Official Journal of
ARRL
The national association for AMATEUR RADIO

QST

devoted entirely to AMATEUR RADIO

October 1999

QST reviews:

- ICOM IC-2800 dual-band FM mobile
- ADI AR-147 2-meter FM mobile

ARRL International DX Contest CW Results

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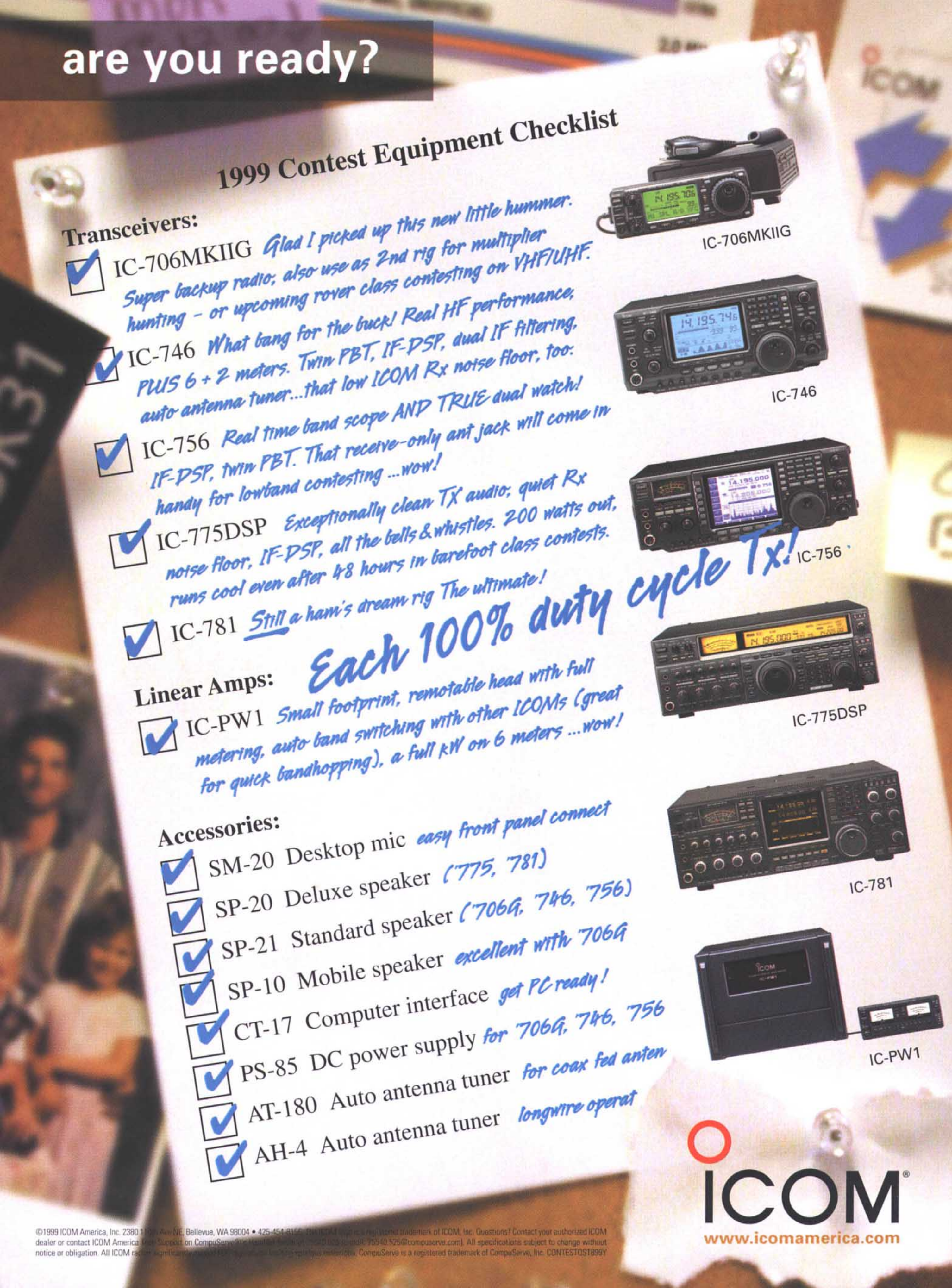
are you ready?
1999 Contest Equipment Checklist
Transceivers:
IC-706MKIIG Glad I picked up this new little hummer. Super backup radio; also use as 2nd rig for multiplier hunting - or upcoming rover class contesting on VHF/UHF.
IC-746 What bang for the buck! Real HF performance, PLUS 6 + 2 meters. Twin PBT, IF-DSP, dual IF filtering, auto antenna tuner...that low ICOM Rx noise floor, too.
IC-756 Real time band scope AND TRUE dual watch! IF-DSP, twin PBT. That receive-only ant jack will come in handy for lowband contesting ...wow!
IC-775DSP Exceptionally clean TX audio; quiet Rx noise floor, IF-DSP, all the bells & whistles. 200 watts out, runs cool even after 48 hours in barefoot class contests.
IC-781 Still a ham's dream rig The ultimate!
Each 100% duty cycle Tx!
Linear Amps:
IC-PW1 Small footprint, remotable head with full metering, auto band switching with other ICOMs (great for quick bandhopping), a full kW on 6 meters ...wow!
Accessories:
SM-20 Desktop mic easy front panel connect
SP-20 Deluxe speaker ('775, '781)
SP-21 Standard speaker ('706G, '746, '756)
SP-10 Mobile speaker excellent with '706G
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PS-85 DC power supply for '706G, '746, '756
AT-180 Auto antenna tuner for coax fed anten
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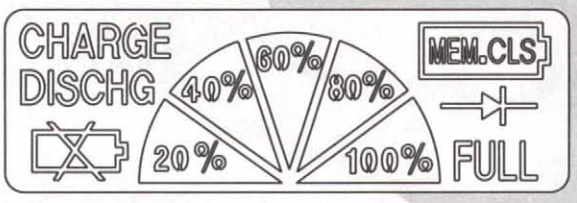

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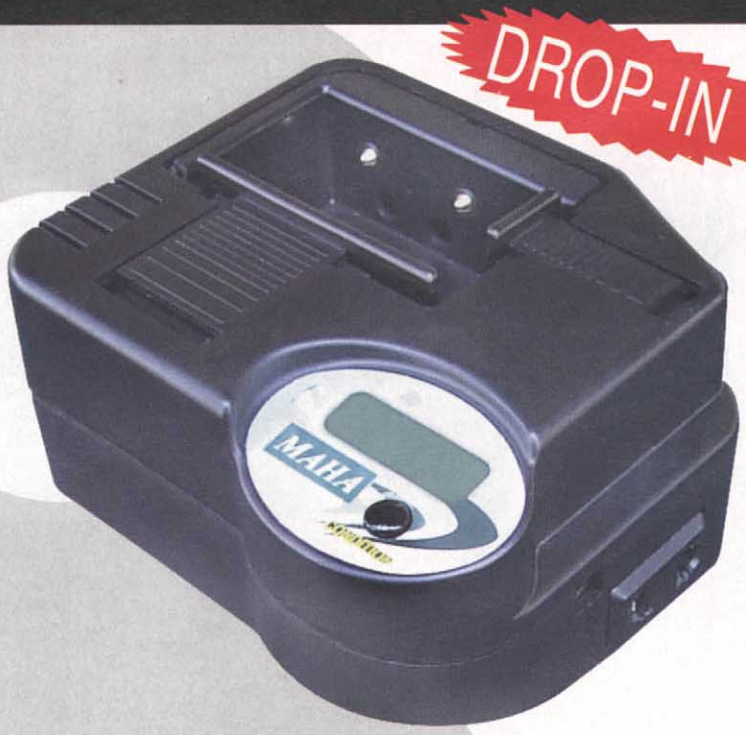

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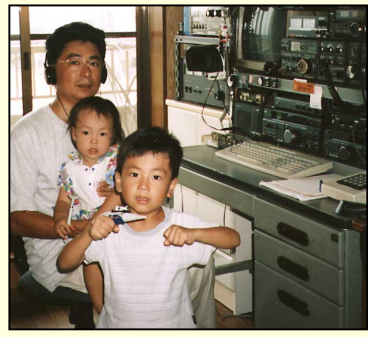
Technical

57

28

News and Features

New Ham Companion



Operating

Departments

Our Cover

Old and new technologies are comfortable side by side in the station of Dr Jerry Svoboda, KB2QIU. As a child Jerry dreamed of becoming a ham, but he didn't make his dream a reality until middle age. When Jerry was finally licensed he discovered a passion for hardware of the past and present. Read his story, "Regeneration and Crystal Control," in this issue.

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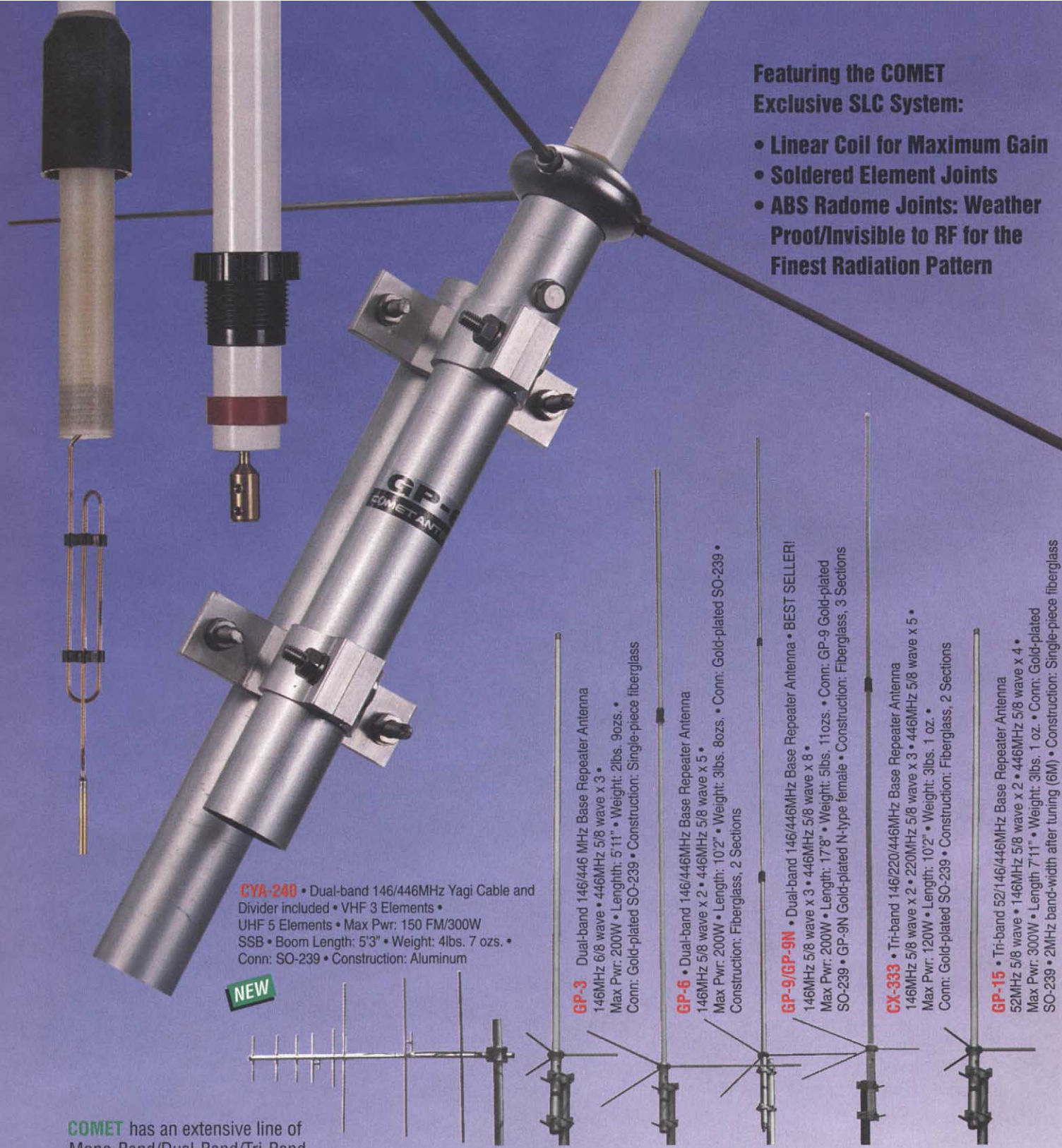

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Max Pwr: 120W

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* The AR-247 has not yet been approved by the FCC. It may not be offered for sale until after such approval is granted.

"It Seems to Us..."

WRC-2000

Ever since a devastating earthquake struck northwestern Turkey in the early hours of August 17, the people of Turkey have been in our thoughts. It is hard to imagine that such suffering and damage can be inflicted in a few brief moments.

Turkey is no stranger to natural disaster, so it is only natural that our colleagues in Telsiz Radyo Amatorleri Cemiyeti (TRAC), the IARU member-society for Turkey, are sincerely interested in emergency communication. While the number of Turkish radio amateurs is still relatively small, about 1200, Amateur Radio has been developing rapidly there thanks to TRAC and to recent support from the Turkish government. Not only is Turkey a participant in the CEPT amateur license arrangements, there is a third-party traffic agreement with the United States—something of a rarity in that part of the world. A couple of years ago, at their request, the ARRL supplied TRAC with information about our own emergency and public service communications programs. Even so, no amount of preparation is ever adequate in the face of a disaster of this magnitude.

At this writing, our friends in TRAC are busy tending to the immediate needs in the affected area. They have asked for some assistance with equipment, and we are doing what we can to help. It is clear that another proud chapter is being added to the chronicle of Amateur Radio public service.

Turkey was already in our thoughts for another reason. On Monday, May 8, 2000, a four-week ITU World Radiocommunication Conference (WRC-2000) is scheduled to begin in Istanbul. At this point it is too early to know whether the earthquake will affect Turkey's hosting of the conference, although it will be entirely understandable if it does; their priorities shifted when the earth shifted on August 17.

Even if WRC-2000 is delayed, even if it is moved to another site, the conference *will* take place at some point in the not too distant future. It must. New uses for the radio spectrum are being developed too quickly for the urgent issues on its agenda to be put off.

There are 33 items on the WRC-2000 agenda. The world is most likely to remember the conference for how it deals with the third generation of mobile wireless access systems known as IMT-2000. While spectrum access is not the only issue, IMT-2000 requires considerable spectrum and will impact existing services either directly or indirectly, particularly around 2 GHz.

The ARRL and IARU also have been working on other WRC-2000 issues of concern to radio amateurs, which include:

- Additional allocations for nongeostationary mobile satellites below 1 GHz (the so-called "little LEOs")
- Maintenance of amateur allocation at 1240-1260 MHz based on compatibility with a new space-to-space allocation for radionavigation satellites
- Rearrangement of allocations above 71 GHz to provide better protection for radio astronomy and other passive services
- Standards for unwanted emissions from stations in space, which could affect the cost and difficulty of building amateur satellites
- Agendas of future conferences

There is little new to say on the subject of little LEOs. Some proponents continue to seek more spectrum for low-cost, slow-speed data communication by satellite. While their focus has shifted outside the amateur bands temporarily, there is no way to predict what WRC-2000 will decide to do; we have been vigilant throughout the preparations for the conference and will remain so until the final gavel.

We have helped develop a technical basis for maintaining the amateur allocation at 1240-1260 MHz, even if the conference decides that space-to-space radionavigation should be protected.

We have worked with radioastronomy and other interests to ensure that their plan for 71-275 GHz includes continued access for amateur experimentation (albeit with some shifts in amateur allocations).

We continue to work on the issue of unwanted emissions standards, to ensure that whatever standards may ultimately be applied to amateur stations are reasonable.

As important as issues such as little LEO allocations may be for us, the agendas for future conferences in 2003 and beyond are equally important. WRC-97 asked the ITU Council to find resources so that several items, including consideration of an allocation for earth exploration satellites somewhere between 420 and 470 MHz, could be included on the WRC-2000 agenda. The Council was unable to do so and the items were dropped, but are likely to reappear. The ARRL and IARU already have done considerable technical work to demonstrate the need to protect incumbent amateur operations.

Other possible future agenda items include the realignment of the 7 MHz band, the adequacy of HF broadcasting allocations from about 4 MHz to 10 MHz, and review of Article S25 of the Radio Regulations that contains the rules specific to the Amateur and Amateur-Satellite Services. No doubt there will be more.

WRC-2000 preparations have been underway since the closing gavel of WRC-97 and will peak at a Conference Preparatory Meeting (CPM-2000) in Geneva this November. The IARU will be represented at CPM-2000, as will the ARRL and other IARU member-societies on their respective national delegations. Plans are in place for similar representation at WRC-2000 itself.

