that are not compliant with 100-MHz boards.

What about the video card? You'll be lucky if you get more than a megabyte of video card memory. That's way too low for many modern software applications.

The hard drive may be an off brand that offers slow-as-cold-molasses access at best.

Finally, does the PC come with *Windows* installed? If it's *Windows 98* you can count on finding the less-stable first edition.

Bottom line: You get what you pay for. What you save in cash you may pay for later with severe buyer remorse. Whenever you purchase a complete PC system, Pentium III or otherwise, examine the specifications carefully and ask plenty of probing questions before you decide to buy.

Q This may seem like a silly question, but what exactly is SSB?

A First of all, there is no such thing as a silly question. In Amateur Radio we often kick these acronyms around without bothering to define them. We just assume that everyone knows what we're talking about! SSB stands for "single sideband." It is basically a form of amplitude modulation (AM).

Modulation is a mixing process. When RF and audio signals are mixed together you wind up with a total of four signals: (1) the original RF signal, or carrier, (2) the original audio signal, and (3-4) and two sidebands whose frequencies are the sum and difference of the original audio and RF signals, and whose amplitudes are proportional to the original audio signal. The sum is the upper sideband (USB) and the difference is the lower sideband (LSB).

All of the information is contained in the sidebands, but $^2/_3$ of the RF power is in the carrier. The carrier serves only to demodulate the signal in the receiver. It is essential for AM reception, but for SSB we can simply generate a carrier signal in the receiver and use it to recover the information (the voice, for example). There is no need to send the carrier along with the sidebands.

There is also no need to send two identical sidebands when one will do. Depending on the mode you've chosen to operate, the upper or lower sideband is eliminated from the transmitted signal. The final result of all this "paring down" is a solitary *single sideband*—SSB—signal.

There are several advantages to using SSB. SSB transmitters are very efficient, requiring less bulky power supplies. SSB signals are also narrower than standard AM signals, meaning that you can fit more SSB signals into a given band. With the transmitted power concentrated in a narrower spectrum, the effective communication range can also be increased somewhat compared to AM or FM.

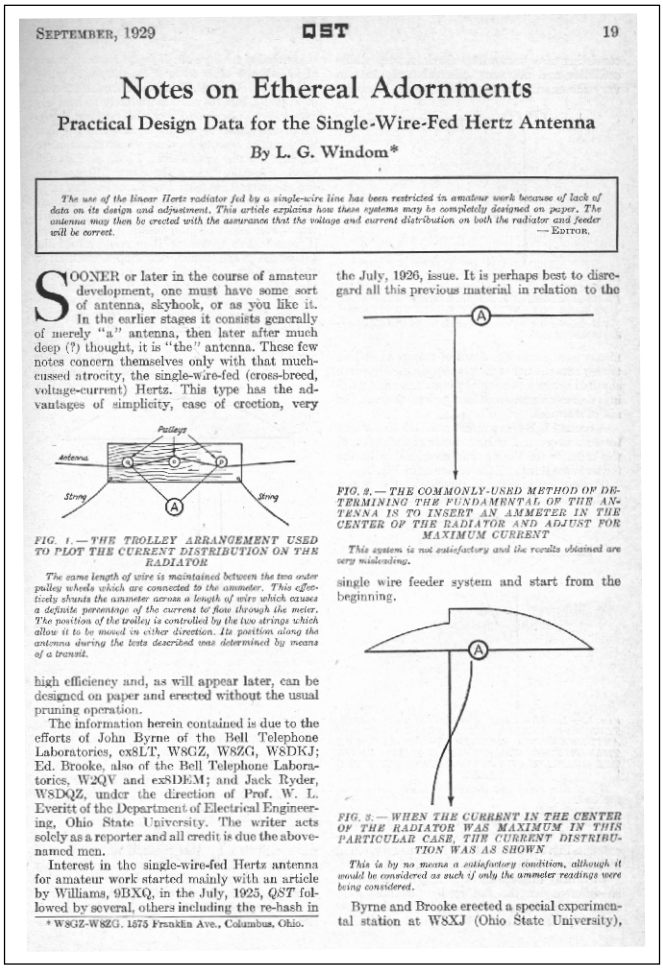
The main disadvantage of SSB is its relative lack of audio quality. You must tune your receiver precisely to achieve a natural-sounding voice. Even then, the frequency range of the

audio is limited. A properly tuned SSB signal is perfectly readable, but it does not have the audio quality of AM or FM.

Q Bob, VE3GND, asks, "I'm thinking about trying a Windom antenna in an inverted-V configuration. Are there any advantages to doing this?"

A There is only one antenna design that can be properly classified as a true Windom. The antenna was described in the September 1929 *QST* article written by Loren G. Windom, W8GZ, titled "Notes on Ethereal Adornments." It was a Marconi-type antenna, using a single-wire feeding into an off-center position of a long horizontal wire. With this design the whole antenna system radiated—there was no feed line used; the antenna was connected directly to the transmitter (see Figure 1). The resulting pattern is dependent upon the band of the transmission.

This antenna is not a good match to modern transmitters, but it worked quite well in its day, so a few modern antenna builders have capitalized on the famous name (much like the various "G5RV" antennas I have seen).



SEPTEMBER, 1929 QST 19

Notes on Ethereal Adornments

Practical Design Data for the Single-Wire-Fed Hertz Antenna

By L. G. Windom*

The use of the linear Hertz radiator fed by a single-wire line has been restricted in amateur work because of lack of data on its design and adjustment. This article explains how these systems may be completely designed on paper. The antenna may then be erected with the assurance that the voltage and current distribution on both the radiator and feeder will be correct. —EDITOR.

SOONER or later in the course of amateur development, one must have some sort of antenna, skyhook, or as you like it. In the earlier stages it consists generally of merely "a" antenna, then later after much deep (?) thought, it is "the" antenna. These few notes concern themselves only with that much-cussed atrocity, the single-wire-fed (cross-breed, voltage-current) Hertz. This type has the advantages of simplicity, ease of erection, very high efficiency and, as will appear later, can be designed on paper and erected without the usual pruning operation.

Pulleys
antenna
Strong
Strong

FIG. 1.—THE TROLLEY ARRANGEMENT USED TO PLOT THE CURRENT DISTRIBUTION ON THE RADIATOR

The same length of wire is maintained between the two outer pulley wheels which are connected to the ammeter. This effectively shunts the ammeter across a length of wire which causes a definite percentage of the current to flow through the meter. The position of the trolley is controlled by the two strings which allow it to be moved in either direction. Its position along the antenna during the tests described was determined by means of a transit.

The information herein contained is due to the efforts of John Byrne of the Bell Telephone Laboratories, ex8LT, W8GZ, W8ZG, W8DKJ; Ed. Brooke, also of the Bell Telephone Laboratories, W2QV and ex8DEM; and Jack Ryder, W8DQZ, under the direction of Prof. W. L. Everitt of the Department of Electrical Engineering, Ohio State University. The writer acts solely as a reporter and all credit is due the above-named men.

Interest in the single-wire-fed Hertz antenna for amateur work started mainly with an article by Williams, 9BXQ, in the July, 1925, *QST* followed by several, others including the re-hash in the July, 1926, issue. It is perhaps best to disregard all this previous material in relation to the single wire feeder system and start from the beginning.

A

FIG. 2.—THE COMMONLY-USED METHOD OF DETERMINING THE FUNDAMENTAL OF THE ANTENNA IS TO INSERT AN AMMETER IN THE CENTER OF THE RADIATOR AND ADJUST FOR MAXIMUM CURRENT

This system is not satisfactory and the results obtained are very misleading.

A

FIG. 3.—WHEN THE CURRENT IN THE CENTER OF THE RADIATOR WAS MAXIMUM IN THIS PARTICULAR CASE, THE CURRENT DISTRIBUTION WAS AS SHOWN

This is by no means a satisfactory condition, although it would be considered as such if only the ammeter readings were being considered.

Byrne and Brooke erected a special experimental station at W8XJ (Ohio State University),

* W8GZ-W8ZG, 1575 Franklin Ave., Columbus, Ohio.

Figure 1—The true "Windom" antenna was described by W8GZ in his 1929 *QST* article.

Commercial "Windoms" are generally not true Windom designs, but merely off-center fed (OCF) dipole antennas. Their chief advantage is that they resonate well on the frequencies that constitute a 1/4-wavelength for each leg of the antenna (or an odd multiple thereof).

The advantages to an inverted-**V** configuration of an OCF dipole are pretty much the same as making a standard dipole into an inverted **V**. That is, you get more radiation off the ends for a tradeoff of broadside radiation, and you can install the antenna with a single support.

On the other hand, when an antenna is used in the inverted-**V** configuration on higher frequencies than where the antenna is 1/2 wavelength long, the pattern degrades considerably compared to the pattern produced by a flattop under similar conditions.

Q I recently purchased a CW send/receive program. It is *DOS* software, but I can run it under *Windows* in a "*DOS* window." The software processes the receive audio through the soundcard and uses DSP to filter and select the signal you want to decode. It does this remarkably well, but the problem is that I can't seem to get the CW keyboard function to work. According to the documentation, you're supposed to be able to build a simple single-transistor keying interface to key your transceiver through a COM port. I built the interface and I'm trying to use it with COM 2, but nothing works. Can you help?

A I suspect that *Windows* has "seized" control of COM 2 and is reluctant to give it up! Even though you're running the software in a *DOS* box, *Windows* is still in control of the COM ports. To allow your software to control COM 2 in *DOS*, you need to disable the port in *Windows*.

Click on your START button, then SETTINGS, followed by CONTROL PANEL. Double click on the SYSTEM icon, then click on the DEVICE MANAGER tab.

Device manager will list all of your computer's "devices." Look for the PORTS label. Double click on it and you'll see a line for COM 2. Double click on this and you'll see the "properties" display for COM 2 (see Figure 2). *Uncheck* the box marked "original configuration." This should disable COM 2 in *Windows*, although you may have to reset your PC for it to take effect. Of course, you must remember to re-enable COM 2 if you want to use it for any *Windows*-based applications.

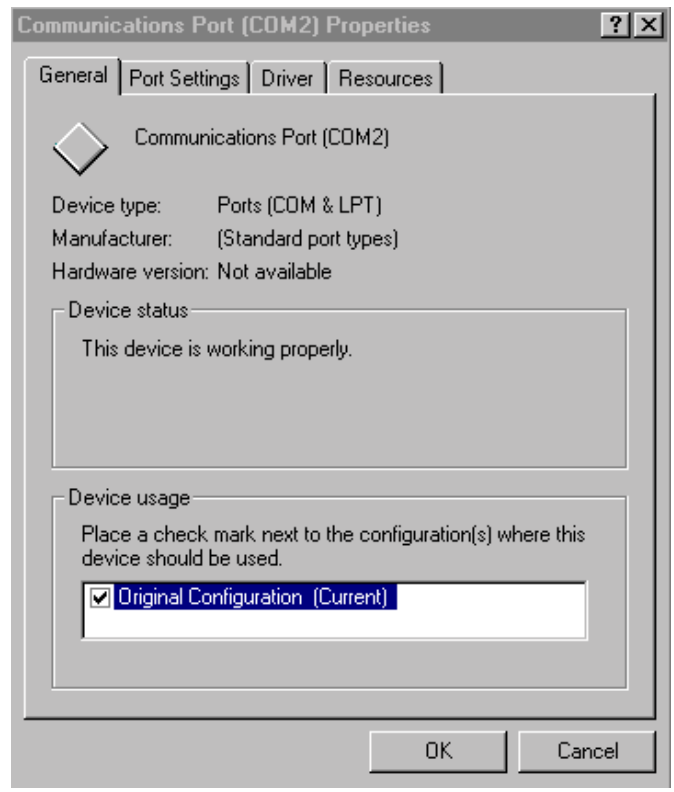


Figure 2—Once you've reached the COM 2 properties under Device Manager in *Windows* just uncheck the Original Configuration box to disable the port.

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.

HINTS & KINKS

A HOMEBREW ESD MAT

◊ Most semiconductor devices can be damaged by electrostatic discharge (ESD), but many hams do not take precautions to make their work area ESD-safe. This is probably due to the high price of ESD mats and other equipment.

A cheap ESD mat for almost any size bench top can be made in the following way. Cut a piece of Masonite to the desired size and coat it with a diluted India ink. This ink is available in art-supply stores and uses carbon as its pigment, so it is conductive when dry. I have used Rapidograph 3080-F ink since it is waterproof when dry. Dilute the ink with two parts rubbing alcohol to one part ink to thin it and make it soak into the Masonite more readily. Then spread the diluted ink around the surface of the Masonite with a piece of Scotchbrite, or other non-absorbing material, until the entire surface has an even black coating. Wear rubber gloves and protect your work surface because this ink stains whatever it touches! When dry, the surface of the board should measure between 100 kΩ and 10 MΩ between any two points on its surface.

One $^3/_4$-ounce bottle of ink is about enough to coat two square feet of Masonite when diluted. Since this ink is inexpensive (one or two dollars a bottle), even large mats can be made inexpensively.

Ground the mat at one corner by drilling a hole and securing a solder lug in firm contact with the black surface using a machine screw and nut. Run a wire from the lug to a good dc ground. A connection for a wrist strap can be made in the same way, but a wrist strap should *not* be directly connected to the ground lug, for safety. You don't want a low-resistance path between your body and ground when working with high-voltage equipment! If you don't have a wrist strap, a piece of wire with an alligator clip to connect to a ring or watchband will suffice.

For extra safety, mask a section of the Masonite before applying the ink and use that area to mount the main ground connection and then use a second lug (still on the isolated area) to attach the wrist strap. Then solder a 1-MΩ resistor between the ground and the wrist-strap lugs to make sure that you are isolated from ground. A third lug can be attached to the black area and grounded through a second 1-MΩ resistor, so that you and the mat are isolated from each other, while still providing a high-resistance path to drain off static charges.—*Bill VanRemmen, KA2WFJ, 104 Mitchell Ln, Hamlin, NY 14464;* **billy@frontiernet.net**; **http://www.frontiernet.net/~billy/**

CIRCUIT BOARDS FROM CARDBOARD AND COPPER TAPE

◊ Many experimenters have their own favorite means of putting together prototype circuits. "Ugly construction," printed circuit board and solderless breadboards all have their devotees. Here's another method for you to try.[1] It's both simple and cheap—no chemicals, circuit-board material or resist pen is needed. As the cost of each board is close to zero, you can simply throw away boards once you've finished with them.

Cardboard construction is ideal for low-power RF and audio circuits using discrete components only. If done with care, the results are even good enough for a permanent project—handy for those times when the prototype works so well that you're afraid to pull it apart.

The technique is based on using strips of self-adhesive copper tape stuck to pieces of cardboard (see Figure 1). This tape is used extensively by stained-glass craftspeople. Available on rolls of 30 meters (≈30 yards) length, the 5-mm ($^3/_{16}$ inch) tape can be cut with ordinary scissors. What makes the tape useful for our purpose, however, is the strong adhesive backing on one side of the copper. This backing can withstand high temperatures, such as applied by a soldering iron.

Figure 1—A photo VK1PK's cardboard circuit boards suitable for AF test and experimental circuits.

The cardboard acts as a nonconductive surface on which rectangles of copper foil are placed. Components are soldered directly to the copper: there is no need for holes to be drilled through the insulating material, as is the case with conventional printed circuit boards. Though cardboard from the side of an ordinary cardboard box is satisfactory, any rigid insulator, such as glass, wood or fiberglass could be used instead.

When building a cardboard circuit the first step is to look at the project's schematic diagram and estimate the size of the cardboard required. Then, working from the schematic, plan the position of each piece of copper tape. Cut the tape into rectangles of appropriate size (with a pair of household scissors) and peel off the paper backing. Pressing the tape tightly against cardboard with your index finger should result in a strong bond, able to withstand the heat of a soldering iron.

To form a right-angled bend, place one piece of copper strip over another, with their ends overlapping. For a good connection between the two pieces, solder the overlapping edges together.

Once the board has been completed, the components can be mounted: these are soldered straight to the copper tape. A blob of Blu-Tac adhesive[2] can be used to attach the cardboard circuit board to the interior of the case housing the project.

Because it is easy to add or remove components, experimentation is far easier than if you used an ordinary printed circuit board. As mentioned before, the cost of assembling circuits is very low, and the technique is ideal for simple school and club projects.

Self-adhesive copper tape is available from craft-supply stores. A 30-meter roll costs around $5. This amount should keep most experimenters going for months, if not years. Other uses for the tape include repairs to printed-circuit boards and window-mounted loop antennas.—*Peter Parker, VK1PK, 7/1 Garran Pl, Garran, ACT 2605, Australia*; **parkerp@pcug.org.au**

[1]This method was previously described in the author's October 1997 *Amateur Radio* (WIA) article "Receive SSB on Your Shortwave AM Radio."

[2]Blu-Tac is apparently a tacky putty adhesive common in Australia and Europe. Suitable equivalent products are sold in stationery and department stores for mounting photos and posters.

Bob Schetgen, KU7G ♦ Senior Assistant Technical Editor

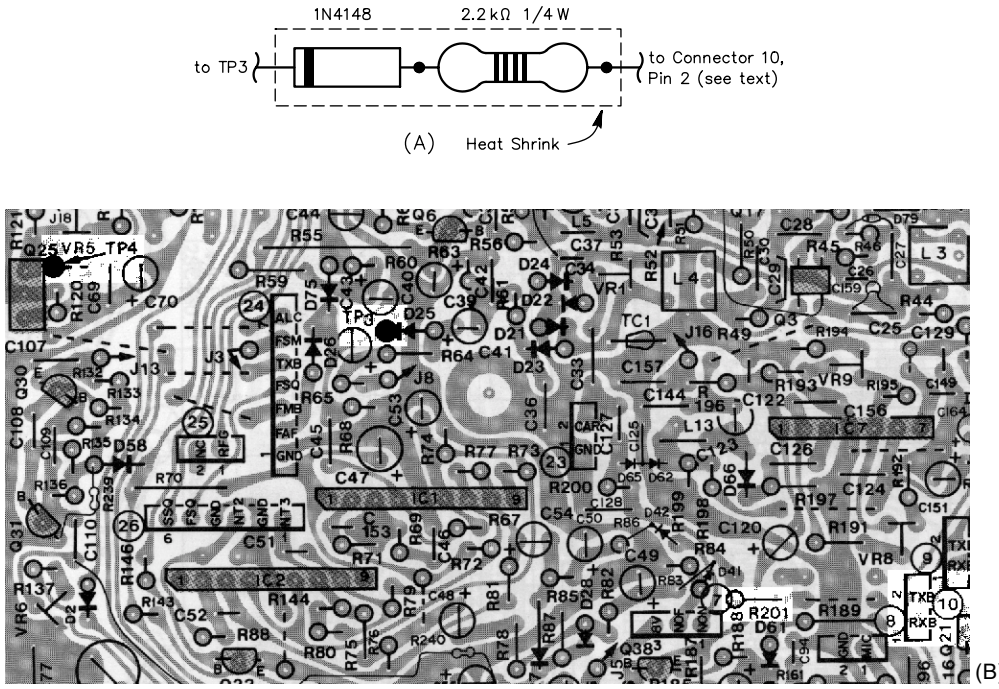


Figure 2—NZ9E's modification of the audio circuit of the Kenwood TS-430S for more complete audio muting while transmitting. (A) shows the added components. (B) is an enlarged portion of the IF board from the TS-430S Repair Manual.

A CURE FOR INCOMPLETE AUDIO MUTING IN THE TS-430S

◊ The Kenwood TS-430S HF transceiver can exhibit incomplete audio muting of its internal audio stages while transmitting. This is particularly noticeable when the FM mode is selected and the squelch setting permits noise to pass through the audio chain. Before this modification, IC2 is only partially cut off, and receiver noise can sometimes leak through when transmitting.

This modification puts sufficient voltage on the section of IC2—the IC that's used as the audio preamplifier out of the detector stage—so that the IC will be completely muted during transmit.

The cure is simple. First, locate the TS-430 IF-unit board. It is the large circuit board that you see when you remove the top cover. Assemble a 2.2-kΩ, 1/4-W resistor in series with a 1N4148 switching diode and a piece of insulated wire with heat-shrink insulation to prevent inadvertent short circuits. (See Figure 2A.) The insulated wire should be long enough for you to install the new components between plug-in connector #10 pin 2 (TX +8 V dc) and the junction of diodes D25, D26 and D75 (also designated as TP3; see Figure 2B). The cathode of the new 1N4148 diode should point toward TP3. This junction of parts is located just to the right of connector #24.

If you'd like to do everything from the top of the board, the new diode's cathode can be soldered to the cathode of D25, D26 or D75—or to TP3. The cathodes are accessible at the top of the vertically mounted diodes. The other end of the extension wire can be spliced into the wire coming from connector #10 pin 2 (the top of R201 is a convenient point).—*Dave Miller, NZ9E, 7462 Lawler Ave, Niles, IL 60714-3108;* **dmiller14@juno.com**

A review of the IF-board schematic reveals that the TXB line also appears at the top of R201 and TP4, which are easily available from the top of the board. These may offer more convenient connection points. Check to be sure that the voltage follows that of connector 10 pin 2 before using these alternate points—KU7G

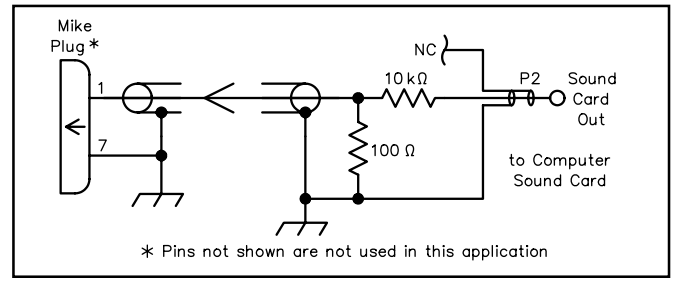


Figure 3—Corrected sound-card to Mike-plug circuit.

PSK31 AND NEWER KENWOOD RADIOS

◊ Ray Schneider, W6JXW, points out that Figure 1 in the November 1999 column (p 75) contained an error. The 100-Ω resistor should have been connected at the Mike end of the 10-kΩ resistor, not the sound-card end as shown. Figure 3 shows the correct arrangement. Also, the text values for the resistors are incorrect. Those in the figure are correct.—*KU7G*

TS-570 BATTERY FEEDBACK

◊ My article, "TS-570 Battery Replacement," appears in the November 1999, issue of *QST*. When writing the piece I had forgotten to include the following. Before removing the old battery, 13.8 V dc must be applied to the power connector on the rear panel. To protect the equipment, the radio should not be turned on during this procedure.—*Harold Kane, W2AHW, 326 NE 45th St, Pompano Beach, FL 33064;* **HAROLDKANE@worldnet.att.net**

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

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

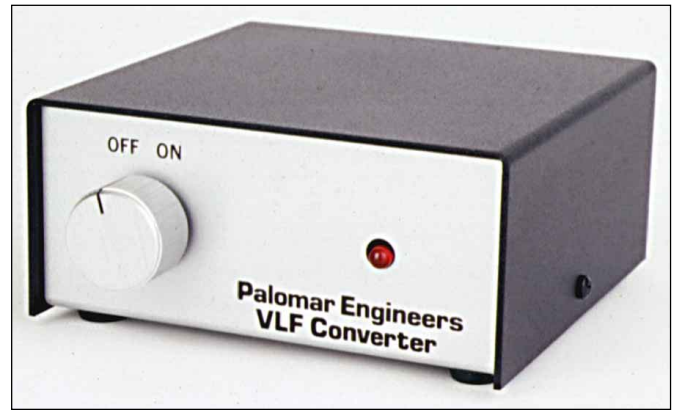
Palomar Engineers VLF Converter

There isn't much to the Palomar VLF converter—and that is one of its strong points. This little 2 × 4.25 × 4.25-inch unit is designed for the easiest installation possible. You connect your antenna to the SO-239 input, then attach a coaxial jumper between the converter output connector (another SO-239) and your radio. There is one switch on the front panel labeled **ON** and **OFF**, along with a red LED to indicate the **ON** state. The converter doesn't have a power supply. Instead, there is a clip on the rear panel for a 9-V battery.

The Palomar converter is simple on the inside as well. Incoming signals are first subjected to a 3-stage low-pass filter, which is essential to block overload from nearby AM broadcasters. After the low-pass filter the VLF signals reach a mixer stage composed of a 1496 mixer IC and a crystal-controlled oscillator designed around an MPF102 transistor. If you purchase the model VLF-A the oscillator/mixer combo converts 10 to 500 kHz to 3510 to 4000 kHz. In the VLF-S (the model tested for this review) the conversion output is 4010 to 4500 kHz. So, with the VLF-S in line, 4010 kHz becomes 10 kHz, 4020 kHz is 20 kHz, and so on.

As is often the case with receive converters of this type, the frequency conversion can be inaccurate. This is usually caused by an oscillator running at the wrong frequency. It turned out that my VLF-B was receiving about 7 kHz above what my IC-706 display was indicating. When my transceiver displayed 4053, for example, I was really listening at 60 kHz rather than 53 kHz. There is no frequency adjustment inside the Palomar converter, so I simply added 7 kHz to whatever I saw on the 706's display. A small trimmer capacitor across the crystal might be a worthwhile addition to allow users to adjust for display inaccuracies.

It's worth mentioning that the converter's **ON/OFF** switch functions as a bypass, connecting your radio directly to the antenna when the switch is in the **OFF** position. The switching arrangement isn't designed to handle any sort of RF power, so I wouldn't recommend transmitting through it!



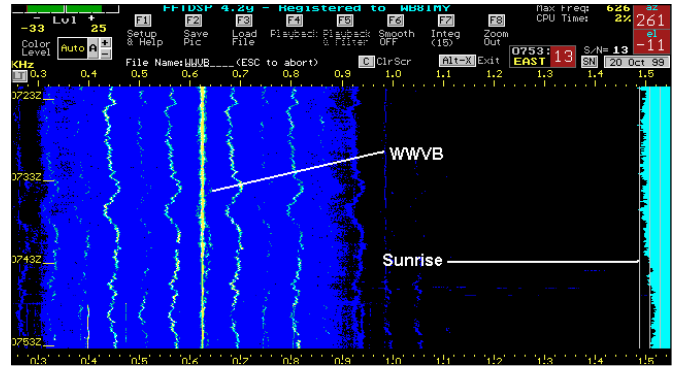


Figure 1—WWVB's 60-kHz signal under the DSP microscope using AF9Y's *FFTDSP* software (http://www.webcom.com/af9y/radio10.htm). The bright line represents WWVB. The white area along the right margin of the image represents the varying signal strength. Notice the drop in strength with local sunrise.

On-Air Performance

I installed the Palomar converter ahead of my ICOM IC-706 transceiver, using my 125-foot long-wire antenna, and subjected it to many evenings of listening. One of my first stops was at 60 kHz where I heard the time-code transmissions from WWVB, the National Institute of Standards and Technology station in Fort Collins, Colorado. With 50 kW of power, WWVB blankets the country with its signal.

ARRL Lab Measurements: Palomar VLF-B Converter

Current consumption: <20 mA
L.O. Accuracy: 6.9 kHz error
Conversion gain: 0 dB to –14 dB (loss), frequency dependent
Conversion gain over frequency:

Frequency (kHz)	*Gain (dB)*	*Frequency (kHz)*	*Gain (dB)*
10	–7	200	–2
20	–5	250	–5
50	–4	300	–9
100	–2	400	–12
150	0	500	–14

Using AF9Y's *FFTDSP* software, I ran my computer throughout an entire night to profile WWVB's signal. You can see a portion of the results in Figure 1. In the Amateur Radio section of my Web site at **http://home.att.net/~wb8imy/home.htm** I've also posted a short WAV audio file of the WWVB signal received with the Palomar VLF converter.

Above 200 kHz there were quite a few navigation beacons sending their two and three-letter Morse identifications. I switched between the Palomar converter and my IC-706 several times while monitoring distant beacons. Despite the lack of conversion gain performance, the difference was astonishing. In many cases I couldn't hear the *navaids* at all with the IC-706, but they were clearly audible when received through the Palomar converter.

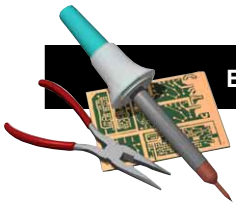
Bottom Line

There are strange and fascinating things going on below 500 kHz. The Palomar VLF converter offers a cost-effective way for you to eavesdrop using your present ham transceiver.

Manufacturer: Palomar Engineers, PO Box 462222, Escondido, CA 92046; tel 760-747-3343; **http://www.Palomar-Engineers.com**. Suggested list price: $89.95. QST

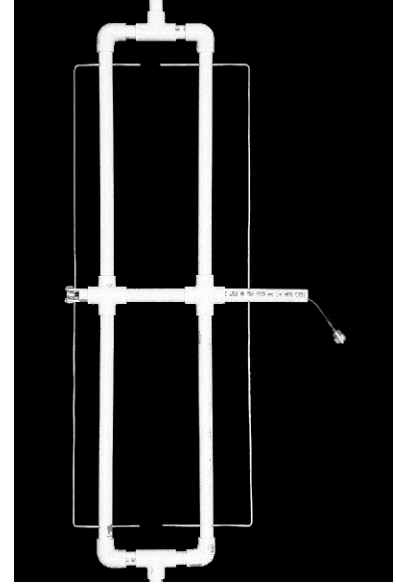
Next Short Take

Steve Ford, WB8IMY ♦ QST Managing Editor



By Lee Lumpkin, KB8WEV, and Bob Cerreto, WA1FXT

A Compact Two-Element, 2-Meter Beam



What do you get when you take an already-unusual design for an HF beam antenna, scale it to VHF and turn it on its ear? A vertically polarized modified Moxon, of course! Build this wire and PVC beauty to solve your 2-meter troubles in a jiffy.

I'd been looking for an antenna to monitor 2-meter simplex and Skywarn frequencies that was affordable and easy to install in my attic. Bob, WA1FXT, and I live in an area that sees Skywarn activations for tornado and severe thunderstorm watches several times a year. I also live in a house where my shack is in a new addition, separated from the rest of the house. When I'm in the older part of the house, I have a much better view of weather approaching from the west and north (the usual directions), but I can't hear the radios in my shack. I'm also out of touch with local 2-meter simplex frequencies when I'm not near the radio room. Bob has a similar situation at his home.

Finding the Design

Bob and I had been discussing HF and 6-meter Field Day antennas. One day, I visited L.B. Cebik's (W4RNL) Web site at: **http://www.cebik.com**. The site is an excellent place to find antenna information and it's a valuable resource for those educating themselves about antennas. While considering his refinement of HF beams designed by Les Moxon, G6XN, I realized that these interesting gain antennas had the characteristics I considered ideal for a 2-meter attic antenna—smooth, wide front lobes with no notches, reasonable gain, relatively compact dimensions and ease of construction and feeding.

Modifying the Design

I cut and pasted W4RNL's dimensions for horizontally polarized HF wire Moxon beams into a spreadsheet and derived formulas for the dimensions. I oriented the antenna to achieve the vertical polarization needed for 2-meter FM and took the 10-meter dimensions and put them into Roy Lewallen's *EZNEC* antenna design and analysis program. Using the formulas I had derived from Cebik's plans, I rescaled the antenna for 2 meters and tweaked it a bit to overcome the large shift in the element length-to-diameter ratio. The resulting design characteristics contained a pleasant surprise. The single, smooth front lobe widened to about 135° along the horizon (the –3dB beamwidth). This vertically polarized variant was much broader than its horizontally polarized cousin.

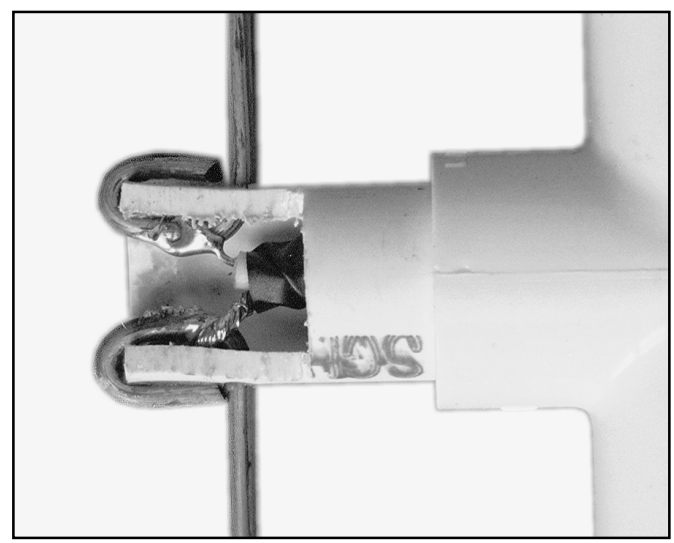
While tracking how the antenna's pattern changed at several points in the 2-meter band, I found a point about 500 kHz above the design frequency that had a single rear notch in the gain pattern at the cost of marginally higher SWR. This resulted in a cardioid-type pattern with a relatively narrow notch to the rear that was about 35 dB down from the maximum forward gain (which models at around 6 dBi in free space). Far from being a disappointment, this was a useful foxhunting antenna of manageable size. This was something Bob and I had both been looking for!

We needed a framework to support the wire elements, so I put the dimensions for the two wire elements into a CAD program and worked up a PVC framework to support them. When Bob saw the antenna pattern and construction plans he became excited about the antenna's possibilities—especially as a foxhunter.

Build One of your Own

Please note that the dimensional accuracy used here is overkill. If you cut your elements to within an eighth of an inch, your antenna should work like a champ, with no practical loss in performance. Put away the calipers and pick up a ruler! The most critical dimension of these "modified Moxons" is the distance between the tips of the reflector tails and driven elements, which can be fine-tuned after assembly.

The first step in construction is to cut the $^1/_2$-inch schedule 40 PVC pipes to the lengths needed for the support frame. The quantities and lengths are listed in the sidebar. If you're going to vary from the pipe lengths shown in the table, be sure to allow $^3/_4$-inch to accommodate the various PVC fittings.



A closeup view of the connection between the coax and the radiating element.

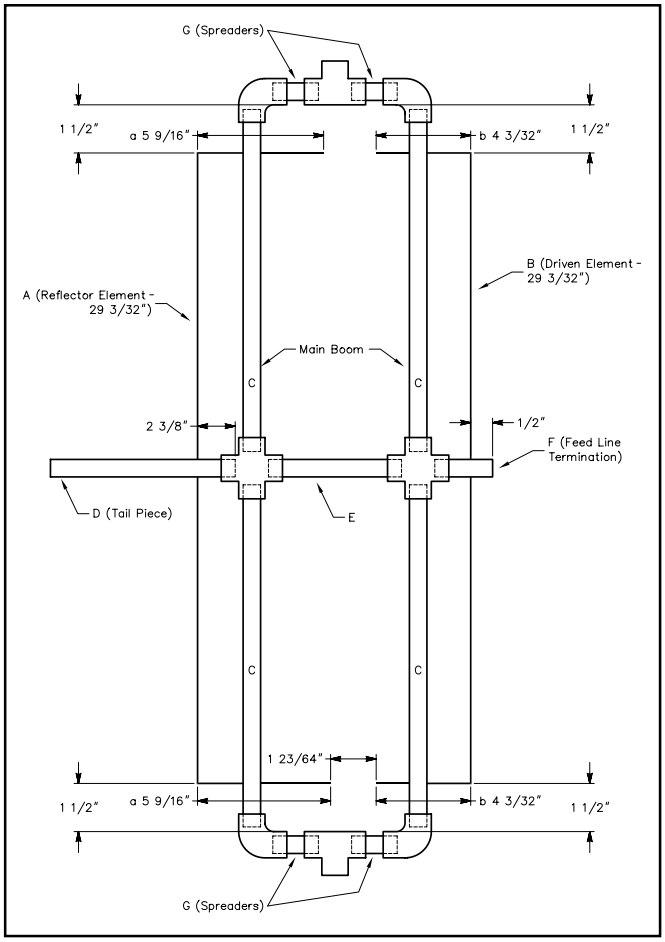


Figure 1—A construction diagram of the Moxon 2-meter beam antenna. See text and tables for details.

Table 1
Bill of Materials

10 feet	1/2-inch Schedule 40 PVC pipe
4	1/2-inch Schedule 40 PVC 90° elbows
2	1/2-inch Schedule 40 PVC crosses
2	1/2-inch Schedule 40 PVC tees
Approx 10 feet	No. 10 AWG copper wire
1	PL-259 coax connector
1	UG-176U coax adapter
2	Wire ties
3	Amidon Ferrite Beads (FB-43-5621) Amidon Associates 240-250 Briggs Ave Cosat Mesa, CA 92626
RG-8X coax	As needed
Misc	Plastic electrical tape

PVC and Wire Cutting Schedule

Reflector element **A** consists of one piece of #10 AWG copper with a straight section and two tails bent at 90°. Total length is a single piece of 40 7/32 inches.

Driven element **B** is two half elements fed in the middle. Total length is a nominal 37 9/32 inches, but build it according to the text. A slightly longer wire is required to wrap around the PVC and secure the feed point to the pipe.

See Figure 1 for the drawing labels.

Wire

Qty	*Label*	*Description*	*Length*
1	A	Reflector Element	29 3/32"
	a	Reflector Element Tail	5 9/16"
1	B	Driven Element	29 3/32"
	b	Driven Element Tail	4 3/32"

PVC

Qty	*Label*	*Description*	*Length*
4	C	Main Boom	15 9/16"
1	D	Tail Piece	6"
1	E	Middle Boom Spreader	5 1/8"
1	F	Feedline Termination	2"
4	G	End Boom Spreader	2 1/16"

After cutting the PVC to length (per the accompanying table), measure and drill the holes for the wire antenna elements. Use a drill press and a fence to center the holes in the pipe (or mark the holes and drill carefully by hand).

Place the tip of a center punch or a nail at the drilling point and tap with a hammer to dimple the surface. This will hold the tip of the drill bit in place and keep it from spinning off target as you drill.

Follow the diagram in Figure 1 as you begin to assemble the antenna. Drill a hole completely through each of the four pipes labeled **C**, 1 1/2 inches from one end. This will go at the end farthest from the antenna center. The hole drilled in pipe **F** should pass all the way through, 1/2-inch from the pipe end. Mark one end of pipe **D**; that end that will be inserted into the PVC cross. Drill a hole completely through pipe **D** 2 3/8 inches from the marked end. Make sure to orient the pipe properly when assembling the PVC frame or you will end up with a bowed reflector element (**A**).

Use solid #10 AWG copper wire for the antenna elements. Number 10 copper wire is a nominal 0.1-inch in diameter, but ours was a bit too large for a 7/64-inch hole, so we used a 1/8-inch drill bit. This allows the wire to pass through easily without too much slop. If your wire slips through the holes after building the antenna, hold the elements in place with wire ties, heat shrink tubing, hot glue, RTV sealant or tape (anything that won't detune the antenna). If you're making a permanent outdoor antenna, use UV-resistant material to secure the elements.

The next step is to assemble the PVC frame. This is best done on a flat surface. Use a rubber or wooden mallet to persuade the pipes to seat snugly in the fittings, being careful to keep the wire holes in the correct plane.

Align the four vertical pipes (**C**) by sighting through the holes you drilled in each pipe for wire tails **a** and **b**, aligning them with the corresponding holes in the opposite vertical pipe. If necessary, a pair of pliers can be used to fine tune the alignment by twisting the pipe in the fittings. The front and tail pipes, **F** and **D**, are aligned by sighting along the lengths of the vertical support pipes to be sure that the holes for wire sections **A** and **B** run parallel with the frame.

Next, prepare and install the wire elements. Straighten some #10 wire before starting the installation. After inserting the wire into the PVC frame, it's difficult to thoroughly clean the wire at the feed point (**F**), so be sure to clean it thoroughly beforehand. Oxidized wire makes it difficult to get a good solder joint, especially in this tight space. So use an abrasive plastic pad or fine steel wool to clean up the wire ends at the feed point to make for easier soldering.

First, install one half of the driven element (**B**). Take a longer piece of #10 wire (about 24 inches) and bend an inch at one end about 90º. Do this at the end you have already cleaned in preparation for soldering at the feed point. Bend about half of that 1-inch bend another 30º to 45º in the same plane. Pass the resulting "J" shape through the feed point hole in PVC pipe **F** from the outside (so the bends end up inside the pipe with about 1/2-inch protruding from the open end of the pipe). Hold the wire against the inside of

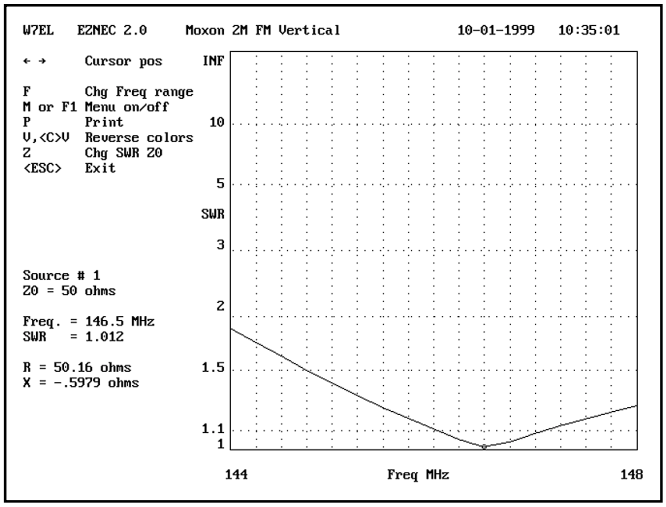


Figure 2—The predicted SWR bandwidth of our 2-meter beam, from 144 to 148 MHz.

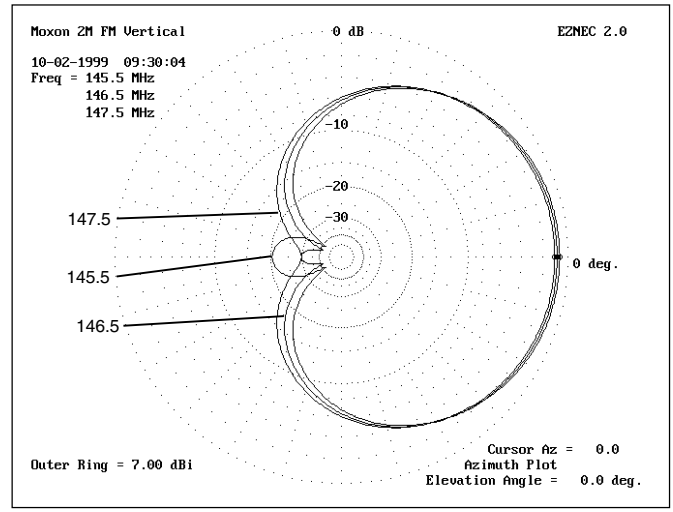


Figure 3—The predicted radiation pattern of the Moxon beam.

the PVC pipe with pliers or a dowel and wrap the $^1/_2$-inch of protruding wire back around the outside of the pipe and crimp it tightly against the outside of the pipe. See the close-up photo of the feed point to see the final result.

Once this is done, hold the wire parallel to the front vertical portion of PVC support frame **C** and bend it back at 90º at a point in line with the support holes in PVC pipe **C**, forming element tail **b**. This will be about $14^1/_8$ inches from the outside of PVC pipe **F**.

Measure and cut the bent-back wire tail section (**b**) to 4-3/32 inches long. Leave extra and trim later if you wish. Pass this tail section through the support hole in the front vertical pipe (**C**) on the PVC frame. Install the other half of driven element **B** using the same steps and dimensions.

Now you need to feed the antenna with coax *before* installing the reflector element (wire **A**). Prepare the feed line by obtaining a three-foot RG-8X jumper (with PL-259s installed on each end) and cutting it in half. This speeds construction and makes it easy to build two antennas at once. You can, of course, make up your own RG-8X coaxial cable and PL-259 assembly.

Strip 1 inch of insulation from the shield and $^3/_4$-inch from the center conductor at the unterminated end of the coax. Use three type-43 ferrite choke beads (Amidon FB-43-5621) to keep RF from returning along the coax shield. Slip the beads onto the feed line and secure them with wire ties and electrical tape as close to the stripped end of the coax as you can without touching the bare copper braid, the center conductor or the wire elements at the feed point. The electrical tape should also help prevent this contact.

To improve access to the feed point, cut a section out of the side of the pipe at the feed point as shown in the photo. First cut into one side of pipe **F** just behind the feed point, perpendicular to the length of the pipe to a depth of about $^1/_3$ of the pipe diameter. Another cut in from the end of pipe **F**, along its length, but cutting in only about $^1/_3$ its diameter, leaves enough support for the center of driven element **B**. This leaves plenty of space for soldering.

We considered making these cuts before installing the driven element wires, but decided that the stresses involved in bending the heavy gauge wire around the PVC at the feed point might cause cracking. You may find that it's okay to make your access cut first. Be sure to use a fine blade, such as a hacksaw or dovetail saw.

Now run the feed line in from the rear of the center horizontal support pipe up to the feed point, through pipes **D**, **E** and **F**. Wrap the coax shield around one side of driven element wire **B** (inside pipe **F**) and the center conductor around the other end of the driven element wire, then solder both connections. Use paste flux and a 100-W iron of sufficient mass. Irons with less thermal capacity can't generate enough heat, or have their thermal energy conducted away too quickly by the #10 wire. Lengthy heating with a smaller iron is likely to melt the PVC.

Now it's time to put reflector element **A** into place. First, pass 45 inches (or more) of #10 wire through the rear center support holes in PVC pipe **D**, being careful to go around the coaxial feed line rather than through it. Bend about six inches of wire at one end back at 90º toward the driven element and support frame (forming tail **a**) and trim it $5^9/_{16}$ inches from the bend. Then, pass this tail through the wire support holes in the rear vertical section (**C**) of the PVC support frame. Measure $29^3/_{32}$ inches from this first bend along reflector wire **A** and make the bend to form the other reflector tail. Trim this tail to $5\ ^9/_{16}$ inches and pass it through its support hole in pipe **C**.

Everything is now in place, so square up the wire elements on the frame. One characteristic of Moxon antennas is a sensitivity to the relative positions of tails **A** and **B**, so make sure the tails are in line with each other and spaced at $1^{23}/_{64}$ inches. This was considered in designing the PVC support frame and the points at which it holds the wire elements. This design allows the wire tails to be held in line with each other, leaving the distance between the tips of the tails to be fine tuned and then taped, glued or otherwise secured to the PVC frame once the antenna is performing to spec.

We didn't cement our PVC frames because my antenna would be installed indoors and the joints were firmly seated without gluing. If you want to cement yours, we'd suggest assembling the frame to align the wire support holes and carefully making reference marks at the junctions of the pipes and fittings. This will allow you to quickly orient the PVC elements before the PVC glue sets up. If you're going to mount your antenna outside, gluing the PVC frame is a good idea. PVC glue sets up very quickly, so if you don't feel confident, you might want to insert small sheet metal screws into predrilled holes instead. Alternatively, you can build the PVC frame and glue it together before drilling the wire support holes.

You should try to run the feed line away from the antenna for a couple of feet before running it parallel with the main sections of the wire elements. Running it parallel to these sections at less than 19 inches or so may distort the pattern of the antenna and change its SWR.

Performance Testing

After building the first antenna, we decided to test its performance before building the second. We took the antenna to a clear spot in the yard and hooked it up to an MFJ-259 antenna analyzer through about

25 feet of RG-213 coax. Bob held the antenna up on a PVC mast while I ran through 2 meters with the analyzer—and I started to laugh.

Bob was dying with curiosity, so we traded places while he swept the band. The antenna came up on the frequency we expected, with an even broader bandwidth (see Figure 2). We decided to check the front-to-back ratio, but had no field strength meter at hand. Bob got in his truck and I aimed the front lobe of the antenna at him until his receiver dropped below S-meter saturation about a mile away.

While I turned the antenna and reported to Bob where he was in the pattern, a station in my normal fringe area called me. This station doesn't receive me full quieting on my base antenna (stacked 5/8-wave omni antennas at 33 feet, fed with about 2 W), but was hearing me now with the Moxon up only eight feet while running 350 mW!

Bob and this other station (11 miles in the opposite direction) reported S-meter readings in line with the computer-predicted pattern as I rotated the antenna in azimuth. At this point, we scrambled back to the garage to build a second antenna before we ran out of time!

The Hunt

About a week later, Bob and I got together for a foxhunt and to check out the front-to-back ratio in a more controlled manner. Bob, his son Matt, and I were on our first hunt together. Bob had borrowed a passive field-strength meter, but we were unsure of its linearity and were unable to get enough useful range out of it to measure the front-to-back ratio on the 2-meter Moxon.

Bob has a well-calibrated attenuator, so we made some measurements and checked the pattern and front-to-back ratio by switching the attenuator to give the same reading on the field-strength meter. The pattern turned out to be in line with the computer model, and the narrow rear notch was down 29 dB from the front lobe, exactly as predicted. We also checked the antenna at 147 MHz, about 500 kHz above the design frequency of 146.5 MHz. Again, as predicted, the rear notch deepened to about –35 dB.

We hunted using the rear notch in the Moxon pattern. We were thrown off several times by reflections from large metal buildings, a power plant that killed the signal, and the unfamiliar terrain. But we overcame the problems and were the third team to find the fox. We covered 19 road miles in the search for the fox, which was about six miles from the start as the crow flies. On one transmission, the fox was on a vertical omni with steady power when we were a couple of miles out. This gave us our best sample. The bearing we took on this transmission was within a couple of hundred feet from the fox's actual position.

The hunter who first found the fox (in half our time) and the team that found it a few seconds ahead of us were both using the same 4-element, balanced feed Yagi that I had used to win two California foxhunts. When tuned properly this Yagi has a single rear notch. The Moxon performed similarly, with the exception of its wider front pattern and reduced forward gain. We were very happy with its performance as a compact foxhunting antenna.

After we had designed and tested this antenna, we decided to see how it would act mounted on a standoff from a metal mast. We haven't checked thoroughly, but computer modeling suggests that at $^1/_4$ wavelength, the rear null is not nearly as deep. The cardioid notch pretty much disappears. At $^1/_2$ and 1 wavelength, the pattern is pretty good, so choose your mounting offsets (from a vertical metal mast) accordingly. This was not a great concern to me because I used PVC tee connectors at the top and bottom of the frame to support the antenna with short sections of PVC pipe attached to the ridge beam and a ceiling joist in my attic. It has performed very respectably there, only 12 feet off the ground. I can make all of my regular 2-meter simplex contacts, and the antenna holds its own when accessing local repeaters.

Bibliography & Resources:

http://www.cebik.com. Learn from L. B.'s experience and modeling expertise. This site is a wonderful resource for antenna experimenters.

HF Antennas for All Locations, 2nd ed., Les Moxon, RSGB, ISBN 1-872309-15-1

"Moxon Rectangles for 40-10 Meters," L. B. Cebik, *QRPp,* Dec 1995, pp25-27.

"An Aluminum Moxon Rectangle for 10 Meters," L. B. Cebik, *Antenna Compendium*, Vol. 6 (ARRL).

"The Moxon Rectangle on 2 Meters," *AntenneX,* Sep 1999, L. B. Cebik.

"Building a 2-Meter Moxon," *AntenneX* (Oct 1999), L. B. Cebik.

"Moxon Rectangles: A Review," *AntenneX,* Oct 1998, L. B. Cebik.

"Modeling and Understanding Small Beams: Part 2: VK2ABQ Squares and the Modified Moxon Rectangle," *Communications Quarterly*, Spring 1995, pp55-70.

"The Moxon Rectangle," Morrison Hoyle, VK3BCY, *Radio and Communications* (Australia), Jul 1999, pp52-53.

Resulting Antenna Performance and Potential Uses

No antenna does everything well, but this design has a number of useful characteristics:

• A smooth, wide front lobe (see Figure 3) with modest, but useful gain (of about 6 dBi in free space) and none of the sidelobe notches associated with most Yagi and quad beams of three or more elements.

• A single, deep rear notch (up to –35 dB relative to the maximum front lobe gain). This makes it useful for rejecting single-source interference and for foxhunting.

• A compact and simple design that is inexpensive and easy to build with minimal tools and skills.

• A very good direct match to 50-Ω feed lines.

You can use this antenna to: minimize or eliminate interference or intermod from pagers or other stations while still receiving desired signals from most other directions; access desired repeaters while rejecting an unwanted repeater; and reach a broad swath of stations or repeaters with reasonable gain and no need to rotate a beam or overcome multiple side lobe nulls that accompany multi-element Yagis and quads. You should also be able to foxhunt by placing the fox's signal in the single null and heading in the direction of greatest signal attenuation.

It should be noted that L. B. Cebik is responsible for refining the geometry of the Moxon beam to its full potential. Our antenna is a simple rescaling of his work. He is very generous in sharing his work with anyone who is interested. His work on this antenna was inspired by the designs of Les Moxon, G6XN, and Fred Caton, VK2ABQ, who started out with square HF wire beams using buttons to insulate the element tails.

This particular version of the Moxon antenna should be used as a starting point. Visit Cebik's web site for a horizontal 10-meter version made from aluminum tubing. Cebik has also suggested using the Moxon's wide front lobe to point directly toward the zenith for "unsteered" satellite communication on 2 meters—a use which deserves attention and development.

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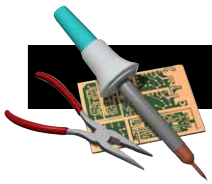


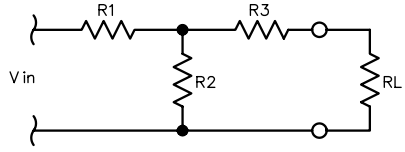
By H. Ward Silver, N0AX

Test Your Knowledge!

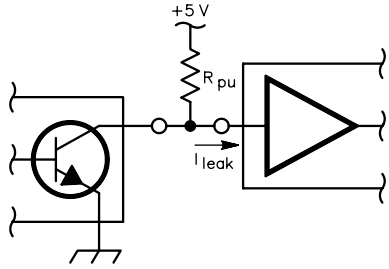
Take a look at the world from the "analog angle."

Our last set of word problems was slanted to the bit-banging side of life. Here's a set aimed at those who prefer the continuous ebb and flow of analog electronics…

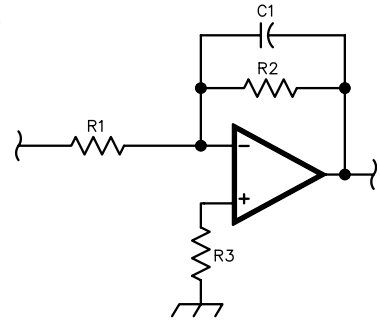
1. If R1 = R2 = 25Ω and R3 = 100Ω…
a. What is the input impedance at V_{in} for RL = 50 Ω?
b. How much is the signal power at RL attenuated (in dB) from the input?
c. If V_{in} = 10 V_{rms}, how much power is dissipated in each resistor?
d. If RL is disconnected, what is the input impedance at V_{in}? If RL is shorted?



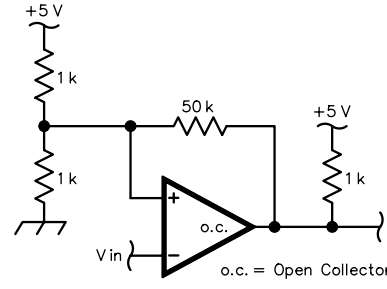
2. An open-collector gate is to drive a digital input that for a logic-low condition requires a voltage of 0.3 V or lower.
a. If the gate's output can sink 10 mA, what is the minimum value of the pull-up resistor, ignoring the gate's output voltage drop?
b. If the digital input's leakage current is 10 µA, what is the maximum value of the pull-up resistor (neglecting the gate's output leakage) that will maintain the input voltage above 4 V?
c. If the digital input's capacitance is 20 pF and the pull-up resistor is 4.7 kΩ, how long does it take the input voltage to rise to 86% of the steady state value assuming a start from 0 V?



3. In the op-amp circuit shown…
a. If R1 = 10 kΩ and R2 = 100 kΩ, what is the dc voltage gain of the circuit?
b. What is the function of R3 and what is its most likely value?
c. If C1 is 100 pF, what is the upper roll-off frequency of the output signal?



4. In the comparator circuit shown, the open-collector output turns off (open-circuit) whenever the voltage at the non-inverting input is greater than that at the inverting input. At what voltage will the output voltage switch from low to high? At what voltage will the output voltage switch from high to low?



22916 107th Ave SW
Vashon, WA 98070

Answers

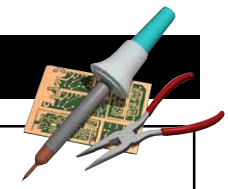
1. a. Input impedance is R1 + the parallel combination of R2 and (R3+RL) = 46.4 Ω.
b. First find the voltage across R2 by treating the circuit as a voltage divider. V_{R2} = V_{in} (21.4 / (21.4 + 25)) = 0.46 V_{in}. The voltage across RL is now found by treating R3 and RL as a voltage divider. V_{RL} = 0.46V_{in} (50 / (100 + 50)) = 0.15 V_{in}. Now calculate attenuation compensating for the difference in impedance between the input (46.4 Ω) and the output (50 Ω). 10 log [(V_{RL}²/RL)/(V_{in}²/R$_{in}$)] = 16.8 dB.
c. It's necessary to compute the voltage across each resistor…
V_{R2} = 0.46 V_{in} = 4.6 V_{rms}, so P_{R2} = 0.85 W
V_{R1} = V_{in} – V_{R2} = 0.54 V_{in} = 5.4 V_{rms}, so P_{R1} = 1.16 W
V_{R3} = 0.46 V_{in} (R3 / (R3 + RL)) = 0.31 V_{in} = 3.1 V_{ms}, so P_{R3} = 0.095 W
V_{RL} = 0.15 V_{in} = 1.5 V_{rms}, so P_{RL} = 0.047 W
As a check, add the power figures (2.16 W) to be sure they're the same as for the computed input impedance from part b of 46.4 Ω.
d. If RL is an open-circuit, the circuit reduces to R1 and R2 in series or 50 Ω. With RL a short, the circuit is R1 in series with the parallel combination of R2 and R3 or 45 Ω.

2. a. R_{pu}min. = supplied voltage / max. current rating = 5 V / 10 mA = 500 Ω.
b. R_{pu}max. = supplied voltage - required input voltage / leakage current = (5 V – 4 V) / 10 µA = 100 kΩ
c. 86% voltage rise represents two time-constants of an R-C circuit, in this case composed of R_{pu} and the input capacitance. The time constant = 4.7 kΩ x 20 pF = 94 nsec. So, it will take 188 nsec for the input voltage to rise to 86% of its final value. Leakage current can be ignored because the value of R_{pu} is small.

3. a. The dc gain of the circuit is –(R2/R1) = –10.
b. Dc offsets are caused by bias current through the op-amp input circuit. If R3 is the same value as R1 in parallel with R2, the bias current voltage drop that appears at the noninverting input balances the voltage drop at the inverting input and they cancel out.
c. The upper roll-off frequency/equals 1/2π x (R2 x C2) = 15.9 kHz.

4. The nominal switching set point of the circuit is established by the 1 kΩ voltage divider at one-half of the supply voltage, or 2.5 V. When the open-collector output is off (and the output is high), the 50 kΩ feedback resistor (ignoring the small contribution of the pull-up resistor) is effectively in parallel with the upper leg of the set point divider. This causes the set point to rise by 20 mV to 2.52 V. This is the point at which a rising input voltage will cause the output to switch from high to low. When the open-collector output is on, effectively connecting the 100 kΩ feedback resistor to ground, the lower-half of the 1 kΩ voltage divider becomes 980 Ω for a low-to-high switch point voltage of 2.48 V. This effect is called *hysteresis* and keeps a slowly-changing or noisy input voltage from causing the output to switch rapidly, a condition called *chattering*.

THE HELP DESK



The "Considerate Operator's Frequency Guide"

The following frequencies are generally recognized for certain modes or activities (all frequencies are in MHz).

Nothing in the rules recognizes a net's, group's or any individual's special privilege to any specific frequency. Section 97.101(b) of the Rules states that "Each station licensee and each control operator must cooperate in selecting transmitting channels and in making the most effective use of the amateur service frequencies. No frequency will be assigned for the exclusive use of any station." No one "owns" a frequency.

It's good practice—and plain old common sense—for any operator, regardless of mode, to check to see if the frequency is in use prior to engaging operation. If you are there first, other operators should make an effort to protect you from interference to the extent possible, given that 100% interference-free operation is an unrealistic expectation in today's congested bands.

1.800-1.830	CW, data and other narrowband modes
1.810	QRP CW calling frequency
1.830-1.840	CW, data and other narrowband modes, intercontinental QSOs only
1.840-1.850	CW; SSB, SSTV and other wideband modes, intercontinental QSOs only
1.850-2.000	CW; phone, SSTV and other wideband modes
3.500-3.510	CW DX
3.590	RTTY DX
3.580-3.620	Data
3.620-3.635	Automatically controlled data stations
3.710	QRP Novice/Technician CW calling frequency
3.790-3.800	DX window
3.845	SSTV
3.885	AM calling frequency
3.985	QRP SSB calling frequency
7.040	RTTY DX
	QRP CW calling frequency
7.075-7.100	Phone in KH/KL/KP *only*
7.080-7.100	Data
7.100-7.105	Automatically controlled data stations
7.171	SSTV
7.285	QRP SSB calling frequency
7.290	AM calling frequency
10.106	QRP CW calling frequency
10.130-10.140	Data
10.140-10.150	Automatically controlled data stations
14.060	QRP CW calling frequency
14.070-14.095	Data
14.095-14.0995	Automatically controlled data stations
14.100	IBP/NCDXF beacons
14.1005-14.112	Automatically controlled data stations
14.230	SSTV
14.285	QRP SSB calling frequency
14.286	AM calling frequency
18.100-18.105	Data
18.105-18.110	Automatically controlled data stations
21.060	QRP CW calling frequency
21.070-21.100	Data
21.090-21.100	Automatically controlled data stations
21.340	SSTV
21.385	QRP SSB calling frequency
24.920-24.925	Data
24.925-24.930	Automatically controlled data stations
28.060	QRP CW calling frequency
28.070-28.120	Data
28.120-28.189	Automatically controlled data stations
28.190-28.225	Beacons
28.385	QRP SSB calling frequency
28.680	SSTV
29.000-29.200	AM
29.300-29.510	Satellite downlinks
29.520-29.580	Repeater inputs
29.600	FM simplex
29.620-29.680	Repeater outputs

Note

ARRL band plans for frequencies above 28.300 MHz are shown in *The ARRL Repeater Directory* and *The FCC Rule Book*. For detailed packet frequencies, see *QST*, September 1987, page 54, and March 1988, page 51.

IBP/NCDXF beacons operate on 14.100, 18.110, 21.150, 24.930 and 28.200 MHz.

VHF/UHF/EHF Calling Frequencies

Band (MHz)	*Calling Frequency*	
50	50.125	SSB
	50.620	digital (packet)
	50.525	National FM simplex frequency
144	144.010	EME
	144.100	CW
	144.200	SSB
	146.520	National FM simplex frequency
222	222.100	CW/SSB
	223.500	National FM simplex frequency
432	432.010	EME
	432.100	CW/SSB
	446.000	National FM simplex frequency
902	902.100	CW, SSB
	903.100	Alternate CW, SSB
1296	1294.500	National FM simplex frequency
	1296.100	CW/SSB

Band (MHz)	*Calling Frequency*	
2304	2304.1	CW/SSB
3456	3456.1	CW/SSB
5760	5760.1	CW/SSB
10000	10368.1	

VHF/UHF Activity Nights

Some areas do not have enough VHF/UHF activity to support contacts at all times. This schedule is intended to help VHF/UHF operators make contact. This is only a starting point; check with others in your area to see if local hams have a different schedule.

Band (MHz)	*Day*	*Local Time*
50	Sunday	6 PM
144	Monday	7 PM
222	Tuesday	8 PM
432	Wednesday	9 PM
902	Friday	9 PM
1296	Thursday	10 PM

See Feedback in February 2000 *QST*.

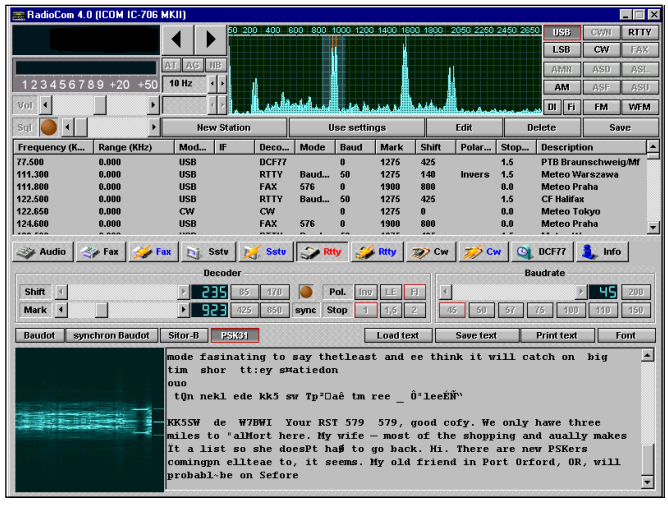
RadioCom 4.0

RadioCom version 4.0 might best be described as a software-based multimode communication processor. Like many other HF digital programs available today, *RadioCom* uses your PC sound card as an analog-to-digital converter. With sophisticated digital signal processing algorithms, *RadioCom* filters and decodes a variety of signals including RTTY, CW, AMTOR, SITOR, PSK31, FAX, SSTV and more. In the latest version the same techniques are used to *encode* RTTY, PSK31, FAX and SSTV signals for transmission (*RadioCom* can also send CW by keying your rig through an available COM port).

RadioCom will work with almost any SSB receiver or transceiver. All you really need are shielded cables to carry the audio between your radio and your sound card. The *RadioCom* package includes a hardware modem/level converter that will allow you to control almost any computer-ready radio through the software. (*RadioCom* supports ICOM, Yaesu, AOR, Kenwood, Lowe, NRD and Drake equipment with drivers for other brands available on line.) *RadioCom's* level converter is an important feature to keep in mind when you consider the $250 price tag. Most commercial level converters cost in the neighborhood of $100 or more. So, when you subtract this cost from the total, you are really paying about $150 or less for the *RadioCom* software.

Deciphering the Manual

RadioCom is a complex piece of software, so it seemed like a good idea to read the manual—and that was where I immediately ran into trouble. *RadioCom* is the brainchild of Bonito Inc, a firm based in Hermannsburg, Germany. If I could read German fluently, I would have been better off studying the German version of the manual (also on the CD) because the English translation is very poor. I had to read slowly and carefully, pausing often to decipher strangely worded sentences. In a few cases I was left with only a vague idea of what the writer was attempting to say. To their credit Bonito recognizes the problem and has indicated that they are working on a much-improved translation. As it stands now, the English manual is a serious impediment to understanding and using *RadioCom*.



***RadioCom* in the PSK31 receive mode.**

Pros and Cons

The middle portion of the *RadioCom* main screen contains a lengthy scrolling list of RTTY, CW, and FAX stations with their frequencies, call signs, locations and signal specifications (RTTY shift and baud rate, for example). With radio control activated, you need only double click your mouse on any line and your rig will instantly switch to the proper frequency and mode. You can modify the list, adding or subtracting stations as you wish. This is a very convenient feature.

RadioCom did an outstanding job decoding HF fax transmissions, which are mostly weather maps and the occasional news report or satellite image. It did an adequate job copying SSTV, although it can only decode Martin 1, Scottie 1, SC2 180 and Robot 72 formats. Using the slant adjustment was a pain because it is very sluggish (even with my 330 MHz Pentium II), but the program saves the alignment settings for the various SSTV formats once you finally manage to straighten out the images. CW decoding was on par with most CW decoders I've tried and *RadioCom* performed quite well with RTTY signals. Its ability to decode PSK31, however, was marginal. Tuning was extremely touchy, making it difficult to obtain clean text even with strong signals. *RadioCom*'s horizontally scrolling waterfall display and tuning indicators were not easy to interpret and the manual was of little help.

When it comes to transmitting, *RadioCom* is still a work in progress. Instead of combining the transmit and receive functions for each mode into single windows, for example, *RadioCom* places them in separate windows that you must open and close when you switch from transmit to receive. This cumbersome arrangement means that you cannot type ahead in RTTY or PSK31 (you can't see what the other fellow is sending when you have the transmit window open). Worse yet, the RTTY and PSK31 transmit buffers do not automatically clear themselves after you transmit. If you don't delete the text you've just sent, it remains in the buffer (and in the window) and will be sent again the next time you click on the transmit button. I discovered this glitch the hard way.

RadioCom is Eurocentric software, and this is most apparent with the "DCF77" decoder. DCF77 is a 76-kHz station located near Frankfurt, Germany that transmits precision time-code signals similar to our 60-kHz WWVB. *RadioCom* will decode the DCF77 signals and automatically update its large numerical time display, along with your PC clock if you desire. Unfortunately, most of us can't receive DCF77 in the US, and *RadioCom*'s DCF77 decoder will not work with WWVB (I tried). I hope that newer versions of *RadioCom* for the American market will provide WWVB decoding instead.

Bottom Line

If you enjoy eavesdropping on HF digital signals, *RadioCom* 4.0 offers impressive flexibility and performance. It's fascinating just to play with the variable DSP filters to see what you can really hear beneath the noise and interference. But for Amateur Radio applications, *RadioCom* needs to return to the drawing board. With a better English manual and other improvements, the next version of *RadioCom* could make hams sit up and take notice.

Manufacturer: Bonito Inc, distributed in the US by Computer International, 207 South Old US 27, Saint Johns, MI 48879-1903; tel 517-224-1791; **computer@email.mintcity.com**. *Suggested retail price: $250.*

Steve Ford, WB8IMY ♦ QST Managing Editor

ICOM IC-R75 Communications Receiver

By Rick Lindquist, N1RL
Senior News Editor

If you've ever thought it might be great to have an extra set of ears in the shack, you'd be wise to consider this latest "communications receiver" from ICOM. Let's face it: Hams, as a rule, do not find much use these days for standalone receivers. Most of the boxes we buy also contain the requisite transmitting circuitry; being able to fit that capability into the IC-R75 box (an IC-*TR*-75?) would make an especially attractive package. But even as a "mere" receiver the IC-R75 is a terrific complement for the typical ham shack.

A Receiver in the Shack?

A dwindling number of us still remember the days when a discrete receiver was standard equipment in every ham shack. Today, that's the exception, of course. Most hams will claim they have no use for a separate receiver—they've got a general-coverage receiver in their transceiver box.

Maybe so, but few "transceiver" receivers are designed for the primary function of listening—something a few of us enjoy doing when the blush is off the latest contest or DXpedition feeding frenzy. For the SWL or BCL, of course, listening is the *only* game.

The IC-R75 is definitely designed for listening—which is, of course, as it should be. An all-mode receiver, it also offers things like synchronous AM detection to enhance AM broadcast enjoyment by ameliorating the effects of multipathing and fading. It also incorporates superb dual passband tuning to combat interfering signals, plus the possibility to add optional crystal filters for enhanced selectivity. Simply push the **FIL** button to set the narrow filter for the mode you've selected (if installed).

You'll find CW, CW-R (reverse) and RTTY mode settings. Another nice touch: it offers adjustable CW pitch, via the menu.

This triple conversion design has IFs at 69 MHz, 9 MHz and 455 kHz. While it only draws about 1 A at full volume, the AF stage delivers a healthy 2 W or so to the front-firing speaker.

The LF capabilities of this receiver are something to keep in mind in terms of the pending request by the ARRL to allocate bands at 136 kHz and at 160-190 kHz. Experimenters and QRP enthusiasts who enjoy building transmitters might find an able companion for their endeavors in the R75.

But from my point of view, the coolest feature of the IC-R75 is its ability to truly integrate itself into a ham shack. Own an IC-706 or one of the other later-model ICOM transceivers with a computer **REMOTE** jack? With a simple connecting cable you can make up yourself, the IC-R75 becomes a main or auxiliary receiver—each unit controlling the other and letting you share the best features of each.

Hook it up to your '706 and you can share the IC-R75's ability to punch in frequencies on the keypad or even the receiver's stored memories. For ham radio use, you'll need to add a T/R switching system. It's a great opportunity to resurrect that old Dow-Key relay you've got in the junk box from your "separate-receiver" Novice days.