International conferences are an expensive business. Even with dedicated volunteers doing much of the work, the cost of effective advocacy is more than can be supported through membership dues alone. For the past three years we have come to you, the ARRL membership, with annual requests for voluntary financial support. You have responded generously. We will be doing so again this fall. When you receive the mailing, please do what you can to help protect radio spectrum access for present and future generations of radio amateurs.—*David Sumner, K1ZZ*

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June 29, 1999
From: Gordon West
To: Don Tyrrell and Jim Burns, Alpha Delta
Re: **Outbacker** Performance On Radio School Van

Hi Don and Jim!

In our NEW communications van installation, we run with the **Outbacker Perth**, the regular **Outbacker** with the short stainless steel whip tip, and when we're parked, the 500 watt **Outreach**. When compared to other mobile antennas at the same approximate length, the **Outbackers** and the **Outreach** are equal if not better performers, and I don't need to unscrew them when we change bands. We have logged over 30,000 miles with all of our **Outbackers** constantly up in the air, and now and then tangles with trees failed to slow them down one bit!

Many of our graduating students who have earned their General class license have gone with our recommendation of the **Outbacker** over the less-expensive mobile whips. The benefit of all bands on one shaft is well worth the money. No extra loading coils–no extra whip tips–no extra shafts to carry...all the bands on just one nice, neat jet-black body.

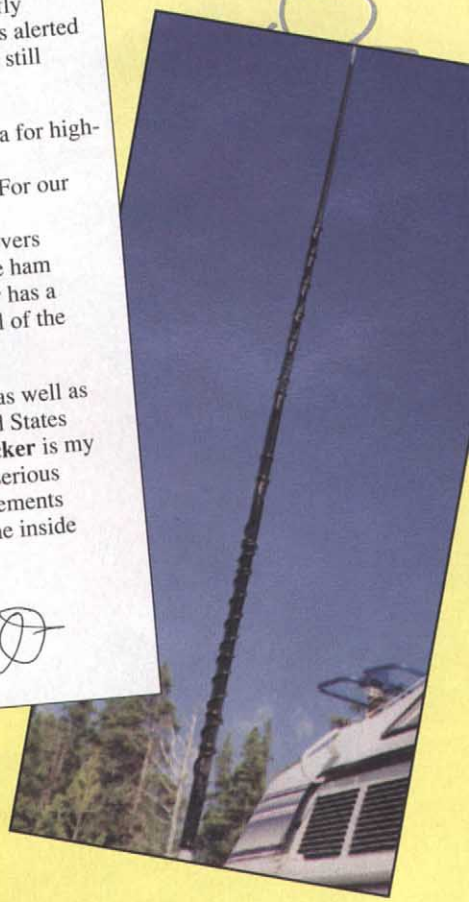
The 500-watt **Outbackers** can really handle the power, coolly. None of these 600-watt amps have been able to blow up the 500-watt **Outbackers**.

Many of our classroom demos use a single **Outbacker** and your tripod, and it works every time over almost any type of ground conductivity. And when we placed the tripod with the **Outbacker** over sea water, whowzers–what a signal!

One of our students dropped his marine **Outbacker** in the bay. After he dried it out, it still continues to work at optimum. Another student forgot to tighten his **Outbacker** into the mount, and it finally vibrated loose and dragged behind the vehicle–still attached by the fly lead–for about 5 miles until other motorists alerted him to the problem. It was scuffed up, but still continued to work great.

I wouldn't have any other mobile antenna for high-frequency work on our communications van than the proven **Outbacker** series. For our emergency Red Cross work, I use the international I.T.U. **Outbacker** that covers those frequencies above and below the ham bands. And if I need both, **Outbacker** has a combination ham/I.T.U. whip with all of the band taps on it clearly marked.

I have run the antenna both mobile as well as maritime mobile all over the United States and coastal waters, and the **Outbacker** is my favorite and ultimate choice for a serious HF whip that can withstand the elements with really nothing movable on the inside to go wrong.



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.

FCC Chairman Kennard Delivers Plan to Congress

Over the summer, FCC Chairman William Kennard delivered the first draft of a congressionally mandated strategic plan outlining how the FCC is streamlining itself into the new millenium. The plan requirement stems from FCC oversight hearings by the House Telecommunications Subcommittee at the end of March. Titled "A New FCC for the 21st Century," Kennard's proposal envisions a future for telecommunication that is much less encumbered by regulation, with the FCC becoming less a regulator and more a "market facilitator."

"With this plan," Chairman Kennard noted, "the FCC is meeting the challenge of reinventing itself to keep pace with the rapidly changing communications industry landscape. We've developed a well-thought-out plan that reflects input from consumer groups, industry, state and local governments, the academic community and FCC employees. It will allow the FCC to enter the next century able to respond fully and quickly to emerging technologies and the inexorable movement from regulation to competition. The Commission looks forward to a constructive dialogue with Congress and a continuing dialogue with all our stakeholders to ensure that this plan is inclusive, and addresses the needs of the American people."

Kennard predicts that Internet-based technology will have the effect of blurring the traditional regulatory distinctions between different sectors of the communications industry. FCC's response, he says, must be to "(1) create a model agency for the Digital Age; (2) promote competition in all communications markets; (3) promote opportunities for all Americans to benefit from the communications revolution; and (4) manage the electromagnetic spectrum…in the public interest."

Specific steps will include efforts to consolidate rulemaking and licensing functions and streamline regulatory processes, as well as to examine the effects of increased competition and convergence on existing FCC bureaus. Tentatively, Kennard envisions an agency restructured "along the functional lines of enforcement, consumer information, licensing, competition/policy, and international communications. "

Among some of the more provocative proposals, Kennard says that The Commission is developing a plan to allocate and assign up to 200 MHz of spectrum for a broad range of new services, such as "expanded wireless communications services, advanced mobile communications services, and new spectrum-efficient private land mobile systems." The FCC is also going to explore new spectrum assignment mechanisms. These would include "band managers, two-sided auctions, and combinatorial bidding," as well as the creation of a secondary market for spectrum based on a public database on current spectrum incumbency, and holding forums to bring together prospective buyers and sellers of "after market" spectrum.

The draft plan can be reviewed on the FCC's web site at **http://www.fcc.gov/21st_century/**.

NTIA Chief Leaving

• Larry Irving, who heads the U.S. Department of Commerce's National Telecommunications and Information Administration (NTIA) planned to leave at the end of the summer, turning over the administrative reins to Gregory L. Rohde, who was Senior Legislative Assistant to Democratic Senator Byron L. Dorgan of North Dakota. NTIA is the government's own telecommunications management agency, with functions that roughly parallel the FCC's management of public telecommunications. Rohde has served as Senator Dorgan's chief policy advisor on the Senate Committee on Commerce, Science, and Transportation, which handles technology and telecommunications issues.

Irving was appointed by President Clinton in 1993, and was an advocate in the administration for policies to promote diversity in telecommunications. He also worked to open foreign markets to the US telecommunications industry, secure better protection for consumers and open up advanced telecommunications services to rural and other under-served areas of the country.

DoD "Super-Primary" Status Off The Table?

Language in the Department of Defense Authorization Act, S.1059, that would have granted "super primary" status to military radio frequency allocations crept out of the bill just as quietly as it originally crept into it. Once the $266 billion measure went to conference to resolve differences between the House and Senate versions, a compromise was apparently reached. The House version is HR.2561. Compromise language calls for a "time out" provision that would require an interagency review and assessment of the progress made in the implementation of national spectrum planning and the reallocation of Federal Government spectrum to nonfederal use. The conference report notes that the study should include "the effects of the reallocation on critical military and intelligence capabilities, civil space programs, and other Federal Government systems used to protect public safety."

The compromise returns to the Defense Department the bands between 138-144 MHz and 1385-1390 MHz, originally reallocated to non-federal use by the Balanced Budget Act of 1997. The 138-144 MHz band has traditionally been used for a variety of utility purposes in the armed services such as military police and base security, as well as for emergency and rescue purposes. The 1385-1390 MHz band has traditionally been set aside for a variety of military positioning, nuclear detection and radar uses.

Update on the Amateur Radio Spectrum Protection Act

♦ By the end of the summer, ARRL had visited approximately 220 Congressional offices (or about half of the House of Representatives) seeking to enlist cosponsors for HR.783 and to discuss Amateur Radio matters generally. As we went to press, 102 members of the House had signed on as cosponsors. Thanks to all of the ARRL members who have taken the time to write to their Representatives. And, for those who haven't written but plan to write, visit the ARRL's Web site at **http://www.arrl.org/govrelations/hr783.html** for a sample letter and addresses. While the summer doldrums, coupled with major appropriations battles had made any further forward motion this year fairly unlikely, the 106th Congress is heating up this autumn and will still have almost a year left to take action before the end of the session. Anything is possible.

Cosponsors for HR.783
Introduced by Rep. Michael Bilirakis (R-FL-9th) (In order of sign on):

Frank Pallone, Jr. (D-NJ-6th)
Michael R. McNulty (D-NY-21st)
Ronnie Shows (D-MS-4th)
Nathan Deal (R-GA-9th)
Patsy T. Mink (D-HI-2nd)
Robert A. Underwood (D-GU-delegate)
John E. Baldacci (D-ME-2nd)
Sam Farr (D-CA-17th)
James M. Talent (R-MO-2nd)
Stephen E. Buyer (R-IN-5th)
Dale E. Kildee (D-MI-9th)
Norman D. Dicks-(D-WA-6th)
Owen B. Pickett-(D-VA-2nd)
Barbara Cubin-(R-WY-1st)
Steve C. LaTourette (R-OH-19th)
Jo Ann Emerson (R-MO-8th)
George R. Nethercutt, Jr. (R-WA-5th)
Robert B. Aderholt (R-AL-4th)
David L. Hobson (R-OH-7th)
Michael G. Oxley (R-OH-4th)
Dan Burton (R-IN-6th)
Bernard Sanders (1-VT-At Large)
Sonny Callahan (R-AL-1st)
Deborah Pryce (R-OH-15th)
Michael F. Doyle (D-PA-18th)
Steven R. Rothman (D-NJ-9th)
Ron Klink (D-PA-4th)
Greg Walden (R-OR-2nd)
Rick Boucher (D-VA-9th)
Charles H. Taylor (R-NC-11th)
Sanford D. Bishop, Jr. (D-GA-2nd)
Donna Christian-Christensen (D-VI-delegate)
Ken Bentsen (D-TX-25th)
Thomas H. Allen (D-ME-1st)
Bob Schaffer (R-CO-4th)
Frank R. Wolf (R-VA-10th)
George Miller (D-CA-7th)
Dave Weldon (R-FL-15th)
Virgil H. Goode, Jr. (D-VA-5th)
Peter A. DeFazio (D-OR-4th)
Louise M. Slaughter (D-NY-28th)
Charles T. Canady (R-FL-12th)
Benjamin A. Gilman (R-NY-20th)
John J. Duncan, Jr. (R-TN-2nd)
Bob Stump (R-AZ-3rd)
Bob Etheridge (D-NC-2nd)
Thomas M. Davis (R-VA-11th)
William Mac Thornberry (R-TX-13th)
Bruce M. Vento (D-MN-4th)
Norman Sisisky (D-VA-4th)
David E. Bonior (D-MI-10th)
Ike Skelton (R-MO-4th)
Michael K. Simpson (R-ID-2nd)
Baron P. Hill (D-IN-9th)
John M. McHugh (R-NY-24th)
Nancy L. Johnson (R-CT-6th)
Nick Lampson (D-TX-9th)
Porter J. Goss (R-FL-14th)
John P. Murtha (D-PA-12th)
Tom Campbell (R-CA-15th)
James A. Traficant, Jr. (D-OH-17th)
John E. Peterson (R-PA-5th)
Robert A. Borski, Jr. (D-PA-3rd)
Debbie Stabenow (D-MI-8th)
Jerry Weller (R-IL-11th)
Neil Abercrombie (D-HI-1st)
Tim Roemer (D-IN-3rd)
Fortney Pete Stark (D-CA-13th)
Robert E. (Bud) Cramer, Jr. (D-AL-5th)
Jerry F. Costello (D-IL-12th)
Tony P. Hall (D-OH-3rd)
Marcy Kaptur (D-OH-9th)
Tim Holden (D-PA-6th)
Maurice D. Hinchey (D-NY-26th)
Marge Roukema (R-NJ-5th)
Sherwood L. Boehlert (R-NY-23rd)
Vernon J. Ehlers (R-MI-3rd)
George E. Brown (D-CA-42nd)
Christopher Shays (R-CT-4th)
Martin Frost (D-TX-24th)
Nick J. Rahall (D-WV-3rd)
Max Sandlin (D-TX-1st)
James A. Barcia (D-MI-5th)
Ed Pastor (D-AZ-2nd)
Richard H. Baker R-LA-6th)
Ted Strickland (D-OH-6th)
Peter T. King (R-NY-3rd)
Ed Whitfield (R-KY-1st)
Constance A. Morella (R-MD-8th)
David E. Price (D-NC-4th)
Pete Sessions (R-TX-5th)
Danny K. Davis (D-IL-7th)
Curt Weldon (R-PA-7th)
Barbara Lee (D-CA-9th)
Ron Kind (D-WI-3rd)
J.D. Hayworth (R-AZ-6th)
Karen L. Thurman (D-FI-5th)
Ray LaHood (R-IL-18th)
Robert W. Ney (R-OH-18th)
Walter B. Jones, Jr. (R-NC-3rd)
Earl Blumenauer (D-OR-3rd)
Mike McIntyre (D-NC-7th)

Slow Going with NTIA Reauthorization

♦ Even as Larry Irving was packing his bags, Congress was quibbling over just what to do with the NTIA, which has been a thorn in the side of many Republicans, who view NTIA's operations as a duplication of what the FCC should be doing, and want the agencies consolidated. As a result, progress on HR.2630, the NTIA Reauthorization Act, was shelved until after legislators returned from the end-of-summer district work period. The bill, which was introduced by Representative Billy Tauzin (R-LA-3rd) called for $11 million a year in funding for the agency for the next two years, but also called for a General Accounting Office and an Inspector General's study to assess the agency's performance. In addition, the bill called for the agency to submit a plan to Congress that would automate or privatize portions of its operations, terminate functions that are no longer necessary and reduce levels of expenses for management.

On the Senate side, in an effort to demonstrate that there is more than one way to skin a cat, Senator John McCain, Chairman of the Senate Commerce Committee, offered an amendment to the Middle Class Tax Relief Act of 1999 that would have cut government overhead by cutting the Department of Commerce entirely. Under the McCain amendment, NTIA functions would have been given to a number of federal agencies. The spectrum management functions would have gone to the FCC. The McCain amendment was tabled.

Media Hits

• A half page story in ***The New York Times*** entitled "Morse Code Hams Let Their Fingers Do the Walking" laid out the pleasures of Morse code as enjoyed by enthusiasts like Macalee Hime, AB5TY and other members of the Queen Bee Net. Also mentioned in the article were Nancy Kott, WZ8C, and Tom Perera, W1TP, as well as Bob Inderbitzen, NQ1R, of ARRL headquarters.

• SAREX made the ***Los Angeles Times***, ***San Antonio Express***, ***Orlando Sentinel*** and other newspapers when STS-93 made contact with schools in Houston, Texas; Ormond Beach, Florida; Corona Del Mar, California and Reston, Virginia.

• Gary Pearce, KN4AQ, reports that **WRAL TV** in Raleigh, North Carolina included him in a story on scanner listening that actually turned out to be a positive examination of the phenomenon.

• **MSNBC** featured what was being billed as the "Public Voice" of *Mir*, an hour's worth of cosmonaut QSOs from Viktor Afanasyev, Sergei Avdeyev and Jean-Pierre Haignere as the space station circled the globe. *Mir*'s call sign is R0MIR.

• As we went to press, a story titled "hams in the Family" featuring the Cross family of Houston was scheduled to appear in the September ***Scouting*** magazine. The Crosses include John, AB5OX, Ginny, KC5CIZ, and sons Richard, KC5CHW, Robert, KC5CIL and David, KD5AOQ.

• J. Leibmann, K5JL, and his 30-foot dish are featured in a lengthy article in the ***Oklahoman*** out of Oklahoma City, Oklahoma. The article presents a broad spectrum of Amateur Radio activities.

• Newspaper clips for Field Day are still coming in months after the fact, making this event the single most important publicity activity for Amateur Radio. ARRL receives virtually hundreds of clippings each year from Field Day. Other interesting items we received include a nice comprehensive essay by Jim Bowman, W7HPK, on Amateur Radio that appeared in the ***Lynnwood Enterprise*** (Washington); a piece quoting Dave Doiron, WA1MKE, of the Muncie Amateur Radio Club that appeared in the Muncie, Indiana ***Star Press***; an article outlining Amateur Radio's emergency capabilities in the Olympia, Washington ***Olympian*** that featured Bob Molesworth, KC7HYJ and Dan Filip, KC7AVR, among others. Mark Huskison, KD5GNB, Kevin Andrews, KC5LDC and Don Faulkner, KB5WPM of the Amateur Radio Club of the University of Arkansas were featured in a full-page article in the Springdale, Arkansas ***Morning News***. Also featured were Bruce Vaughan, NR5Q and Floyd Deen, AA5QY of the Ozark Wireless Society.

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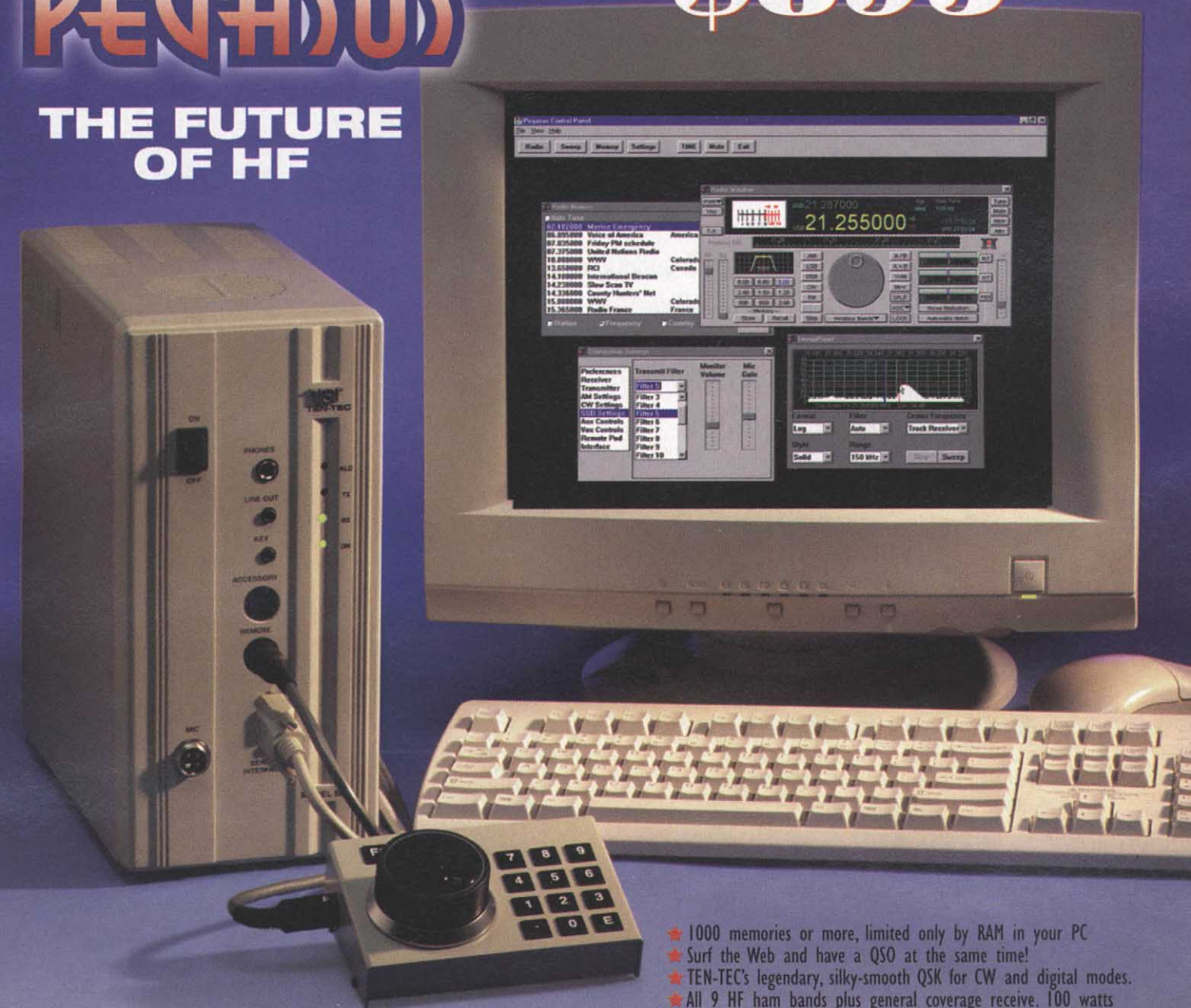

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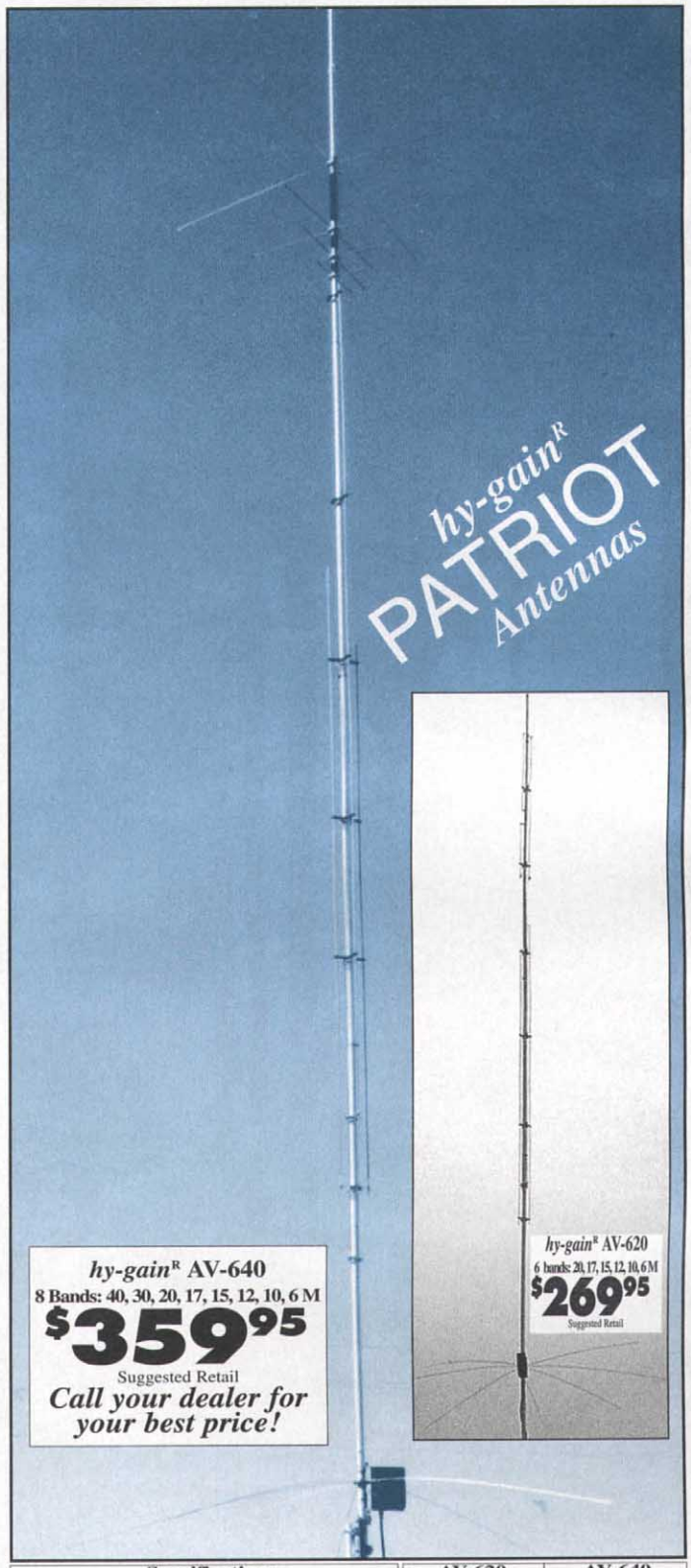
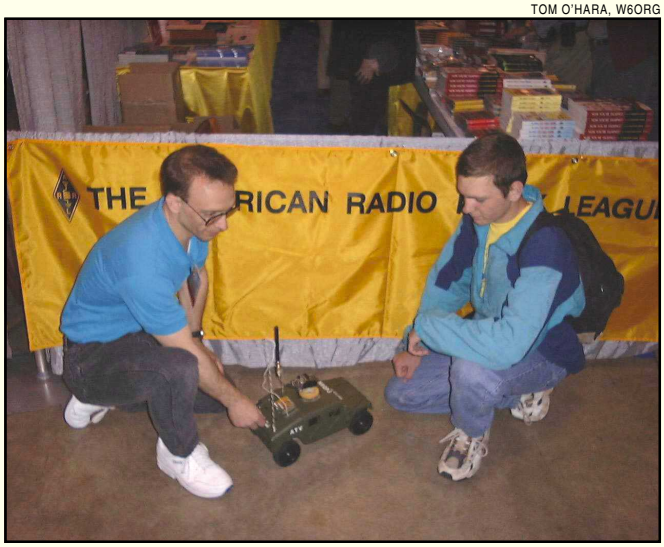


Specifications	AV-620	AV-640
Bands covered (meters)	6,10,12, 15,17,20	6,10,12,15, 17,20,30,40
2:1 VSWR Bandwidth (KHz)		
40M	N/A	150
30M	N/A	175
20M	500	500
17M	500	500
15M	500	500
12M	500	500
10M	1500	1500
6M	2000	1500
VSWR at resonance (typical)	1.5:1	1.5:1
Power handling (watts output) key down 2 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

No intermod! Don, KK9H (left), and Bill, W9WR (right), managed to stay in touch and solve the H-T intermod problem at the 1999 Dayton Hamvention by operating on 3.885 MHz using their World War II-vintage BC-611 handie-talkies.

TOM O'HARA, W6ORG



'99 Dayton Hamvention Humvee. At the ARRL booth Jeff, N8QPJ (left), tells Adam, KC0BNI (right), how he mounted a small TV camera, call sign overlay board and 23-cm FM ATV transmitter in his radio controlled Humvee. Jeff uses the Humvee to demonstrate ATV at club events.

Condo communication. Would you believe that this innocent-looking balcony supports an MFJ HF loop antenna, a 10-meter dipole and a center-fed copper loop antenna? Paul, W7EAI, uses these cleverly hidden antennas to operate successfully from his Seattle condominium.

HARVARD GAZETTE—KRIS SNIBBE

Ninety years on the air. W1AF, the Harvard (University) Wireless Club celebrates its 90th anniversary October 2-3 (see "Special Events" in this issue). HWC president, Frank Wright, N3OQB (background), and vice president Nick Guydosh, N2MSE (foreground), celebrate by firing up vintage Heath gear at the club station.

DAWN TARANT, KB3CCF

Magic bus. Mike, W3MT, and Dawn, KB3CCF, are both school bus drivers in Hatfield, Pennsylvania. (They met on the job and married last May.) Mike can't resist using his bus to promote the magic of Amateur Radio. When students ask what "W3MT" means, that's his cue to tell the ham story!

Headquarters Lobby Gets a Makeover

For more than 35 years the 1200-square foot lobby at ARRL Headquarters in Newington, Connecticut has welcomed visitors from around the world. It has also functioned as an informal showcase of radio history, a project begun by Roland Bourne, W1ANA (SK) in the '60s. But with a new century and millennium looming, it was time for a change.

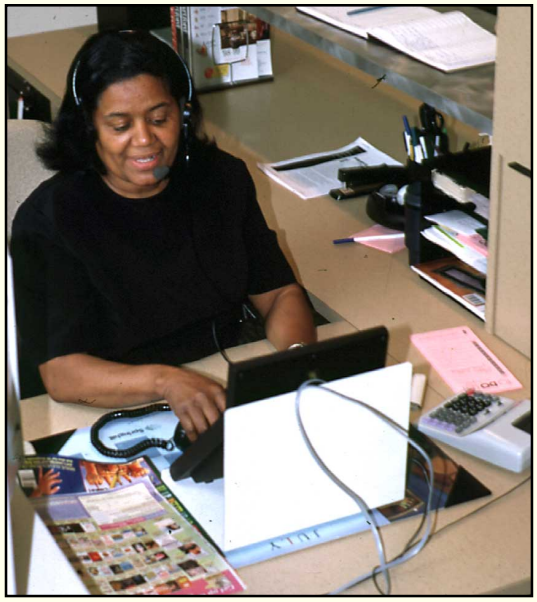
Earlier this year the ARRL accepted a renovation design proposed by BKM, a Connecticut architectural firm. Work began in June and was completed by mid July. The new Headquarters lobby is more open and inviting, with an attractive showcase for vintage equipment and a comfortable reception area. Stop by and see for yourself!

RICK LINDQUIST, N1RL

The old display cases are painstakingly unloaded. The cases, and much of the vintage equipment collection, were moved to other locations within the Headquarters building. Equipment will be displayed in the new lobby on a rotating basis.

RICK LINDQUIST, N1RL

Work begins in early June. A new ramp is constructed for disabled access. Drywall is installed and painted.



RICK LINDQUIST, N1RL

Penny Harts, N1NAG, inspects her new lobby reception desk. Penny has been a familiar face to Headquarters visitors for years.

JOE BOTTIGLIERI, AA1GW

This is the view you'll see as you walk through the front doors. The gently sloping ramp allows easy access for everyone. Along the south wall lighted displays showcase the history of Amateur Radio equipment.

JOE BOTTIGLIERI, AA1GW

The renovated reception area is spacious and comfortable.

Jamboree on the Air 1999!

1

NORTHWESTERN FLORIDA DAILY NEWS—JEFF NEWELL

On the weekend of October 16-17 more than 100,000 Scouts throughout the world (4,000 in the US alone) will be taking to the airwaves. See the Jamboree announcement by Jean Wolfgang, WB3IOS, in last month's *QST*. Here are some images from JOTA '98.

1—Jared Boswel, of Boy Scout Troop 543, speaks with another Scout in Montana. Playground Amateur Radio Club president Chris Duval, KF4RRM, volunteered his time to help set up and supervise the operation.


2

RICK LINDQUIST, N1RL

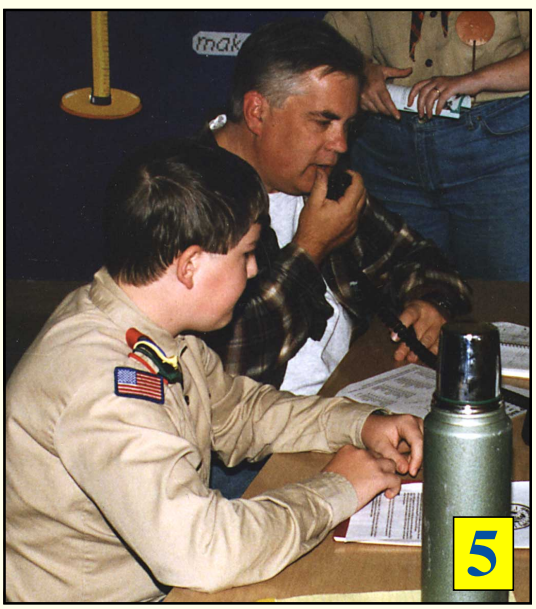
2—JOTA is for Girl Scouts, too! Cara Cavallari, age 8 (right), and Kerry Isakson, age 7, are on their way to earning their Girl Scout Ham Radio patches, as well as their Communication and Technology badges.


3

3—Anthony LeBaron, KF4UVC (third from left), sets up an Amateur Radio demo station for his fellow Scouts. Anthony is a Life Scout in Troop 162.


4

4—Cubs and radios! Marc Trager, KB2HZK (right), supervises the Jamboree fun for Cub Scout Pack 74 as Matthew Williamson (center) and Marc's son Andrew (left) look on.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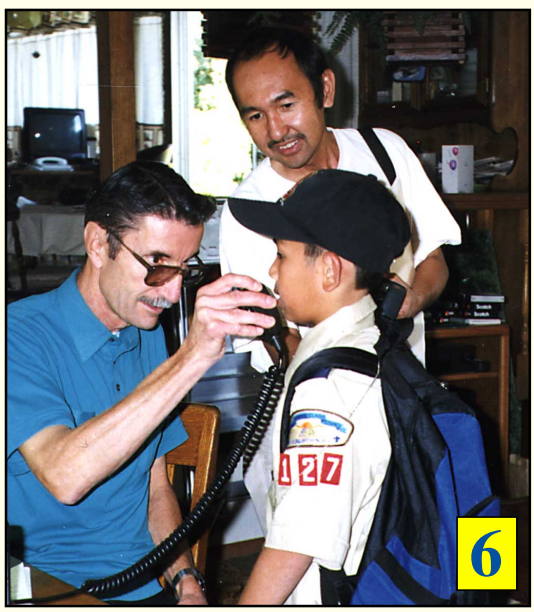
5—The Colorado QRP Club assisted Littleton Scouts by setting up a station with coverage from HF through VHF. Dick, AB0CD, sets up a contact before turning the mike over to a member of Cub Scout Pack 466.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6—Don, K6PBQ, knows the cure for mike fright. Kindness and patience work every time. For the past several years Don has been inviting Scouts to visit his station during the Jamboree.