An Accessible Receiver

The IC-R75 suggests a cross between the IC-706 and IC-746 transceivers—a bit closer to the latter in terms of size, styling, and front-panel layout, but more compact and without the large LCD screen. The R75's sizeable display offers big numbers (or channel names—it's your call) and yellow-orange backlighting. There's a multi-segment LED S meter that reads out up to 60 dB over S9. Numerals almost as large as the frequency display tell you which memory you've got dialed up. Other important icons are clear and prominent.

Like the "original" IC-706, there's no band switch. You can directly enter a new frequency or set the tuning step to the correct display digit and dial away. Up and down buttons let you page swiftly through memories—all 99 of them.

The front-panel layout is sensible and accessible. This is a piece of gear you literally can get your hands on without your fingers getting in the way of what you're trying to do. There's a nice large knob with a decently sized dimple on it. The knob incorporates a rubber grip ring. It has a nice "feel" to it. The drag is adjustable.

You can lock the settings with a push of the **LOCK** button on the front panel. A metal bail is easily deployed from the bottom of the set to angle up the front panel for better viewing.

The right-hand frequency keypad (which also functions to enter memory channel names) is terrific. All buttons and knobs are substantial and clearly labeled. There's a 1/4-inch phone jack on the front panel. Much of being able to operate this little receiver I learned from my experiences with other ICOM gear.

You can connect two separate antennas to the IC-R75 and select either from a front panel button. I'd have preferred to see two 50-Ω SO-239 connectors, but the IC-R75 offers an SO-239 for **ANT 1** and snap-on connectors for **ANT 2** to wire a 500-Ω (or other high impedance) antenna, such as a longwire.

The receiver powers from 13.8 V dc via

Bottom Line

A versatile HF/6-meter receiver that offers a good measure of performance in a compact package. All mode capability for the ham and utility listeners and synchronous AM for the SWLs should make the IC-R75 a popular choice for a wide variety of radio enthusiasts.

Joe Bottiglieri, AA1GW ♦ Assistant Technical Editor

Table 1
ICOM IC-R75, serial number 01206

Manufacturer's Claimed Specifications	*Measured in the ARRL Lab*
Frequency coverage: 0.03-60 MHz.	As specified[1].
Power requirement: 1.1 A, 11.7-15.9 V dc. (An ac power supply is provided)	2 A. Tested at 13.8 V.
Modes of operation: SSB, CW, AM, S-AM, FM, AFSK.	As specified.
Receiver	*Receiver Dynamic Testing*
SSB/CW sensitivity, bandwidth not specified, 10 dB S/N: 0.1-1.8 MHz, <2.0 μV; 1.8-28 MHz, <0.16 mV; 28-30 MHz, <0.18 mV; 50-54 MHz, <0.13 μV.	Noise floor (mds), 500 Hz filter:
AM sensitivity, 10 dB S/N: 0.1-1.8 MHz, <5.6 μV; 1.8-30 MHz, <1.6 mV; 50-54 MHz, <1 μV.	10 dB (S+N)/N, 1-kHz tone, 30% modulation:
FM sensitivity, 12 dB SINAD: 28-30 MHz, <0.22 μV; 50-54 MHz, <1 μV.	For 12 dB SINAD:
Blocking dynamic range: Not specified.	Blocking dynamic range, 500 Hz filter:
Two-tone, third-order IMD dynamic range: Not specified.	Two-tone, third-order IMD dynamic range, 500 Hz filter:
Third-order intercept: Not specified.	
Second-order intercept: Not specified.	Preamp off, +60 dBm; preamp one, +65 dBm; preamp two, +51 dBm.
FM adjacent channel rejection: Not specified.	20 kHz channel spacing, both preamps on: 29 MHz, 67 dB; 52 MHz, 60 dB.
FM two-tone, third-order IMD dynamic range: Not specified.	20 kHz channel spacing, both preamps on: 29 MHz, 67 dB*; 52 MHz, 70 dB*; 10 MHz channel spacing, both preamps on, 52 MHz, 106 dB.
S-meter sensitivity: Not specified.	S9 signal at 14.2 MHz: preamp off, 82 μV; preamp one, 31 μV; preamp two, 9.5 μV; 50 MHz, preamp off, 178 μV; preamp one, 60 μV; preamp two, 20 μV.
Squelch sensitivity: SSB, CW, RTTY, <5.6 μV; FM, <0.32 μV.	At threshold, both preamps on: SSB, 16 μV; FM, 29 MHz, 0.08 μV; 52 MHz, 0.2 μV.
Receiver audio output: 2 W at 10% THD into 8 Ω.	2.3 W at 10% THD into 8 Ω.
IF/audio response: Not specified.	Range at –6dB points, (bandwidth): CW-N (500 Hz filter): 221-972 Hz (751 Hz); CW-W: 67-2625 Hz (2558 Hz); USB-W: 87-2591 Hz (2504 Hz); LSB-W: 64-2597 Hz (2533 Hz); AM: 66-2510 Hz (2444 Hz).
Spurious and image rejection (except IF rejection on 50 MHz): 70 dB.	First IF rejection, 14 MHz, 81 dB; image rejection, 14 MHz, 72 dB.
Size (hwd): 3.7×9.5×9 inches; weight, 6.6 pounds.	

Noise floor (mds), 500 Hz filter:	*Preamp off*	*Preamp one*	*Preamp two*
1.0 MHz	–130 dBm	–137 dBm	–140 dBm
3.5 MHz	–133 dBm	–141 dBm	–143 dBm
14 MHz	–132 dBm	–138 dBm	–142 dBm
50 MHz	–127 dBm	–136 dBm	–140 dBm

10 dB (S+N)/N, 1-kHz tone, 30% modulation:	*Preamp off*	*Preamp one*	*Preamp two*
1.0 MHz	1.7 μV	0.8 μV	0.6 μV
3.8 MHz	1.2 μV	0.6 μV	0.4 μV
53 MHz	2.4 μV	1.0 μV	0.5 μV

For 12 dB SINAD:	*Preamp off*	*Preamp one*	*Preamp two*
29 MHz	0.5 μV	0.2 μV	0.2 μV
52 MHz	1.0 μV	0.4 μV	0.2 μV

Blocking dynamic range, 500 Hz filter:	*Preamp off*	*Preamp one*	*Preamp two*
3.5 MHz	122 dB	120 dB	115 dB
14 MHz	122 dB	120 dB	113 dB
50 MHz	119 dB*	119 dB*	111 dB*

Two-tone, third-order IMD dynamic range, 500 Hz filter:	*Preamp off*	*Preamp one*	*Preamp two*
3.5 MHz	91 dB	89 dB	87 dB
14 MHz	88 dB*	86 dB	87 dB
50 MHz	88 dB*	86 dB*	84 dB*

	Preamp off	*Preamp one*	*Preamp two*
3.5 MHz	+3.6 dBm	–7.7 dBm	–13 dBm
14 MHz	–0.3 dBm	–9.1 dBm	–17 dBm
50 MHz	+4.9 dBm	–7.1 dBm	–14 dBm

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.
[1]Sensitivity reduced below 0.06 MHz.

the supplied—and sizeable—ac adapter. Fortunately, it's wired with a plug on the end of a cord so you don't have to figure out where to plug in the hefty cube.

A Capable Receiver

The R75 packs a lot of performance into its compact frame. Keep in mind that ICOM was able to concentrate on simply producing a decent-performing receiver here; they didn't have to worry about what was happening on the transmitter side.

With the R75, you've got a receiver that not only covers a huge chunk of the known HF spectrum plus the low end of the VHF (the only thing that would have made it better would be to have included coverage comparable to the IC-706, but that's for the next version), but also has ample sensitivity over its coverage range. ARRL Lab testing showed the preamp-off sensitivity hovered around –130 dBm—right up there with the big boys—but it includes two preamp stages to boost sensitivity by as much as 10 dB. These really can come in handy!

A few words on dynamic range: This is an aspect of receivers that, while important, often gets less than a full discussion in the typical transceiver review. It's also something that many amateurs are still unfamil-

iar with—at least as it pertains to receiver performance. In fact, outstanding receiver performance largely hinges on outstanding dynamic range, which defines a receiver's ability to distinguish weaker signals in the presence of nearby, stronger ones.

In the ARRL Lab, we measure dynamic range for SSB and CW in the CW mode with the narrowest filter employed and injecting "interfering" signals 20 kHz away from the signal we're trying to listen to. The R75 is no slacker in this regard. The two-tone third-order IMD dynamic range of the R75 is more than merely respectable—in the vicinity of 90 dB on HF through 50 MHz. This is in a league with the receivers in many mid-priced transceivers.

As it does even on more expensive receivers, the two-tone third-order IMD degrades slightly with the application of the preamplifier. In this case, it's no big deal—only a couple of dB or so (see Table 1). The presence of the preamps is a big boost—pun intended.

A lot of people look at the third-order intercept number as a "measure of quality" for a receiver. This is an indication of how the receiver handles strong signals overall. While not outstanding in this regard, the receiver is in the "plus" numbers on 3.5 and 50 MHz, and it breaks even on 14 MHz. This is good.

In very practical terms, this means that you can take this receiver out on a busy HF band during a contest weekend and—under optimal selectivity conditions—the front end won't fold up when the neighborhood bully is bellowing down the band with his "killerwatt." For "problem" situations, though, the R75's twin passband tuning can be a huge plus. The radio also has an attenuator that comes in handy when too much gain becomes an issue. There's plenty of sensitivity to go around in most cases.

Up until now, we've been talking about CW and SSB performance by and large. Of course, with a receiver like this you'll want to know how it does on AM and FM. Again, the sensitivity numbers are respectable or better—especially with the preamp engaged. I happen to enjoy listening to AM broadcasts, so this is a big plus. In fact, while checking out the R75, the local Public Radio station was "begging," so the incentive was even greater to listen elsewhere.

An even bigger plus is the inclusion of synchronous AM detection on the R75. On certain signals it can make all the difference between enjoyable and annoying listening. Simply push and hold the **AM** button once you've tuned in your station—it will switch to AM-S—and you're in business.

Less impressive was the two-tone third-order dynamic range on FM. It was in the 60 dB range, worst case, on HF and VHF (again, see Table 1). This number typically is comparable to FM adjacent channel rejection. Some VHF mobiles have better DR and adjacent channel numbers. This could impact the receiver's ability to avoid interference from nearby signals. At wider spacings, the DR was much improved—106 dB at 50 MHz.

Filters and DSP

Digital signal processing is an option in this receiver, and it's something I'd highly recommend (the IC-R75 accepts the same UT-106 DSP board as the later models of the IC-706). (ICOM is now including this as "standard equipment."—*Ed.*) The DSP board adds audio-frequency level noise reduction and auto notch. It works in all modes, and it sure helps to make things easier on the ears when noise starts to get the best of the signals. The noise reduction level is adjustable via the menu. There's also a noise blanker to minimize pulse-type noise.

As with most upper-tier receivers, the IC-R75 lets you add a filter at the second and third IFs. The IC-R75 offers quite a few choices here. We added a 500-Hz CW filter at the higher IF, which is a real plus if you're into CW. Real serious CW listeners will want a narrow CW filter at the lower IF too. ICOM offers CW filters at 250, 350 (CW/RTTY) and 500 Hz for the 9 MHz IF and 250 and 500 Hz at the 455-kHz IF. SSB filters are available at 1.9 and 2.8 kHz for the 9 MHz IF and 1.8, 2.8 and 3.3 kHz at the lower IF.

A Versatile Receiver

You can do a lot with the IC-R75, and within the performance limitations we've already outlined (and which are spelled out in detail in Table 1), the R75 provides lots of listening fun. Aside from its all-mode capabilities, the R75 gives you lots of scanning possibilities, and it's easy to set up scanning. Programmed, memory, selective memory scans all are possible. There are two band-edge memories. A nifty inclusion is the auto memory write scan that automatically puts signals it encounters during a scan into a sequestered set of channels—19 in all—for later review. There's also a priority watch that will automatically keep an ear on a selected memory channel and go to it the instant it becomes active.

I especially liked the ability to name memories, but I found the memory-naming method a bit out of the ordinary. To name a memory you input the character you want by pushing different keys on the keypad one or more times. For example, the **[2]** key inputs the numeral two and letters A, B and C, the **[3]** key the numeral 3 and the letters D, E, and F, and so forth. The appropriate letters are marked on the keys, just like a telephone keypad except the Q and Z are on the **[0]** key. The upside of this scheme is that it takes less time to input a name than systems that force you to scroll or step through all numbers and letters till you find the one you want.

Memory names can be up to eight alphanumeric characters each. The IC-R75 lets you choose to display either the memory name or the frequency that it represents.

Listeners often find they want to record some of the signals they hear. The IC-R75 accommodates recording by making line level audio available at a rear-panel jack. There's also a **REC REMOTE** jack to turn your machine on and off.

There's a 24-hour clock built-in. For unattended listening, you can take advantage of the IC-R75's timer and remote tape recorder hookups to automatically start your recorder either when the receiver hits a signal while scanning or at the appointed hour you've set on the timer.

Computer Control

Icing on the cake is the ability to control the IC-R75 via a genuine RS-232C connector on the rear panel to permit a serial connection to a PC. In addition, as already mentioned, the **REMOTE** jack on the rear panel allows connection with another similarly equipped ICOM receiver or transceiver or of up to four ICOM receivers to a PC for command control via an optional CT-17 CI-V level converter. The *Instruction Manual* provides details on commands. Computer control software, RS R75, has just become available.

Menus

The IC-R75 menu—accessible by simply pressing the front panel **SET** button—makes available a host of user-settable items ranging from the level of the "confirmation beep" that sounds when a button has been pressed to CW pitch, backlighting level, auto tuning speed, and front-panel display backlighting.

The Last Word

The IC-R75 stands ready to extend the listening capabilities of the average ham shack. If you enjoy listening to LF and HF, you'll appreciate the IC-R75.

Manufacturer: ICOM America, 2380 116th Ave NE, Bellevue, WA 98004, 425-454-8155; fax: 425-454-1509; **http://www.icomamerica.com**. Manufacturer's suggested retail price: IC-R75, $949. Typical current street price, $800. FL-100 500 Hz CW/RTTY filter, $133; RS R75 software, $80.

QST Compares: Switching Power Supplies

Reviewed by Joe Bottiglieri, AA1GW

Do you occasionally enjoy taking your dc-powered transceiver along on your vacation or out into the field for generator-powered operations—such as Field Day? Are you tired of hauling around that bulky transformer-based power supply?

If this sounds familiar, you've probably noticed the wide selection of switching dc power supplies that have hit the Amateur Radio market over the last few years. Their compact size and light weight, fractions of that of the more conventional alternatives, would seem to make them the perfect traveling companion—particularly for use in conjunction with those subcompact multiband wonders that have become the radios of choice for squeezing into suitcases and backpacks.

This time around we'll have a look at the Astron SS-30M, the ICOM PS-85, the Kenwood PS-40, the MFJ-4225MV, the Samlex SEC 1223 and the Yaesu FP-1023. Each of these dc switching power supplies carries continuous output current ratings that make them suitable for use with any of the currently available 100 W transceivers.

About the time that we were finalizing this review, Alinco announced the release of a switching supply of their own—the DM-330MV. ICOM has also redesigned and re-released an updated version of the PS-85. We'll keep these two in mind as possible subjects for a future column.

The Battery of Tests

The lab tests run on each of the units began with measurements of the actual dc output voltage at loads of 1.1 A and 21 A. Next, a Variac was inserted in the ac line and the minimum ac voltage input required to retain proper regulation of the dc output was determined. (This value is recorded in the tables as the low line drop out voltage.)

The amount of ripple on the dc output, and the presence—or absence—of any high frequency ringing spikes while under load was also investigated. The resulting oscilloscope traces appear in the figures.

A "dynamic test" was set up using an HF transceiver. In this test, each supply was subjected to a pulsed load that rapidly alternated between approximately 1.1 and 21 A. The resulting variation in the supplied dc voltage appears in the tables.

In the final lab test, the supplies were set to 13.8 V (if adjustable) and a load that drew about 20 A was connected. The dc output of the supplies was ac-coupled to a spectrum analyzer and the analyzer was swept from 1.5 to 100 MHz. These spectral plots are also included as figures.

Each of the supplies—of course—was also subjected to on-the-air testing in different locations and station configurations. More on those results later…

Astron SS-30M

The Astron SS-30M sports the largest cabinet in this group. Generously sized dual voltage and current meters take up nearly the entire front panel. A lighted rocker style power switch is located in the lower left hand corner.

The dc connection points are located on the back panel and consist of two 1/4-20 threaded studs about 3/4-inch long with hex nuts and washers. The polarity labeling for these can be difficult to see—the + and – symbols are embossed into the metal and the terminals are not color-coded. You'll want to pay close attention when hooking up your radios and accessories. The power cord is removable and—as is the case with most of these supplies—is the same type that's typically used on computer equipment. A recessed switch allows selection of 110 or 220 V ac operation.

A large temperature-controlled external cooling fan protrudes from the center of the rear panel. It only activates after extended operation under load. Once running, the sound level generated by the fan is low to moderate and the case temperature remains low even after 1/2 hour of continuous operation under a 21 A load.

The documentation that's packed with the SS-30M includes a sheet with a listing of the specifications of their entire line of switching supplies and a second sheet with information on their other power supply products.

Manufacturer: Astron Corp, 9 Autry, Irvine CA 92618; 949-458-7277; fax 949-458-0826; **http://www.astroncorp.com**.

Manufacturer's suggested price: $172. Typical current street price: $150.

Table 2
Astron SS-30M, serial number 98080024

Manufacturer's specifications
Power requirement: 90-132 V ac or 180-264 V ac at 50/60 Hz (switch selectable).
Output voltage: 13.8 V dc.
Output current (continuous): 25 A.
Size (hwd): 3.75×7×8.63 inches; weight, 5 pounds.

Lab Measurements
Output voltage, no load: 13.83 V dc.
Output voltage, 21 A load: 13.66 V dc.
Low line drop out voltage: 94 V ac.
Dc variation during dynamic testing: ≈150 mV.

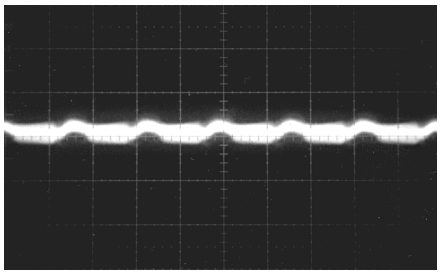


Figure 1—An oscilloscope trace of the dc output of the Astron SS-30M under load. The vertical scale is 50 mV/div, the horizontal scale is 5 ms/div. (Note: these scaling factors vary in some of the other figures.) The level of the dc ripple is very low, <20 mV p-p, and there are no discernable high frequency spikes.

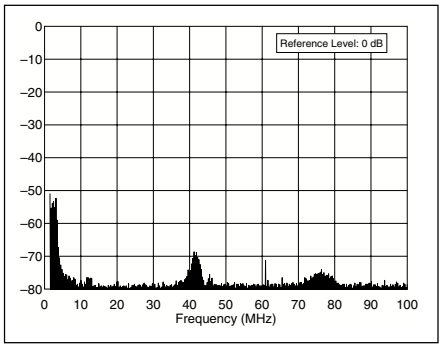


Figure 2—A spectral plot of the output of the Astron SS-30M under load. This supply exhibited very low levels of broadband noise, and the peaks that do appear fall outside of the US amateur bands above 160 meters.

ICOM PS-85

The ICOM PS-85 is designed to be the "matching supply" for a number of the HF and multiband transceivers in their line. The front panel is small—about 4 inches square—and the enclosure is rather deep. A rocker type power switch and a red LED power indicator are mounted on the front panel.

The ac power cord is removable. The dc power cord is about 18 inches long and is permanently attached. It terminates in a six-pin Molex connector that mates with most of the current 100 W transceivers. Separate terminals for powering additional station accessories are not provided.

The PS-85 is the only supply in this group that does not include the ability to convert it for 220 V ac operation.

An internal cooling fan is mounted just inside the back panel. The fan is not temperature controlled—it runs continuously when the supply is on. The sound level of the fan is moderate. The case temperature remained low even after $^1/_2$ hour of continuous operation into a 21 A load.

ICOM includes a single *Instructions* sheet with operating instructions and specifications.

Manufacturer: ICOM America, 2380 116th Ave NE, Bellevue, WA 98004, 425-454-8155; fax: 425-454-1509; **http://www.icomamerica.com**. Manufacturer's suggested retail price: $406. Typical current street price: $295.

Table 3
ICOM PS-85
serial number 01913

Manufacturer's specifications
Power requirement: 100-120 V ac (fixed).
Output voltage 13.8 V dc ±5%.
Output current (continuous): 20 A.
Size (hwd): 3.7×4.4×11.3 inches; weight, 5.5 pounds.

Lab Measurements
Output voltage, no load: 13.9 V dc.
Output voltage, 21 A load: 13.6 V dc.
Low line drop out voltage: 80 V ac.
Dc variation during dynamic testing: ≈200 mV.

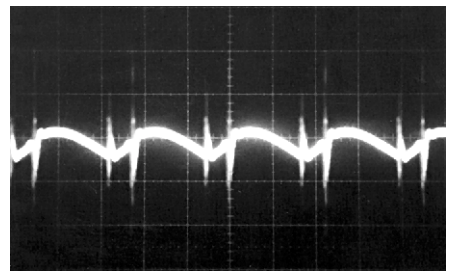


Figure 3—An oscilloscope trace of the dc output of the ICOM IC-85 under load. The vertical scale is 100 mV/div and the horizontal scale is 5 ms/div. The level of the dc ripple is about 100 mV p-p, and there are spikes due to switching that extend out to about 600 mV p-p.

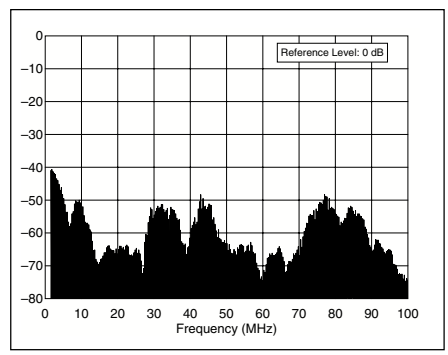


Figure 4—A spectral plot of the output of the ICOM PS-85 under load. This supply exhibited the highest levels of broadband noise of the group.

The Kenwood PS-40

The Kenwood PS-40 is approximately the same size as the TS-50 HF transceiver. A rocker type power switch is mounted on the front panel. A small red LED indicates when the supply is on.

The power cord is removable. Large color-coded dc power terminals are mounted on the rear panel. The PS-40 is

Table 4
Kenwood PS-40
serial number 80500885

Manufacturer's specifications
Power requirement: 115/230 V ac ±10 % at 50/60 Hz (switch selectable).
Output voltage: 13.8 V dc ±5 %.
Output current: (continuous) 20 A.
Size (hwd): 2.5×7×8.9 inches; weight, 4.4 pounds.

Lab Measurements
Output voltage, no load: 14.4 V dc.
Output voltage, 21 A load: 14.14 V dc.
Low line drop out voltage: 97 V ac.
Dc variation during dynamic testing: ≈200 mV.

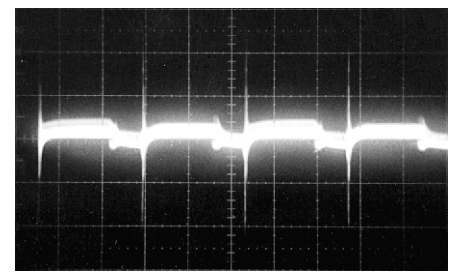


Figure 5—An oscilloscope trace of the dc output of the Kenwood PS-40 under load. The vertical scale is 50 mV/div and the horizontal scale is 5 ms/div. The level of the dc ripple is low, <20 mV p-p, but there are spikes due to switching that extend out to about 200 mV p-p.

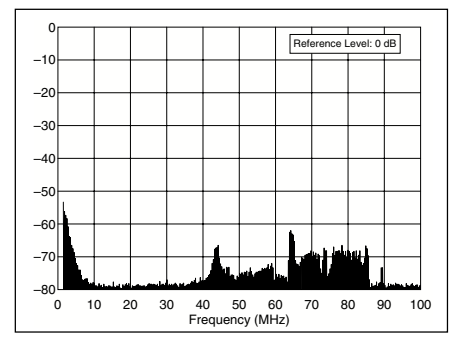


Figure 6—A spectral plot of the output of the Kenwood PS-40 under load. While there are some ranges where broadband noise is evident, the majority of these are outside of the US amateur bands.

the only supply in this group to include a separate connection point for chassis ground. A small recessed slide switch allows you to easily select between 110 and 220 V ac operation.

The cooling fan is mounted externally on the rear panel. It runs continuously when the power is on. The sound level of the fan is moderate to high—the loudest of the bunch. The supply remains cool even after 1/2 hour of continuous operation with a 21 A load.

Kenwood provides a 4-page *Instruction Manual* that includes sections on connection, operation, specifications and troubleshooting—including tips on reducing interference.

Manufacturer: Kenwood Communications Corp, 2201 E Dominguez St, Long Beach, CA 90801; 310-639-5300, fax 310-537-8235; **http://www.kenwood.net**. Manufacturer's suggested retail price: $230. Typical current street price: $225.

MFJ-4225MV

The MFJ-4225MV is shaped a bit like a cube—it's taller, narrower and shallower than most of the other supplies in this roundup. The front panel is busy—there are large backlit meters for current and voltage, a rocker type power switch, LED indicators for the power and fan and a cigarette-lighter type dc power jack. Five way binding posts for the dc output are provided on the front panel.

This supply is the only one in the group that offers an external control for the output voltage. The voltage is variable from about 9 to 15 V dc—very handy for test bench applications.

Table 5
MFJ-4225MV

Manufacturer's specifications
Power requirements: 85-135 V ac at 47-62 Hz or 170-260 V ac at 47-63 Hz (switch selectable).
Output voltage (variable): 9-15 V dc.
Output current (continuous): 22 A.
Size (hwd): 4.5×5.75×6 inches; weight, 3.7 pounds.

Lab Measurements
Output voltage, no load: 14.4 V dc.
Output voltage, 21 A load: 14.14 V dc.
Low line drop out voltage: <85 V ac.
Dc variation during dynamic testing: ≈200 mV.

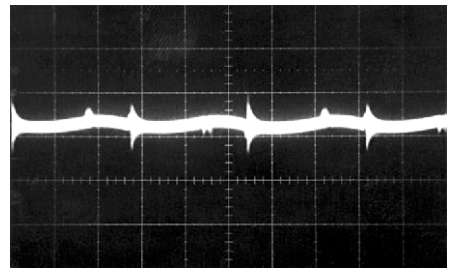


Figure 7—An oscilloscope trace of the dc output of the MFJ-4225MV under load. The vertical scale is 50 mV/div and the horizontal scale is 5 ms/div. The level of the dc ripple is low, <20 mV p-p. Spikes due to switching only measure about 70 mV p-p.

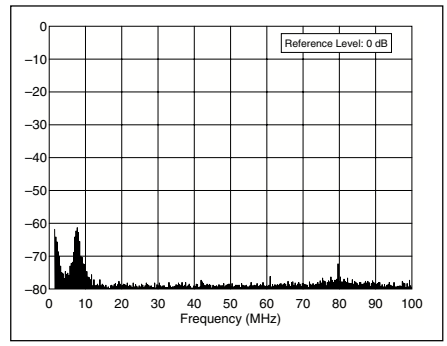


Figure 8—A spectral plot of the output of the MFJ-4225MV under load. Overall, the noise generated by this supply is very low, with the exception of the range of frequencies between about 7.5 and 10 MHz.

The ac power cord is permanently attached to the cabinet. The back panel includes a recessed slide switch for easy selection of 110 or 220 V ac operation.

The cooling fan is mounted internally just inside the left panel of the cabinet. The fan is on continuously when power is supplied to the unit, but the fan speed (and the meter backlighting level) varies with the output voltage setting. The level of sound generated by the fan at the 13.8 V dc output setting is moderate.

The power supply is cool to the touch even after 1/2 hour of continuous operation connected to a 21 A load.

A 4-page *Instruction Manual* is provided and includes a table of specifications, installation and operating instructions and a detailed schematic.

Manufacturer: MFJ Enterprises, 300 Industrial Park Rd, Starksville, MS 39759; 800-647-1800; fax 662-323-6551; **http://www.mfjenterprises.com**. Manufacturer's suggested retail price: $150. Typical current street price: $140.

Samlex SEC 1223

The Samlex 1223 ties the Yaesu FP-1023 for "smallest enclosure" honors. A lighted rocker style power switch is mounted on the front panel.

The power cord is removable. The dc connection points are large, color-coded 5-way binding posts. The supply can be eas-

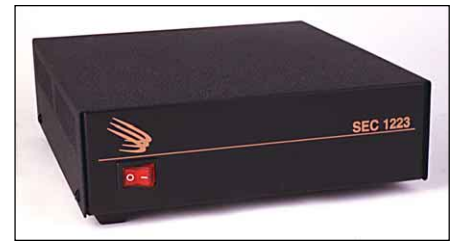


Table 6
Samlex SEC 1223

Manufacturer's specifications
Power requirements: 100-130 V ac or 200-260 V ac at 50/60 Hz (jumper selectable).
Output voltage: 13.8 V dc.
Output current (continuous): 23 A.
Size (hwd): 2.2×7×8.25 inches; weight, 3.5 pounds.

Lab Measurements
Output voltage, no load: 13.94 V dc.
Output voltage, 21 A load: 13.79 V dc.
Low line drop out voltage: 95 V ac.
Dc variation during dynamic testing: ≈200 mV.

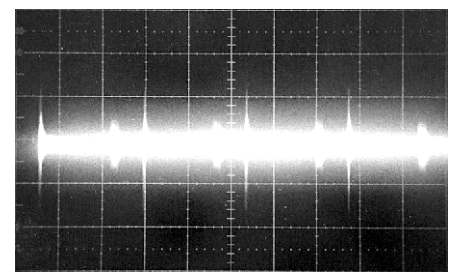


Figure 9—An oscilloscope trace of the dc output of the Samlex 1223 under load. The vertical scale is 200 mV/div and the horizontal scale is 10 ms/div. The level of the dc ripple is low, <30 mV p-p, but there are spikes due to switching that extend out to about 600 mV p-p.

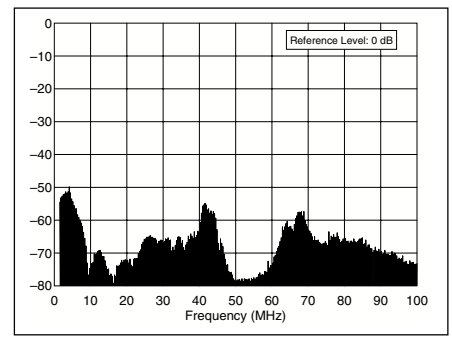


Figure 10—A spectral plot of the output of the Samlex 1223 under load. There are several ranges—including several within the US amateur bands, where the broadband noise is moderate.

ily converted for 220 V operation by removing an internal jumper.

The cooling fan is temperature controlled. It's mounted internally and forces air out through a grill on the bottom of the cabinet. Once activated, the sound level of the fan noise is moderate. The enclosure, particularly the front panel, warms up considerably after 1/2 hour of continuous operation powering a 21 A load.

A small 6-page *User Manual*, with installation and operating instructions, a specifications table, a troubleshooting guide and details on removing the jumper for 220 V ac operation, is included.

Manufacturer: Samlex America, 110-17 Fawcett Rd, Port Coquitlam BC, Canada V3K 6V2; 800-561-5885; fax 604-525-5221; **http://www.samlexamerica.com**. Manufacturer's suggested retail price: $100. Typical current street price, $100.

The Yaesu FP-1023

The Yaesu FP-1023 and the Samlex are very similar. The enclosure is small and seems well suited for portable operation where luggage space is at a premium. A lighted rocker style power switch is mounted on the front panel.

The power cord is removable. The dc connection points are large, color-coded 5-way binding posts. Conversion for 220 V ac operation is easy—simply remove an internal jumper.

The cooling fan is temperature controlled. It's mounted internally and forces air out through a grill on the bottom of the cabinet. Once activated, the sound level of the fan noise is moderate. The supply enclosure, especially the front panel, gets considerably warm after about 1/2 hour of continuous operation connected to a 21 A load.

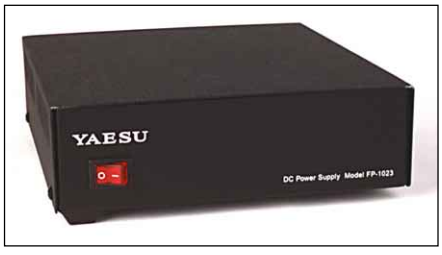


Table 7
Yaesu FP-1023

Manufacturer's specifications
Power requirements: 100-130 V ac or 200-260 V ac at 50/60 Hz (jumper selectable).
Output voltage: 13.8 V dc.
Output Current (continuous) 23 A.
Size (hwd): 2.2×7×8.25 inches; weight, 3.5 pounds.

Lab Measurements
Output voltage, no load: 13.9 V dc.
Output voltage, 21 A load: 13.75 V dc.
Low line drop out voltage: 90 V ac.
Dc variation during dynamic testing: ≈200 mV.

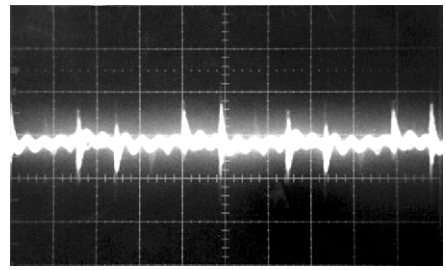


Figure 11—An oscilloscope trace of the dc output of the Yaesu FP-1023 under load. The vertical scale is 200 mV/div and the horizontal scale is 10 ms/div. The level of the dc ripple is low, <30 mV p-p, but there are spikes due to switching that extend out to about 600 mV p-p.

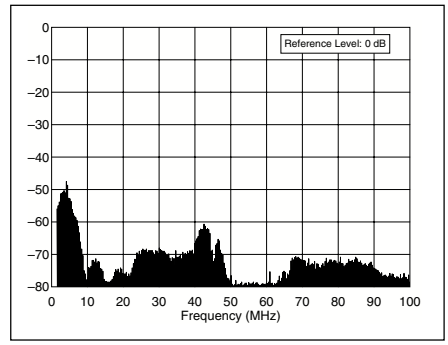


Figure 12—A spectral plot of the output of the Yaesu FP-1023 under load. There are several ranges—including several within the US amateur bands, where the broadband noise is moderate.

A small 6-page *User Manual*, with installation and operating instructions, a specification table, a troubleshooting guide and details on removing the jumper for 220 V ac operation, is included.

Manufacturer: Yaesu USA, 17210 Edwards Rd, Cerritos, CA 90703; 562-404-2700, fax 562-404-1210 **http://www.yaesu.com**. Manufacturer's suggested retail price: $169. Typical current street price, $149.

Operational Impressions and Considerations

A quick glance through this collection of oscilloscope traces and spectral plots indicates—at least as far as the overall purity of the supplied dc power is concerned—that the clear choices here are the Astron SS-30M or the MFJ-4225. These exhibit admirable performance and deserve praise for their superior design. Before you pull out your credit card and dial up your favorite Amateur Radio products dealer, however, let's consider the actual implications of selecting one of the runners up.

On-the-air tests helped to shed some light on a very important consideration: the level of the broadband RF noise that's generated by these supplies is proportional to the load. The oscilloscope traces and the spectral plots represent the characteristics of the supplied dc power at loads that simulate *transmit* conditions. Since, under the majority of operating conditions, transmission and reception will not be occurring simultaneously, the levels of RF noise experienced during receive—when the load is typically only about 5% that of transmit—are considerably smaller.

This was verified in the field testing. Each of the six power supplies was substituted for the existing conventional dc supplies in three typical HF station configurations. Five of the six supplies tested did not generate any perceivable interference in the station receivers—even when these were tuned to the frequencies outside of the ham bands where the spectral plots indicated elevated levels of RF noise. This is certainly good news for 160-meter operators and those who enjoy exploring the shortwave bands occasionally!

"*How does this one sound?*"-type transmit quality testing using SSB, FM and CW also revealed no noticeable difference in the quality of the transmitted signals when powering the transceivers using either the conventional or the switching supplies.

The only supply that resulted in any interference in typical transceive operation was the ICOM PS-85. This supply generated a series of spurious signals about 85 kHz apart that slowly drifted across the entire 10-meter band in one receiver, and even affected reception on some of the lower bands on the others. Ferrite material installed on the ac and dc power cords did not seem to reduce the interference. Hopefully ICOM has been able to address these problems in their recently released updated version.

There are a few instances where the level of broadband RF noise generated by a supply under load could create interference problems. Multi-radio operations where several transceivers are set up in close proximity, contest stations where a second receiver is sharing the same supply with a transceiver or "mode A" full-duplex satellite operation are some examples.

For the majority of the casual fixed station and portable operators, nearly any of the currently available switching power supplies should provide acceptable performance. Carefully consider your operating requirements and "weigh" your options.

We would like to thank Rudy Severns, N6LF, for his help in preparing this review. Rudy provided the majority of the laboratory measurement data that appears in the tables and figures.

New Faces to Grace ARRL Board

The ARRL Great Lakes Division has a new Director and Vice Director, and there are new faces in division leadership positions in the Dakota, Midwest and Pacific divisions.

Ballots submitted by ARRL members in the affected divisions were counted November 19. Balloting for Director occurred in the Great Lakes and Midwest Divisions. Balloting for Vice Director took place in the Atlantic, Great Lakes, and Pacific Divisions.

In the Great Lakes Division George Race, WB8BGY, of Albion, Michigan, was the victor in a three-way race to again serve as Director. Race—the Great Lakes Vice Director—nosed out current Great Lakes Director Dave Coons, WT8W, by 101 votes—1700 to 1599. Challenger Murray Scott, KE8UM, garnered 1302 votes.

In 1995, Race—the Great Lakes Vice Director since 1990—assumed the Director's position when former Director Al Severson, AB8P, now a Silent Key, resigned, then won election in his own right later that year. In 1997, Race was defeated for re-election to the Director's post by Joe Falcone, N8TI. Falcone resigned just three months into his term, elevating then-Vice Director Coons to Director. Race subsequently was named to again serve as Vice Director. In 1999, citing his past experience and understanding of the "complex issues" facing Amateur Radio, Race filed nomination papers seeking to regain the top job in the Division. He's pledged to work toward a greater public service commitment and to enhance Amateur Radio's stature.

Gary Johnston, KI4LA, of Covington, Kentucky, is the new Great Lakes Vice Director. He defeated Lawrence Solak, WD8MPV, 2498 to 2010. Race and Johnston will serve three-year terms. Johnston says his primary interest is keeping the airwaves clear and protected through enforcement and spectrum management.

In the Midwest Division Robert W. "Wade" Walstrom, W0EJ, of Cedar Rapids, Iowa, defeated John Seals, WR0R, 2050 to 766, for a three-year term as Director. Walstrom—an ARRL Life Member—replaces retiring Director Lew Gordon, K4VX. A former three-term Iowa Section Manager and a current volunteer examiner, Walstrom has pledged to work to protect the rights of amateurs to erect antennas.

In the Atlantic Division, incumbent Vice Director Bernie Fuller, N3EFN, beat back a challenge from John Buchanan, KW3X. The vote was 3047 to 2038. Fuller will serve a three-year term.

RICK LINDQUIST, N1RL

ARRL Headquarters staff members open and sort ballots for machine counting.

In the Pacific Division race for Vice Director, Robert Vallio, W6RGG, of Castro Valley, California, won a three-way race over Jettie Hill, W6RFF, and John Ronan, III, K3ZJJ. Vallio polled 1278 votes to 1186 for Hill and 1155 for Ronan. An ARRL Life Member, Vallio—who's currently East Bay Section Manager—will serve a two-year term. Vallio also serves as a director and secretary of the Yasme Foundation and as a director of the Northern California DX Foundation.

Unopposed and declared elected were incumbent Directors Kay Craigie, WT3P (Atlantic), Rick Roderick, K5UR (Delta), and Frank Butler, W4RH (Southeastern) and incumbent Vice Directors Bruce Frahm, K0BJ (Midwest) and Evelyn Gauzens, W4WYR (Southeastern).

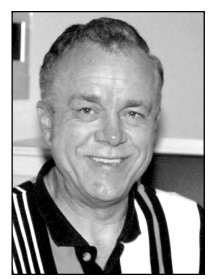
Incumbent Directors Tod Olson, K0TO (Dakota) and Brad Wyatt, K6WR (Pacific), decided not to seek re-election. Incumbent Vice Directors Jay Bellows, K0QB (Dakota), and James Maxwell, W6CF (Pacific), will move up to Director in their respective divisions. Newcomer Twila Greenheck, N0JPH, of Shoreview, Minnesota, was unopposed to become the Dakota Division's new Vice Director. Maxwell will serve a two-year term; the others will serve for three years.

Terms of office for all successful candidates begin at noon January 1, 2000.

No candidate was nominated for the Delta Division Vice Director position, now held by Henry Leggette, WD4Q. The ARRL Articles of Association provide that "Should the office of Vice Director be vacant, the vacancy shall be filled by appointment by the President."

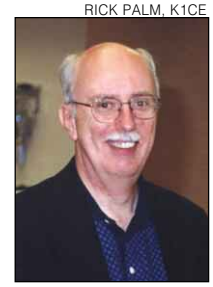
RICK PALM, K1CE

Great Lakes Division Director George Race, WB8BGY



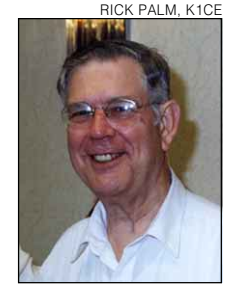
Midwest Division Director Wade Walstrom, W0EJ

RICK PALM, K1CE



Dakota Division Director Jay Bellows, K0QB

RICK PALM, K1CE



Pacific Division Director Jim Maxwell, W6CF

Rick Lindquist, N1RL ♦ Senior News Editor

FCC News

AMATEUR RESTRUCTURING COULD BE CLOSE AT HAND

As press time neared, knowledgeable sources in Washington were saying the amateur license restructuring issue had moved to the front burner at the FCC, and a *Report and Order* could be released by January 1.

The Amateur Radio community has been awaiting license restructuring—known officially as the 1998 Biennial Regulatory Review of Part 97 (WT Docket 98-143)—for approximately one year now. No one has mentioned a hard-and-fast date to wrap up the long-awaited proceeding, but reports from several sources in early November suggested that the *R&O* draft was in its final stages.

During a recent visit to top FCC officials in Washington, League officials pressed again for early action on the license restructuring rulemaking. They were assured that the issue was not stalled and that the Wireless Telecommunications Bureau was "working very actively" to move restructuring along.

Whatever its final form—and no one has hinted at that—license restructuring poses significant implications for Amateur Radio and its future direction and growth. On August 10, 1998, the FCC proposed to phase out the Novice and Technician Plus licenses, leaving just four amateur license classes in place—Technician, General, Advanced, and Extra. The Commission also asked the amateur community to express its opinions on Morse code requirements for licensing and testing, but offered no specific recommendations.

At its July 1998 meeting, the ARRL Board of Directors—attempting to get the jump on restructuring—issued its own plan to restyle Amateur Radio. Among other details, the ARRL plan also calls for four license classes and for "refarming" Novice/Tech Plus subbands to provide additional spectrum for higher-class operators. Under the League plan, the Technician license remains unchanged, and the General becomes the entry-level ticket to HF operation. The ARRL proposed Morse code requirements of 5 WPM for General and 12 WPM for Advanced and Extra class.

The restructuring debate generated more than 2200 comments to the FCC, many of them from individual amateurs. Once the FCC approves the *Report & Order*, a *Public Notice* will be issued, and the actual *R&O* will be released a few days later.

FCC REVISES CONDUCTED EMISSION LIMITS

The FCC has gone along with recommendations from the ARRL and others to hold the line on conducted emissions below 30 MHz from unlicensed consumer electronic and industrial, scientific and medical devices operating under Parts 15 and 18 of the Commission's rules. The FCC has proposed new emission guidelines that are just slightly more stringent than the current FCC standards.

"We conclude that mandatory conducted emission limits continue to be necessary to control interference to communications services," the FCC said in a *Notice of Proposed Rule Making* in ET Docket 98-80, released October 18. The Commission announced plans to "harmonize" its conducted emission standards with international standards developed by the International Electrotechnical Commission's International Special Committee on Radio Interference—known as CISPR.

The CISPR emission limits for consumer equipment are "approximately 5 dB more stringent below 5 MHz and 1 dB more stringent above 5 MHz" than the existing standards, the FCC said. "We believe that these standards address some of the concerns expressed by ARRL" and others in response to last year's FCC *Notice of Inquiry* on the issue, the Commission commented. In general, the FCC's current conducted emissions limit is 250 µV.

The Commission said it was not persuaded by a National Association of Broadcasters' suggestion to impose much tighter standards—22 dB greater than present—to protect AM broadcasting.

Interfering devices include such common household appliances as computers, TV sets, and microwave ovens. Conducted emissions result from RF voltages imposed on the ac power line, which can, in turn, act as an antenna. Equipment manufacturers had argued to relax existing limits to keep down production costs, while the ARRL and others representing spectrum users had asserted that the existing limits were not tight enough.

The FCC also invited comments on expanding the frequency ranges over which the conducted emission limits from the current 450 kHz to 30 MHz to the 9 kHz to 30 MHz spelled out in the CISPR standards. The ARRL has proposed that the FCC allocate new LF amateur bands at 136 kHz and at 160 to 190 kHz.

Comments on the NPRM were due 75 days after its publication in *The Federal Register*, and reply comments are due 30 days later. A copy of the FCC's *Notice of Proposed Rule Making* in ET Docket 98-80 is available at **http://www.arrl.org/announce/regulatory/et98-80/nprm.html**.

FCC ALLOCATES 75 MHz AT 5.9 GHz FOR ITS

As expected, the FCC allocated 75 MHz of spectrum in the vicinity of 5.9 GHz for use by so-called "Intelligent Transportation System" services aimed at improving highway safety. The co-primary allocation for Dedicated Short Range Communications systems at 5.850 to 5.925 GHz includes the upper portion of a secondary Amateur Service allocation. Hams share 5.650 to 5.925 GHz with government radars and nongovernment fixed satellite service uplinks. The FCC already has allocated 5.725-5825 GHz for U-NII devices to provide short-range, high-speed wireless digital communication under Part 15.

In releasing its *Report and Order* in ET Docket 98-95 October 22, the FCC said the 5.850-5.925 GHz band would be devoted to a variety of Part 90 DSRC uses such as traffic light control, traffic monitoring, travelers' alerts, automatic toll collection and traffic congestion detection. Other proposed uses of ITS would include electronic inspection of moving trucks and emergency vehicle traffic signal preemption. The Commission said that amateur organizations and licensees "raised the majority of DSRC spectrum sharing concerns" in their comments on the issue.

The League had asked that the FCC compensate the Amateur Service by elevating remaining Amateur and Amateur Satellite allocations at 5.650 to 5.725 and 5.825 to 5.850 GHz to nongovernment primary "to insure against future preemption by nongovernment services with higher allocation status." The FCC *Report and Order* did not specifically address the ARRL's request.

In the *R&O*, the FCC said it was "sympathetic" with the League's concerns that the ITS and U-NII allocations could impact amateur use in the band but said hams have 275 MHz in the band and most ham use is for point-to-point networks. Given amateur radio's inherent frequency agility, the FCC said it believes "spectrum sharing between the amateur service point-to-point links and DSRC operations is viable."

Amateur Enforcement News:

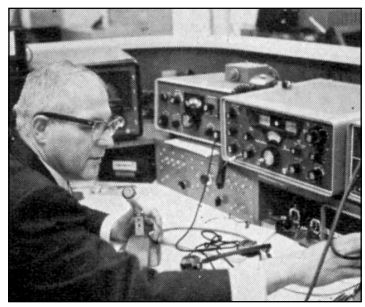
• **FCC tackles border dispute:** FCC Special Counsel for Amateur Radio Enforcement Riley Hollingsworth made good in October on a promise to look into complaints of apparent US malicious interference to a repeater in Mexico operating on 145.460 MHz. "We've been getting some vigorous complaints for a little while now about the repeater system KC6OKA/K6PYP," Hollingsworth said. The repeater on 145.460/144.860 MHz—jointly owned and operated by Angos Winke, KC6OKA, and Scott V. Swanson, K6PYP—apparently ignores a voluntary coordination arrangement and seems to be causing a lot of interference in Mexico, he explained.

On October 12, 1999, Hollingsworth wrote Winke and Swanson to inquire about alleged "broadcasting, playing music, transmitting tape recordings and the use of high power" and unmodulated carriers to deliberately interfere with the Mexican repeater system. Hollingsworth asked Winke and Swanson for detailed information on the operation of the repeater system including steps taken to ensure that no interference is caused to other amateurs in the repeater's coverage area or in Mexico. Winke and Swanson had 30 days to reply. Hollingsworth says the issue goes beyond a local repeater coordination squabble. "Mexico helps us a great deal with interference problems, and we're not going to tolerate any deliberate interference to Mexico," he said.

• **FCC proposes Tucker call sign reduction plan:** The FCC wrote the attorney representing California's Tucker family on November 3, 1999, proposing to permit family members to retain 14 of the

NOTABLE SILENT KEYS

• **Frederick Oliver Hammond, VE3HC, SK:** Fred Hammond, VE3HC—considered by many to be the Grand Old Man of Canadian Amateur Radio—died November 7 in Guelph, Ontario. He was 86 and had been in failing health since suffering a stroke last year. "Amateur Radio has lost one of its distinguished members and champions who will be sadly missed by his many friends everywhere," said IARU Region II President Tom Atkins, VE3CDM. An amateur for more than 70 years, Hammond was elevated to the Canadian Amateur Radio Hall of Fame in 1996. ARRL Executive Vice President David Sumner, K1ZZ, recalled Hammond as an enthusiastic and generous supporter of the ARRL. The September 1995 issue of *QST* includes "Thrills, Butter Churns and Honeycombs: A Visit to The Hammond Museum of Radio," which depicts Hammond's collection of vintage amateur equipment, a favorite personal project. It reorganized and reopened October 2 under the direction of Hammond's son Bill (see "The New Hammond Museum" in AWA's *The Old Timers Bulletin*, November 1999, page 37—*Ed*). The Kitchener-Waterloo Amateur Radio Club has posted additional information about Hammond at **http://www.kwarc.org/fred/**. Services were November 11 in Guelph. Memorial donations to the St Joseph's Health Care Foundation, 50 Westmount St, Guelph, Ontario, the Foundation of Guelph General Hospital, or the charity of your choice are welcome.



• **ARRL Honorary Vice President Charles G. Compton, W0AF, SK:** ARRL Headquarters has learned of the death August 16 of ARRL Honorary Vice President Charles G. Compton, W0AF (ex-W0BUO). He was 79. Compton had suffered a stroke a few years ago. He was a resident at a nursing home in Merritt Island, Florida, at the time of his death. A Charter Life Member of the ARRL, Charlie Compton had served as Dakota Division Director from 1960 until 1970. He was ARRL First Vice President from 1970 until 1974. He also served as Dakota Division Vice Director from 1958 to 1959 and was a past president of the St Paul Radio Club. "He enjoyed being a ham operator," said his wife, Mary Winkelman-Compton. "He would often encourage young people to get involved."

• **Colin C. Dumbrille, VE7NN/VP9C, SK:** Former ARRL Canadian Division Vice Director Colin Dumbrille, VE7NN/VP9C (ex-VP9BK), of Maple Ridge, British Columbia, died July 29. He was 79. A life member of the ARRL, Dumbrille was first licensed at age 14 as VE2BK. He attended McGill University, served in the Canadian Army Signal Corps during World War II, and went to work for Dupont. In the mid-1960s, he was transferred to Bermuda. He was active in the Bermuda Radio Society and once served as its president. Dumbrille was awarded a plaque by the ARRL in recognition of his outstanding support of WARC 79. He also belonged to the Quarter Century Wireless Association and Radio Amateurs of Canada. He retired in 1988 and returned to Canada in 1997. Ruth, his wife of 56 years, died in April 1999, and both are buried in Bermuda.—*thanks to Vic Politi, W1NU, and Robert N. Boyd, VE3SV*

• **Frank Koval, W8RSW, SK:** Well known DXer and Honor Roll member Frank Koval, W8RSW, of Cincinnati, Ohio, died September 9. He was 78. During his Amateur Radio career, Koval gained international fame as a contester, DXer and certificate chaser. His achievements—including a pioneering DXpedition to Navassa as KC4AF in 1958, certificate No 1 (CW) for the US Counties Award, and 5BDXCC—led to his election to the Greater Cincinnati Amateur Radio Association Hall of Fame. Koval was an ARRL member. Memorial donations are welcome to Vitas Hospice, 1132 W Kemper Rd, Cincinnati, OH 45240.—*thanks to George Rizzi, W8GOC*

• **Robert A. Cerasuolo, W6IJZ, SK:** *West Coast VHFer* newsletter founder and editor Robert A. Cerasuolo, W6IJZ (ex-WA6IJZ), of Sun Valley, Arizona, died September 21. He was 66. Cerasuolo was very active for many years on VHF. He was an ARRL Life Member.—*Pat Coker, N6RMJ*

• ***CQ* WAZ Award Manager James L. Dionne, K1MEM, SK:** *CQ* Worked All Zones Program Manager and well-known lowband DXer Jim Dionne, K1MEM, of Sudbury, Massachusetts, died October 12, 1999. He was 51 and had been in ill health for some time. *CQ* Publisher Dick Ross, K2MGA, called Dionne "one of those people who was content to toil quietly in the trenches in the service of others." An ARRL Life Member, Dionne also belonged to the First-Class CW Operators Club and the Yankee Clipper Contest Club and was a participant in several DXpeditions. Dionne was the New England Division representative on the ARRL DX Advisory Committee. He had been WAZ manager for about 15 years. Survivors include his wife, Genevieve, N1CPC. Donations are welcome in Jim Dionne's name to the Kidney Transplant/Dialysis Association Inc, PO Box 1362 GMF, Boston, MA 02205-1362.

• **Douglas A. Blakeslee, N1RM, SK:** Former ARRL Technical Department staff member Doug Blakeslee, N1RM (ex-W1KLK), of Verona, Wisconsin, died November 4 after a short illness. He was 58. Blakeslee worked in the ARRL Technical Department from 1964 to 1972, and his byline appeared frequently in *QST*. Services were November 10 in his native Connecticut.

36 club station call signs they new hold as trustees. Earlier in 1999, the FCC requested that individual Tucker family members justify their multiple club station call sign grants. Under the plan, Roy Tucker, N6TK, would retain three of seven club station call signs granted November 4, 1996. Kathryn Tucker, AA6TK; Ken Tucker, AA6KT, and Eric Tucker, AA6ET, each would retain three of eight club station call signs granted November 4, 1996; Nancy Tucker, W5NAN, would retain two club station call signs assigned to her January 9, 1998. The letter from FCC Special Counsel for Amateur Radio Enforcement Riley Hollingsworth noted that the Tuckers collectively received 31 club call sign grants on the same day. "That, coupled with the information submitted that shows that family members appointed each other trustee in 29 instances, stretches the credibility of their claim that these are legitimate clubs," Hollingsworth wrote. He said if the Tuckers did not respond by November 20, 1999, the FCC would adjust the family's club station call sign holdings in accordance with the FCC's proposal. Hollingsworth says Tucker family members have vowed to demand a full hearing prior to any attempts by the FCC to revoke the club station grants at issue. He says the FCC is ready for that possibility.

• **FCC reaffirms order to keep North Carolina ham off HF:** The FCC has reaffirmed its order that John A. Abernethy, K4OKA, of Hickory, North Carolina, will

News in Brief:

• **Bequest Seeds W1AW Fund:** Thanks to the generosity and foresight of an Ohio ham, Maxim Memorial Station W1AW now can make more definite plans to upgrade and improve station equipment and facilities. With a substantial bequest from the estate of the late Harold A. Jones, WB8AMI, the ARRL has chartered the W1AW Fund. ARRL Chief Financial Officer Barry Shelley, N1VXY, says the W1AW Fund was created to ensure that Amateur Radio's flagship station will continue to serve future generations of amateurs. Shelley said that, through Jones' generous contribution, the W1AW Fund help to provide ongoing resources to support day-to-day operations as well as maintenance and future improvements at W1AW. A League member for more than 30 years, Jones, of Mason, Ohio, died in 1998 at the age of 74. Shelley invited other amateurs to follow Jones' lead in helping to provide for the future of Amateur Radio. "There are many ways to provide for charitable gifts, and choosing the right one should be done in conjunction with your attorney or financial advisor," Shelley said. If you would like to consider a gift to the ARRL, contact Barry J. Shelley, N1VXY, at ARRL, 225 Main St, Newington, CT 06111; **gifts@arrl.org**; 860-594-0212.

• **Chod Harris, WB2CHO/VP2ML, hospitalized:** Former ARRL HQ staffer and *CQ* magazine DX columnist Charles J. "Chod" Harris, WB2CHO/VP2ML, in late November remained hospitalized in California after suffering a heart attack earlier in the month. At press time, Bob Locher, W9KNI, reported that Harris was showing some improvement after suffering a setback. He remained in intensive care, but his condition had improved enough that a respirator tube was removed. "While he is still unconscious because of heavy sedation needed to avoid problems with the respirator tube, he is expected to regain consciousness shortly," Locher said November 22. On behalf of Harris' wife, Jean, Locher thanked those who had sent cards and letters. Friends may write Chod Harris, 3201 Franz Valley Rd, Santa Rosa, CA 95404.—*Bob Locher, W9KNI*

• **Section Managers elected:** Ballots were counted November 23 at ARRL Headquarters to determine the results of contested Section Manager races in Alaska, East Bay, and Tennessee. In Alaska, challenger Larry "Kent" Petty, KL5T, of Anchorage defeated incumbent SM David W. Stevens, KL7EB, 169 to 116. In East Bay, incumbent SM Bob Vallio, W6RGG—who was elected Pacific Division Vice Director on November 19—defeated Don Smith, W6NKF, 337 to 245. Vallio may not hold both offices, however. Once he has chosen, the other office will be filled by appointment. In Tennessee, incumbent SM O.D. Keaton, WA4GLS, defeated Lee Hall, NY4T, 645 to 501. Incumbent candidates in seven other sections ran unopposed and were declared elected: In Alabama, Bill Cleveland, KR4TZ; in Western Massachusetts, Bill Voedisch, Jr. W1UD; in Delaware, Randall Carlson, WB0JJX; in New Mexico, Joe Knight, W5PDY; in Santa Barbara, Robert Griffin, K6YR; in Michigan, Richard Mondro, W8FQT; and in Kansas, Orlan Cook, W0OYH. Terms of office for all candidates begin January 1, 2000. Contact information for all ARRL Section Managers is on page 12 of any issue of *QST*.

• **Section Managers appointed:** Dave Armbrust, AE4MR, of Sarasota, Florida, has been appointed to serve as the first Section Manager for the new West Central Florida Section, effective January 15, 2000. Armbrust will serve until January 1, 2001. The West Central Florida section was approved by the ARRL Board in October after a lopsided vote by the affected counties. The new section consists of Charlotte, DeSoto, Hardee, Highlands, Hillsborough, Manatee, Pinellas, Polk, and Sarasota counties. Elsewhere, Leonard Gwinn, WA6KLK, of Willits, California was appointed San Francisco Section Manager, effective November 10 to replace John Wallack, W6TLK, who resigned, and Chuck Orem, KD2AJ, of Plattsburgh, New York, was named Northern New York Section Manager, effective November 11, to replace Les Schmarder, WA2AEA, who resigned. Contact information for all ARRL Section Managers is on page 12 of *QST*.

• **It's as easy as IOY:** Nominations for the ARRL Instructor of the Year awards are due to section managers by January 31. It's simple to nominate an exceptional ham radio instructor, teacher or recruiter to receive one of the four annual awards! A nomination form is available on the Web or by mail. Each award nomination requires endorsements and testimonials from others. Two of the four annual awards honor instructors. The ARRL Professional Instructor of the Year award recognizes paid instructors, such as those teaching through adult education, while the Herb S. Brier Instructor of the Year Award recognizes an unpaid volunteer instructor. The ARRL Professional Educator of the Year award recognizes a teacher who incorporates ham radio into a school curriculum. The ARRL Excellence in Recruiting award goes to a person who has gone the extra mile to introduce others to Amateur Radio. Award winners receive a handsome plaque and recognition for their time and effort in service to the ham radio community. Runners-up get certificates. To get an Educational Awards Nominating Application, visit **http://www.arrl.org/ead/award/application.html** or contact Jean Wolfgang, tel 860-594-0219; e-mail **jwolfgang@arrl.org**.

have to stay off the HF bands until January 22, 2000. The FCC modification on July 27, 1999, was a result of FCC station inspections last January. The letter included a tape recording alleged to be of K4OKA's transmissions on July 16. Abernethy subsequently disputed the authenticity of the tape recordings and requested the modification be lifted or lessened. But Hollingsworth told Abernethy on November 3, 1999, that the sanction was based on findings made during the station inspection and not necessarily on the tape recording. He cautioned Abernethy that violation of the modification order could lead to license revocation. FCC personnel inspected Abernethy's station last January 21 and 22 in the wake of what Hollingsworth has called "longstanding complaints from other amateurs and from our field offices." Complaints to the FCC alleged that Abernethy had aired something called the "Porkbutt Song," the FCC said. The FCC says its High Frequency Direction Finding Center in Maryland tracked the transmissions of the "Porkbutt Song" to K4OKA. Abernethy "voluntarily destroyed the tape recording" last January while FCC personnel looked on, Hollingsworth said.

ROSALIE WHITE, WA1STO, TO HEAD FIELD AND EDUCATIONAL SERVICES

RICK LINDQUIST, N1RL

Rosalie White, WA1STO

Rosalie White, WA1STO, has been named to head ARRL Field and Educational Services. The appointment, effective November 11, fills the gap left by departing Field Services Manager Rick Palm, K1CE.

White has been serving as ARRL Educational Services Manager since the Field Services and Educational Activities departments consolidated last January 4, and she and Palm had co-managed the combined units since then. As Field and Educational Services Manager, White becomes the main contact person for section managers as well as representing the League to the outside agencies it serves and promoting and supporting the field organization. She'll also serve as the primary staff contact for Amateur Radio in space issues.

White stressed that Amateur Radio public service will continue to be a high priority under the new F&ES management regime, and supporting field volunteers in disaster response efforts will get top attention. "It's one of the most important aspects of Amateur Radio and one of the main reasons why we enjoy the myriad frequencies we've been allocated," she said.

Since the inception of the combined department last winter, White says she's been ramping up her knowledge of the "Field Services" side of the unit and familiarizing herself with the issues and personnel involved. In early November she was on the road to support both halves of the house, meeting on the West Coast with the Enforcement Task Force then jetting to Texas to confer on matters related to Amateur Radio on the International Space Station program.

"We have a good team in place in the department that values customer service and is capable of serving a variety of needs across the broad spectrum of field volunteers," she said.

The 1995 Dayton Hamvention Amateur of the Year, White, 50, was first licensed as WN9FJT in 1970 in her native Indiana. She holds bachelors and masters degrees in education. White began her career at ARRL Headquarters in 1973, and in 1976, she became the first woman manager at ARRL Headquarters when she was tapped to head the new Club and Training Department. She left the HQ staff in 1979 but rejoined it nine years later as Educational Activities Department manager.

White enjoys operating Maxim Memorial Station W1AW for Field Day and during contests, Kid's Day and School Club Roundup. A private pilot, she also enjoys hiking and canoeing.

Section Manager Election Notice

To all ARRL members in the Illinois, Indiana, Maine, Northern Florida, Oregon, Santa Clara Valley, Vermont, and Wisconsin sections. You are hereby solicited for nominating petitions pursuant to an election for section manager (SM). Incumbents are listed on page 12 of this issue.

To be valid, a petition must contain the signatures of five or more full ARRL members residing in the section concerned. Photocopied signatures are *not* acceptable. No petition is valid without at least five signatures, and it is advisable to have a few more than five signatures on each petition. Petition forms (FSD-129) are available on request from ARRL Headquarters but are not required. We suggest the following format:

(Place and Date)

Field & Educational Services Manager,
ARRL
225 Main St
Newington, CT 06111

We, the undersigned full members of the _____ ARRL section of the _____ division, hereby nominate _____ as candidate for Section Manager for this section for the next two-year term of office.

(Signature _____ Call Sign _____
City _____ ZIP _____)

Any candidate for the office of Section Manager must be a resident of the section, a licensed amateur of Technician class or higher and a full member of the League for a continuous term of at least two years immediately preceding receipt of a petition for nomination. Petitions must be received at Headquarters by 4 PM Eastern Time on March 10, 2000. Whenever more than one member is nominated in a single section, ballots will be mailed from Headquarters on or before April 1, 2000, to full members of record as of March 10, 2000, which is the closing date for nominations. Returns will be counted May 23, 2000. Section managers elected as a result of the above procedure will take office July 1, 2000.

If only one valid petition is received from a section, that nominee shall be declared elected without opposition for a two-year term beginning July 1, 2000. If *no* petitions are received from a section by the specified closing date, such section will be resolicited in the July 2000 *QST*. A section manager elected through the resolicitation will serve a term of 18 months. Vacancies in any section manager's office between elections are filled by the Field Services Manager. You are urged to take the initiative and file a nomination petition immediately.—*Rosalie White, WA1STO, Field & Educational Services Manager*

The Pitcairn Islands

British naval officer Philip Carteret discovered the Pitcairns in July 1767, but he was unable to land because the surf was too rough. The island group, and Pitcairn island itself, was named after Midshipman Robert Pitcairn who was the first to spot them.

Captain Cook had planned to explore the islands. His plans went awry, however, when scurvy broke out aboard his ship.

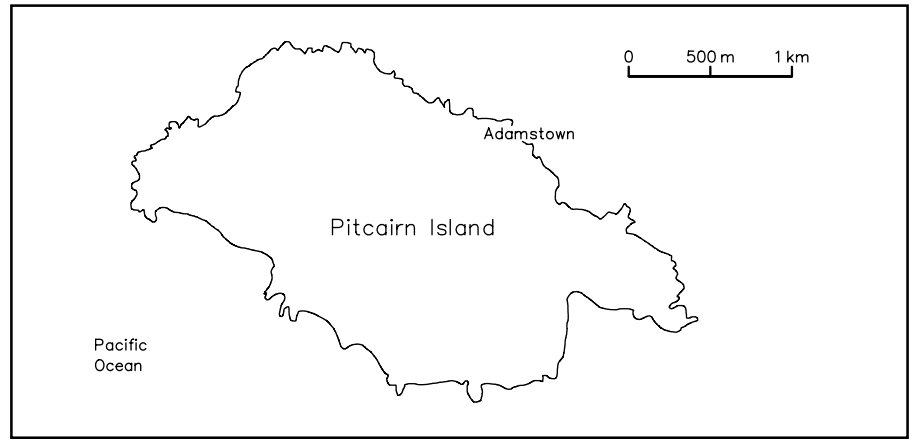
It was the infamous mutiny aboard the HMS *Bounty* that finally resulted in the colonization of the Pitcairns. Fletcher Christian and the other *Bounty* mutineers (along with 12 Tahitian women) fled across the Pacific with British authorities in hot pursuit. They sailed through the Cook, Tonga and Fiji islands before they reached Pitcairn Island on January 15, 1790.

Life on the islands was not pleasant. The Tahitians were treated as slaves and living conditions for everyone deteriorated. The Pitcairn community soon collapsed after several murders, a suicide and a revolt. By 1800 John Adams was the only surviving mutineer.

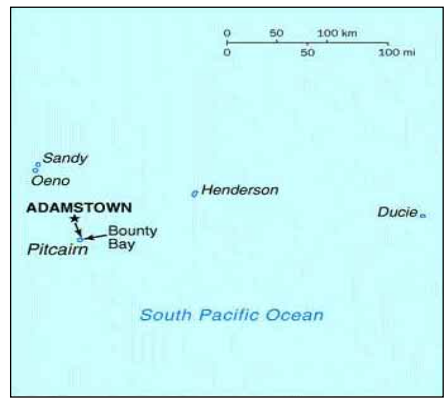
An American captain named Mayhew Folger discovered the colony in 1808 and reported his findings to the British, who were not the least bit interested. They were far too busy doing battle with Napoleon at the time.

Six years later British commanders finally journeyed to the islands. Rather than arresting John Adams, they granted him mercy considering what he had already endured. Adamstown is the only town on Pitcairn Island and was named after John Adams.

The Pitcairn Islands consist of Pitcairn, Sandy, Henderson, Ducie and Oeno. The island of Pitcairn is the only one currently inhabited and is located at 25°04' South and 130°05' West. The population of the island was about 50 in 1998, of which 10 were Amateur Radio operators. It seems that this DXCC Entity may have the highest percentage of Amateur Radio operators per capita!



Pitcairn Island was one of the original DXCC Entities from 1945. In May 1998 all Amateur Radio operators changed from the VR6 prefix to the new VP6 prefix.



The Pitcairns are actually a group of islands that includes Pitcairn, Oeno, Sandy, Henderson and Ducie.

Amateur Radio from Pitcairn Island

VP6BX	Brian Young
VP6CB	Clarice Brown
VP6DB	Dave Brown
VP6DC	Dennis Christian
VP6JC	Jay Warren
VP6MW	Meralda Warren
VP6PAC	Pitcairn Amateur Radio Club
VP6SC	Shawn Christian
VP6TC	Tom Christian
VP6TY	Terry Young
VP6YL	Betty Christian

Pitcairn 2000

Pitcairn is not the easiest place to reach. And once you're on the island leaving is equally difficult. There are cruise ships that do visit the Pitcairns, but they are expensive. Another way to reach the islands is to link up with one of the cargo ships that travel between Auckland, New Zealand and the US or Europe. These ships visit about every three or four months, delivering supplies needed by the islanders.

Jukka Heikinheimo, OH2BR, will be celebrating his 40th year in Amateur Radio in the year 2000 and has announced that he will be going to Pitcairn in January 2000. In the 1998 *DX Magazine's* "Most Wanted List" Pitcairn was ranked number 21 in Europe. The island has not been on the ARRL's DXCC "Most Wanted" list for several years, but that doesn't mean that people won't be eager to work Jukka. His goal will be to supply the maximum number of VP6 contacts on all bands from 6 to 160 meters, and on CW, SSB and all the digital modes. He has already received the license to land and reside on the island. The call sign VP6BR has been reserved by the licensing commissioner and will be issued upon his arrival in Auckland in early January.

Jukka's plans, as of this writing, were to leave Finland on January 3, 2000 and to arrive in Auckland, New Zealand on January 5th. These plans are contingent on securing transport on a P&O container ship that is scheduled to set sail for Pitcairn in early January. The shipping company does not confirm the date until one week prior to departure. So, as you can understand, exact dates for this trip are impossible to predict. The good news for DXers is that once Jukka is on the island he's going to be there for some time. The trip from Auckland to this remote island takes eight days and Jukka hopes to be able to operate on board the ship to keep the DX community updated. Watch the DX bulletins for the latest news on this trip.

Support

Since the announcement Jukka has been able to secure help to mount this trip. The UK Six Meter Group (UKSMG) has donated a five-element beam for 6 meters. The European DX Foundation (EUDXF) made a grant to help procure a multimode TNC for the digital modes. He'll be taking a new prototype ACOM 1-kW solid-state amplifier, which covers 6 through 160 meters, supplied by FinnFet. Thanks to the help of

Bernie McClenney, W3UR ♦ 3025 Hobbs Rd, Glenwood, MD 21738-9728 ♦ howsdx@dailydx.com

the Auckland ARC a 2-kW generator will be available along with another 3-kW generator that he will be renting in Auckland. Other supporters of this DXpedition include the Northern California DX Foundation, Clipperton DX Club, OZ DX Group and the German DX Foundation.

Jukka will be taking FT-1000MP and IC-706 MKII transceivers. At press time he was still negotiating for beam antennas for 10 through 20 meters. On 30, 40 and 80 meters he'll be using two phased verticals. No mention was made of a 160-meter antenna, but Jukka has stated that he does plan to be active on Top Band.

KR6MR/VY0

By John Larribeau, KR6MR

Way up north by the magnetic pole is a facility called The Resolute Bay Observatory, which is operated and managed by SRI International with funding from the National Science Foundation's Upper Atmospheric Facilities Program. The facility is located near the Resolute Bay Airport on Cornwallis Island (NA-009) in the Canadian Arctic. It is located at 74° 44' North and 94° 54' West.