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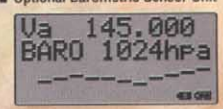

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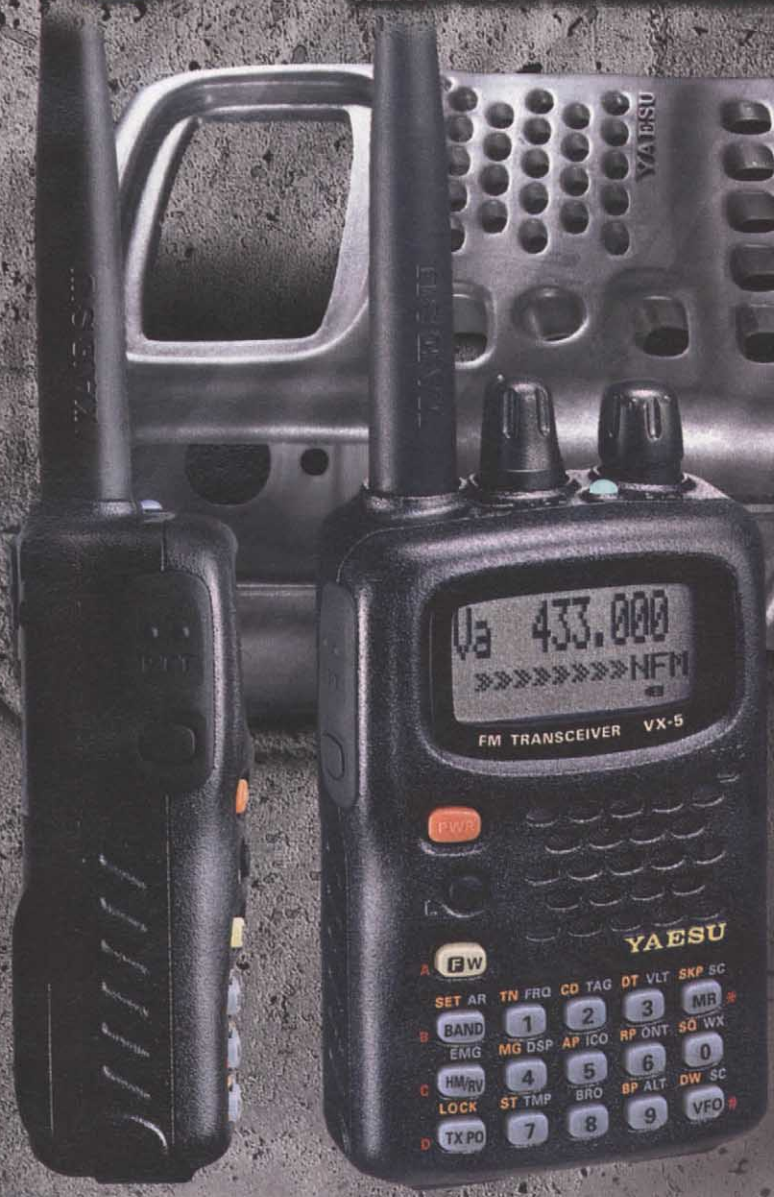

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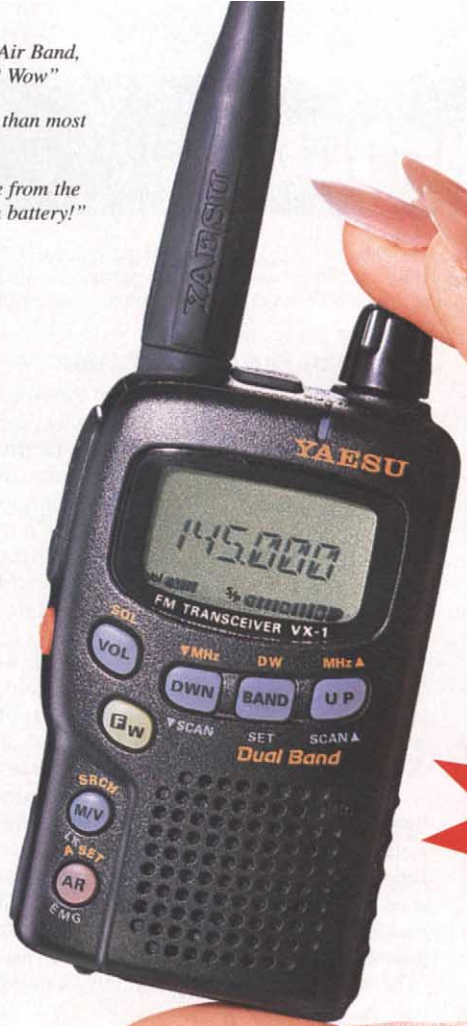
**Battery Life: 5-5-90 duty cycle.*



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†Smallest HT as of Jan. 1998

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Your opinions count! Send your letters to "Correspondence," ARRL, 225 Main St, Newington, CT 06111. You can also submit letters by fax at 860-594-0259, or via e-mail to: **qst@arrl.org**. 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.

CALL SIGNS RUN AMOK

♦ I think it's sad that the club call sign/vanity call sign program has been so perfectly ruined by a few bad eggs. Our League went to a great deal of trouble to get these programs implemented and to a large extent it's gone to waste. This past summer the *ARRL Letter* reported that one amateur was holding 35 different call signs!

Some suggestions are in order. I feel that a ham should only be the trustee of a single club station. Not two or three, and certainly not 34! If these so-called "clubs" have members, they should have plenty of people to choose for trustees. In addition, I suggest that club call signs should simply match the call signs of the trustees. In other words, the FCC should just issue a second ticket to a trustee showing the club address as the station location.

And if a different club call sign must be issued, please let it be from the correct district! In fact, I believe this should be true for *all* vanity call sign requests. It may not be important to the FCC, but when we hear a station using a KH8 suffix, for example, it's confusing (and often disappointing) to hear him report that he is located in Iowa and not American Samoa!—*Jay Craswell, W0VNE, Jordan, Minnesota*

A NEW WAY TO FIND DX

♦ After reaching the 300 country plateau, you would think finding a new one requires hours of careful tuning across the bands, supplemented by studying the DX bulletins and constantly monitoring the DX clusters. Not true! I have developed a technique, the natural extension of the well known "tune for the pileup," that allows me to scan the entire HF spectrum in less than five minutes. I simply "tune for the malicious interference." It's easy to spot—just listen for the key word and phrases such as "split," "shut up!," "who's the DX?," "lid!," "report to the FCC," etc. Just listen for the malicious interference and you can be sure that really good DX is buried right on the frequency. Operating CW is even easier, and you don't even have to be able to copy Morse code. Since any decent operator can tune up an amplifier in less than 10 seconds, I just listen for any carrier that is at least 15 seconds long. Once again, where there's interference, there's DX.

So, I wish to extend my deep gratitude to all of you malicious interferers out there. I don't know how I could ever do it without you (except maybe join a list?). Next stop, the DXCC Honor Roll!—*James Meister, K2WU, North Potomac, Maryland*

ASSISTING THE COAST GUARD

♦ In the July 1999 *QST* "Public Service" column there is an outstanding story by Pete Ostapchuk, N9SFX, concerning the public service aspects of transmitter hunting. In the story Pete correctly encourages hams to offer their transmitter hunting expertise to local Civil Air Patrol groups. I would like to add the suggestion that amateurs should also contact their local US Coast Guard stations or Coast Guard Auxiliary units.

The US Air Force is responsible for land SAR (search and rescue), but the US Coast Guard is responsible for the water. Most of the smaller Coast Guard boats, as well as those of the Auxiliary units, don't carry direction-finding equipment (or the equipment they have is defective). Distress signals from Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs) are often difficult to pinpoint while at sea, even with position information provided by satellites. With assistance from foxhunting hams we could greatly improve our search-and-rescue efforts.

And the assistance could extend beyond emergency situations. Hams could help us locate Datum Marker Buoys (DMBs). These buoys are dropped by aircraft and allowed to drift with the surface currents. They provide SAR planners with valuable sea current information. DMBs are usually recovered by boat, but this is quite difficult without good DFing equipment and competent operators.

Not only you will be helping to save a life, you may also enjoy the thrill a Coast Guard (or Coast Guard Auxiliary) boat ride. Just make sure you have good sea legs or you may lose your lunch! You can get more information on the US Coast Guard by visiting their Web site at **http://www.uscg.mil**. —*Jose E. Diaz, KP3J, LTJG, US Coast Guard, Portsmouth, Virginia*

SIX METER EXCITEMENT

♦ I am a fairly new ham. I took my Technician exam last year and was thrilled when I passed. I purchased a 2-meter FM transceiver and enjoyed repeater and simplex operating. To boost my station performance I decided to make my own 1/4 wavelength ground-plane antenna. I cobbled it together out of an SO-239 connector and electric fence wire. To my astonishment, the antenna worked. I mounted the ground plane about 60 feet up in a pine tree and with the height advantage it worked even better! Building and using your own antennas is one of the best feelings in the world.

During this time I kept hearing about the delights of the 6-meter band. I finally bit the bullet and bought an HF transceiver with 6-meter capability since I know I'll eventually upgrade to a license with HF privileges. Along with the radio I purchased and installed a 5-element 6-meter Yagi antenna.

When I fired up the transceiver for the first time I wasn't sure what to expect. Although the band was not open that day, I still enjoyed conversations with several local stations. Six meters was friendly and fun!

"Fun" took on a whole new meaning in early March when I heard a strange call sign on 50.125 MHz. The call belonged to Steve, NO6M, in Iowa—the band was open to the Midwest! I worked Steve and several others during that sporadic E opening. It was one of the most exciting afternoons I've ever experienced.

Since then I've worked many 6-meter openings, working all sorts of grid squares and racking up a total of 39 DXCC countries. I haven't been licensed a year and already I am in love with this hobby—and this band!—*William A. Brown, KG4AQH, Kingstree, South Carolina*

NET INTERFERENCE AND FIELD DAY

♦ Last June I participated in Field Day with the Meriden (Connecticut) Amateur Radio Club, W1NRG, for a short while Saturday. The club was active in Field Day throughout the weekend and I'm sure that a good time was had by all.

I also tried to participate in another one of my favorites—county hunting on the County Hunters Net on 14.336 MHz. This net consists mainly of mobiles operating from various counties in a net-type operation, usually under a net control who limits them to a 10 minute "run" of contacts. The net also serves to assist mobiles with emergencies while on the road, and the mobiles themselves assist the amateurs and general public by reporting accidents, weather and road conditions. Most net controls and other stations that monitor the frequency keep a list of emergency numbers to report these problems to the proper authorities.

But net operation on Field Day is difficult to say the least. Stations jump into the middle of the net looking for Field Day contacts, not realizing that the net was not a Field Day operation. Worse yet, Field Day stations simply begin calling "CQ" on the frequency without bothering to listen first. I am sure that we are not the only net that has this problem.

I am very concerned that Field Day stations are not adhering to good operating practices of listening *carefully* before transmitting. This practice not only detracts from Amateur Radio in general, but also makes the ARRL and its policies look bad in the eyes of many hams.

I realize that there are those that abhor contests or operating events of any kind, but then again the same could be said of net operations, DXpeditions or even someone engaging in a good long ragchew. This year I noticed that there was a rule that prohibited Field Day contacts on 146.52 MHz, the national 2-meter simplex frequency. I think this is a good policy and would like to propose that this rule be widened to protect other frequencies. I would like to suggest that the League add 20-meter frequencies above 14.300 MHz to this rule. This would protect most of the organized nets that meet on the band. You could levy the same penalties for violation of this policy as you do for those using 146.52 MHz. I believe that there are other frequencies on other bands that could benefit from the same types of restrictions.—*Al Kaiser, N1API, Meriden, Connecticut*

FIELD DAY "FISHING"

♦ When George, my long-time pal and ham radio mentor, announced he'd be in California on business over the Field Day weekend, it didn't take me long to decide I'd drive up to Santa Barbara to meet him. George was bringing his shiny new ICOM IC-706 Mk II transceiver and a pristine Outbacker antenna—a pair that had set him back a cool grand and a half. "Since I was a kid all I owned was trash," he declared. "Before I die I want some decent gear." George is in his late 30s and doesn't look like he's in danger of dying anytime soon, but when you're rationalizing ham radio purchases it's any port in a storm.

We jammed into his rented Chrysler and headed up Route 154 into the Los Padres National Forest. As we climbed higher and higher the road ascended in a series of switchbacks revealing ever more stunning panoramas. At 5,000 feet the road leveled off and we found a small dirt trail with a battered sign that read "Broadcast Peak." Perfect. It had an unobstructed view of the Santa Ynez mountains to the east. To the west the coastline was visible through the haze, miles below. "This is where the Navy had antennas set up to DF the Japanese fleet," George told me.

Amidst a tiny pine grove we leapt into action. The IC-706 power cord plugged into the cigarette lighter. The Outbacker threaded into a huge three-magnet mount and was plopped dead center on the roof of the car. We did a quick test. For some reason, the 706 shut itself down every time the power was turned up to more than 5 W. "Maybe the SWR is too high?" I queried. The 706 had millions of obscure menus and settings. George hadn't had time to learn them all. Maybe we'd missed something. "Oh well," George said, "from up here it doesn't matter. 5 W is plenty".

The 706 sprang to life with the frantic, cacophonic bleating of Field Day. The contest was in full swing. I took the mike and belted out a short CQ, confident we'd be swarmed with contacts.

No one replied.

We called one station, then another, and another, with equal results. We tried all bands. We checked all connections. We even threw up a 20-meter dipole I'd brought along. We pleaded, cajoled, begged, but not a soul came back to our by now desperate calls. It was as if we didn't exist.

Defeated, we headed back down the mountain. The Outbacker bobbed on the Chrysler's roof. I idly tuned the 706, scanning the melee of signals on 40 meters. By chance I made a contact. It was a station only a mile or so away. "Sorry, I can't copy you old man," he said. "There's some nasty RF feedback in your audio".

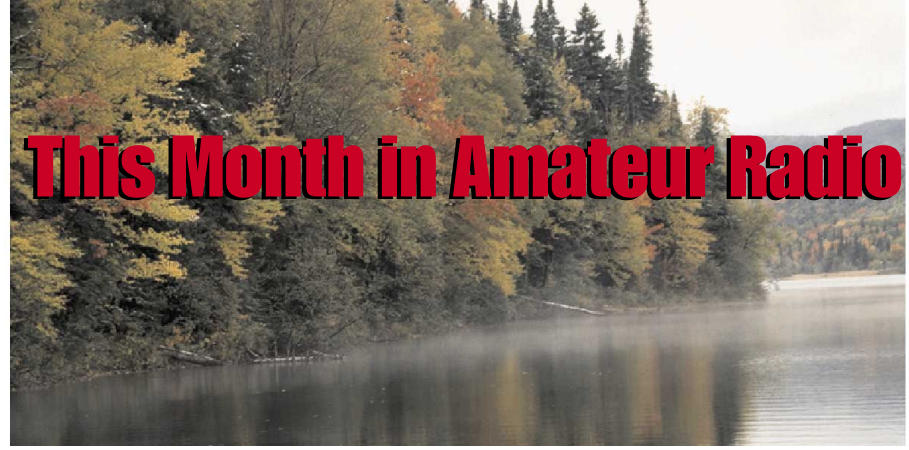
RF feedback? Figurative light bulbs winked on in our heads. We pulled over and decided, as an experiment, to run some wire from the ground lug on the chassis of the 706 to the car battery negative terminal. Instantly, the SWR dropped to 1:1 and the transceiver cooperated by generating a full 100 W of power. Apparently the cigarette lighter plug arrangement had been less than ideal in terms of RF ground.

We were in business—and we quickly filled a logbook page with far-flung contacts. The fact that we had actually learned a valuable lesson about throwing together an emergency mobile station was not lost on us. Perhaps, we mused, this was what Field Day was really all about.

Later, we parked at the marina and casually ran pileups on 15 meters as a gorgeous sunset reddened the seascape. Every so often one of us would get out and change the taps on the Outbacker, an exercise that involved taking it off the roof and manhandling the bulky black pole like a deep-sea rig. "How's the fishing?" asked a confused passerby. "Oh, they're biting now," we replied.—*Joe Tyburczy, W1GFH, Burbank, California*

MORE CALL SIGNS ON AIRCRAFT

♦ I was interested to see the photograph of Bob Chesley's Lancair 320 in the July "Up Front" (page 20) with his call sign—N4YH—as the tail number. Many amateurs may be surprised to know that their call signs have also appeared on aircraft. For example, there are a number of World War II and Korean War US fighters with "inadvertent" call sign designations. I'm fond of one of these aircraft in particular—the Douglas AD5Q. There is an AD5Q on display at the National Museum of Naval Aviation in Pensacola, Florida, but you can also view it at my site on the Web at **http://www.nol.net/~ids/aircraft.htm**.—*Roy Hradilek, AD5Q, Houston, Texas* QST

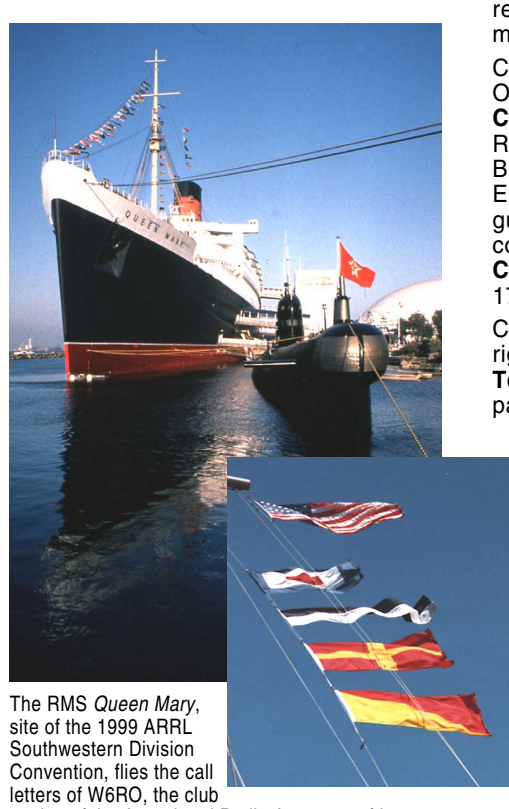


This Month in Amateur Radio

The long, hot summer is on the wane at last. Autumn has arrived, and with it the promise of improving HF band conditions to come! Autumn also brings **the end of Daylight Saving Time**. Unless you live in an area that doesn't observe DST, don't forget to set your clock back one hour on October 31 (or on the evening of October 30 before you hit the sack). Don't touch your UTC clock, though!

October is traditionally the beginning of "contest season" and we have quite a few competitions on the calendar, including the ever-popular **CQ Worldwide DX contest**, October 30-31. The air will be filled with the warbling tones of PSK31 October 2 during the **Troy (New York) Amateur Radio Association PSK31 "Rumble."** RTTY operators have no less than *three* contests to try this month: The **Internet RTTY Sprint**, October 7, the **BARTG RTTY Sprint**, October 9, and the **JARTS Worldwide RTTY Contest**, October 16. You'll find information about all of these contests and many more in "Contest Corral" in this issue.

If you're coming to New England for the fall foliage, stop by the **Nutmeg Hamfest/ Connecticut State Convention** in Wallingford, Connecticut on October 10. Visit ARRL Headquarters in Newington and see our new lobby and visitor's area. The renovation project is featured in this month's "Up Front."



The RMS *Queen Mary*, site of the 1999 ARRL Southwestern Division Convention, flies the call letters of W6RO, the club station of the Associated Radio Amateurs of Long Beach, located in the ship's wireless room.

California is a convention hot spot in October. The **Southwestern Division Convention** will be held aboard the RMS *Queen Mary* docked in Long Beach, October 1-3. Riley "The Enforcer" Hollingsworth, K4ZDH, is the guest banquet speaker. Farther up the coast you have the **Pacific Division Convention** in Concord, October 15-17. See "Coming Conventions."

Charge your batteries and inspect your rigs. **SET, the Simulated Emergency Test**, will determine just how well prepared you are for a natural or man-made disaster. The "fun" begins October 2. See the announcement in your September *QST*.

JOTA—Jamboree On The Air—starts October 16 at 0001 *local time* and ends October 17 and 2359 local. You can help Scouts become hams by inviting them to your station, or helping them set up one of their own. Read the article by Jean Wolfgang, WB3IOS, in the September *QST*, and see the JOTA photos in this month's "Up Front."

The **17th Space Symposium and AMSAT-NA Annual Meeting** gets under way October 8-11 at the Hanalei Hotel in San Diego, California. Contact the AMSAT business office at 301-589-6062 (voice), 301-608-3410 (fax) or e-mail **martha@amsat.org**. Additional information is available on the Web at **http://www.amsat.org**.

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Suggested Retail

Full kilowatt PEP output from a whisper quiet compact desktop linear. Only 8½x14x15½ inches. Plugs into nearest 120 VAC outlet. All bands 160-15 Meters, 1000 Watts out on SSB, 850 watts out on CW, genuine Amperex 3-500ZG tube has graphite plate, nearly 70% efficiency, inrush current protection, multi-voltage transformer.

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New class of *Near Legal Limit*™ amplifier gives you 1300 Watt PEP SSB power output for *65%* of price of full legal limit amps! Four rugged *Svetlana* Russian 572B tubes. Instant 3-second warm-up. Plugs into 120 VAC. Compact 8½Hx15½Dx14½W. 160-15 Meters. 1000 Watt CW output. Tuned input, instantaneous RF Bias, dynamic ALC, parasitic killer, inrush protection, two lighted Cross-Needle meters, multi-voltage transformer.

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Two tubes
1500 Watts plus

Suggested Retail

AL-800
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Single tube
1250 Watts

AMERITRON's new 800/H amplifiers cover 160-15 Meters including WARC bands. The AL-800 has a single Eimac™ 3CX800A7 tube and produces 1250 Watts PEP. The AL-800H has two 3CX800A7s giving 1500 Watts plus.

Both amps have an adjustable slug tuned input circuit, grid protection, ALC control that is front panel adjustable,vernier reduction drives, heavy duty 32 pound grain oriented silicone steel core transformers and high capacitance computer grade filter capacitors.

These amplifiers have multi-voltage operation (14 user selectable AC line voltage from 90-140; 200-250 VAC), quiet pressurized ventilation systems, dual illuminated Cross-Needle meters that read peak forward and reflected power, SWR, high voltage, grid current and plate current.

Vernier reduction drives make tuning adjustments smooth and easy. Ameritron's exclusive *Step-Start Inrush Protection*™ stops damage to your amplifier from inrush current. Ameritron amps feature an attractive Lexan front panel decal and superior, all metal construction -- it's built to last! Ultra compact desktop size is perfect for your operating station. 8½ x16½ x14¼".

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AMERITRON's legal limit amplifiers use a super heavy duty Hypersil® power transformer capable of 2500 watts!

Ameritron's most powerful Linear

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Ameritron's super powerful amplifier uses the herculean Eimac® 8877 ceramic tube. It's so powerful that 65 watts drive gives you the full legal output -- and it's just loafing because the power supply is capable of 2500 Watts PEP.

Ameritron's 3CX1200A7 linear Amp

AL-1200
$2295
Suggested Retail

Get ham radio's *toughest* tube with the Ameritron AL-1200 -- the Eimac 3CX1200A7. It has a 50 watt control grid dissipation. What makes the Ameritron AL-1200 stand out from other legal limit amplifiers? The answer: A super heavy duty power supply that loafs at full legal power -- it can deliver the power of more than 2500 watts PEP two tone output for a half hour.

Ameritron's dual 3-500 linear

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This linear gives you full legal output using a *pair* of 3-500s.
Most competing linears using 3-500s *can't* give you 1500 watts because their lightweight power supplies can't use these tubes to their full potential.

AMERITRON no tune Solid State Amplifiers

Ameritron ALS-500M Mobile no tune Solid State Amp has 500W out, covers 1.5-22 MHz

ALS-500M
$799
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Ideal Mobile amplifier -- uses 13.8 Vdc mobile electrical system, very compact 3½x9x15 in., extremely quiet, 500W output, 1.5-22 MHz coverage, instant bandswitching, no tuning, no warm up, no tubes, SWR protected.

Ameritron ALS-600 no tune Solid State base amp includes heavy duty power supply, 600 Watts out

ALS-600
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Suggested Retail

No tuning, no fuss, no worries -- just turn it on and operate. *Includes* AC power supply, 600 W output, continuous 1.5-22 MHz coverage, instant bandswitching, *fully* SWR protected, extremely quiet, very compact. Amp is 6x9½x12 inches.

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RCS-8V Remote Coax Switch . . . $149

Replace 5 coax feedlines with a single coax. 1.2 SWR at 250 MHz. Useable to 450 MHz. 1kW at 150 MHz. **RCS-4, $139..** 4 position remote HF switch.

ADL-1500 Dummy Load with oil . . . $59.95

Oil cooled 50 ohm dummy load handles 1500 W for 5 minutes. SWR under 1.2 up to 30 MHz. Low SWR to 400 MHz.

ICP-120/240-$79

Stops power-up inrush current and absorbs momentary high voltage spikes to your amplifier. ICP-120 for 110-120V, ICP-240 for 220-240 V.

ATR-15 Legal Limit Antenna Tuner . . . $399

Designed for legal limit amplifiers! Covers 1.8-30 MHz, peak reading SWR/Wattmeter, 6 pos. antenna switch, 1:1 or 4:1 balun.

ARB-700/702 amp-to-radio interface . . 39.95

Protects your costly transceiver from damage by *keying line transients*, steady state current and excessive voltages.

QSK-5 Pin Diode T/R Switch . . . $349

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ATP-100 Tuning Pulser lets you safely tune your amplifier . . . $49.95

Pulse tuning lets you *safely* tune up your amplifier for full power output and best linearity. Keeps average power to low safe level to prevent overheating, tube damage, power supply stress and premature component failure.

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Whisper quiet fan. Handles any legal limit amplifier -- 2500 Watts average power for 1 minute on, ten off. 300 Watts continuous. SWR below 1.25 to 30 MHz and SWR below 1.4 to 60 MHz.

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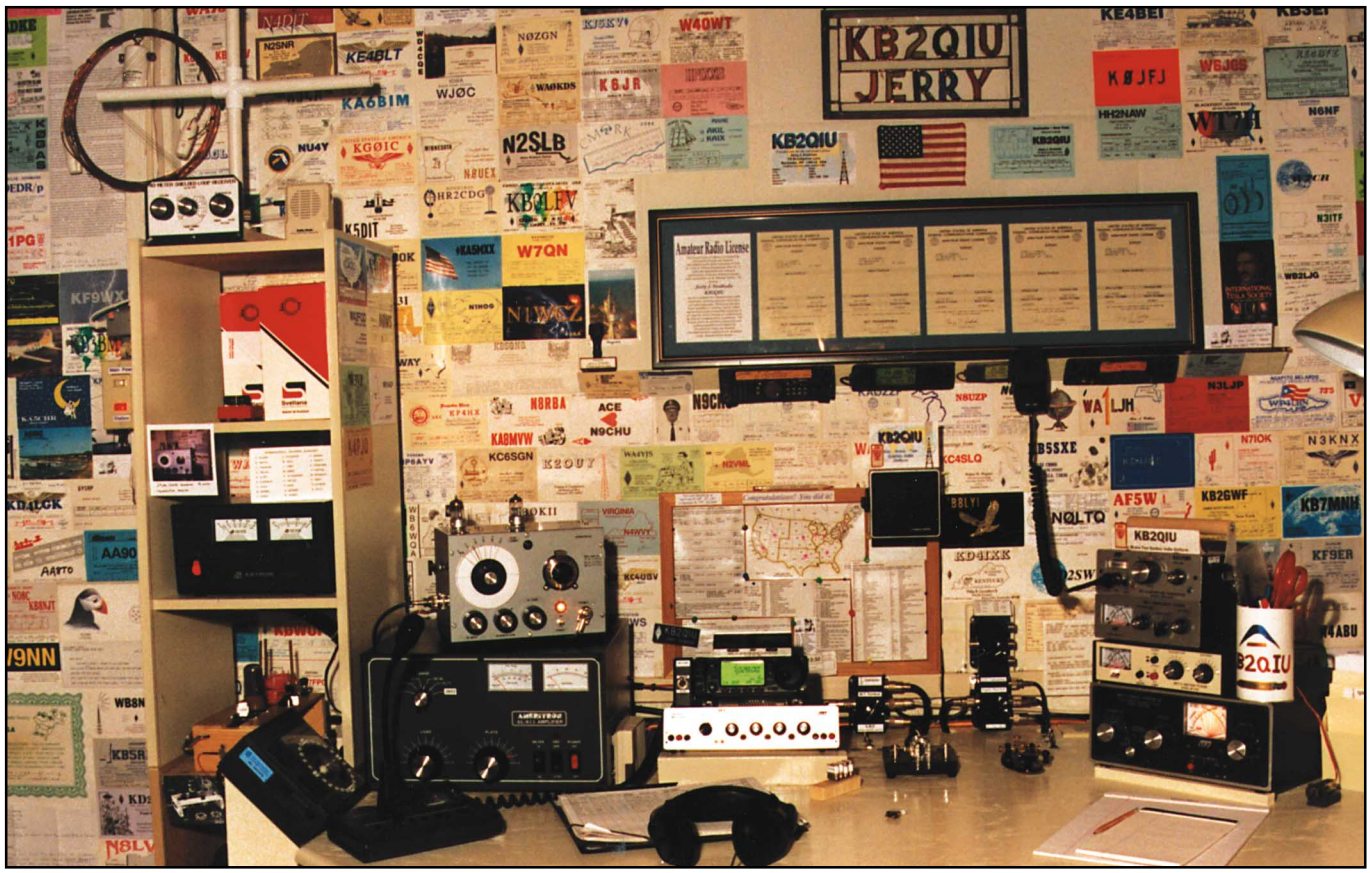
By Dr Jerry J. Svoboda, KB2QIU

Regeneration and Crystal Control



QSL cards paper the walls of the author's shack. His home-brew regenerative receiver sits atop the amplifier, and the 6V6 wooden chassis transmitter is on the left. The IC-706 MK II transceiver is mounted on the MFJ DSP unit. The 6V6 rig is used with a MFJ-971 tuner and a Cushcraft R7 vertical antenna. A switch to left of the '706 allows either receiver's audio to be fed through the DSP box. The stained glass call letters on the wall were a gift from WA2BLF (SK).

I'd been interested in radio since childhood, but I took more than 30 years to get my ticket. I've always loved building things because of my dad, but a special uncle showed me the "radio ropes." Along the way I became a doctor. Becoming a ham finally became a reality when I met a patient named Fred, who I'll introduce later in the article. If you follow along with me, I'll show you how a few pivotal friendships have made me into an unusual radio specimen—a middle-aged Old-Timer!

Born in Cleveland, Ohio, in 1951, I began making crystal sets with 1N34 diodes and loopstick antennas at age 7, no doubt influenced by my then-teenage uncle, Dick Texler, K8VKW. He and my dad taught me to solder, and before Dick was licensed he lent me a CB rig he'd built from scratch.

I learned the code early on, and I took Alfred Morgan's *The Boys' First (*and *Second) Book of Radio and Electronics*[1,2] out of the library so many times that I practically wore them out. My mom finally got me my own copies as a birthday present when I was 10 or 11. From these wonderful books I built a one-transistor radio, a code oscillator, a darkroom timer and, later on, a record player and a three-tube phonograph amplifier.

I dreamed of building Morgan's one-tube regenerative receiver and his Geiger counter, but I couldn't find the right tubes. I pored over catalogs from Allied,[3] Lafayette, and Burstein-Appleby. Ham radio looked interesting and I was intrigued by Uncle Dick's ham shack. I fantasized about having my own shack someday and covering the walls with QSL cards. I knew

I could probably get my Novice ticket—but I also knew that after one year I would have to upgrade or get off the air (at that time, Novice licenses were nonrenewable). The General exam seemed way over my head, so I never got my ticket—not then, anyway.

Radios Crated and Set Aside

During my college days in St Louis, I visited a Heathkit store. I still imagined getting my ticket someday, and I even built a Heathkit ham-band receiver and an Ameco CW transmitter. I didn't use them on the air, though. I didn't have an antenna, a license or a crystal!

Through years of medical training and moves to Philadelphia, Denver and New Jersey, my radio time (and interest) waned. Each time I moved my junkbox got smaller—my collection of parts and radios was successively packed into fewer and fewer boxes.

By 1983, I was married and beginning practice as a vascular surgeon. My wife Adelaide and I were leaving our small apartment in New Jersey with toddler Elizabeth in tow. We were moving back to Denver to start in practice. On that day, my radio hobby fit in a large wooden crate that hadn't been opened in a year. With the moving van out front—and our cargo priced by the pound—Adelaide convinced me to leave the heavy crate behind. After all, I wasn't really interested in radio anymore. But I couldn't just put it in the dumpster.

I loaded the crate into our hatchback and scoured the Englewood, New Jersey, neighborhood, looking for ham antennas. I finally found a house with a beam and tower—but there was no one home! I've often pictured that ham pulling into his (or her) driveway to find my crate and my note, left as a gift to an unknown friend.