I have traveled here on numerous occasions and it is a very lonely place. This time was different. I was tired of dragging a bunch of CDs to kill the time. On this trip I installed a log periodic antenna as I decided to do a little recreational hamming with my Icom IC-706 transceiver. On September 22nd I called CQ on 17 meters and K8RNM returned with a 5/5. I worked another eight stations to test the LP antenna and the Granger broadband crossed dipoles.

The following day I worked KC4AAA at the South Pole and KL7FQQ at North Pole AK. You might say I worked pole to pole to pole. The 24th through the 26th I worked over 700 stations and over 50 countries on 15 and 20 meters, with a few on other bands.

What started out as a little recreational hamming became more of a DXpedition that I was not fully equipped to tackle. My next trip will include a working computer, logging program, Chap Stick and throat lozenges.

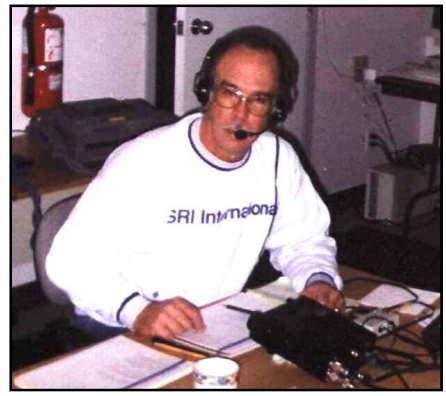
Yes, I will be back!

CLEANING UP THE BANDS—CONTINUED

In October we discussed the poor practice of using only part of your call sign in a pileup. This month let's go over some basics of calling when you are called—and not calling when someone else is being called!

When a DX station shows up on the air running a pileup he is there for one reason and that is to work (QSO) stations. In order for the pileup to be processed as efficiently as possible it's important for both the DX station and you, the DXer, to listen carefully.

In fact, the most important thing you can do is listen. Whether he is on CW, SSB or RTTY you must listen—not just to the DX station, but also to others in the fray. No matter if you are a beginner, intermediate or veteran DXer you must listen and follow the DX station's requests. Ask most DXpeditioners who are the best behaved in the pileups and more than likely there going to tell you the Japanese. Why is this? Polite discipline is ingrained in Japanese culture.



Operator John Larribeau, KR6MR, is an Engineering Assistant at the Radio Science and Engineering Division of SRI International.

SSB Pileups

SSB pileups are usually bigger and more rambunctious than CW pileups. More than 99.9 % of all pileups on SSB are run in the English language. So those of us who are native English speakers have no excuse for not understanding the rules of the game.

Don't jump into the pileup without knowing who the DX station is. Take a few moments to determine what area of the world the DX station is working. Pay attention to how fluent he is in English.

Is he working simplex or split? If the DX station is operating split, listen for a minute or two and see if you can hear the stations he is working. Note the frequency he works them on. If you are having problems hearing the DX station make sure you are using your headphones. This will help!

Pay more attention to the DX station rather than those calling him. Does the DX station seem to be picking up the loudest stations? Is he moving up or down in frequency? Does he ever work more than one station on the same frequency? Is he taking tailenders? (We'll save tailending for a future discussion.)

When the DX station says, "Who is the WZ7 station?" this means everyone who does not have WZ7 in his or her call sign should be QRX (standing by). WX2ABC should not be calling, no matter what! In fact, if WX2ABC cannot hear the DX station consistently he should not be in the pileup in the first place.

Occasionally you will not hear the DX station due to QRM, QRN or QSB. Bad timing in this situation is understandable, but consistently calling the DX station when he is clearly asking for others is absolutely wrong and should not be tolerated. Some DXpeditioners will purposely spin the dial right by those who call out of turn. They may say, "I am only listening for XX station" and will not identify the offending station.

When on SSB you should always use standard phonetics. Don't give something cute like I Have Two Tie My Shoe (IH2TMS), especially if the operator is not fluent in English. If the DX station appears to have only marginal English skills, speak slower and use simple sentences. Avoid any sort of slang.

CW Pileups

Many of the above-mentioned SSB hints can also be used on CW. Once again, the most important task is to be a careful listener.

If the DX station comes back to something other than your call with out a question mark (?) then you should not continue calling until the DX stations requests callers again. Use your headphones, especially if the station is weak. If you're new to breaking CW pileups you may consider using your narrowest receiving filter. Those with more experience should consider going as wide as possible in order to also hear the pileup.

Some people think all you need to know is how to recognize your call sign in Morse code in order to work the DX station on CW. Let's say the DX station comes back to Johnny Watandx, WZ7QRP, and gives him a report. While both stations are struggling to complete the exchange, Kant Copy, WX2NIL, is still sending his call and won't stop until he hears it coming back from the DX station. Everything else is gibberish to him. This obnoxious practice is known as "beacon DXing."

Bottom line: If you can't copy more than your call sign then you need to practice copying and sending with someone to build up your code speed and confidence.

Listen, Listen, Listen

I can't stress this enough. The most important thing in any mode of communication is to listen. Is it any wonder that the best doctors are also the best listeners? If you're busy talking, you're sure to miss something important. It is as true in DXing as it is in medicine. If we all listen, and exercise a bit of discipline, we'll all be better people, better DXers and have more QSL cards on the wall. Real DXers listen!

MISCELLANEOUS DX NEWS

Paul Swartzendruber, JT1FBB (K4EQY), says he is no longer having his QSLs printed in Mongolia. They are all done Stateside and mailed out by his QSL manager W9JOE. "As to operating habits, I hang out mostly on 20-meter SSB between 14.190 and 14.200 MHz. I also check into the Southern Cross net on 14.226 and the William Bennett Family Hour on 14.245, usually on weekends and when conditions permit. I am also looking for my first Stateside contact on 10 meters, but so far have heard nothing coming over the Pole."

Macquarie Island ranked #12 on the ARRL's DXCC "Most Wanted" list in 1998. Alan Cheshire is scheduled to be on this rare island for about one year starting in December 1999. Some of you may remember some of Alan's old calls: VP8PJ, A4XYF, VS5AC, V85AC, P29AC, VK8AC and VK6CQ. Look for him to be using VK0LD and possibly a VM0 or VJ0 call to commemorate the millennium. Alan enjoys 20-meter CW and likes to work stations in sequential number order (i.e. 0, 1, 2, etc.). For equipment he'll take an ICOM IC-706 MKIIG transceiver and possibly a linear. This is not a DXpedition, as he will be working on the island for 12 months. However, he will be on in his spare time. Alan has a Web page at **http://www.geocities.com/vk0ld/1.html**.

WRAP UP

That's all for this month. Thanks to OH2BR, KR6MR, JT1FBB and VK0LD for helping to put this month's column together. Keep those letters and photos coming. Until next month, see you in the pileups!—*Bernie, W3UR*

Hams Fill Void for Hurricane Floyd

The quiet coming of fall and the gentle September breezes were rudely interrupted by an interloper named Floyd. A massive storm carrying enormous firepower, Hurricane Floyd affected all interests up and down the entire eastern seaboard with powerful winds and storm surge. It made landfall in North Carolina, where the recovery phase is still ongoing as this column is being written. The amateur response was magnificent without exception, with all ARRL sections engaging emergency plans and serving relief agencies to excellent effect.

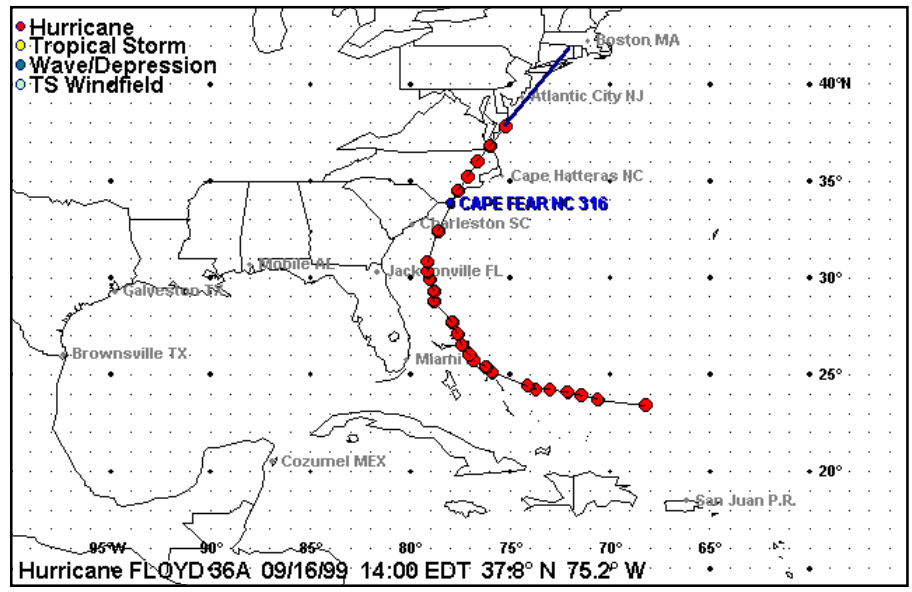
September 14—Hurricane Gert lined up behind a very powerful Hurricane Floyd in the Atlantic, as hams in Florida, Georgia, the Carolinas and Virginia prepared for the possibility that one or both of the storms would hit land. The Hurricane Watch Net had activated on Sunday and Caribbean stations passed weather-related information to the National Hurricane Center in Miami via W4EHW.

Net Control Don Kay, K0IND, reported two stations in the Bahamas—one aboard a boat—which had fed information to the Net, secured their operations and "gone to higher ground and safety." ARRL Headquarters offered assistance to the Bahamas Amateur Radio Society.

A dangerous Category 4 storm, Floyd packed winds in excess of 150 MPH and bashed the Bahamas. At the same time, two million residents in coastal and low-lying areas of Florida and Georgia were being advised or ordered to evacuate.

In Florida's Martin County—near Lake Okeechobee—AEC and SKYWARN Coordinator Dave Smith, KE4UEI, reported that a state of emergency had begun with shelters open at four schools, and hams staffing them. "I am operating from home as an emergency station passing traffic from shelters via the Emergency Operations Center and packet," he said.

Florida emergency nets were activated on both 75 and 40 meters. In Georgia, SEC Tom Rogers, KR4OL, said "The Georgia Emergency Management Agency is forcing evacuations on the Georgia coast, and the American Red Cross opened shelters. Georgia ARES decided to handle traffic on 3.975 MHz." In South Carolina, Section Manager Les Shattuck, K4NK, issued a first alert and SEC Gerald Hensley, K8AFP, directed the effort. Nets would prepare on 3.993.5 and 3.915 MHz. Shattuck said VHF nets were planned.



The track of Hurricane Floyd as it swept through the Bahamas and up the US East Coast.

In North Carolina, the state's Emergency Management Division considered Floyd a major threat to the entire state, and Section Manager Reed Whitten, AB4W, prepared his state's ARES/RACES organization for the worst.

Hams as far north as Virginia were making ready, as some models showed the storm affecting the state's Tidewater region. "Hurricane force winds can be expected in Virginia," said ASEC and ASRO Tony Amato, KR4UQ. "This is a serious storm and should not be taken lightly!" he advised his ARES/RACES colleagues.

The FCC asked hams not involved in the storm emergency to avoid designated frequencies on HF used for emergency nets. Numerous frequency set-asides were processed expeditiously by the FCC.

In Northern Florida, SEC Nils Millergren, WA4NDA, reported shelters filling in Orange, Lake, Seminole, and Flagler counties. He said the Duval County EOC was operating on 146.76 MHz from Jacksonville City Hall on emergency power.

In Georgia, Chatham County DEC Mike Boatright, KO4WX, reported opened Red Cross shelters and urged amateurs to monitor the MATPARC 145.410 repeater to help evacuees. "The first wave of folks are reaching Atlanta now," he said. Georgia SEC Tom Rogers, KR4OL, said interstate highways and hotels inland from the evacuated areas were "packed."

September 15—Response to the threat posed by Hurricane Floyd galvanized hams in the Caribbean and throughout the southeastern US. While the Hurricane Watch Net continued to assist weather forecasters in tracking the progress of the huge and dangerous storm, members of ARES and RACES assisted governmental agencies and relief organizations such as the Red Cross.

Hams in the Bahamas continued to feed damage reports to the Hurricane Watch Net: Marty Brown, KF4TRG/C6A in Green Turtle Cay reported extensive damage. Operating from batteries, she reported roofs blown off, boat docks severely damaged, and power and telephone lines down. Brown had collected reports from other hams via marine radio nets in the islands, including a report from Man o' War Cay that two dozen vessels were aground there. "Oh, man, what a day!" Brown said as she took a moment to catch her breath.

Rick Palm, K1CE ♦ Field & Educational Services

Millions of residents and visitors along the southeastern US coast headed inland by evacuation routes, including Joanne Palm, W1GUN, wife of worried Field Services Manager Rick Palm, K1CE, who was visiting family in St. Augustine, Florida. She ended up in an Orlando motel with the rest of her family. One major Florida interstate highway had all lanes flowing in one direction—away from Floyd.

Northern Florida SEC Nils Millergren, WA4NDA, reported hams providing communication at shelters in more inland counties, where thousands took refuge, as well as assisting in communication for hospitals and ambulance services. In the Crown District around Jacksonville, North Florida Amateur Radio Society President Billy Williams, N4UF, said ECs lined up operators and handled logistics. The Duval county emergency net (DCEN) met on 146.76 MHz and activity increased as evacuees headed west on I-10 and more minor roads. A Red Cross net convened on the W4IJJ 164.64 MHz repeater. The Florida Crown Emergency Net (FCEN) convened with all district counties represented. Other county nets activated as well, and operators supported the Jacksonville weather office. The Crown District was looking down the barrel of Floyd's gun. At daybreak on Wednesday, September 15, however, Floyd turned to the north and a lucky Crown District was spared.

Floridians breathed a collective sigh of relief as Floyd turned away heading northerly. Hams in Georgia continued to staff Red Cross shelters and emergency nets. North Carolina Section Manager Reed Whitten, AB4W, sought additional operators from other parts of the state to back up local operators in the Wilmington and Lumberton areas. Operators were to be stationed at the state Emergency Operations Center in Kinston. State amateurs prepared to activate stations at county EOCs.

September 16— Floyd flirted with Georgia and South Carolina before sweeping ashore near Cape Fear south of Wilmington, North Carolina, pounding its coast with 110-MPH winds and an 11-foot wall of water. The storm already had dumped more than 14 inches of rain. The Hurricane Watch Net continued operation as Floyd moved up the coast, collecting weather information from stations in the Carolinas, Virginia, and points north, funneling the data to forecasters via W4EHW at the National Hurricane Center.

Reed Whitten, AB4W, said that he was glad that the storm did not plow further into North Carolina than it did. Fifty-one counties had activated their local EOCs and 28 counties were under a local State of Emergency. Twelve counties had evacuation orders. In addition to closed roads and bridges, power outages affected more than 400,000 North Carolinians in 21 counties. More than 200 shelters were opened, housing more than 37,000 people. "This is the largest shelter operation in North Carolina history," Whitten said.

How high is the floodwater? This photograph says it all!

"The worst is over as Floyd heads up the East Coast," said Virginia ASEC Tony Amato, KR4UQ. He reports some parts of Virginia experienced 100-MPH winds, a dam broke in Williamsburg, severe flooding, and some 8000 people in shelters. 50,000 homes in Virginia were without power. "Amateur Radio operators have done a fantastic job of covering this event," he said.

Earlier in Georgia, SEC Tom Rogers, KR4OL, reported ARES operators represented numerous EOCs in coastal counties during the approach of Hurricane Floyd and were available to relay many messages between the EOCs, state emergency management officials, and the Red Cross. "Luckily, Hurricane Floyd realized Georgia was very well prepared for his arrival, [so he] turned and remained far enough offshore to cause no significant damage to Georgia," he said.

South Carolina operators were similarly involved. ARES and RACES groups up the rest of the East Coast prepared for the effects of Hurricane Floyd. Advisories, FCC declarations and bulletins continued to go out.

September 17—By Thursday night, the by then fast-moving storm had pushed past New Jersey and New York into New England and began to dissipate, doing minimal damage. Floyd had been downgraded to a tropical storm, and high winds, heavy surf and higher-than-normal tides were reported along the coastline from New York's Long Island and northward into Connecticut, Rhode Island, and Massachusetts. Heavy rain generated by the storm caused local flooding. Downed trees and tree limbs and some power outages were reported in New England. Among other activities, hams in the Northeast staffed weather-spotting nets on VHF to keep abreast of the storm's progress and any substantial damage or difficulties.

The storm cleanup and recovery began. The Bahamas may have borne the brunt of Hurricane Floyd. Damage in the Abacos islands was said to be substantial. Nets in the Bahamas were handling emergency and health-and-welfare traffic on 40 meters. A health-and-welfare net was established on 14.262 MHz as well.

North Carolina suffered the worst flooding in the eastern one-third of the state, but hams there, as elsewhere, did an excellent job. North Carolina still is reeling from the storm's effects, and the state was declared a disaster area. Some residents in Beaufort County were stranded in treetops due to rising water. Water supplies in several North Carolina coastal areas were considered contaminated.

As did other states, Virginia suffered flooding and power outages, along with some downed trees. Virginia SM Lynn Gahagan, AF4CD, reported the power outage caused the failure of a water-cooled generator at the Portsmouth EOC, which took down communication there.

Recovery

September 21—Flooding in eastern North Carolina and in parts of Virginia in the wake of Hurricane Floyd made Amateur Radio a critical communication link in some communities in the recovery phase. ARES and RACES members stationed at county EOCs and at shelters in the affected areas helped to facilitate relief operations.

In Virginia, the city of Franklin "experienced the worst flooding ever with the downtown area and 182 businesses under 12-plus feet of water," said Virginia EC and State RACES Officer Frank Mackey, K4EC. Nearly all traffic going in and out of Franklin—including police and fire communication—was handled by hams.

The recovery effort was hampered by power outages, flooded and washed out roadways—including major interstate highways—in both Virginia and North Carolina. "We still have over 10,000 people in shelters, most of whom don't have a home to go back to," said SM Whitten. "Most of what we're doing is being done at the local level," he said. Most amateur support consists of assistance at shelters and at county EOCs. The statewide Tar Heel Emergency Net operated continuously on HF to support county operations, with assistance from individual amateurs.

September 28—Amateurs in North Carolina were finally released from all emergency operating centers and shelters, although some continued to provide backup communication for the Southern Baptist Convention/American Red Cross mass feeding effort.

The storm claimed more than three dozen lives. Whitten said the Amateur

Radio response in North Carolina to Hurricane Floyd and the resulting flooding could be one for the record books. "This was the largest operation we have had in a number of years—possibly the largest ever," he said. He also called it the "smoothest operation" in terms of amateur mobilization, mutual assistance and coordination.

In addition to their traditional role as communicators, hams applied their technical expertise to benefit the flood recovery. Amateurs were instrumental in setting up a nonamateur UHF repeater system for the Red Cross. Whitten said Elmo Yancey of Direct Call Inc, Durham, North Carolina, donated the repeater, amplifier, antenna, and installation for the Red Cross repeater system, so the system was operational before the Red Cross had any radio equipment in North Carolina.

As part of the repeater effort, an amateur from South Hill, Virginia, Sammy Simmons, KD4MJO, traveled 50 miles to Emporia, Virginia, to meet Red Cross radio technician Patrick Doherty, also an amateur, to give him the software necessary to program the Red Cross mobile radios. "I think this is an excellent example of ARES operating in an appropriate role as communications consultants," said Whitten.

Salvation Army Tactical Emergency Radio Network operator James Proctor, KA4IZN, in New Bern, North Carolina, reported on the national SATERN network. Proctor and his wife were actively involved in helping the Salvation Army effort to feed and clothe flood victims in eastern North Carolina. "Amateur Radio has been critical to this disaster operation," the SATERN report said. "Over and over private and civil organization and agencies have been assisted by hams who have greatly expedited the organizations' ability to mitigate the impact of the disaster due to good communication."

At week's end, hams primarily were providing backup communication, and none remained stationed at county emergency operations centers, shelters or mass feeding units. Nine Southern Baptist kitchens were using ham radio as their backup communication to the Red Cross.

The North Carolina traffic and ARES nets resumed regular operating schedules. "We are having daily critiques on the Tar Heel Emergency Net on HF," Whitten said. Whitten, as well as other ARRL response officials throughout the entire Atlantic coast thanked all amateurs, emergency officials, and state government officials who participated in the Hurricane Floyd response.

QST

Field Organization Reports

Public Service Honor Roll
October 1999

This listing is to recognize amateurs whose public service performance during the month indicated qualifies for 70 or more total points in the following 8 categories (as reported to their Section Managers). Please note the maximum points for each category: 1) Checking into a public service net, using any mode, 1 point each; maximum 60. 2) Performing as Net Control Station (NCS) for a public service net, using any mode, 3 points each; maximum 24. 3) Performing assigned liaison between public service nets, 3 points each; maximum 24. 4) Delivering a formal message to a third party, 1 point each; no limit. 5) Originating a formal message from a third party, 1 point each; no limit. 6) Serving as an ARRL field appointee or Section Manager, 10 points each appointment; maximum 30. 7) Participating in a communications network for a public service event, 10 points each event; no limit. 8) Providing and maintaining an automated digital system that handles ARRL radiogram-formatted messages; 30 points. Stations that qualify for PSHR 12 consecutive months, or 18 out of a 24-month period, will be awarded a certificate from HQ on written notification of qualifying months to the Public Service Branch at HQ

843
NM1K
452
K9RTB
443
W9RCW
356
WB8SIW
325
KB5WEE
K7BDU
319
N5JZ
298
WB8ZYY
246
N2LTC
236
KA2ZNZ
227
WB5ZED
221
W7TVA
217
WB5NKC
215
KF5A
210
K7VVC
N2CCN
198
N5IKN

192
WA4GQS
N2YJZ
191
N7DRP
190
W6DOB
N2UTK
189
WB2UVB
187
KK3F
N2OPJ
186
N2JBA
185
AA3SB
180
KB2LML
179
N1VXP
WA9VND
178
KA2GJV
AC4CS
W4ZJY
177
W2AKT
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K0IBF
174
W6IVV
173
W4EAT

KR4MU
172
K6YR
171
KK1A
W0OYH
KC2ALG
KA4FZI
168
K2DN
K9FHI
AD4DO
166
WB4GM
N5NAV
165
KF1L
K4RBR
W5ZX
WA5I
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KD2AJ
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KA5KLU
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N2XOJ
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KD1LE
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W6QZ
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K4IWW
W3YVQ

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WA1JVV
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N8FPN
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KB2RTZ
KC2AHS
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W5GKH
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WN0Y
K4SCL
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W3VK
KJ3E
150
N5JCG
WA2UKX
KB2VVB
WA1TBY
149
N0KJ
148
KC4TLG
WO0A
N7YSS
WA6ODQ
147
K2UL
AA2ED
W0WFF
146
N5XGI
145

N8FWA
144
WB2ZCM
KC5OZT
143
KB2KLH
NY2V
N5OUJ
W2JHO
W0GCB
NR2F
142
K8GA
N3WKE
WA1FNM
W9YCV
141
KA8FCC
WD8MIO
WD4JJ
KD4GR
KB5TCH
140
KB5W
W0LAW
AF4PU
139
WX8Y
AA8SN
WA4DOX
N4CAC
W7ZIW
138
K5DPG
N3WK

W2MTA
KC4ZHF
K2BTP
N1LKJ
N9BDL
W7GB
KT6A
137
WB0ZNY
W2RJL
AG9G
136
N2WDS
NN2H
135
KF6OIF
134
N2XJ
NZ1D
W7NWP
W7GHT
133
WA4QXT
N2AKZ
KB2VYZ
AF2K
KB2VVD
KA4HHE
AC5Z
W2EAG
132
KE4JHJ
KA1GWE
W5CDX
131
WB2QIX
130
KB2VRO
K5IQZ
KE0K
W9CBE
NN7H
129
KA2CQX
WA2GUP
KO6RZ
N9MN
128
K5DMC
AF4NS
K4FQU
WA0TFC
W7LG
127
WB2GTG
126
N3WAV

KC2FEM
125
N0SU
KE1AI
AA3GV
W1JX
AD6HR
124
N8JGS
K2BCL
WA4NDA
WX4H
123
K5WOD
AA2SV
W1ALE
KG2D
WB4TVY
N9BNQ
KF4NFP
122
NC4ML
121
W1QU
W2WFN
N2GJ
120
KI4YV
K7NLM
KB0DTI
W1PEX
W9ZY
KB2UQZ
WU4C
W5MEN
KA4UIV
K7GXZ
119
K0PIZ
K7MQF
118
KM5DT
K5MC
K4MTX
N3ZKP
KO4OL
AE4NW
N1JBD
W3OKN
K9GBR
KA2DBD
W4CKS
W4PIM
K4IFD
WW4SC
117
WA4EIC

116
WB2FGL
115
WA1QAA
WA2YBM
114
N8DD
K6AGD
W3BBQ
N3RB
KJ4N
KB4WBI
WD0GUF
113
KC5VLW
K9LGU
112
KC2EOT
W2PII
WB5NKD
111
WA8EYQ
K4YVX
WI2G
KA0DBK
W4RRX
KC5QGI
110
W4NTI
W2MTO
N4GMU
109
KA8FCC
KC7ZZB
KB2WII
108
W7VSE
KT4SJ
107
WA8SSI
K3CSX
W1JTH
106
K0PY
KC3Y
105
KB2ETO
KA9KLZ
104
N5JUU
KC2DAA
KJ7SI
103
KC7SRL
102
WB4ZNB

KC4VNO
K5MXQ
101
W3CB
AD4IH
100
W2FR
KF6UMU
99
KE6MIW
98
KG5GE
K8ZJU
97
W5XX
K8IG
KA7TTY
KA4LRM
96
KL5T
KA1OTN
95
KA8DHB
KE4DNO
94
K5VV
K8LEN
WB2IJH
N5HK
K2PB
93
K4AKC
KC6SKK
92
KE8FK
K7ZQR
KD5AHW
91
AA8PI
90
KC8LYY
KB5YAM
WB7VYH
89
N1CPX
88
KA1VEC
KA2ZKM
87
AC4ZO
AB7ZQ
KC8GMT
W2CC
KD4GHU
86
W7EP

K3UWO
KC8CMQ
K4BW
WA5FXQ
85
K4BEH
N1IST
84
W2CS
KB2YBM
W4DGH
83
WA2JSG
N3KB
K4WKT
W7HH
N4JAQ
KD6YJB
82
WA4GLS
KA9FVX
WB9GIU
81
AL7N
KB2GEK
N2ZMI
K1SEC
80
N4FNT
79
W4CC
78
KC4PZA
77
WA5WBZ
WA4EYU
76
KD5P
KG4CHW
75
KC8HTP
K8SH
N1LAH
74
K5UCQ
73
W0UCE
WB4PAM
72
KU4WJ
71
KE4PAP
N4MM
70
K2VX
W7JMH

The following stations qualified for PSHR in previous months, but were not recorded in this column: (Sept) NM1K 946, KA1VEC 117. (Jun) K6NTZ 260, (May) K6NTZ 163, (April) K6NTZ 230.

Section Traffic Manager Reports
October 1999

The following ARRL section traffic managers reported: AL, AR, CT, CO, DE, EMA, ENY, EPA, EWA, GA, IA, ID, IL, LA, KS, ME, MDC, MI, MN, MO, NC, NFL, NH, NLI, NNJ, NTX, NV, OH, OK, OR, ORG, SBAR, SC, SD, SDG, SFL, SNJ, STX, SV, TN, VA, WI, WMA, WNY, WPA, WWA, WY.

Section Emergency Coordinator Reports
October 1999

The following ARRL section emergency coordinators reported: AL, ENY, EWA, CT, IN, KY, MDC, MI, MN, MO, NLI, SD, SFL, TN, VA, WMA.

Brass Pounders League
October 1999

The BPL is open to all amateurs in the US, Canada and US possessions who report to their SMs a total of 500 points or a sum of 100 or more origination and delivery points for any calendar month. All messages must be handled on amateur frequencies within 48 hours of receipt in standard ARRL radiogram format.

Call	*Orig*	*Rcvd*	*Sent*	*Dlvd*	*Total*
NM1K	719	534	731	10	1994
WX4H	2	497	739	8	1228
N2LTC	0	535	555	38	1128
KK3F	19	116	862	52	1049
K7BDU	84	428	438	73	1023
W9RCW	0	558	13	367	938
W1PEX	0	51	775	6	832
K9RTB	0	428	69	284	781
K9JPS	0	395	27	314	746
KF5A	111	230	378	0	726
W9IHW	1	383	68	233	685
WB5ZED	24	323	290	25	662
KA2ZNZ	17	296	2239	81	633
N5IKN	1	309	103	207	618
W7AMM	182	108	274	16	580
W6DOB	11	269	267	31	578
K7VVC	26	247	293	6	572
KT6A	0	307	264	0	571
W9YPY	0	265	297	0	562
KA2GJV	0	294	258	0	552
WA9VND	1	334	196	10	531
N2OPJ	0	245	265	9	519
W5SEG	8	242	250	10	510
N2UTK	8	92	389	14	503

BPL for 100 or more originations plus deliveries: WB8SIW 185, N5JZ 181, K8LJG 117, KB5WEE 107. The following stations qualified for BPL in September, but the results were not reported in this column last month: NM1K 2774, KA1VEC 503.

QST

OLD RADIO

This is a new column about old radios, old ham radios to be exact. Sometimes they're called *boatanchors*. Sometimes they're called antiques. Whatever you want to call them, if you like old radios and radio history, this is your column! Each month we will try to cover another area of collecting, profile a collector and profile another old radio.

John Who?

First, I would like to tell you a little about myself, John Dilks, K2TQN, and how I became interested in ham radio and in collecting radios.

It began the summer I turned 12. My dad borrowed a National NC-100-XA receiver for the summer from one of his friends. We set it up in the workshop, put up an antenna and turned it on. The sounds of 80 meters came flooding out of the speaker. I was amazed to hear people talking to each other. I was forever hooked. A couple years later, in high school, I finally got my license: KN2TQN.

My first station consisted of a homebrew single-6V6 oscillator, made from ARRL's *How to Become a Radio Amateur*. It was exactly like the one in the October 1999 *QST*, page 29 ("Regeneration and Crystal Control," Jerry Svoboda, KB2QIU). The first receiver I owned was a 1937 National NC-81X. I paid $35 for it from an older ham. I didn't realize it then, but I had just purchased my first old radio.

When you're a new ham, people tend to give you things. My first *really* old radio was just such a gift: a Pilot Super-Wasp made in 1929. I looked it over and decided to dismantle it and build something else with the parts. This is where my dad stepped in and explained what an important radio this was and how he would have given a right arm for such a radio when he was my age. We (mostly my dad) decided to keep it intact and store it in the attic where I wasn't allowed to touch it.

A few years after high school I started to collect, slowly at first. I found Morse keys were inexpensive (this was the 1960s) and nice to have. Then came an occasional receiver and transmitter. Over the years I found tubes, microphones, speakers, magazines and books, which all followed me home.

Over the last few years I have had a strong desire to display my collection. I started by hauling a vanload of heavy boxes to local ham club meetings. It took a long time to set up the display, and afterwards a long time to repack everything. The talk usually lasted 20 minutes, followed by a hands-on look at the collection by those in attendance. After arriving back home, I had to remove everything from the van and store it. It was becoming a real chore. I had to find a better way to display my collection.

The solution came in the form of an old RV-like mobile office. A collector friend told me about such a vehicle in an upcoming auction. It was a 1973 Dodge-powered, twenty-seven foot long office with only 39,000 miles on it. After purchasing the RV, I spent the next eight months building the display in it. Since August 1998 I have traveled over 12, 000 miles to hamfests and radio events. (See September 1999 *QST*, page 71.) Perhaps we will meet at a hamfest or radio event this year!

Old Radio Profile: Pilot Super-Wasp, 1929

First advertised for $29.95 in the June 1929 *QST*, the Super-Wasp was an immediate success. Here was an affordable kit radio designed by Robert S. Kruse, W1BAO. Amateurs were eager to move up to the short waves, and this radio would do it in style!

Popular features included: increased sensitivity and selectivity made possible by the "tuned" screen-grid RF stage, universal wavelength range—it tuned from 14 to 500 meters and absolutely no "hand capacity" effects (completely shielded). The package included an easy to assemble kit of parts with large blueprints showing part placement and other details.

Many of the popular radio magazines of the day carried articles touting the features and successes of this radio. Hams and shortwave enthusiasts everywhere were buying or duplicating the Super-Wasp. Thousands of kits were sold. Many young hams bought kits and assembled them for less-talented neighbors and friends. This created a "cottage industry" and a little extra spending money for more ham radio equipment.

The Super-Wasp pictured here is the one given to me in the 1960s. For more detailed information you can visit my Web page at: **http://www.eht.com/oldradio/arrl/index.html**.

Conclusion

In the future I hope to hear from you. If you have something to share, take a photo, write a short description and send it in. If you'd like me to address a particular subject or piece of hardware, I want to hear from you. Just drop me a letter or e-mail at the address shown on this page. QST

Collector Profile: Paul Wolcott, N2JTD

Paul enjoys collecting, restoring and operating his old radios on the air. Everything in the accompanying photo is operational. Shown are two of the favorite stations he uses in the "AM Windows" on the 160, 80 and 40-meter bands. The Heath DX-100 transmitter and Collins R-390A receiver is his favorite AM combo. Paul also uses the Heath DX-60 and Ameritron AL-811 amplifier on 80 and 40 at times. The Kenwood TS-450S is used for his SSB contacts and the Kenwood 231A for local 2-meter work.

"I find that the reliability of the older radios is amazing," Paul said. "They keep on going, and they are fun to operate. I like Heathkit gear the best. They have good manuals, which makes them easy to work on. For this reason alone, Heathkits should be considered by new collectors."

During the 1960s Paul discovered ham radio while in middle school. During a visit to the school library he found a copy of *QST*. As Paul thumbed through the magazine he became more and more excited about Amateur Radio. Every month, as the new issues appeared, Paul would be the first to check them out. He particularly remembers the photos of all those great stations and the fun their operators appeared to be having. So for him, collecting old radios comes almost naturally.

John Dilks, K2TQN ♦ 125 Warf Road, Egg Harbor Township, NJ 08234-8501 ♦ e-mail: K2TQN@arrl.org

SPECIAL EVENTS

Agoura Hills, CA: APA Digital Communications Network, N2K, 0000Z **Dec 24** to 2359Z **Jan 7**, celebrating the new year and the Y2K rollover. 3.870 14.340 21.390 28.390. QSL. Jeff Reinhardt, 5904 Lake Lindero Dr, Agoura Hills, CA 91301.

Roanoke, VA: Roanoke Valley Amateur Radio Club, W4CA, 0000-0600Z **Jan 1**, at First Night Roanoke, Celebrating the Year 2000. 7.250 14.250 21.325 28.410. QSL. RVARC, PO Box 2002, Roanoke, VA 24009.

West Central Florida Section, FL: ARRL West Central Florida Section, AE4MR, 1300Z **Jan 15** to 0500Z **Jan 24**, for first contacts from the new ARRL West Central Florida Section. 7.271 14.031 14.271 28.371. Certificate. Dave Armbrust, 1641 Baywinds Ln, Sarasota, FL 34231.

Dady City, FL: East Pasco Amateur Radio Society and Zephyrhills Area Amateur Radio Club, K4EX, 1400-2200Z **Jan 29**, for the 3rd annual Kumquat Festival. 7.245 14.250 21.340 28.450. Certificate. EPARS Special Event, PO Box 942, Dade City, FL 33526.

Melbourne, FL: Collins Amateur Radio Club, W4CRC, 0000Z **Jan 15** to 2200Z **Jan 16**, to celebrate the 40th anniversary of the Collins KWM-2. 3.895 7.260 14.245 21.375. Certificate. Collins Amateur Radio Club, 2052 Algeria St NE, Palm Bay, FL 32905.

Plano, TX: Rockwell Collins Amateur Radio Club, W5ROK, 0000Z **Jan 15** to 2200Z **Jan 16**, to celebrate the 40th anniversary of the Collins KWM-2. 3.895 7.260 14.245 21.375. Certificate. Rockwell Collins Amateur Radio Club, PO Box 940714, Plano, TX 75094.

Cedar Rapids, IA: Collins Amateur Radio Club, W0CXX, 0000Z **Jan 15** to 2200Z **Jan 16**, to celebrate the 40th anniversary of the Collins KWM-2. 3.895 7.260 14.245 21.375. Certificate. Collins Amateur Radio Club, 855 35th St, Mail Station 150-100, Cedar Rapids, IA 52498.

Dearborn, MI: Flying Beers International ARC, K8FBI, 1600-2100Z **Jan 21**, celebrating the 176th birthday of Thomas "Stonewall" Jackson. 21.033 14.033 10.113 7.033. Certificate. Bob Fox, AA8YO, 1537 Culver Ave, Dearborn, MI 48124.

Clarksburg, WV: Stonewall Jackson ARA, K8DF, 1400-2200Z **Jan 22**, celebrating the 176th birthday of Thomas "Stonewall" Jackson. 7.240 14.280 28.480. Certificate. Stonewall Jackson ARA, PO Box 752, Clarksburg, WV 26301.

Coloma, CA: El Dorado County Amateur Radio Club, AG6AU, 1600Z **Jan 22** to 2100Z **Jan 23**, for the 152nd anniversary of the discovery of gold in California. 14.060, lower 25 kHz of the General phone bands, and the 10-meter Novice/Technician phone band. QSL. El Dorado County ARC, PO Box 451, Placerville, CA 95667.

Shawnee, KS: Kansas DX Club, KØS, 0000Z **Jan 24** to 2359Z **Jan 29**, to celebrate Kansas statehood. 14.220 28.350. QSL. Rick Carver, WAØKS, 13425 West 56th Terrace, Shawnee, KS 66216.

San Diego, CA: Challenger Middle School ARC, KI6YG, 1430-2400Z **Jan 28**, to commemorate the 14th anniversary of the space shuttle *Challenger* tragedy. 14.250 21.350 28.350 146.52. QSL. Frank Forrester KI6YG, Challenger Middle School, 10810 Parkdale Ave, San Diego, CA 92126.

Jean, NV: BioRem Area 3 ARC, AL7LS, 1400Z **Jan 29** to 0200Z **Jan 31**, to commemorate the completion of Salt-Lake-City-to-Los-Angeles Railroad in 1905. 3.990 7.091 7.290 14.103. Certificate. Bruce Rossi, 2127 Sierra Stone Ln, Las Vegas, NV 89119.

Punxsutawney, PA: Punxsutawney Area Amateur Radio Club, K3HWJ, 1300 to 2000Z **Jan 30**, celebrating Punxsutawney Ground Hog Day 2000. 14.025-14.150; 7.025-7.100. Certificate. Sherman Hollipeter, W3QOS, PO Box 20, Big Run, PA 15715.

Certificates and QSL cards: To obtain a certificate from any of the special-event stations offering them, send your QSO information along with a 9×12 inch self-addressed, stamped envelope to address listed in the announcement. To receive a special event QSL card (when offered), be sure to include a self-addressed, stamped business envelope along with your QSL card and QSO information.

Special Events Announcements: For items to be listed in this column, you must be an Amateur Radio club, and use the ARRL Special Events Listing Form. Copies of this form are available via Internet (**info@arrl.org**), or for a SASE (send to Special Requests, ARRL, 225 Main St, Newington, CT 06111, and write "Special Requests Form" in the lower left-hand corner. You can also submit your special event information on-line at **http://www.arrl.org/contests/spevform.html**. Submissions must be received by ARRL HQ no later than the 1st of the second month preceding the publication date; ie, a special event listing for **Jan** *QST* would have to be received by **Nov 1**. Submissions may be mailed to George Fremin III, K5TR, at the address shown on this page; faxed to ARRL HQ at 860-594-0259; or e-mailed to **events@arrl.org**. QST

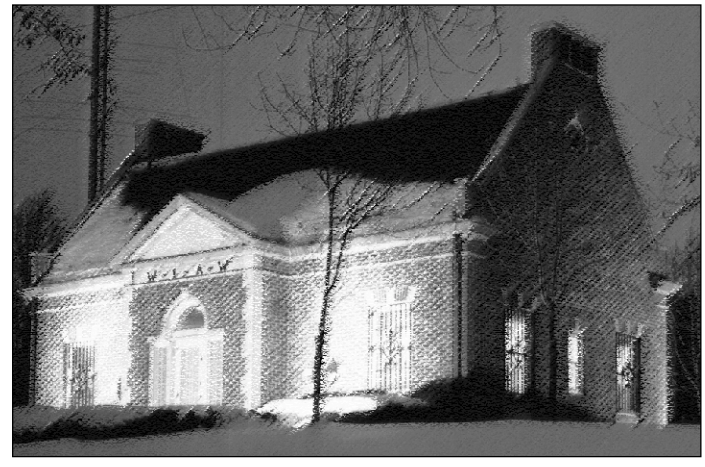
George Fremin III, K5TR ♦ RR1, Box 322, Johnson City, TX 78636 ♦ k5tr@arrl.org

W1AW 2000: On the Air for Y2K and the New Year

W1AW, the Hiram Percy Maxim Memorial Station at ARRL Headquarters in Newington, Connecticut, will be celebrating New Year 2000 *on the air!*

ARRL staff will be manning W1AW and ARRL Headquarters beginning at 1200Z (1200Z is local New Year's day in New Zealand) on December 31, for at least the following 24 hours. W1AW will be fully prepared for whatever Y2K might bring, and the operators will be monitoring and checking into various Y2K nets.

Additionally, W1AW will be operated on several bands and modes for general QSOs, including the ARRL New Year tradition of Straight Key Night, and other modes such as SSB and PSK31 as time permits.



A Special Midnight Contact

At midnight Eastern Standard Time (0500 UTC), W1AW will attempt to establish contact with special-event station M2000A on the prime meridian in Greenwich, England. You'll find more details about the M2000A operation on page 43 of your December *QST*.

Certificates and QSLs

If you work W1AW during our New Year 2000 operation, you will be eligible for a special certificate and QSL. Just send your QSL along with a self-addressed, stamped envelope to:

W1AW 2000
ARRL, 225 Main St,
Newington, CT 06111

TELECOM-99

TELECOM is the world's largest international trade exhibition of telecommunications equipment and services. Organized by the International Telecommunication Union (ITU), it is held every four years at PALEXPO, a huge facility adjacent to the airport in Geneva, Switzerland. TELECOM-99 was held October 9-17. Regional TELECOMs are held in other years in Asia, Africa, and the Americas. TELECOMs have become an important source of revenue for the ITU.

Because the cost of renting booth space at TELECOM would be prohibitive for a noncommercial organization such as the International Amateur Radio Union, the ITU waives the rental fee as a courtesy. Thus, the IARU is able to put a face on the Amateur and Amateur-Satellite Services for the TELECOM attendees, who in 1999 numbered more than 175,000.

The IARU team at TELECOM included President Larry Price, W4RA, Nasser Al Rawahi, A41KG, Tafa Diop, 6W1KI, Hans Ehlers, DF5UG, Reinaldo Leandro, YV5AMH, and Paul Rinaldo, W4RI, assisted by volunteers from the Geneva area. A special commemorative lapel pin designed by the IARU International Secretariat was a very popular souvenir with visitors. The accompanying photos provide some flavor of the event.

Coincident with the exhibition the ITU sponsors a TELECOM Forum at which a wide range of telecommunications issues is addressed. IARU President Price participated as a panelist for a Forum session entitled "Telecommunications in the Service of Humanitarian Assistance."

HANS EHLERS, DF5UG

A general view of TELECOM-99.

IARU COUNCIL MEETS

On the heels of the IARU Region 1 Conference in Lillehammer, Norway (December 1999 *QST*, p 75), the IARU Administrative Council met for three days, September 26-28. The Council coordinates the representation of the interests of amateur radio at international telecommunications conferences and serves as the coordinator between the IARU regional organizations on all matters of mutual interest.

The Council adopted an information paper for prospective owners and operators of amateur satellites. The document's purpose is to reduce the possibility of inappropriate use of the Amateur-Satellite Service. The information paper, developed and adapted from material originally prepared by AMSAT-NA, cautions that the Amateur-Satellite Service is not intended for broadcasting, that communications be in plain language, and access open to all amateur licensees.

In other action, the Council resolved that the IARU and its member societies develop "appropriate responses" to what were termed "growing threats of interference from broadband telecommunications over unshielded power and telephone lines." The IARU will develop input to the International Telecommunication Union working party that is studying acceptable levels of radiation from such systems as well as techniques to measure and minimize the effects of such radiation.

The Council also prepared a draft recommendation defining the operational and technical qualifications for those wishing to operate Amateur Radio stations. A very general statement of these qualifications is now a part of Article S25 of the international Radio Regulations. The draft recommendation contains 11 categories of qualifications: radio regulations, licensing conditions, interference, operating skills, electromagnetic compatibility, safety, theory of electrical circuits and devices, transmitters/receivers/antennas, propagation, modes of communication, and measurements. The draft was a followup to previous work of the IARU Future of the Amateur Service Committee. If a review of Article S25 of the international Radio Regulations ends up on the agenda for the next World Radiocommunication Conference after WRC-2000, probably in 2003, the draft recommendation would form the basis for a submission to an appropriate ITU study group.

The Council heard a report on another item that could come up for discussion at WRC-2003: the status of preparations for the eventual "harmonization" of the 40-meter band between amateurs and broadcasters. Up for discussion would be the proposed realignment of the 40-meter allocation to permit a worldwide allocation in the vicinity of 7 MHz.

A news release with more details on the meeting is available at **http://www.iaru.org/rel990928.html**. The Administrative Council members are W4RA, VK3ADW, K1ZZ, PA0LOU, G3GVV, VE3CDM, HC2EE, ZL2AMJ, and 9M2SS. QST

HANS EHLERS, DF5UG

The IARU stand was very popular with visitors.

HANS EHLERS, DF5UG

One of the visitors to the IARU stand was ITU Radiocommunication Bureau Director Robert Jones, VE3CTM, shown here signing the guest book.

Hello, and welcome to "Radios To Go"!

This column is for *us*—amateurs on the go. Looking at the equipment ads in this issue you'll notice that an overwhelming majority of the featured items are the mobile/portable radios and accessories. We love mobile and portable radios. The manufacturers recognize this, and it perpetuates a never-ending race to put more features into smaller packages. The result? It's never been easier, or more fun, to operate mobile, portable, maritime mobile or even aeronautical mobile. However, as with most hobbies, the more options we have, the more questions arise.

That's where this column comes to the rescue. "Radios To Go" is here to help you get more smiles per mile. Our primary focus will be the technical aspects of mobile radio. We'll help you with the typical issues of mobile hamming: "Where do I mount a radio in my new car?", "How do I route the power/antenna cables?", "Where should I make power connections?", and lots of other questions.

Even if you don't ham on four wheels, this is still the place to be. Remember, "Radios To Go" is for hams on the go. It doesn't matter whether you hike, bike, board, boat, blade, jog, fly, explore caves, or snorkel—if your radio accompanies you, this is *your* column. (And if you operate snorkel mobile, we're especially interested!) If you're perplexed about how to mount an antenna without destroying your car's resale value, or unsure about reciprocal operating procedures at your vacation destination, here's a place you can come for answers. On the other hand, maybe you've experienced and solved an unusual problem in your ham radio travels. "Radios to Go" is a place where you can share your solution with others. You say you're not a "techie"? Not to worry. Your story about how you've put mobile/portable ham radio to work in a unique way is something you'll want to share.

Feedback is Important

I look forward to hearing from you. Break out the pen, word processors and cameras—all contributions are welcome. The best way to contact me is by e-mail, with postal mail a distant second. Photos can't be returned, so please send only what you can spare. If you desire a reply by conventional mail, please enclose an SASE.

Jeff, AC4HF, operates HF and VHF mobile from his compact car. His Ten Tec Argonaut transceiver handles QRP CW duties, while an H-T keeps Jeff in touch on 2-meter FM. All of the equipment is firmly secured, yet easily removable.

UNAUTHORIZED WITHDRAWALS

It's hard to describe the sinking feeling you get when you discover someone has ripped off your radio gear. For me, the loss of an expensive mag-mount dual-band antenna while parked at a local mall was a real wake up call. Sometime after the disbelief and rage subside, you begin to wonder how you could have prevented yourself and your equipment from becoming victims of someone's unconscionable greed. While it's true that there is little we can do to deter a determined thief, there are still lots of ways to make his vocation a bit less rewarding. Much of our defense consists of simple, yet often-overlooked precautions.

KISS?

For our purposes, that familiar acronym represents "keep it safe and secure". Want to hang onto your mobile radio? Lock your doors! It may be trivial advice, but owners who leave their vehicles unlocked unwittingly aid an unfortunate number of thefts from autos. It's especially tempting to gamble your radio's fate when you're making that "quick stop" at the local market. Those few minutes are all some fleet-footed thief needs to snatch or damage your equipment. Door locks are one of the simplest and most effective theft deterrent devices you'll ever own. The price is right, too! Power door locks and vehicle alarms are common equipment on many vehicles, providing a double-dose of protection at the press of a button.

Now You See It—Now You Don't

Remote mounted radios are a godsend to anyone attempting to install ham gear within the busy cockpit of a modern automobile. Not only are remote-mounted rigs easier to install, they are inherently theft-resistant. With the appropriate separation kit, the main chassis can be tucked safely away under a seat or in the trunk, leaving only the thin control panel to be installed on the dash or console. When leaving your vehicle unattended, you simply snap the control panel out of its mounting pod and stow it and the microphone safely away from view of prying eyes.

If your budget doesn't allow replacing older radios with remote mountable gear, it's still worth your time to remove rigs and lock them in the trunk, or take them with you. With the exception of one in-dash rig, I've always installed my equipment in a manner that allows it to be quickly and easily removed. Winged mounting screws, slotted mounting brackets and easily accessed power plugs can be employed to make removal and reinstallation a one-minute job. Your rig's manufacturer may offer a quick-release mounting bracket as an option. If removal isn't practical, a jacket, pillow or some other covering placed over a radio can give it at least a fighting chance against those Midnight Radio Supply procurement agents. QST

Roger Burch, WF4N ♦ Box 100, Island, KY 42350 ♦ e-mail: wf4n@arrl.org

DIGITAL DIMENSION

MT63: An HF Panacea?

MT63 is an experimental HF mode for the transmission and reception of digital data. Developed by Pawel Jalocha, SP9VRC, MT63 uses FEC (forward error correction) with 64 tones spaced at 15.625 Hz. The MT63 modem audio occupies the range from 500 to 1500 Hz. Here's a user's description:

During several HF contacts, MT63 proved to be very robust in combating interference (natural and manmade) and fading. MT63 is similar to OFDM (Orthogonal Frequency Division Multi-plexing), which is used for DAB (Digital Audio Broadcasting). —*Andreas Gawron, DF7YC*

MT63 may be run on the Motorola DSP 56002 EVM board and may be available for PC sound cards soon. A *Linux* version of MT63 may be downloaded from **http://www.peak.org/~forrerj**.

Point/Counterpoint

Long-time HF digital mode experimenter and PSK31 *bon vivant*, Peter Martinez, G3PLX, recently expressed his concern regarding MT63, when the subject of porting MT63 to PC sound cards came up.

From Peter Martinez, G3PLX

The note about the availability of MT63 for sound cards marks another milestone in the route to chaos, which I predicted in my June 1999 *RADCOM* article entitled "Wide or Narrow, the Digital Dilemma."

To bring everyone up to date, I should explain that MT63 is a wide-band mode (can be up to 2 kHz wide), which uses vast amounts of redundancy to transmit hand-keyed text at a speed similar to PSK31. This makes MT63 very, very robust indeed in rejecting interference from narrow-band modes such as CW and PSK31, but it has no resilience to interference from another co-channel MT63 signal and only a modest advantage in terms of weak-signal working or propagation disturbance.

MT63 has so far only been available for the EVM card. We, the Amateur Radio community as a whole, need to think very carefully before we release this demon into our midst. Think about it: if this mode is so robust against interference, then it's going to become popular, and especially so if it's available for the soundcard. Just think of the consequences of PSK31 operators switching to MT63, which is 50 times wider! Life would be intolerable for the remaining narrow-band operators, a bit like working PSK31 in the SSB band.

The recent soundcard implementation of the MIL STD 188 modem by Bob McGwier, N4HY, also comes into this category, although it is versatile and can be used for higher baud rates with progressively lower levels of robustness. I would put forward the proposal that experimental use of such wide-band modes should take place *only* in the wide-band segments of the bands, that is, in the SSB sections of the bands where similar wide-band non-voice modes (SSTV and FAX) are well established.

In the longer term we need to debate whether modes like this, which exist only to be robust against interference from others, have any place at all in Amateur Radio. They would only achieve their robustness if they *were* sharing spectrum, which means they only "perform" when causing interference to others. This is patently unfair. Furthermore, if these modes acquired their own dedicated channels so that they didn't cause interference, then they would not be subjected to it either. A wide-band interference-resistant mode with no interference is no more than a criminal waste of spectrum!"—*Peter Martinez, G3PLX*

Paul Straks, PA0OCD Responds to G3PLX's Comments

As it is now, MT63 can be used in the 500-Hz, 1-kHz, or 2-kHz mode, with normal or double interleaving (running, at the moment, only on the Motorola DSP 56002 EVM starter kit). As for the 1-kHz and 2-kHz MT63 modes, I think it is reasonable to use the wide-band (phone/SSTV/FAX) part of the Amateur Radio band. But, as for the 500-Hz mode, I think there is no need to move to the wide-band part of the band because, in my opinion, there is enough space (for the 500-Hz mode) in the narrow-band part of the band. There, modes like RTTY, AMTOR, PACTOR-1 and 2, Clover and G-TOR are used (from 250 to 540 Hz wide).

Nowadays, hams like to experiment, not only with antennas, transceivers, propagation and so on, but also with new modes using personal computers. Experimenting shows how useful a new mode is or how the mode must adapted to be useful to the ham community. For this reason, I fully support the idea (and the efforts) to make the MT63 available to many more hams by making it run on soundcards.

I do not think MT63 can be called a "demon." All new modes can be seen as a threat somehow, but in due time, they either advance to become a very useful mode or just disappear. When new modes (or old modes) cause severe jamming to other modes, we can use the newsgroups on the Internet to make the users of those modes aware of that fact and find a reasonable solution for it.

With a bit of good will in the ham community, many modes (old and new) can peacefully coexist side-by-side. As a result, ham radio can remain a very interesting hobby of experimentation and personal development (and not personal frustration).—*Paul Straks, PA0OCD*

[Although both writers suggest using MT-63 in the phone bands, it is important to note that the FCC does not permit data emissions in the US amateur HF phone bands.—*Ed.*]

Any Comments?

I will gladly entertain printing your thoughts regarding MT63 or G3PLX's and PA0OCD's comments in future installments of Digital Dimension.

By the way, to keep abreast of what is going in the world of HF digital-mode experimentation, consider subscribing to the PSK31 reflector (e-mail list). To do so, send e-mail to **majordomo@aintel.bi.ehu.es** with a text line of "subscribe psk31" or "subscribe psk31-digest" depending on whether you want to receive each PSK31 message separately or grouped together on a daily basis (digest mode). Also, check out the "official" PSK31 home page at **http://aintel.bi.ehu.es/psk31.html**. QST

NEW PRODUCTS

GPS TRACKER FROM KANTRONICS

◊ Kantronics has taken their KPC-3 Plus TNC, added a Garmin X-12 GPS module and squeezed them both into a cabinet about $1^{3}/_{16} \times 7^{1}/_{2} \times 3^{5}/_{16}$ inches. The result is their new GPS Tracker. Connect the unit to your transceiver and a dc power source and it can report your station or vehicle location, receive APRS information and operate as a full-featured packet radio modem.

The GPS Tracker package also includes a Garmin GA-27 GPS active antenna with a suction cup mount. Power requirements are 6 to 12 V dc at approximately 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**; **http://www.kantronics.com/**. Suggested list price: $649. QST

Next New Product

Stan Horzepa, WA1LOU ♦ One Glen Ave, Wolcott, CT 06716-1442 ♦ wa1lou@arrl.net, www.tapr.org/~wa1lou

EXAM INFO

License Restructuring for the New Millennium

As these words were written the amateur community was still awaiting word from the FCC concerning license restructuring. Who knows? By the time you read this, the big news may already be on the street. (Such is the time-delayed nature of magazine publishing!)

Of course, all details regarding the FCC decision will be printed in *QST* as soon as they are available, although you'll likely get the first word on the ARRL Web site at **http://www.arrl.org/news/**. Keep a watchful eye on the amateur media—our best information as this goes to press is that a restructuring announcement from FCC may come in time to be able to be put under the Christmas tree, or arrive just in time to ring in the New Year.

Year 2000 ARRL/VEC Test Fee is $6.65

The FCC has announced that, effective January 1, the maximum allowable reimbursement for an amateur operator license examination is $6.66. This amount, up from $6.49 in 1999, is based upon a 2.6% US Department of Labor Consumer Price Index (CPI) increase between September 1998 and September 1999.

Volunteer examiners (VEs) and volunteer examiner coordinators (VECs) may charge examinees for out-of-pocket expenses incurred in preparing, processing, administering or coordinating examinations for amateur operator licenses. The amount of any such reimbursement fee for any one examinee at any one examination must not exceed the maximum reimbursement fee.

Accordingly, the ARRL/VEC has set its 2000 test fee at $6.65 for each examination (except for those examinations consisting of only Element 1A, Element 2, or both for which there is no charge—an ARRL/VEC policy). Any questions may be directed to the ARRL/VEC by calling 860-594-0300, or by e-mail to: **vec@arrl.org**.

All Question Pool Updates Still On Hold

Pending a decision in the license restructuring matter, the Question Pool Committee of the National Conference of VECs announced in September 1998 that all question pool updates (including the Advanced pool update scheduled for July 1999) were placed on indefinite hold until the restructuring debate is resolved.

In the meantime, all present question pools will continue to remain in effect until further notice. The current question pools can be found on the ARRL Web site at: **http://www.arrl.org/arrlvec/pools.html**. If you're looking for an exam location in your area, try our ARRLWeb ExamSearch page at: **http://www.arrl.org/arrlvec/examsearch.phtml**.

ARRL Spring and Fall National Exam Days for 2000

Saturday and Sunday, April 29-30
Saturday and Sunday, September 23-24

The ARRL Spring and Fall National Exam Days in 2000 will be held on the last full weekends of April and September this year. Knowing these dates well in advance, prospective hams and upgraders alike can focus their time and prepare to take their test(s). Good luck to all National Exam Days participants!

If you are looking for information regarding exams to be held in your area, or questions pools information, see the ARRL/VEC Web site at: **http://www.arrl.org/arrlvec/**,or call 860-594-0300. For instructors and club info, call 860-594-0200. The ARRL can provide media kits to help you publicizing your Spring and Fall National Exam Days. Contact Jennifer Hagy, N1TDY, at: 860-594-0328, or via e-mail at: **jhagy@arrl.org**. QST

VECs in the Amateur Radio Service

As we enter the last year of the millennium there are presently 14 Volunteer Examiner Coordinators (VECs) in the Amateur Service. These 14 VECs coordinate the voluntary efforts of more than 30,000 Volunteer Examiners (VEs):

- *Anchorage AR Club*, HC01 Box 6139-C, Palmer, AK 99645-9604; tel 907-746-3996; **worcester@alaska.net**
- *ARRL/VEC*, 225 Main St, Newington, CT 06111; tel 860-594-0300; fax 860-594-0339; **vec@arrl.org**; **http://www.arrl.org**
- *Central Alabama VEC*, 1215 Dale Dr SE, Huntsville, AL 35801; tel 256-536-3904; **dtunstil@advicom.net**
- *Golden Empire AR Society*, POB 508, Chico, CA 95927; tel 530-345-3515; **wa6zrt@aol.com**
- *Greater L.A. AR Group*, 9737 Noble Ave, North Hills, CA 91343; tel 818-892-2068; fax 818-892-9855; **gla.arg@gte.net**
- *Jefferson AR Club*, POB 24368, New Orleans, LA 70184-4368
- *Laurel AR Club, Inc*, POB 3039, Laurel, MD 20709-3039; tel 301-317-7819, 301-572-5124 (1800-2100 hrs); **rbusch@erols.com**
- *The Milwaukee RA Club*, Inc, POB 25707, Milwaukee, WI 53225; tel 414-797-6722
- *MO-KAN VE Coordinator*, POB 11, Liberty, MO 64069-0011; tel 816-781-7313, 913-375-1177
- *Sandarc-VEC*, POB 2446, La Mesa, CA 91943-2446; tel 619-465-3926
- *Sunnyvale VEC AR Club*, Inc, POB 60307, Sunnyvale, CA 94088-0307; tel 408-255-9000; **vec@amateur-radio.org**; **http://www.amateur-radio.org**
- *Western Carolina AR Society/VEC, Inc*, 6702 Matterhorn Ct, Knoxville, TN 37918; tel 865-687-5410; **wcars@korrnet.org**; **http://www.korrnet.org/wcars/**
- *W4VEC*, 3504 Stonehurst Place, High Point, NC 27265, tel 336-841-7576; **w4vec@aol.com**
- *W5YI-VEC*, POB 565101, Dallas, TX 75356-5101; tel 817-860-3800; **w5yi@w5yi.org**

Any questions or comments for the FCC regarding the VEC system can be directed to: William Cross, FCC Wireless Telecommunications Bureau at 202-418-0680, or by e-mail at: **bcross@fcc.gov**.

NEW PRODUCTS

CODE WARRIOR JUNIOR FROM VIBROPLEX

◊ A production version of the NORCAL K8FF key, the Code Warrior Junior is the first "QRP key" offered in the history of the Vibroplex product line.

The black powder-coated base on this iambic key measures just $2^1/_2 \times 3$ inches. The paddles are clear plastic and the action is magnetic—no springs are used.

Its small size should make it a popular accessory for both portable and fixed QRP operations.

Each Code Warrior Key is sequentially serial numbered and dated.

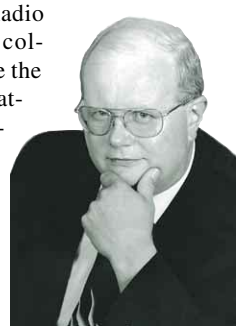
For more information visit your favorite ham radio products dealer or contact The Vibroplex Co Inc, 11 Midtown Park E, Mobile, Al 36606; tel 800-840-8873 or 334-478-8873; fax 334-476-0465; **http://www.vibroplex.com/**. QST

Next New Product

Bart Jahnke, W9JJ ♦ ARRL/VEC Manager

Welcome!

My name is Rich Arland, K7SZ. I have been involved with low power communications (QRP) for 35 years and I'm truly honored to accept the editorship of this landmark column in *QST*, the world's premier Amateur Radio magazine. In this column we will explore the exciting and fascinating world of low-power communications. Over the years I have seen the face of QRP change quite dramatically. No longer are QRPer (those who practice the art and science of low power communications using 5 W or less RF power output) regarded as a weird fringe element of our hobby. In reality, QRP has become the fastest-growing facet of Amateur Radio, with thousands of amateurs making the transition to low power operating every year.



Each month we will explore a topic within the low power arena. We will start simply and progress from basic to advanced operating skills. This column will feature some of the more popular QRP URLs on the Internet, where you can glean additional information. We'll include a QRP Calendar of Events, which will list upcoming QRP forums and operating events. Occasionally we will feature an interview with a well-known QRPer, providing some insight into how that person perceives and enjoys the QRP hobby. As my time and travel plans permit, there will be coverage of the larger QRP events like Atlanticon, the Four Days In May, the Dayton Hamvention, HamComm and Pacificon. Since the heart and soul of the QRP movement is people, we will be asking you, the readers of this column, for your input and suggestions, along with questions you might have regarding low power communications. Whether you are a seasoned veteran or a newcomer to QRP, this column will be available to help and encourage your efforts.

Y2K and the QRPer

This column was written in September 1999. As you read this we are within two to three weeks of Y2K. This is a time when we, as radio amateurs and especially QRPers, can be poised to help our communities by offering our services to the local ARES or RACES chapter. With our battery friendly equipment we can provide critical communications links should this much touted and little understood "Y2K Bug" be anything but a speedbump on the road of life. Take this opportunity to contact your local ARES/RACES coordinators and offer your services. Get involved with your local community. Y2K provides an excellent opportunity to plug amateur radio and QRP. You never can tell, there might be a future QRPer or two just waiting for a "push" to enter the hobby.

QRP and the Internet

The Internet gets blamed for a lot of things. However, the one thing that the Internet has meant to the low power communicator is a way to share information, almost instantly, with thousands of like minded QRPers around the world. If anything, the Internet has brought QRP into the 21st Century. If you are not on-line and connected to the Internet, you are missing a very important resource. Probably the *one* place to be is on the QRP-List (**qrp-l@lehigh.edu**). This "reflector" is the brainchild of Chuck Adams, K7QO (ex: K5FO) and is the focus of this month's *QRP WebSurf* .

The QRP-L offers a near-real-time exchange of ideas and a method of contacting others within the hobby. At last count there were over 3100 QRPers tied into the list, providing the largest "QRP Brain Trust" on the planet. If you have a problem or question, need to buy or sell a QRP rig or accessory, want to share an operating feat, catch up on the latest insider "buzz", or just keep abreast of the latest happenings, QRP-L is the place to be. As I indicated previously, if you are not connected on-line you *are not* in the mainstream of low power communications.

You can subscribe to QRP-L by sending an e-mail message to: **listproc@lehigh.edu**. In the body of the message type "subscribe qrp-l" (without the quote marks). The listprocessor will send you back a confirmation message. Follow the directions in the message and the list processor will then add you to the subscriber listing of QRP-L and you can participate on the list.

Conclusion

That's all for this month. On a personal note, I'd like to take this opportunity to thank *QST* Editor Mark Wilson, K1RO, and Managing Editor Steve Ford, WB8IMY, the "front end crew" of *QST* for this opportunity to break new ground. Little did I imagine that my first article on QRP (October 1994 *QST*) would lead to a monthly column. It would be unfair not to mention some people who laid the initial groundwork for this column by writing regular QRP feature articles over the years: Doug DeMaw, W1FB (SK), Zach Lau, W1VT, Jim Kearman, KR1S, and Dave Benson, NN1G, just to name four. Thanks, guys. The League has taken the step of offering a monthly QRP column in *QST* because they know that low power communications has become a major area of interest within the hobby. Remember one thing: I only write this column. It belongs to you, the reader. That means I want to hear from you. Send me your thoughts and ideas for future columns.

Until next month, crank back the RF power and get active in QRP.—*72/73 Rich, K7SZ*

Grassroots QRP often means building kits or homebrewing your gear from scratch. This collection is the pride of Ralph Taggart, WB8DQT.

Rich Arland, K7SZ ♦ 25 Amherst Ave, Wilkes Barre, PA 18702 ♦ email: k7sz@epix.net

Using 1/2-Inch 75-Ω CATV Hardline

Losses due to long runs of coaxial cable are a perpetual concern at 50 MHz and higher frequencies. RG-8-type cables are popular because they are reasonably priced and convenient to use with modern equipment and antennas. Suitable UHF and N connectors are inexpensive and plentiful. These 0.4-inch diameter cables have improved significantly over the past dozen years, yet losses for the best of them may still be unacceptable for long runs on the VHF bands.

Slightly larger 0.5-inch, Hardline and 0.6–inch coaxial cable (such as Time LMR 600) can reduce losses by nearly half, in comparison with the best RG-8 types, but they are more expensive and the connectors can cost three to 10 times as much. There is a more attractive, widely available and inexpensive alternative. Half-inch aluminum 75-Ω CATV cable has about the same low losses as pricey alternatives, but CATV cable can cost little or nothing. See Table 1.

Local CATV companies are often willing to give away scraps and reel ends just for the asking. Scraps in the CATV business can be 100 feet and longer, but such lengths can be handy for running up a tower. Even shorter pieces can be quite useful. It does not hurt to inquire. CATV line often appears at flea markets and hamfests at quite attractive prices.

The Impedance Problem

There is still a price to pay for using CATV cable. The 75-Ω impedance may not be perfectly compatible with equipment and antennas designed for 50-Ω feed lines. In addition, usable UHF and N connectors are not widely available for aluminum CATV cable. Nevertheless, both problems can be overcome.

The main consequence of using 75-Ω cable in a system designed for 50 Ω may be nothing more than an SWR of 1.2 to 1. The additional losses incurred for the mismatch are a few tenths of a decibel at most, but in practice, this can be reduced to near zero.

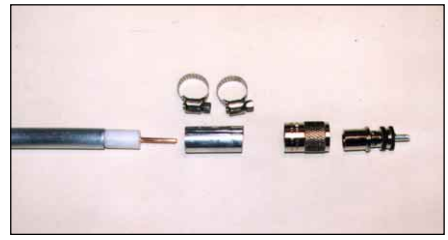


Figure 1—The prepared 1/2-inch CATV cable end, PL-259 plug, adapter sleeve and two hose clamps ready for assembly.

Most antennas can be retuned slightly for a 75-Ω, thus effectively eliminating the mismatched load. Modern equipment can usually cope with a 75-Ω feed line and antenna.

In other applications, the 75-Ω impedance is just what is needed. Simple power dividers and phasing lines are commonly designed and constructed using 75-Ω cables. CATV cable may actually make a superior alternative to RG-11 types often used in such applications, because it is cheap, mechanically strong and not likely to deteriorate over time.

Connectors

It is not difficult to adapt a standard PL-259 connector for 1/2-inch aluminum CATV cable. In addition to the PL-259 connector, two small hose clamps and a home-made adapter sleeve are required. Fabricate the adapter from a 1 1/4-inch length of aluminum tubing, 5/8-inch diameter and 0.058-inch wall. Cut a slit down the entire length of the aluminum tube. The sleeve will then just slide over the CATV cable and the barrel of the PL-259, providing a good electrical contact between the two, once assembled and compressed.

Prepare the CATV cable by carefully cutting through the aluminum shield exactly 1 3/8-inch from the end. Use a circular cutter intended for copper tubing. Score a very shallow grove at first and then slowly tighten the circular blade while cutting. Avoid crushing the aluminum before the blade has a chance to cut through to the foam insulation. Snip away the short piece of aluminum jacket, as it is not likely to slide off. Then remove exactly 7/8-inch of the foam insulation from the end. Take care not to score or to scratch through the copper-plated aluminum center conductor. The prepared cable and connector parts are shown in Figure 1.

Slide on the aluminum sleeve adapter, the two hose clamps and the outer shell of the PL-259. Screw the connector barrel onto the end of the cable so that the foam insulation is forced right past the solder holes. The exposed cable end will fit snugly inside the connector. The center conductor should just reach the end of the center pin when the cable is fully inserted. Solder the center pin as usual. Then screw on the outer shell and push up the split sleeve adapter so that it overlaps the barrel of the connector. Tighten up the two hose clamps to compress the sleeve, thereby making a tight electrical and mechanical connection between the cable and the connector.

This arrangement probably comes close to continuing a 75-Ω impedance within the connector, as the center-conductor to outer-shell ratio is maintained. In any outdoor installation, waterproof the whole assembly with several layers of good quality electrical tape. Take care when installing CATV cable, as sharp bends may put a permanent crimp in the cable, making it useless.

ON THE BANDS

Six meters dominated the activity for October. The sheer amount of letters, e-mail, packet spots and WWW summaries was overwhelming, although Cycle 23 DX possibilities were just beginning. All these reports

This Month	
January 3	Quadrantids meteor shower peaks
January 22-24	ARRL VHF Sweepstakes

Table 1
Comparative Losses for 1/2-Inch CATV Cable (dB / 100 feet)

Frequency MHz	*Best RG-8 Types**	*Times LMR 600*	*1/2" Hardline*	*1/2" CATV (75Ω)*
50	0.9	0.6	0.5	0.5
144	1.5	1.0	0.8	0.8
222	1.8	1.2	1.0	1.1
432	2.6	1.7	1.5	1.6

*Belden 9914, Times LMR 400 and similar cables

Emil Pocock, W3EP ♦ Box 100, Lebanon, CT 06249 (home 860-642-4347, fax 860-594-0259) ♦ w3ep@arrl.org

were essential for creating the following summaries, even if many details needed to be abridged—and mention of more common DX passed over altogether. Thanks to KB1DSG, WB2AMU, KC2DLD, W3BO, N3ZTZ, WA4LOX, WA5IYX, N6CO, K6KLY, K6YK, N6XP, W7GJ, K7JA, K8MFO, K9AKS, KA9CFD, KG9N, W9/VE3CDP and N0VSB not otherwise credited. Dates and times are UTC.