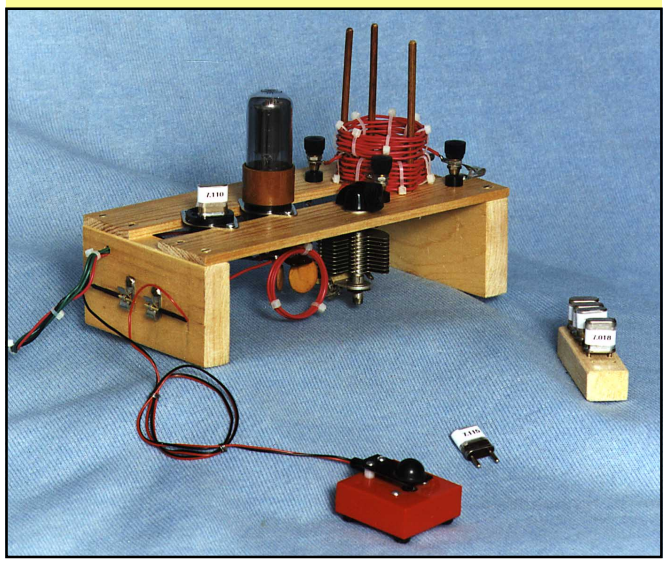
Patient, Friend and Inspiration

Years passed. Adelaide got her PhD in Colorado. Mark was born as we moved to Rochester, New York, in 1984. After practicing there for several years, I met a patient whose kindness I will never forget. He was an older gentleman, and when I met Fred Retallick, he was irritated. "Doctor, I'm sure you have a good reason for running late, but today is the first day of the Rochester Hamfest and I need to be there. I've waited all year for this!"

Fred, WA2BLF, told me of his long interest in ham radio and we became friends, not simply doctor and patient. My son and I visited his home, saw his shack and met his wife, Dot. Fred awakened something that had been simmering inside me for all these years. I went to a hamfest for the first time, looked around and had lots of fun.

A walk through the flea market reintroduced many old friends: Heathkits, tube checkers, soldering guns and needle-nosed

This tale of retro-reminiscing is filled with stories of friendship and dreams fulfilled. Take it from a young Old-Timer—the love of radio can lie dormant for years before blooming…



The 6V6 transmitter[10,11,16,26] pictured with six crystals[27] and a Whiterook Products key.[28] The original design was by R. O. Deck, W9JVI. In actual use, the author uses a Nye Speed-X straight Key.[29] As suggested in the original published design, an octal tube socket is used for the crystal and the coils[19] are hand wound with bell wire. Three wooden dowels support the coils on the chassis. *(Photos by author except as noted.)*

Several homebrew projects dress up the station. Top shelf from the left: 40-meter regenerative receiver[20] using two 3S4 tubes; 40-meter shielded-loop receiver (N1YBT design);[17] and a broadcast-band regenerative using a 1H4G tube.[21] Middle shelf from the left: 40/80 meter regenerative receiver using a 3S4 tube;[22] and a 40/80 meter breadboard CW transmitter (N1TEV design).[18] Bottom shelf from the left: Spider web coil crystal set;[23] and a sliding-inductor crystal set.[24]

pliers, to name just a few. The new radios looked terrific, too.

I left the hamfest, stopping at RadioShack on the way home. There I bought a Novice study package and discovered how easy it was to relearn the code from the 5-WPM tapes. The theory questions were easy, too. The mandatory upgrade was ancient history. How proud I was to call Fred in June of 1993 to tell him that my Novice ticket had arrived. We were both very happy that he had been in my waiting room that day.

Finally on the Air

I got on the air with a Kenwood TS-140S and a Cushcraft R7 vertical. I loved sticking the QSL cards to the wall with little balls of rubber adhesive. I was ecstatic with my first European contact on 10 meters after I passed the Technician test that fall.

Getting a General ticket—the imaginary goal of my youth—still seemed impossible. But Fred's encouragement and the lure of all those HF bands kept me working, especially on the code. Jim Collinsworth, N2JC, a member of my church, also kept me on task.

Persistence paid off. I celebrated the unbelievable feeling of passing my General-class exam in the fall of 1994 by (1) calling Fred (a General licensee himself) on the phone, (2) tuning across all those new frequencies and (3) stopping by RadioShack for an Advanced study guide.

I started chasing the League's DXCC award and finished my WAS. With hard work and a week's worth of free time, I upgraded to Advanced by Christmas of 1994. Right away I started thinking about the final step to Amateur Extra and made myself a deal: I would pass the theory first, and have a year to get to 20 WPM with the code. Fred was so impressed by my last upgrade that he decided to give it a go, too. Fred was now 83 years old, but I still have his letter from January 1995 posted in my shack.

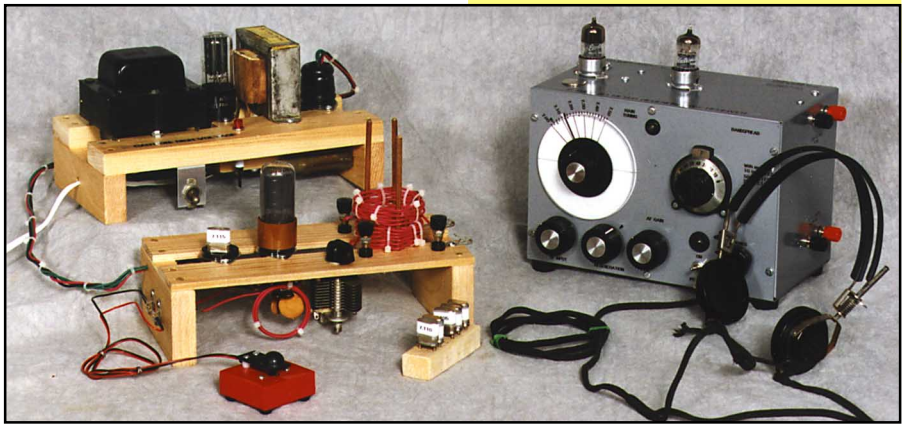
"The bread that you cast upon the waters has returned and now it is my turn to say thank you. The loan of your text and encouragement has paid off. Last night I passed the Advanced examination and now have the "AA" suffix added to my call sign. I have used your progress as a shining example of how friends are made in ham radio."

The Push for Amateur Extra

The one-year clock began ticking after I passed the Amateur Extra theory in late 1995. Fred became ill and was in and out of the hospital. Spring arrived and I had made no progress toward 20 WPM. The months were slipping by. If I didn't make Extra this year I would lose the credit I had already gained by passing the theory.

Because I hadn't made many CW QSOs, I doubted I could even pass the 13-WPM code test again! I had little time as a busy surgeon. Practice was hectic, and I had recently accepted the post of president of the medical staff at the hospital. "What a mistake," I thought. "Now I'll never get the Extra."

I've had many great times, but nothing has been more thrilling than getting my General ticket, passing the 20-WPM code test or listening to W8OHM's memories of the golden age of radio.



The author's complete homebrew station on display. On the left is the 6V6 transmitter with its power supply.[12] The two-tube regenerative receiver is on the right.

It was now or never. I ordered Code Quick[4] by Jerry Wheeler, W6TJP, and got up "extra" early every morning. I spent 20 minutes twice a day working on the code. On test day, my examiner, Alex Piccirilli, NV2Y, could tell I was really wound up. I was the only one taking a code test and I couldn't seem to get my hands dry.

When he graded my paper and told me I had passed I let out a huge war whoop that neither of us will ever forget. After I settled down, Alex told me to make sure I took my wife out for dinner—good advice! I had made my goal with two months to spare.

Unfortunately, Fred wasn't getting any better. As he spent more time in the hospital, he gradually lost the energy for ham radio. His doctor started him on dialysis, but after the fourth treatment, Fred decided he'd had enough. He was going home for good.

Fred wrote me a beautiful Christmas card. "To one of a kind," it says. "Your friendship is special." I will never forget Fred. He went back to the Creator on January 13, 1997. His cards and notes to me will stay on my wall as long as I own a radio.

Second Childhood

About a year after Fred died, I qualified for DXCC which, oddly enough, took some of the wind out of my DX sails. I became interested in Morse QSOs and QRP, and my old homebrewing fires started burning again. Hamfests became an opportunity for parts. Now in my mid-40s, I got out my well-worn copy of *The Boys' First Book of Radio and Electronics* and thought that now was the time to build that one-tube regenerative receiver.

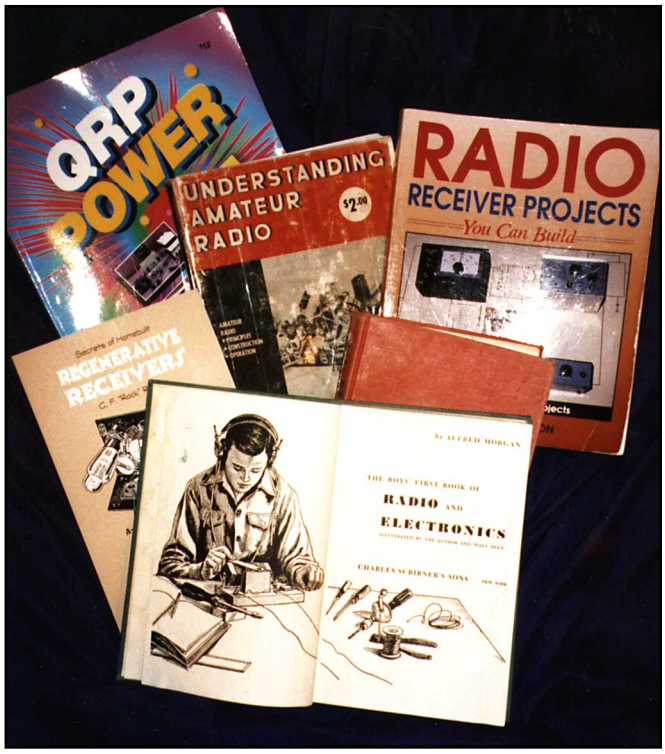
I managed to find a working 1H4 tube and built a power supply kit for the radio from Antique Electronics.[5] The radio worked and the hours spent planning, building and scrounging for parts were fun, too.

The radio wasn't good enough for QSOs, though, and I was only able to make it receive AM broadcast stations. I then built a series of regenerative receivers, each one better than the last. Inspiring me were books such as *Secrets of Homebuilt Regenerative Receivers*[6] and *Radio Receiver Projects You Can Build.*[7]

The Thrill of a Homebrew QSO

Today, I have two stations rolled into one—and I love it. The modern station, an Icom IC-706 MK II transceiver and an Ameritron AL-811 amplifier, is alongside my homebrew retro station, a one-tube 5-W CW transmitter (6V6) with crystal control, straight key[29], wooden chassis and hand-wound coils.[10]

The "Up Front" piece by Bob Reif, W1XP,[11] was my inspiration for this project, and he was helpful in providing the design reference and tips.[26, 9] The receiver is a two-tube (6U8s) regenerative featured in *QRP Power.*[12, 13, 29] Contacts involve careful listening, throwing a T/R switch and the



Old and new friends at KB2QIU (clockwise from upper right): *Radio Receiver Projects You Can Build*,[7] *The Boys' Second Book of Radio and Electronics*,[2] *The Boys' First Book of Radio and Electronics*,[1] *Secrets of Homebuilt Regenerative Receivers*,[6] *QRP Power*,[25] *Understanding Amateur Radio*.[8]

K8VKW

Dick Texler, K8VKW (left), and the author at the Dayton Hamvention, 1998. Dick, who initially interested his young nephew in electronics, is the retired Photographics Division Chief of NASA's Lewis Research Center, Cleveland, Ohio. He presently heads Texler Electronics in Cleveland, which provides circuit design and servicing of commercial strobes and densitometers.

glow of warm filaments. Signal reports don't always end in 9, and they may also have an X, C or K!

Every QSO with the homemade station is a thrill. Using it also gives many Old-Timers an opportunity to share memories of their homebrew days. QRP enthusiasts sometimes respond to my QSL card with schematic diagrams or photos of their own homebrew outfits.

My first contact with the one-tube transmitter was with Hal Fuelling, W8OHM, who wrote, "Ur 6V6 Xmitter sure sounded great. I remember the 6V6. I built many one-tube rigs and receivers. The good old days! Age hr 82 yrs, ham for 63 yrs."

Several hams asked for schematics. More recently, Sterling Copeland, K4JTD, wrote, "Sometimes one really enjoys getting a card as a result of something special. You brought back many memories of the '30s and '40s."

Conclusion

Maybe someday I'll try for the Honor Roll, bounce a signal off the moon or have my first satellite contact. Right now, I'm happy with homemade CW and I'm searching for my first regen/xtal to regen/xtal QSO.

I'm grateful for Uncle Dick, Fred, Adelaide's patience, my parents and my many other life guides. I've had many great times, but nothing has been more thrilling than getting my General ticket, passing the 20-WPM code test or listening to W8OHM's memories of the golden age of radio.

Have you noticed that you can always find the time for something you *really* want to do? We all have that potential. When you feel it rise inside of *you*, get up and go for it!

You can contact the author at 70 Brandywine Lane, Rochester, NY 14618; **elixir17@aol.com.**

Notes

[1]Morgan, Alfred; *The Boys' First Book of Radio and Electronics*, Charles Scribner's Sons, New York, 1954.

[2]Morgan, Alfred; *The Boys' Second Book of Radio and Electronics*, Charles Scribner's Sons, New York, 1957.

[3]Allied Electronics, Inc; **http://www.allied.avnet.com**.

[4]Wheeler Applied Research, 38221 Desert Greens Dr West, Palm Desert, CA, 92260; **http://www.cqinternet.com/codequick.htm**.

[5]Antique Electronic Supply, PO Box 27468, Tempe, AZ 85285-7468.

[6]Rockey, C. F. "Rock"; *Secrets of Homebuilt Regenerative Receivers*, Lindsay Publications Inc, Bradley, IL, 1996.

[7]Davidson, Homer L.; *Radio Receiver Projects You Can Build*, TAB Books, New York, 1993.

[8]Grammer, George; *Understanding Amateur Radio*, ARRL, West Hartford, Connecticut, 1963.

[9]*QST View, 1950-1959* (and other years), ARRL, Newington, Connecticut, 1996.

[10]"A Simple Transmitter" in *How to Become a Radio Amateur*, 1953, ARRL, West Hartford, Connecticut, pp 19-24.

[11]Reif, Bob; *QST*, "Up Front," Sep 1997.

[12]"A Simple Transmitter Power Supply" in *How to Become a Radio Amateur*, 1953, ARRL, West Hartford, Connecticut, pp 22-23.

[13]Newkirk, David; "A 40-Meter Regenerative Receiver You Can Build" in *QRP Power*, ARRL, Newington, Connecticut, 1996, pp. 4-1 to 4-5.

[14]Goodman, Byron; "How to Lay Out a Transmitter; The Elements of Radio Design," *QST*, Jul 1951, pp 38-40ff.

[15]Goodman, Byron; "How to Build a Transmitter; Some Elements of Radio Construction," *QST*, Dec 1951, pp 25-28.

[16]Goodman, Byron; "How to Wire a Transmitter; The Basic Techniques of Radio Wiring," *QST*, Feb 1952, pp 30-32ff.

[17]Wissell, Daniel; "The 40M SLR—a Shielded Loop Receiver," *QST*, Oct 1997, pp 33.

[18]Kitchin, Charles; "A Simple CW Transmitter for 80 and 40 Meters," *QST*, Feb 1998, pp 40.

[19]Old-style air inductors are available from Barker & Williamson; **http://www.bwantennas.com/coilcat.htm**.

[20]"Antique Shortwave Set" in Davidson, Homer L.; *Radio Receiver Projects You Can Build*, TAB Books, New York, 1993, pp 245-253.

[21]Morgan, Alfred; "How to Build a One-Tube Regenerative Receiver" in *The Boys First Book of Radio and Electronics*, Charles Scribner's Sons, New York, 1954, pp 160-183.

[22]"A Simple Receiver" in *How to Become a Radio Amateur*, ARRL, West Hartford, Connecticut, pp 13-18.

[23]"The Spider-Web Special" in Davidson, Homer L.; *Radio Receiver Projects You Can Build*, TAB Books, New York, 1993, pp 41-48.

[24]The "Simple Crystal Radio" in Davidson, Homer L.; *Radio Receiver Projects You Can Build*, TAB Books, New York, 1993, pp 31-41.

[25]*QRP Power*, ARRL, Newington, Connecticit, 1996.

[26]Goodman, Byron; *QST*, Dec 1946, pp 33.

[27]Petersen Radio Co, 2735 Ave A, Council Bluffs, IA 51501.

[28]Whiterook Products Co, 309 S Brookshire Ave, Ventura, CA 93003.

[29]William M. Nye Co, Bellvue, WA 98005.

[30]Newkirk, David; *QST*, Sep 1992, p 35ff.