Six Meter DX

Nearly every part of the US had opportunities to work into South America sometime during the month. Large parts of the country also had openings into the South Pacific, while East Coast stations made the first tentative contacts with Europe. Some truly exceptional DX was reported from Europe and Japan. Undoubtedly there has been more exciting DX excitement by the time you read this, but October was exciting enough for starters.

South and Central America

Six meters opened to South America from somewhere in the US on more than half the days of October. Argentina was the country most often worked. The logs of LW5EJU, LU6DRV and other Argentines show US stations from every call district. US stations also worked Brazil, Chile, Columbia and Ecuador on many of the same dates. HC8N (Galapagos Island), operated by N5KO, made over 400 QSOs in US call areas 4, 5, 6 and 7, from Virginia to California. Signals along north-south paths were often strong. Jon Jones, N0JK (EM17) in the center of the US, was running just 10 W to an attic dipole when he hooked up with CX1CCC, who was using just 5 W to a ground plane himself. Many other low-power stations completed contacts into South America without great difficulty.

CE4MLN, CE4WJR and XQ6ET were among the more sought-after stations on October 15, 16, 17, when they worked into W7, 8, 9 and 0. Al Olcott, K7ICW (DN26), was surprised by contacts with two of the Chileans on the afternoon of October 17. Other South American calls commonly mentioned in the many reports included HC2FG, HC5K, HC8GR, HK3YH, PT7NK, PY0FM (Fernando de Noronha) and YV4AB/b. US stations also worked Central Americans and Caribbeans TI5KD, HP3XUG, several KP4, J68CB (St Lucia) and J79AND (Dominica).

The South Americans had more on their hands than US stations. On at least 10 days in October, LW5EJU, LU6DRV, PY0FM, PY1VOY, PY2IAX, PY5CC, PP1CZ and others worked into Europe as far east as Malta, Sicily, Italy and Germany. *RadCom* VHF editor Norman Fitch, G3FPK, reported the five-hour opening of October 12 from the United Kingdom to LU, CX and PY was perhaps the best in more than a decade. PY1VOY made more than 120 contacts into Europe the following day, while PY0FM logged over 100 CT, EH, F, G, GJ, GU and GW stations on October 21. LW5EJU worked SV1DH and SV1IW on October 18, for some of the longest contacts into Europe.

The South Americans also worked Hawaii and across the Pacific to Asia. LU, CX, PY and CE contacts with Japan were so common in October that they were hardly news anymore, according to JA1VOK. PY2XB also logged VR2 (Hong Kong) and JD1 (Minami Torishima) on October 18.

Europe and the Mediterranean

October 15 may have been the earliest date on which US or Canadian stations have ever worked Europe via F_2. Around 1750, VE1YX and WA1OUB reported weak contacts with EH7KW, via a southerly skewed scatter path. VE1PZ reported another weak contact with EH7KW two mornings later. On October 27, several EH and CT stations worked VE1, W1, W2 and W3 call areas between 1445 and 1640, but signals were weak and inconsistent. WA1OUB reported weak CT stations the next day.

Southern Europeans continued to have nearly daily openings into Africa and many days with propagation to South America. New calls in many European logs included 5X1T (Uganda), who worked as far north as Poland. SV1DH made other outstanding contacts with PY, CX and ZP on October 20 and VR2XMT, VR2LC, BG7OH (China), VK8MS and VK6JP on October 26. The first ever 6-meter contact between Poland and Australia took place on the 25th, when SP6ASD made it with VK6JQ around 1012. On the morning of October 31, YO4AUL logged a series of notable contacts with VK4ABW, VK4BW and VK4FNQ.

JY9NX also had a memorable month. He got into the African openings and worked FR5DN on October 1. The JY9NX contact with JA6QGG on October 9 was probably the first ever between Jordan and Japan on 6 meters. This was made via a southerly skewed path and was followed by several other JA contacts. JA1VOK also reported that JY9NX worked JR6 on October 18 and 23.

Pacific

There were some unusual early-cycle openings between the US and the South Pacific on the late afternoons of October 15 to 19, 22 and 25. Among the exciting catches was FO0KOJ (Austral Island, a recent addition to the DXCC list), who made dozens of contacts in all US call areas, save W1. W5UWB (EL17) was among the first to log the Austral Islander on October 15 around 2235. A35SO (Tonga) worked nearly as widely and logged W5OZI at 0141 on October 16, the earliest that appears in the reports. Roman Flores, XE2EED and likely other Mexican and Central American stations also found FO0KOJ and A35SO.

Australians (primarily VK4s in South Australia) worked into the western states and south to Mexico and Central America on October 16, 17, 18, 19 and 25. K7ICW (DN26), KC7IJ (DN44), K5CM (EM25) and W4LZP (EM66) were among more easterly stations making the grade to Australia during the month. A smaller number of lucky western US stations also worked V73AT and V73CW.

John Butrovich, W5UWB (EL17), may have had the single most spectacular run of Pacific stations on October 22. Between 1858 and 2344, John logged FO0DEH, KH6IAA (on a southerly skew path), A35SO, 3D2TC (Fiji) and YJ8UU (Vanuatu)—what a line up of DX!

Japan and Asia

Surely some of the most exotic and exciting DX news of the month came from Asia; thanks especially to Hatsuo Yoshida, JA1VOK. He reports that JR6DGU, JR6HI, 7J6CCU and others in the Ryukyus (the southern most of the Japanese islands) continued to lead the way. Their catches for the month included 5R8GJ (Madagascar), 7Q7RM (Malawi), 9U5D (Burundi), AP3WAP (Pakistan), EY8MM (Tajikistan) and UU7JM (Ukraine). JR6HI heard ZD8VHF/b on October 6 around 0100.

Japanese in most of the rest of the remaining call areas had to make do with S21ZE (Bangladesh), 9V1UV (Singapore), BV2DP (China), FO0KOJ, A35SO and ZP6CW (Paraguay).

Other Asian stations made incredible contacts. BV2DP worked VQ9DX (Chagos), VK8MS and KH0/JK3HLP (Marianas), along with many Japanese, on October 1. VR2XMT (Hong Kong) logged PY0FM, AP2WAP, EY8MM, FR1GZ, 5R8GJ, 9V1UV, SV5BYR, 4X1RF, OD5SX, JY9NX, SV1DH and two 9H (Malta) during the month. In addition to Japan and Hong Kong, EY8MM worked 5B4FL (Cyprus), JY9NX, 4S7 (Sri Lanka), 9M2TO (West Malaysia) and DU (Philippines) on October 8 and 9. S21ZE ran 434 JAs in all call areas save JA8, BV, VR2, HL, KH0 and V7 between October 14 and 18. Finally, YJ0DX (Vanuatu) made a long-path contact with TZ6VV (Mali) on October 30 at 2121.

There was a lone report of a US contact with East Asia. Erik Dean, N6XP (DM06), made an unusual southerly skewed-path contact with JA9CGR on October 18 at 0142.

Summary

This was probably the most unusual October for 6-meter DX ever recorded. The number of new countries and the huge increase the number of stations on the air since the last solar-cycle peak certainly accounts for much of activity. Equipment, operating techniques and real-time reporting methods have also improved significantly over the past decade. More interesting were the number of contacts made by southerly skewed scatter paths along the lines suggested in November's column. This is just a start. It is hard to imagine what we will be working as you read this in late December.

Aurora and Auroral E

The October 22 aurora caught many VHFers by surprise when it suddenly intensified just after 0000. Contacts on 144 MHz were possible all across the northern half of the country, roughly from northern Virginia, west to Missouri, northern Colorado and northern California. Signals were often strong until at least 0730, although the aurora seemed to come and go several times during the early morning hours. Dick Hart, K0MQS (EN31), probably had as wide a coverage as any station. Dick worked east to FN41 (Rhode Island), west to FN70 (Colorado) and some unusual contacts into the South, including EM64 (Alabama).

Conditions on 6 meters were even more widespread, as auroral-E propagation took over from time to time, especially on longer paths. Jeff Leer, KG0VL, just happened to be in central Manitoba on one of his periodic trips into the auroral zone on October 22. As VE4/KG0VL (EO36), Jeff had been making auroral-E contacts across the arctic nearly every evening, but his first contact that night was with W3EP (FN31) at 0126. Jeff subsequently made more than two dozen auroral-E contacts as late as 0650 with stations west to VE6PY (DO20) and south to KB0PE (EM48).

W3EP ran a mix of aurora and auroral-E contacts into the Midwest and found W7CI (CN87) on auroral E at 0719. Bill Hohnstein, K0HA (EN10), also found a mix of aurora and auroral-E propagation. He worked stations as far west as N7EIJ (DN44) and south to K5SW (EM25) on

Microwave Standings

Microwave standings are compiled each November 1 for publication in the January *QST*. To be included in this list you must have contacted a minimum of five grids or communicated over a minimum distance that varies with each band. (For bands above 10 GHz, you need only make one contact for inclusion.) You must also submit an activity report at least every two years. You don't need to work new stations, but please confirm your continued interest. Reports can be submitted by e-mail to **standings@arrl.org**. You can also request reporting forms by sending and SASE to WB8IMY, ARRL, 225 Main St, Newington, CT 06111.

33 cm (902-928 MHz)

Minimum terrestrial DX = 250 km

Call Sign	QTH	States	DXCC	Grids	Best DX† (km)
K1TEO	CT	16	2	43	970
AF1T*	NH	14	1	19	621
K1UHF	CT	13	1	29	858
W1JR	NH	10	3	28	634
W1VT	VT	8	2	25	613
W1GHZ	MA	8	1	10	558
K1MAP	MA	4	1	4	312
K2DH*	NY	21	2	40	1400
N2WK	NY	12	2	46	950
WB2VVV	NJ	10	1	16	454
K2AN	NY	9	2	27	1401
W3RJW	PA	14	2	32	690
K4RF	GA	9	1	10	1045
AD4DG	VA	8	1	13	761
N4CH	VA	6	1	13	420
AA4H	TN	6	1	9	367
WB4JEM	FL	3	—	3	1430
W5LUA*	TX	20	2	58	1725
W5ZN	AR	15	1	40	1150
AA5C	TX	11	1	33	1503
N5QGH	TX	4	1	15	1062
N6CA	CA	4	3	18	3978
W6CPL	CA	1	2	17	825
KE7SW	WA	2	1	9	260
N7YAG	OR	2	1	4	329
N3CEV/7	WA	2	1	4	328
WA8WZG	OH	22	2	52	1533
KE8FD	OH	13	2	32	1402
K2YAZ	MI	11	1	30	960
K8MD	MI	11	2	29	896
K8TQK	OH	16	2	33	1378
KU8Y	MI	7	1	19	615
WB8XX	OH	3	1	6	348
K3SIW/9	IL	17	2	55	1200
WB9SNR	IL	10	1	22	614
W0UC	WI	8	1	28	783
WA1MKE	IN	4	1	6	500
WA0BWE	MN	10	2	27	1353
N0HJZ	MN	6	1	12	480
K0RZ	CO	4	1	16	450
W0LD	CO	4	—	4	615
WA2HFI/0	MN	3	1	6	284
VE3KH	ON	14	2	10	447

23 cm (1240-1300 MHz)

Minimum terrestrial DX = 250 km

Call Sign	QTH	States	DXCC	Grids	Best DX† (km)
K1TEO	CT	17	2	42	1010
K1UHF	CT	14	1	34	858
W1JR*	NH	13	4	36	1054
WA1OUB	NH	12	3	39	987
W1VT	VT	10	2	28	733
K1ZE	RI	10	2	18	954
AF1T	NH	10	2	15	564
W3EP/1	CT	7	2	10	485
W1GHZ	MA	6	1	8	558
K1MAP	MA	5	1	6	312
W1AIM	VT	4	2	10	493
K2DH*	NY	33	29	112	2148
WA2LTM	NJ	20	2	54	1458
N2WK	NY	16	3	54	1201
W2CNS	NY	16	2	48	1154
K2AN	NY	11	2	34	1401
WB2VVV	NJ	10	1	18	640
WA2ZFH	NY	10	1	14	469
W2FCA	NY	8	2	20	650
W3HHN	NY	6	1	13	345
KB3PD*	DE	27	9	53	—
W3RJW	PA	18	2	50	1123
K3UA	PA	14	2	26	700
NO3I	PA	10	1	23	—
K4MRW	AL	20	1	46	1300
WA4OFS*	FL	17	14	59	1789
K4RF	GA	17	1	32	1067
W4DEX	NC	14	1	23	1078
WB4JEM	FL	12	1	38	1647
K4ZOO	VA	11	1	27	642
AA4H	TN	9	1	18	560
W4WTA	GA	9	1	16	1023
W4EUH	VA	8	1	13	450
AD4DG	VA	7	1	11	520
N4CH	VA	6	1	15	608
KD9KP	TN	6	1	7	1165
W5LUA*	TX	39	37	228	2060
WD5AGO*	OK	36	35	202	1240
W5ZN	AR	20	1	54	1500
W5RCI	MS	17	1	61	—
AA5C	TX	17	1	55	1562
K5SW	OK	15	1	55	1583
N5QGH*	TX	14	7	45	1545
WA5TKU	TX	10	1	43	1988
W5VY	TX	8	—	35	1832
W5UWB	TX	6	1	13	1664
N6CA*	CA	8	11	44	3978
K6QXY	CA	4	2	18	3794
W6CPL	CA	3	3	27	3984
N7STU	CA	2	1	15	444
W7CS*	AZ	10	16	38	410
W7RV	AZ	6	2	27	643
N7LQ	NV	4	1	16	467
W7PUA	OR	3	1	18	605
WA7GSK	ID	3	—	10	—
KE7SW	WA	2	2	13	408
N7YAG	OR	2	1	10	329
K7XC	NV	2	1	6	369
N3CEV/7	WA	2	1	6	328
WA8WZG*	OH	37	22	119	1533
KE8FD	OH	20	2	59	1402
K2YAZ	MI	18	2	56	1300
K8MD	MI	17	2	45	923
K8TQK	OH	13	1	32	1026
KU8Y	MI	11	1	29	945
W8PAT	OH	10	2	26	1407
N8KOL	OH	10	2	24	765
WB8XX	OH	8	1	16	968
N8XA	OH	3	1	6	—
K3SIW/9	IL	20	2	72	1207
W9ZIH	IL	19	1	34	1184
WB9SNR	IL	16	2	51	1250
W0UC	WI	11	1	45	1180
K9KL	WI	8	2	27	900
WA1MKE	IN	4	1	8	500
N0JK	KS	18	1	52	—
N0HJZ	MN	15	1	44	1530
N0LL	KS	13	1	46	1321
WA0BWE	MN	12	2	46	960
K0RZ*	CO	8	3	40	678
W0ZQ	MN	8	1	21	788
W0LD	CO	7	—	19	615
WA2VOI/0	MN	6	—	8	—
WB0LJC	MN	5	1	11	750
KB0IKP	MN	4	1	8	450
W0PHD	MN	3	2	13	
WA2HFI/0	MN	3	1	10	387
N0KE	CO	3	1	5	500
N0UK	MN	2	1	8	508
VE6TA*	AB	20	25	45	—
VE3KH	ON	3	—	13	345

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

Minimum terrestrial DX = 250 km

Call Sign	QTH	States	DXCC	Grids	Best DX† (km)
K1TEO	CT	12	1	19	720
W1JR	NH	9	2	11	414
K1UHF	CT	8	1	15	413
W1VT	VT	8	1	15	413
AF1T	NH	5	1	7	374
K2DH*	NY	16	8	56	1535
WA2LTM	NJ	14	1	24	705
N2WK	NY	10	2	31	950
WB2VVV	NJ	5	1	6	209
W3RJW	PA	14	1	26	
W4HHK*	TN	10	—	16	936
K4MRW	AL	8	1	8	925
K4RF	GA	4	1	6	293
W5LUA*	TX	20	19	88	1533
W5ZN	AR	10	1	27	1040
W5RCI	MS	8	1	15	—
AA5C	TX	7	1	18	1082
N5QGH	TX	4	1	12	1013
WA5TKU	TX	3	1	11	704
N6CA	CA	3	3	15	3978
W6CPL	CA	1	2	10	508
W7PUA	OR	2	1	11	605
WA8WZG*	OH	19	15	62	1533
K8TQK	OH	6	1	15	673
K2YAZ	MI	5	1	21	600
K3SIW/9	IL	13	1	48	1041
W9ZIH	IL	9	1	10	1184
W0UC	WI	6	1	10	783
WB9SNR	IL	6	1	9	812
WA0BWE	MN	9	2	25	1353
N0HJZ	MN	7	1	14	1086
W0LD	CO	3	—	7	457
K0RZ	CO	2	1	11	238

9 cm (3300-3500 MHz)

Minimum terrestrial DX = 200 km

Call Sign	QTH	States	DXCC	Grids	Best DX† (km)
W1VT	VT	6	1	12	419
K1TEO	CT	6	1	6	360
K2DH	NY	10	2	18	943
WA2LTM	NJ	9	1	13	705
N2WK	NY	4	2	19	950
WB2VVV	NJ	3	1	5	209
W3RJW	PA	7	1	10	664
W4DEX	NC	4	1	5	714
K4RF	GA	2	1	2	293
W5LUA*	TX	9	5	30	1353
W5ZN	AR	7	1	18	1040
AA5C	TX	5	1	14	1048
N5QGH	TX	3	1	7	294
WA5TKU	TX	2	1	6	96
N6CA	CA	3	3	12	3978
W6CPL	CA	1	2	8	508
W7PUA	OR	2	1	7	418
WA8WZG	OH	14	2	24	1045
K8TQK	OH	5	1	10	537
W9ZIH	IL	11	1	26	943
K3SIW/9	IL	9	1	35	880
WB9SNR	IL	5	1	8	518
WA0BWE	MN	5	1	17	1353
W0LD	CO	4	—	6	517
K0RZ	CO	2	1	6	130
N0HJZ	MN	2	1	5	200

5 cm (5650-5925 MHz)

Minimum terrestrial DX = 200 km

Call Sign	QTH	States	DXCC	Grids	Best DX† (km)
W1GHZ	MA	6	1	8	367
W1VT	VT	5	1	9	419
K2DH	NY	7	1	13	943
N2WK	NY	3	2	11	892
W3RJW	PA	3	1	6	366
W5ZN*	AR	8	3	21	1040
W5LUA*	TX	7	12	39	1187
AA5C	TX	5	1	17	1134
WA5TKU	TX	3	1	6	304
WD5AGO	OK	2	1	5	138
N5QGH	TX	1	1	6	256
N6CA	CA	3	3	20	3978
WA8WZG	OH	15	2	22	1045
K2YAZ	MI	3	1	5	600
W9ZIH	IL	11	1	31	943
K3SIW/9	IL	8	1	33	800
WB9SNR	IL	5	1	7	614
WA0BWE	MN	5	2	7	655
K0RZ	CO	2	1	5	125

3 cm (10-10.5 GHz)

Minimum terrestrial DX = 150 km

Call Sign	QTH	States	DXCC	Grids	Best DX† (km)
AF1T	NH	9	1	11	425
W1GHZ/1	NH	8	1	13	549
K1UHF	CT	8	1	11	388
K1AE	NH	7	1	10	486
W1VT	CT	7	1	10	303
K1MAP	MA	7	1	8	241
N1RWM	MA	7	1	8	238
K1AE	MA	7	1	8	238
W1AIM	VT	6	1	10	313
W1VT	NH	6	1	8	549
N1RWM	NH	6	1	8	486
WA1HOG	NH	4	1	6	190
W3RJW	PA	3	1	13	548
K2DH	NY	6	2	15	943
WA2LTM	NJ	4	1	5	296
N2WK	NY	3	2	9	892
W2EV	NY	2	2	9	266
KB2VGH	NY	1	1	6	—
W4DEX	NC	6	1	7	899
K4RF	GA	1	1	2	153
W5LUA*	TX	9	14	43	510
AA5C*	TX	6	9	25	475
N5QGH	TX	3	1	11	382
W5ZN	AR	3	1	7	1040
WW2R/5	OK	2	1	2	151
WA5TKU	TX	1	1	2	64
WB6CWN	CA	3	2	18	1123
N6CA	CA	2	2	16	3978
W6OYJ	CA	2	2	13	657
WA6QYR	CA	2	2	11	919
W6CPL	CA	1	2	9	510
W6ASL/6	CA	1	1	15	770
W7PUA	OR	2	1	12	605
WA8WZG	OH	7	2	18	1045
W9ZIH	IL	10	1	22	898
K3SIW/9	IL	7	1	19	464
WB9SNR	IL	5	1	10	742
K0RZ	CO	3	1	8	216
W0LD	CO	1	1	1	—

12.5 mm (24-24.25 GHz)

Minimum requirement = 1 QSO

KA2MCU	NY	2	1	2	80
W2EV	NY	1	2	4	66
KB2VGH	NY	1	1	5	38
K2DH	NY	1	1	2	16
WA2BAH	NY	1	1	1	2
W4SW	VA	1	1	2	66
W5LUA	TX	2	1	3	160
WW2R/5	OK	2	1	2	162
K5RHR	NM	1	1	4	48
N5QGH	TX	1	1	2	23
W5ZN	AR	1	1	1	47
AA5C	TX	1	1	1	11
W6CPL	CA	1	1	5	175
N6CA	CA	1	1	5	167
WA6QYR	CA	1	1	5	136
W6OYJ	CA	1	1	1	133
WA8WZG	OH	2	1	2	65
K3SIW/9	IL	1	1	3	60
W9ZIH	IL	1	1	2	70
WB9SNR	IL	1	1	1	113
W0LD	CO	1	—	2	75

6 mm (47-47.2 GHz)

Minimum requirement = 1 QSO

W2SZ/1	MA	3	1	7	106
W2EV	NY	1	1	4	38
W2SZ/4	VA	1	1	5	114
WA1ZMS/4	VA	1	1	1	66
K2AD/4	VA	1	1	1	66
WW2R/5	TX	1	1	1	7
W5LUA	TX	1	1	1	1
N5QGH	TX	1	1	1	1
WA8WZG	OH	1	1	1	2

4 mm (75.5-81 GHz)

Minimum requirement = 1 QSO

W2SZ/4	VA	1	1	5	114

2.5 mm (119.98-120 GHz)

Minimum requirement = 1 QSO

WA1MBA	MA	1	1	1	1.15

2 mm (142-149 GHz)

Minimum requirement = 1 QSO

WA1MBA	MA			1	3.8

Laser (474 THz)

Minimum requirement = 1 QSO

WB0LJC	MN	1	1	1	1

— Information not supplied
*Some stations worked via EME (moonbounce)
†Terrestrial distance

aurora, but heard beacons in the northeast as far as WA1OJB (FN54) and VE8BY (FP57) at about 3400 km distance on auroral E.

More northerly stations had auroral-E propagation on October 12 and 15. LA6FJA (JP50) reported hearing VE8BY/b around 2240 on the 12th. The distance was 3890 km—typical for many auroral-E contacts across North America, but this path connects North America and Europe. On October 15 after 0425, W7XU/0 heard VE8WD/b (DP22) and worked VE6TA (DO33), VE7AGJ (CO96) and NL7Z (BP51) at about 3900 km. KL7NO (BP54) reported W7FI and W7XU/0 during the same period.

144 MHz DX

DX has not been limited to 6 meters. On October 11, Ed Rodriquez, WP4O, was working LU, PY and CX stations on 50 MHz with very loud signals. He switched over to 2 meters around 2349 and found LU7FA on 144.200 SSB via transequatorial field-aligned irregularities (TE) propagation. The opening died out before Ed could work other stations he heard. On the 25th, Antonio Scolamiero, YV4DDK, hooked up with LW5HEQ on 146.49 MHz FM using a $^5/_8$-λ vertical from his truck. LU2FWS, YV4FT and YV4DYL also participated in this TE session.

Roman Flores, XE2EED (DM12) in Tijuana, made some notable contacts to Hawaii on 2 meters this past July 11. In addition to KH6HME (BK29), he also found KH7O, KH7L and NH6OF (all in BL11). The distances to BL11 are in the 4100-km range. For other contacts on that date, see the summary in the October column.

VHF/UHF/MICROWAVE NEWS

The VHFer

The *West Coast VHFer* suffered a sad loss with the recent passing of Bob Cerasuolo, W6IJZ. Bob edited the newsletter for more than 15 years and made it one of the leading monthly sources of VHF news, especially for the West Coast crowd. The newsletter has now passed into new hands.

John Kitchens, NS6X, has announced that he will continue publishing the newsletter as *The VHFer*, beginning in March 2000. He plans a free electronic version with expanded national and international coverage. Mailed monthly paper subscriptions will be $12/year. John seeks activity reports, article authors, advertisers and new subscribers. For more information, contact *The VHFer* at Box 178, Somis, CA 93066 or e-mail **vhfer@hotmail.com**.

New VHF Society Based in Oklahoma

The Ultra Highs Weak Signal Society was organized this summer in northeastern Oklahoma. The first two meetings attracted initial members from northwestern Arkansas, southeastern Kansas and southwestern Missouri. It is already off to a flying start. The first issue of its newsletter, *The Beacon,* came out this past November and the club Web site can be found at **www.angelfire .com/ok3/w5vhf/**. The club call is W5VHF. For further information, contact Myron Cherry, K4YA, Box 1246, Tahlequah, OK 74465, or e-mail **k4ya@arrl.net**. QST

STRAYS

HAM RADIO UNIVERSITY 2000

◊ Ham Radio University 2000 is a special day of Amateur Radio education. It will be held Sunday, January 23, 2000 at the Babylon Town Hall Annex, Phelps Lane, in Babylon, New York. The event begins at 9 AM and ends at 3 PM. A $2 donation is requested at the door; children under 12 admitted free. Ham Radio University 2000 will include technical forums on all aspects of amateur radio. It is *not* a fleamarket or hamfest. There will be no items for sale. It is solely for educational purposes. There will be forums on license restructuring, antennas, DXing, contesting, APRS, QRP and much more (see the complete list on the Web at: **http://www .arrlhudson.org/nli/hru2000.htm**). In addition, there will be information booths for all the participating Amateur Radio clubs in the New York City/ Long Island area as well as booths for the ARRL, QCWA, a tune-up clinic and DXCC/WAS card checking. For more information contact Phil Lewis, N2MUN, at **lewisp@hazeltine.com**, or call 516-226-0698.

CALL FOR NOMINATIONS

Technical Awards

ARRL Technical Service Award: Given annually to the licensed radio amateur whose service to the amateur community and/or society at large is of the most exemplary nature within the framework of Amateur Radio technical activities.

ARRL Technical Innovation Award: Granted annually to the licensed radio amateur whose accomplishments and contributions are of the most exemplary nature within the framework of technical research, development and application of new ideas and future systems.

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

Nominations for the ARRL Technical Awards are due at ARRL Headquarters by March 31. Formal nominations may be made by any ARRL member. Supporting information, including the endorsement of ARRL affiliated clubs and elected or appointed League officials, should be submitted along with the nomination document. Send nominations to the attention of Jean Wolfgang, WB3IOS.

Educational Awards

ARRL Herb S. Brier Instructor of the Year: Presented to a volunteer ham radio instructor.

ARRL Professional Instructor of the Year: Presented to a paid, non-state licensed, instructor.

ARRL Professional Educator of the Year: Presented to a professional teacher within a school system.

ARRL Excellence in Recruiting Award: Presented to hams who exemplify outstanding recruiting enthusiasm and technique.

Complete information and nomination forms for educational awards are available at **http://www.arrl.org/ead/award/**. Completed forms must be sent to your Section Manager **before January 31**.

The Hiram Percy Maxim Memorial Award is given to the licensed radio amateur under the age of 21. Please make your Section Manager aware of young hams who have distinguished themselves through their ham radio activities. **Formal nominations from Section Managers must be received at Headquarters by March 31**. For more information visit **http://www .arrl.org/field/awards/hpm.html**.

I would like to get in touch with...

◊…anyone who was stationed on YHB-1 or YPs off Balboa, Panama during WW II. Ernest J. Gershon, 2224 Sisson Dr, La Crosse, WI 54601; **k9zvu@juno.com**.

◊…anyone who may know of a net dedicated to those affected by Parkinson's Disease. Please contact Robert Sauber, WA3ZYA, 401 N. Perry St, Titusville, PA 16354; **wa3zya @mail.usachoice.net**.

Next Stray

NEW PRODUCTS

AVIATION BAND RECEIVER

◊ Hamtronics Inc now offers the R121, an aviation band receiver that covers from 118 to 137 MHz AM. Private pilots, Airport personnel, Civil Air Patrol (*CAP*) members and Amateur Radio search and rescue groups will appreciate this economical commercial-grade AM air band receiver patterned after Hamtronic's popular repeater receiver line.

In addition to its monitor receiver capabilities, the device also offers two dip switch programmable "utility" modes.

In the first mode, the unit can be tuned to the 121.5 MHz Emergency Locator Transmitter (*ELT*) frequency and will trip an alarm if a signal is received over a time period that exceeds a preprogrammed limit.

In the second mode, the receiver can be employed by small airports for runway lighting control. The pilot can activate the lights on approach by clicking the mike button 3, 5 or 7 times, thereby selecting the desired lighting intensity. After a predetermined time period, the lights will shut off automatically.

The R121 is a frequency synthesized receiver that employs triple-tuned circuits in the front end and dual IF filters to ensure good selectivity. Low noise FETs in the front end provide resistance to overload. Sensitivity is specified at 0.2 µV—a receive preamp is typically not required. An S-meter output—very handy for portable direction finding applications—is included.

The R121 Aviation Receiver Module is available wired and tested for $209. A complete unit in a rugged enclosure sells for $299.

For additional details, contact Hamtronics Inc, 65 Moul Rd, Hilton, NY 14468; tel 716-392-9430; fax 716-392-9420; **jv@hamtronics .com**; **http://www.hamtronics.com**. QST

Next New Product

Looking Forward in 2000

Take a look at just a few of the many great efforts your Foundation dollars have supported throughout the years. Your contributions are working to bring the thrill of hamming, emergency communications, growing scholastic funding, and other worthy endeavors into the year 2000. Why not continue the momentum and start the New Year off in a way that can benefit many? Send a contribution today to support your favorite Foundation program. We're a 501c(3) charitable organization and every contribution is tax-deductible to the extent of IRS regulations. We're celebrating Amateur Radio's bright future at: The ARRL Foundation, Inc., 225 Main Street, Newington, CT 06111.

A Scholarship to Honor a CW Ace

The friends of the late Francis Walton, W9ACU, numbered many on either side of a QSO. A skilled CW operator and 72-year member of ARRL, Francis was a devoted hobbyist who had a passion for Amateur Radio. Good friends Bruce Boston, KD9UL, along with Lavinia Walton at the Jacksonville Amateur Radio Society, with assistance from the Illinois Valley Radio Club, have established a scholarship award to honor his memory. The first $500 award will be made in 2000 and multiple awards may be made as income to the fund permits. For full details write to: foundation@arrl.org.

CHARLOTTE HOROWITZ, KB7TKO

Bigger and better than ever, the Center for Amateur Radio Learning at the Arizona Science Center put approximately 14,000 visitors on the air last year under the guidance of their volunteer operators. A General Fund Grant of $5000 helped launch the program in 1996, and today, they are moving ahead with plans for expansion in 2000.

SCOTT GARRETT, W8JSG

A General Fund Grant of $1000 helped the Shelby County (Ohio) ARES make needed equipment acquisitions for their state-of-the-art emergency communication trailer.

SCOTT GARRETT, W8JSG

The proud members of Shelby County (Ohio) ARES.

Contributor's Corner

We wish to thank the following for their generous contributions to:

The Bill Bennett, W7PHO, Memorial Scholarship Fund
Western Washington DX Club (Washington) and
Rod and Donna Linkous in fond memory of
Vernon Phillips, W7OF

The General Fund
John W. Halladay, KA0JMO
Robert D. Cirri, KA2OTD
Ray Jurgens, KQ6RH
Clarence E. Boston, K8RZA
W. C. Louden, W8WFH, in fond memory of
Robert E. Blair, W8ABL and John Steinfeld, KH6JSE
The Tessier Family; Berkerly and Company Hose Company No. 9; Marianne R. Pedulla; Jeanette G. Davis-Harris; Eric and Michelle McKenna; George and Susan Splane; Edward and Rosemary Amo; Richard Garvey and Alison Lockwood; Carol A. Bernier-Gawle, WA1LGU; Thomas J. Brick, Jr; Shirley A. Larose
in fond memory of Raymond Feeley, K1CSB
Mt. Beacon ARC (New York)
in fond memory of Dick Whatham, K2JXU
Mrs. Arthur Winslow
in loving memory of Arthur F. Winslow, W7NH
Mark R. Kelly, AB0EH
Allan W. Swayze, W0SC
Allan W, Anderson, Jr
in loving memory of Allan W. Anderson, W3TMB
Raymond L. Pitts, N9VJT
John A. Goetz, WA2FDK
Jim A. Von Striver, W6ASL
Walter J. Kleinfelder, K2YEI
Stuart Smith, KB5UEH
Forrest and Mary-Ann Stobaugh; Loretta A. McCoy; Brian M. and Laura A. Tucek
in fond memory of Arthur F. Winslow, W7NH
Robert G. Chapman, W0ISL
Mrs. Patricia Downing
in loving memory of George Downing, K7VC
US West Foundation (Colorado)
Mark Benanti
Rex Beavers, W5SX,
in fond memory of Dave Willemin, N8DW
Robert A. Bertsche
Marion ARC (Ohio)
in fond memory of Jack Fetter, KB8DP
Steven G. Martin, KA0SM
Dr. William F. Rocker, Sr., K8NFT
Gene T. McCoy, N8KOJ
Algard A. Chase, WA1ITW
Andrew L. Varva, KD3RF

As received and acknowledged during the months of **September and October.**

QST

Mary E. Lau, N7IAL ♦ Secretary, ARRL Foundation, Inc

SILENT KEYS

It is with deep regret that we record the passing of these amateurs.

KA1ADF, Lawrence B. Roy, Newcastle, ME
K1AJL, Robert M. Piper, Rutland, VT
N1AWD, Joseph F. Seiler, Newington, CT
KA1BLW, Robert L. Philpot, Las Cruces, NM
W1COD, Bernie E. McPeck, Plymouth, MA
K1CSB, Raymond J. Feeley, Southampton, MA
W1HMS, James B. Buckley, Fairhaven, MA
W1HTY, Leslie A. Harlow, Plymouth, MA
W1IOP, Alexander J. Koda, Stamford, CT
KC1KI, Charles K. French, Dorset, VT
K1OAJ, Richard P. Russell, Barre, VT
K1OLN, Wilmer S. Garrick, Harvard, MA
W1PAM, Robert M. Stellmaker, Pawcatuck, CT
W1QEY, Walter H. Brzezinski, Westford, MA
K1WNU, Clair L. Leslie, Montpelier, VT
W2ADK, Alfred A. Sundberg, Toms River, NJ
W2ASM, Frank J. Mayernik, West Palm Beach, FL
WA2BIF, Francois X. Zrinski, Cresskill, NJ
WA2EEP, Fred Carroll, Westwood, NJ
WA2EFV, Frank Mommicco, Tampa, FL
K2KME, Ciro A. Cangialosi, Montville, NJ
K2KXY, Gordon C. Bradbury, Pompton Plains, NJ
N2LM, Louis M. Minsk, Rochester, NY
W2MTS, T. J. Wahler, Eagle Bridge, NY
KB2QAM, Manuel F. Beltran, Rochester, NY
WA2TTC, Albert L. Hunt, East Brunswick, NJ
W2YVP, Donald B. Bradford, Old Tappan, NJ
NA3D, Edward J. DeFrees, Reading, PA
W3JAV, Howard W. Hunter, Pittsburgh, PA
K3JD, James P. Dux, Lancaster, PA
K3JYN, Robert S. Herbein, Reading, PA
K3MNX, Leon R. Robinson, Stevens, PA
W3RD, Vincent S. Roddy, Silver Spring, MD
KE3XQ, Robert W. Gilson, Erie, PA
K4COM, Michael L. Stacy, Abilene, TX
WD4DAO, Finn M. Crowe, Anniston, AL
W4EXS, Arthur R. Ashley, Fairfax County, VA
W4FJT, Thomas A. Russell, New Smyrna Beach, FL
AA4HX, Joseph E. Zurcher, Asheville, NC
N4IXC, Joseph E. Picard, Iron Station, NC
N4JRE, C. J. Hunt, W Jefferson, NC
WD4MFA, Joseph E. Mc Conville, Sarasota, FL
K4OO, Herbert N. Ostrom, Ormond Beach, FL
W4PUH, William A. Cann, Fairfax, VA
K4QM, Isaac Roach, Vero Beach, FL
W4REE, Whit M. Bishop, Arlington, VA
W4RWB, Eugene R. Grant, Columbus, GA
KB4SO, Walter C. Burney, De Funiak Sprgs, FL
*WA4WII, Lewis M. Brooks, Montgomery, AL
N5BKH, C. R. Garber, El Paso, TX
WA5DIK, Richard L. Thomas, Jarrell, TX
WB5FSX, Rudolph F. Mikeska, La Grange, TX
*KB5GQ, Robert R. Funck, La Place, LA
W5HWJ, Eugene L. Hansen, Corrales, NM
WA5KBJ, Jack E. Keeler, Tulsa, OK
N5OSJ, Marcelino B. Macias, Eagle Pass, TX
N5ROL, Robert L. Burleson, Lindale, TX
*W5SKT, Jack K. Seale, Quitman, TX
KF5TM, J. D. Keeling, Edmond, OK
W5UHH, John D. Vaughan, Stuart, FL
W5VAA, Few C. Holmes, Texarkana, AR
KA5VDX, James E. Lewis, Santa Fe, TX
N6AIT, William C. Gregory, Chico, CA
N6CNM, James J. Watson, Aptos, CA
W6CSP, Theodore P. Cocores, South Lake Tahoe, CA
KA6DGN, Avard B. Ward, Huntington Beach, CA
WA6DTT, Gordon E. Nielsen, Sacramento, CA
W6GBB, Homer C. Ford, Woodland Hills, CA
KD6IEN, Herbert L. Schoonover, Yachats, OR
W6JYL, A. G. Ewing, Auburn, CA
KE6LHX, Frank E. Haskins, Garberville, CA
W6LPN, John Brownston, Sacramento, CA
K6LRE, William Henderson, Turlock, CA
WA6OHB, Leona K. Wallace, Las Vegas, NV
WA6PIR, Donald L. Royer, Fountain Valley, CA
KE6PZ, Thomas B. McKenney, Modesto, CA
KD6WL, Travis M. Hearne, Coarsegold, CA
K6WO, John E. Burrell, San Clemente, CA
*W6YB, Gunnar F. Ohlson, Yorba Linda, CA
K6ZXS, Don R. Martinez, San Francisco, CA
KB7FEQ, Leon R. Rodman, Las Vegas, NV
KR7F, Alvin H. Niemann, Ocean Shores, WA
*K7MJO, Martin J. Oppenheimer, Tempe, AZ
*KN7MVO, Marc W. Herold, Mountlake Terrace, WA
WB7OEX, Bonnie Wade, Aumsville, OR
W7OSX, Don A. Morris, Cincinati, OH
KC7OX, Harold E. Robertson, Tucson, AZ
WA7UQV, Ronald L. Chudy, Tacoma, WA
KB7WUH, Herman R. Burback, Portland, OR
W8DKA, Lee M. Augustus, Ypsilanti, MI
N8DKT, George R. Spencer, Marion, IN
KB8DP, Jack L. Fetter, Marion, OH
*N8DW, David R. Willemin, Elyria, OH
W8EDO, Thomas B. Mexicott, Englewood, FL
KA8FYY, Thomas Roberts, Charlotte, NC
*WB8KWD, Patrick D. Keating, Fremont, OH
KA8LRA, Louis E. Szczepanik, Bedford, OH
W8LXA, Bob M. Manning, Parma, OH
W8LXR, Norman O. Simon, Geneva, OH
WD8NIW, Jerry W. Weaver, Jackson, MI
W8QBY, Theodore Chinalski, Fennville, MI
K8RJ, John H. Pitcher, Fayetteville, OH
WD8RXP, John B. Baublitz, Ithaca, MI
W8TOK, Dwight E. Cavender, Tornado, WV
KA8TSX, Burl Brockway, Fremont, OH
N8VCD, Arnold R. Dilley, Sebring, FL
WB8YSR, Andy M. Perolis, Uniontown, OH
N8ZWR, Patricia R. Flynn, Boon, MI
KJ9D, Joseph E. Sego, Indianapolis, IN
*WB9ESM, John F. Glaeser, Manitowoc, WI
W9FKC, Myron Hexter, Highland Park, IL
K9HA, Harold E. Blythe, Decatur, IN
KA9HDI, Frank J. Azmann, Carlsbad, CA
K9HIX, Robert L. Trieglaff, Metropolis, IL
K9ILK, Miriam F. Yelch, Princeton, IN
W9MER, Harold J. V. Anderson, Sussex, WI
KA9MOZ, Steven Potter, Dixon, IL
KA9SRM, Michele L. Tracy, Richland, MI
KA9WWJ, Carl L. Odermann, New Berlin, WI
W9YME, Ken A. Tyson, South Bend, IN
W9YZA, Wilbur H. Fritz, Racine, WI
W9ZPO, Wayne E. Lewellyn, Dugger, IN
N0ACS, John R. Morris, Paola, KS
K0CTM, Thomas E. Unruh, Arvada, CO
K0DIA, Darold G. Arvidson, Minnetonka, MN
W0DNV, Homer Anshutz, Tea, SD
KE0EK, John C. Nolan, Clifton, VA
N0IXM, Elza Runkle, Kearney, MO
KA0KYP, Arlene E. Pederson, Onamia, MN
N0RFU, Marvin G. Foster, Cedar Rapids, IA
AA0VF, Rod L. Stor, Bailey, CO
WB0WAS, Naciya Boeckenhaupt, Overland Park, KS
CN8MH, H.M. King Hassan II, Rabat, Morocco
VE2HWB, Hans W. Barth, Perrefonds, QC, Canada
*VE3HC, Frederick O. Hammond, Guelph, ON Canada
VK4QM, Charles A. Miller, Caloundra, Australia

*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

STRAYS

PSK31 DX REFLECTOR

◊ A new e-mail reflector has been created devoted to discussions of PSK31 DXing, including information on DX stations and DXpeditions using PSK31. You can subscribe on the Web **http://psk31dx.listbot.com**.

IBM EMPLOYEES/RETIREES REFLECTOR

◊ An e-mail reflector (list) has been established for Amateur Radio operators who are employees or retirees from IBM. For more information contact Bill Bennett, N7DZ, at **n7dz@arrl.net**.

4500 HAM LINKS!

◊ K1DWU's collection of Amateur Radio Web links has grown to over 4,500. Links verified every week and listed only once. To sample this massive Web collection yourself, point your browser to: **http://www.ham-links.org/.**

MEMORIES ON THE WEB

◊ Anyone who was ever stationed at Keesler Air Force Base, Mississippi and was a member of K5TYP should take a look at their site on the Web at: **http://web.intelispan.com/~ad4xx/k5typ.html**. It really brings back memories!—*Glenn Kurzenknabe, K3SWZ.*

FREE REDIRECTS

◊ Exchange your long, cumbersome Web address for one that is much shorter and easier for users to remember. Rather than **http://www.members.hosting/~g9xyz/**, for example, you could replace it with **http://QSY.to/g9xyz**. Users who enter **http://QSY.to/g9xyz** into their browsers will be redirected to the actual site automatically. In addition, the *QSY.to* address can be updated easily if you change Internet providers. The *QSY.to* Web address referral/redirection service is free. For more information contact David Southworth at **info@qsy.to**, or visit the Web site at: **http://QSY.to/**.

WANTED: W2KYY QSLs

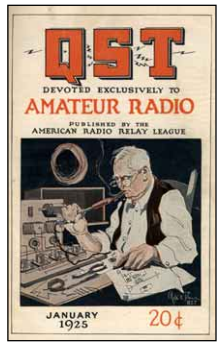
◊ I am looking for someone who may have a QSL card from my father, Herb Schack, W2KYY, who lived in New York City. He became a Silent Key in 1944 and I have nothing from his ham days. Please contact Dave Schack, WC3A, 6020 Fort Jenkins Lane, Bloomsburg, PA 17815; **wc3a@epix.net**.

WANTED: 701A TUBES

◊ Does anyone know of a source for Western Electric 701A tubes? Jim Kelley, K4YBB, PO Box 309, Okahumpka, FL 34762-0209.

75, 50 AND 25 YEARS AGO

January 1925

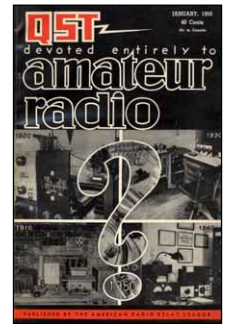


◊ The cover art by Clyde Darr, 8ZZ, shows an OM lighting his cigar with his large soldering iron as he builds the latest transmitter circuit. The editorial, "This League of Ours," opens by saying, "We've encountered quite a few amateurs recently, even members of the American Radio Relay League, who haven't any really adequate idea of the nature of the League, and it seems we should tell the story again."

John Clayton, 1DQ, tells of his method of winding "Some Cylindrical Self-Supporting Coils" that does away with coil forms. "Super DX," by K. B. Warner tells of the excitement in the air as "Amateurs of Europe, Australasia, South and North America now all [work] each other nightly." The amateur-adopted informal country prefixes (rendered in print as lower case letters) show up in the column (eg, New Zealander z2AC, Australian a2CM, Chilean ch9TC, and US station u1SF. S. Kruse announces that "Three Cups [Are] Offered for Short Wave Work," with the lead sentence, "Recent tests have shown that very unusual daylight work can be done at 40 meters wavelength." The Cooper Cup is offered for the top 40-meter work using a tube rated at 5 watts. The A.R.R.L. offers both the 20-Meter Cup and the 5-Meter Cup, following the same stringent rules as does the Cooper Cup.

An article describes "The Neutrodyne C.W. Tuner at 9ZT." Earl Smith, 3PZ-3XO, discusses "Mercury Arc Rectifiers." Morris Taurenwerfer, noted radio experimenter and the new associate editor of *QST*, presents information on his circuit, "The Supersink Receiver."

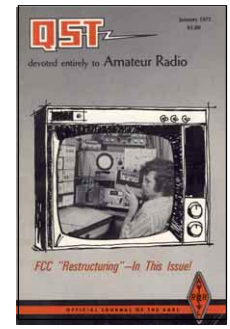
January 1950



◊ At the midpoint of the 20th Century, the cover photo montage shows typical ham stations of 1910, 1920, 1930 and 1940—with a large question mark in the center to wonder what a 1950s station will look like. The editorial reviews an editorial of a year ago and provides an update on the subject, "Where's that 21-Mc. Band?" The answer is that, with all the procedural and governmental steps yet to come, US hams likely won't get to use the band during 1950.

"A High-Attenuation Filter for Harmonic Suppression," by A. M. Pichitino, W3NJE, tells how to build an effective but inexpensive filter for helping hams rid themselves of TVI. Ed Tilton, W1HDQ, in "Antenna Polarization of 144 Mc.", reports on polarization-comparison tests using "flop-over" arrays. Gerald White, W3LTR, and L. W. Sieck, W4KMG, describe "A One-Tube VFO Amplifier" to amplify the output of military-surplus LM frequency meters (precision oscillators) that so many hams are using as VFOs. Bruce Kelley, W2ICE/W2QCP, tells about using "Folded Elements in a Reversible Unidirectional Array." As the use of single sideband by hams increases, George Nibbe, W6BES, helps with an article on "Audio Phase-Shift Networks." Richard Turrin, W2IMU, discusses improvements in keyer circuits in "Debugging the Electronic Bug." "With the AREC" reports that "Norwalk, Conn., was hit by a triple disaster last October 16th—a hurricane and a railroad wreck, followed by a flood." *Wait!* Those were only their *simulated* disasters during the Simulated Emergency Test.

January 1975



◊ The cover photo shows WB6MEU working ATV. The editorial looks back on 1974, commenting on its hurricanes and tornadoes, the FCC/ARRL meeting, the Red Cross coopera-tive agreement, and G3CY's Nobel Prize, as well as many other good and bad times for ham radio.

The lead article, by Thomas O'Hara, W6ORG, presents "Practical Ideas for the ATV Enthusiast." James Fox, WA9BLK, tells about "An Integrated Keyer/TR Switch." Steven Maas, K3WJQ, describes "An Inexpen$ive Low Noise Preamplifier for 432 MHz." Rudolph Bacher, WA3JYI, tells about building "A Simple Fixed-Direction Quad." Arlo Eggensperger, W2TJZ, presents Part I of "Frequency Counter—A Modular Approach." Aksel Mathiesen, OZ1AM, tells how to get "100 Watts PEP Output with Power Transistors."

"OSCAR News" reports that, for the first time, *two* active and functional amateur satellites are simultaneously in orbit. "FCC Issues Restructuring Proposals" describes the Commission's proposal for two new license classes, and the "sweeping changes" in licensing procedures and operating privileges.—*Al Brogdon, W1AB*

W1AW SCHEDULE

Pacific	Mtn	Cent	East	Mon	Tue	Wed	Thu	Fri
6 AM	7 AM	8 AM	9 AM		Fast Code	Slow Code	Fast Code	Slow Code
7 AM-1 PM	8 AM-2 PM	9 AM-3 PM	10 AM-4 PM	Visiting Operator Time (12 PM - 1 PM closed for lunch)				
1 PM	2 PM	3 PM	4 PM	Fast Code	Slow Code	Fast Code	Slow Code	Fast Code
2 PM	3 PM	4 PM	5 PM	Code Bulletin				
3 PM	4 PM	5 PM	6 PM	Teleprinter Bulletin				
4 PM	5 PM	6 PM	7 PM	Slow Code	Fast Code	Slow Code	Fast Code	Slow Code
5 PM	6 PM	7 PM	8 PM	Code Bulletin				
6 PM	7 PM	8 PM	9 PM	Teleprinter Bulletin				
6:45 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 W6OWP, with K6YR as an alternate. At the beginning of each code practice session, the schedule for the next qualifying run is presented. Underline one minute of the highest speed you copied, certify that your copy was made without aid, and send it to ARRL for grading. Please include your name, call sign (if any) and complete mailing address. Send a 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

MISSISSIPPI STATE CONVENTION

February 4-5, Jackson

The Mississippi State Convention, sponsored by the Jackson ARC, will be held at the Mississippi State Fairgrounds Trade Mart Building, NE of the Coliseum; exit I-55 at High St (Exit 96-B), go W to second traffic light, turn left into main entrance of Fairgrounds, Trade Mart is first building on left. Doors are open for dealer setup Friday at 1 PM, non-dealer setup at 3 PM, Saturday 7 AM; public Friday 5-8 PM, Saturday 8 AM to 4 PM. Features include flea market, forums (MARS, APRS, QRP, satellite, traffic nets), ARRL HQ representative Steve Ewald, WV1X, Introduction to Ham Radio (Friday, 6 PM), test bench, Y2K-Bug display, VE sessions (Sunday, Feb 6, 1:30 PM, Red Cross Building, 875 Riverside Dr, Jackson; all classes), RV camper space available on fairgrounds (hookups $10). Talk-in on 146.76. Admission is $5, under 13 free. Tables are $15 (non-dealer flea market), $20 (dealers). Contact Ronald Brown, AB5WF, Box 55643, Jackson, MS 39296-5643, 601-956-1448 or 601-982-0101, fax 601-982-3385; **ab5wf@arrl.net**; **http://www.jxnarc.org**.

SOUTHEASTERN DIVISION CONVENTION

February 5-6, Miami

The Southeastern Division Convention (40th Annual "Tropical Hamboree"), sponsored by the Dade Radio Club of Miami, will be held at the Dade County Fair and Exposition Center, 10901 SW 24th St (Coral Way). Doors are open Saturday 9 AM to 5 PM, Sunday 9 AM to 4 PM. Features include major manufacturer and dealer booths, commercial exhibits, vendors, 850 swap tables, FCC Enforcement (Riley Hollingsworth, K4ZDH), Washington Scene Report (Chris Imlay, W3KD), "The World and Amateur Radio" (Larry Price, W4RA, and Rod Stafford, W6ROD), "Hands-On" new ham demonstrations and operating tips, Dade County Emergency Response Team demonstration, forums (ARRL, APRS, DX, AMSAT), GPS demos, hidden transmitter hunt, QLF sending contest, VE sessions (two exam sessions for all licenses), on-site campground for 300 RVs with full hookups ($20 per night), free parking, refreshments. Talk-in on 146.76, 147.0, 147.925, 442.525. Admission is $5 in advance, $7 at the door. Contact Evelyn Gauzens, W4WYR, 2780 NW 3rd St, Miami, FL 33125, 305-642-4139, fax 305-642-1648, **w4wyr@bellsouth.net**; **http://www.hamboree.org**.

2000

February 12-13
Tennessee State, Memphis

February 26
Vermont State, Milton

March 10-11
Nebraska State, Norfolk

FLORIDA STATE CONVENTION

February 11-13, Orlando

The Florida State Convention (53rd Orlando Hamcation Show), sponsored by the Orlando ARC, will be held at the Central Florida Fairgrounds, 4603 W Colonial Dr (Rte 50); 3 miles W of I-4. Doors are open for setup Friday 9 AM to 4 PM; public Friday 5-9 PM, Saturday 9 AM to 5 PM, Sunday 9 AM to 3 PM. Features include over 400 swap tables and 150 commercial booths, largest tailgate in the SE, RV camping with electricity and water ($16 per night in advance, $20 per night at the door), VE sessions (preregister, Gil Lineberry, 407-843-4112), foxhunt, seminars, lectures, demonstrations, special guest speakers. Talk-in on 146.76. Admission is $7 in advance, $9 at the door. Tables are $35 in advance, $45 at the door (good for 3 days). Contact Ken Christenson, KD4JQR, 5548 C Cinderlane Pky, Orlando, FL 32808, 407-291-2465, **kd4jqr@arrl.net**; **http://www.oarc.org/hamcat.html**.

Attention Hamfest and Convention Sponsors:

ARRL HQ maintains a date register of scheduled events that may assist you in picking a suitable date for your event. You're encouraged to register your event with HQ as far in advance as your planning permits. Hamfest and convention approval procedures for ARRL sanction are separate and distinct from the date register. Registering dates with ARRL HQ doesn't constitute League sanction, nor does it guarantee there will not be a conflict with another established event in the same area.

We at ARRL HQ are not able to approve dates for sanctioned hamfests and conventions. For hamfests, this must be done by your division director. For conventions, approval must be made by your director and by the executive committee. Application forms can be obtained by writing to or calling the ARRL convention program manager, tel 860-594-0262.

Note: Sponsors of large gatherings should check with League HQ for an advisory on possible date conflicts before contracting for meeting space. Dates may be recorded at ARRL HQ for up to two years in advance. 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 **January 1** to be listed in the **March** 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 (Greenville)—Jan 29. Jerry McCullough, KE4ERO, 334-382-7644.

†**Arizona (Glendale)—Jan 15,** 6 AM to 2 PM. *Sprs:* ARCA and ADAW. Glendale Community College, 6000 W Olive Ave; I-17 to Dunlap, W to Olive (Dunlap turns into Olive in Glendale). *TI:* 146.52. *Adm:* Free. Mark Kesauer, N7KKQ, 602-779-2722; **arcathill@aol.com**; **http://www.phx-az.com/arca**.

†**Colorado (Loveland)—Jan 8,** 9 AM to 3 PM. *Spr:* Northern Colorado ARC. Larimer County Fairgrounds, 700 Railroad Ave. Commercial exhibits, computers, QRP seminar, VE sessions (10 AM), refreshments. *TI:* 145.115 (100 Hz), 146.52. *Adm:* $3. Tables: $10. Michael Robinson, N7MR, 2236 Silver Trails Dr, Fort Collins, CO 80526, 970-225-7501 or 970-282-1167; **michael@frii.com**; **http://www.info2000.net/~ncarc**.

†**Florida (Arcadia)—Jan 29;** set up Friday until 8 PM, Saturday 6 AM; public 8 AM. *Spr:* DeSoto ARC. DeSoto County Fairgrounds, 1/2 mile S of Hwy 70 on Hwy 17. Tailgating (free with paid admission), vendors, VE sessions (10 AM), auction (11 AM), refreshments. *TI:* 147.075. *Adm:* $4. Tables: inside $10, outside $5. Doug Christ, KN4YT, Box 1422, Nocatee, FL 34268, 941-494-5070 or 941-993-4834; **kn4yt@cyberstreet.com**.

†**Florida (Brooksville)—Jan 22,** 9 AM to 4 PM. *Spr:* Hernando County ARA. Hernando County Fairgrounds, 6436 Broad St; on US 41, 2 miles S of Hwy 50. Hamfest/Computer Show, free parking. *TI:* 146.715. *Adm:* $6. Tables: main building $20, annex $12. John Nejedlo, WB4NOD, 15430 Waxweed Ave, Spring Hill, FL 34610, 727-856-2568; **wb4nod@gate.net**; **http://www.hcara.org**.

Florida (Miami)—Feb 5-6, Southeastern Division Convention. See "Coming Conventions."

Florida (Orlando)—Feb 11-13, Florida State Convention. See "Coming Conventions."

†**Florida (Pensacola)—Jan 22;** set up Friday evening and Saturday morning; public 8:30 AM to 3:30 PM. *Spr:* University of West Florida ARC. UWF Student Commons Building 22, 11000 University Parkway; located in NE Pensacola near Escambia Bay, on US Hwy 90 Alternate (Nine Mile Rd). Ham Radio and Computer Equipment Fair, vendors, seminars, technical forums, free parking, refreshments. *TI:* 146.76, 145.35. *Adm:* $3, under 12 and UWF ID card holders free. Tables: $7 each (includes 1 admission). Ray Killough, KE4UNR, 1450 Kingslake Dr, Cantonment, FL 32533, 850-968-1048, **hamfest@qso.arc.uwf.org**; **http://qso.arc.uwf.org/~hamfest**.

†**Florida (Sarasota)—Jan 15-16;** Saturday 9 AM to 5 PM, Sunday 9 AM to 4 PM. *Spr:* Sarasota ARA. Roberts Arena, 3000 Ringling Blvd; Exit 39 (Fruitville Rd) off I-75, go 5 miles W. Forums, tailgating, VE sessions. *TI:* 146.91. *Adm:* advance $5, door $7. Tables: $15. Eddie Martin, KI4ZJ, 1870 Bahia Vista St, Sarasota, FL 34239, 941-954-1869; **ki4zj@msn.com**; **http://www.saraclub.org**.

†**Illinois (Cicero)—Jan 23,** 8 AM to 2 PM. *Spr:* Wheaton Community Radio Amateurs. Chicago Motor Speedway, 3301 S Laramie. Ham Radio/Computer/Electronics flea market, commercial booths, VE sessions, plenty of free parking, handicapped accessible. *TI:* 145.39. *Adm:* advance $5, door $7. Tables: $20 (before Jan 4), $25 (after Jan 4). Make check payable to WCRA and send with business size SASE by Jan 1 to WCRA, Box QSL, Wheaton, IL 60189. Don Motz, N9NYX, 630-545-9950, **hamfest2k@hotmail.com**; **http://www.w9ccu.org**.

†**Kansas (LaCygne)—Feb 5,** 9 AM to 1 PM. *Spr:* Mine Creek ARC. LaCygne Community Building on Broadway; 1 block N of K-152 Hwy (downtown), 5 miles W of US 69. Contests, refreshments. *TI:* 147.285. *Adm:* Free. Tables: $10. Mike Eyman, W0XM, 29048 SE 1200th Rd, Garnett, KS 66032, 913-898-4695; **w0xm@arrl.net**.

†**Louisiana (Hammond)—Jan 15.** *Spr:* South East Louisiana ARC. SLU Center, University Ave; I-55 N to Exit 32, go E 1.1 miles, University is on N side of road. VE sessions, facilities for RVs,

Gail Iannone ♦ Convention Program Manager

free parking. *TI:* 147.0. *Adm:* Free. Tables: $10 (limited number). Nathan Gifford, N5BFC, 16087 Goudeau Rd, Tickfaw, LA 70466, 504-542-6798; **n5bfc@arrl.net**; **http://www.selarc.org/selarchamfest.html.**

†**Maryland (Odenton)—Jan 30;** set up 6 AM; public 8 AM to 2 PM. *Spr:* Maryland Mobileers ARC. Odenton Volunteer Fire Department Hall, 1425 Annapolis Rd (Rte 175), 9 miles E of I-95. Indoor flea market, vendors, free VE sessions (preregister, Jerry Gavin, NU3D, 410-761-1423), free parking, refreshments. *TI:* 146.805. *Adm:* $4, under 13 free. Tables: $10. Bill Hampton, N3WGM, 7609 McGowan Ave, Glen Burnie, MD 21060, 410-766-2199, **diamondb@space4less.com**; **http://www.space4less.com/usr/mmarc**.

Michigan (Flushing)—Jan 15. Clay Hewitt, KF8UI, 810-233-7889.

Michigan (Hazel Park)—Jan 16. Tom Krausnick, WC9F, **tkrausnick@home.com**.

Michigan (Negaunee)—Feb 5. Bill Beitel, N8NRG, 906-226-2779.

Mississippi (Jackson)—Feb 4-5, Mississippi State Convention. See "Coming Conventions."

Missouri (Springfield)—Jan 29. Michael Blake, N0NQW, 417-742-3955.

†**Missouri (St Joseph)—Jan 15,** 8 AM to 3 PM. *Sprs:* Missouri Valley and Ray-Clay ARCs. Ramada Inn, I-29 and Frederick Ave (Exit 47 off I-29), just 47 miles N of Kansas City. Indoor flea market, dealers, major exhibitors, VE sessions, free parking. *TI:* 146.85, 444.925. *Adm:* advance $2 each or 3 for $5; door $3 each or 2 for $5. Tables: $10 each (first 2 tables), $20 each (tables 3 and up). Northwest Missouri Winter Hamfest, c/o Dick Merrill, KC0AMY, Box 1533, St Joseph, MO 64502, 816-279-2304, **KevinRPhillips@hotmail.com**; **http://www.kc.net/~oconnor**.

†**Missouri (St Louis)—Jan 22,** 8 AM to 2 PM. *Spr:* St Louis Repeater. St Charles Exposition Hall, 1355 S 5th St; NE corner of Hwy 70 and 5th St. Manufacturers, commercial dealers, VE sessions. *TI:* 146.94. *Adm:* $4. Tables: $14 each; electricity $15 additional. Jim Glasscock, W0FF, 3416 Manhattan Ave, St Louis, MO 63143, 314-504-1104, **kb0mwg@arrl.net**; **http://www.listen.to/stlouisrepeater**.

New Mexico (Albuquerque)—Jan 29. Tom Ellis, K5TEE, 505-291-8122.

New York (Lockport)—Jan 29. Duane Robinson, KC2ELM, 716-791-4096.

†**New York (Marathon)—Jan 15,** 7 AM. *Spr:* Skyline ARC. Civic Center, Rte 81 (N or S), Exit 9, follow signs; 50 miles S of Syracuse, 20 miles N of Binghamton. VE sessions. *TI:* 147.18. *Adm:* $2. Patrick Dunn, KC2BQZ, 1907½ W Genesee St, Syracuse, NY 13204, 315-468-5909; **patdunn@dreamscape.com**.

†**New York (Yonkers)—Jan 16,** 9 AM to 3 PM. *Spr:* Metro 70cm Network. Lincoln High School, NY State Thruway, Exit 2 to Yonkers Ave, W to St Johns, 2 blocks to Teresa Ave, right to Kneeland Ave. Giant electronics flea market, vendors, VE sessions, unlimited free coffee. *TI:* 146.91, 440.425 (156.7 Hz), 145.27 (79.8 Hz). *Adm:* $6, under 12 free. Tables: advance $19, door $25 (if available). Otto Supliski, WB2SLQ, 53 Hayward St, Yonkers, NY 10704, 914-969-1053, **wb2slq@juno.com**; **http://www.metro70cmnetwork.com**.

†**North Carolina (Winston-Salem)—Jan 22,** 7 AM to 1 PM. *Spr:* Forsyth ARC. Dixie Classic Fairgrounds, Deacon Blvd, Gate 5; US Hwy 52 to Akron Dr (Exit 112), left on Reynolds Blvd, left on Shorefair, right on Deacon Blvd, left into Gate 5. Tailgating ($3 per space, unlimited tailgate space), free parking. *TI:* 146.64, 145.47. *Adm:* $5. Tables: $15 each. John Kippe, N0KTY, Box 11361, Winston-Salem, NC 27116-1361, 336-723-7388; **http://members.xoom.com/w4nc/hamfest.htm**.

†**Ohio (Dover)—Jan 30;** set up 6 AM; public 8 AM to 1 PM. *Spr:* Tusco ARC. Ohio National Guard Armory, 2800 N Wooster Ave; exit I-77 at Exit 87 (Strasburg), turn right at stop sign, head S on County Rd 74 to first traffic light, continue through traffic light intersection, Armory is on right. Dealers, ARES forum, refreshments. *TI:* 146.73. *Adm:* $3. Tables: $10 (bring your own extension cords). Billy Harper, KB8CQG, Box 80407, Canton, OH 44708, 330-484-4634, fax 330-484-4683; **bharper@neo.rr.com**.

†**Ohio (Middletown)—Jan 15,** 9 AM to 4 PM. *Spr:* Dial RC. Miami University, Thesken Hall; from I-75 exit at SR 122 (Exit 32), go W toward Middletown; continue to Breiel Blvd, turn right (N), continue on Breiel to 6th traffic light; this is entrance to University, second building is Thesken Hall. 14th Annual SW Ohio Digital Symposium. *TI:* 146.61, 224.96, 444.825. *Adm:* Free. Hank Greeb, N8XX, 6580 Dry Ridge Rd, Cincinnati, OH 45252, 513-385-8363, Fax 513-385-8888; **n8xx@arrl.net**; **http://w3.one.net/~rkuns/swohdigi.html**.

†**Ohio (Nelsonville)—Jan 16;** set up Saturday 6 PM, Sunday 6 AM; public 8 AM to 2 PM. *Spr:* Sunday Creek AR Federation. Hocking College, Hocking Parkway; from N take Rte 33E to Nelsonville, turn right at second light; from S take Rte 33W to Nelsonville, turn right at first light. Flea market, VE sessions (noon, walk-ins accepted). *TI:* 147.15. *Adm:* $5. Tables: first table is free, $5 for each additional (first-come, first-served). Russ Ellis, N8MWK, 8051 Oregon Ridge, Glouster, OH 45732, 740-767-2226; **SCARF@hocking.edu**.

Pennsylvania (Philadelphia)—Jan 12. Russ Stafford, W3CH, 610-631-3401, Ext 902 (Auction).

†**South Carolina (North Charleston)—Feb 5,** 8:30 AM to 4 PM. *Spr:* Charleston ARS. R. B. Stall High School Gym, 7749 Pinehurst St; located near I-26 and Ashley Phosphate Rd. Hamfest/Computer Show, dealers, forums (ARRL, weather), VE sessions, refreshments. *TI:* 146.79, 145.25. *Adm:* $5, under 12 free. Tables: $8. Jenny Myers, WA4NGV, 2630 Dellwood Ave, N Charleston, SC 29405-6814, 843-747-2324; **brycemyers@aol.com**; **http://www.qsl.net/wa4usn/index.html**.

Tennessee (Gallatin)—Jan 22; set up Friday 5-10 PM, Saturday 5-7 AM; public 7 AM. *Spr:* Sumner County ARA. Gallatin Civic Center, Albert gallatin Blvd, Hwy 31 E. Flea market, vendors, VE sessions. *TI:* 147.24 (114.8 Hz), 444.35 (107.2 Hz). *Adm:* $5, under 10 free. Tables: $15 or 3 for $12 each. Roger Good, KC4WPS, 615-451-0213, **hamfest@rogerg.com**; **http://www.rogerg.com/scara**.

†**Virginia (Richmond)—Jan 16;** set up Saturday 1-8 PM, Sunday 6-8 AM; public 8:30 AM to 3:30 PM. *Spr:* Richmond Amateur Telecommunications Society (RATS). The Showplace, 3000 Mechanicsville Tpke, I-95, Exit 75 to I-64 E, then Exit 192 (Rte 360), go ½ mile on left. Amateur Radio & Computer Show, indoor dealers and electronics flea market, national and local vendors, computer gear, demonstrations, forums (MARS, computers, Y2K concerns), parking, handicapped accessible, refreshments. *TI:* 146.88. *Adm:* $6. Tables: dealers $35, flea market $15 (must reserve by Dec 28, 804-330-3165). Jim Clark, N3JJF, Box 14828, Richmond, VA 23221-0828, 804-739-2269 (ext 3378), **jim@compudata.net**; **http://frostfest.rats.net**.

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**.

NEW PRODUCTS

THE 20th EDITION OF THE NRC'S AM RADIO LOG

◊ The National Radio Club has released the 20th edition of their *AM Radio Log*. This 321-page listing gives information on thousands of US and Canadian AM broadcast stations operating on the frequencies between 530 and 1705 kHz.

The main body of the publication breaks down the listings by operating frequency. Under each frequency heading is an alphabetical listing of the call signs of the stations assigned to that frequency. Information given for each station includes the location, network affiliation, station address, telephone number, station slogan and daytime and nighttime transmitter power. Cross reference-tables that list the stations by city and by call letter are also provided.

The *Log* is printed on 8½ × 11 paper, 3-hole punched and in loose-leaf format.

Price for NRC or IRCA members is $16.95. For nonmembers: $22.95 in the US and Canada; $24 in Latin America; $25 in Europe and $28 elsewhere. Postage is included. Payment by check only to National Radio Club, Publications Center, Box 164, Dept W, Mannsville, NY 13661.

DX CLUSTER AND COMMUNICATIONS SOFTWARE FROM AR-TECHNOLOGY

◊ AR-Cluster is a 32-bit *Windows 95/98/NT*-based DX spotting and communications package. In addition to conventional DX spotting and messaging, built-in TCP/IP communications capabilities allow AR-Cluster to connect to other AR-Cluster nodes for the exchange of DX spots and other traffic. Simply connect to your local ISP via a modem, ISDN or cable modem, add a local RF port and you're up and running.

Key features include the convenience of the *Windows* graphical user interface, built in support for both the *AGW* packet engine and BPQ32 drivers, providing *KISS* support for practically any TNC, Telenet support for user connections and multi-media sound alerts.

Some additional features include support for *Buckmaster Hamcall*, a built-in QSL database with 179,000 entries, a radio key interface to announce spots over the air, weather station support and advanced DX and WWV filtering protocols.

Live on-the-air systems can be test driven by telneting to **telnet://dxc.wu3v.net** or **telnet://24.93.55.165**.

Price: $499. For more information contact AR-Technology, 5518 Great Divide, Austin, TX 78736; fax 318-289-0044; **tgerdes@austin.rr.com**; **http://149.74.21.166/**.

CONTEST CORRAL

Feedback

In the **General Rules for all ARRL Contests published in the November 1999 *QST***, the mileage radius restriction for the Local Club category should be **35** miles instead of 20.

In the **1998 Ten Meter Contest Results, KR0B** should be listed with a final score of 1,018,776 based on 1545 QSOs and 227 multipliers as a mixed-mode single-op low-power station from the MN section. **KB9THU** should have been listed as a multi-single with **K9IG** as the second operator. **N0IJ**'s score in the MN sections should have been published as 25,676 based on 138 QSOs and 49 multipliers.

In the 1999 ARRL International DX Contest Phone Results, P40B (P43P, op) should be listed as single-op high-power unassisted, which places him in 5th place in that category. (**WB2ZTH** was the solo op for that station.) **K5ZD** should be listed as single-op all-band in the WMA section instead of single assisted. **JH7PKU**'s log was missing portions of data. After recompiling the log, their score should show 1,624,488 points as a multi-multi, finishing 5th overall.

In the **1999 ARRL International DX Contest CW Results, AB7U** should be listed as a single-band 20-meter entry from the WWA section. **K1TWF** should be listed as a multi-single in the EMA section with a score of 2,718,738 based on 2277 QSOs and 398 multipliers, placing them 5th in the category among W/VE stations. **W2VJN/7** should show 1,589,796 points based on 1677 QSOs and 316 mults, making him the leader in the OR section.

The **1999 Field Day Results** were reported with both types of Class-A stations (generator and battery powered) in a single listing. Member feedback shows that you would like us to revert back to listing separate generator and battery listings, which we will do in next year's results. In the 1999 Field Day, **KS4C** should be listed as 1E in the GA section with a total of 101 CW QSOs and a score of 404 points. **W0BU's** score has been recalculated to 10,472 points in class 3A.

W1AW Qualifying Runs are 10 PM EST Thursday, January 6, and 9 AM EST Friday, January 21. The **West Coast Qualifying Run** will be at 9 PM PDT on Wednesday, January 5. Check the W1AW schedule for details.

Dec 31

14th Internet CW Sprint, sponsored by the Boring Amateur Radio Club, 2300Z Dec 31 to 0100Z Jan 1. CW only, 40 and 20 meters. 150 W output or less. Exchange consecutive QSO number (starting with one), name and state/province/DXCC country. The name used in the exchange for your first QSO is your name. For every QSO that follows, the name you send is *the name you received in the previous QSO*. Call "CQ INT". The standard sprint QSY rules must be followed. If you solicit a QSO (ie with CQ or QRZ), after completing the QSO, you must QSY at least 1 kHz before calling another station, or 5 kHz before soliciting another QSO. You may work the same station multiple times provided the contacts are separated by at least 3 other QSOs in both logs (regardless of band). Total score is the number contacts you make. Logs must be sent in ASCII format via e-mail to **n6tr@contesting.com** within 72 hours after the end of the contest. For more information on the Web see: **http://www.jzap.com/k7rat/.**

Jan 1

ARRL Straight Key Night. See your December 1999 *QST*, page 99.

PSK31 Millennium Contest, sponsored by the Chautauqua Contest Club, 1200Z Jan 1 to 1200Z Jan 2. 80 40 20 15 10 meters. *PSK 31 only*. No operation over 100 W. Power classes are LP = 30 W or less; HP = 31 W to 100 W. Entry classes: Single-op all-band LP; single-op all-band HP; single-op single-band LP, single-op single-band HP. Only one transmitter and one band permitted during the same time period. Once a station has begun operating on a band it must stay on that band for at least 10 minutes. Listening time counts as operating time. This contest uses the same scoring rules as the CQ WW RTTY contest. Contact stations once per band. Exchange: W/VE (excluding KL7 and KH6) send RST, state/province and CQ zone. All other stations send RST and CQ zone. Multipliers are US states (48), Canadian provinces (13), and DXCC countries (including the WAE country list) and CQ zone. Count multipliers per band. Final score is total QSO points × total multipliers. Use a separate log sheet for each band. Send logs by Feb 15 to PSK Millennium Contest, c/o Andrew O'Brien, KB2EOQ, 9082 Concord Dr, Fredonia, NY 14063; **http://www.netsync.net/users/obrienaj/carc.htm**

SARTG New Year RTTY Contest, sponsored by the Scandinavian Amateur Radio Teleprinter Group, 0800-1100Z Jan 1. RTTY only, 80 and 40 meters. Single-op all-band, multi-op single transmitter and SWL. Exchange RST, QSO number, name and "Happy New Year" (in your native language). Count 1 point/QSO. Multipliers are DXCC countries and Scandinavian prefixes on each band. Final score is QSO points x multipliers. Awards. Send logs by Jan 31 to SARTG Contest Manager, Ewe Hakansson SM7BHM, Box 9019, SE-291 09 Kristianstad, Sweden; **sm7bhm@kristianstad.mail.telia.com**.

Y2K QRP Contest, 1200-2400Z Jan 1. CW, SSB, PSK-31 and FM. All bands except for 30 17 12 meters. Operate 8 hours out of the 12. You may operate all 12 hours and pick your best 8 hours. Exchange RST, state/province/country and ac or dc (your power source). If you are running from commercial power you are ac; if you are using battery, solar or generators you are dc. Count 1 point per QSO if you are dc powered; 2 points per QSO if you are ac powered. Final score is QSO points × total states/provinces/countries × power multiplier. Power multiplier is ×2 for 5 W or less and ×1 for more than 5 W. Send logs by Feb 1 to Jay Miller, WA5WHN, 4613 Jupiter St NW, Albuquerque, NM 87107-3944; **wa5whn@hotmail.com**.

7-9

ARRL RTTY Roundup.See your December *QST,* page 100.

Japan International DX Contest, CW, low-band portion. Sponsored by *Five-Nine Magazine*. 2200Z Jan 7 until 2200Z Jan 9 (high-band CW portion is 2300Z Apr 7 until 2300Z Apr 9). Work JAs only. Low bands are defined as 160/80/40; high bands are 20/15/10. Operate no more than 30 hours (JAs operate full 48). Single operator multi/single band, high (>100 W) or low (<100 W) power, multi-single, or maritime mobile. Exchange RS(T) and CQ zone; JA stations exchange prefecture number (1-50). Score 4 pts/QSO on 160; 2 pts/QSO on 80 and 10; and 1 pt/QSO on 40, 20 and 15. Multipliers are JA prefectures worked per band (max 50). Final score is QSO points × multipliers. Electronic entries accepted. Awards. Send logs postmarked by Feb 28 (high-band, May 31; phone, Dec 31) to JIDX Contest, c/o *Five-Nine Magazine*, PO Box 59, Kamata, Tokyo,144 Japan; **jidx-log@dumpty.nal.go.jp.** For more information on the Web see: **http://jzap.com/je1cka/jidx/**.

Meet the Novices and Technicians Day, sponsored by YLRL. 1500Z Jan. 8 to 0500Z Jan. 9. CW and phone. YLs only. Use only Novice/Technician Plus HF subbands along with 6 meters, 2 meters and 70 centimeters (no repeater contacts). Exchange RS(T), name, QTH, license class. 3.676, 7.133, 21.133, 28.176, 28.333 MHz. Score 3 pt/QSO for each YL Novice/Technician Plus worked; 2 pt/QSO for each General or Advanced YL worked; and 1 pt/QSO for each Amateur Extra YL worked. Final score is total QSO points. Awards. Send logs postmarked within 30 days of contest to Cleo Bracket, K0JFO, 810 Town Square Dr, Fremont, NE 68025; **cleob@mitec.net**. For more information: **http://www.qsl.net/~ylrl/ylcontst.html**

North American QSO Party, CW, sponsored by the *National Contest Journal*. 1800Z Jan 8 until 0600Z Jan 9 (phone is 1800Z Jan 15 until 0600Z Jan 16). Single op (no spotting nets) and multi-two. Single ops may have only one transmitted signal at a time; multi-twos have a 10-minute rule. All entries must use <100 W output power. Multiops may operate for the full 12 hours; single ops may operate 10 hours, with off times at least 30 min long and marked in the log. Work stations once per band. CW in CW subbands only (phone in phone sub bands only). Exchange name and state/province/DXCC country. If your name or location change during the contest the change must be clearly marked in the log. Multipliers are states (including KL7/KH6), provinces (including Nunavat), and other North American countries. Non-North American stations may be worked for QSO credit, but not as multipliers. Final score is QSOs×multipliers. Team competition. Awards. Electronic logs accepted. Send CW logs to Bob Selbrede, K6ZZ, 6200 Natoma Ave, Mojave CA 93501; **cwnaqp@ncjweb.com**. Send phone entries to Bruce Horn, WA7BNM, 4225 Farmdale Ave, Studio City, CA 91604; **ssbnaqp@ncjweb.com**.

15-16

North American QSO Party, phone. See Jan 7-9 listing.

2000 CW QRP Contest, sponsored by the Michigan QRP Club. 1200Z Jan 15 to 2359Z Jan 16. CW only, 160 80 40 20 15 10 6 meters. Classes: **A—**250 mW or less; **B—**1 W to 250 mW, **C—**5 W to 1 W; **D—** more than 5 W. Exchange RST, state/province/country and MI-QRP member number (nonmembers send power output). Work stations once per band for QSO points and Multipliers. Contacts with MI-QRP members count 5 points/QSO, nonmember DX contacts outside W/VE are 4 points/QSO and W/VE nonmembers are 2 points/QSO. Final score is total QSO points from all band × total states/provinces/countries worked on all bands. (W and VE do not count as countries) Bonus points: Multiply your score by 1.25 for homebrew TX or RX combined with commercial TX or RX; multiply by 1.5 for a total homebrew TX/RX setup. Homebrew means any kit or homemade gear. Awards. Send logs by Feb 12 to: L.T Switzer, 654 Georgia Ave, Marysville, MI 48040-1243; **n8cqa@tir.com**. More information is available on the Web at: **http://www.tir.com/~k8dd/miqrp.htm.**

Hunting Lions in the Air Contest, sponsored by the International Association of Lions Clubs. 0900Z Jan 15 until 2100Z Jan 16. Operate no more than 24 hours; off periods must be at least 1 hour. Single op all band and multi-single. Multi singles have a 10-minute rule. 80 40 20 15 10 meters. Work stations once per band, regardless of mode. Exchange RS(T) and serial no. Lion/Lioness/Leo Club members will also send name, district and QTH of the club, and must sign "/L" or "Lion"; members of the Melvin Jones Memorial RC must sign "Melvin" or "/LM"; the Melvin Jones Memorial station will sign W7YU/MJM. Score 1 pt/QSO w/own country; 2 pts/QSO w/other country in same continent; and 3 pts/QSO w/different countries. Bonus points: Add 5 pts/QSO w/Lion members in the same country and 10 pts/QSO w/Lion members outside own country; 5 pts/QSO w/Melvin Jones Memorial RC members; and 5 pts/QSO w/W7YU/MJM. Multiplier is the total of different prefixes worked x2. Final score is QSO points × multipliers. Awards. Send logs by Jan 31 to: Lion Rad Handfield-Jones, ZS6RAD, Lions Club of Midrand, PO Box 1584, Halfway House 1685, South Africa; **http://sarl.org.za/public/contests/lionita.htm**.

22-24

ARRL January VHF Sweepstakes. See your December *QST*, page 101.

George Fremin III, K5TR ♦ RR1, Box 322, Johnson City, TX 78636 ♦ k5tr@arrl.org

28-30

CQ WW 160-Meter DX Contest, CW, sponsored by *CQ Magazine*. 2200Z Jan 28 until 1600Z Jan 30 (phone is 2200Z Feb 25 until 1600Z Feb 27). Single op and multi-single. Single ops can be QRP (<5 W), low power (<150 W), or high power (>150 W). Use of spotting nets or PacketCluster makes you a multiop. Exchange RS(T) and state/province/DXCC country. Score 2 pts/QSO w/own country; 5 pts/QSO w/countries on same continent; and 10 pts/QSO w/different continents. Maritime mobiles count 5 pts/QSO, but do not count as multipliers. Multipliers are US states (48), Canadian call areas (13), and DXCC countries. KH6/KL7 are considered DX. US and VE do not count as countries. Final score is QSO points x multipliers. Awards. Electronic entries accepted. Club competition. Send logs by Feb 28 (Mar 31 for phone) to: David L. Thompson, K4JRB, 4166 Mill Stone Court, Norcross, GA 30092; **cq160@contesting.com**; **http://www.cq-amateurradio.com160rules99.html**

REF French Contest, CW, sponsored by Reseau des Emetteurs Français. 0600Z Jan 29 until 1800Z Jan 30 (phone is 0600Z Feb 26 until 1800Z Feb 27). Work French, French military, French overseas territorial and department stations. Single op all band/single band, and multi-single. 80 40 20 15 10 meters. Exchange RS(T) and serial number; French stations give RS(T) and department number or prefix (for territories and overseas department stations). Score 1 pt/QSO w/stations in the same continent, 3 pts/QSO w/stations in different continents. Multipliers are French departments, French territory and overseas stations and F6REF worked per band. Final score is QSO pts × multipliers. Awards. Send logs by Mar 15 (Apr 15 for CW) to: Reseau des Emetteurs Français, REF Contest, BP 7429, 37074 Tours Cedex, France.

UBA Contest, phone, sponsored by Unie van de Belgische Amateurzenders and the EC Commission for Communication, Information and Culture. 1300Z Jan 29 until 1300Z Jan 30 (CW is 1300Z Feb 26 until 1300Z Feb 27). 80 40 20 15 10 meters only. Single op single band, all-band QRP or multi-single. PacketCluster use by single ops allowed. All stations must remain on a band for 10 minutes. Exchange RS(T) and serial number. Score 10 pts/QSO with Belgian stations, 3 pts/QSO with other EC member stations, and 1 pt/QSO with stations outside the EC. Multipliers are Belgian provinces, Belgian prefixes, and EC-member DXCC countries. Final score is QSO pts × multipliers worked per band. Awards. Electronic entries accepted. Send logs postmarked within 30 days to: UBA HF Manager, Carine Ramon, ON7LX, Bruggesteenweg 77, B-8755 Ruiselede, Belgium; **http://www.uba.be/.**

YL International QSO Party, CW, sponsored by YL International SSBers Inc. 0000Z Jan 29 to 2359Z Jan 30 (SSB 0000Z Feb 26 2359Z Feb 27). Use general CW bands. Open to all with emphasis on member-to-member contacts. Exchange report, state, country, name and YLISSB number. All logs must be received by March 31, 1999. Send SASE for entry and summary forms and address questions, comments, entries to N4ZGH/N4KNF, The Livingstons, 2160 Ivy St, Port Charlotte, FL 33952; **hamsrus@afcon.net**

Kansas QSO Party. 1800 UTC Saturday January 29 to 1800 UTC Sunday January 30. All amateur bands except 30 17 12 meters. Single op, multiop. HF, VHF+ or combined. Kansas stations exchange RST and county on HF, or grid square on VHF. Non-Kansas stations exchange RST and state or country on HF, RST and grid square on VHF. Count HF 1 point for SSB; 2 points for CW; 3 points for RTTY, SSTV, or other digital HF mode. Multiply total points by different states worked (max 48) multiplied by different DX countries worked (DXCC list). VHF+ 1 point per contact on 2 meters, 2 points per contact on 6 meters or 220 MHz. Three points per contact on 440 MHz. Five points per contact above 1 GHz or any contact in the VHF or UHF bands using ATV, digital (including packet) or moon-bounce. Multiply total points by number of different grid squares worked. Add HF score to VHF+ score for High Overall Score. Add 1000 bonus points for contact with K0S on each band. Awards. Send logs no later than March 1 to: Kansas QSO Party, c/o Rick Carver, WA0KS, 13425 West 56th Terrace, Shawnee, KS 66216; **http://www.geocities.com/CapeCanaveral/Hall/7380/contest.html**

NEW BOOKS

THE RSGB GUIDE TO EMC

By Robin Page-Jones, G3JWI

Published by the Radio Society of Great Britain (RSGB). Available through the ARRL, $30 plus shipping. Soft cover, 204 pages, 9½ × 6¾ inches, B&W illustrations. 1998, ISBN 1 872309 488.

Reviewed by Paul Danzer, N1II
ARRL Technical Advisor

◊ It's always interesting to see how hams in other parts of the world deal with the same problems we face here. G3JWI is an active ham, an engineer and, if this book is any measure, a clear and concise writer. *The RSGB Guide to EMC* was first published in 1992, and this 1998 revision seems to bring the contents up to date.

First the title. EMC stands for *electromagnetic compatibility*, and this book treats the topic in the broadest possible way. As it says in the introduction, "Radio amateurs exist in the EMC environment and dealing with interference is part and parcel of the practice of amateur radio." Thus *The RSGB Guide to EMC* covers the technical end—interference from Amateur Radio and interference to Amateur Radio—the troubleshooting aspect, or how to find what is the real problem—and the social problem—how to deal with an angry neighbor (or family member!).

A few nice illustrations in chapter 2, as well as a few pages of interesting text, introduce the topic from the antenna point of view. What does the field look like near a radiating antenna, and somewhat removed from the antenna? Later in the book, other illustrations show how this field can be conducted accidentally by water pipes, TV transmission lines and other conductors. The book goes on to show that a conductor such as one of those, if near a conducting ground, actually forms a transmission line!

The rusty metal joint also is discussed. Incidentally, for those who are mathematically inclined, remember that a real diode can be seen as a square-law device, conducting in just one direction and blocking current flow in the other direction. A rusty joint, where oxidation forms the contact, also is a square law device—but it can conduct in both directions! The harmonic components of rectification from a real diode are therefore very different than those from a rusty metal junction.

While many American hams do live in apartments and smaller "clustered" housing, many live in homes that do have room for reasonably sized and placed antennas. This RSGB book seems to emphasize the problem of hams living on very small lots, where the antennas are sure to be in proximity with house wiring and other structures. One result of this emphasis is the idea that you can save yourself a lot of future problems, if you think about possible interference before you select the antenna type and location.

"The EMC Detective" is the name of one particularly interesting chapter. It is the sort of thing that most of us wish we had read before we became immeshed in a problem. A set of three very nice flow charts helps guide you through this detective process. One source of interference that may be new to many hams is switching power supplies. Yes, you may have heard of the difficulty of designing them for ham radio use, and their tendency to radiate interference, but did you ever consider how many of them are in today's household appliances—especially those that are on 24-hours a day? FAX machines, VCRs and even TV sets often have these low-cost, continuously-on supplies. Each is a possible source of that strange noise you may be hearing on HF or VHF!

A schematic and construction information is included for a device that functions as a field strength meter, but in place of an antenna it has a coupling coil and split ferrite core. If you want to know if a piece of wire, such as a power line or the outside of a cable TV line is conducting RF, simply snap the core around the wire and look for a reading. Thus you can see if your antenna is radiating to a nearby wire, and the RF causing the interference is actually coming in on that wire and not directly from the antenna field.

In the 1950s the first set of books—actually softcover pamphlets—were published to explain TVI to hams. At that time two effects were noted, *harmonics* and *fundamental overload.* G3JWI calls fundamental overload *breakthough*, but now it applies to much more than just TV sets. The question is what happens in today's modern electronic household, with cable TV, VCRs, extended audio and other enter-tainment systems—when you are just transmitting more power than the consumer appliance can stand? The answer seems to be to consider both fixing the appliance (assuming it is in our household) and changing your operating mode. Some modulation modes are kinder to household appliances then others. Once again, as pointed out in several ARRL publications, think twice before you try to fix your neighbor's equipment, or you may end up paying for it!

Just as interference is a two-way street—amateur transmitters to the surrounding neighborhood and appliances in the neighborhood to amateur receivers—so is the social side of the problem, which is covered well in *The RSGB Guide to EMC*. On the one hand, you may have to deal with an irate neighbor, who claims you are interfering with his or her stereo. On the other hand, you may have to find a diplomatic approach to a neighbor who just installed a touch-controlled lamp that is covering 20-meters with an awful racket—just, of course, an hour before the ARRL CW DX weekend.

I confess—when I received this book, I jumped ahead to chapter 9, "Some Specific EMC Problems", because I wanted to see if the problems in the United Kingdom would be different than those we see every day in the States. And the answer is "no." The paragraphs dealing with passive infrared sensors (PIRs, or those inexpensive motion detector floods lights commonly placed around homes today) gave me a chuckle. It was not long ago I added a few to my home, and the next night was told by my wife that they were going on and off "strangely." I quickly found strangely meant you could read my 40-meter CW to some extent by watching the floods blink! No, the problems UK hams encounter—including PIRs, cable systems and co-location of stations at field day—are not very different than we encounter in the US.

A set of seven appendices finishes *The RSGB Guide to EMC*, including one on causes and cures of interference from personal computers. Another appendix has the characteristics of a number of ferrite cores and commercially-constructed filters. The inside back cover lists those filters that can be purchased directly from the RSGB.

Each chapter of *The RSGB Guide to EMC* ends with a summary of the key points covered—a technique that perhaps more books should adapt. This is an interesting and convenient book. It wraps up the EMC (or as we often call it, *RFI)* neatly and clearly with a number of good, practical ideas and clear illustrations. QST

By Dan Henderson, N1ND
Contest Branch Manager

1999 June VHF QSO Party Results

VHF/UHF operators, microwave gurus and weak signal enthusiasts are a rare breed in today's Amateur Radio. Thank goodness we have them.

In many circles, the contesting credo is "loud is good." It is hard to argue with that. Getting "loud" requires tremendous time, energy and planning. Never underestimate the ability of a high power operator. The quest for "loud" presents a set of problems unique to guys who go QRO on the HF bands.

Among VHF/UHF contesters at times the credo may well be "loud is not possible." At frequencies where fractions of dBs can make the difference between completed QSOs and fruitless efforts, at times just being heard becomes the crusade. It comprises a different set of challenges that tax the skills of these dedicated operators. Running low power or QRP on the highest frequencies will test the mettle of even the most experienced operators.

To encourage this challenge the ARRL sponsors a series of annual events in the highest ranges of the amateur spectrum. Always among the most popular is the annual June VHF QSO party. In 1999, 701 log entries were received at Headquarters from across the USA and beyond, including Canada, Mexico, the Bahamas and Cuba for this early summer soirée. This included 75 rover entries—11% of the total entries received.

Only one overall scoring record fell in the June ARRL VHF QSO party. Congratulations to the Mt. Greylock Expeditionary Force W2SZ/1 on a record-setting multioperator score of 1,746,602 points. This is

It is a true team effort to handle the logistics at the W3CCX site on Camelback Mountain.

Twenty-three antennas and a quarter mile of coax made up the W3SE operating locale.

Region Box

Northeast Region (New England, Hudson and Atlantic Divisions; Maritime and Quebec Sections)			Southeast Region (Delta, Roanoke and Southeastern Divisions)			Central Region (Central and Great Lakes Divisions; Ontario Section)			Midwest Region (Dakota, Midwest, Rocky Mountain and West Gulf Divisions; Manitoba and Saskatchewan Sections)			West Coast Region (Pacific, Northwestern and Southwestern Divisions; Alberta, British Columbia and NWT/Yukon Sections)		
K1TEO	378,658	S	W4RX	106,335	S	K9PW	300,040	S	K5IUA	146,664	S	N6HKF	101,010	S
K1UHF	220,160	S	K2UOP/8	104,104	S	KE8FD	144,313	S	W8CM	118,030	S	K6TSK	61,311	S
WA2FGK (K2LNS,op)	203,190	S	N8UM	83,456	S	K8TQK	133,101	S	K0GU	117,832	S	KQ6QW	49,440	S
W1QB	45,090	Q	AI4CW	1,508	Q	W9GKA	8,320	Q	WD5AGO	4,600	Q	KC6TMB	12,992	Q
K1ZE	29,920	Q	W4SKI	1,215	Q	N8XA	6,174	Q				K6LMN	11,956	Q
WB2AMU	3,630	Q				KD4EVB	390	Q				N6JO	11,568	Q
W2SZ/1	1,746,602	M	K8GP	1,214,750	M	W0UC/9	200,618	M	W1XE	253,129	M	W6TOI	170,534	M
W2UTH	1,066,602	M	K4RF	78,400	M	W9ICE	192,240	M	KK5IH	63,008	M	W3SE	153,446	M
K3MQH	814,929	M	K4SZ	4,165	M	WW8M	165,981	M	W0KVA	44,577	M	W6MMM	95,892	M
K3YTL	297,306	L	W4IY	252,096	L	VA3AEC	16,905	L	W7XU	249,084	L	W2ODH/6	376,068	L
AB2I	129,610	L	AA4ZZ	150,920	L	W8ZNT	11,220	L	W5KFT	148,626	L	WA7JTM	61,341	L
K2BAR	120,032	L	W4COV	28,747	L	KC8AAV	6,039	L	N0UK	97,970	L	KF7NP	47,520	L
N3IQ	302,341	R	W4VHF	60,701	R	AB4CR	134,656	R	W5DF	66,204	R	N6DN	49,770	R
W3EKT	141,702	R	N4OFA	44,411	R	K8WW	72,726	R	WB5VYE	45,356	R	AL1VE	24,544	R
N1MJD	112,409	R	NK4Q	11,620	R	N4STK	59,254	R	KF0UK	36,660	R	AA7VT	22,540	R

S = Single Operator; M = Multioperator; L = Limited multioperator; Q = QRP

Top Ten Box and Plaques

Single Operator Sponsor

K1TEO	378,658	Mt. Greylock Expeditionary Force, W2SZ/1
K9PW	300,040	Mt. Frank Contesters, K9NS
K1UHF	220,160	Ed Parsons, K1TR
WA2FGK (K2LNS,op)	203,190	Wellesley ARS, Mt. Equinox Contest Crew
K1RZ	157,174	N0KQY, W0LD, N0JK, WB0DRL, N0LL
K5IUA	146,664	South Mountain Contest Team, K3MQH
KE8FD	144,313	In Memory of John Chambers W6NLZ by John Butrovich W5UWB
K3DNE	141,115	AB4CR Rover Team
K1GX	136,629	Southeastern VHF Society
K8TQK	133,101	

QRP Portable

W1QB	45,090	*West Coast VHFer*
K1ZE	29,920	Robin Gist, K4VU
KC6TMB	12,992	
K6LMN	11,956	
N6JO	11,568	
W9GKA	8,320	
N8XA	6,174	
WD5AGO	4,600	
WB2AMU	3,630	
AC6XK	3,077	

Multioperator

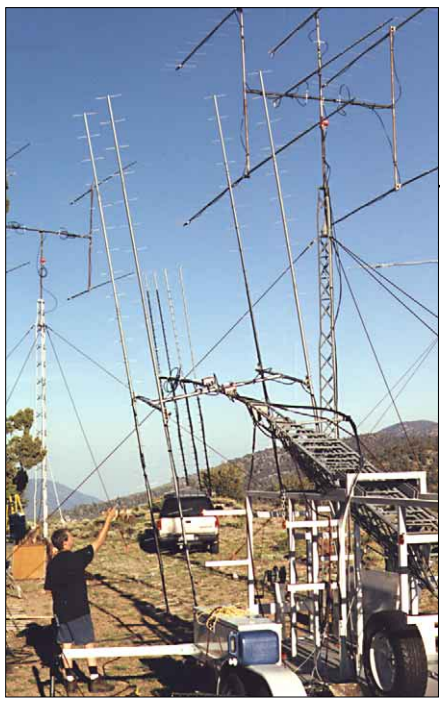
W2SZ/1	1,746,602	Randy Stegemeyer, W7HR
K8GP	1,214,750	N2LIV & Ten-X Group
W2UTH	1,066,602	Mt Airy VHF Club
K3MQH	814,929	Rochester VHF Group
W3CCX	718,537	George Noyes, W1XE
K2TVI	344,469	Schenectady ARA, K2AE
K1WHS	320,024	In Memory of Sid Krauss, WA2VNK
WD3R	263,857	
W1XE	253,129	
W0UC/9	200,618	

Limited Multioperator

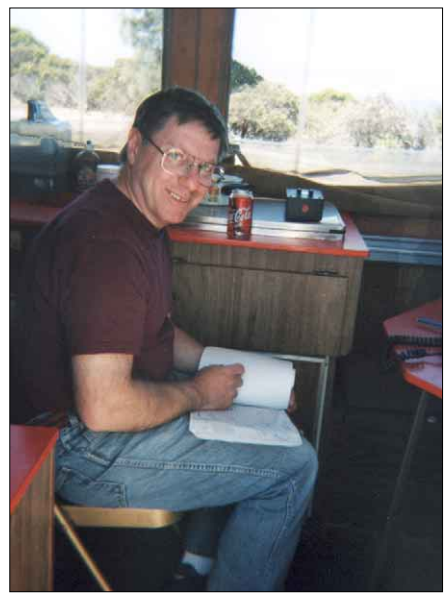
W2ODH/6	376,068	W3EP, K9AKS.W9IP
K3YTL	297,306	K1TEO, W2GKR, W2GKO, KA1FVG
W4IY	252,096	
W7XU	249,084	
AA4ZZ	150,920	
W5KFT	148,626	
AB2I	129,610	
K2BAR	120,032	
WB1GQR	119,992	
W3IP	101,508	

Rover

N3IQ	302,341	W2SZ/1, in Memory of Dick Goodman, WB1HIH
W3EKT	141,702	Wayne King, N2WK
AB4CR	134,656	Northern Lights Radio Society and W0UC
N1MJD	112,409	Southeastern VHF Society
K8WW	72,726	
K3QII	69,687	
W5DF	66,204	
W4VHF	60,701	
N4STK	59,254	
VE3NPB	55,483	



KB6WKT supervises deployment of the 432 MHz and 1.2 GHz arrays at the W6TOI site.



Dueling section managers: W6TLK of the SF section on the west coast operated W6MMM (left) while N1KAT of Maine ran on the East Coast (right).

also the new record for the New England Division.

K9PW now holds the Central Division single op mark with a score of 300,040, while the operators of K8GP broke the million-point barrier while setting a new Roanoke Division multioperator mark with 1,214,750 points. The Southwestern Division limited multi-operator record now belongs to the operators at W2ODH/6 with their score of 376,068. N3IQ's rover score of 302,241 now stands atop the Atlantic Division while N1MJD once again upped the New England Division rover score, this time breaking the 100k barrier at 112,409.

A Change for 2000

The year 2000 running of the June ARRL VHF QSO Party will see one significant change. Starting in 2000, the single operator category is now split into high power and low power classifications. To qualify as low power, your output cannot exceed 200 W PEP on 50 and 144 MHz, 100 W PEP on 222 and 432 MHz, and 10 W PEP on 902 MHz and above. If you surpass the power limit on any band, your entry is classified as high power. We anticipate some exciting contesting battles between operators in the new power divisions to accompany the continued tough contests in the established categories. Make certain you read the revised "General Rules for ARRL Contests on Band Above 50 MHz" on page 106 in the November issue of *QST*. The rules are also found on the contest Web page at: **http://www.arrl.org/contests**.

Participants are reminded that for an entry to be complete, you must submit both a completed summary sheet and complete log file. Also, your entry should be legible if done by hand. Take a few moments to send an SASE to the Contest Branch to request forms you need or you can download them from the contest Web page. Incomplete entries are classified as check logs.

In VHF/UHF/microwave contesting, one of the keys is the more bands you operate, the greater your score will be. If you look at the number of bands reported by the top scoring stations, you will see they utilize more bands than the average contester.

QSO Leaders By Band

Single Operator

50 MHz		144 MHz		222 MHz		432 MHz		902 MHz		1296 MHz	
N5JHV	467	K1TEO	427	K1TEO	101	KE6GFF	205	K1TEO	41	K1TEO	54
K5AM	439	K1UHF	330	K1UHF	90	K1TEO	161	K3DNE	27	K1GX	45
K0GU	406	K5MA	252	K3DNE	72	K1UHF	126	K1GX	26	WA2FGK (K2LNS,op)	41
KB2ZVP	375	WA3BZT	244	WA2FGK (K2LNS,op)	72	K9PW	114	K1RZ	25	K1UHF	41
N7ML	353	K9PW	231	K5MA	69	K5MA	114	WA2FGK (K2LNS,op)	25	K1RZ	38
W5UWB	321	K1GX	224	K1GX	68	WA2FGK (K2LNS,op)	113	K1UHF	25	K3DNE	34
K8LEE	300	WA2FGK (K2LNS,op)	218	N6HKF	67	N6HKF	105	K2UOP/8	25	K9PW	34

Multioperator

50 MHz		144 MHz		222 MHz		432 MHz		902 MHz		1296 MHz	
W2SZ/1	744	W2SZ/1	725	W2SZ/1	217	W2SZ/1	350	W2SZ/1	104	W2SZ/1	138
K8GP	674	K3MQH	717	W2UTH	204	K3MQH	294	W2UTH	97	W2UTH	106
W3CCX	610	W3CCX	608	K8GP	176	K8GP	273	K8GP	55	K8GP	64
K3MQH	589	K8GP	572	K3MQH	167	W2UTH	269	W3CCX	44	W3CCX	55
K2TVI	546	W2UTH	463	W3CCX	161	W3CCX	249	K3MQH	26	K1WHS	43
W2ODH/6 -L	499	WD3R	443	W2ODH/6 -L	160	W2ODH/6 -L	215	K2TVI	22	K3MQH	43
K3YTL -L	458	W4IY -L	436	W4IY -L	122	K3YTL -L	195	WW8M	20	W6MMM	42

-L denotes Limited multioperator

Multiplier Leaders By Band

Single Operator

50 MHz		144 MHz		222 MHz		432 MHz		902 MHz		1296 MHz	
K5AM	172	K0MQS	61	KE8FD	36	K1TEO	40	K1TEO	21	K3DNE	20
N5JHV	170	KE8FD	61	K1TEO	35	KE8FD	37	K3DNE	17	KE8FD	20
K0GU	155	K1TEO	51	K8TQK	34	K4QI	37	K1RZ	16	WA2FGK (K2LNS,op)	19
N7ML	127	K8TQK	51	K3DNE	28	K9PW	36	K9PW	14	K8TQK	19
N5WS	122	N0KQY	50	K1UHF	28	WA2FGK (K2LNS,op)	33	K2UOP/8	14	K1TEO	19
W5UWB	119	WB9Z	49	WA2FGK (K2LNS,op)	27	K3DNE	31	WA2FGK (K2LNS,op)	14	K1RZ	18
K1TOL	116	K9PW	46	K9PW	27	VA3ST	30	KE8FD	13	K4QI	18
						KA1ZE	30	K8TQK	13		

Multioperator

50 MHz		144 MHz		222 MHz		432 MHz		902 MHz		1296 MHz	
W1XE	175	K8GP	76	K8GP	64	K8GP	58	W2SZ/1	31	W2SZ/1	34
W7XU -L	171	K3MQH	69	K3MQH	52	W2UTH	54	W2UTH	31	W2UTH	30
W5KFT -L	140	W2UTH	59	W2UTH	49	K3MQH	53	K8GP	27	K8GP	26
K8GP	128	W4IY -L	59	W4IY -L	43	W2SZ/1	48	K3MQH	12	WW8M	17
W2ODH/6 -L	124	W3CCX	59	K3YTL -L	38	K3YTL -L	46	W3CCX	12	K3MQH	17
W0UC/9	123	W7XU -L	58	W9ICE	38	W7XU -L	43	WD3R	12	W3CCX	16
WA7JTM -L	117	W2SZ/1	58	W3CCX	38	W3CCX	41	WW8M	11	W6TOI	14
				W2SZ/1	38	W4IY -L	41				

-L denotes Limited multioperator

In an attempt to encourage more participation on the higher UHF/microwave bands, the ARRL Technical Information Service has put together a new informational Web page. This page features downloadable information and reprints of articles from *QST*, *QEX* and other ARRL publications. You will also find an up-to-date bibliography and a list of links to sources that sell equipment and parts for UHF/microwave projects. This information will help you as you look for less expensive ways to increase your band totals and QSO points on the higher bands. Thanks to the TIS and Lab guys for their work on this project. The Web site is **http://www.arrl.org/tis/info/uhf-mw.html**.

The June 2000 ARRL VHF QSO Party will be held June 10-12. Find a mountain top to try your hand as a QRP portable. Get your club together and plan to participate in the multi-op or limited mult-op class. Get out the grid square maps, overlay them on your road maps and plot out a rover course that will maximize your efforts. Plan over the winter months how to improve your operation. Visit the TIS website and build a project that will add a band or two to your arsenal of weapons.

When you beat the challenges posed in VHF/UHF/microwave operations, you will feel the same rush you feel in completing the November Sweepstakes "Clean Sweep," or working the rare entity to move up to the DXCC Honor Roll. Being *heard* is good!

Scores

Each line score lists call sign, score, stations worked, multipliers, hours, number of grids activated (if Rover), and bands (A= 50 MHz, B = 144 MHz, C = 222 MHz, D = 432 MHz, 9 = 902 MHz, E = 1296 MHz, F = 2304 MHz, I = 10 GHz, J = 24G GHz, K = 47 GHz, P = 300+ GHz). Band leader indicators are listed in boldface type.

1

Connecticut

K1TEO	378,658	1073	238	S	**ABCD9EFG**
K1UHF	220,160	872	172	S	ABCD9E**FI**
K1GX	136,629	621	141	S	ABCD9EFG**H**
W1COT	41,172	308	94	S	ABCDE
WZ1V	27,010	195	74	S	ABCD9EFG
N1NQD	24,820	251	68	S	ABCD9E
NT1N	23,652	292	81	S	AB
K1EM	14,460	174	60	S	ABCDE
N1JMM	12,582	214	54	S	ABD
K1NGO	9,752	175	46	S	ABD
W1QJL	7,439	120	43	S	ABCDE
K1WVX	5,838	105	42	S	ABCDE
W1WHL	5,032	148	34	S	A
K1KI	2,415	105	23	S	A
N1OPO	1,872	67	24	S	ABD
KE1LE	342	38	9	S	AB
WA1GTP	132	12	11	S	AB
W1QB	45,090	336	90	Q	ABCD9EF
K1ZE	29,920	323	68	Q	ABCDE
NM1K	2,016	72	21	Q	ABCD
N1QVQ	286	22	11	Q	ABCD
W1QK (+AA1MY,KA1SYG,K1XS,N1ABY,N1GS, N1TIV,N1TMG,W1QJ)	85,260	723	98	L	ABCD

Eastern Massachusetts

K5MA	103,212	663	122	S	**ABCD**
W1GHZ	66,924	466	99	S	ABCD**9EI**
W1PM	42,800	304	100	S	ABCD**E**
N1GJ	25,956	271	63	S	ABCD9E
WG1Z	13,468	178	52	S	ABCDE
W1DYJ	3,782	69	31	S	AB
KV1J	2,136	77	24	S	ABCD
KA1EKR	1,824	59	24	S	BD
N1VQR	1,136	65	16	S	ABD
AD1B	846	47	18	S	AB
NZ1D	598	42	13	S	ABCD
W1XM (KB1DCA,KB1CGZ,KB1CTH,W1GSL, KD1KY,KB1DQY,KA2ZLZ,N1ZOE,ops)	27,235	361	65	L	ABDE

Maine

N1RWY	39,292	334	94	S	**ABCD**
K1TOL	34,104	294	116	S	**A**
NY1E	19,435	299	65	S	A
KQ1V	3,420	95	36	S	AB
N1KAT	1,690	45	26	S	BCD
KB1DQH	138	20	6	S	ABC
K1OYB	135	12	9	S	ABCD
K1WHS (+K1CA,K1OR,K1DY,W1MRQ,KY1K, NK1I,N1LBI,AF1T,KB1DXD)	320,024	1051	218	M	ABCD9EFGHI

New Hampshire

K1TR	98,171	544	127	S	**ABCD9EF**
KU2A	34,320	301	78	S	ABCD9E
WA1T	33,538	281	82	S	ABCDE
WA1HOG	31,070	321	65	S	ABCDE**I**
K2HZN	5,616	138	39	S	ABD
AC1J	3,627	89	31	S	ABCD
N1NUM	3,213	108	27	S	ABCD
N1JHJ	2,754	87	27	S	ABD
N1XOQ	2,208	66	32	S	ABD
W1OA	1,562	64	22	S	ABCD

Rhode Island

KM1X	38,614	383	86	S	**ABD**
K8BGZ	1,944	80	24	S	ABD

Vermont

W1AIM	15,022	162	74	S	**ABC**D
KG1M	9,975	122	57	S	ABC**DE**
KT1VT	4,560	95	48	S	AB
N1ZUK	648	36	18	S	AB
WB1GQR (W1SJ,N2YHK,ops)	119,992	907	106	L	ABCD

Western Massachusetts

N1DPM	67,648	346	112	S	ABCD**9E**FG
N1MUW	42,828	350	86	S	AB**CDE**
WA1MBA	35,882	234	77	S	**BD9EFGHI**
K1ISW	14,355	194	55	S	ABCD
WA1UOZ	6,468	115	44	S	ABCD
N1MHH	4,964	112	34	S	ABCD
WA1NYV	2,185	115	19	S	B
KC1OM	684	33	18	S	ABCD
W2SZ/1 (+K1DH,K1EP,K2AD,K2TR,KB0WJO, KB2YQE,KC1ZN,KE2TP,KE4IBF,N2BNY, N2GXH,N2HPA,N2NQI,N2XRE,N2ZVI,W1SZ, W1VE,W2ARQ,WA1ZMS,WA2AAU,WA2SPL, WS2B)	1,746,602	2554	394	M	ABCD9EFGHIJKL
W1XX (+W1BYH,N1REK,N1RSX)	149,604	808	137	M	ABCD9E

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Eastern New York

W3HHN	18,247	208	71	S	ABCD**9**E
W2FCA	17,787	152	77	S	AB**CD**E
K2ZZ	13,965	248	49	S	A**BD**
WG2E	5,950	170	35	S	**A**
W2LGB	4,288	108	32	S	ABCD
K2LEG	2,805	85	33	S	AB
N2TMT	2,584	136	19	S	A
W2ENY	2,352	84	28	S	AB
W2KHQ	1,368	48	24	S	ABDE
K2RI	240	19	8	S	BCD
KC2ECW	120	30	4	S	B

K2TVI (+K2ZVI,KC2EBH,N2DHH,N2DVQ,N2FMC, N2GKM,N2HTT,N2NWZ,N2GDY,WB2NHC, WB2VVS,N3EMF)
344,469 1274 199 M ABCD9EFGHI

AB2I (+K2KJ,KB2SSS,N2BZP,W2AWX,WA2IID, WB2DVV,WC2J,WN2Y)
129,610 833 130 L ABDE

NYC-Long Island

K2OVS	21,868	270	71	S	A**B**D
WA2ZFH	20,945	232	59	S	A**BCDE**
WB2CMI	7,350	123	50	S	ABCD
NB2T	5,538	146	26	S	BCD
KF2XF	2,244	132	17	S	B
WV2C	264	22	12	S	AB
WB2AMU	3,630	103	33	Q	ABD

Northern New Jersey

WB2VVV	75,168	432	108	S	AB**CD9EFG**
K2KIB	31,652	288	82	S	ABCDE
K2SIX	14,045	231	53	S	A**B**D
WB2CUT	4,370	190	23	S	**B**
N2CSF	3,584	111	32	S	ABD
N2LMS	2,210	110	17	S	ABD
K2OEI	1,536	96	16	S	B
KE3PL	1,330	70	19	S	A
K2YSY	648	36	18	S	AB
WA2BTR	585	40	13	S	BD
WA2BKN	444	37	12	S	AB
WA2ASQ	190	19	10	S	A

WD3R (+N2WM,K2BJG,KB2LHH,KB2YJT, KC2DLD,N2HMM,WB2UFF,AD2P,K2BM)
263,857 1105 187 M ABCD9EF

K2BAR (WI2W,WA2QHL,W2JEK,K2AMI,N2ST, N2PBY,KF2OKJ,K2YLH,WU2C,KB2YGJ, KA2NJP,KO2OKM,WK2M,W2MSK,NA2AA, WA2LXE,KC2HL,WB2HID,WB2ZSE,W1GI,ops)
120,032 763 124 L ABCD

N2XR (+WA2EDD,WD2AEV)
26,048 363 64 L ABD

KC2CTF (+W2DEN,KC2COB,N2XYO,KC2EIQ)
1,334 48 23 L BD

Northern New York

KB2ZVP	40,125	375	107	S	**A**
WA2AEY	15,040	166	80	S	A**BD**
K3KYR	4,922	107	46	S	AB
WB2KLD	3,024	69	36	S	ABD

W2NNY (W2IB,NT2W,KC2BEZ,ops)
7,280 134 52 L ABD

Southern New Jersey

KD2KS	34,200	353	75	S	**A**BCD
N2SCJ	31,785	342	65	S	AB**CDE**
K1JT	19,825	284	61	S	A**BD**
W2SJ	6,987	76	51	S	ABCD**9EFG**

Western New York

K2AN	39,895	225	101	S	ABCD**9EF**
W2EV	30,765	195	105	S	**ABCDEI**
N2ODU	22,923	283	81	S	**A**
W2DYY	4,356	68	44	S	ABDEF
W2WGL	2,343	57	33	S	BD
KB2YVC	1,625	65	25	S	A

W2UTH (AA2WV,K2DB,K2DH,K2OS,KA2RDO, KB2DMK,N2KG,N2HLT,N2JQR,N2WK,N2YB, NS9E,VE3IEY,W3OAB,ops)
1,066,602 1693 354 M ABCD9EFGHIJP

WA2AAZ (N2MKT,N5THV,KC2DLK,N2JC,ops)
8,410 118 58 M ABCDE

N2JH (+AB2GF,KB2OAZ,KC2DXS,WA3MKT, N2LXD,KC2ELD,K2ITE,KB2YIN)
61,963 365 131 L ABCD

KB2SGX (+KG2NF,N2VJV)
7,729 112 59 L ABCD

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Delaware

W3OR	15,225	121	87	S	A**BCD9E**
WA3BZT	8,296	244	34	S	**B**

Eastern Pennsylvania

WA2FGK (K2LNS,op)
203,190 668 195 S **ABCD9EFG**

N3NGE	52,074	314	99	S	ABCD9EF
K3GNC	42,370	325	95	S	ABCD
W3SZ	15,360	176	60	S	BCDEF
KB3IB	9,480	107	60	S	ABCD9E
WS3C	9,024	150	48	S	ABD
N3XJX	4,520	91	40	S	ABCD
W3ZQN	2,407	71	29	S	ABCD
N3TBB	1,750	70	25	S	AB
N3JNX	1,680	50	28	S	ABD
K3NAT	1,541	62	23	S	ABCD
WA3UGP	1,210	43	22	S	ABCD
N3JIX	714	42	17	S	AB
K3ARR	666	37	18	S	A
WA3CSP	612	36	17	S	A
K3URT	462	38	11	S	ABD
KK3K	455	24	13	S	BDE
WT3P	324	27	12	S	A
K3KEL	210	12	10	S	ABD
KD3KZ	180	19	9	S	ABD
KC3LE	120	15	8	S	A
W8IJ	1	1	1	Q	A

K3MQH (+K3RA,K3MM,N3KTV,AI3M,W2GG, N3EYB,W3SST,W6HZW)
814,929 1858 323 M ABCD9EFHI

W3CCX (WA1YHO,AA3GN,WA3DRC,N3ITT, N3OZO,W3GAD,K1DS,N3EVV,NK8Q,W3RJW, W2SK,KB3XG,WA3RLT,WA3NUF,N3FUJ, W3KM,NE3I,ops)
718,537 1778 283 M ABCD9EFGHIJ

K3YTL (KA3EEO,KA3ZHT,KB3QI,KE3OA,N1TQP, N3FA,N3PBH,N3TDE,N3TKK,N3RN,W3DZH, WA1HHN,WA1MKE,WA3NVS,WB3FKQ,UA1LD, ops) 297,306 1186 199 L ABCD

W3HZU (N3JDQ,N3ZCW,WB3CQN,AD3E, KB3DBT,KB3DPF,N3NBT,N3BQB,N3RBT, N3RB,ops)
22,445 312 67 L ABD

KA3YZD (+KB3AFT)
12,624 220 48 L ABCD

Maryland-DC

K1RZ	157,174	564	178	S	ABCD9**EFI**
K3DNE	141,115	545	169	S	**ABCD9**E
K3ZO	38,316	412	93	S	**AB**
N3HBX	30,492	316	84	S	ABCD
K3HCE	13,969	189	61	S	ABD
N3VOP	10,560	197	44	S	ABD
N3II	10,074	219	46	S	AB
N3KNI	8,344	115	56	S	ABCD9
W6AXX	3,942	146	27	S	B
KA3TCC	3,729	101	33	S	ABD
W3GN	2,772	84	33	S	AB
WA4PRR	2,320	73	29	S	ABD
W2KBR	572	44	13	S	A
WB3KDB	57	19	3	S	B

W3IP (+N3CBJ,K3MLA,WA3TID,WG3R,N6OBP, K3HH,W3NLB)
101,508 593 132 L ABCD

N3UMA (+AA3LE,AA3KY)
3,248 112 29 L AB

Western Pennsylvania

KA1ZE	117,876	439	188	S	**ABCD9EFG**
KA3SDP	12,978	145	63	S	ABCD
AA3GM	7,040	96	55	S	ABCD
W3ZA	255	17	15	S	AB
WG3E	240	20	12	S	AB
N3YVG	204	17	12	S	A
WB0IWG	12	4	3	Q	AB

N3PUR (+K3MD)
21,160 188 92 M ABCDE

W3YA (K3VOT,WA3ENK,W3ZZO,K3CM,K3JRS, KF3CA,N3EB,KE3HL,ops)
14,490 187 69 M ABD

W3YOZ (+KA3EJJ,K4VV,WR3Z)
54,483 368 127 L ABD

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Alabama

KU4IU	16,235	191	85	S	**AB**
KU4WW	5,712	112	51	S	AB
AJ4W	2,747	65	41	S	AB**D**
AI4CW	1,508	50	29	Q	ABD

KV4T (+KS4YT)
3,960 85 44 M ABD

N4ION (+K4WXX,KS4B)
15,048 177 76 L ABD

Georgia

KD4HLG	27,927	242	87	S	**ABCDE**
KD4K	9,454	124	58	S	ABCD
K4KAZ	1,431	41	27	S	ABCD
W4AMP	288	24	12	S	ABD
K4BAI	16	4	4	S	A

K4RF (+K4EA,K4TW)
78,400 401 160 M ABCD9E

K4SZ (+KF4OTV)
4,165 83 35 M ABCD9E

Kentucky

W4FVQ	16,112	147	76	S	A**BCD9E**
KF4RAV	5,559	109	51	S	**AB**
N4JK	4,324	86	46	S	ABCD
KY4SA	2,553	60	37	S	ABD
KE4WDZ	1,815	55	33	S	A
AK4U	476	28	17	S	B
KD4EVB	390	26	15	Q	AB

N4GN (+N4OKX)
42,837 283 131 M ABDGHI

North Carolina

K4QI	68,248	334	152	S	**ABDE**
W4VHH	8,673	90	59	S	BDE**FG**
KE4DGI	2,145	65	33	S	A
N4AJF	1,539	55	27	S	ABD
W4SKI	1,215	43	27	Q	ABD

AA4ZZ (+K2SD,K4DXA,KA4YMY,W4MW)
150,920 635 196 L ABCD

N4ILM (KE4LKC,KD4GHB,KG4CYB,KD4JRX, K4GMP,KG4AKV,KD4BFQ,W4EBR,KE4OXQ, KE4BMY,KD4LYW,ops)
925 34 25 L ABD

Northern Florida

NX4E	7,788	103	59	S	A**BD**E
W2BZY	6,660	117	45	S	A**BCD9**E
KE4YYD	2,294	67	31	S	A**BD**
WD4FAB	1,360	51	17	S	B**DE**
N1RT	665	35	19	S	AB
KB4CRT	384	24	16	S	AB
KX5U	1	1	1	S	A

Puerto Rico

KP4IT	264	38	6	S	B**CD**
WP4LNY	236	55	4	S	**BD**

South Carolina

KR4QO	14,080	148	80	S	**ABCD**
N4UFP	3,276	67	42	S	ABCD
K4AIR	286	26	11	S	B
K4WJV	88	11	8	S	A

Southern Florida

WB2WIH	10,149	162	51	S	**ABCD**
K0VXM	3,375	79	27	S	ABCD**9EF**
KF4KSN	560	34	16	S	ABD
N4BP	264	33	8	S	AB

Tennessee

N8UM	83,456	408	163	S	**ABCD9E**
NS4W	27,140	225	92	S	ABCD
KD4HIK	17,091	178	81	S	ABCD
AD4F	4,056	83	39	S	ABCD
WB4ZUG	2,263	61	31	S	ABD
AB8DY	1,320	56	22	S	ABD
KG4BMH	1,197	57	21	S	B
KC5RCZ	336	37	8	S	BD
KC8MHP	300	25	12	S	AB

Virginia

W4RX	106,335	582	153	S	**ABCD**E
K4RTS	32,218	228	89	S	ABCD**9E**
N4MM	15,372	222	61	S	ABD
KN4SM	13,321	141	77	S	ABD
K4FTO	8,722	139	49	S	ABCD
N4CH	6,987	137	51	S	A
KC4AUF	5,040	98	40	S	ABCDE
AD4TJ	3,663	111	33	S	AB
K4SO	2,599	113	23	S	B
K4FJW	1,075	43	25	S	AB
N3RC	1,045	52	19	S	ABD
K4ME	480	32	15	S	B
W2YE	180	20	9	S	A

W4IY (+W4CE,KA4RRU,W4DC,W4NF,K0RI, W4RM,WA0DYJ,W4AD,K4RG,N4DXS,KG4DFJ)
252,096 983 202 L ABCD

W4COV (WA4PGI,AD4HG,KF4MUC,KK4IY, KI4BH,KG4AFC,KC4ZTE,KE4DDM,KE4UUH, KN4FT,VE2HX,KG4DQD,KF4YLM,KQ4NW, KG4BPU,KB4TZS,WA4UVA,ops)
28,747 292 89 L ABDE

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Arkansas

W5HUQ	16,300	147	100	S	A**B**CDE
W5ZN	12,225	93	75	S	A**BCD9EFGHI**
N5FAC	2,457	47	39	S	**BD**
KC5BYT	403	13	13	S	ABCD9EFGHI
KB5YIQ	403	13	13	S	ABCD9EFGHI

Louisiana

WA5RT	14,337	166	81	S	**ABD**
N5MYH	3,871	72	49	S	ABD
W5CTV	1,769	59	29	S	ABD
KC5QAY	720	36	20	S	AB
W5FYZ	416	26	16	S	B
K5CZD	216	17	12	S	ABD

Mississippi

KJ5RC	1,518	46	33	S	**A**
K5MLW	42	7	6	S	A
N3AWS	16	4	4	S	A

New Mexico

K5AM	99,800	484	200	S	ABCD
N5JHV	85,084	478	178	S	A**B**
K9RU	44,408	296	122	S	AB**CDE**
K5RHR	27,615	227	105	S	A**BCD**
N6ZZ	13,200	176	75	S	A
N5XZM	9,515	124	55	S	ABCD**9**E
W5DO	3,015	64	45	S	ABD
W5FF	1,995	57	35	S	A
KB5ZSK	1,476	58	18	S	ABCDE
K5TEE	957	56	11	S	BCD
WB5YYX	480	26	15	S	ABD

North Texas

W8CM	118,030	491	185	S	**ABCD9E**
W5SXD	35,501	240	131	S	ABCDE
WD5K	16,562	182	91	S	A
K5LOW	14,013	150	81	S	ABD
N5NJ	10,608	146	68	S	ABD

WA5BU (N5VHO,KD5ANZ,ops)
8,064 125 63 L ABD

Oklahoma

K5HP	18,291	189	91	S	**ABD**
WD5AGO	4,600	73	50	Q	ABCDE

South Texas

K5IUA	146,664	482	216	S	AB**CD9EFG**
N5WS	83,544	379	177	S	A**B**CD9E
W5UWB	66,096	395	153	S	A**B**CDE
N5HHS	62,777	406	143	S	ABD
W3XO/5	61,230	338	157	S	ABCD9E
W3UUM	18,723	192	79	S	ABCDE
N5BA	12,670	145	70	S	ABCD
AA5XE	9,398	127	74	S	A
K5DGU	9,075	121	75	S	AB
K5IX	8,509	123	67	S	ABD

N5XU (KA5WSS,op)
7,332 132 47 S ABCD

KC5FP	5,940	96	60	S	ABD
WA5IYX	5,880	105	56	S	A
KM5TY	4,042	94	43	S	A
KA5GLX	2,336	67	32	S	ABD
KA5EYH	720	36	20	S	AB
AJ4F	80	16	5	S	B
K0RDS	56	8	7	S	A

W5KFT (+KM5FA,N5RZ,K5TR)
148,626 618 207 L ABCD

West Texas

KK5IH (+KK5KK)
63,008 316 176 M ABCDE

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East Bay

KF6GYM	27,740	264	76	S	AB**CDE**
W6OMF	18,291	186	67	S	A**B**CDE
KQ6DI	1,512	54	14	S	**C**
KE6QR	1,020	57	17	S	ABD
K6VXY	564	47	12	S	AB
WB6ETY	15	4	3	S	BD

KG6HM (+AC6T)
1,462 86 17 L AB

Los Angeles

KQ6QW	49,440	467	80	S	A**BC**D
N6KN	43,218	353	98	S	**A**BCD
KE6FCT	34,353	280	99	S	ABC**D**
W6AQ	30,552	291	76	S	ABCD**E**
K6SYW	12,737	207	47	S	ABCD
W7IXL	12,314	235	47	S	ABD
KD6RUH	7,750	168	31	S	ABCD
W6IST	7,409	170	31	S	ABCD
KE6AXJ	5,738	185	19	S	ABCD
KD6CML	5,328	147	24	S	ABCD
KE6MAS	4,840	165	20	S	ABCDE
WA6BIL	3,663	111	33	S	AB
K6SE	2,448	68	36	S	A
AC6EN	2,266	80	22	S	ABCD
KO6VG	1,010	67	10	S	BCD

W6YRA (WA6AYI,op)
938 51 14 S ABD

N6LL	686	49	14	S	A
KF6BYM	360	22	10	S	BCD
K6LMN	11,956	199	49	Q	ABCD
N6JO	11,568	156	48	Q	ABCDE
KQ6EE	2,070	97	15	Q	ABCD

W3SE (+N6OPR)
153,446 778 146 M ABCD9E

KF6RDO (+W6PPT,KF6SWI)
26,001 273 81 L ABCD

Orange

N6HKF	101,010	549	130	S	A**BCD**E
K6TSK	61,311	389	107	S	A**BCD**E
K6IBY	21,372	189	78	S	ABCD
KF6HAM	20,181	187	93	S	ABCD
N6KZB	14,960	210	55	S	ABCDE
W6ZQ	11,180	216	43	S	ABCDE
KC6UIX	8,832	138	64	S	AB
KC4KK/6	8,736	224	39	S	AB
KE6GFF	7,380	205	18	S	**D**
KR6VV	7,072	150	34	S	ABCD
N6VHF	3,576	115	24	S	BD
KE6GFI	3,366	136	22	S	BD
KD6UIH	1,610	50	23	S	ABCD
KN6VR	1,566	65	18	S	BE
KF6XA	1,536	64	24	S	AB
K6QUE	1,012	68	11	S	BD
KE6QCB	273	33	7	S	BD
KC6TMB	12,992	166	56	Q	ABCDE
AC6XK	3,077	128	17	Q	BCD
KQ6BS	1,441	131	11	Q	B
KF6WHS	15	5	3	Q	B

W6TOI (KB6WKT,N6TEB,KE6HPZ,AD6HT, KD6PUI,KF6MDF,ops)
170,534 699 182 M ABCD9E

Pacific

NH6YK	408	41	8	S	A**BD**
AH6TM	248	26	8	S	ABD
KH6HME	160	20	8	S	**AB**
KH6/KF4SGA	60	8	6	S	ABD
WH6TF	24	8	3	S	B

Santa Barbara

N6PI	46,134	344	99	S	**ABCD9**
WB6AAG	35,616	250	106	S	ABCD**E**
KE6RCI	2,312	114	17	S	BD

W6FM (K6LVR,K6YR,W6ZIP,W6WE,W6FJL, KQ6XL,KD6NRU,AD6EA,W9EC,ops)
80,656 434 142 M ABCDE

K6WLC (+K0BGL)
41,258 308 98 M ABCD9EJP

W2ODH/6 (+K1SG,K6KWQ,KF6UBB,N6RMJ, N6ZE,WA6DJS)
376,068 1253 231 L ABCD

W6LKF (K7RR,W6YY,AB6BO,KE6JUN,ops)
3,735 70 45 L ABD

Santa Clara Valley

W6GYD	11,132	175	46	S	AB**CD**E
N6JET	7,056	107	49	S	ABCD**E**
N6IIU	2,380	85	28	S	**A**
KD6PAO	1,088	68	16	S	**B**

K6ARP (KB6HRB,N6JXL,KC6UCN,N6VYT, KE6YDG,N6ZGY,ops)
63,070 419 106 M ABCDE

K6PVJ (KO6MX,KF6MXK,KF6HFL, KE6HCK,KE6HNY,ops)
5,650 159 25 M BCD

AA6PA (+AB6SO,N6DOK)
3,528 71 28 M ABCDE

K6PUD (+KQ6OB,KC6SBJ,N6IV,N6DE, KF6QXN,N6FFC)
29,888 349 64 L ABDE

San Diego

KF6JBB	16,884	218	63	S	**AB**CD
KD6EFQ	9,238	192	31	S	AB**CD**
W6EEB	2,538	87	27	S	ABD
K6IAH	1,311	52	23	S	ABD
WB6AXW	220	19	10	S	ABC
KF6JXM	96	11	8	S	ABD

KE6NRO (+K6CYS)
36,050 277 103 M ABCDE

W6PT (N7CW,KD6QK,W6NXS,ops)
32,980 381 85 L ABD

WB6DTA (+K6DYD)
27,063 246 93 L ABCD

W6RDF (KO6ET,KQ6NU,ops)
243 25 9 L AC

San Francisco

WN6W	299	23	13	S	**A**
K6PZB	77	11	7	S	**B**

W6MMM (WD6HDY,KD6LTB,WB9NJS,W6TLK, WA6KLK,KB6OFY,ops)
95,892 539 122 M ABCDE

San Joaquin Valley

N6AJ	36,064	241	98	S	**ABCD9E**
K6YK	11,373	159	51	S	ABCD
KM6WO	1,518	66	23	S	AB
K6YOS	646	38	17	S	AB

KF6CNV 567 63 9 S B
W6TE (+N6XP,K6MI,N1VM,WA6LUT)
34,944 260 91 M ABCD9EI
WA6SEK (+K6QG,W6RMR,KE6ZNQ,KC6TTZ,
KF6CDR) 17,516 208 58 M ABCDE

Sacramento Valley

N6KBX 40,255 281 97 S ABCDE
WB6NTL 32,164 250 86 S AB**DE**
KC6ZWT 20,246 254 53 S **BCD**
KD6VNQ 7,380 139 45 S ABC
N6YBZ 3,458 102 26 S ABCD
NZ6N 2,387 53 31 S ABCDE
W6YM (+K6FEE,K6KLY)
73,472 466 112 M ABCDE
KC6TEU (+WA6TMJ,WA5YWC)
55,080 394 102 M ABCDE

7

Arizona

W7CS 41,985 299 135 S **ABE**
AA7A 36,600 285 120 S ABD
KE7FC 35,500 247 125 S **ABCD**E
K1SC 7,260 121 60 S A
N7SKT 7,040 100 64 S ABD
KD7AHO 3,870 80 45 S ABCD
WB4LDS 3,569 79 43 S ABD
WB7OHF 2,581 81 29 S ABCD
NX7U 1,664 59 26 S ABD
KF7JS 936 32 24 S ABD
W7GZ 740 28 20 S ABCD
WA7VHF 2,378 72 29 Q ABD
WA9TKK (+N6QIX)
3,920 93 35 M ABCDE
WA7JTM (+N7AMA,WW7B)
61,341 347 161 L ABCD
KF7NP (+NU8I,KE7OT)
47,520 323 132 L ABCD

Eastern Washington

N7AU 21,755 190 95 S **ABCD**E
KC7VNA 7,645 93 55 S ABCD**9E**
W7JHS 2,664 58 37 S ABD
W6LLP 50 10 5 S B
K7XW (+W7FHI,KC7OYY)
31,200 224 100 M ABCD9E

Idaho

KC7IJ 14,532 173 84 S **AB**
N7EIJ 9,088 131 64 S AB**D**
KJ7TH 3,030 79 30 S ABD**E**
KA7GUX 2,240 57 35 S ABD
W7ID 2,205 57 35 S ABD
K7MAC 1,377 51 27 S **AB**
K0IP 1,302 42 31 S AB

Montana

N7ML 44,831 353 127 S **A**
K7KX (+K7CW)
45,195 342 131 L ABD

Nevada

K7ICW 32,967 247 111 S **ABCDE**
N7LQ (+K7UI,KB7UIF,AE7I)
83,304 386 178 M ABCDE
NW7O (+W7TVF)
13,485 146 87 M ABD
W7KK (+K7XC,N6IFW)
47,158 297 146 L ABCD

Oregon

W7EW 27,048 264 92 S **ABCD**
N7DB 13,804 187 68 S ABCD
W7DSA 5,590 107 43 S ABCD**E**
WA7TDU 2,006 59 34 S A
K7HSJ 1,782 58 27 S ABCD**E**
KC7QIK 1,224 59 18 S ABD
KA7EXM 140 20 7 Q AB
W7IY (+WB6FFC,W5HVK)
11,277 151 63 L ABDE
K7TM (+N7LKA)
8,684 147 52 L ABD
K7ZZZ (KI7WB,K9QAM,K7SQ,K4XU,ops)
6,120 90 68 L AB
W7QH (+W7IK)
4,797 103 39 L ABCD

Utah

NJ7A 1,932 55 23 S ABC**D9E**
K7LNP 1,554 47 21 S **ABCD**9E
N7MLD 260 20 13 S **AB**
KK7IG (+K7LNP,NJ7A)
11,025 161 63 L ABCDE

Western Washington

K7ND 36,828 278 93 S AB**CD9E**
KE7SW 33,432 263 84 S **ABCD**9E**GH**
K7XD 20,325 230 75 S **ABCDE**
N4SL 3,808 106 34 S ABD
W3JPT 3,562 125 26 S ABD
KD7DLV 1,207 61 17 S ABD
WA7SKT 735 35 21 S AB

8

Michigan

K8MD 74,443 376 151 S ABC**D9E**
K2YAZ 63,655 305 145 S **ABCD9EF**
KB8O 25,290 231 90 S ABD
W8CO 11,880 216 55 S **A**
KC8JTK 5,376 113 42 S ABC
N8ZVB 3,478 94 37 S AB
K8PNW 2,136 61 24 S BDE
N8IA 1,440 46 30 S ABD
WA8YLZ 81 9 9 S A
WW8M (+K8DAZ,NE8I,WA8VPD)
165,981 451 183 M ABCD9EFGHIJK
W8ZNT (+N8DMG,KG8IE)
11,220 188 55 L ABD
K8CAD (WB8WIV,WA8MIL,KI8AU,N8NJA,
WB8JLO,KB8GC,WA8LT,ops)
5,800 104 50 L ABD

Ohio

KE8FD 144,313 433 221 S **ABCD9EF**
K8TQK 133,101 406 207 S ABCD**9EFG**
WA8RJF 55,675 264 131 S ABCD9EFG**H**
K8MR 11,799 171 69 S AB
WB8AUK 11,151 133 63 S ABCD
KC8CSD 6,552 91 56 S ABCD
W8CAR 2,870 82 35 S AB
KB8TJX 2,475 53 33 S ABCDE
WA8RCN 850 50 17 S AB
KC8CFI 629 27 17 S BD
N8VEA 580 27 20 S ABD
W8WG 126 14 9 S AB
N8XA 6,174 89 49 Q ABCD9E
N8ZM (+W8PLZ,KD8FO,N8IDS,N8KXH)
48,375 307 125 M ABCDE
KC8AAV (N8MWK,N8UVM,N8CKP,W8LXC,
KB8UUD,KA8LGK,KI8CA,KC8HXQ,N8TRK,
WD8LWC,WA8EBE,KB8YPU,KC8HKL,ops)
6,039 91 61 L ABD

West Virginia

K2UOP/8 104,104 432 154 S **ABCD9EF**
W4EUH 30,972 270 87 S ABCD
N8XUR 16,434 209 66 S ABCD9E
K8UC 5,720 77 52 S ABCDE
K8KFJ 2,196 61 36 S A
W8PT 1,148 41 28 S A
K8GP(K1RA,K1HTV,KA1TB,K3SX,W3ZZ,N4UK,
W4XP,K6LEW,K8ISK,ops)
1,214,750 1895 430 M ABCD9EFGHIJP

9

Illinois

K9PW 300,040 784 260 S **ABCD9EFGHI**
N2BJ 101,970 454 165 S ABCD9E
K2DRH 75,524 389 158 S ABCD
N9GH 26,036 197 92 S ABCDE
WB9Z 20,661 210 97 S ABD
KA9CFD 9,520 102 80 S ABCD
N9TF 9,360 145 52 S ABCD
K9YR 6,336 118 48 S ABCD
W9JXN 4,290 111 30 S BCD
WS9V 1,470 49 30 S A
KB9MLA 1,240 62 20 S AB
WO9S 1,188 54 22 S AB
W9SE 884 34 26 S A
N9HET 810 45 18 S B
N9TZO 720 30 24 S AB
W9SZ 286 17 13 S BD
W9GKA 8,320 114 65 Q ABCD

Indiana

K9EA 33,814 270 106 S A**BD**
K8LEE 27,600 300 92 S **A**
AA9LT 9,804 126 76 S ABCD
N9MZF 6,528 109 51 S ABD
KB9NKM 5,643 99 57 S AB
N8LUX 5,151 86 51 S ABD
N9QX 3,160 70 40 S AB**CD**
WB9DRB 2,112 53 33 S AB**CD**
K9GPS 874 46 19 S AB
K9FOH 814 37 22 S A
W9ICE (WB9YCZ,WB8ERB,N8NQG,N9QQY,
K9YDO,N8JLZ,KA9BFM,KB9NWP,KG9OP,ops)
192,240 621 240 M ABCDE

Wisconsin

W9GA 50,142 306 122 S **ABCDE**
N9DG 16,240 183 80 S ABD
ND9Z 12,308 134 68 S ABCDE
WA9LZM 11,310 128 78 S ABD
N9ISN 10,586 144 67 S ABD
KE9RY 9,240 165 56 S AB
KC5AWL 3,686 90 38 S ABD
W9YCV 2,664 67 36 S ABD
N9NDP 1,680 70 24 S AB
W9PHJ 1,357 59 23 S AB
WA9PWP 1,320 44 30 S AB
W0UC (+K0GJX,KB9SHM,N0AKC,N0UR,W0OHU,
W0VB,WB9QNX)
200,618 645 242 M ABCD9EI

0

Colorado

K0GU 117,832 519 206 S **ABCD**
K0YW 22,374 198 113 S A
K0RZ 21,760 181 68 S ABCD**9EI**
W3DHJ 7,854 119 66 S AB
K0CS 6,272 112 56 S A
N0OLX 2,400 67 30 S ABD
NN5DX/0 2,176 52 34 S AB9
N0FCK 858 33 26 S A
W1XE (+K0CL,N0KE,WB0GAZ,N0DVL,N0BRI)
253,129 701 269 M ABCD9EI
W0KVA (+N0WBW,W0KU)
44,577 314 117 M ABCDEI
W0ETT (+KC0GBC)
2,375 78 25 M ABDE

Iowa

K0KD 49,056 249 146 S AB**CD9E**
KM0T 31,204 237 116 S A**BD**
K0MQS 10,492 172 61 S **B**
NE0P 4,802 79 49 S ABCD
AB0HF 3,276 78 42 S AB
KC0DBO (+KC0AYG)
18 6 3 M AB

Kansas

N0LL 71,378 325 178 S AB**CDEJ**
KA0MR 23,712 191 104 S ABCDE
N0KQY 22,932 184 98 S A**BD**E
W0RT 2,268 60 36 S ABD
K0ZN 1,020 51 20 S AB
KC0AHN (KB0YHU,KB0OPH,KB0YHT,KB0YWM,
KC0BVX,KC0EMK,ops)
4,446 100 39 L ABDE

Minnesota

KB0VUK 59,492 306 139 S **ABCDE**
WA0BWE 33,345 229 95 S ABCD**9EGH**
WA2HFI/0 16,080 140 80 S ABCD9E
W0OHU 12,672 133 72 S ABD
N0SRQ 7,345 95 65 S ABD
KB0ZEV 4,810 103 37 S ABCD
W0PHD 4,324 66 47 S ABDE
KC0P 3,210 74 30 S ABCDE
KB0LYL 2,100 150 14 S B
KB0OBT 1,360 73 16 S ABD
WB0LJC 750 49 10 S BC9E
N0UK (+WA2PHW,WB0GGM,W0ZQ)
97,970 419 194 L ABCD
KB0PYO (+KB0IKP)
14,280 147 85 L ABCD

Missouri

W0JRP 3,264 64 51 S **AB**
KA0GGI 1,953 54 31 S **BD**

North Dakota

K0ND (WV0H,WB0OAJ,KC0BVL,ops)
32,634 250 126 L ABCD

Nebraska

KA0ABA 4,752 92 48 S A**BD**
AE0G 1,080 40 27 S **AB**
KC7KDZ 416 26 16 S AB
W0FRN (+N1EKV)
962 37 26 L AB

South Dakota

WB0ULX 3,060 63 45 S A**BD**
WB0HHM 3,024 60 36 S **ABCD**
W0GC 375 20 15 S ABD
KI0BV 104 13 8 S A
W7XU (+WD0T,W0SD,W0DB)
249,084 690 306 L ABCD

Quebec

VE2PIJ 13,068 154 66 S **ABC**D
VE2XX 5,499 81 47 S ABC**DE**
VE2ZP 1,508 52 29 S AB
VE2SHW 48 24 2 S B
VE2CUA (VE2HFX,VA2JWR,ops)
1,020 40 20 L ABCD

Ontario

VA3ST 39,183 246 111 S **ABCD**
VE3OJN 14,399 135 77 S ABCDE**IP**
VA3FIN 10,855 122 65 S ABCD
VE3DBF 8,745 125 53 S ABD**E**
VE3FHU 7,714 104 58 S ABCDE
VE3SXE 5,376 112 48 S AB
VE3BFM 1,682 40 29 S ABCD**9**
VE3RM 1,431 53 27 S **A**
VE3CWJ 713 26 23 S ABCD
VA3AEC (+VE3TMG)
16,905 183 69 L ABCD

Alberta

VE6JW (+VE6MK,VE6LDX,VE6JY)
9,990 147 54 L ABDI
VE6LDN (+VE6EKP)
4,048 81 46 L ABD

British Columbia

VE7DXG 14,795 228 55 S **ABD**
VE7SKA 6,594 145 42 S ABD
VE7AGG 6,068 148 41 S AB
VE7VDX 4,116 130 28 S ABD
VE4AKX 1,924 50 37 S ABD

Bahamas

C6AKL (WB8XX,op)
25 5 5 S **A**

Cuba

CO0VHF (CO2WF,CO2CW,CO2KK,CM2CE,
CM2KL,ops)
2,499 146 17 L ABD

Mexico

XE2/N6XQ 37,324 330 86 S **ABCDE**
XE2HWB 640 37 16 S ABD
XE2/NF6L (+K6FQ,N6MU)
11,096 152 73 M AB

Rovers

Atlantic

W2FU 174,903 574 173 R 6 ABCD9EFGHI
W3EKT (+K3IXD)
147,610 729 145 R 4 ABCD9E
KA2CKI (+KV2X)
59,052 366 111 R 6 ABCD9EFG
K3QII (+W3IKE)
6,594 96 42 R 4 ABCD9E
N2VJV (+KB2SGX)
2,546 65 38 R 4 ABD
K8MR/R 414 23 18 R 6 B
N3ZYL 407 18 11 R 6 BDE

Central

WB9SNR 57,152 299 94 R 8 ABCD9EFGHI
K9JK (+AA5UK)
51,920 273 118 R 8 ABCD9EFGH
N9GH 40,480 292 88 R 6 ABCDE
N9KS 13,500 180 75 R 8 AB
N9RLA (+N9RMJ)
6,200 111 50 R 2 ABD

Dakota

N0BEL (+KB0NES)
3,848 84 37 R 4 ABCDE

Delta

NT4L (KQ4TV,KB4IDC,ops)
22,480 223 80 R 7 ABCDE
KD4NOQ 16,093 183 77 R 7 ABD

Great Lakes

AB4CR (+KF4TUK)
255,635 582 215 R 12 ABCD9EFGHIJ
N4STK 91,350 224 145 R 13 ABCD9EFGHIJ
KF9US 68,808 341 122 R 8 ABCD9EI
K8WW (+KB8ZW)
65,010 420 110 R 8 ABCDE
AA4R 15,521 184 83 R 4 ABD

Hudson

N2OPJ (+KB2YZA)
1,768 90 17 R 4 ABCD
KF2XY 506 29 11 R 2 ABD9
WA2SDO 440 33 11 R 4 BD

Midwest

AL7PO 65,835 385 171 R 17 AB
N0KE (+KB0LRR)
37,848 283 114 R 9 ABCDE
KB0YFN (KB0WPY)
33,810 291 115 R 6 ABD
N3KKM 10,792 126 71 R 4 ABCDE
KB0QGT 7,638 114 67 R 8 AB
K0DAS (+N0LNO)
5,152 91 46 R 4 ABD9

New England

N1MJD (+N1JEZ)
99,440 673 110 R 11 ABCD9E
N1QVE (+N1QDQ)
35,136 349 64 R 5 ABCD9EI
N1ISB 13,332 237 44 R 6 ABCD9EFHI
KJ1K (+WB2VVQ)
10,665 140 45 R 6 ABCD9EFGH

Northwestern

WB7RBJ 53,457 425 103 R 23 ABCD9
AA7VT 19,688 283 46 R 6 ABCD9EGH
K7UV 8,052 122 66 R 4 AB
KC7WGS 3,638 95 34 R 9 ABD
N7CFO 3,542 68 46 R 6 ABD
W7HOF 1,551 47 33 R 3 AB

Pacific

N6NB (+N6MU)
90,552 537 132 R 8 ABCDE
K7XC 65,727 470 109 R 18 ABCD
KB7PQW 30,485 259 91 R 26 ABCD
N6IFW 28,400 321 71 R 12 ABD
N7TUA 14,280 150 70 R 18 ABD
N6DHN 13,034 212 49 R 3 ABCDE
W7KK 10,080 164 48 R 9 ABCD
KB6OLL (+KC6UDS)
2,266 61 22 R 6 BCD
KA6AMD 1,890 54 35 R 9 B

Roanoke

ND3F 148,257 479 153 R 12 ABCD9EFGHIP
N4OFA 16,425 183 75 R 6 ABCD
KC4ZRH (+KD4GAR)
15,150 169 75 R 5 ABCD
WB3AKD 8,865 197 45 R 4 AB
KS4S 4,450 89 50 R 4 A
KC4YHI 2,380 68 35 R 5 AB

Rocky Mountain

KC5YXB 5,488 105 49 R 2 ABD

Southeastern

K4GSX 588 28 21 R 2 A

Southwestern

KC6WLC (+KD6WZR)
16,182 171 58 R 9 ABCDE
N6VHF 12,690 233 47 R 3 ABD
N7QJP 6,231 160 31 R 6 ABD
AD6AF 2,240 98 16 R 4 ABD
KQ6BS 1,089 121 9 R 2 B
KF6JXM 60 9 6 R 2 ABD

West Gulf

W5DF (+AB5SS)
66,920 326 140 R 11 ABCD9EHP
K5UHF (+KD4JDT)
60,324 394 132 R 8 ABCD9E
N5VBK (+KB5VPR)
52,245 338 135 R 11 ABCD
WB5VYE (+K5OT)
52,197 302 137 R 10 ABCD9E
WD5AGO 17,372 185 86 R 6 ABD

Canada

VE3OIK (+VE3SMA)
38,592 229 96 R 5 ABCD9EFGI
VE3NPB (+VE3OIL)
37,152 294 96 R 9 ABCDEG
VE7DXG (+VE7DDR)
27,816 312 76 R 3 ABD
VE6AQE (+VE6MK)
7,038 123 51 R 5 ABD
VE6TC 2,208 71 24 R 4 ABDE

Checklogs:

YC2OK, KB8CCD,VE3IQ, K6NTZ, N5WDZ, W1CPC, K5MAT, TI5KD, N1ZUK, W3RJW (WB3KRW,op), NE1S, K6PHE, W3EP,K0PG, KC5YOV, K3PG, K2SZ,N3ZTZ,VE1ZJ, WA4OFS,N1NJB

Please see Revised "Rover" Scores in the March issue of *QST*.