See Feedback in December 1999 *QST*.

By Julio Volpe, EA5XX

TJ2RSF, the Mission

More than a DXpedition, this journey by Spanish hams had a greater purpose.

During October 1998 I was part of a group of Spanish hams that went on a different kind of DXpedition to Cameroon. This expedition—or to be more correct, mission—was planned by URE (Unión de Radioaficionados Españoles), which is the Spanish member of the IARU. We were acting in cooperation with Radioamateurs Without Frontiers (see sidebar). Through our efforts we tried to prove that DXpeditions can be more than just activating a rare DXCC entity. They can also be the means to help solve some of the problems that exist in the region of operation.

The experience changed all of our lives. For Angel, EA1QF; Ignacio, EA2CLU; Paco, EA4AHK; Carlos, EA5PR; Juan Carlos, EA8ADJ; Belinda, EA8NN; and me, Julio, EA5XX, nothing will ever be the same again. Our scale of appreciation for human values has changed after this mission to Batibo, Cameroon. For us, Amateur Radio has taken on a new dimension. It is no longer only a means to exchange 59(9) reports. We have seen the immense value of a radio station in a jungle where it can take more than six hours to travel 30 miles, in four-wheel drive vehicle.

The Geography, People and Conditions

Cameroon is located on the Gulf of Guinea, and borders Nigeria, Congo, Chad, the Central African Republic, Gabon and Equatorial Guinea. Cameroon is slightly

Julio, EA5XX, takes time to pose with a couple of his new friends.

Carlos, EA5PR, and Julio, EA5XX, take a break to see the sights in Cambrun.

Acho, TJ1AD, with mike in hand activates TJ2RSF on phone while Angel, EA1QF, keeps the log. Paco, EA4AHK, stands behind the other observers.

Radioamateurs Without Frontiers

By Francisco M. Hernando, EA4AHK, President RWF

Radioamateurs Without Frontiers is a nongovernmental, nonprofit organization (NGO), that is headquartered in Spain. It was created in September 1995 by persons aware of the importance of radio communication in cooperation and solidarity with human groups that are geographically separated.

It offers the following services:

- Select and train technically qualified volunteers to act as radio station operators, where needed and requested by other NGOs.
- Provide other organizations with equipment and installation when needed.
- Maintain a transmission network for handling messages, finding urgently needed medicines and providing humanitarian aid in general.

Since 1995, RWF has been involved in 14 countries in Africa, Central America and Europe. They have completed 41 projects with a total value of $305,000. You can find details in Spanish on the RWF Web page. The future holds the promise of projects that will donate and install radios in the Democratic Republic of Congo (includes solar panels for a mission 1400 km up the Congo River—a 9-day boat trip), Cameroon, Sierra Leon, Tanzania (1200 km from Dar Es Salaam), and the Central African Republic.

If you wish to support this organization, you are welcome to do so in several ways:

- Join RWF, radio amateur or not. Membership application available in Spanish at: **http://web.jet.es/rsfong/**
- Donate international reply coupons.
- Donate money or radio equipment, new or used.
- Participate in our daily net on 14.128 MHz from 1500 to 1600 UTC.
- Dedicate some of your spare time to help.

Contact information:
Radioamateurs Without Frontiers
PO Box 100
Galapagar, Madrid 28260
Spain
rsf@ong.jet.es
http://web.jet.es/rsfong/

larger than California, and just a bit smaller than Spain. The climate is tropical and we were there in the rainy season. The mission of Saint John of God is in the vicinity of Batibo, in the county of Bamenda, which is located in the northwest. It takes a day's trip through the jungle to arrive there.

In Cameroon, there are 150 different native languages. However, French is widely spoken, except in Batibo county where they speak English. The people have a high degree of literacy, more than 60% of their children are educated. This in a nation where families typically have eight or more children. Some children walk miles every day, dressed in their blue uniforms, just to reach their classrooms. Some of them carry a hoe on their shoulder to work on community projects after school. The experts say Africa will double in population in less than 10 years.

I saw a large population of children and adults who laugh a lot, sing and dance together. They appreciate the value of the family. They frequently walk miles and miles to arrive at their destinations. I saw their efforts to overcome cultural barriers. I witnessed their appreciation of our efforts to help. They in turn gave us a new vision of happiness and contentment in an environment where suicide does not exist.

Communications is a great problem in the jungle of Cameroon. Telephones do not work well when they do work. The roads are almost impassable during the many months of the year when it rains two or three times each day. People have to walk those narrow jungle roads to deliver a message that could be sent instantly with a radio. (Only 6% of the highways of the Cameroon are paved.)

Paradoxically, we personally suffered the isolation caused by inadequate communications when one of us became sick as soon as we arrived on the African continent. Our sick friend didn't improve quickly, so most of the group went on to the Mission of Batibo. Four of us stayed behind in the city of Douala with one of the three cars, waiting for him to recover. We tried to send word ahead that we were delayed, but the telephone at the mission didn't work and we were unable to communicate with the mission.

Our trip from Douala started early in the morning in some stupendous 4WD cars. It was after dark when we arrive at the Mission. From Bamenda, the last city on the route, one has to cross 30 miles of jungle paths. This takes at least four hours. There is mud at each curve, and the cars can become stuck. At the most difficult points, there are groups of youths that will help extract cars from the mud. They use stones and ropes. They push and pull and the cars come out. This will cost you less than two dollars for all of them. You continue and they wait for the next car, and this way they earn a living.

Results

Our expedition installed seven VHF stations in the missions of Batibo, Widikum and Koano and in two ambulances. With them, we established the first emergency net in that remote area of northwest Cameroon.

The Spanish nuns that live in Widikum will no longer have to sleep in their car when it becomes stuck in the mud. This happened to them just a few days before we arrived. Neither will the local doctor have to regret the loss of life (as happened the same night we arrived at the mission). Word came late and one of a pair of twins died in childbirth. Had he known sooner, the child would probably have lived.

We faced concerns, inconveniences and delays, and our families in Spain worried about our welfare. Most of these will not be a problem now that the radio stations are installed.

For us, everything was an unforgettable experience. Often one second becomes an eternity for all the missionaries who fight in the jungle against illnesses and the needs of the people. Today, thanks to the radios, they have a new confidence in the effectiveness of their work. And their own lives are safer.

12,409 QSOs!

The TJ2RSF DXpedition began in the mission, Saint John of God, in Batibo, Cameroon. The first days were difficult. Three of the antennas that we took to Africa didn't work well and the antenna that was already there was damaged. But Ignacio, EA2CLU, and Juan Carlos, EA8ADJ, made and erected a dipole. The operation began, and the pileup was seemingly endless. It wasn't easy working all the stations, but it was lots of fun. The operators got along well. We operated in shifts according to our own desires and propagation conditions. Each day the operation became better known in the Amateur Radio world, and the charming melody of the pileup continued.

Relationships among human beings are not always easy. Add to this a strange and exotic context plus long hours operating a transceiver, and the consequences can be disastrous. But we had the backing of URE and that made us feel part of a group. It didn't start that way as we met each other at the airplane. However, thanks to the experience of URE's General Secretary, EA1QF, the group came together and worked well and without problems. His many years of organizing, planning and directing groups paid big dividends for us. When somebody criticized the effectiveness of the operators, there was EA1QF with the appropriate answer. As he said, the best operators in the world were those on the scene and not those that remained in the comfort of their homes.

There are only 50 licensed radio amateurs in Cameroon. On very few occasions have they been active on CW. For that reason we tended to concentrate our efforts on that mode. On phone, we put in most of our effort on the 30, 17, 12 and 10 meter bands.

On all the bands we found avid hams trying to contact us and we decide to operate on all the bands taking advantage of the propagation changes. European, Japanese and American hams, in that order were the most numerous in the pile-up. They kept calling for hours at a tune. We even worked some good DX. Hams in American Samoa, Nauru, Hong Kong, Monaco, Taiwan, Libya, Oman, Alaska and Bangladesh, among others, called and made contact during our operation. With 7412 CW contacts and 4997 phone contacts logged, we surpassed our expectations. And that gave the operators a great sense of satisfaction.

Keeping track of our data was very important. We used three computers for keeping our logs. At times we had three simultaneous stations running. You should have seen our faces as we realized that we were going beyond our previous limits, records and expectations.

The last day of the DXpedition, two officials from the Cameroon Ministry of Telecommunications came to the mission. One of them was our friend Acho, TJ1AD. He spent a lot of time activating TJ2RSF on phone. The officials were astonished at the considerable number of QSOs we had made. They were particularly interested in our computerized logging.

I have returned from Africa feeling humanly enriched. In my mind, I can still see the happiness of those that lack material things. I can still hear the cheerful cry of delighted children as they shouted greetings to us as we walked by.

You can contact the author at PO Box 4062, Alicante 03080, Spain; **ea5xx@redestb.es**. QST

The DXpeditioners with staff and local residents at the mission Saint John of God in Batibo, Cameroon.

By Bob Larkin, W7PUA

The DSP-10: An All-Mode 2-Meter Transceiver Using a DSP IF and PC-Controlled Front Panel

Part 2—This versatile 2-meter transceiver uses a PC as its front panel. With most of the radio in software, the mechanical construction of the radio is much easier to handle.

Before you get started with this installment, be sure you have your copy of Part 1 nearby.[11] I'll begin by covering the transceiver's control functions, briefly discuss the software, then move on to assembly and testing of the transceiver.

Control Functions

Other transmit functions on the board (see Figure 9) include a microphone amplifier (U109A), logic-level converters for the CW key (U110E and U110F) and the PTT line from the microphone (U110C).

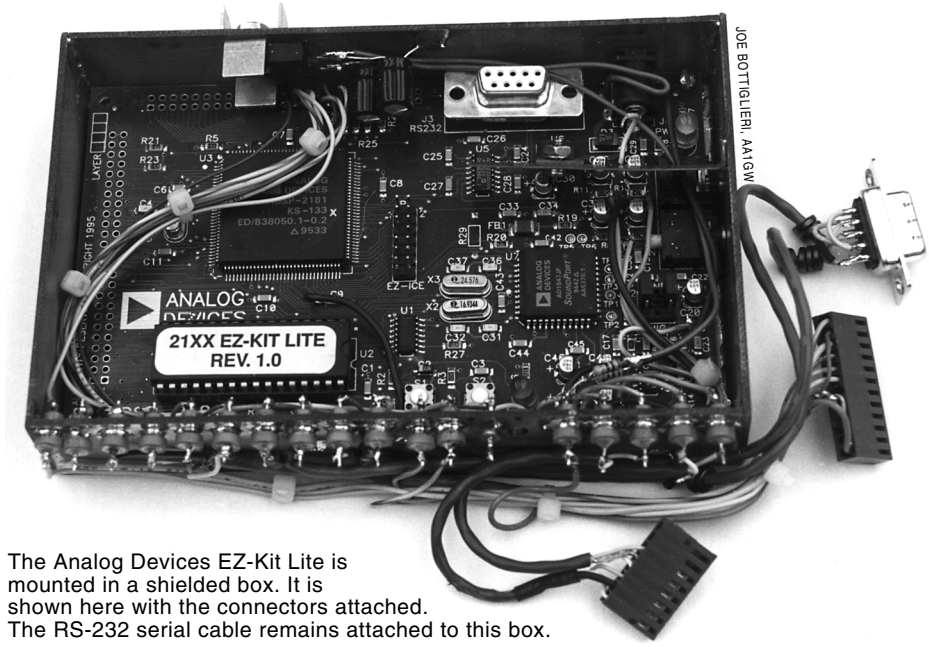
Except for the voltage-tolerant audio amplifier, U14, the main circuit board is powered through a 10-V regulator, U101, as shown in Figure 10. This low-dropout regulator makes operation independent of input supply voltages ranging from 11 to 16 V. A noise filter consisting of C101, L101 and C102, along with reverse-voltage protection from a 1-A fuse (F1) and diode (D101) provide power conditioning.

MOSFETs Q105 and Q106 are used to switch the +10 V line between transmit and receive. Typically, there is a drop of about 0.25 V in these switches.

Two serial data streams coming from the DSP control the various functions on the main board. These DSP interconnects are three-line systems having one common line for *data*, one common line for *clocking* the data and two separate *enable* lines that indicate when all data has been clocked to the board. One of these serial streams goes to the second-conversion synthesizer, U7 (see Figure 8). The other goes first to a pair of eight-bit serial-to-parallel shift registers, U108 and U107, and then to the first-conversion synthesizer, U104.

Shift registers U107 and U108 have 16 outputs for control functions such as transmit, receive, external-amplifier relay and external-antenna relay. The latter two functions are for relay sequencing that is controlled by the PC, eliminating the need for an external sequencer. There are three spare external control leads, E1, E2 and E3 at P108. The shift register also controls the receiver RF-stage gain by changing the current through the PIN diodes used for TR control.

Once full voltage has been applied to all circuits, U110A and its associated components reset the shift registers to a known condition. This reset status is also an input to the DSP so that hardware programming does not occur when the shift registers are not ready.



JOE BOTTIGLIERI, AA1GW

The Analog Devices EZ-Kit Lite is mounted in a shielded box. It is shown here with the connectors attached. The RS-232 serial cable remains attached to this box.

DSP Software

The DSP program is roughly 2,000 words long and written in assembly language. No attempt will be made here to show program details. A number of articles and books are available that provide details on the algorithms used for signal processing.[12] The source code for the transceiver programs is quite well commented and is available for study and change.[13] A code sample is shown in the sidebar "What Does a DSP Radio *Look* Like?"

The DSP program is synchronized by an AD1847 CODEC that performs the analog-to-digital conversion. To accomplish this, interrupts are generated by the CODEC 48,000 times each second. All internal timing is derived from these interrupts for functions such as frequency conversion, IF and AF filtering, SSB generation and serial communications with the PC. Some of these functions operate directly at the 48-kHz rate, while others run every fifth cycle at a rate of 9.6 kHz.

[11]Notes appear on page 40.

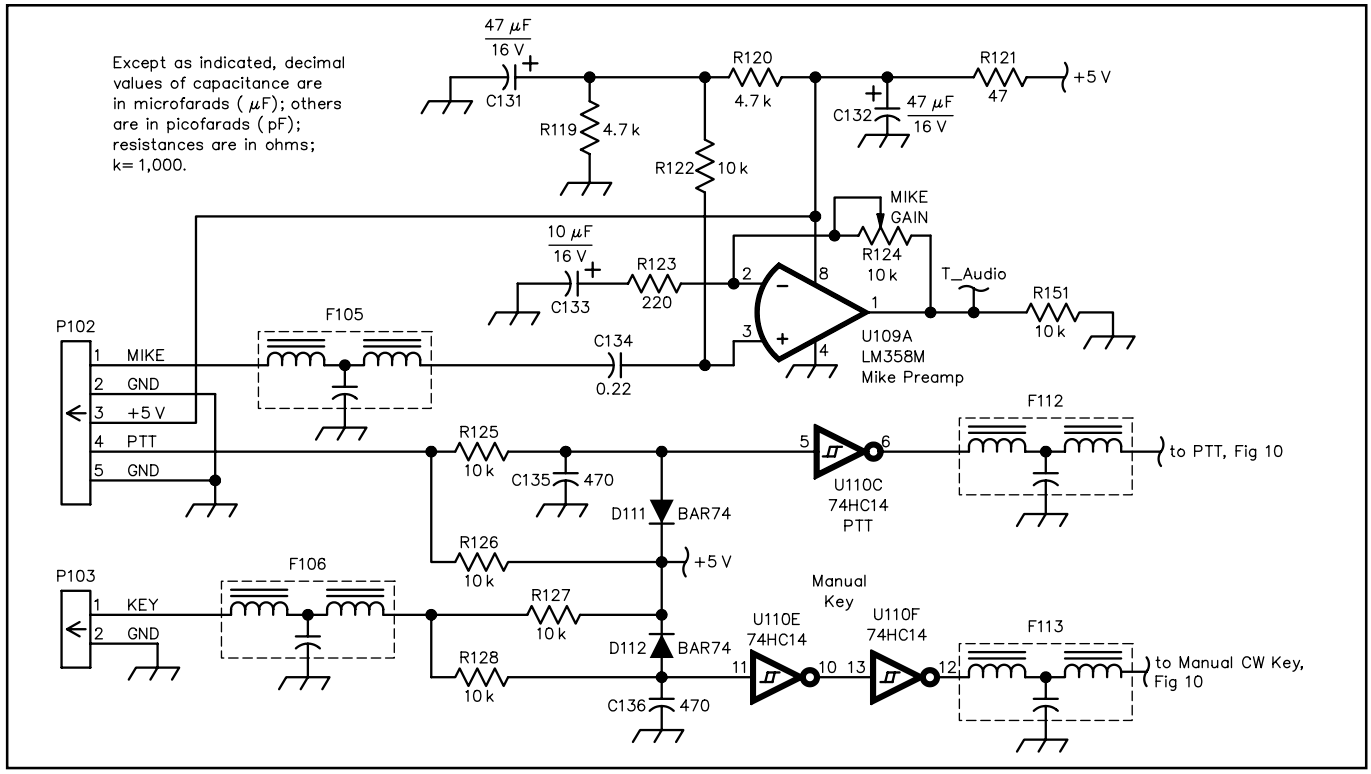


Figure 9—Microphone preamp, PTT and keying logic for the 2-meter transceiver. The microphone amplifier is adjustable to bring the voltage up to that required for the ADC. Protection circuitry is added to the keying and PTT circuits to protect against excessive external voltages. (See the sidebar "Parts Sources" in Part 1 for an explanation of the part-source abbreviations.)