By Dan Henderson, N1ND
Contest Branch Manager

1999 ARRL UHF Contest Results

Floating a trial balloon can sometimes be risky...or beneficial. Last July 1999 we published the rules for the 1999 ARRL UHF Contest. In the announcement we floated a trial balloon by asking hams to take a look at the future of the contest. Many thanks go to those who responded with thoughtful comments.

The response to the call to "get involved" was outstanding. The 249 logs received in 1999 ties the record for the most logs ever submitted for this event (set back in 1994). It represents an increase of 51% from last year!

Not only was participation up, scores were up. All three overall scoring records fell. WA8WZG set a new single-operator record score with 350,424 points. The W2SZ/1 multi-operator crew racked up a new record of 793,254 points. Finally, the new rover high-water mark was established by K9PW with a score of 153,816. Each of

Matt, K0UK, set up his contest station in a Minnesota cornfield.

Inside the tiny camping trailer, provided by N0KQG, was K0UK's wall-to-wall station!

Scores

Each line score lists call sign, score, stations worked, multipliers, entry category (S = single operator, M = multi-operator, R = rover), ARRL/RAC section, and bands (A= 50 MHz, B = 144 MHz, C = 222 MHz, D = 432 MHz, 9 = 902 MHz, E = 1296 MHz, F = 2304 MHz, G = 3456 MHz, H = 5760 MHz, I = 10 GHz. J = 24 GHz, K = 47 GHz, L = 75 GHz, M = 119 GHz, N = 142 GHz, O = 241 GHz, P = 300+ GHz). Band leaders are indicated in boldface type.

Atlantic

WA2FGK (K2LNS,op)						
	126,048	268	104	S	EPA	**CD9EFG**
K1RZ	33,294	126	62	S	MDC	CD9EF
W2SJ	22,317	107	43	S	SNJ	CD9EFG
W3ZZ	19,845	113	49	S	MDC	CD9E
WA2ONK	17,427	123	37	S	SNJ	CD9E
N3XEM	16,416	116	32	S	EPA	CD9EF
K3DNE	12,546	79	41	S	MDC	CD9E
NQ2O	11,280	70	40	S	WNY	CD9E
K8ZES	9,450	70	45	S	WNY	CD
N3RN	9,240	68	35	S	EPA	CD9EF
KB3IB	8,961	81	29	S	EPA	CD9E
K3GNC	6,699	63	29	S	EPA	CD9E
N3FA	4,698	50	27	S	EPA	CD9E
W3SZ	4,590	47	18	S	EPA	CDEF
K3HCE	3,402	63	18	S	MDC	D
K3IXD	3,306	50	19	S	MDC	CDE
KA3SDP	2,886	37	26	S	WPA	CD
K2AN	2,772	31	22	S	WNY	CD9E
NE3I	2,013	51	11	S	EPA	CDE
AA3GM	1,782	26	22	S	WPA	CDE
W3IP	1,014	26	13	S	MDC	CD
K3KEL	576	16	12	S	EPA	D
K1JT	483	23	7	S	SNJ	D
KZ3X	210	14	5	S	EPA	D
WB2WPM	189	9	7	S	WNY	C
K3DLA	72	6	4	S	WPA	D
W3IIT	72	8	3	S	EPA	CD
K3EO	63	7	3	S	MDC	D
N3JNX	36	6	2	S	EPA	D
WB1FXX	36	6	2	S	MDC	D
N2JMH	17,901	89	51	M	WNY	CD9EF
K2IWR (KB2FAF, N2MRE,ops)						
	270	10	9	M	WNY	CD
N3LJK (+K3YWY)						
	44,286	171	59	R	EPA	CD9EFI
W2FU	31,350	119	51	R	WNY	CD9EFGH
K1DS	9,324	79	28	R	EPA	CD9EFP

Central

K3SIW/9	140,616	180	126	S	IL	CD**9EFGHI**
W9FZ	38,475	128	75	S	WI	CD9EF
N2BJ	38,340	144	71	S	IL	C**D**9E
W9UD	21,321	95	69	S	IL	**C**D9
W0UC	18,144	88	54	S	WI	CD9EI
N9TF	6,528	64	34	S	IL	CD
N9GH	4,950	47	30	S	IL	CDE
ND9Z	4,275	48	25	S	WI	CDE
KA9CFD	3,906	42	31	S	IL	CD
K9YR	2,640	44	20	S	IL	CD
WA9LZM	1,248	26	16	S	WI	D
WD9EGE	1,218	21	14	S	WI	DEF
WA1MKE/9	1,083	19	19	S	IN	CD
AA9LT	561	17	11	S	IN	CD
W9SZ	540	13	12	S	IL	CDE
K9RQ	192	8	8	S	IN	D
AJ9K	108	6	6	S	WI	D
N9LAG (+N9KJE,KB9QQR,KB9QKL)						
	384	16	8	M	IL	CD
K9PW	153,816	248	104	R	WI	CD9EFGHI
WB9SNR	111,807	182	96	R	IL	CD9EFGHI
KF9US	16,632	96	37	R	IL	CD9E
K9JK/R	12,960	77	40	R	IL	CD9E
K0PG	6,840	50	40	R	IL	CDE
K9GEM	2,337	41	13	R	WI	D

Dakota

KB0VUK	13,038	84	42	S	MN	CD**E**
WA0BWE	12,705	82	35	S	MN	CD**9EFGH**
KF0UK	11,316	76	46	S	MN	**CD**9E
WB0LJC	5,340	59	20	S	MN	CD9EF**GHIP**
KA0PQW	3,969	49	27	S	MN	CD
WB0GGM	3,588	46	26	S	MN	CD
N0UK	3,468	54	17	S	MN	CD9E
WA2VOI	3,264	55	16	S	MN	CD9E
W0AUS	2,925	46	15	S	MN	CDEH**IJ**
W0OHU	2,835	45	21	S	MN	D
W0PHD	1,260	24	15	S	MN	DE

KE6GFF took his solar-powered operation to a hilltop above Laguna Beach, California.

Top Five

Single Operator

WA8WZG	350,424
WW8M	242,820
K3SIW/9	140,616
WA2FGK (K2LNS,op)	126,048
W5LUA	101,277

Multioperator

W2SZ/1	793,254
AA4ZZ	20,580
N2JMH	17,901
WD8USA	16,686
W2ODH/6	15,228

Rover

K9PW	153,816
WB9SNR	111,807
N1MJD	58,788
N3LJK	44,286
W2FU	31,350

the winning scores also represents new Division records. Special mention goes to WW8M who also broke the previous single operator record while finishing second.

Others that set new Division score marks included K3SIW/9 (Central single op), K1TEO (New England single op), WB6NTL (Pacific single op), W5LUA (West Gulf single op), N3LJK (Atlantic rover), W5ZN (Delta rover), N2UZQ (Hudson rover), N1MJD (New England rover), N3EUA (Rocky Mountain rover), and N6TEB (Southwestern rover). Congratulations to all of these operators—and to those who worked them!

In looking at the comments on the future of this contest, the most common remark referred to the cost and availability of equipment. Thanks to the ARRL Lab a new page was added to the ARRL Technical Information Service Web site. The page on "UHF and Microwave Equipment and Operating" has reprints of a few selected ARRL articles on microwave equipment, lists of manufacturers and suppliers of transverters and other UHF and microwave equipment along with a bibliography of a lot more articles from *QST*, *QEX*, *The ARRL Handbook* and other sources. Visit the page at **http://www.arrl.org/tis/info/uhf-mw.html** for help in finding less expensive ways to get on the higher UHF/microwave bands.

The next ARRL August UHF Contest will be held August 5-6, 2000. Our hope is to see this contest continue to develop a viable constituency among the UHF/microwave community.

N0HJZ (+IK1IYX)
7,872 76 32 M MN CDE

Delta

WB4JGG 1,296 27 16 S TN **CD**
AD4F 408 17 8 S TN CD
N5YLS 210 10 7 S MS D
KA4CHI 150 7 5 S TN D**E**
W4ZUG 81 9 3 S TN D
W4KGN 63 7 3 S TN CD
W5ZN 21,204 105 24 R AR CD9EFGHI

Great Lakes

WA8WZG 350,424 357 186 S OH **CD9EFGHI**
WW8M 242,820 307 142 S MI
CD9EF**GHIJK**
K2YAZ 37,230 117 73 S MI CD9EFGH
K8TQK 16,530 72 58 S OH CD9EFG
K8MD 9,159 60 43 S MI CD9E
N8XA 3,672 38 24 S OH CD9EI
WB8AUK 1,953 31 21 S OH CD
W4FVQ 1,350 18 18 S KY CD9E
KC8JTK 30 5 2 S MI C
N8VEA 24 4 2 S OH D
KC8DRK 15 5 1 S MI D
WD8USA (+WA8TON,WB8TGY,N8DGD, N8WVP,loggers)
16,686 87 54 M MI CDEF
N8PVT (+KC8ALA)
231 11 7 M MI D
NE8I 5,040 31 21 R MI CDEFGHIJK

Hudson

WA2ZFH 9,204 101 26 S NLI C**D**E
W2FCA 9,126 65 39 S ENY C**D**E
N3EMF 6,408 77 24 S ENY CD**9**E
K2ZD 2,592 48 16 S NNJ CDE
WB2WHD 2,184 40 14 S ENY CDE
N2GKM 1,020 34 10 S ENY CD
W2BEJ 720 16 12 S ENY CDE
K2AMI 714 34 7 S NNJ CD
K2RI 552 23 8 S ENY CD
N2MSS 528 10 8 S ENY CD**I**
K2ZZ 528 22 8 S ENY D
WA2QHL 315 15 7 S NNJ CD
KK3K/2 252 14 6 S NLI D
NB2V 195 13 5 S NLI D
W2VDI 120 6 5 S ENY D9
KC2DEM 84 7 4 S ENY D
K2OVS 72 8 3 S NLI D
WB2IDV 15 5 1 S NNJ D
KA2MCU 3 1 1 S ENY D
N2UZQ/R (+KB2VQS)
13,689 77 27 R ENY CD9EFGHIJ
WA2BAH (+KA2MCU)
6,912 50 24 R ENY CD9EFGI
N2MH 4,818 73 22 R NNJ CD

Midwest

K0KD 10,560 68 44 S IA **CD9E**
WQ0P 4,950 36 31 S KS CD9E**HI**
N0LL 1,782 23 22 S KS CDE

New England

K1TEO 95,202 261 86 S CT **CD9EFG**
K1UHF 54,441 191 69 S CT CD9EFI
K1TR 24,645 127 53 S NH CD9EF
K1DY 9,690 72 34 S ME CD9E
N1GJ 8,928 77 32 S EMA CD9E
W1PM 8,736 77 32 S EMA CDE
KU2A 8,640 81 32 S NH CD9E
K1VYU 6,156 60 27 S CT DE
WA1T 5,688 68 24 S NH CDE
AF1T 5,460 47 28 S NH CD9EI
W1AIM 4,032 42 28 S VT CDI
W1GRW 3,060 51 20 S CT CD
KA1EKR 1,170 25 13 S EMA CDE
W1GHZ 1,008 19 12 S VT **DI**
N1FUS 810 27 10 S WMA D
K1LPS 462 16 7 S VT DI
N1TMF 336 11 8 S EMA CDE
NM1K 162 9 6 S CT CD
W2SZ/1 (K1IM,KD2KT,N2XRE,W2ARQ,WS2B, K2JJB,N1SXY,N2YCA,WA1ZMS,KB0JWO,N2BNY, N2YZO,WA2AAU,KB2YQE,N2PA,N2ZVI, WA8USA,ops)
793,254 697 187 M WMA CD9EFGHIJ
W1QK (+K1PHG,W1QJ)
10,656 93 37 M CT CDE
N1DGF (+K1ZE)
5,964 63 28 M ME CD9E
WA2IID (+KB2SSS)
1,125 20 15 M VT CDE
N1MJD (+N1JEZ)
58,788 213 69 R VT CD9EF

Northwestern

K7ND 8,190 62 26 S WWA **CD9EF**
KE7SW 6,264 52 24 S WWA CD9EF**G**
N7MWV 2,475 26 15 S WWA DEF
N7EPD 357 17 7 S WWA CD
K7HSJ 90 5 5 S OR CD9
KK7AT 21 7 1 S ID D
N7DB 18 3 2 S OR CD
AA7VT (+KD7TS)
5,301 42 17 R WWA CD9EFGHI
NU7Z 5,124 42 14 R WWA CEFGI

Pacific

WB6NTL 8,100 85 27 S SV **CDE**
N6AJ 5,772 60 26 S SJV CD**9**E
N6KBX 5,727 72 23 S SV CDE
KC6ZWT 3,216 67 16 S SV CD
K6HEW 2,754 45 17 S EB CDE
N6JET 1,974 38 14 S SCV CDE
K6YK 1,224 34 12 S SJV CD
WA6HRK 576 22 8 S SCV CDE
KQ6DI 483 23 7 S EB C
W6ABW 126 21 2 S NV CD
N6XP 24 2 2 S SJV **9**

Roanoke

W3IY 25,905 134 55 S VA C**D**E
K4QI 24,072 103 59 S NC **DE**
K2UOP/8 20,670 103 53 S WV CD**9**E
W4VHH 5,307 41 29 S NC DE**FGI**
K4ZOO 5,220 54 29 S VA CDE
N4MW 3,519 39 23 S VA CD9EF
KC4AUF 2,820 43 20 S VA CDE
W4AD 2,268 34 18 S VA CDE
N8XUR 2,016 35 16 S WV CD9E
NK4Q 756 21 12 S NC D
WN3C 540 20 9 S VA D
W4FSO 450 15 10 S NC C
N4MM 210 10 7 S VA D
WU4W 189 7 7 S NC CDE
WS4Z 144 6 6 S NC CDE
W4FAL 144 8 6 S NC D
K4AIR 120 10 6 S SC D
KD4UZR 54 5 3 S NC CDE
W4IOJ 30 5 2 S NC D
N4AJF 3 1 1 S NC D
AA4ZZ (+W4MW)
20,580 116 49 M NC CD9EI
N4OFA (+KG4CWK,KG4BCW,AF4HX,KI4M)
10,824 79 4 M NC CD9E

Rocky Mountain

K0RZ 9,030 56 35 S CO **CD9EFI**
NJ7A 1,152 23 12 S UT CD9E**F**
N5XZM 759 19 11 S NM CDE
KC0COU 690 18 10 S CO DE
N0POH 459 17 9 S CO CD
K7LNP 420 15 7 S UT CD9E
KB5ZSK 330 21 5 S NM CDE
K5RHR (+N0IO)
429 11 11 M NM CDE
N0IO (+K5RHR)
210 9 7 M CO CDE
N3EUA (+WD0FHG)
3,240 42 16 R CO CD9E

Southeastern

K4RF 5,481 46 29 S GA CD9**EFG**
KD4HLG 2,829 41 23 S GA C**D**
K0VXM 2,208 30 16 S SFL CD9**EF**
WB4OMG 1,296 25 12 S SFL CDEF
K4SZ 561 15 11 S GA CD9E
K4KAZ 294 14 7 S GA CD
WB0QGH 126 6 7 R GA CD

Southwestern

N6HKF 10,050 110 25 S ORG **CDE**
K6TSK 9,360 106 24 S ORG CD**E**
WB6DTA 3,417 55 17 S ORG CDE
W6GGV 3,195 58 15 S LAX CDE
K6EHA 2,604 48 14 S LAX CDE
KE6GFF 2,133 79 9 S ORG **D**
K6IBY 1,680 40 14 S ORG CD
KE6MAS 1,584 42 11 S LAX CDE
N6PI 1,521 34 13 S SB CDE
KF6JBB 1,188 36 11 S SDG CD
W6IST 1,170 39 10 S LAX CD
KD6RUH 1,152 48 8 S LAX CD
K6AY 816 34 8 S LAX CD
KF6FZY 702 26 9 S ORG CD
N6KZB 616 23 11 S ORG CDE
K6OUE 525 35 5 S LAX D
KD6UIH 510 17 10 S ORG CD
KE6GUQ 315 15 7 S ORG CD
W7IXL 252 21 4 S LAX D
KE6GFI 153 17 3 S ORG D
K7KGB 105 5 5 S AZ CD**9**E
K6IAH 60 5 4 S SDG D
W5EEB 45 5 3 S SDG D
KE6QCB 36 6 2 S ORG D
W2ODH/6 (+N6RMJ)
15,228 120 36 M LAX CD9E
W6TOI (KB6WKT,KE6HPZ,N6VHF,ops)
12,267 115 29 M ORG CD9E
K6WLC (+K0BGL,KD6YOB)
7,797 92 23 M SB CDE
N6TEB 7,140 115 17 R LAX CDE
N6DN (+W6KK)
4,944 103 16 R ORG CD
KA6T 1,440 29 12 R LAX CE

West Gulf

W5LUA 101,277 143 99 S NTX **CD9EFGHI**
AA5C 22,842 74 47 S NTX CD9EFGHI
WA5TKU 6,264 41 24 S NTX CDEFGHI
WA5VKS 2,025 38 15 S NTX CDE
W5UWB 1,488 27 16 S STX CDE
K5VH 1,482 23 19 S STX CDF
K5SW 1,296 23 16 S OK CDE
K4YA 1,170 22 15 OK CDE
WD5AGO 720 12 10 S OK CDEH**P**
N5BA 495 15 11 S STX CD
KM5OL 198 11 6 S NTX D
KK5IH (+KK5KK)
756 16 14 M WTX CDE
N5QGH 21,918 128 26 R NTX CD9EFHI

Canada

VA3ST 12,150 90 45 S ON **CD**
VE3SMA 2,268 33 21 S ON CD**E**
VE3BFM 1,653 27 19 S ON CD**9**
VE4KQ 1,215 24 15 S MB CDE
VE3NPB 1,152 24 16 S ON CD
VA3AEC 1,134 27 14 S ON CD
VE6TA 84 4 4 S AB C**E**

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—Section Web site: gographics.com\randall\secpage.htm. Be sure to mark your calendars for the first full weekend in Feb (Feb 5 and 6, 2000). This is the date for annual Delaware QSO Party, sponsored by the FSARC. For rules, see their Web site at WWW.FSARC.ORG or drop me an e-mail and I will forward you a copy. The QSO party was re-instituted in 1997 after a long absence, and has a small but growing number of participants. We are even getting a cast of regulars from outside the state, they all agree that more Delaware hams need to participate. It would be nice to have a really good showing of Delaware Hams on the bands that weekend. If you do work the event, even if only for a couple of contacts, please send in your logs. It's important to let the FSARC club know that the event is worth putting on. Traffic (Oct) DTN: QNI 156 QTC 11 in 21 sess. DEPN: QNI 28 QTC 0 in 5 sess. KCARC net: QNI 52 QTC 2 in 5 sess. K3JL 31.

EASTERN PENNSYLVANIA: SM, Allen R. Breiner, W3TI—EC: Eric Olena, WB3FPL. ACC: Steve Maslin, N3ORG. OOC: Alan Maslin, N3EA. PIC: E. Max Peters, KI6NJ. STM: Harry Thomas, W3KOD. TC: Cully Phillips, N3HTZ. SGL: Allen Breiner, W3ZRQ. ASMs: WB2YGA, WY3K, K3TX, N3KYZ, WB3FQY. New appointments N3UPO is a TS and KB3CVO is OES. A lot of misinformation has been circulated regarding the issuance of your new call letter license plates. If in doubt, contact our ASM K3TX who will set you on the right track. Clubs elect officers this time of the year and in order that your mail goes to the right official, be sure the League and Section Manager has an update on new officers and correct address. Year 2000 officers for the Del-Lehi ARC are: KA3JWE Pres. KD3TI VP, N3DFF Secy, KA3MOU Treas; Tamaqua Wireless Assn: W3ZRQ Pres; KB3CFV VP, W3TI Secy-Treas. Does your club print a bulletin? N3TZW edits an excellent paper for the RF Hill ARC and experiences the same problem most clubs have in getting articles from its members to fill the pages. The following members of Chester Co ARES supplied communications for the Marshallton Triathlon: KD3OK WA3DMW WB3GCK N3SEN W3STA W3MYP N3JKL N3LRA N3MEL and KC3XL. For the thirty-second consecutive year, Tamaqua Wireless Assn provided communications for the Tamaqua Halloween parade sponsored by the Chamber of Commerce and Tamaqua Lions Club. Members assisting: WY3K, KB3ACB, KB3CFV, KA2WGG, KA2WGF, KB3DYJ, W3ZRQ, and W3TI. Thanks to the ECs who filed SET activity reports. Your efforts and experience gained through simulated drills shall not have been in vain. They'll pay off in the event of the real thing. When I turned my computer on today, it informed me that it had changed over to standard time, meaning more biological adjustment, attend evening meetings in the dark and a lot more. Summer 1999 is kaput, Field Day was a blast and plans are being laid for next year. The PA QSO Party and ARRL Sweepstakes contest is history for another year. Speaking of "Year," the possible Y2K glitch is just a few days away. It's going to be interesting to see just what will happen. Hamfest season is over, and we wish to express our thanks and appreciation to the clubs who gave us table space for our section information booth. Regardless of how you celebrate the holidays, may we wish you the best for a Merry Christmas, Hanukkah or Kwanzaa and a safe and prosperous New Year. Tfc (Oct): W3KOD 396, W3IVS 134, W3IPX 89, W3HK 87, N3EFW 65, N3YSI 61, K3TX 51, KA3AEB 38, W3UAQ 38, NR9K 30, N3HR 28, N3AO 27, KB3BRR 21, N3IRN 20, W3JKX 19, W3TWV 16, AD3X 16, W3BNR 12, W3ZQN 12, KA3LVP 12, N3DCG 11, N3AT 10, N3AS 9, N3SIN 8, W3TI 8, W3NNL 6, K3ARR 4, KB3CKD 4, N3KYZ 2. Net reports EPA 97, HBSN 89, EPAEP&T 87, PFN 73, PTTN 33, MARCTN 27, D3ARES 17, LCARES 15, SEPTN 10, WAREC 3, MCOES 2, EPAS 2, D4ARES 1.

MARYLAND/DC: SM, Bill Howard, WB3V, 410-551-6775, wb3v@arrl.org—ASM/RACES: Al Nollmeyer, W3YVQ (**w3yvq @arrl.net**). BM: Al Brown, KZ3AB, 301-490-3188 (**kz3ab@arrl .net**). SEC: Mike Carr, WA1QAA (**bamcc@erols.com**) 410-799-0403. STM: Bruce Fleming 301-863-6582. (**MEGASWOOP @aol.com**). MDC Section Web homepage **www.erols.com/ wb3v/mdc/.** All the best wishes for a safe and happy new year! I would like to take this opportunity to thank all those who participated in recent major events in MDC. First , thank you to those who freely gave their time to participate in our annual Simulated Emergency Test SET, and secondly to all those who participated in the Marine Corp Marathon in Washington, D.C. Additionally Army and Navy MARS participated in the SET and we thank them for their participation as well. They were very helpful in cross filing messages, and were quite professional. WICO EC WB2MJR reports that on 9 Oct. the Seagull Century took place. There were over 6,000 riders. The following amateurs helped, WA4GGH KA3OTL WA3OMY N3NKK NQ4Q N3PXT WB2MJR/NCS WA3WFL and KA7OGK/monitoring operations. It was a rather quiet ride with only a few injuries. Two courses were in operation: a 100 mile ride (SEAGULL CENTURY) and a 64 mile ride (METRIC CENTURY). Next year, low band operations are being planned to permit passing traffic to the MEPN. KENT EC WA6LHQ reports four stations on the air and for most of the exercise the K3ARS repeater on 147.375 MHz was used. The scenario developed for SET was as follows: Scenario: At 0930L a tornado has struck Rock Hall, Maryland causing structural damage, fires, and power outage and injuries. KENT ARES determined that they could work all of the sites on simplex if they lost the repeater. The main concern was to evaluate the improvements to the station at the shelter at the Rock Hall Volunteer Fire Department since this site was very marginal during hurricane Floyd. The other remote stations were located at Kent and Queen Anne's Hospital and at the Kent County Red Cross chapter headquarters in Chestertown. Eight amateurs assisted in this operation: WA6LHQ and WA3UJE at the EOC; N3TF and W3KG at Red Cross; WA3RER and WA3TBN at the Rock Hall Shelter; N3JYH and N3SSQ at the Hospital. 73 - Bill and with the nets:NET/NET MGR/QND/QTC/ QNI: MSN/KC3Y/31/53/318, MEPN/N3WKE/37/101/643, MDD/ WJ3K/53/252/428, MDD TOP BRASS//KJ3E/241/AA3SB/118/ AA3GV//120, BTN/AA3LN/31/84/318, SMN/KE3OX/NO REPORT//, Tfc: KK3F 1049, KJ3E 364, AA3SB 222, N3WKE 134, W3YVQ 101, AA3GV 97, WA1QAA 90, KC3Y 66, K3CSX 55, W3VK 36, N3KGM 34, N3WK 24, N3ZKP 23, W3CB 19, N3EGF 17, WA3GYW 2, KE3FL 1. PSHR: KK3F 187, AA3SB 185, W3YVQ 158, W3VK 151, KJ3E 151, N3WKE 142, N3WK 138, AA3GV 125, N3ZKP 118, WA1QAA 115, K3CSX 107, KC3Y 106, W3CB 101.

NORTHERN NEW YORK: SM, Les Schmarder, WA2AEA—Web: **http://www.northnet.org/nnyham**. ASMs: KD2AJ, WB2KLD, N2ZMS, WA2RLW. ACC: WZ2T. BM: KA2JXI. OOC: N2MX. PIC: N2SZK. SEC: KF2GC. STM: N2ZGN. TC: N2JKG. CVARC Officers for 2000 Pres. KC2ALG, 1stVP WA1KMO, 2nd VP WA2FAA, Sec N2YTS, Tres KB2RKV. NNY ARES Units have been very active during the summer, marathons, triathlons, biathlons, JOTA. TLARC and TLARC ARES have been working diligently with the Tri-Lakes Chapter of the American Red Cross to establish an Emergency Operation Center in Saranac Lake. A lot has been accomplished and donated to the project. There is still a lot of work to be done and equipment to be gathered to complete the project. Great job. NNY QSO Party Feb. 6 & 7. Looking forward to another great year. 73 KD2AJ. Activity Reports: KD2AJ NTS 102, PSHR 164; KB2LML NTS 41, PSHR 180; KC2ALG NTS 15, PSHR 171.

SOUTHERN NEW JERSEY: SM: Jean Priestley, KA2YKN (@K2AA) e-mail: **ka2ykn@arrl.org—**ASM: W2BE K2WB W2OB N2OO. SEC: N2SRO. STM: WB2UVB. ACC: KB2ADL. SGL: W2CAM. OOC: K2PSC. PIC: N2YAJ. TC: W2EKB. TS: W2PAU. W2BE WB2MNF KD4HZW WB3IJB N2QNX N2XFM WA2NBL AA2BN. Happy 2000! We enter a new century, look to the future and pose the question "where do we expect ham radio to be in 20 years. Where do "we" expect to be as a ham radio operator in 10 years. Silent Keys: Jim Eckersley, K2IXE, member of OBARC and former ARRL ACC for years passed on in October. Jim was known as "Mr. Hamfest" and was licensed in 1932. Also a SK, we will miss the voice of Gene Shepherd, K2ORS. Last October's JOTA was a success with hundreds of kids who are not hams getting to see what ham radio is about. It does not need to start and stop with JOTA. We can create activities to demo ham radio to kids. The ways are endless. We talk about the future of Amateur Radio. They are the future. October: NJSN QNI 137 NJN/E QNI 229 NJN/L QNI 181 NJM QNI 209 SJVN QNI 261 Tri St Hurricane Net QNI 57 WB2UVB 254 KB2RTZ 98, AA2SV 96, K2UL-4 53, N2WFN 21, K2UL 21, KB2VYZ 12, KA2CQX 10, N2WXF 10, W2AZ 7, WA2JSG 6, N2AYK 4, N2ZMI 3, KB2VSR 2, KB2YMB 1, KB2ETU 1.

WESTERN NEW YORK: SM, William W. Thompson, W2MTA — Please send club newsletters and station activities to Scott W2LC and if newsletters go electronically, to W2MTA also. It's been FB to motor thru forty New York counties upstate in all their grandeur to attend ham events and meet many great folks in this avocation. Thanks to all who served as WNY LOs, especially ASMs W2BCH and N2JAW, and to a great tutor KE2SM, for their inspiring efforts in behalf of many in our great hobby. CLUB OFFICERS/DIRECTORS: GRAM KB2UQZ WA2GUP KB2ZCE WB2CGF/KB2LXD N2KZF W2GIR W2XG WA2ABQ; KLARA KB2WXV N2WEA KV2W N2VEB/KB2SLZ KC2DQV WA2HOE. JOTA '99 was supported by many WNY clubs: ARATS, Binghamton, GRAM, Lockport, RAWNY, WNYDXA, Xerox and others. APPOINTMENT: (ORS) KB2ETO (Oct) BPL: N2LTC N2UTK KA2GJV KA2ZNZ; DATALINK: K2DN RX4/TX1; KA2GJV RX24/TX7; N2LTC RX156/TX154; NY2V RX4/TX3. SILENT KEY: W2ABM will be missed by K2MMW/mm, his Elmira friends and many others performing Amateur Radio public service.

Net/NM	*QNI*	*QSP*	*QND*
EBN/WB2IJZ	486	000	22
NYSEMO/N2AGO	087	010	05
NYSCN/W2MTA	016	007	05
#NYS-M/KA2GJV	212	117	31
CHN/W2EAG	173	036	31
#WDN-M/VVD	644	286	31
#NYPHONE/LTC	248	431	31
#NYPON/N2YJZ	318	248	31
ESS/W2WSS	390	117	31
NYSPTEN/KD2V	317	049	31
#OCTEN-E/ZNZ	1569	244	31
OMEN/K2DYB	019	001	02

Net/NM	*QNI*	*QSP*	*QND*
#STAR/N2NCB	421	021	31
#WDN-E/N2JRS	571	209	31
#NYS-E/WB2QIX	414	279	31
OARCN/N2KPR	040	006	04
THIN/N2JRS	018	000	01
TIGARDS/MTA	026	003	05
BRVSN/WB2OFU	tbd		
STTHN/N2WDS	052	010	08
#CNYTN/PUU	393	112	31
#OCTEN-L/ZNZ	686	253	31
#WDN-L/UQZ	531	154	31
#NYS-L/W2YGW	291	259	31

# Denotes NTS net. * Denote Public Service Honor Roll. Traffic (Oct.): N2LTC*1128, KA2ZNZ*633, KA2GJV*552, N2UTK* 503, NN2H*351, KF1L*315, K2BCL*275, WB2IJH* 253, WI2G* 251, W2MTA*241, W2PII*207, AF2K*174, WB2QIX*168, KB2VVD*140, KC2FEM*131, KG2D*127, N2JRS*105, W2FR*102, NY2V*97, KA2DBD*96, N2CCN*87, AA2ED*72, N2WDS*70, KC2EOT*43, KB2UQZ*43, WA2UKX *42, KB2ETO*35, K2DN*26, WA2GUP*25, KB2WII*12, KA2QIK 7, W2RH 6. Here's a thought-provoking view by WB2DZF. "Initiatives to stem the rush to extinction have done little more than rearrange the chairs on the deck of Titanic. Why? Because our hobby will not be resuscitated by an influx of school children. By all means welcome any youngster who shows interest, but it's a fact of life that the majority of active amateurs do not begin to fully enjoy the myriad facets of ham radio until the competing pressures of their exams, genes, jobs, families and careers have been mastered. It's time to shift the emphasis of our recruiting to an age group that has the time and the absence of competing pressures to enjoy it. We are continually being told that our population is aging and we are in the grip of "the baby boomers". The baby boomers were as much a product of WW2 as the post-war surge in amateur radio. Sadly, the ranks of "old soldiers" are thinning as rapidly as the students taking the amateur radio exams. GB CR." 73.

WESTERN PENNSYLVANIA: SM, Bill Edgar, N3LLR—ASM: N3MSE. ACC: open. ASM-ARES: WB3KGT. SEC: N3SRJ. ASM-Packet: KE3ED. ASM-Youth & Education: KE3EE. OOC: KB3A. 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. Hope you and your family have had a wonderful holiday season, and that the Y2K bug was a figment of many peoples' imagination. (This article is being written in November of 1999.) I would like to recognize an individual who has been an important resource to me, and to the WPA Section. We are blessed in the WPA Section for numerous volunteers who do a splendid job. One such volunteer stands out in my mind. WPA Section Assistant Section Manager, John Rodgers, N3MSE, has put in many volunteer hours to make this hobby better for all concerned, and deserves recognition for his time and talents. John, thank you! We have some changes in WPA Section field appointments that we are excited about. Chris Robson, KB3A, was appointed as the Official Observer Coordinator. Chris has been "radio-active" for many years within the hobby – some of you may recognize his call as a rabid contester! He has been very active as a VE with the RAE VE sessions each month and he has served as an instructor for the hobby. Additionally, Chris has served in several appointments in the WPA ARES program as a DEC and the SEC. Chris takes over this appointment from Jim Salter, WR4W. Jim held two WPA Section level appointments: Official Observer Coordinator and Technical Coordinator. Due to increased workload at the office, Jim needed reduce his time with the hobby and asked that we find a replacement for the OOC appointment. Happily, Jim will remain as our Section's Technical Coordinator. Another new appointee is Jim Metzler, N3BZW. Jim was appointed as the District Emergency Coordinator for District South 2. Jim has served as an Assistant Emergency Coordinator for Blair County ARES for a number of years. Please join me in wishing each of the new appointees the very best in their appointments. Last year, we had a slogan "One more for '99" that we used to encourage hams to introduce at least one more person to the hobby. I'd like to use the same type of slogan, but with minor modification to provide encouragement for us to share this hobby with at least one more person in 2000. The new slogan for 2000 is "Another for 2000" Please join me in Another for 2000!

CENTRAL DIVISION

ILLINOIS: SM, Bruce Boston, KD9UL—SEC: W9QBH. ACC: N9KP. STM: K9CNP. PIC: N9EWA. TC: N9RF. OOC: KB9FBI. DEC-Central: N9FNP. The Lamoine Emergency ARC has received an award from Macomb's Quality of Life Committee

Continued on page 116.

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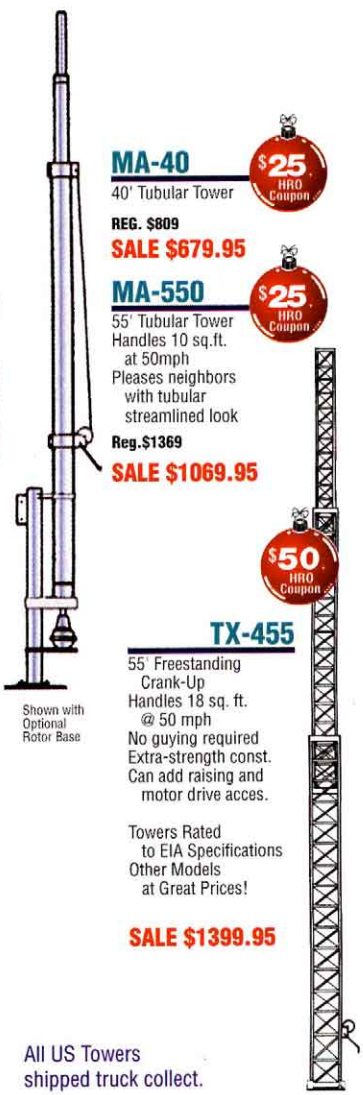

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http://www.hamradio.com

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NEW!

TH-D7A 2M/440

- 2M/440 Dual Band
- Built-in 1200/9600 Baud TNC
- APRS Compatible
- DX Packet Cluster Monitor
- 200 Mems., CTCSS
- VC-H1 Messaging Control

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TM-D700A NEW!

2M/440 Dualband
- 50w VHF 35w UHF
- Receives 118-1300 mHz (cell blocked)
- Remote Head Inst. only (kit included)
- 200 Memories
- Built In 1200/9600 baud TNC
- Advanced APRS Features
- Sky Command II
- Dx Packet Cluster
- Tone Scan
- GPS/VC-H1/PC Ports
- Opt. Voice Syn.

$10 HRO Coupon

TS-50S/TS60S HF Trans. • 6M

- TS-50S - World's smallest HF trans.
- 100W out. (90W TS-60S, 50MHz only)
- SSB, CW, AM. FM, • 12V Gen. Cov. RX,
- 6.4 lbs., 7.16 x 2.4 x 9.32"
- 105 db dynamic range, 100 Mems.
- Opt. ext. ant. tuners available (TS-50S only)

Call For Special Low Price!

$10 HRO Coupon

TS-870S HF Transceiver

- DSP in I.F. Stage! • 100W, 12V DC
- Dual mode noise reduction
- Digital Filtering (no opt. filters req.)
- Built-in RS232,Windows software incl.

$10 HRO Coupon

TM-V7A 2M/440Mhz

- 50W/35W • 280 Mems • Visual Scan
- Alpha Numeric • Enc/Dec & Duplexer Built-in
- Computer Programmable • 9600 Baud Ready
- Cool-blue Reversible LCD • Backlit Mic

Call Now For Low Price!

$10 HRO Coupon

VC-H1
Visual Communicator

Compatible w/all FM VHF/UHF Transceivers + HF SSB • Send/Rec Digital Images (32 seconds) for download • Store pictures in memory • 1.8" Color TFT LCD Display • Built-in speaker + mic • Download to PC (with special software) •

Call For Low Price!

$5 HRO Coupon

TM-261A 2M Mobile

- 50W + Mid and Low • Mil-Spec
- 61 Mem. Chanels • Alpha Numeric Function
- Dual Menu, DTMF Memory
- Backlit mic & built-in encode

Call Now For Special Low Price!

$5 HRO Coupon

TH-G71A 2m/440

- 2m/440 Dual Band HT
- 200 Mems • PC Programmable
- 6w 2m, 5.5w UHF @13.8 VDC
- Alphanumeric Display
- CTCSS Built It • Backlit Keypad

Call For Low Price!

$10 HRO Coupon

TS-570DG/TS-570SG DSP Enhanced

- 100w HF, (100w on 6M TS-570SG only)
- QSK, CW Auto Tune • Autotuner incl 6M
- DSP • Large LCD Display • Elect. Keyer
- RCP2 Radio Control Program Compatible

Call Now For Your Low Price!

Limited Time!

FREE 2M/440 Duplexer

$10 HRO Coupon

TM742AD 2M/440Mhz

- Optional 3rd band available • Back-lit mic
- Up to 303 memories • 101 per band
- PL Encode Built in • Detachable front panel

Call Now For Your Low Price!

5w High Power Also Avail.

$5 HRO Coupon

TH-22AT

- Ultra Compact
- 2M HT, 5W optional
- 40 memories
- Encode Built-In

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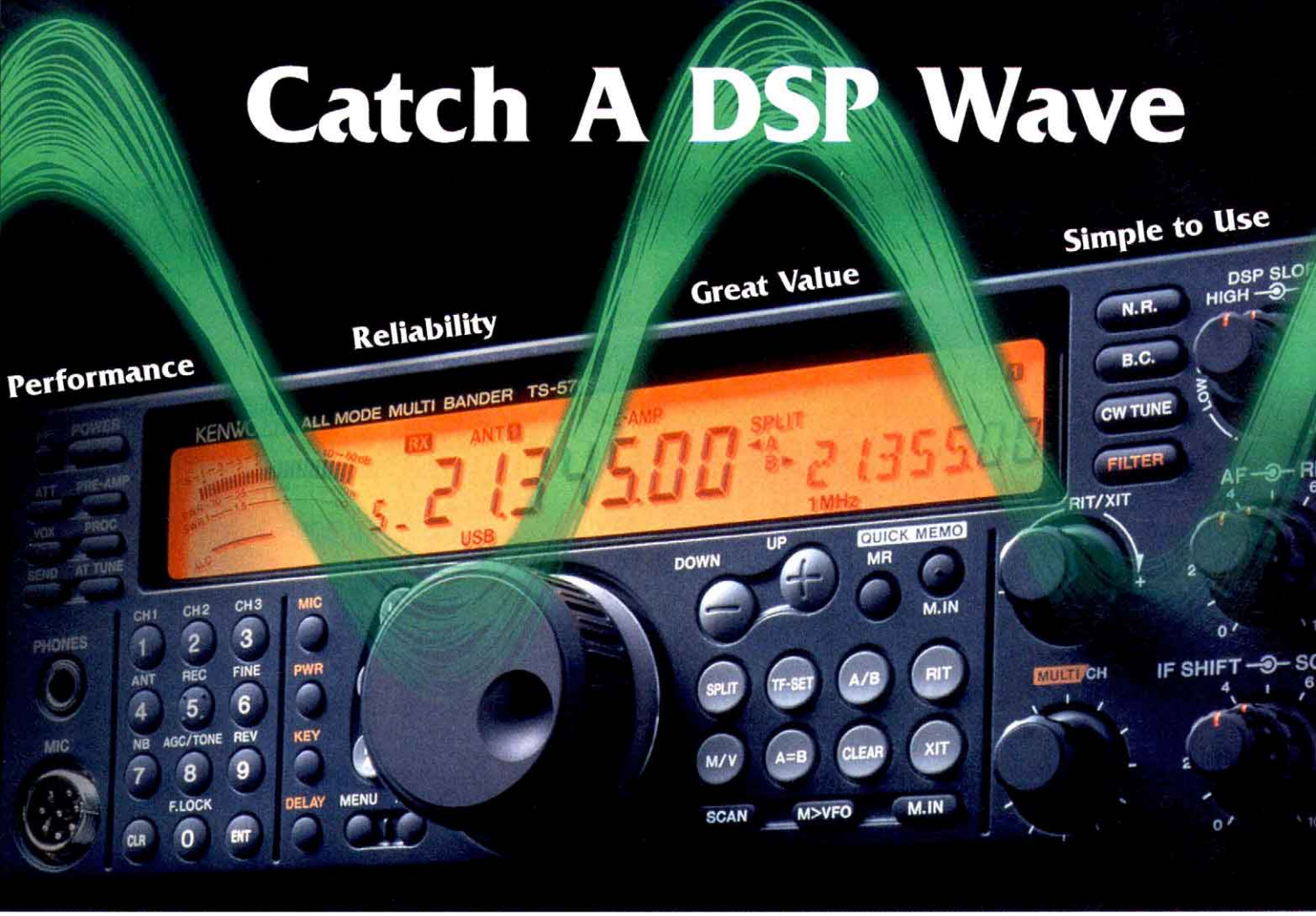

TS-570D(G) HF TRANSCEIVER/TS-570S(G) HF + 6M TRANSCEIVER

Kenwood has not been standing still since the introduction of the TS-570D/S HF Transceiver last year. Now you can command even more of Kenwood's advanced DSP technology with the G model.

The **DSP** filters and extracts signals with digital technology that is unmatchable with standard analog circuits. It provides **CD-class transmit and receive audio quality** that can be shaped to your needs, and two powerful noise reduction systems: **Line Enhancer Method** for SSB/AM modes, and **Speech Processing by Auto Correlation** (SPAC) for CW mode. DSP also enables the **CW-Auto Tune** feature that automatically zero-beats CW signals.

The **Extensive Memory Functions** provide a bank of 100 memory positions split into 90 standard channels for general operation and 10 for programmable VFO, programmable scan and long-term memory. Memory contents can be scrolled, copied or locked out. In addition there are **5 quick memories** for storing frequencies and modes on the fly, perfect for the busy DX contester.

The powerful **Menu System** incorporates **46 menu features** and an **on-line guide** for instant reference. The **large amber backlit LCD display** provides 4 light levels for clear readability under any lighting conditions.

The TS-570D/S has no shortcomings in the construction and performance area. The **continuous-duty 100 watt transmitter** incorporates a large heavy-duty heat sink with integrated cooling fan for non-stop operation even under extreme environmental conditions. The **wide-band receiver** is rock-stable from 500 kHz through 30 MHz with **dual pre-amps** and **dual bandpass filters** for exceptional selectivity and sensitivity.

With the features and performance of a high-end radio integrated into an affordable mobile-size package, the TS-570D/S is the perfect choice for the field or to build a full station around at home.

- ***FREE* operating manual via FTP site**
  ftp://ftp.kenwood.net
- Beat cancel
- 2 position antenna switch
- CW auto tune adjust (a world's first)
- Channel scan, program band scan, memory scan with channel lock-out and group channel scan, all with TO (time operated) or CO (carrier operated) resume modes
- Compact 10-5/8 inch by 3-3/4 inch front panel size for any travel or installation requirement
- Preset auto antenna tuner with 18 sub-bands
- Variable electronic keyer (0 and 100 wpm)
- Packet and FSK features
- RCP-2 software for PC-based display and memory configurations available via the Internet
- Full functionality on 6M (TS-570S) including DSP, 100 watts output and preset Auto Antenna Tuner

TS-570D/S (G) new features

■ TX sound quality monitor with 9-step monitor volume for absolute control over voice quality ■ NR1 (SSB) is operator controllable in 9-step increments, or automatically tracks input signal strength ■ New CW DSP Filters (80 Hz, 150 Hz and 500 Hz) give you a total of 11 user-selectable filters ■ NR1 and NR2 settings can now re-configure automatically when changing mode groups (SSB/AM/FM to CW/FSK) ■ Manual weight feature (with built-in electronic keyer) for adjusting the relative length of dots and dashes in 16 steps between 1:2.5 and 1:4.0 ■ Equalize receive signals, and use different settings for both TX and RX ■ "One-touch" DSP filter wide mode allows 'resurfacing' to check the band conditions when operating in narrow mode ■ Dual selectable Beat Cancel (BC) works against intermittent beat interference (except in CW mode) ■ CW auto tune mode links only with the RIT frequency without changing the transmit frequency.

Advance Technology Upgrade is available in new production models and for pre-existing TS-570D/S; contact you dealer for details.

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Kenwood Corporation
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KENWOOD
Amateur Radio Products Group

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in recognition of the club's contributions to the safety of the community, most notably for its weather nets. The award presenters included club member and Macomb Police Chief KB9AKD, the State Police Commander, the Macomb School Superintendent and others. Eight members of the Six Meter Club of Chicago (SMCC) provided communications assistance again this year for the American Cancer Society's West Cook Bikeathon. SMCC also participated in this year's JOTA event from La Grange Park. The new officers for the SMCC are: Pres W9CEJ, VP WA9FIH, Sec WA9RIJ, Trea AK9Y. The Egyptian RC has appointed KD9SG to head their club's digital committee. KD9SG has a background in ATV and packet, and is the owner and sysop of 'toybbs' on packet. MAC, the Metro ARC, reports Antique Wireless Association (AWA) newsletter editor N9EWJ gave a presentation to the club on the early years of radio, including an interview with ARRL co-founder Clarence Tuska. The AWA is an organization of some 4,000 members linked by a common interest in the history of communications. Williamson Co EC WA9APQ has been promoted to fire chief of Carterville. The ARRL has renewed the status of the Radio Communication Y Enlace Amateur A.C. as a Special Service Club. Members of the Sangamon Valley RC participated in this year's Jamboree On The Air with the Pawnee Boy Scouts. Twenty scouts and scout leaders were in attendance, and operation took place on the 10 and 17 meter phone bands. According to the *STARS newsletter*, the Jerling Junior High School ARC held its first meeting with 16 students in attendance. A new scholarship in memory of Silent Key Francis Walton W9ACU, a 72-year member of the ARRL, has been established at the ARRL Foundation. October traffic: K9CNP 152, NS9F 96, W9HLX 55, W9TVD 38, NC9T 24, KA9IMX 9, WA9RUM 6, W9FIF 3. ISN Report de WB9TVD QNI-217, QTC-77, Sessions-30. W9VEY Memorial Net de K9AXS 6 with 207 check-ins.

INDIANA: SM, Peggy Coulter, W9JUJ—SEC: K9ZBM. ASEC: WA9ZCE. STM: N9ZZD. OOC: KA9RNY. SGL: WA9VQO. TC: W9MWY. BM: KA9QWC. ACC: N9RG. Sympathy extended to the families and friends of Silent Keys 10/13 Robert A. Craigin, N9UYS, Hobart; 10/17 Charles H. Apfelstadt, N9GWS, Evansville. They will certainly be missed. Members of the Mid-States ARC supplied communications at the Greenwood High School in Franklin by 15 amateurs using 2-meter simplex. The Elkhart Co ARES provided communication for the Annual Loveway Theraputic Horseback Riding event also using 2-meter simplex. Howard Co ARES/RACES provided the Halloween Patrol support for the Kokomo area. They provided 133 man-hours of public service activity over the 5 day period. 16 members of Porter Co ARES conducted the "Black Cat Patrol". Tippecanoe Co ARES participated in a simulated airplane crash drill at Purdue Airport near Lafayette with 13 members assisting. They also provided support for the Feast of the Hunters Moon by WB9BRX, KB9JDE, WB9SGP, WB9SWD, W9YA, WB9CZC, KB9KUQ, KB9SSS and KF9UP. Members of Brown Co ARES/RACES provided communication support during 2 major fires. The Wabash Valley ARES provided support for the Deuces Wild Duathalon, N9YRX, and K9DUR were in command with about 15 hams assisting in making it a smooth running event. That same day members were invited to provide a booth to interest visitors at a Bean Dinner. N9YNF was coordinator. We all need to work harder on Public Service Activities. Those of you with repeaters, if you have not sent in an update to the IRC in the last 2 yrs should do so. If you have, you should have a signed coordination document for your records. There is no charge and you do not have to be an IRC member. This is important to the future of your repeater. Please update now. You can do so if you have e-mail on (www.ircinc.org). Wishing you all had a Very Merry Christmas and A Very Happy New Year and hope the Y2K doesn't get you. NM's ITN/W9ZY, QIN/N9PF, ICN/K8LEN, WN/AB9AA, VHF/N9ZZD.

Net	*Freq*	*Time/Daily/UTC*	*QNI*	*QTC*	*QTR*	*Sess*
ITN	3910	1330/2130/2300	2628	506	1549	93
QIN	3656	1430/0000	110	53	341	47
ICN	3705	2315	?	41	?	41
IWN	3910	1310	2200	–	310	31
IWN VHF Bloomington			471	–	465	31
IWN VHF Kokomo			673	–	155	31
IWN VHF Northeast			1091	–	620	31
Hoosier VHF nets(? nets)			?	28	?	59

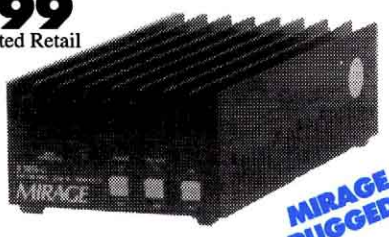
D9RN no report. 9RN total QTC 321 in 62 sessions represented by WA9QCF, WB9UYU, K9PUI, N9PF, KO9D, AA9HN, KJ9J, and W9FC. Tfc: W9FC 368, W9ZY 114, N9ZZD 103, WB9QPA 94, W9UEM 93, K9PUI 68, AB9AA 59, K9GBR 56, W9JUJ 49, K9ZBM 47, KA9QWC 46, KA9EIV 38, N9WNH 37, KO9D 32, WA9QCF 31, N9PF 24, AA9HN 23, KB9NPU 22, K9RPZ 18, W9EHY 10, K8LEN 10, W9BRW 10, KA9DIG 9, K9DIY 8, AB9A 7, WB9NCE 4, W9KT 3, K9CUN 2, K9OUP 1.

WISCONSIN: SM, Don Michalski, W9IXG—SEC: WB9RQR. STM: K9LGU. ACC: KF9ZU. SGL: AD9X. OOC: W9RCW. PIC: K9ZZ. TC: K9GDF. ASM: K9UTQ, W9RCW, W9CBE. BM: WB9NRK. Because this section news is about 2 months old, I felt a need to start a new section management web site for Wisconsin! This site will enable you to keep abreast of current issues as I receive it. Go to: **www.eBoard.com** and enter w9ixg in the "enter eBoard" box. Drop a note in the feedback box for all to read! Also, I suggest you check into the WNA **www.eBoard.com** web site for information on our traffic nets. Our STM, K9LGU, maintains this site. Enter wna in the eBoard.com box. It is with deep regret that I inform you of the passing of John Offerdahl, W9XH (formally KC9XH). John was a former president of Four Lakes Amateur Radio Club and active in many public service events and nets. Also, Ray Sunderland, K9ANV, is regrettably a SK. A reminder to notify me of any Silent Keys. Hopefully, Y2K will be a non-issue. Don't relax! There will be other emergencies that could use your assistance. Contact me or SEC, Stan Kaplan, WB9RQR, and we will connect you up with the appropriate EC. Remember, it takes lots of money to run a good repeater system. Support your local repeater club! KB9DED, N9LIA, KB9FRB, KB9DZG, N9TTA, KB9VBR, & N9NMH provided support for the Rib Mountain Foot Race. There will be many more of these events in 2000 so plan on helping out with communications. Congratulations to Spencer Clope, W9LDH, for serving two years as QCWA president! Spencer has been a ham for 65 years! Larry McCalvy, WA9JMO, is the new Chapter 162

MIRAGE ...160 Watts on 2 Meters!

Turn your mobile, base or handheld into 160 Watt powerhouses and talk further, longer, clearer . . . All modes: FM, SSB, CW . . . Superb GaAsFET preamp . . . Overdrive, high SWR, Over-temperature protection . . . Remote controllable . . .

B-5016-G
$299
Suggested Retail



MIRAGE RUGGED!

Power Curve -- typical B-5016-G output power								
Watts Out	*130*	*135*	*140*	*145*	*150*	*155*	*160*	*165*
Watts In	*20*	*25*	*30*	*35*	*40*	*45*	*50*	*55*

The MIRAGE B-5016-G gives you 160 watts of brute power for 50 watts input on all modes -- FM, SSB or CW!

Ideal for 20 to 60 watt 2 Meter mobile or base. *Power Curve* chart shows typical output power.

Hear weak signals -- low noise GaAsFET preamp gives you excellent 0.6 dB noise figure. Select 15 or 20 dB gain.

B-5016-G has legendary ruggedness. *We know of one that has been in constant use since 1979!*

Heavy-duty heatsink spans entire length of cabinet -- prevents overheating. Power transistors protected by MIRAGE's *Therm-O-Guard*™.

Fully protected from high SWR and excessive input power. Has warning LED.

Has smooth adjustable Transmit/Receive switching with remote external keying.

RC-1B, $45, Remote Control. On/Off, preamp On/Off, selects SSB/FM. With 18-ft cable.

Draws 17-22 amps at 13.8 VDC. 12x3x5½ in.

More 160 Watt, 2 Meter Amplifiers . . .

B-2516-G, $299. For 10 to 35 watt mobile or base stations. 160 watts out for 25 watts in.

B-1016-G, $379. MIRAGE's most popular *dual purpose* HT *or* mobile/base amplifier. 160 watts out/10 W in. For 0.2-15 watt transceivers.

B-1016-G Great for ICOM IC-706!

B-215-G, $379. MIRAGE's most popular *handheld* amp. 150 watts out/2 watts in; 160 watts out/3½ W in. For 0.25 to 5 watt handhelds.

100 Watts for 2 Meter HTs

B-310-G
$199
Suggested Retail

Power Curve -- typical B-310-G output power							
Watts Out	*25*	*50*	*75*	*95*	*100*	*100+*	*100+*
Watts In	*¼*	*½*	*1*	*2*	*4*	*6*	*8*

- *100 Watts out with all handhelds up to 8 watts*
- *All modes: FM, SSB, CW*
- *Great for ICOM IC-706*
- *15 dB low noise GaAsFET preamp*
- *Reverse polarity protection/SWR Protection*
- *FREE mobile bracket* • *Auto T/R switch*
- *FREE handheld BNC to B-310-G cable*
- *Ultra-compact 4³/₄x1³/₄x7³/₄ inches, 2½ pounds*
- *One year MIRAGE warranty*

***Boost** your 2 Meter handheld to 100 Watts!*

Ultra-compact all mode B-310-G amp is perfect for *all* handhelds up to 8 watts and multimode SSB/CW /FM 2 Meter rigs. *Great for ICOM IC-706!*

35 Watts for 2 Meter HTs

B-34-G
$89.95
Suggested Retail

Power Curve -- typical B-34-G output power								
Watts Out	*18*	*30*	*33*	*35+*	*35+*	*35+*	*35+*	*35+*
Watts In	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*

- *35 Watts Output on 2 Meters*
- *All modes: FM, SSB, CW*
- *18 dB GaAsFET preamp*
- *Reverse polarity protection*
- *Includes mobile bracket*
- *Auto RF sense T/R switch*
- *Custom heatsink, runs cool*
- *Works with handhelds up to 8 watts*
- *One year MIRAGE warranty*

MIRAGE RUGGED!

35 watts, FM only . . . $69.95

B-34, $69.95. 35 watts out for 2 watts in. Like B-34-G, FM only, less preamp, mobile bracket. 3¹/₈x1³/₄x4¹/₄ inches.

MIRAGE Dual Band 144/440 MHz Amp

BD-35
$159.95
Suggested Retail

MIRAGE RUGGED!

Power Curve -- typical BD-35 output power							
Watts Out (2Meters)	*30*	*40*	*45*	*45+*	*45+*	*45+*	*45+*
Watts Out (440 MHz)	*16*	*26*	*32*	*35+*	*35+*	*35+*	*35+*
Watts In	*1*	*2*	*3*	*4*	*5*	*6*	*7*

- *45 Watts on 2 Meters/35W on 440 MHz*
- *Auto Band Selection* • *Auto T/R switch*
- *Full Duplex Operation* • *5x1³/₄x5 inches*
- *FREE mobile bracket* • *"On Air" LEDs*
- *Single Connector for dual band radios and antennas*
- *Reverse polarity protection*
- *Works with all FM handhelds to 7 watts*
- *One year MIRAGE warranty*

Add this Mirage *dual band* amp and boost your handheld to a *powerful* mobile or base -- 45 watts on 2 Meters or 35 watts on 440 MHz! **Mirage's** exclusive *FullDuplexAmp*™ lets you talk on one band and listen on the other band at the same time -- *just like a telephone conversation.* (Requires compatible HT).

6 Meter Amplifier

FCC Type Accepted

The A-1015-G, $389, is the *world's most popular* all mode FM/SSB/CW 6 Meter amplifier. 150 watts out for 10 in. For 1 to 15 watt transceivers.

70cm Amplifiers (420-450 MHz)

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

Amateur TV Amps

Industry standard ATV amps -- **D-1010-ATVN, $414,** 82 watts PEP out / 10 in. **D-100-ATVN, $414,** 82 watts PEP out/2 in. (without sync compression).

Remote Control Head for Amps

RC-1, $45, remote controls most MIRAGE amps. Power On/Off, preamp On/Off, switch for SSB/FM. 18 foot cable (longer available). 1³/₄x3³/₄x2½ inches.

Repeater Amps

11 models -- continuous duty all modeFM/SSB/CW repeater amps for 6, 2, 1 1/4 Meters, 70cm, 450 MHz ATV.

Low noise GaAsFET preamps

KP-1

KP-2

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430-450	KP-1/440	KP-2/440

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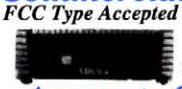

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QCWA president. We wish him well! 73, Don, W9IXG, **w9ixg@arrl.org.** Tfc: W9RCW 938, K9RTB 781, K9JPS 746, W9IHW 685, W9YPY 562, K9GU 336, W9CBE 235, N9BDL 99, AG9G 98, N9KHD 92, W9YCV 77, W9UW 76, K9LGU 60, N9CK 54, K9FHI 47, KE9VU 46, KA9KLZ 39, W9BHL 33, AA9BB 28, WZ7V 28, K9HDF 26, KA9FVX 23, W9ODV 22, KG9B 21, WB9ICH 21, N9JIY 10, K9UTQ 4, W9PVD 1.

DAKOTA DIVISION

MINNESOTA: SM, Randy "Max" Wendel, N0FKU—It's a unique opportunity to be around the calendar to mark the turn of a millennium. There have been unbelievable advances in technologies especially in recent years. You can't help but wonder what lies ahead. Seems that every day something becomes obsolete which was the up and coming thing just a few years ago. As radio amateurs, we certainly realize these changes just in our own little world of communications...which is just a small piece of the technology pie. Connectivity ..from the taps of a CW key to the squawks of a modem connection. The devices used...from a radio to a satellite...a palm device/ computer to a wrist watch pager. Have we outdone ourselves with these inventions? Have we only seen the tip of the iceberg? Time is the only answer. Sometimes we tend to place these technologies between us, and soon we realize that it is time further apart that we actually take the time to be together. A handshake is replaced with a text screen. A smile is replaced with an emotion. We are either @here or @there. As long as we continue to communicate, we share a common interest. How we do it will vary in many ways which is what has made our overall experience interesting. As we "surf" these waves of change, remember where those waves began. As long as we can speak with "analog voices", we can keep radio out of the history museums and in our hobby for many years to come. I wish you all a blessed Christmas, Happy New Year and New Millineum at 2000. Godspeed de Randy Wendel, N0FKU, your Minnesota ARRL Section Manager.

Net	*Freq*	*Time*	*QNI/QTC/Sess*	*Mgr*
MSPN/E	3870	5:15 P	797/65/31	W0WVO
MSPN/N	3860	12 P	485/111/31	WA0TFC
MSSN	3710	6 P	N/A	VACANT
MSN/1	3605	6:30 P	207/83/31	W0HPD
MSN/2	3605	10 P	124/53/30	K0PIZ
PAW	3925	9A-5P	2249/90/77	KA0IZA

Tfc: KB0AII, WA0TFC, W0LAW, K0PIZ, W0HPD, WO0A, KN9U, K0WPK, W0GCB, W7HH, KB0AIJ, W0WVO, K0PSH, W3FAF, KB0OHI, K0OGI, WD0GUF, N0JP.

NORTH DAKOTA: SM, Bill Kurtti, WC0M—I'm sorry to report W0VAL, Andy, is now a Silent Key. Andy was well known for his work in radio broadcasting and interest in Amateur Radio. Also, W0GGR & WA0CYW from Bismarck are now Silent Keys. All 3 were active in the Bismarck area. The Totton Trail Swap meet was well attended with a good assortment of ham equipment in on the tables. In Fargo, WQ0J N0LKX KB0JVO KA0CHX and KA0ZLG responded to the call to clean up the back room and install radios and antennas at the EOC. Dickinson Hams under the direction of WD0DAJ have been cleaning up & doing preventive maintenance on the repeater sites in their areas. Also, WD0DAJ, is resigning as repeater coordinator for ND so we need a volunteer to fill those big shoes. Thank you for your many years of great work, Stan. New repeater on 147.015 on Harlow Butte 30 miles west or Devils Lake. Tfc: N0RDJ 5. Sess/QNI/QTC: Goose River, 1895 kc 8:30 AM Sun 4/50 /0; DATA 3937 kc 6:30 PM Daily 27/555/0; WX Nets 3937 kc 8:30 AM 12:30 PM 26/757/24; Storm Net 3937 kc (Continuous as needed during storms).

SOUTH DAKOTA: SM, Roland Cory, W0YMB—Black Hills ARC made an application to ARRL HQ to become a Special Service club. Pierre is installing a mag mount antenna at the high school to be ready in case of a disaster. They are also building a half dozen J pole antennas for use at emergency shelters. This would be a good project for other clubs in our area. Black Hills ARC has a volunteer to put out a club newsletter. Don't forget to work a Dakota Chapter 102 QCWA station on Feb 12 and 13 and obtain their nice certificate. Pierre ARC is working on a project to put their ATV weather information on the local TV channel. Club secretaries please send information to W0YMB that you would like to have here in our column. Total traffic reported for Oct was 645. Happy New Year.

DELTA DIVISION

ARKANSAS: SM, Roger Gray, N5QS, e-mail **n5qs@arrl.org**—This month I had a lot of fun at JOTA. We had about 75 Boy Scouts come by the station, and I think most enjoyed the demonstration. I listened in on part of the SET from JOTA this year and got a report from Terry Busby, W5ARS (our SEC), and he considers it a success with good participation from the entire section. I want to announce the re-appointment of Dom Esposito, W5TT, as OOC for the Arkansas Section. Dom held this position before and brings back a lot of experience and is working well with several ongoing problems in our section. When you read this, Y2K will be over. Remember, many of the preparations you need to make are normal good practice and should be in place at all times. Keep at least 2 weeks food and water, alternate sources of power, heat, or anything you can't do without and any medicines you need. Now that Y2K is over, don't let your preparations drop. Tfc: K5BOC 91, K7ZQR 66, AB5AU 54, AB5ZU 10, W5HDN 8, W5RXU 7, KK5QS 4. Nets: AMN 43, APN 20, ARN 80, OZK 14.

LOUISIANA: SM, Lionel A "Al" Oubre, K5DPG, e-mail **k5dpg @arrl.org** Web Page **www.aisp.net/k5dpg**. ASM: KB5CX, K5MC. ACC: KA5IJU. BM: K5ARH. TC: KE5FZ. SEC: N5MYH. OOC: WB5CXJ. PRC: KB5QVI. STM: KG5GE. NM LTN WB5ZED, NM LCW W4DLZ. I am pleased to report that I have been accepted into the prestigious A-1 Operators Club .I have been a traffic net participant for many years, and never thought I'd make the grade. Several people have stated that they were so sure that I was already a member that they didn't nominate me. Could there be other deserving members out there that have been over looked? The list of members is on the ARRL Web site. I wish to extend to each of you the best New Year ever. Upcoming Minden December 4, Hammond January 15, Rayne March 11-12 Go out and support our area hamfest events. By the time you read this you should have received the ballot for LA Section Manager. Please take the time to

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vote. Remember, the person you select will lead the section during the next two years. Louisiana Section Net Schedule: LTN 6:30 PM, local, 3910 kHz, nightly, WB5ZED mgr; LCW 6:45 PM. Local 3673 kHz nightly W4DLZ Mgr reports for October 1999: LTN QNI 318 QTC 70 in 31 sessions LCW QNI 199 QTC 26 in 30 sessions. DRN5 LA Rep 100 % by WB5ZED, K5IQZ, K5WOD, W5BKM, W5CDX, N0KWA, WA5LHL, K5DPG. PSHR: WA5WBZ 77, KG5GE 98, K5MC 118, K5WOD 123, K5IQZ 130, W5CDX 131, K5DPG 138, WB5ZED 227. Tfc: K5WOD 5, WA5WBZ 8, K5DPG 19, KG5GE 31, K5MC 75, K5IQZ 144, W5CDX 170, WB5ZED 662 BPL 8th.

MISSISSIPPI: SM, Malcolm Keown, W5XX—STM: KD5P. NM: N5JCG, KB5W, KI5UK, K5XU, KB5WJJ, N5YNY. Mississippi hams again helped with communications during the Diabetes Walk. In Jackson AB5WF, KM5GE, W5PFR, KC5OSM, KD5HDZ, KC5ZJE, KB5RCI, KB7IWX, KC5FUB, KD5EDV and in Vicksburg KC5DNY, K5IMT, N5EZX, N5QDE, WB5OWY, N5KWT, and W5XX. Congratulations to N4KMH who was named SERA Vice Director and Frequency Coordinator for Mississippi. JARC and VARC both have APRS digipeaters on the air. Season's Greetings to all and watch out for the Y2K Bug. If you miss him, he will be at the Jackson Hamfest. OO Report: K5XQ. EC Report: W5DGK, K5DMC, N5HTQ, WB5OCD, N5ZNT. Net Reports: sessions/QNI/QTC. MSPN 31/2751/58, MTN 30/181/68, MSN 31/1028/10, PBRA 31/1035/7, Jackson Co ARES 31/685/33, MSSN 21/97/5, Hancock Co ARES 13/148/5, MAEN 7/91/0, MBHN 4/23/0, Stone Co ARES 5/52/0, Lowndes Co 4/64/0, PSHR: N5JCG 150, N5XGI 146, KB5W 140, K5DMC 128, KM5DT 118, W5XX 97, K5VV 94, KD5P 60. Traffic: KB5W 328, N5JCG 74, N5XGI 58, K5DMC 51, KD5P 50, KM5DT 44, W5XX 30, K5VV 13.

TENNESSEE: SM, O.D. Keaton, WA4GLS—ACC: WA4GLS. ASM: WB4DYJ. PIC: W4TYU. SEC: WD4JJ. STM: WA4HKU. OOC: AD4LO. TC: KB4LJV. The following NARC members participated in the Multiple Sclerosis 150 mile tour were: KF4OAL, KC5TMV, KC4TCR, KE4OAH, K5LKT, KA4CPO, KF4ZVO, WB4ZCQ, KC4WKR, KA4AIJ, N4VHM, KF4WME, KE4TQO, N4GWE, K4ANH, K4IHI, WB4HCL, KF4MCD, KF4OXO, KF4NRE, KF4VCO, KF4WHI, KF4RZW, KF4MCG, WD4ICI, KF4BMH & KF4VOW. Thanks to all for your very nice turnout. Sheila, KF4VMJ, wishes to thank all the RACK members for assisting in the Wears Valley 15K Race and the Walk for the Cure-American Diabetes Society: KE4HID, KC4TRY, KD4LDL, ND4F, KC4UHZ, KG4BLO & KF4BTO. All Tri-Cities hams be sure to join in on JCARA's weekly net on W4ABR 19/79 repeater at 9 PM on Tuesday. Thanks to the ORARC members KC4RHW, KA4UOV, KD4PQP, KR4EP & KD4RIC for assisting the communications for the Memory Walk for the Alzheimer's Association. The DARC members are to be congratulated for providing communications for the Bartlett Celebration's 5K Run. Maury Co EC, Tom, KKM4ES, expresses his satisfaction that the recent weather has been calm; however, he warns against the ARES/SKYWARN group becoming complacent, be alert because the weather can change at any time. BARC's W4B special event station went so well this year that the club is already planning for another year 2000. Contact W4CZ for information concerning this year's certificates. ZERO BEAT reported the results of the 1998 ARRL 10-Meter contest. Jim, N4IR, 399,000 points with 798 QSOs on high power CW. Luther, N4UR, 99,000 points with 273 QSOs on low power. Dan, N4ROA, 84,096 points with 289 QSOs on CW with QRP. The 1999 ARRL RTTY Roundup contest showed Bill, W4CA, as leader in the southeast region, Delta Division, scored 43,510 points with 458 QSOs. John, KC4SAW, scored 19,608 points with 258 QSOs. Correction to Nov. column: Amateur Radio Emergency tags will not be available until 2001. Net sess/QTC/QNI: TMPN 31/25/1684; TCWN 23/22/180; TEMPN 21/47/678; TEPN 26/59/2389; TSCWN 17/3/81. Tfc: N4PU 75, WA4HKU 44, NF4G 41, KA4KDB 27, W4SQE 26, WB4DYJ 20, W4SYE 12, WA4GLS 12, KI4V 8, WD4JJ 5, W4PSN 4.

GREAT LAKES DIVISION

KENTUCKY: SM, Bill Uschan, K4MIS—ASM: Tom Lykins, K4LID. SEC: Ron Dodson, KA4MAP. ACC: Todd Schrader, KE4WFZ. STM: John Farler, K4AVX. TC: Scotty Thompson, KI4AT. SGL: Bill Burger, WB4KY. BM: Ernie Pridemore, KC4IVG. PIC: Steve McCallum, W2ZBY. I want to take the time too wish all of you a very Merry Christmas and a good New Year. The last hamfest of the year was held November 6, 1999, in Hazard, KY. It is with deep regret that we mention that Friday Wolfe, W4ADO, became a SK on October 22, 1999; and Crosby Sparks, K4PYA, also became a SK. He lived in Winchester, Ky. Remember in our prayers the mothers of Mike Wagoner, KB4VKS, and Mike Kappas, N4AMH. Beginning in January, even though it is still winter, it's time for all the SKYWARN groups in the Section to start scheduling their severe weather classes. Weather personnel need to be contacted and set up a class. Remember, tornados are not just a Spring occurrance. The SGL is busy preparing for the next meeting of the Ky. Legislator. Hopefully we can strengthen the "Scanner Law" to include MARS and CAP members Also we need legislation to protect communication towers with Amateur Radio antennas from local and State tower restrictions. I noticed in the State Journal recently about some kind of meeting to discuss height and location restrictions for communications towers. Net QNI/QTC/Sess: KRN 822/21/21; MKPN1291/43/31; KTN 1921/48/31; KEN 176/10/5; KSN 252/69/31; OVN 428/91/31. Tfc: KF4RBK 218, KO4OL 56, K4AVX 46, AE4NW 46, NF4G 41, KC0CEG 35, N4GD 21, AF4PX 19, W4ET 10, K4YKI 10, WB4ZDU 7.

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: Carl Hillaker (**carln8zdw2@juno.com**). This issue should arrive a few weeks prior to year's end, and I would like to appeal to all of you to get in touch with your emergency coordinators/ RACES Officers to volunteer for the now famed Y2K Event. They all need lots of help and even if you can't get out, you may be able to help from your home. Many operators have been training for months and participating in communi-

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COAX (50 OHM "HF" GROUP)	100FT/UP	500FT	1000FT
RG213/U STRD BC MIL-SPEC NC/DB/UV JACKET 1.2 dB/2500WATTS @ 30MHz	.36/FT	.34/FT	.32/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.....	.15/FT	.13/FT	.12/FT
RG58/U 95% BRAID UV RESISTANT JACKET 2.5dB/400 WATTS@ 30MHz.....	.15/FT	.13/FT	.11/FT
RG58A/U STRD CENTER 95% TC BRD UV RESISTANT JKT 2.6dB/350 WATTS @ 30MHz	.17/FT	.15/FT	.13/FT
RG214/U STRD SC 2 95% BRD NC/DB/UV JKT 1.2dB/1800WATTS @ 30MHz.....	.25FT/UP	1.75/FT.	
RG142/U SOLID SCCS 2-95% SILVER BRAIDS *Teflon®* JKT 8.2dB/1100WATTS @ 400MHz.....	25FT/UP	1.25/FT.	

COAX (75 OHM GROUP)	100FT/UP	500FT	1000FT
RG11A/U STRD BC (VP-66%) 95% BRAID NC/DB/UV JKT 1.3dB/1000WATTS.....	.44/FT	.42/FT	.40/FT
RG6/U CATV FOAM 18GA CW FOIL + 60% ALUM BRAID.....	.20/FT	.13/FT	.11/FT
RG6/U CATV FOAM 18GA CW FOIL *QUAD SHIELD*.....	.25/FT	.18/FT	.16/FT

LADDER LINE GROUP	100FT/UP	500FT	1000FT
"FLEXIBLE" 450 OHM 16GA COMPRESSED STRD CCS(PWR-FULL LEGAL LIMIT+).....	.20/FT	.18/FT	.16/FT
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14GA SOLID *"COPPERWELD" (for long spans etc.)*.....	.10/FT	.08/FT	.06/FT
14GA SOLID *"SOFT DRAWN" (for ground radials etc.)*	.10/FT	.08/FT	.06/FT
ROPE: 3/16" DOUBLE BRAID *"POLYESTER"* 770# TEST WEATHERPROOF	.12/FT	.09/FT	.08/FT
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RG8/U strd BC foam 95% braid UV resistant JKT. 0.9dB 1350 watts @ 30MHz.
150' $64.95 125' $54.95 100' $44.95 75' $34.95 50' $24.95 25' $14.95
10' $13.95 6' $11.95 3' $9.95 1' $8.95

RG8 MINI(X) strd BC foam 95% braid UV resistant JKT. 2.0dB/875watts@ 30 MHz
150' $34.95 125' $29.95 100' $24.95 75' $19.95 50' $15.95 25' $10.95
6' $4.95 3' $3.95 *(3ft & 6ft are China made)*

LMR 400 SOLID CCA CNTR FOIL + BRAID 2.7dB @ 450MHz WP/UV JKT 100' $72.95

With USA made Silver/Teflon®/Gold Pin male "N" connectors.

FLEXIBLE 9913 strd BC cntr foil+95% braid 2.7dB 400MHz NC/DB/UV JKT.
150' $110.95 125' $95.95 100' $80.95 75' $67.95 50' $54.50 35' $45.95
25' $39.95 15' $32.95 10' $25.95 6' $16.95 3' $15.95 1' $14.95

With USA made Silver/Teflon®/Gold Pin PL259 to male "N"

FLEXIBLE 9913 strd BC cntr foil+95% braid 2.7dB 400MHz NC/DB/UV JKT.
150' $104.95 125' $89.95 100' $74.95 75' $59.95 50' $44.95 25' $29.95
15' $26.95 10' $23.95 6' $14.95 3' $13.95 1' $12.95

With USA made Silver/Teflon®/Gold Pin PL259 to male "BNC"

FLEXIBLE 9913 strd BC cntr foil+95% braid 2.7dB 400MHz NC/DB/UV JKT. 50' $45.95

HT Solutions: use any of these jumpers to improve & increse the life of your HT.

RG8 MINI (X) 6'	PL259-male BNC 6'	$9.95
RG58/U w/Right Angle Male BNC to SO239 3'		$14.95
RG58/U w/Right Angle Male BNC to PL259 3'		$14.95
RG142/U w/Female BNC to Male SMA 3'		$9.95

All connector terminations are soldered, Hi-Pot® tested @ 5kv for one minute, continuity checked, ultra violet resistant heat shrink tubing, and red protective caps. Which can also be used as a boot. CUSTOM CONNECTOR WORK TOO.
Call for price and delivery.

CONNECTORS

Both connectors fit 9913 types and LMR400 MADE IN USA

PL 259 SILVER/*Teflon®*/GOLD TIP.....10PC $12.50.....25PC $27.50.....50PC $52.50....100PC $100.00
"N" (2PC) SILVER *Teflon®* /GOLD TIP...10PC $32.50.....25PC $75.00.....50PC $143.75..100PC $275.00
For our other connectors and adapters see http://www.cablexperts.com

TINNED COPPER "FLAT" GROUNDING BRAID

1 INCH WIDE (equivalent to 7ga).....25FT $24.00.....50FT $47.00.....100FT $94.00
1/2 INCH WIDE (equivalent to 10ga)..... 25FT $14.00.....50FT $27.00.....100FT $53.00
1/2 INCH x 6FT Copper Plated Ground Rod w/clamp.....$7.00 each

I.C.E. PRODUCTS

180A Beverage/Longwire matching unit.....$39.00/ea
348 Rotor cable Line filter.....$44.00/ea
303U Coax impulse suppressor 8 kW 1.5-200MHz.....$44.00/ea
516R Remote RF power switch for up to 6 antennas.....$184.00/ea
Individual Band Pass Filters.....$35.00/ea
Purchase two or more ICE units and enjoy a 10% discount.
All other I.C.E.s stocked.

HELIAX® LDF series from **ANDREW®** Corporation.

- **Premium electrical performance.**
- **100% RF shielding.**
- **50 Ω Impedance.**
- **Very Low Loss Foam Dielectric.**
- **Use "N" and/or UHF connectors.**
- **Termination price: $15.00/each.**

CABLE PRICES

Cable	Size	Price/ft
LDF2-50A	3/8"	$1.70
LDF4-50A	1/2"	$2.10
LDF5-50A	7/8"	$5.37

CONNECTOR PRICES

Cable	"N"/Price	UHF/Price ea.
LDF2-50A	$27.00	$41.75
LDF4-50A	$30.00	$27.00
LDF5-50A	$73.00	$70.00

Prices do not include shipping. $20.00 minimum order.
Prices subject to change without notice.

http://www.cablexperts.com
FAX: 847-520-3444
TECH INFO: 847-520-3003
HOURS: M-F 9AM-5PM CST.

ORDERS ONLY:

800-828-3340

416 Diens Drive, Wheeling, IL 60090

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CABLE X-PERTS, INC.

cations exercises to prepare themselves for this event. It's still not too late to help. Remember that our State Emergency Frequencies that will be monitored December 31 through Jan 1, and longer if needed, are SSB Voice on 3932 kHz on 75 Meters and 7232 kHz on 40 Meters. Also CW on 3663 kHz on 80 Meters and 1200 baud Packet on 145.760 and 145.090 on 2 Meters. The callsign of our State EOC in Lansing is WC8EOC. Please remember to have your batteries charged and a good supply of portable light along with warm clothes. You may want to consider putting together a "ready pack" to use at a moments notice. And those of you that use prescription medications, be sure to have an adequate supply on hand. A first aid kit would be a useful item as well. Remember it is wise to be prepared so that you can be an asset rather than a liability. I would also like to take this opportunity to extend my thanks to everyone that has been involved in our Michigan Section programs in the past year. It is you and your help that makes us the strong communications team that we are. Please continue to support our programs and help to add to our ranks by getting a friend involved. We have a spot for anyone willing to help. I hope that we all have a safe and uneventful Happy New Year 2000! 73, Dick, W8FQT. Traffic reports for October 1999: K8GA 238, WB8SIW 224, KB8ZYY 162, AA8PI 134, K8LJG 117, W8RTN 89, N8FPN 85, WX8Y 71, K8AE 61, K8KV 52, W8RNQ 50, AA8SN 42, K8UPE 28, KC8GMT 29, W8YIQ 28, K3UWO 25, N8OSC 22, KC8GMT 20, N8JGS 20, KC8GMQ 20, WB8WJV 19, WA8DHB 17, KI8GR 17, K8AI 11, K8ZJU 10, N8TDE 9, KB8EIW 8, N8SJP 1. (Reports by 5th of the month please)

Net	*QNI*	*QTC*	*Sess*	*Freq*	*Time*	*Day*
QMN	721	401	65	3.663	6:30&10 PM	Daily
MACS	230	57	31	3.953	11 AM	Daily (1 PM Sun.)
MITN				3.952	7 PM	Daily
UPN				3.921	5 PM	Daily (Noon Sun.)
GLETN	547	93	31	3.932	9 PM	Daily
SEMTN	451	96	34	146.640	10:15 PM	Daily
WSSBN	701	35	31	3.935	7 PM	Daily
ARAHH	54	4	4	145.130	8 PM	Wed
VHF Nets	161	0	11	Various		

OHIO: SM, Joe Phillips, K8QOE, Fairfield, (to contact me, see page 12)—ASM-NE Ohio: Bob Winston, W2THU, Cleveland, **w2thu@nacs.net**. ASM-NW Ohio: Ron Griffin, N8AEH, Findlay, **griffin@ohio.tds.net**. ASM-Central Ohio: Mary Carpenter, N8AOM, Columbus, **n8oam@iwaynet.net**. ASM-SW Ohio: John Haungs, W8STX, Cincinnati, **w8stx@aol.com**. ASM-SE Ohio: Connie Hamilton, WD8MIO, Marietta, **wd8mio @arrl.net**. SEC: Larry Solak, WD8MPV, Mantua 330-274-8240. STM: Jack Wagoner, WB8FSV, Hilliard, **fsv@netwalk .com**. ACC: Joanne Solak, KJ3O, Mantua, 330-274-8240. TC: Mike Brown, W8DJY, Middletown, **w8djy@arrl.net**. PIC: (appointment pending) OOC: Carl Morgan, K8CM, Middletown, **k8cm@arrl.net**. SGL: Jeff Ferriell, K8ZDA, Columbus, **jferriell@law.capital.edu.**....By now we have elected a Great Lakes Division Director (and vice-director) to new three year terms. These officers represent Ohio, Michigan and Kentucky on the ARRL National Board. The only other elected position for Ohio is Section Manager and a new two year term for that position will be on the ballot for all ARRL members in Ohio this year. This elected official is responsible for all ARRL programs and field appointments in Ohio. All of you reading *QST* know this but it would help if you bring it up at club meetings and hamfest forums so all ARRL members know how the League works.....Saturday, January 15 at Thesken Hall of Miami University of Middletown, Ohio, will host the 14th Annual SW Ohio Digital Symposium. Interested in CW, RTTY, Packet, AMTOR or other digital modes? Plan to attend. For all newsletter editors or club database managers - please make sure your addresses for the SM, your area ASM, PIC, ACC are all up to date and correct. All of us should be receiving your newsletters and club activities. It is to your advantage to spread the news around...OHIO SECTION APOLOGIES to Doug Marsh, N8TUT, Columbus for missing his call in the November *QST*. He is veep of Capital Cities RA...OHIO SECTION CONGRATS:...(A) To Alliance ARC's new officers, KG8RN, pres.; KE8VE, veep,; W8UKQ, sect.; KB8IVS, Treas.; and trustees, K8LTG, N8XTJ, and KA8GRC. (B) To Jim Powell, N8NLE, Toledo, for his defense of CW in the Aug. 2, Toledo Daily Blade newspaper.(C) To Ohio Ham Radio Newsletters who have done a masterful job in explaining Universal Licensing (ULS) and our obligations under the new law. And also to those newsletters who spotlighted the October Boy Scouting Jamboree OF The Air (JOTA) which introduces ham radio to a group vital to our future - young people. Two major reasons to join and support your local ham radio club.....(D) To Ben Pfeiffer, KA8LLE, Canton for his "Elmering" story in the Canton ARC newsletter "Feedline" for August, 1999...(E) New officers for Lancaster and Fairfield County ARC, Tom Moore, KB8USK, pres; Larry Pontious, W8ZZZ, veep; Ed Campbell, Sr., WD8PGO, sec; Kevin Numbers, KC8MTV, tres; and Becky Plouge, KC8LXC, activities mgr....(F) New officers for Greater Cincinnati ARA, Jay Parks, N8JP, pres; Gary Osbourne, W8XS, 1st veep; Jim Kamphaus, N8SIM, 2d veep; Allan Hale, WA9IRS, rec sec; Tom Denham, K8VOE, corrs sec; and Frank Bernhardt, W8DOS, treas. (G) To the Maple Knoll ARC, Cincinnati, for its recent affiliation with the ARRL and its new newsletter....de K8QOE. Now for the October traffic reports.

Net	*QNI*	*QTC*	*QTR*	*Sess*	*Time*	*Freq*	*Mgr*
BN (E)	131	53	247	31	1845	3.577	WD8KFN
BN (L)	158	72	348	31	2200	3.577	NY8V
BNR	99	16	673	31	1800	3.605	W8LDQ
OSN	152	60	649	31	1810	3.708	WB8KQJ
OSSBN	1930	540	2330	93	1030,1615,1845	3.9725	KF8DO
OH Section ARES Net					1700 Sun	3.875	WD8MPV

Tfc: KF8DO 257, WD8KFN 173, NS8C 156, N8IXF 151, WB8FSV 143, W8STX 142, W8PBX 141, KA8FCC 127, KD8HB 113, N8FWA 112, KB8TIA 104, N8TNV 101, N8YWX 85, KC8KYP 84, KA8FCC 82, WA8SSI 79, WD8MIO 71, KI8IM 70, WA8HED 61, N8DD 56, K8OUA 52, WA8EYQ 50, N8YXL 43, W8WOQ 40, KI8O 39, WB8IOW 37, W8BO 34, W8RG 32, KA8VWE 32, N8PAI 29, WD8KBW 27, NY8V 27, KC8FWU 26, KC8HFV 25, WB8HHZ 25, WA8HED 24, W9GGA 24, K8IG 21, N8CW 19, KC8DWM 17, KI8GW 12, N8GOB 12, KC8HFV 12, KF8FE 9, KC4IYD 9, W8GAC 8, W8RPS 8, KI8GW 7,

MFJ Contest Voice Keyer

Brand New design . . . Microprocessor controlled

Transformer-coupled -- No RFI, hum or feedback . . . 75 seconds total, 5-messages . . . Can be computer-controlled by CT, NA, etc . . . Records received audio . . .

Let this *new* microprocessor controlled MFJ *Contest Voice Keyer*™ call CQ, send your call and do contest exchanges for you in your own voice!

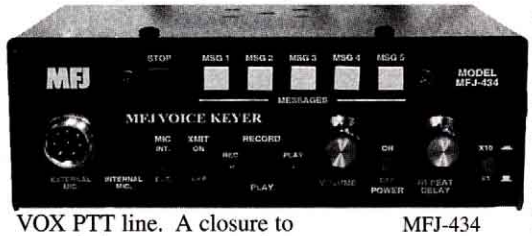
Store frequently used phrases like "CQ Contest this is AA5MT", "You're 59" . . . "Qth is Mississippi" and more! Contest by pressing a few buttons and save your voice.

You can record and play back five natural sounding messages in a total of 75 seconds. EEPROM technology keeps messages stored for up to 100 years -- no battery backup needed.

Repeat messages continuously and vary the repeat delay from 3 to 500 seconds. Makes calling CQ so easy and it's also a great voice beacon.

A receive audio jack lets you record and play back off-the-air signals -- great help if you didn't get it right the first time! No more "*Please repeat*".

A playing message can be halted by pressing the *Stop Button*, your PTT mic button or by your



VOX PTT line. A closure to ground via remote control or computer can also halt messages.

MFJ-434
$179.95
plus s&h

Has jack for remote or computer control (using CT, NA or other program and its interface). Lets you select, play and cancel messages.

The MFJ-434 is transparent to your microphone -- your mic's audio characteristics do not change when your MFJ-434 is installed. Dual controls make it easy to tailor audio level to match your voice.

All audio lines are RF filtered to eliminate RFI, audio feedback and distortion. An audio isolation transformer totally eliminates hum and distortion caused by ground loops.

It's easy to use -- just plug in your 8 pin microphone cable and plug the MFJ-434 shielded cable into your transceiver's mic connector. Internal jumpers let you customize it to Kenwood, Icom, Yaesu, Alinco or Radio Shack rigs. Use your station or built-in microphone for recording.

Built-in speaker-amplifier lets you monitor stored messages. 3.5 mm speaker/headphone jack. SMT technology. Use 9 Volt battery, 9-15 VDC or 110 VAC with optional MFJ-1312B, $14.95. 6½Wx2½Hx6½D inches.

MFJ-73, $29.95. Remote Control Head with cable for MFJ-434.

MFJ *Professional grade* Boom Mic Headphones

For marathon contesting, DXing, traffic nets, ragchewing . . . These lightweight, fully padded Boom Mic Headphones make operating superbly comfortable! Flexible gooseneck microphone boom and speech frequency tailored microphone cuts through noise and QRM!

This *professional grade* MFJ Boom-Mic Headphones set is designed for contesting, DXing and traffic nets. Features *total comfort* design with leatherette padding for operating long hours.

Superb 3/4 inch thick padding on each ear and headband lets you wear your headset all day long! So super lightweight, you won't even know they're there! Headband adjusts for a perfect fit to keep out external noise.

The headphones' frequency response is enhnanced for communications to bring out speech fidelity that you never knew existed. Signals never sounded so crystal clear.

The flexible microphone boom lets you position the mic comfortably at an optimum distance to minimize silibant sounds.

MFJ's frequency tailored microphone element lets you bust through noise and QRM!

Extra-long 9⅔ feet of cable lets you move about your ham shack!

Has standard 1/4 inch jack for headphones and 3.5 mm jack for microphone. Build your own adaptor or use MFJ's pre-wired adaptors to match your transceiver. **Order** MFJ-5396 Y/K/I (YAESU, KENWOOD, ICOM respectively). $15.95 each.

Even casual operators will appreciate the advantages of MFJ's superbly crafted Boom-Mic headphones for *hands-free* operating at an incredibly low price.

MFJ-392, $19.95. Communication Headphones only. Great for ham radio, shortwave listening -- all modes, SSB/FM/AM/ Data/CW.

Each phone has individual volume and speech enhancement control. Superb leatherette padding.

Both MFJ-392 and MFJ-396 have MFJ *No Matter What*™ one year limited warranty.

MFJ Communications Speaker

SSB, FM, AM, and CW never sounded so crystal clear! Plug in this MFJ-281 *ClearTone*™ speaker and bring out communication speech fidelity that you never knew existed. Restores the smooth sinewave sound that CW naturally generates and makes copying easier. It was carefully designed to improve intelligibility of speech in the frequency range of 600 to 4000 Hz while reducing undesirable noise, static and hum. A top grade 3" Mylar cone speaker is mounted in a well designed baffle. Its fine mesh metal grille allows sound to radiate without muffling. 8 Watts, 8 Ohms. Six foot cord. 3.5 mm mono plug. 3¾x3x2¼ inches.

MFJ-281
$12.95
Ship Code A

MFJ 12/24 Hour DXers Watch

MFJ-181
$39.95
plus $6 s&h

This *MFJ DXers Watch* lets you quickly check 12 hour local time and 24 hour time in time zones around the world. By noting day and night areas around its rotatable bezel, you can estimate which bands are open each hour to different parts of the world. You can even estimate best times of gray line propagation. It features a highly accurate *Japanese* quartz movement. Turn out the lights . . . *NiteGlo*™ hour, minute and second hands show up in the dark! Has date display. Well-known world cities encircle it's attractive world map face to indicate time zones. A durable stainless steel band adjusts to fit. Attractive giftbox has felt padding. A great gift!!!

MFJ 12/24 Hour LCD Clock

MFJ-108B
$19.95
plus $6 s&h

Dual Clock with separate 24 hour UTC and 12 hour local time displays. Large 5/8 inch LCD numerals, heavy brushed aluminum frame, sloped face, battery included. Synchronizable to WWV. 4½x1x2 in.

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W8DYF 6, W8GPQ 6, KB8SIA 6, K8RDK 6, KE8FE 5, KE8FK 5, W8LDQ 5, N8RAK 5, KB8SBK 4, KC8HTP 3, KE8FX 3, W8RPS 3, KD9K 3, K8QIP 1, KA8YIT 1.

HUDSON DIVISION

EASTERN NEW YORK: SM, Rob Leiden, KR2L—STM: Pete Cecere, N2YJZ. SEC: Ken Akasofu, KL7JCQ. ACC: Shirley Dahlgren, N2SKP. SGL: Herb Sweet, K2GBH. PIC: John Farina, WA2QCY. BM: Ed Rubin, N2JBA. OOC: Hal Post, AK2E. TC: Rudy Dehn, W2JVF. ASM: Tom Raffaelli, WB2NHC. ASM: Bob Chamberlain, N2KBC. ASM: Andrew Schmidt, N2FTR. ASM: Richard Sandell, WK6R. ASM: Phil Bradway, KB2HQ. Net Reports (October 1999) Check-ins (QNI)/Traffic handled (QTC+QSP): AES 33/6 CDN 330/148 CGESN 44/0 ESS 390/234 HVN 563/240 NYPHONE 248/879 NYPON 318/504 NYS/E 414/588 NYS/M 212/245 NYS/L 291/524 SDN 345/103. Congrats on its ARRL club reactivation and welcome back to WA2ZWS, the Albany State Univ. Remember to keep your emergency gear ready at all times, especially in the car! Check out the ENY Emerg Net 145.25 on the 1st Tues each month. 73 de KR2L. PSHR: N2YJZ N2JBA W2AKT WB2ZCM W2JHO K2BTP WA2YBM KC2DAA Tfc: N2YJZ 452, N2JBA 86, N2TWN 86, WB2ZCM 55, KC2DAA 41, W2JHO 40, K2BTP 39, WA2YBM 30, W2AKT 14, N2AWI 6, KL7JCQ 5, WA2BSS 4, N2YGK 2, K2AVV 1.

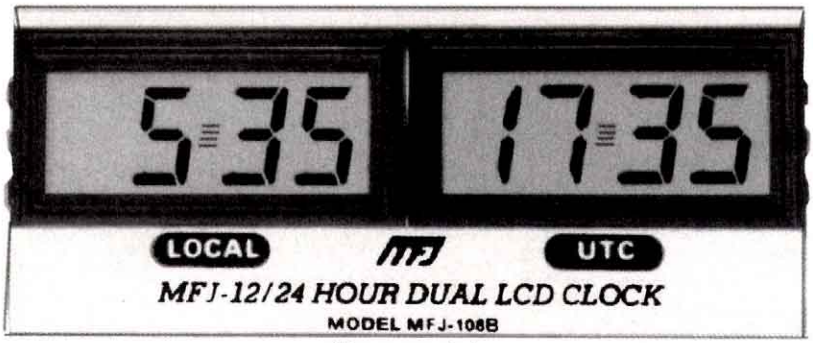
NEW YORK CITY / LONG ISLAND: SM, George Tranos, N2GA—ASM: KA2D, N1XL, K2YEW, W2FX, KB2SCS. SGL: N2TX. SEC: KA2D. ACC: K2EJ. PIC-East: N2RBU. PIC-West: K2DO. TC: K2LJH. BM: W2IW. OOC: N1XL. STM: WA2YOW. Please check in to your local ARES net on New Year's Eve and Day for help with Y2K preparedness. Nassau County ARES will be on 146.805 MHz and Suffolk County on 145.33 MHz. Ham Radio University / Long Island is Sunday, Jan. 23, 2000, 9 to 3 PM at Babylon Town Hall Annex in North Babylon. Fifteen different forums are scheduled including license restructuring, DX, contesting, antennas, purchasing amateur radio equipment, Packet flexnet , ARES, APRS, Satellite, QRP, YL, Tower and Antenna regulations, RFI, RF Safety, QCWA, and kit building. Talk-in on 146.685 MHz. Check the NLI Webpage at **www.arrlhudson.org/nli** for more information on upcoming events. NYC/LI VE exam list follows: Islip ARES, 1st Sat 9 AM, Slip Town Hall West 401 Main St. Slip, Len Battista, W2FX, 516-277-0893. Bears VE: ABC Bldg Cafeteria, 125 West End Ave at 66th St. Call Hotline 212-456-5224 for exact dates & times, Jerry Cudmore, K2JRC. Grumman ARC (W5YI) 2nd Tues 5 PM. Northrop-Grumman Plant 5 S Oyster Bay Rd via, Hazel St Bethpage, NY. Bob Wexelbaum, W2ILP, 516-499-2214, LIMARC, 2nd Sat 9 AM NY Inst of Tech, 400 Bldg Rm 409, Northern Blvd. Old Westbury, Al Bender, W2QZ, 516-623-6449. East Village ARC, 2nd Friday 7 PM, Laguardia HS, Amsterdam Ave and West 65 Street, Manhattan. Robina Asti, KD2IZ, 212-838-5995. Great South Bay ARC, 4th Sun 12 PM, Babylon Town Hall, ARES/RACES Rm 200 E Sunrise Hwy N Lindenhurst, Michael Grant, N2OX, 516-736-9126. Hellenic ARA: 4th Tues 6:30 PM; Pontion Society, 31-25 23rd Ave, Astoria, NY, George Anastasiadis, KF2PG, 516-937-0775. Larkfield ARC, Huntington Town Hall, room 114, 2nd Saturday in Feb, May, Sep, Nov, Contact Stan Mehlman N2YKT, 516-423-7132. Columbia U VE Team: 3rd Mon 6:30 PM, Watson Lab 6th.floor 612 W 115th St NY, Alan Crosswell, N2YGK, 212-854-3754 PARC: exams held every three months at Southold School Oaklawn Ave, Southold, NY, on next to last Friday of the month.6:30 PM all classes of licenses. For info contact Ralph Williams/N3BT 516-323-3646. Mid-Island ARC, Last Tue. 7 PM, Brookhaven Rec Ctr, 20 Wireless Rd, Centereach, NY. Mike Christopher, KG2M, 516-736-9126. Report all changes to N2GA before the 12th of the month. Tfc: WB2GTG 310, N2AKZ 200, KB2KLH 85, W2RJL 85, N2XOJ 52, WA2YOW 31, KB2GEK 28.

MIDWEST DIVISION

IOWA: SM, Jim Lasley, N0JL—ASM: N0LDD—SEC: NA0R. ACC: N0IJP @ KE0BX. BM: K0IIR @ W0CXX. SGL: K0KD. TC: W0DIA Need an early warning? Amana hamfest will be August 13, 2000, and the Davenport fest will be Nov 5, 2000. The review by KE0BX of a logging program by N3FJP was favorable. Hey, Randy, KA0DX! What's this about Chinese accented CW? See you at the bottom of the band! WB0UGO has some beautiful pictures of Heathkits in the ACRS newsletter. The BFDARG sounds like fun. TSARC has put more electric heat in their van. Seems it was WAY too cool. Check with WA0AUU about "Project Buzz." They also have a 200A power supply for their repeater. Now that's QRO! Welcome to KG0DC, the new EC for Warren County. OARC has changed the location for the monthly breakfast... again. Want to be a club officer? Burlington is looking for a few good folks. And I would guess that YOUR club would like some new ideas, also. It does take a little time but the rewards can be great. If you would like to have a better club, it is up to you to make it happen! I have read several comments that it is difficult for clubs to find develop programs for the meetings. Ain't no guarantee of great, but I know a Section Manager that has been asked to speak to clubs only two (2) times in five years! Give me a call (or e-mail) and see what we can work out. Newsletters were received from SIETS, FMARC, ACRS, NIARC, TSARC, OARC, IIARC, SARA. Traffic: W0SS 101, N0JL 19, WB0B 2. 73 de N0JL

KANSAS: SM Orlan Cook, W0OYH—ASM/ACC/OCC: Robert Summers, K0BXF. SEC: Joseph Plankinton, WD0DMV. SGL: Marshall Reese, AA0GL. The Mine Creek ARC ARRL approved hamfest will on Feb. 5, 2000, at La Cygne, KS. KS QSO Party Jan 19 to 30 info sheet via **wa0ks@arrl.net**. Larry N0LLworked the VHF Contest 50 MHz thru 1296 MHz for 26,596 score. Don't any one forget the ARRL state convention Aug 27 at Salina. For more KS info see our "KAR" Kansas Amateur Radio Web site **http://www.colossus.org/kar/** Pse welcome new DECs John, N0LJR, of Topeka, Doug N0LKK, Plainville, ECs Doug, N0MZX, Paola, Ken, KB0RPV, Olsburg, & John, WW0H, Hillsboro. I am sending out a KAR e-mail newsletter each month and it is available to anyone sending me their e-mail address. Thanks for serving your neighbors by being prepared. Sep Kansas Nets: sessions/QNI/QTC, KSBN30/914/81 KPN21/268/27 KMWN30/604/506 KWN30/816/517 CSTN 26/1821/98 QKS 54/214/58 QKS-SS 6/14/1 JCA3/8/0 SEC 44/805/13 QNS DMV KB0AMY WD0DDG AA0HJ AA0IQ N0LJR KF4LM KB0PQP N0UXG TEN 167 msgs Ks 60% W/AA0FO KX0I K0PY NB0Z WB0ZNY = W0SSmgr DTRN 60/598/270 Ks 100% W/AA0OM W0WWR N0KFS KF0WS W0FE KB0AMY N0KJ Mgr. BBS reports: W1AW

MFJ 24/12 Hour Clocks



Shown actual size

Dual 24/12 hour LCD Clock

MFJ-108B

$19.95 plus s&h

MFJ-108B dual clock has separate 24 hour and 12 hour displays. Lets you read both UTC and local time simultaneously. Features huge high-contrast 5/8 inch LCD numerals that makes it easy to read across the room. Mounted in solid brushed aluminum frame with sloped face for easy viewing. Synchronizable to WWV for split-second timing. Quartz controlled for excellent accuracy. Long life battery included. 4½Wx1D x2H in. MFJís famous *No Matter What*™ one year limited warranty. *$6 s&h.*

DXerís Wall Clocks

MFJ-125, $29.95. 12 inch DXerís Quartz wall clock gives 24 hour time plus more. Has three smaller independently settable dials for 12 hour time, day of week and date. No more day/date confusion when logging DX! Highly visible, easy-to-read dials! Has Seconds hand.

MFJ-115, $24.95. Set this 24 hour clock to UTC/ GMT and you can determine the time in any time zone of the world at any time of the day. Premier world cities encircle its colorful world map face to indicate time zone. 12 inch face is easy to see across room. Has Seconds hand.

MFJ-105C, $19.95. *Worldís most popular ham radio wall clock!* True 24 hour Quartz movement. Huge 12 inch black face with large white numerals give excellent visibility across room. Attractive gold colored hour, minute and seconds hands.

MFJ-126, $24.95. 12 hour Quartz movement gives 12 hour time on inner dial (for XYL) and 1200 to 2400 hour time on its outer dial (for you). Attractive clean, white face is highly visible. Real glass cover! Handsome hunter green trim. Has seconds hand.

Hi-Contrast LCD Clocks

MFJ-119B, $49.95. Giant LCD Display 24/12 Hour Clock. Has *giant* see-across-the-shack 2¼ inch time digits. Digital calendar or clock modes. Displays inside temperature (F/C), relative humidity, month, date and day of week. Handsome hunter green and tan color. Wall mount. 8½x9 inches.

MFJ-118, $24.95. 24/12 hour clock has jumbo 1¼ inch LCD digits. Displays 24 or 12 hour time, year, month, date, and day of week. 100 year full calendar. Hang on wall or desk mount. 5¾Wx2½Hx½D in.

MFJ-107B, $9.95. 24 hour UTC Clock has large 5/8 inch LCD numerals. Synchronizable to WWV. Solid brushed aluminum frame lasts for years. Long life battery included. 2¼x1x2 in.

MFJ-112, $24.95. 24/12 Hour World Map LCD Clock displays time in *every time zone in the world*. Selected time zone flashes on LCD world map. Displays 24 or 12 hours, minutes, seconds, year, month, date, day, time zones, cities. Single button accesses pre-set second time zone. Alarms for two time zones. Adjusts for daylight savings time.

MFJ-152, $24.95. Read Indoor *and* Outdoor temperatures *and* 24/12 Hour time at-a-glance on huge 3/4 inch LCD digits! Choose F or C. Stores minimum and maximum temperature readings. Has backlight for in-the-dark viewing, outdoor temperature sensor with ten foot cable.

Bright LED Clocks

MFJ-114B, $59.95. Bright, GIANT 1.75 inch red LEDs are the biggest and brightest weíve ever seen! 24 or 12 hour time with *seconds* digits. Easily seen 50 feet away -- even in the dark! 110 VAC. Great on your desk or mounted on the wall! 12½Wx4½ in.

MFJ-116, $14.95. Big bright 5/8 inch LED digits. 24 or 12 hour, 9 min. ID timer, battery back up. Black. 110VAC.
MFJ-116DC, $19.95. 12 VDC, plugs in cigarette lighter. *Great for motorhomes and truckers!* 12 hour only.

Monster Display Atomic Clock with PinPointAccuracy™

MFJ-120, $69.95. 24/12 hour *Atomic Clock* automatically receives WWVB for millisecond accuracy. Monster 2 inch LCD characters. Reads relative humidity and temperature (F or C). Has alarm. Attractive metallic copper color. Use on desk or mount on wall. Giant 8x10½Wx¾D inch showpiece.

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Receive continuous weather info/ warnings on all 7 weather channels: 162.4/.425/.45/.475/.5/.525/.55 MHz from 380 U.S. locations 24 hours/day. Also includes AM/FM radio, spotlight, siren, flashing light for emergencies. Water resistant cabinet. Shoulder strap. Great for hamfests, DXpeditions, camping.

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Ham Radioís most versatile tool! This 14-in-1 tool pocket-size toolbox is all you need for putting up antennas or working on rigs. Includes needle-nose pliers with wire cutters and jaws for gripping. Has flathead and Phillips screw drivers, knife, ruler, file, punch, more! Stainless steel, belt carrying case.

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Bul/Per/NTS AA0HJ 21/507/0 N0OBM 45/218/0. Tfc: N0KJ 400, WB0ZNY 85, OYH 71, K0PY 56, K0RY 40, KX0I 26, W0WWR 21, N0ZIZ 16, KB0DTI 14, K0BJ 4, KB0GUS 4, K0NK 2.

MISSOURI: SM, Dale Bagley, K0KY—ASM: Tom Housworth, KI0JO. ASM: John Seals, WR0R. ACC: Keith Haye, WE0G. OOC: Mike Musick, N0QBF. PIC: Dennis McCarthy, AA0A. SEC: Fred Langeneckert, WA0US. SGL: E.B. DeCamp, KD0UD. STM: Tom Housworth, KI0JO. TC: Wayland McKenzie, K4CHS. I enjoyed the opportunity to visit with many amateurs at the St Louis Suburban Radio Club meeting. Fred Langeneckert, WA0US, the club president served also as the MO Section Emergency Coordinator. Because of a job change, Fred will be moving to Texas and he will really be missed by both the SRC and the MO Section. The Suburban Radio Club has a great newsletter edited by Ed Henderson, WA5VJF, and an outstanding Web Page, by Brian Vanderheyden, KB0PRY. I had a great time visiting the SMARC club in Springfield, MO. SMARC members and President Bruce, Braithwaite, N9TTN, are working hard to get an Emergency Communications trailer. The SMARC newsletter, SMARCALLING, is one of the best in the MO Section. The Southside Hamfest in Gladstone, MO was a well received Hamfests. I want to thank John Seals for representing the MO Section ARRL at the Southside Hamfest. I attended the Halloween Hamfest in Kirkwood. Steve Welton, WB0IUN, and the committee did a great job promoting the well-attended event. I add my voice to those thanking outgoing Midwest Director Lew Gordon, K4VX, for the effort he has made in behalf of the ARRL and Amateur Radio in his tenure as Director. I know that the new director will have some big shoes to fill. Net Reports: QCWA#35 4/94/0; HAMBUTCHERS 21/720/31; AUDRAIN ARC 5/52/5 WAARCI 5/142/0. MOTN 31/591/137. MON 60/165/46. ROLLABILLBOARD 29/322/3; JACOARES 5/38/0 PAUL REVERE 5/47/0. Tfc: KE0K 144, W0WFF 89, KI0JO 150. PSHR: W0WFF 147, KE0K 130, KI0JO 48.

NEBRASKA: SM, Bill McCollum, KE0XQ—ASMs: W0KVM, N0MT, WB0ULH, WY0F & WB0YWO. It is with deep regret to inform you that the following amateurs have become Silent Keys; Ed Woerner, WA0QJK, and Lois Keene, K0SFB. Ed had been the Television Network Engineer for NETV. Lois was a charter member of the Plattsmouth ARC. Congratulations to Merritt, WA0HFH, on his twenty years as a NCS for the Nebraska Storm Net. I want to take this time to thank all ARRL members in the section for their continued support in 1999. I especially want to recognize the EC's for devotion to their jobs. The Lincoln ARC received a letter of appreciation from the Lancaster County Sheriff for their communications support of the Nebraska State Fair. So far in 1999 the LARC has total of 4,240 volunteer hours! On October 10, 8 Amateurs from the AK-SAR-BEN provided communications support for the Crop Walk in Omaha. The Midway ARC announces Hamfest 2000 to be held in Kearney February 12. Net Reports: NCHN QNI 27, QTC 19 & 27 sessions, NMPN QNI 1556, QTC 10 & 31 sessions, Mid NE ARES QNI 317, QTC 4 & 29 sessions, NESN QNI 712, QTC 7 & 31 sessions, W0IRZ QNI 91, QTC 4 & 7 sessions, NE 40 Meter Net QNI 327, QTC 4 & 24 sessions. Traffic: K0PTK 114, KE0XQ 28, W0RWA 10, W0WLO 8, WY0F 8, KA0DOC 2, W0UJI 2, WA0ZCM 2, KA0CPO 2, K0SW 2, W0EXK 2, WC0O 2. PSHR: KA0DBK 111, KB0YTM 16.

NEW ENGLAND DIVISION

CONNECTICUT: SM, Betsey Doane, K1EIC—BM: KD1YV. OOC: WA1TJT. PIC: W1FXQ. SEC: WA1D. SGL: K1AH. STM: K1HEJ. TC: W1FAI. Congrats to Brian, KB1BEX, on his election as President of SCRAMS. Many thanks to Harrison, WA1YQI, for his arduous work as president. Congrats to Wade, W1GHU, on his election as president of the CT Nutmeg Chapter of the QCWA. SCARA reports that The SCARA snow birds and others can be contacted on the following frequencies: 10 AM EST 14.330 MHz or 14.3425 MHz, 12 noon EST 28.350 MHz. Congrats to Dave, WA1WUF, on upgrading to Advanced! Check out some new Web sites: SCARA: **http://www.wa2fnq.hamradios.com/scara.htm**; SCRAMS: **http://www.qsl.net/kb1bzp/**. The Greater Norwalk ARC is staring a Novice class January 4 so spread the word! It was fun talking with Scouts about our involvement with Y2K preparedness. They were looking forward to their camping weekend and JOTA activities! I will be speaking to the Stamford ARC in January. Speaking of January, A VERY HAPPY AND HEALTHY NEW YEAR TO YOU ALL! Get involved! Strive to become leaders even in small groups. We need your enthusiasm and energy! Why not give something new a try! NTS Net Schedule: CT Phone Net: 3.965 M-SA, 1800; Su. 1000 N1DIO NM; CT Net: 3.640 1900 daily N1AEH NM; Western CT Traffic Net 147.18/R 2030 dy KA1GWE NM; Eastern CT Traffic Net 2100 146.73 DY WA4QXT NM; Nutmeg VHF Tfc Net 146.88 2130 dy K1STM NM. Net sess/QNI/QTC: WESCONN 33/343/123; ECTN 31/280/75; NVTN 31/176/57; CPN 31/262/92; CN 28/85/33; BEARS of Manchester 28/310/105. Tfc: NM1K 1994, KA1VEC 426, KA1GWE 184, KE1AI 132, WA4QXT 118, N1VXP 114, K1STM 102, KB1CTC 15.

EASTERN MASSACHUSETTS: The following was submitted by STM Bill Wornham, NZ1D.

Net	*Sess*	*QTC*	*QNI*	*QTR*	*NM*
EMR	62	194	226	596	K1SEC
EMRIPN	31	96	182	433	WA1FNM
EM2MN	31	122	321	425	N1LKJ
HHTN	31	33	250	320	N1IST
CITN	31	76	293	523	N1SGL
WARPSN	5	14	68	NA	K1BZD
NEEPN	5	6	15	NA	WA1FNM
CHN	31	36	173	323	W2EAG

Tfc: WA1TBY 222, W2EAG 184, N1LKJ 109, WA1FNM 102, N1TPU 86, NZ1D 84, K1SEC 69, K8SH 54, WA1LPM 50, N1OBL 42, KD1LE 41, NG1A 36, N1LAH 34, N1AJJ 33, N1IST 27, N1TDF 22, KB1EB 11, N1BNG 8, WA1VRB 6, N1VUX 1.

MAINE: SM, Bill Woodhead, N1KAT—ASMs: WA1YNZ, KA1TKS. STM: NX1A. BM: W1JTH. SGL: W1AO. ACC: KA1RFD. OOC: KA1WRC. PIC: KD1OW. SEC: N1KGS. Asst Dirs: W1KX, KA1TKS, K1NIT. Web Site: N1WFO. Tick, tock, tick, tock, the countdown to the Y2K ARRL State Convention is approaching rapidly. The dates are March 24-25. So far, things are coming together well. There is still time to include new topics or programs that may interest you. If you or your club has a special interest and are willing to make an effort to

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Find your antenna's true resonant frequency. Trim dipoles and verticals.

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Perfectly tune critical HF mobile antennas in seconds for super DX -- without subjecting your transceiver to high SWR.

Measure your antenna's 2:1 SWR bandwidth on one band, or analyze multiband performance over the entire spectrum 1.8-170 MHz!

Check SWR outside the ham bands without violating FCC rules.

Take the guesswork out of building and adjusting matching networks and baluns.

Accurately measure distance to a short or open in a failed coax. Measure length of a roll of coax, coax loss, velocity factor and impedance.

Measure inductance and capacitance. Troubleshoot and measure resonant frequency and approximate Q of traps, stubs, transmission lines, RF chokes, tuned circuits and baluns.

Adjust your antenna tuner for a perfect 1:1 match without creating QRM.

And this is only the beginning! The MFJ-259B is a complete ham radio test station including -- frequency counter, RF signal generator, *SWR Analyzer*™, RF Resistance and Reactance Analyzer, Coax Analyzer, Capacitance and Inductance Meter and much more!

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Fully portable, take it anywhere -- remote sites, up towers, on DX-peditions. It uses 10 AA or Ni-Cad batteries (not included) or 110 VAC with MFJ-1315, $14.95. Its rugged all metal cabinet is a compact 4x2x6¾ inches.

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Wear it around your waist, over your shoulder, or clip it onto the tower while you work -- the fully-adjustable webbed-fabric carrying strap has snap hooks on both ends.

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MFJ-99, $54.85. Accessory Package for MFJ-259/B/249/B/209. Includes *genuine* MFJ-29C carrying case, MFJ-66 dip meter adapter, MFJ-1315 110 VAC adapter. ***Save $5!***

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put it in a forum that could be presented to the amateur community, please let me know ASAP at **N1KAT@arrl.org**. There is always room for good programs! Thanks to the hundreds of hams who staffed the EOCs and hospitals during the transition into the new millennium. You made it possible for the rest of the community to enjoy a once in a lifetime event, the beginning of the year 2000! Tfc: W1KX 183, W1JX 51, W1QU 47, AF1L 33, W1JTH 40, KA1RFD 16, N1JBD 14, KA2ZKM 13.

NEW HAMPSHIRE: SM, Mike Graham, K7CTW—ASMs: WW1Y, W1NH, WB1ASL, N1KIM. TC: WA1HOG. STM: WA1JVV. PIC: KA1GOZ. OOC: W1GTA. SGL: K1KM. BM: KH6GR. ACC: AA1QD. SEC (acting): WW1Y. Happy Y2K! Keep an ear out New Year's Eve on 3943 kHz +/- and your local ARES VHF/UHF frequency. No major deal - just in case. Checked your winter emergency supplies? Now's the time to be ready. Change the oil in your genny and clean the spark plug; fresh gas on hand (enough for 48-72 hours intermittent ops); flashlights with spare bulbs and batteries; bottled water; canned/dried food and a hand-cranked can opener; full gas tank(s) in the car/truck; extra prescription meds on hand; a bit of cash squirreled away. It always makes good sense here in New England. Very sorry to report that W1PLN, Walt Amazeen, long-time member of GBRA, is a Silent Key. Rumor mill has it that many of the clubs are gunning for CVRC in the upcoming NH QSO Party. Revised rules this year - be sure to check. New CVRC Officers are Jason N1IIC-Pres., Dale AF1T-VP, Dave N1KTP-Treas. Congrats all. For now, Happy New Millennium and best 73 de K7CTW. Net NM/Sess/QNI/QTC: GSFM N1RCQ/31/245/38; GSPN K1TQY 26/86/35; TSEN N1VFM/4/57/7. VTNH WA1JVV/31/178/152. Tfc: W1PEX 832, W1FYR 337, K1TQY 240, WA1JVV 144, N1NH 73, W1ALE 47, KA1OTN 16, N1CPX 14.

RHODE ISLAND: SM, Armand Lambert, K1FLD—Happy Y2Kaos! By the time you read this, Rick Palm, K1CE, ARRL's Field Services Manager with over 20 years of service to the Amateur Radio operators of the USA, will have set sights on new horizons in Florida. His special attention to details will surely be missed by many of us. Please join me in wishing all the best to Rick for he has done much to educate us. And now onto club activities. Recent elections at the ARSNE club, W1AQ, have resulted in the following appointments: Pres Doug, N2RDF, Vice Pres Harold, KD1FI, Secr Mark, N1XTU, and Treas Bob, KM1X. In Newport, NCRC has operated a special event station at the Harvest Fair. The club proudly displayed their call sign, W1SYE, in neon! Their set up demonstrated Amateur Radio to the attending crowds. This year's Phantom Farms 10th Annual Fall Classis 5 mile Road Race, comms was provided by members of the BVARC (Dick N1DO, Norm W1AUT, Dave, N1IMS, Rick N1ZJH, Marian, KE1LJ, Maria KB1DRM, Catherine, KB1EAQ, Zdenko, KB1DOY, Art N1JYZ). While John, N1MIU, organized the group, Armand, K1FLD, acted as net control. Thanks to all who helped out. Emergency communications is gaining in popularity as area hams join Martin, N1JMA, in standing by during recent storms. If you're interested, contact Martin. Until next time, play radio and have fun. 73 K1FLD.

VERMONT: SM, Bob DeVarney, WE1U—Well, it looks like winter's here to stay. We've had a few snow storms as of mid November, and the temperature tells me it's time to start playing radio inside again. I hope everyone gets what they wanted from Santa, whether it's that new rig or shack accessory or whatever it is you wanted. Before we know it, it will be time for the Milton Hamfest again! Happy Holidays to all, and 73 de WE1U.

NORTHWESTERN DIVISION

ALASKA: SM, David Stevens, KL7EB—OOC: KL7IKX. SEC: NL7DL. DEC: KL7JBV. DEC: WL7GK. TC: AL7CE. TS: KL7CC. TS: N1TX. ACC: KL0CY. ACC: KL5T. ASM. Snipers Net 3920 Daily 1900 AST, Bush Net 7087 Daily 2000 AST, Motley Group 3933 Daily 2100 AST, and Alaska Pacific Net 14.292 M-F 0830 AST. Let's get involved with our winter races, including Junior Iditarod, Fur Rondy Races (car and dog), Yukon Quest, and Iditarod Dog Sled Race. Lil Marvin, NL7DL-SEC, wants us to get involved with your local emergency coordinator now, because emergencies don't wait. Jimmie Tvrdy, KL7CDG, is looking for hams licensed for 25 years or more to call him at 907-345-3063. PSHR: AL7N 81, KL5T 96.

EASTERN WASHINGTON: SM, Kyle Pugh, KA7CSP— (November Report) As of this writing the Y2K event is getting close and the ARES groups are meeting and preparing for it. As of this issue of *QST* it will have happened. It will be interesting to learn how the Y2K event may have impacted people's lives in various places. The new century will bring some big changes in Amateur Radio that is going to be affected by new technologies, with more interference and the Amateurs having to share more frequencies. The Goldendale ARES members racked up 226 public service hours at the Klickitat County Fair. Official Observer Activity was reported with 7 out of 12 OO stations. Net Activity (for November): WSN: QNI 882, tfc 290; Noontime Net: QNI 7921, tfc 197; WARTS: QNI 3330, tfc 137. Tfc: K7GXZ 197, K7BFL 281, W7GB 185, KA7EKL 59, KK7T 36, W7UVP 0. PSHR: W7GB 138, K7GXZ 120, W7UVP 60.

IDAHO: SM, M.P. Elliott, KF7ZQ — OOC: N7GHV. SEC: AA7VR. STM: W7GHT. The Pocatello club provided communications for a NWS/ARRL event on Oct. 28. The event was to raise awareness of continued amateur service to the NWS nationwide - great public service! VOI's "Balloons Over Idaho" launched 2 high-altitude balloons on Oct. 9. The balloons traveled from Murphy to near Hailey, Idaho at a height of 98,000+ feet. A simplex repeater and camera were aboard. Voice contacts were made in ID, OR, WA, MT, UT, NV, and AK. Recorded pictures were dramatic! Congratulations to VOI and K7TIH for a successful project. Two balloon launches are planned for 2000. 73 — Mike, KF7ZQ. Tfc: W7GHT 373, WB7VYH 54, KB7GZU 32, and N7MPS 32. PSHR: W7GHT 134, WB7VYH 90, and W7JMH 70. Net (SESS/QNI/QTC/Mgr.): FARM - 31/2476/39/W7WJH; NWTN - 31/1315/108/KC7RNT; IDACD - 21/488/16/K7UBC; IMN 31/422/230/N7MPS.

MONTANA: SM, Darrell Thomas, N7KOR—Many amateurs from around the section gathered in Bozeman Montana on October 16th to attend the hamfest hosted by the Gallatin Ham Radio Club. This event was well organized and provided a good opportunity for folks with excessive treasures in their shacks to display and sell the items. In addition there were several seminars presented on a variety of subjects. We were

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MFJ-986 Two knob Differential-T™

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Two knob tuning (differential capacitor and *AirCore*™ roller inductor) makes tuning foolproof and easier than ever. Gives minimum SWR at only one setting. Handles 3 KW PEP SSB amplifier input power (1.5 KW output). Gear-driven turns counter, lighted peak/average Cross-Needle SWR/Wattmeter, antenna switch, balun. 1.8 to 30 MHz. 10³/₄Wx4¹/₂Hx15 in.

MFJ-962D compact Tuner for Amps

MFJ-962D **$269.95**

A few more dollars steps you up to a KW tuner for an amp later. Handles 1.5 KW PEP SSB amplifier input power (800W output). Ideal for Ameritroní s AL-811H! *AirCore*™ roller inductor, gear-driven turns counter, pk/avg lighted Cross-Needle SWR/Wattmeter, antenna switch, balun, Lexan front, 1.8-30MHz. 10³/₄x4¹/₂x10⁷/₈ in.

MFJ-969 300W Roller Inductor Tuner

MFJ-969 **$199.95**

Superb *AirCore*™ Roller Inductor tuning. Covers *6 Meters* thru 160 Meters! 300 Watts PEP SSB. *Active* true peak reading lighted Cross-Needle SWR Wattmeter, *QRM-Free PreTune*™, antenna switch, dummy load, 4:1 balun, Lexan front panel. 3¹/₂Hx10¹/₂Wx9¹/₂D inches.

MFJ-949E deluxe 300 Watt Tuner

MFJ-949E **$149.95**

More *hams use MFJ-949s than any other antenna tuner in the world!* Handles 300 Watts. Full 1.8 to 30 MHz coverage, 48 position *Precision48*™ inductor, 1000 Volt tuning capacitors, *full size* peak/average lighted Cross-Needle SWR/Wattmeter, 8 position antenna switch, dummy load, *QRM-Free PreTune*™, scratch proof Lexan front panel. 3¹/₂Hx10⁵/₈Wx7D inches. **MFJ-948, $129.95.** Economy version of MFJ-949E, less dummy load, Lexan front panel.

MFJ-941E super value Tuner

MFJ-941E **$119.95**

The *most for your money!* Handles 300 Watts PEP, covers 1.8-30 MHz, *lighted* Cross-Needle SWR/Wattmeter, 8 position antenna switch, 4:1 balun, 1000 volt capacitors, Lexan front panel. Sleek 10¹/₂Wx2¹/₂Hx7D in.

MFJ-945E HF+6 Meter mobile Tuner

MFJ-945E **$109.95**

Extends your mobile antenna bandwidth so you doní t have to stop, go outside and adjust your antenna. Tiny 8x2x6 in. *Lighted* Cross-Needle SWR/Wattmeter. Lamp and bypass switches. Covers 1.8-30 MHz *and* 6 Meters. 300 Watts PEP. **MFJ-20, $4.95,** mobile mount.

MFJ-971 portable/QRP Tuner

MFJ-971 **$99.95**

Tunes coax, balanced lines, random wire 1.8-30 MHz. Cross-Needle Meter. SWR, 30/300 or 6 Watt QRP ranges. Matches popular MFJ transceivers. Tiny 6x6¹/₂x2¹/₂ inches.

MFJ-901B smallest Versa Tuner

MFJ-901B **$79.95**

MFJí s smallest (5x2x6 in.) and most affordable wide range 200 Watt PEP Versa tuner. Covers 1.8 to 30 MHz. Great for matching solid state rigs to linear amps.

MFJ-16010 random wire Tuner

MFJ-16010 **$49.95**

Operate all bands anywhere with MFJí s reversible L-network. Turns random wire into powerful transmitting antenna. 1.8-30 MHz. 200 Watts PEP. Tiny 2x3x4 in.

MFJ-906/903 6 Meter Tuners

MFJ-906 **$79.95**

MFJ-906 has lighted Cross-Needle SWR/Wattmeter, bypass switch. Handles 100 W FM, 200W SSB. **MFJ-903,** $49.95, Like MFJ-906, less SWR/Wattmeter, bypass switch.

MFJ-921/924 VHF/UHF Tuners

MFJ-921 or MFJ-924 **$69.95**

MFJ-921 covers 2 Meters/220 MHz. **MFJ-924** covers 440 MHz. SWR/Wattmeter. 8x2¹/₂x3 inches. Simple 2-knob tuning for mobile or base.

MFJ-922 144/440 MHz Tuner

MFJ-922 **$79.95**

Ultra tiny 4x2¹/₂x1¹/₄ inch tuner covers VHF 136-175 MHz and UHF 420-460 MHz. SWR/Wattmeter reads 60/150 Watts.

MFJ-931 artificial RF Ground

MFJ-931 **$79.95**

Creates artificial RF ground. Also electrically places a far away RF ground directly at your rig by tuning out reactance of connecting wire. Eliminates RF hot spots, RF feedback, TVI/RFI, weak signals caused by poor RF grounding. **MFJ-934, $169.95,** Artificial ground/300 Watt Tuner/Cross-Needle SWR/Wattmeter.

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honored to have Gregg Milnes, the NW Division Director, in attendance who also gave a presentation to the group. This is likely going to be an annual event and those who missed it should watch for next year's date. Many hams in the section have received weather spotter training and the National Weather Service was in attendance with a very informative presentation. Net/QNI/QTC/NM MSN120/1 W7OW; MTN 1810/52 N7AIK; IMN 442/330 N7MPS. PSHR: N7AIK 127 Cat 1/57 2/21 3/24 4/8 5/7 6/10.

OREGON: SM, Bill Sawders, K7ZM—ASM: KK7CW. ASM: KG7OK. SEC: WB7NML. STM: W7IZ. SGL: N7QQU. OOC: NB7J. STC: AB7HB. ACC: K7SQ. 2000 is here, and here are a couple updates for new club officers. The Central Oregon Radio Amateurs (CORA) have introduced Phil Hodapp, N7QKR, as their new President. Wayne Linschied, KH6JUC, Vice President. Marty Moore, KD7GQG, Secretary, and John Ogden, W9CZ, Treasurer. The Central Oregon DX Club, 2000 President is Dick Frey, K4XU. Russ Spalding, W7MT is Vice President, and A.J. Parry, WA7AJ, is the new Secretary-Treasurer. Many clubs have just completed their Year 2000 elections, and I will announce them here, as reported. Here are a few interesting statistics. Why not jot them down, and ask your club members if they know the answers. How many club stations are there in Oregon? A. 134. How many military clubs are there in Oregon? A. 0. At last count (June 1999) how many hams reside in Oregon? A. 12,774. Here's the breakdown according to individual stations: Novice: 853. Technician: 3,666. Technician Plus: 2,546. General: 2,393. Advanced: 1,982. Extra: 1,334. The Salem 2000 Hamfair, held in Rickreall, is Saturday, February 19. It's Oregon's biggest and best computer and electronic swapmeet. Many ham radio related businesses will be on hand, as well as hundreds of buyers and sellers. See you there...and keep in touch. NTS traffic totals for October: N7DRP 191, KK1A 171, K7NLM 120, K6AGD 114, KC7ZZB 109, W7VSE 108, KC7SRL 103, AB7ZQ 87, and KC7SGM 69.

WESTERN WASHINGTON: SM, Harry Lewis, W7JWJ—What does being an ARES volunteer entail? Certainly an ARES volunteer does just that, with he or she committing oneself to a certain time and task within ones capabilities and experience. It is not only an involvement with one's fellow Amateurs, but also those within one's sphere of acquaintances and working relationships. For those in ARES leadership positions this means working together with those in other volunteer organizations and those individuals that are tasked with emergency preparedness. Within this circle one finds those that are fully prepared and those that need an Elmer. We willingly extend a helping hand to those Amateur neophytes just learning about amateur communications. Can we do no less for those other volunteers and para professionals? This is what being an ARES member is all about. As the century ended let's look back and see what activities the volunteers of Western Washington were engaged in. As gleaned from reports submitted to SEC N7NVP we find that Clallam Co gained valuable training providing communications for a mountain bike race. King Co ARES worked to meet the needs of customers such as the United States Coast Guard and the Marine Safety Office. Clark Co Amateurs participated in setting up a station at the Red Cross Chapter and some 20 Amateurs assisted the Police and Sheriff in a safety patrol for Halloween. There were 4 days of Search and Rescue support provided in Cowlitz Co. The medical team under the leadership of Marina Zuetel, N7LSL, held a tabletop exercise to practice types of messages that would be seen in an internal hospital communications incident. The team also held an Orientation to Urban Search & Rescue seminar with 45 people attending. Marina also received a well-deserved Certificate of Commendation from ARRL HQ for extensive volunteer work she has done in the last decade. ACS teams in Shoreline, and other cities, held practice communication drills with fire departments and other city functions. The team of Official Observers spent many hundreds of hours monitoring the amateur airwaves. Traffic handlers of the National Traffic System and Section Nets practiced handling simulated emergency communications. Several radio clubs held weekend classes for new and upgrading amateurs. ARES leadership people met with emergency management officials, enforcement officials and with representatives of communication systems, such as telephone companies, in preparation of Y2K. If you are reading this, we all have survived. This is what being an ARES or other volunteer is all about. To the next century. 73.

PACIFIC DIVISION

EAST BAY: SM, Bob Vallio, W6RGG—ASM: KF6RCO. SEC: KE6NVU. DECs: WA6TGF/Alameda County, KO6JR/Contra Costa County, WA7IND/Napa County, K6HEW/Solano County, N6UOW/Training, KE6HCI/Administration, W6CPO/Technical Services, KQ6TM/Section Plans and Administration. STM: K6APW. OOC: W6NKF. TS: KF6NY. Check out the EB WWW Page at **http://www.pdarrl.org/ebsec/**. Webmaster is KB6MP. ORCA has started a weekly on-the-air club meeting. Everyone is invited to check-in on the WB6NDJ repeater, 146.88, 7:45 PM each Sunday. EBARC welcomes new member KF6WXC. Members providing comms for the "Solano Stroll" included KF6HFA, WD6GGC, AA6XZ, and K6SRZ. MDARC did another outstanding job at PACIFICON-99. Members who provided comms for the Las Trampas Endurance Trail Ride were KD6GLY, K6RHL, WA6JAU, KE6ZIW, and WA6DQN. VVRC congratulates member KF6KFP on his upgrade from Tech Plus to General. LARK replaced a regular Klub meeting with a day at Del Valle Regional Park, in Livermore. KV6L and KE6YCW kept the coals hot for the barbecue, and everyone had a good time. SARS had 31 members in attendance at their last meeting. Oct tfc: W6DOB 578, WB6UZX 17. PSHR: W6DOB. BPL: W6DOB. Tfc nets: NCN1/3630/7 PM; NCN2-SLOW SESSION/3705/9PM; 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, Bob Davis, K7IY—ASM: Jan Welsh, NK7N. SEC: N7JEH. TC: NW7O. ACC: N7FFP. STM/SGL: N7CPP. PIC: WW7E. OOC: N7ELV. Happy New Year to the Nevada Section. By now, most of the Section clubs and organizations have held their elections and new officers and boards have been selected. Congratulations go out to all the new members that have taken the time to get involved with their local clubs. CW dead and gone??? Not hardly, says Steve Rogers, W7VI, along with Steve, N7ELV, Who head up the Nevada Section

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Front-panel control lets you vary output from 9 to 15 Volts DC.

Front-panel has easy access five-way binding posts for heavy duty use and cigarette lighter socket for mobile accessories. MFJ-4245MV has two sets of quick-connects on the rear for accessories.

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A whisper quiet internal fan efficiently cools your power supply for long life.

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Massive 19.2 pound transformer . . . No RF hash . . . Adjustable 1 to 14 VDC . . .

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MFJís heavy duty conventional power supply is excellent for powering HF or 2 Meter/440 MHz transceiver/accessories.

A massive 19.2 pound transformer makes this power supply super heavy duty! It delivers 35 amps maximum and 30 amps continuous without even flexing its muscles. Plugs into any 110 VAC wall outlet.

Itís highly regulated with load regulation better than 1%. Ripple voltage is less than 30 mV. *No RF hash* -- itís super clean!

Fully protected -- has over voltage protection, fold back short circuit protection and over-temperature protection.

You get front panel adjustable voltage from 1 to 14 VDC with a convenient detent set at 13.8 VDC. A pair of front-panel meters let you monitor voltage and current.

Three sets of output terminals include a pair of heavy duty five-way binding posts for HF/VHF radios, two pairs of quick-connects for accessories and a covered cigarette lighter socket for mobile accessories.

A front-panel fuse holder makes fuse replacement easy. Whisper quiet fan speed increases as load current increases -- keeps components cool. 9½Wx6Hx9¾D inches.

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MFJ-1118, $74.95. This is MFJís 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 transceiverís 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 ìONî LED indicator.

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MFJ-1116, $49.95. Similar to MFJ-1118. No 30 amp posts. Has ìONî LED and 0-25 VDC voltmeter. 15 amps total.

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chapter of FISTS International. For more info Call 775-972-3672 or 775-786-6735. Joe, N7JEH in Elko reports continual involvement and support of the Elko American Red Cross. Jan, NK7N, reports that many repairs and upgrades are still on the books for the Las Vegas area. Les, AA7YC, says that WADG is attempting to Re-organize at this time and looking to expand its membership. George, WW7E, says preparations are complete for the SIERA "after the Holidays" party in mid-January. Also, reminder to check in to the Nevada Section HF ARES net on Sat, 8:30 AM 3965. Hi to Johnny, K2YKQ. Thanks & 73, Bob, K7IY. Tfc: N7CPP 10, K7OK 2.

PACIFIC: SM, Ron Phillips, AH6HN—ASMs: Harry Nishiyama, KH6FKG; Lee Wical, KH6BZF; Jim Reid, KH7M; George Heloca, Sr, KH6ANA; Mel Fukunaga, KH6H. SEC: Dennis Carvalho, KH7H. TC: Chuck Cartwright, AH7Y. PIC: Russ Roberts, KH6JRM. ACC: Bob Schneider, AH6J. Bob, AH6J, and I attended the Koolau ARC's hamfest on 23 October. We had the chance to meet many hams and to discuss issues and concerns of the Section. The event was well attended by hams from all islands. Thanks to Warren, KH6WM, for all the effort in setting up the event. Warren plans on making this an annual activity. The October SET went well with participation from all parts of the state. Thanks again to Dennis, KH7H, SEC, for all the coordination. BIARC has invited the Hawaii Civil Defense chief to be the guest speaker in November. He will be discussing concerns relating to emergency communications for the island. A petition is being circulated to change the boundaries of the Pac Sec for the purpose of providing better coordination of ARRL activities. Please keep reports coming to me on *QST* delivery. Mahalo and 73. Ron, AH6HN, PacSec Manager.

SACRAMENTO VALLEY: SM Jettie Hill, W6RFF: W6EN has been appointed as an OO for the Amateur Auxiliary. Now that the FCC is enforcing the rules, there is more activity in the OO program. Jim White, WS6K, became a SK. He was very active with the Sacramento ARC and the Sacto. Blood Bank. By now most of the clubs have new Officers for the year 2000. If not, please volunteer for your club. KO6GR lost his home in a fire in Yuba County. "Gold Country Nuggets" published another interesting article by Rudi HB9DU called "The Story of Amateur Radio" Rudi presents many technical programs at the Nevada County ARC. Sierra Foothills ARC members aided the Roseville Police during the Holiday Parade. Yolo ARS had two aircraft with repeaters during the Davis Double Century bike ride. They also used other repeaters. ALL CLUBS: please e-mail me your officers for the new year. **w6rff@arrl.net**. Pacificon Convention was again a huge success, put on by the Mt. Diablo ARC. They are planning now for the year 2000, again in Concord in October. Have you enjoyed the fun of handling messages on the air? The Northern Calif. Net holds 3 sessions every night of the year. At 7 PM on 3630 kHz, 7:30 PM on 145.210- PL 100 MHz, 9 PM on 3705 kHz. The Sacramento Valley Traffic Net meets at 9 PM on 146.850- PL 110.8 also daily. I hope this has been a good year for all of you. I wish you a Merry Christmas and a Happy New Year. 73, Jettie. Tfc: K6NTZ 137 (Apr), K6NTZ 112 (May), K6NTZ 316 (Jun).

SAN FRANCISCO: SM, John Wallack, W6TLK—ASM: N6KM. SEC: WB6TMS. TC: N1AL. I'm sad to report that KD6AEP of Willits is a Silent Key. KE6WHH, DEC for Del Norte, reports a new ARES net on 5 linked 2 meter repeaters meets weekly on Wed at 1930. The net covers far northern CA and southern OR connecting 9 counties. Many thanks to KD6PKE for an excellent job of editing Wavelength, the Anchor Bay ARC newsletter, for the past 5 years. Due to family and work concerns, I have decided to step down as SM. Thanks to all for your kind support over the years. Please continue your support for my replacement, Len Gwinn, WA6KLK, of Willits. Len is president of the Willits ARS.

SAN JOAQUIN VALLEY: SM, Donald Costello, W7WN—Well, as I am writing this column, Mike Staal, K6MYC, is in St Lucia working much vhf dx. I saw a call out on the K6UR spotting network reflecting a request that Mike listen for Europe since they were hearing him. The station putting on the request was a Portugese station. A few minutes later, the same station posted a statement of glee that he had worked Mike on six meters. Mike Staal, of M2 enterprises, is a prominent ham in the Section and an avid vhf dxer. January 1, 2000, Jim Maxwell, W6CF, will take over as Pacific Division Director. Congratulations, Jim. The San Joaquin Valley Section now has an extensive emergency communications staff with Kent LeBarts, K6IN, Section Coordinator, two District Coordinators and Emergency Coordinators in most counties including Mono County. The Section also has an expanded Offical Observer staff under the guidance of Victor Magana, N1VM. Our Affiliated Club Coordinator, Charles McConnell, W6DPD has done an outstanding job with section affiliated clubs and continues to contribute to Amateur Radio through his work in helping to provide examination sessions to the Fresno area as a Volunteer Examiner. Thanks, of course go out to the Assistant Section Managers, Mike Siegel, KI6PR, John Lee, K6YK, and Pat Fennacy, W6YEP. There are, of course, many, many other appointees who comprise the SJV Staff, and to all of you, Thank You for a great 1999 and I look forward to working with you all in 2000.

SANTA CLARA VALLEY: SM, Glenn Thomas, WB6W—SEC: KM6GE. BM: WB6MRQ. TC: WA6PWW. OOC: KB6FPW. Congratulations to Bob Fike, KO6XX, and his class for Technician aspirants. Calls are pending! Monterrey Co ARES/RACES assisted the Red Cross in their efforts to provide temporary shelter for about 200 rail passengers stranded by a derailment. Thanks to Don, KQ6FM (DEC), Bob, N6IBO, and Don, KB6BZL, San Mateo ARES was activated by county official George Berry, KC6ULT, to provide emergency communications support during a phone outage on the coast in the Moss Beach area. They provided operators at a Sheriff's sub-station, several hospitals and fire stations. The broadcast media advised citizens to walk in to these locations if they had an emergency. Thanks to John, KM6GE, SEC, Peter KD6BXY, DEC, Burt, KD6BXZ, Richard, KE6HNY, DRO, Andy, KF6VWD, Dan, KF6FSH, Bill, KE6CHQ, Dave, N5FDL. Special mention of Millbrae ARES leadership: Bob, KD5GPJ, AEC and Terry, KB6TR, EC, for their efforts to alert and provide operators for the field positions. Santa Clara Co ARES/RACES supported a county-level earthquake drill held on the 10th anniversary of the Loma Prieta quake. Work on the improved ARES/RACES packet system continues. San Lorenzo ARES/RACES participated in three exercises: Sutter Hospi-

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Farnsworth makes it easier to learn *entire* characters. Stop counting individual dots and dashes that slows learning! Farns- worth character speed is adjustable 10 to 60 Words-Per-Minute for high-speed practice.

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Use fixed length or more realistic random length groups (up to 8 characters).

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MFJ-3400, $19.95. *Morse Code: Breaking the Barrier*. "How to learn by the Koch Method" book.

More pocket size MFJ Morse Tutors

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tal Y2K drill, a 194-mile team foot race from Sonoma County to Santa Cruz and Ohlone Day at Henry Cowell State Park. The Santa Clara County Amateur Radio assoc meets 2nd Mondays at 7:30 PM at HP Oak Room, contact Clark, KE6KXO, at 408-262-9334 for more info. Milpitas ARES/RACES did their annual "Punkin Patrol", providing extra eyes and ears around the city. A quiet evening, though it seems like there were more "goblins" out this year. The San Lorenzo Valley ARC heard from Eric Shwartz, WA6HHQ, of Elecraft on the K2 QRP transceiver. Also, Jeff Liebermann, WB6SSY, spoke about cellular telephone service in the Valley. The San Lorenzo Valley ARC meets on the first Friday of each month (except December), 1930 hours, Zayante Fire Station, Felton. For general information on clubs and other activities in the section, take a look at the SCV section Webpage at **http://www.pdarrl.org/scvsec/index.html**. Tfc: W6PRI 8.

ROANOKE DIVISION

NORTH CAROLINA: SM, W. Reed Whitten, AB4W— SEC: KE4JHJ. STM: K4IWW. TC: K4ITL. SGL: KI4AN. OOC: W4ZRA. PIC: KN4AQ. ACC: W4CC. BM: KD4YTU. **http://www.ncarrl.org.** The Carolinas Slow Net (CSN) now meets at 8:00 PM (local) on 3695 kHz. Participation has increased since the net moved to its new time. This joint NC/SC NTS net runs at 5-8 WPM and all are welcomed - please join us. Our other multi-section net, the Carolinas Net (CN) meets at 7:00 (18-22 wpm) and 10:00 PM (15-18 wpm) on 3573 kHz. Our HF NTS phone nets are the Morning Net (NCMN) at 7:45 AM on 3927 kHz and Evening Net (NCEN) at 6:30 PM on 3923 kHz. The Tar Heel Emergency Net at 7:30 PM, also on 3923 kHz is our Section HF ARES net. All are invited to participate in these nets. We continue to need VHF NTS nets in western and in northeastern NC Contact your STM, K4IWW or Asst. STM, W4EAT for info on helping establish local nets. ARES and NTS are two aspects of preparation for emergencies, not two isolated activities. I am gratified by the cooperation and joint participation in ARES and NTS in our Section. Your ARRL Field Organization encourages working together for the benefit of the Amateur Radio Service. A decision to use tactical, rather than formal traffic, during an emergency should be based on experience with NTS nets, not lack of training. Critiques of our hurricane activities continue to emphasize the importance of training, exercises and activities such as Field Day and the SET. Many counties and State Emergency Management have asked ARES to participate in their Y2K standby operations. Another chance for publicity for our emergency communications activities. (I guess someone else will have to throw the main breaker at the New Years Eve parties while we are helping with this exercise.) Oct tfc: W4EAT 404, AB4E 218, KI4YV 156, W2CS 121, NC4ML 114, K4IWW 104, W0UCE 103, W4IRE 71, AC4DV 69, W4CC 52, KE4JHJ 45, WA4SRD 44, N4AF 42, AB4W 37, KE4AHC 33, W3HL 28, KE4YMA 22, N0SU 15, NT4K 14, WD4MRD 14, AD4XV 12, KB8VCZ 10, KF4OZF 10, KR4ZJ 7, KT4CD 7, N2JLE 6, KA4IZN 5, KF4YHG 4, AC4ZO 3.

SOUTH CAROLINA: SM, Les Shattuck, K4NK—HAPPY NEW YEAR! The year 2000 is here. Hopefully the Y2K bug didn't get you too badly. What's in store for the South Carolina Section? Folks, as your section manager, I travel all over the state attending hamfest and visiting clubs. I have noticed a disturbing trend. Clubs are getting smaller and hamfest are dying out altogether. Ever wonder why? Seems everyone wants to do their own thing these days. Ham Radio is a fraternal hobby made up of people of all walks of life have studied and earned an Amateur Radio license. Let's see if we can turn the tide and make our hobby grow. Take an interest in your local club. Support the hamfest in our state. Congratulations and a big thank you to all of you who helped during this hurricane season. Continued training is the key and as the scout moto goes "be prepared". Please continue to support the 3.915 SC SSB net as well as all the NTS nets in South Carolina. This year as a side job I am 2nd Vice Pres of the Palmetto chapter of the QCWA. If you have 25 years in ham radio, please consider joining us. Have a good month and keep active on the bands. Traffic report by Johnnie King WA4UGD our STM. OCT 1999 WW4SC 158, KT4SJ 150, KA4LRM 55, W4DRF 55, KA4UIV 49, WA4UGD 49, W4CQB 11. PSHR OCT 1999: KA4UIV 120, WW4SC 118, KT4SJ 108, KA4LRM 97.

VIRGINIA: SM, Lynn Gahagan, AF4CD—ASM: W4TLM. SEC: K4EC. SGL: KK4IY. TC: W4IN. OOC: KR4UQ. PIC: W2MG. STM, ACC: AF4CD. The fall has shaped-up to be a very busy time here in the Virginia Section. First, the City of Franklin, that was devastated by the floods resulting from Hurricane Floyd, presented Virginia ARES/RACES with a Certificate of Appreciation from the Mayor and City Manager, on behalf of their City, for the services provided by ARES/RACES. On November 6 at the Hampton Basic Orientation, almost 150 amateurs turned out for the event, which included the mobile DMV van to process RACES ID cards. DMV reported 74 cards were issued. Area "C" held an ARES/RACES Basic Orientation on November 14 at Middletown, with 45 attending. I would like to thank everyone who helped put on these two events and also the ones who took the time to attend. Packet is once again very active in Virginia after a decline over the past years. The digital mode played an extensive part in supporting the Virginia Department of Emergency services. Packet carried over 500 messages into and out of the affected cities and counties impacted by Floyd. While on the packet subject, ARES District 7 has a packet Net every week at KR4MA's BBS on 145.730 that is well attended. Also, supporting the thirst for packet training, Dan (W4DJV) conducted a packet training session in Fairfax County on November 13. ARES/RACES state staff has been producing a new video, which the League will distribute, called "We Didn't Know You Existed." The initial cut was previewed at Hampton and Middletown, to great reviews. The final editing will be done in November and the tape should be available from the league in January, 2000. AF4CS (Greg) did all the principal digital recording. With the Solar Flux Index up, and the winter months around, the 80 and 160 meter bands should be in good shape for some good DXing or just plain rag chewing. I know I will be working to put quite a few "New Ones" in the log during this cycle which is my first to experience. I hope everyone enjoyed the holidays and wish everyone a great and prosperous New Year in 2000. Just a reminder, The Frost Fest is January 16th. Let's kick off the New Year with a great turn out in Richmond! See you there! 73 de AF4CD. Tfc: W3BBQ 192, K4MTX 179, KR4MU 135,

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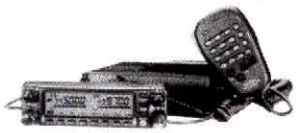

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WEST VIRGINIA: SM, O.N. (Olie) Rinehart , WD8V—STM: N8OYY. SEC: W8XF. ASEC: KA8ZOO. SGL: K8BS. TC: K8LG. OOC: N8OYY. ACC: WD8MKS. APRSC: W8XF. DC: K8MHR. If and when you are privileged to read this, I will be possibly one hundred and seventy years old or won't be born for thirty years. What I am trying to indicate is, Y2K will have passed and in my personal opinion, 99% of us won't be aware of any change. I have no advanced or personal information in regard to the restructuring of the Amateur Radio licensing system, except that the FCC's Report and Order may be released in December 1999 or January 2000. The FCC and other government agencies are working from all sides to acquire our amateur bands to be used for land mobile, satellite, and other digital communications. So, I plead with you, get active, get on the air, use the bands or loose them. As most of you know, NTS is my cup of tea, so if you are not pursuing an active on the air portion of our hobby (DX, Contesting, etc) look at the *Net Directory* and get active in this national traffic system (NTS). Where were you New Year's Eve, on the air? 73. Tfc: KA8WNO 254, WD8V 136, W8WWF 107, WD8DHC 113, KC8CON 31. PSHR WD8V-212, WD8DHC 138, KA8WNO 118; KC8CON 101 WVFN 833/96/31 N8OYY; WVMN 999/31/31 KC8CON; WVNE 133/90/31 W8WWF; WVN L 110/82/31 W8WWF; DIGITAL 81, K8MHR.

ROCKY MOUNTAIN DIVISION

COLORADO: SM, Tim Armagost, WB0TUB—ASM: Jeff Ryan, N0WPA. SEC: Mike Morgan, N5LPZ. STM: Mike Stansberry, K0TER. ACC: Ron Deutsch, NK0P. PIC: Erik Dyce, W0ERX. OOC: Karen Schultz, KA0CDN & Glenn Schultz, W0IJR. SGL: Mark Baker, KG0PA. TC: Bob Armstrong, AE0B. BM: Jerry Cassidy, N0MYY. Representative Bob Schaffer (R, CO-4th) has signed on as a co-sponsor for HR 783, the Amateur Radio Spectrum Protection Act of 1999. That's one down and five to go from Colorado's members of the House. Keep those letters going to the others. It is with sadness that I report Al, KA0PAC (the PACMAN), and Bob, N0RNQ, are Silent Keys. Each was very active in his local ham community, and their presence will be missed. Erik, W0ERX, reports that a nice article about hams appeared in a Denver weekly newspaper. The headline read: "Radio Stars" and detailed how Erik and hundreds of other hams will be 'on duty' on New Years Eve. Mike, W5VSI, reports the EOSS group assisted balloon crews November 5-6 during the ReMax Cup balloon event. One of the pilots was world renowned Joe Kittenger, N4HDP. Joe expressed interest in using APRS for future events. EOSS participants included Marty, WA0GEH; Norm, KB7VJT; Rick N0KKZ; Lloyd KB0MQQ; and John WD4MUO. If you have items for this column, e-mail them to me at **n0wpa@arrl.net** 73, de N0WPA. NTS traffic: K0TER 108, AD0A 81, N0CYR 41, W0W 24. Colorado Amateur Weather Net (CAWN) (Oct) totals: W0WPD 946, N0DKK 479, WB0VET 425, W0LVI 410, K0HBZ 365, AA0ZR 365, KI0ND 346, W0GGP 324, N0NMP 316, KB0QBF 280, N0FCR 222, N0JUS 175.

NEW MEXICO: SM, Joe T. Knight, W5PDY—ASM: K5BIS & N5ART. SEC: K6YEJ. STM: N7OIM. NMs: WA5UNO & W5UWY. TC: W8GY. ACC: N5ART. New Mexico Roadrunner Net handled 124 msgs with 1151 checkins. New Mexico Breakfast Club handled 260 msgs with 1071 checkins. Yucca Net handled 29 msgs with 770 checkins. Caravan Club Net handled 3 msgs with 67 checkins. SCAT Net handled 14 msgs with 504 checkins. Four Corners Net handled 34 msgs with 380 checkins. GARS Net handled 5 msgs with 50 checkins. Rusty's Net handled 82 msgs with 649 checkins. Valencia Co Net handled 8 msgs with 41 checkins. In NM, we are still busy with preparations for the Y2K. We have been asked by the NM State Police, various county Sheriff's Offices and many of the police and fire departments around the state to be in position for any emergency that might arise. Some practice sessions have been run with good success. We believe we will be ready for anything that could surface. Our VA hospital Amateur Radio station, N5VA, was manned Nov 11 as a special event station. Riley Hollingsworth was scheduled to be at the Socorro hamfest on Nov 13. Very sorry to report the passing of W5RMY, a regular operator at N5VA and W5EAW who established the original VA station, formerly WB5MII. They will both certainly be missed. Do hope all have a wonderful Christmas and a very Happy New Year! Best 73, Joe, W5PDY.

UTAH: SM, Mel Parkes, N5UVP—Welcome to the Year 2000! Happy New Year! Lots neat things are already planned for this year. The Utah VHF Society will hold their annual meeting and Swap Meet on 26 February at the National Guard Armory on Sunnyside Avenue in SLC at 8:00 AM. Plan now to attend Utah Hamfest 2000 in July 7-9 at Rubys Inn, for more info see the Web site at **http://www.utahhamfest.org**. By now most of the clubs in the state that conduct their annual elections in December have elected their new officers, congratulations! If you are a new club officer, please contact me I would love to share ideas that may help you and your club. I enjoyed my visit with the Bridgerland ARC in Logan last month. We were saddened to hear that Tom Beverly, WA7SKH, in Bountiful became a Silent Key on 24 Oct 1999. Our thoughts go out to his family. 73 de Mel, N5UVP.

WYOMING: SM, Bob Williams, N7LKH—ASM Christine Riegert, KC7MJI, has undertaken the mission of introducing Amateur Radio to more schools around Wyoming, beginning in the Casper area. She has found a ham, Mike Street, KD7AHN, who is in the Army and stationed in Korea. Mike is involved with a high school ham club in Seoul, which is looking for sister high schools in the U.S. Anybody who is interested in either helping Christine by spearheading a project in a local school, or in contacting the school hams in Seoul (2 are girls), should contact Christine, **criegert@coffey.com**. Sweetwater and Shy-Wy ARCs participated in Jamboree on the Air. Shy-Wy had 18 Girl Scouts and 15 Boy Scouts and 20 visitors. All 33 scouts will be eligible to get their Communications Merit Badges. They participated in HF operations, VHF repeater operations, and CW instruction, and toured the antenna farm. Sweetwater ARC also had a successful weekend, even contacting K2BSA on Sunday, and had 12 people sign up as interested in attending license classes to Sweetwater ARC on becoming re-activate with ARRL after a lengthy hiatus! They are even beginning to consider the idea of sponsoring a Wyo-

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ming State Hamfest. Don't forget that time is running out if we are to hold a WIMU in August, 2000. We still need to raise about $1500, and it looks like most of that will have to come from Wyoming. Let me know if you or your club will make a donation. October Reports: NN7H, traffic 285, PSHR 130.

SOUTHEASTERN DIVISION

ALABAMA: SM, Bill Cleveland KR4TZ – ASMs: W4XI KT4XA KD4PDQ. SEC: AF4HE. STM: WB4GM. BM: KA4ZXL. OOC: WB4GM. SGL: KU4PY. ACC: K4LI. TC: W4OZK. PIC: KA4MGE. Happy New Year! Technically the new Millennium doesn't start until 2001, but we still have to get used to writing our year as 2000 or 00. I have great things planned for the Alabama Section, and look forward to your help. There have been some changes in the Section Cabinet. After being an ACC for a very long time Ellis Dobbins (K4LI) has decided to let his term expire on December 31, 1999. I want to thank Ellis for a job well done, and look forward to his continued support of the Alabama Section. Gene McGlaughn (WB4GM) is letting his term as STM expire on December 31, 1999, and will instead continue as the OOC and ASM for North Alabama. Thank you, Gene, for a terrific job as STM, and I know you'll do a great job as OOC and ASM! Made a New Year's resolution to join your local ARES group, participate in NTS, or upgrade your license class? Check out the Alabama Section's Website at **www.qsl.net/al-arrl** to find information about ARES in your county, the current net schedules, and where Amateur Radio exams are given. Not to mention, we publish a list of Amateur Radio Clubs in Alabama. Speaking of things to do in Alabama, Butler County and Pike County RACES will have their hamfest at the Butler County Fairgrounds on January 29, 2000. For more information contact Jerry McCullough (KE4ERO) at 334-382-7644 or **KE4ERO@alaweb.com**. I hope to see you there. 73, Bill KR4TZ.

GEORGIA: SM, Sandy Donahue, W4RU—ASM/So Ga: Marshall Thigpen, W4IS. ASM/Legal: Jim Altman, W4UCK. SEC: Tom Rogers, KR4OL. STM: Jim Hanna, AF4NS. SGL: Charles Griffin, WB4UVW. BM: Eddie Kosobucki, K4JNL. ACC: Bob Lear, K4SZ, OOC: Monroe Gaines, KF4NXD. TC: Fred Runkle, K4KAZ. The November hamfest sponsored by the Alford Memorial Radio Club was an outstanding success. Gorgious weather on both days brought out a large crowd surging throughout the exhibits, flea market and tailgating area. Guest speaker, Riley Hollingsworth, K4ZDH, got a standing ovation before and after his presentation to a crowd of several hundred. His speech and question period clearly outlined what the FCC is doing to correct past mistakes and assure a smoother future. Thanks to Randy Bassett, KR4NQ, Hamfest Chairman for an outstanding event. Riley promises to come back next year. Hollingsworth will also attend the Gainesville Hamfest/Ga ARRL State Convention, July 8, at the Georgia Mountain Center. Athens ARC elected officers: Pres. N4ZRA, V Pres, KF4AQO, Sec KE4TYW, Treas KF4GRZ, PIO KE4TYV. I regret to report the passing of W4WJK, Steve Baumgartner, McDonough and K4AEL, Elaine Loner, Blairsville. Our sympathies go out to their families. SEC KR4OL says the annual ARES Conference will be Jan 22 at the GPSTC HQ in Forsyth. The next hamfest in Georgia will be Feb 26 in Dalton. 73 Sandy. Tfc Oct: WU4C 89, AF4NS 68, KA4HHE 54, K4BEH 47, WB4GGS 31, KU4WJ 31, WB2NYM 18, K1FP 15, K4WKT 13, K4JNL 10, K4BAI 7.

NORTHERN FLORIDA: SM, Rudy Hubbard, WA4PUP—ASM: E Central, AC4PF. ASM-W Panhandle: KO4TT. ASM-APRS: WY8O. ACC: WA4B. BM: N4GMU. OOC: AF4EW. PIC: KF4HFC. SEC: WA4NDA. SGL: KC4N. STM: WX4H. TC: KO4TT. PACKETT: N4GMU. Ken Christian, Chairperson for the Orlando Hamcation is busy preparing for the State Convention. They will be mailing about 40,000 flyers, so let us help Ken make this one of the best. The Northern Florida Section will conduct a forum beginning about 10 AM. While on the subject of Hamfest, the Jacksonville Hamfest was held in a new location, and had to compete with the Ga/Fl football game. However, many did attend, and was considered a very good turn out considering the competition of the game. John Fleming, WD4FFX, Communication Officer for the State of Florida made an excellent presentation on Y2K and Amateur Radio. He also made it very clear what the DEM expected of Amateur Radio, as their service to the State has been good. The Northern Florida Emergency Communication Plan will be used by the State. Hurricane Floyd kept the Crown District busy with people having to evacuate. There are many lesson to be leaned from Floyd, and the main one is: Never take anything for granted, always be prepared for the unexpected. The FCC Riley Hollingsworth has been busy "catching" the violators of rules and regulations. Heavy fines and the cancellation of licenses have been issued. Frank Ambrose, AF4EW, and the OOs have been notifying those that do not proper ID, and suggesting the operators improve their operations by using good operating practices. A new APRS digipeater is active in Santa Rosa County. Thanks to WY8O and KU4LY. The Volunteer Protection Act of 1997 passed in June 1997 and signed by the President. This was reported in some length in *QST*. The VPA covers nearly "all" volunteers for government and not for profit groups. The whole thing may be accessed at the congressional Web site by pointing and clicking at GOTOBUTTON BM_1_ **http://thomas.loc.gov/boss/d105query.html** and then entering S.543 in the search box. Suggest those that believe the amateur operator does not have liability coverage should read this Act. The ARES operator in Florida is covered by State Insurance when the emergency is support of the States' emergency operations. May the year 2000 be the best for you and lets improve amateur operations by setting an example of considerate, loyal, progressive, friendly, and patriotic. 73 de Rudy, WA4PUP. Tfc: KE4DNO 241, NR2F 227, AF4PU 94, W5MEN 89, KF4NFP 77, N9MN 65, AF4GF 63, WB2FGL 50, AD4DO 43, KF4TM 41, KE4PRB 38, K4JTD 33, KB4DCR 31, N4JAQ 28, KM4WC 26, KC4FL 25, K1JPG 23, N4GMU 21, W4KIX 19, W8IM 12, WA4NDA 14, AB4PG 14, N0ZO 10, KJ4HS 10, KF4VRS 10, WB2IMO 10, K4LTS 7, WA4EYU 6, WB9GIU 5, WB8NER 4, WX4J 4, WD4ILF 3, N4ORZ 1.

SOUTHERN FLORIDA: SM, Phyllisan West, KA4FZI—Abbott "Doc" Kagan, WA4HDH, became a Silent Key on Oct. 23. Well known for his perfect CW, Doc authored a 200-page book of QFN history and was a great helper and example for new hams. We extend sympathy to his family. W4WDK and AD4RZ report both Highlands and Okeechobee ARES units were

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activated during the Oct. hurricanes. The Polk Co EM had hams prove flexibility by using a new 800 MHz trunked system in test phase for shelter comm. (AJ4Y EC), and the Sarasota EARC worked with the Div. of Forestry to test a MAC (Mutual Aid Communication) unit (WD4AHZ EC). Good job! The new SFL STM is Jan Scheuerman, KJ4N. Jan's background since 1963 includes YLRL leadership, ECARS service control, part of the first all YL DXpedition to Niue Island, ORS over 30 years and still active on 10 Section/Region/Area nets, ARRL VE, active in 8 radio clubs and secretary of the local QCWA chapter. Current Cabinet Appointees remaining in the SFL Section include SEC Manny Papandreas W4SS, TC Joel Kandall KI4T, and SGL John Hills KC4N. Cabinet Appointees who will become part of the new WCF Section are ACC George Baustert W3BL, BM Bill Dibble KE4WU, PIC Alan Gauzens WA4ATF. My sincere thanks to these exceptionally fine leaders and their teams for the years of service to ARRL and the amateur community in Southern Florida. Thanks, also, to the SFL amateurs who volunteered to serve in a cabinet position. Resumes are always welcome. Bulletin Manger Report (Oct): Stations 7, Rcvd 128, Sent 164, Total 292. Traffic: W7AMM 580, WA9VND 531, KC4ZHF 305, KB4WBY 290, AB4XK 248, K4SCL 228, KD4GR 206, KA4FZI 179, KD4HGU 151, KE4IFD 126, WA4CSQ 126, WB4PAM 112, WA4EIC 99, K4FQU 89, K4LKL(Club) 86, K4RBR 72, AD4IH 70, KJ4N 64, KT4XK 47, KE4WBI 45, W8SZU 40 KE4UOF 38, AA4HT 35, AF4NR 34, KG4CHW 21, KF4KSN 20, W4AUN 16, W4WYR 15, KT4PM 12, W3JI 11, K3VBA 10, KT4TD 9, K4OVC 6, KG4DUF 4, K4ENA 1, KF4UTH 1. 73, de KA4FZI.

VIRGIN ISLANDS: SM, John Ellis, NP2B, St Croix—ASM: Drew, NP2E, St Thomas. ASM: Mal, NP2L, St John. SEC: Vic, WP2P, St Croix. PIC: Lou, KV4JC, St Croix. ACC: Debbie, NP2DJ, St Thomas. NM: Bob VP2VI/W0DX. Tortola. Team Virgin Islands (KD2D) took first place WORLD in the 1999 ARRL RTTY Roundup. Team members were Ron, KP2N, Drew, NP2E, and Bernie, NP2W. Good work guys! The group at NP2B made some 4600+ QSOs in the CQWWDX contest. A multiplier station and a decent 160M antenna helped run the score up to over 5,750,000 points! Operators were Julio, WD4JNS, Bruce, W4OV, John KU4GY, and John, NP2B. KP2N was active in the CW sweeps but had to leave early. VI WILL be represented better next year on brass! KP2D planning a multi/single in the phone SS as well as NP2B in the SO category. KP2N Ron is going to be putting the 10M repeater back up soon. Tnx Howard, WB2HWW, for antenna for that machine, output will be on 29.68. repeater TX will be on , RX will be on St. John. Good to see Paul EI2CA back on St. Croix for a visit. Good luck in the contest! 73, John, NP2B

WEST CENTRAL FLORIDA: SM, Dave Armbrust, AE4MR, **ae4mr@arrl.org**—Visit the new Section Web Page at: **http://www.wcfarrl.org** The new West Central Florida Section officially starts on Jan. 15. Please join me in welcoming the following cabinet members: ASM Paul Toth, K2SEC. ASM-Webmaster: Paul Knupke, Jr., KR4YL SEC: Allen Turck, KE4MPQ TC: Darrel Davis, KT4WX BM: Bill Dibble, KE4WU OOC: George Baustert, W3BL. Jack Belich, WB4PBF of St. Petersburg is the new SKYWARN Coordinator for Pinellas County. I would like to thank the ARRL members in the new West Central Florida Section for their support of the new section. It is your vote that made it happen. Consider applying for a station appointment of ORS, OES, OO, OBS, TS, PIO or LGL and help build the WCF Section. You can make a difference. With Y2K only days away be prepared to lend assistance if requested. **Silent Key –** Wyatt Bishop, K4VJI 11/09 Wyatt Bishop was the President of the Sarasota Emergency Radio Club, a friend to all, a friend to ham radio. He will be sorely missed. **Special Event** – WCF First Contact – Starting January 15. Nine counties in nine days. See the section home page at http://www.wcfarrl.org for more details. **Hamfests** - Sarasota Hamfest Jan. 15th and 16th and Desoto Amateur Radio Club Hamfest Jan. 29 in Arcadia.

SOUTHWESTERN DIVISION

ARIZONA: SM, Clifford Hauser, KD6XH—October was the Southwest Convention, then the OPRC Hamfest with a few club meetings between events. November was the Tour De Tucson bike event, Yuma ARC, Bullhead City ARC, and Post 599 ARC. Chuck Green, N0ADI, gave a very good AMSAT Phase 3D satellite presentation at the November meeting of the RST club. The Hualapai ARC participated in the Andy Devin Parade in Kingman on October 9, 1999, and even had a special event station. Since 10-meters was open they made over 150 contacts with only one (1) station. We get to start a New Year with new ideas and new attitudes. In the past, we as Amateur Radio operators of all classes have been very well respected by other professional organizations because we have allowed all aspects of our hobby to share the limited frequencies. It did not matter what mode of communications we used, all people cooperated together. In some parts of the country, this cooperation is becoming a rare event. Some people want no regulation and others want complete regulation. Without regulation and cooperation, our Amateur Radio band will become nothing more than chaos. Remember that Amateur Radio is still a hobby. Below is a reprint of a set of standards for Amateur Radio by Paul Segal, W9EEA (1928). Hams should be: Considerate to other's operating enjoyment; Loyal by offering encouragement to others; Progressive by keeping his station state-of-the-art, well maintained, and efficient; Friendly by offering advice, counsel, and assistance to the beginner; Balanced by remembering that radio is his hobby; and Patriotic by offering his hobby, knowledge and station for the service of country and community. We need to work together as a group of people with similar interest or else we will lose. Next Hamfest is Glendale Community College on 15 January 2000. Start planning for the spring Hamfest in March at Scottsdale Community College. The year 2000 Southwest Division Convention will be held at the Ramada Inn in Scottsdale on 6-8 October. I will be gone from 16 January 2000 to 8 February 2000. Look for me on the HF bands from Myanmar (Burma). If you need any help, contact Bernie Sasek (520-297-5885), Jim Swafford (520-298-7793), or Gary Capek (602-237-4314). 73, Clifford Hauser, KD6XH. Net QNI/QTC/Sess: ATEN 852/81/31; ACN 117/30/31. Tfc: K7VVC 210, W7EP 86.

LOS ANGELES: SM, Phineas J. Icenbice, Jr., W6BF – We are honored to have a new and outstanding PIC, {Public Information Coordinator} for our LA Section. His name is Dave Bell,

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160–10m Ham Band operation • 500kHz–30MHz receive • 100w output • Auto antenna tuner • 16-bit DSP technology • Scrolling menu; 46 types of func. • "One-touch" DSP filter wide mode • Enhanced CW DSP including 11 user-selectable CW DSP filters • RS-232 port for up to 57,600 bps PC control • Electronic keyer • Different settings for TX & RX • 9-step operator controllable NR1 • 10⅜"w x 3¾"h x 10¹⁵⁄₁₆"d • 15 lbs .....**Special $1088.95**

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Same features and looks as TM-261AD but 438–450MHz transmit, 400-470MHz receive, 35w output **$439.95**

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DFK-4B	13' cable kit; TM-733A	**39.95**	**SC-33**	Case; TH-28A/48A/PB13/BT8	**9.95**
DFK-7B	22' cable kit; TM-733A	**59.95**	**SC-34**	Case; TH-28A/48A/PB17/18	**19.95**
DTU-2	Digital paging; TM-541A	**19.95**	**SC-41**	Soft case; PB-32	**9.95**
MB-13	Mobile mt; TS-50S	**29.95**	**SC-43**	Soft case; TH-79/PB-33/34	**9.95**
MB-14	Mobile mt; TM-742AD	**29.95**	**VP-1**	Bumper mount, spring	**19.95**
ME-1	Mem. expand;TH-28A,TM-251A	**9.95**	**YK-88CN**	270Hz CW filter; R-5000	**69.95**
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W6AQ, Movie Producer/Director and outstanding promoter of Amateur Radio. If you don't know Dave from ARRL Conventions or DX meetings, you will more than likely have the privilege of talking to him very soon because Dave is also the Chairman of the ARRL Public Relations Committee established to publicize our great fraternity. Attention all PIOs, please feed your news stories directly to Dave at: **dbell@aol.com**. – Barry's, (AD6HR), SCN, report for Oct. is 14 sessions, QTC 4, QTR 91 & QNI 45. Barry's message is "send me an e-mail and get involved with our communications network." (**bgeipel @primenet.com**) Public Service is one our best techniques to gain public support for retaining our frequency assignments and antenna construction privileges. The first of the Educational Awards nominations has arrived from Casey, AD6DI. You can download the application from the ARRL HQ Web site: **www.arrl.org/ead/award/application.html**, if you have an outstanding candidate this is your chance to thank someone for service rendered. The ten meter band was very good during the DX Contest. I was able to work about 125 countries and 27 zones in about six hours. If you are looking for speakers in the Los Angeles Area check out our Web site **qsl.net/arrlsw /lax.** Vy 73 es good DX, Phineas, W6BF.

ORANGE: SM, Joe Brown, W6UBQ—ASM Orange County: Art, W6XD, 714-556-4396. ASM: Riverside County, Joe, KO6XB, 909 685 7441. ASM: San Bernardino County. The Orange Section semi-annual staff meeting aboard the Queen Mary SW DIV Convention appeared productive. Rick Palm noted the Orange Section was viable and going well. The focus of the meeting was on recruiting new hams for the Amateur Radio hobby and membership in the ARRL. What can we do to increase the membership? League membership in the Orange Section at January 1999 was 3522 and at present 3484. Rick Palm, K1CE, advised that there was a big drop in membership, but at present we are on the rise. Some of the ideas presented by the Staff were as follows: (1) Make ourselves more visible on Field Day. (2) Talk up the ARRL on an individual basis, ham to ham. (3) At your ham classes, be sure to promote the ARRL. (4) Remind our fellow club members that the League is for everyone. (5) Use the new ham information to contact new hams before they even know their own call sign. (6) We need to reach the inactive hams and get them to join our clubs and the League. (7) Public Service is our reason for SURVIVAL. We need to be sure that we always are looking in this direction. (8) We need to always work with government. If you want to give something back to our wonderful hobby the following positions are vacant; ASM for membership. DEC for Orange County, EC for the Parris ICC. For more information about the positions listed. Call 909 687 8394, e-mail **w6ubq@arrl.org**. Traffic for Oct 99: KO6RZ 209, KC6SKK 81, W6QZ 60, AD6HR 53, N6GIW 39, N3IVO 5. Digital traffic: N6GIW NTS MAILBOX 234, W6QZ NTS BBS 199. PSHR: W6QZ 159, KO6RZ 129, AD6HR 125, KC6SKK 93. SCN Net report from KO6RZ: 31 sess, QNI 191, QTC 67. de W6UBQ 73.

SAN DIEGO :SM, Tuck Miller, K6ZEC, 619-475-7333—Well, we made it, or did we? Are we now in the new millennium, or do we have a year to go yet? Hopefully by the time you read this, we would have made it through all the possible Y2K "glitches." As we start a new year, I would like to thank all the people who make it all happen in the San Diego area. All the San Diego ARRL staff, and also to all the folks who hold appointments with the Amateur Radio Emergency Service (ARES). If it were not for all these people, everything would go down the drain in a heartbeat. Speaking of heartbeats, Carl Brummund, KE6JQL just went thru a 5 way bypass, and he says he is doing a whole lot better. Ralph, W6OAB, just underwent surgery to remove an aneurysm from his abdomen. Lastly Mike, AE6CQ underwent knee replacement, and complications set in. Hey folks, get better real quick. Know of someone who has been in the hospital. Let me know. Many clubs re-elect new officers for the new year about this time, I would love to be kept updated with who your officers are. Please make sure I am on your mailing list for your club newsletter. If you have a club Website, make sure I have that so I can provide a link from the section web page. Make plans to attend the next ARES meeting. It is always on the 2nd Saturday of each month, at the Normal Heights Methodist Church. Meeting time is 8 AM, with breakfast at 7. Come on, you can wake up early one Saturday. New years resolutions? Have you made any? How about traffic handling? For traffic KT6A 571, KD6YJB 183, W6IFF (Sep) 177, WA6ODQ 151, W6FFF (Oct) 150, KO6BU 14, KE6IQQ 12, WA6IIK 1 BPL: KT6A 571 PSHR: WA6ODQ 148 KT6A 138 KD6YJB 83. 73, Tuck, K6ZEC.

SANTA BARBARA: SM & STM, Rob Griffin, K6YR, 805-543-3346 & **k6yr@arrl.org**. SEC: Jack Hunter, KD6HHG (**kd6hhg @arrl.net**). ACC: Michael Atmore, KE6DKU (**jatmore@telis .org**). OOC: Howard Coleman, W6HQA (**w6hqa@pacbell.net**). PIC: Jeff Reinhardt, AA6JR. (**jreinh@ix.netcom.com**). TC: Warren Glenn, KM6RZ (**wglennrz@ix.netcom.com**). ASM: Ventura, Don Milbury, W6YN (**w6yn@juno.com**). ASM-Internet, Jack Bankson, AD6AD (**jackbankson@jps.net**). DECs: Dave Lamb, WA6BRW (**dlamb@silcom.com**). SLO-Bill Peirce, KE6FKS (**ke6fks@arrl.net**) & Ventura-Dave Gilmore, AA6VH (**aa6vh@arrl.net**). On behalf of the Santa Barbara Section, congratulations to Dave, WA6AYI, recipient of the 1998 ARRL Excellence in Recruiting Award. This award, cosponsored by the Carson Valley Radio Club, was presented to Dave for his outstanding volunteer work recruiting newcomers to Amateur Radio. The Ventura Co. Amateur Radio Society recently gained ARRL Affiliation Charter. It's exciting to see this level of new activity and recognition! SB Sec Web: **wwww .qsl.net/arrlsb**. Also remember our Section traffic nets: SCN slow speed NTS Net, M-F, at 1915 local on 3598 kHz & SCN/SB at 2100 local on 147.000+ (131.8), 224.90- (131.8) & 448.875-(100). PSHR/Tfc: K6YR 172/108, KF6OIF 135/46, KE6MIW 99/49, KF6UMU 100/- & W6VIF -/11.Thats 30. 73, Rob, K6YR.

WEST GULF DIVISION

NORTH TEXAS: SM, Don Mathis, KB5YAM—SEC: K5UPN. STM: KC5OZT. SGL: N5GAR. OOC: WB5UDA. ACC: WN5PFI. ASMs: KX5K, K5RE, W5FB, KK5QA, KK5NA, N5JZ, KB5LWZ, KD5HIS, AD5X, W5GPO. Visit the section Web page at (**http: //www.lsic.net/net/ntexas.html**) for the most current information. If you would like to be on the Section Newsletter mailing, send me an e-mail: **dmathis@lsic.net**. I would like to welcome Mike Ihry, N5KB. Mike will be assisting me in setting up the Section Technical Team. This Team will be a group of technical experts in the section that will be willing to assist people on

some of the more interesting technical aspects of the hobby. We hope to have lists of speakers, technical papers, and technical links that could be referenced. See the section Web page at: **http://lsic.net/net/sectiontech.html** for further information. Let us know if you would be interested in serving with us on this team. John Fullingim, WN5PFI, reminds all clubs to verify that their database information is correct on the ARRL Web site. If it is incorrect, the information can be updated on line. We are dropping the separate section club page because the of the good quality of the ARRL club page information. The Rockwall Amateur Radio Club was officially formed on November 2, 1999. Meetings are held the first Tuesday of odd-numbered months. Come and see what ham radio can do in the smallest county in TX! Give a yell on the KK5PP repeater at 441.525 MHz (141.3 tone). Contact Richard Neilson at **k5rn@flash.net** for more info. Nettie Weigart Freer, age 74, just passed her Technician Test. You young whipper-snappers had better watch out now! Congratulations, Nettie. That made me feel good when I heard about your accomplishment. Tfc: N5JZ 383, KB5WEE 272, KC5OZT 140, KC5EIV 136, KC5VLW 136, N9BNQ 113, WA5I 101, K5AO 99, KB5TCH 85, K5MXQ 54, KC5QGI 32, AC5Z 20, PY2CGB/W5 8, KB5YAM 4, KD5AHW 2, AC5PO 2, N8QVT 1. Please note BPL: N5JZ has qualified with 181 orig./deliveries and KB5WEE with 107 orig./deliveries. Again, have a happy and safe holidays. See you all this next year. 73, Don, KB5YAM.

OKLAHOMA:SM, Charlie Calhoun, K5TTT—ASMs: N6CL, W6CL. SEC: W5ZTN. ACC: KB5BOB. PIC: WA9AFM. OOC: K5WG. SGL: W5NZS. STM: K5KXL. Well by this time we've made it through the Christmas season and Y2K. Hopefully we aren't still suffering any consequences from that. This is a difficult column to prepare for, as it is being written in early November. I'm not much of a fortune teller. But, it also is the first column for 2000. I wish I had some words of wisdom for you, but I'm not much of a philosopher. I'll make it simple and wish you the best for the new millennium. I didn't receive a whole lot of news from the section, so I will report to you that everything seems to be rolling along fine. I've completed my first year as your SM, and I really like it. I am always open to your input, and glad to have it. TARC reported that their special event celebrating their 75th anniversary was an unqualified success. The Green Country Hamfest committee has announced their 2000 scholarship winners. Yes, that's plural. Congratulations to Graham Guhl, KJ5ZM, of Oklahoma City and William D. Snook, KD5HQO, of Tulsa. The scholarship award committee, upon review of their applications, was extremely impressed with both young men and decided to award two scholarships this year. They were especially impressed with the applicants in the area of Academic achievement. I might also mention that Graham acquired an advanced class license at age 13. That's it for this month. 73, Charlie. Tfc: KF5A 726, N5IKN 618, WB5NKC 378, KE5JE 108, KI5LQ 95, WA4OUV 77, K5KXL 58, WB5NKD 52, KK5GY 30, W5REC 29, N5FM 2.

SOUTH TEXAS: SM, Ray Taylor, N5NAV—ASMs: NR5ED, N5WSW, W5GKH, K5DG, N5LYG, WA5UZB, KK5CA, WA5TUM, KB5AWM, WA5JYK, K5PFE, K5PNV, and K5SBU. STM: W5GKH. SEC: K5DG. ACC: N5WSW. PIC: KA5WSS. TC: KJ5YN. BM: W5KLV. OOC: W5JAM. SGL: K5PNV. January is the first month of the year, but this year is different, it is also the first of the New Millennium. As you read this, you should be getting ready for the December 31st event. We need every available Amateur Radio operator on our frequencies in case something does occur. The frequencies are listed in the 1999 – 2000 ARRL Net Directory pages 3 and 4. You will notice Texas, Louisiana, and Mississippi all work together, for NCS and relay station. They are also listed in each States listing. Emergency and Tactical Traffic Net, daytime 7285 kHz, nighttime 3873 kHz. Health and Welfare and Routine Traffic Net, daytime 7290 kHz, nighttime 3935 kHz. For those of you that are apprehensive about Texas DEM being in control, that will not be the case. ARES and Amateur Radio operators are not to serve only one agency, but any and all agencies. ARES will be in control, and run the nets for Y2K and all other emergencies that might occur in the future. I developed this plan last year for all the emergencies that came our way. This is the first time that Texas had a system that worked for all concerned. This was also the plan agreed on by all agencies at the Texas State Emergency Management Conference, March 7-9, this year, and the DEM representative was in the final meeting, and spoke for 10 minutes, in full support of this plan. When one agency gets control, they only consider their own needs and all others are left out. ARES was not developed for only one agency. We will activate at 5 PM on December 31st, as per State plan March 9. The greatest concern is the Sun eruptions starting in January - May. It is predicted that some of our satellites could be knocked out by the Sun spikes. Ham operators have been asked to standby in case we're needed. All amateurs are encouraged to listen to the training on the Texas Traffic Net around 7 PM, Monday, Tuesday, Thursday, and Friday. I received some excellent pictures of this year's JOTA from WA5UZB. Thanks Alan. You can also see them on the STX Web page. WA5UZB and N5LYG have done an excellent job of setting up the Web page. There are some corrections that will be made soon. Take a look. **http://www.qsl.net/n5lyg/index.htm** . 73 and have a great New Year. Tfc: W5SEG 510, KA5KLU 187 NR5ED 139, W4RRX 102, W5KLV 98, W5ZX 71, WA5FXQ 46, N5NAV 40, W5GKH 38, N5OUJ 32, W5ZIN 18, K5UCQ 12, W5OYY 7, N5HK 2.

WEST TEXAS: SM, Charlie Royall, WB5T, 915-944-0469, **WB5T@arrl.org**—ASMs: Cley, K5TRW; Ron, KB5HGM; Jerome, K5IS. Fred, W6VPI. Sandy, W5MVJ. SEC: Alex, N5LRH. OOC: John, KO5D. OBM: Frank, N5WT. This column is dedicated to Raymond Bethel, N5RMO. DEC in Coleman, TX. Raymond is an outstanding individual that has served the West Texas Section very well and has provided communications for his district with four of his own repeaters while acting as trustee on a fifth one. He is an outstanding amateur who has made this part of the world a nicer place. Thanks, Raymond, for everything you've done and everyone you've touched through your actions! Chase the Feb blustery blues away with the upcoming Panhandle Hamfest in Canyon TX, 19 Feb 2000. It'll be held in the West Texas A&M University Ballroom. Also, remember to mark your calendars for the St Patrick's Hamfest in Midland TX, coming up in Mar 2000. If you're reading this, then you survived the hullabaloo, festivities, and kooks and made it to the new millennium. Hope all of you have a healthy, prosperous 2000! 73 de Charlie, WB5T.

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Length	98.4"	204.7"
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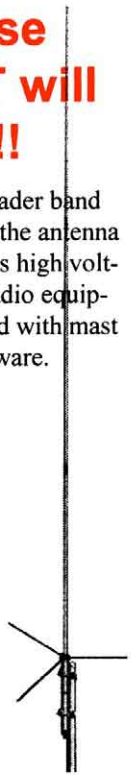
Frequency	144-148/435-450	144-148/435-450
Max Power	200w	200w
VSWR	Less than 1.5:1	Less than 1.5:1
Connector	SO-239	SO-239
Price	$59	$89



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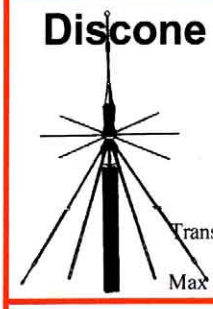

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Model # T734

Full band antenna
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Transmission bands: 26-27-46-49-72-144-220-440-900-1290 Mhz
Max Power: 60 Watts below 30 Mhz, 200 Watts VHF & UHF

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6M, 2M, 70cm in a HT!

VX-5R Yaesu, the world leader in amateur radio is pleased to announce the world's smallest durable tri band handheld transceiver on earth the "new" VX-5R. The VX-5R is a miniature tri band FM transceiver with extensive receive frequency coverage, providing leading-edge features for 2M, 440MHz and 50MHz amateur communications along with unmatched monitoring capability.

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CAT # DCTX-1213 **$5.50 each**

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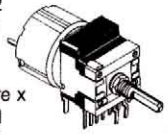
Motorized Potentiometer Dual 10K Linear Taper

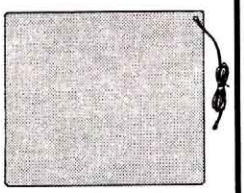


Alps Electric # 726T-10KBX2 Dual 10K linear pot powered by a small reversible 6 Vdc gearhead motor. Pot and motor assembly are 1" square x 1.7" long excluding shaft and bushing. 6 mm flatted shaft is 0.5" long. 9mm threaded bushing. PC pins and mounting tabs for pc board mounting.

CAT # MPOT-10K **$4.00 each**

10 for $35.00

Anti-Static Mat



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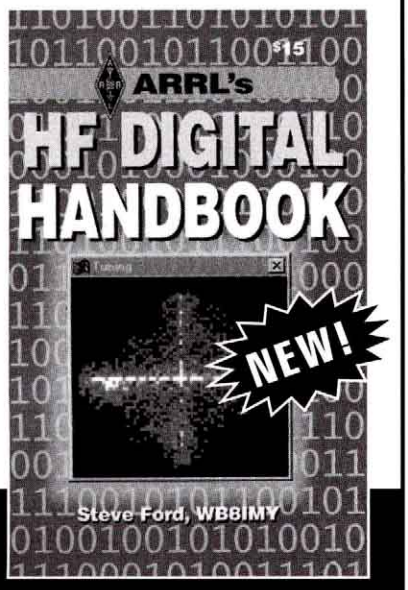

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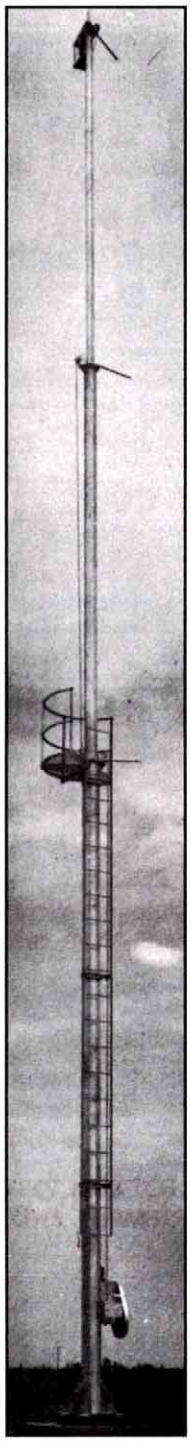

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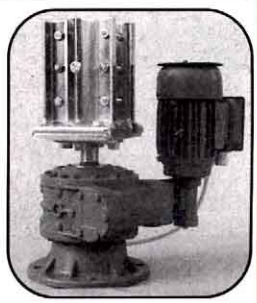

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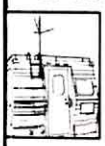

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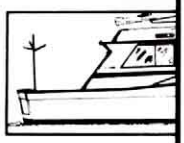

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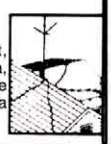

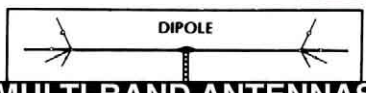

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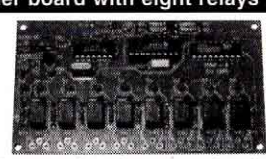

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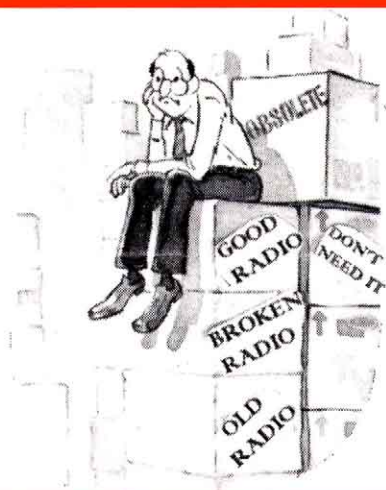

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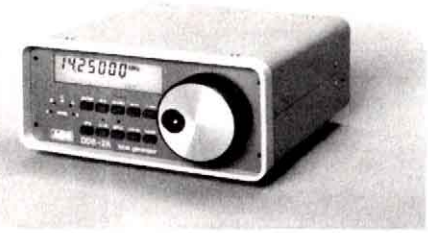

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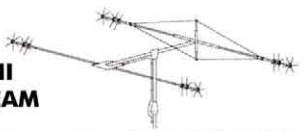

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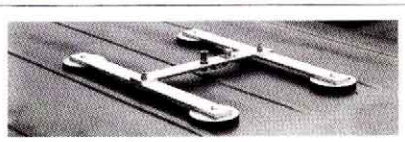

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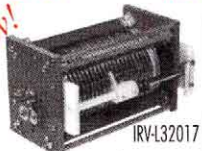

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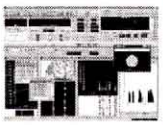

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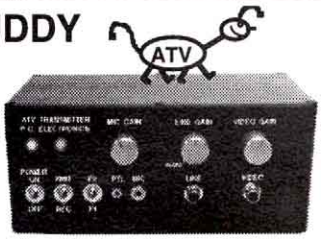

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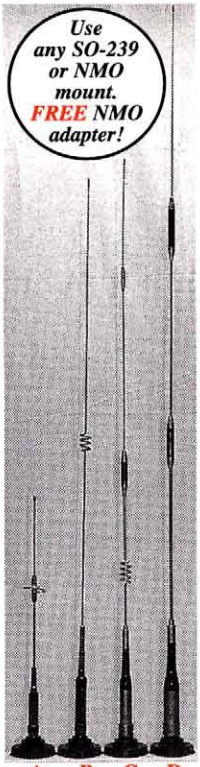

A. B. C. D.
Shown on mini mag mounts, not included.

Each MFJ RuffRider™ mobile antenna comes with MFJ's unique 90 degree "fold-over" feature -- lets you pull into your garage without knocking your antenna over!

MFJ's heavy duty bases are extremely strong to handle super rugged rides and day-to-day highway abuse.

MFJ's *RuffRider*™ High Gain dual band 144/440 MHz mobile antenna series is for the serious mobile ham who demands the highest quality, premium products at reasonable prices.

They feature the finest quality construction using precision machined components. *RuffRiders*™ battle the elements, handle rugged rides and day-to-day highway abuse.

Stacked elements with high-Q phasing coils give you outstanding gain. Stay in solid contact!

Phased Radiators

Phased radiators flattens the radiation pattern and concentrates your power to give you *super gain.*

High-Q phasing coils are housed in weather proof high-tech plastic insulation. They're attached to stainless steel stacked radiators by solid metal end sections.

Heavy Duty Base

Rigid, heavy duty solid metal base reduces SWR flutter due to wind vibration. Two Allen set screws securely fastens radiator.

Specially treated center pin provides excellent electrical connection.

Quickly screws off -- helps prevents theft of your expensive rig.

Use SO-239 or NMO Mounts

RuffRiders™ have a PL-259 base mount for quick installation to your heavy duty SO-239 magnet, trunk/hatch, gutter or mirror mount.

A *free* NMO adapter is included for use with an NMO mount.

MFJ mounts are recommended.

All MFJ *RuffRiders*™ are dual band 144/440 MHz antennas and factory tuned for SWR less than 1.5:1 and have 50 Ohm impedance.

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All *RuffRider*™s are covered by MFJ's famous *No Matter What*™ one year limited warranty. MFJ will repair or replace (at our option) your antenna for one full year.

Choose from several different length and gain antennas . . .

A. ***RuffRider Junior*™.** Premium, short 16½" antenna fits in any garage on any auto. ¼ Wave on 2 Meters, ½ Wave, gain on 440 MHz. 100 Watts. No fold-over.
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B. ***RuffRider High Power*™.** Just 40" long handles full *200 Watts.* Great for high power mobile amp. ½ Wave, gain on 2 Meters, ⅝ Wave, gain on 440 MHz.
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D. ***RuffRider Hyper Gain*™.** 62½" brute gives a whopping gain on ⅞ Wave 2 Meters, ⅝ Wave, gain on 440 MHz. Our highest gain antenna. Handles 150 Watts.
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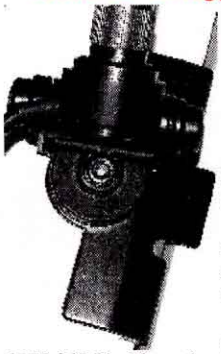
MFJ *RuffRider*™ super heavy duty Antenna Mounts

Trunk/Hatchback *Lip* Mount



MFJ-345 Lip Mount is shown mounted vertically to a mini-van's angled hatchback lip. Note extra-wide mount with reinforcing tab at right -- safely secures heavy antennas. Swivel mount is adjusted so antenna is near vertical away from mini-van to clear luggage rack.

MFJ-345 **$34.95** add s/h

MFJ's *RuffRider*™ super heavy duty solid steel Trunk/Hatchback *Lip* Mount mounts to any lip on your vehicle.

Extra-wide *four* inch lip and large reinforcing tabs on each side safely distributes the load over your vehicle's lip.

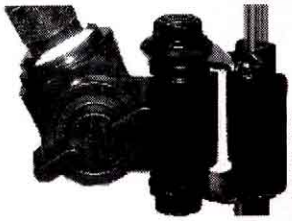
Two large set screws on each end of the mounting lip locks your mount in place. A scratch-proof rubber guard protects your vehicle's finish.

Secures large VHF, UHF and medium size HF antennas even at highway speeds.

Mounts on lips at any angle. Two axis of rotation lets you position your antenna vertically, horizontally or at any desired angle. Serrated swivel joints locks securely in place with huge 3/8 inch set screw.

Has SO-239 base mount. Use adapter for NMO. Includes low loss coax with PL-259 connector, Allen wrenches and protection caps for SO-239 and locking screw, One year MFJ *No Matter What*™ limited warranty.

Mirror/Luggage *Pipe Clamp* Mount



MFJ-340 Pipe Clamp Mount is shown clamped solidly to vertical mirror support rod on a pickup truck. Antenna is slightly swiveled to the left and positioned about 30 degrees from vertical to clear cab of the pickup truck.

MFJ-340 **$34.95** add s/h

MFJ's *RuffRider*™ Mirror/Luggage *Pipe Clamp* Mount mounts on support rod of mirror, luggage rack or spare tire carrier of your truck, van, RV or SUV. Mounts on any horizontal, vertical or angled rod or pipe up to 5/8 inches in diameter.

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Convenient *Thumb and Finger* turn knob makes fold-over operation quick and easy. Locks in twelve positions.

Fold down your antenna at night when pulling into your garage and quickly put it back up to its operating position in the morning.

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MFJ's *MaxStrength*™ high-flux magnet mounts give you maximum pull strength -- your antenna stays on top of your vehicle at highway speeds.

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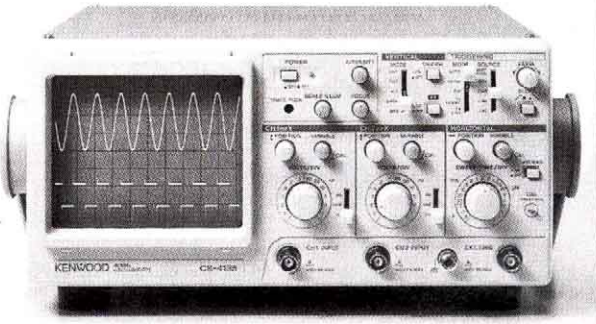

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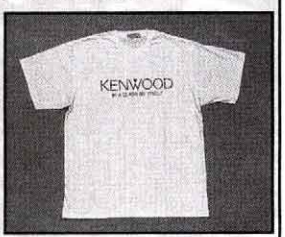

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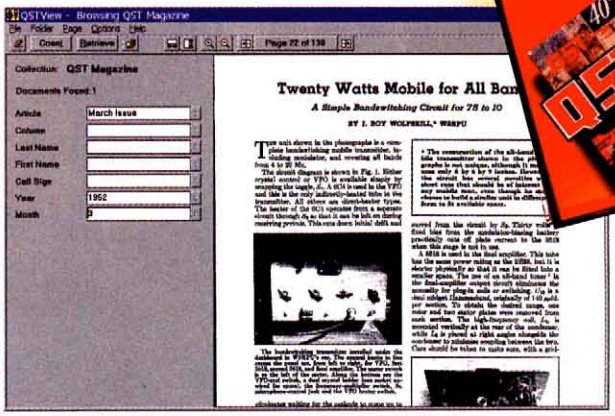

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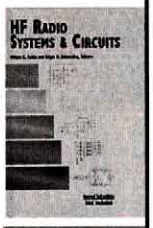

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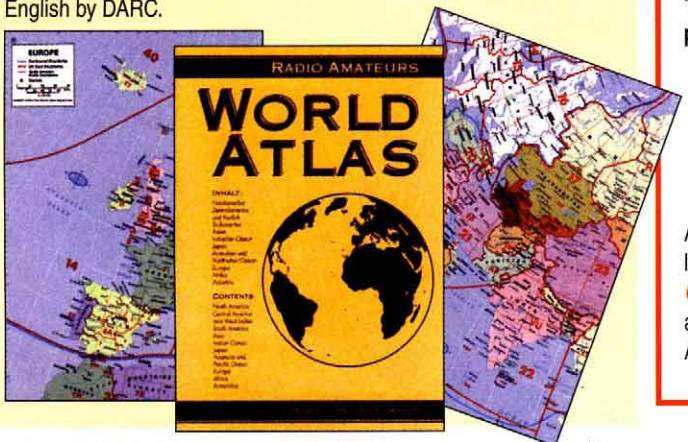

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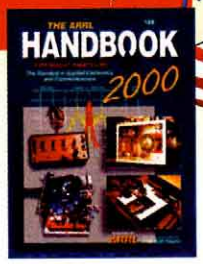

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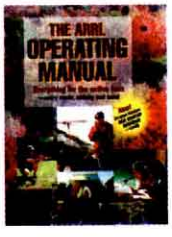

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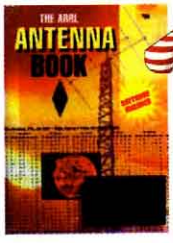

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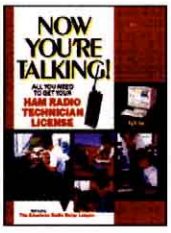

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Solid state amplifier featuring 1 kW output, high power antenna tuner, and more!

FT-847 .... $200 Yaesu Coupon!

The Yaesu FT-847 is an all mode transceiver covering HF/6m/2m/70cm! The radio is perfect for satellite operation, and features digital signal processing, built-in RS-232 interface, tone encode/decode, and more. Supplied with an up/down microphone and DC power cord.

FT-920 ..... Yaesu Special!

The Yaesu FT-920 is an all mode HF/6m transceiver featuring digital signal processing, automatic antenna tuner, CW memory keyer, CTCSS tone encode/decode, 127 memory channels, and more. Supplied with up/down hand mic and DC power cord.

IC-706MK2G ..... Now In Stock!

The Icom IC-706MK2G is a compact HF/6m/2m/70cm all mode transceiver with digital signal processing, automatic repeater offset, built-in CW keyer, built-in CTCSS tone encode/decode/scan, 107 memory channels and more. A detachable front panel offers convenient mounting, even in compact vehicles.

IC-707 ..... Entry Level Price!

The Icom IC-707 is an all mode HF transceiver featuring a front panel mounted speaker, AGC, 20 dB attenuator, 32 memory channels, multiple scanning modes, noise blanker, RIT, and more.

IC-2800H ..... Now In Stock

The Icom IC-2800H is a 2m/70cm dual band mobile FM transceiver with a 3" color TFT display. The radio features a separate control face, video input, bandscope display, 9600 bps Packet jack, CTCSS tone encode/decode/scan, 232 memories, cross band duplex, and more. With DTMF hand mic, mounting brackets, and power cord.

IC-821H ..... In Stock

The Icom IC-821H is an all mode 2m/70cm dual band transceiver. Great for satellite use, the radio offers dual RX, dual frequency display, tone encode, and more.

FT-90R ..... New!

New ultra-compact 2m/70cm dual band mobile transceiver with detachable control panel, and huge extended RX range.

FT-2600M ... New Lower Price!

Rugged 2m mobile with intermod-proof receiver, big display, and an illuminated DTMF mic. Built to MIL-STD 810.

FT-8100 ..... New Lower Price!

Great 2m/70cm dual band mobile, 45/35 Watts, removable front panel, and more!

FT-100 ..... In Stock!

The Yaesu FT-100 is an ultra-compact all mode transceiver for HF/6m/2m/70cm operation. The radio features a removable control panel, digital signal processing, CW memory keyer, built-in RS-232 interface, tone encode, 200 memory channels, VOX, and more. Supplied with a DTMF hand mic, DC power cord and mounting bracket.

FT-840 ..... New Lower Price!

The Yaesu FT-840 is an all mode HF transceiver with 100 watt output, optional FM unit.

IC-W32A ..... New Lower Price!
IC-Q7A ..... Tiny HT, Tiny Price!
IC-T7A ..... Great Low Price!
IC-T8A ..... Triband HT!
IC-T81A ..... New QuadBand HT!
IC-T2A ..... Amazing Low Price!

IC-207H ..... New Lower Price!

The Icom IC-207H is a 2m/70cm dual band mobile transceiver featuring CTCSS tone encode/decode, 182 memory channels, removable front control panel, and more. Supplied with a back-lit DTMF hand mic, mounting bracket, and a DC power cord.

IC-2100H ..... Great Low Price!

The Icom IC-2100H is a rugged 2m mobile transceiver featuring CTCSS tone encode/decode/scan, DTMF paging/squelch, 113 memory channels, switchable display color, multiple scan modes and more. Supplied with a back-lit DTMF hand mic, mounting bracket, and a DC power cord.

G-2800SDX $1069

Heavy duty antenna rotator handles 34 square feet of antenna load, and features 450° rotation, preset and variable speed.

G-1000SDX $479
G-800S/SDX $319/399
G-450A $239
G-5500 ..... $499
G-550 ..... $289

VX-5R ..... Now In Stock!

Tiny 6m/2m/70cm triband HT, with CTCSS tone encode/decode/scan, high capacity Lithium-Ion battery pack, and more.

FT-50RD ..... New Lower Price!
FT-51RH ..... Yaesu Special!
VX-1R ..... Yaesu Special!

WEEKDAY HOURS:
9AM–5PM CST

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

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

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

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

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

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

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

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

THE TASK MASTERS.

They're out there. Those elusive DX signals that can't poke through the QRM regardless of the late-night hours you put in trying to find them. But when a Yaesu HF enters the picture, weak signals suddenly jump into your headphones. Yaesu's High Frequency transceiver technology uniquely combines years of RF and AF design know-how with cutting edge advancements in IF filtering, noise reduction, and dynamic range. Whether you're on high bands or low, at home or away, the high frequency technology of Yaesu's task masters quickly fills up your log with contacts. Learn more about Yaesu products on the web at www.yaesu.com

YAESU **Choice of the world's top DX'ers.**

An APRS® transceiver built for tomorrow's communication needs with advanced features available today.

TM-D700A DATA COMMUNICATOR 144/440MHz FM Dual Bander

Conspicuous with its extra-large amber & black display, Kenwood's new TM-D700A is fully equipped to make the most of the exciting opportunities offered by SSTV, GPS and APRS® (the Automatic Packet/Position Reporting System that is rapidly gaining popularity worldwide), and other innovative features. This mobile transceiver with built-in TNC offers a wide range of data communications options, including simple packet operation using the AX.25 protocol. You can also send and receive SSTV images using Kenwood's VC-H1. Ham radio is truly entering a new era.

APRS® (Automatic Packet/Position Reporting System)

- **Position/directional data**
  With an NMEA-0183 compatible GPS receiver you can transmit position data for automatic calculation of distance, current speed and heading. Last 4 digits can be masked for position ambiguity. Manual input of latitude/longitude is also possible.
- **Versatile messaging**
  Transmission of position data can be accompanied by a choice of programmable status text (up to 28 characters), position comments (15 settings), icons and bulletins. For added messaging flexibility, individual alpha messages (up to 64 characters) can also be sent.
- **Station list**
  Store received APRS® data in up to 40 station reports.
- **Grid square locator**
  Position data is displayed on the grid square locator for visible reference.
- **BCON TX interval (0.2/0.5/1/2/3/5/10/20/30 min.)**
- **Packet path selection for Digipeat**
- **Weather station & PHG data reception**
- **Digipeat station and DIGI function capability**
- **Auto Message Reply**
- **Audible APRS® message receive (call sign) notification (requires VS-3)**
- **Waypoint position data output**

FEATURES

◗ Full Dual-band operation: VHF x VHF/VHF x UHF/UHF x UHF ◗ Wide-band receive: 118~524, 800~1300 MHz (excluding cellular blocked + frequencies) ◗ Detached panel (extension cable and panel holder supplied) with extra-large (188 x 54 dots) backlit LCD and multifunction key display (reversible) ◗ Improved key operation announcement with optional VS-3 voice synthesizer ◗ Built-in 1200/9600bps TNC compliant with AX.25 protocol and KISS mode ◗ Simplified packet monitoring ◗ SSTV functions with Fast FM for transmission of images in just 14 secs (approx.) and dual receive for voice and image transmissions (two frequencies simultaneously) ◗ 200 memory channels with 8-character memory name input ◗ Up to 10 programmable memory scan banks ◗ Easy-to-use menu system similar to the TH-D7A ◗ Built-in DCS (Digital Code Squelch) and CTCSS encode and decode ◗ CTCSS tone frequency scan ◗ DCS code scan ◗ 9600bps PC-based packet communications for chat, BBS ◗ DX packet cluster monitoring ◗ Cross-band repeater ◗ Wireless remote controller ◗ 1750Hz tone burst ◗ D-sub 9 pin terminal (for PCs) ◗ GPS input terminal (NMEA-0183) ◗ Visual band scope ◗ Mute function ◗ Memory control program available via Internet access ◗ New backlit microphone with alphanumeric message input.

NOTICE:

The TM-D700A has not been approved by the F.C.C. This device is not, and may not be, offered for sale or lease, or sold or leased until the approval of the F.C.C. has been obtained. Pending approval in December, 1999.

Example A: with GPS receiver & laptop

Example B: with VC-H1

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JQA-1205
Communications Equipment Division
Kenwood Corporation
ISO9001 Certification

KENWOOD
Amateur Radio Products Group

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