C131, C132—47-μF, 16-V surface-mount electrolytic (DK PCE3033CT)
C133—10-μF, 16-V surface-mount electrolytic (DK PCE3031CT)
D111, D112—BAR74 diode (DK BAR74ZXCT)
FIL105, FIL106, FIL112, FIL113—470-pF filter (DK P9806CT)
P102—5-pin 0.1-inch in-line header (DK WM4203)
P103—2-pin 0.1-inch in-line header (DK WM4200)
R124—10 kΩ variable resistor, Bourns 3329H (DK3329H-103)
U109—LM358M dual op amp (DK LM358M)
U110—MM74HC14M (DK MMHC14M)

What Does a DSP Radio *Look* Like?

Many people find writing computer programs to be a bit challenging. But it is interesting to see what a common circuit looks like when built in assembly language. What follows is a short clip from the DSP-10 image-reject mixer program used in SSB and CW to convert from 15 kHz to audio. The comments along with the computer instructions are enclosed in curly brackets, { }, and explain the operations.

```
{ The program starts here with the signal in the register my0 }
{ First we generate the DDS conversion oscillator using if_dphase that determines the frequency }
ax1 = dm(if_dphase);      { Phase increment for conversion osc, from memory}
ay1 = dm(if_phase);       { Phase, as computed for last data point, also from memory }
ar = ax1 + ay1;           { New phase is old phase + phase increment }
dm(if_phase) = ar;        { Save it for the next data point }
{ The routine named sin converts from phase to amplitude of a sin wave }
call sin;                 { Phase in ar, Sin returned in ar }
{The following operation is a double balanced mixer (DBM)! }
mr=ar*my0(SS);            { Multiply the conversion oscillator and the signal }
dm(i_audio) = mr1;        { Store 0 degree (in-phase) output }
{ We now have 0 degree audio and to do image reject mixing we need the 90 degree audio: }
ax0 = dm(if_phase);       { Get current phase, as just computed }
ay0 = 16384;              { 90 degrees for quadrature osc. 16384 represents 0.25 (of 360) }
ar = ax0 + ay0;           { This is the phase of the 90 degree osc. }
call sin;                 { Convert phase to 90 degree osc signal}
mr=ar*my0(SS);            { Signal is still in my0; This is the 90 degree DBM }
dm(q_audio)= mr1;         { Store sample in fir1q delay line }
{This leaves the two audio signals i_audio and q_audio in memory, ready to be low-pass filtered and then added or subtracted
  to form USB or LSB  }
```

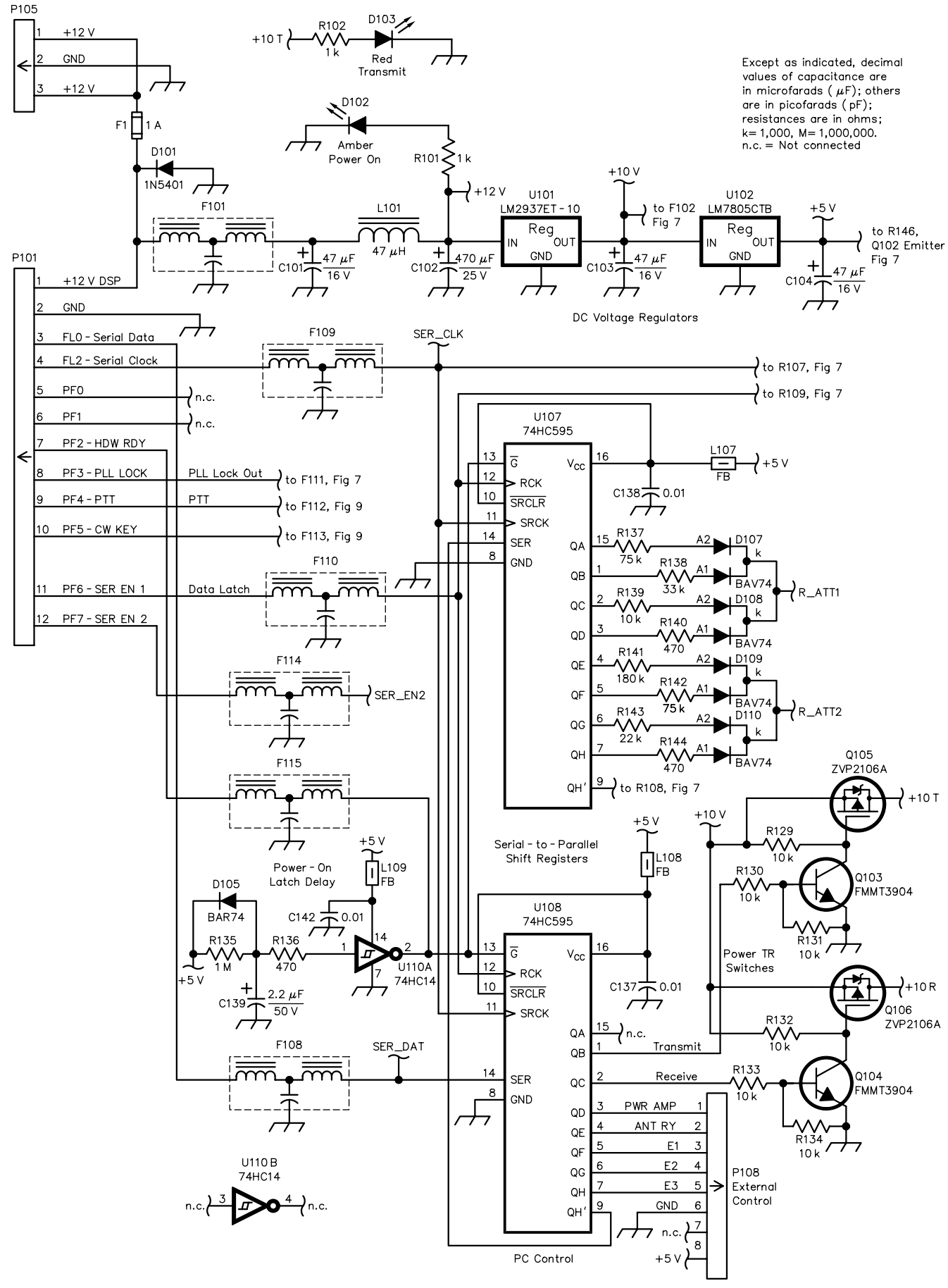
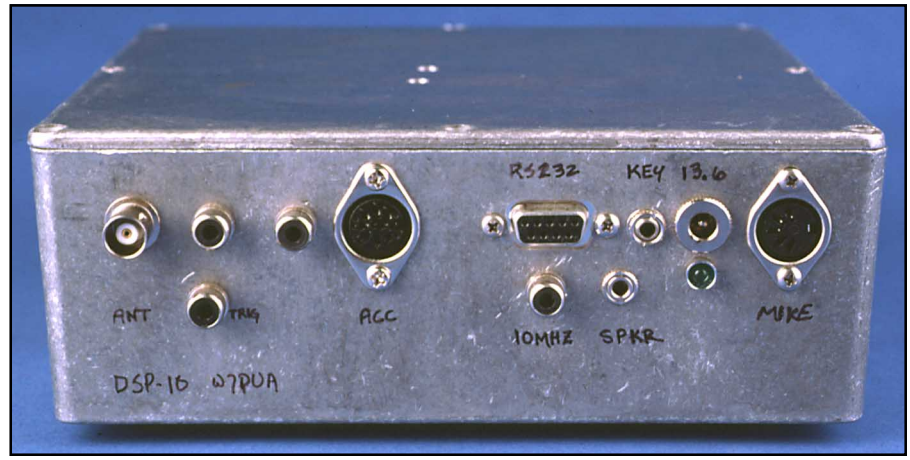

P105
1 +12 V
2 GND
3 +12 V
F1 1 A
D101 1N5401
+10 T
R102 1 k
D103 Red Transmit
D102 Amber Power On
R101 1 k
+12 V
Except as indicated, decimal values of capacitance are in microfarads (μF); others are in picofarads (pF); resistances are in ohms; k= 1,000, M= 1,000,000. n.c. = Not connected
F101
L101 47 μH
C101 47 μF 16 V
C102 470 μF 25 V
U101 LM2937ET-10
Reg IN OUT GND
+10 V
to F102 Fig 7
C103 47 μF 16 V
U102 LM7805CTB
Reg IN OUT GND
+5 V
to R146, Q102 Emitter Fig 7
C104 47 μF 16 V
DC Voltage Regulators
P101
1 +12 V DSP
2 GND
3 FL0 - Serial Data
4 FL2 - Serial Clock
5 PF0 n.c.
6 PF1 n.c.
7 PF2 - HDW RDY
8 PF3 - PLL LOCK PLL Lock Out to F111, Fig 7
9 PF4 - PTT PTT to F112, Fig 9
10 PF5 - CW KEY to F113, Fig 9
11 PF6 - SER EN 1 Data Latch
12 PF7 - SER EN 2
F109
SER_CLK
to R107, Fig 7
to R109, Fig 7
U107 74HC595
G Vcc RCK SRCLR SRCK SER GND
QA QB QC QD QE QF QG QH QH'
L107 FB +5 V
C138 0.01
R137 75 k
R138 33 k
R139 10 k
R140 470
R141 180 k
R142 75 k
R143 22 k
R144 470
D107 D108 D109 D110 BAV74
R_ATT1
R_ATT2
to R108, Fig 7
F110
F114
SER_EN2
F115
Serial - to - Parallel Shift Registers
Power - On Latch Delay
D105 BAR74
R135 1 M
R136 470
C142 0.01
C139 2.2 μF 50 V
U110A 74HC14
L109 FB
L108 FB
U108 74HC595
C137 0.01
Q105 ZVP2106A
+10 T
R129 10 k
Q103 FMMT3904
R130 10 k
R131 10 k
Power TR Switches
+10 R
Q106 ZVP2106A
R132 10 k
Q104 FMMT3904
R133 10 k
R134 10 k
Transmit
Receive
F108
SER_DAT
U110B 74HC14
n.c.
PWR AMP
ANT RY
E1
E2
E3
GND
P108 External Control
PC Control

Figure 10—Power regulator and control circuitry. The shift registers, U107 and U108 are used to obtain digital outputs from the DSP used to control the RF gain and other parameters. R137 to R144 control the current through PIN diodes for the RF gain.

C101, C103, C104—47-µF, 16-V surface-mount electrolytic (DK PCE3033CT)
C102—470-µF, 25-V axial-lead electrolytic (DK P1329)
D105—BAR74 diode (DK BAR74ZXCT)
D101—1N5401 diode (DK 1N5401CT)
D102—Amber LED (RS 276-066)
D103—Red LED (RS 276-021)
D107, D108, D109, D110—BAV74 dual diode (DK BAV74ZXCT)
F1— 1-A fuse, 5 mm (DK F948) with two fuse clips (DK F058)
FIL108-FIL110, FIL114, FIL115—470-pF filter (DK P9806CT)
L107-L109—Ferrite SMT bead 1206 (DK 240-1019-1)
L101—47-µH iron-core inductor (DK TK4444)
P101—12-pin, 0.1-inch in-line header (DK WM4210)
P105—3-pin 0.1-inch header (DK WM4201)
P108—8-pin, 0.1-inch in-line header (DK WM4206)
Q103, Q104—FMMT3904 NPN transistor, SOT23 (DK FMMT3904CT)
Q3, Q6, Q102—FMMT3906 PNP transistor, SOT23 (DK FMMT3906CT)
Q105, Q106—ZVP2106A N-channel MOSFET (DK ZVP2106A)
U101—LM2937ET-10, low-dropout voltage regulator, TO-220 case (DK LM2937ET-10)
U102—LM7805CTB voltage regulator, TO-220 (DKLM7805CTB)
U107, U108—MM74HC595 (DK MM74HC595M)



A front-panel view of the transceiver. The two phono jacks adjacent the BNC **ANT** jack are used for interconnection to an amplifier or transverter. The two jacks can be connected together with a short jumper cable for QRP operation.

Figure 1 in Part 1 includes a functional block diagram of the DSP programs used for reception. The input signal is an IF centered at 15 kHz. SSB and CW reception require mixing down to audio frequencies. The conversion oscillator (BFO) is a DSP-calculated sine wave in the 12.5- to 17.5-kHz range, with a resolution better than 1 Hz. This provides the fine-tuning needed because the first-conversion synthesizer changes in 5-kHz steps. To discriminate between LSB and USB, there are two software mixers, one driven by a sine wave and the other driven 90° out-of-phase by a cosine wave. The two audio signals, called in-phase (I) and quadrature (Q), are low-pass filtered at 2.8 kHz to remove the high-frequency conversion products and other possible interfering signals. Up to this point, all processing is at a 48-kHz rate.

Because the audio bandwidth has been limited at this point, it is possible to drop to a 9.6-kHz rate. The two audio signals must have a 90° phase difference to allow sideband selection. A DSP routine called a Hilbert transform accomplishes this. The desired sideband, upper or lower, is selected by respectively adding or subtracting the two audio signals.

Following the sideband selection are optional narrowband audio finite-duration impulse-response (FIR) filters and an LMS adaptive noise-reduction routine.[14] Presently, two CW filters having bandwidths of 200 and 450 Hz centered at 600 Hz are available. These filters can be changed easily by reassembling the DSP program with new files for the FIR-filter coefficients.

NBFM Reception

Narrowband FM is received in a manner that starts much like SSB reception. The I and Q audio signals generated by mixing are used to calculate a phase angle relative to a center frequency, using an arctangent function. The phase angle is subtracted from the previous measurement taken 1/48000 second earlier. This phase-angle difference, after low-pass filtering, is the desired detected FM signal.

During reception, spectral analysis is being done with a 1024-point FFT using the audio data sampled at a 9.6-kHz rate. The spectral data from 12 overlapping data sets are averaged and converted to decibels. These are transmitted serially to the PC at 9600 baud. The decibel conversion allows the spectral data to be transmitted using only eight bits per frequency point.

SSB Transmit

The SSB transmit process is essentially the same as that used for reception, but in reverse order. The microphone's audio signal is converted to a 16-bit word by the ADC. Next, a low-pass FIR filter limits the bandwidth of the audio signal. A Hilbert transform then generates a pair of signals with a 90° phase difference. These two signals are run through a pair of mixers having 90° out-of-phase conversion oscillators. Finally, the resulting signals in the 15-kHz region are either added or subtracted to form an USB or LSB signal, respectively, which is sent to the same DAC used for audio output during reception.

CW Transmit

For CW, the process is simpler. The keying signal comes from the PC or a key connected to the RF board. This signal is fed through a 500-Hz low-pass filter to limit key clicks, producing a signal that amplitude modulates a sine wave in the 15-kHz region. In the DSP, this modulation is simply a multiplication routine. The resulting modulated output is ready for the DAC.

FM Transmit

FM transmission starts by limiting and filtering the microphone input as is done for SSB. This signal is then used to determine the frequency of a software oscillator in the 10- to 20-kHz range, which is sent to the DAC.

Serial communication with the DSP is at 9600 baud, and all UART functions are in software. All commands from the PC to the DSP consist of six bytes. This allows us to send commands for controls such as audio gain. About 15 different commands are available. These commands are kept as simple as possible and decision making is concentrated in the PC.

PC Software

To keep things simple, the PC software runs under DOS. It is written in *C* (not *C++*) and uses the Borland DOS Graphics Interface routines. The programs were compiled using *Borland C++* version 4.0.

All transceiver control is done via the PC keyboard. Alphanumeric keys and standard punctuation marks are reserved for sending CW; thus, most control operations involve the use of function keys, the **ALT** key and the **CTRL** key. A mouse is not used.

Basic display updating is controlled by the reception of the spectrum and status data from the DSP. This is about 535 bytes of data and takes approximately 0.6 seconds to receive. Once a full data set is received, and after the desired averaging, the display is updated. The received data is buffered up to 8 kB by the interrupt routine, so the display data updates can be delayed for up to eight seconds before data is lost. This provides some program-operation flexibility.

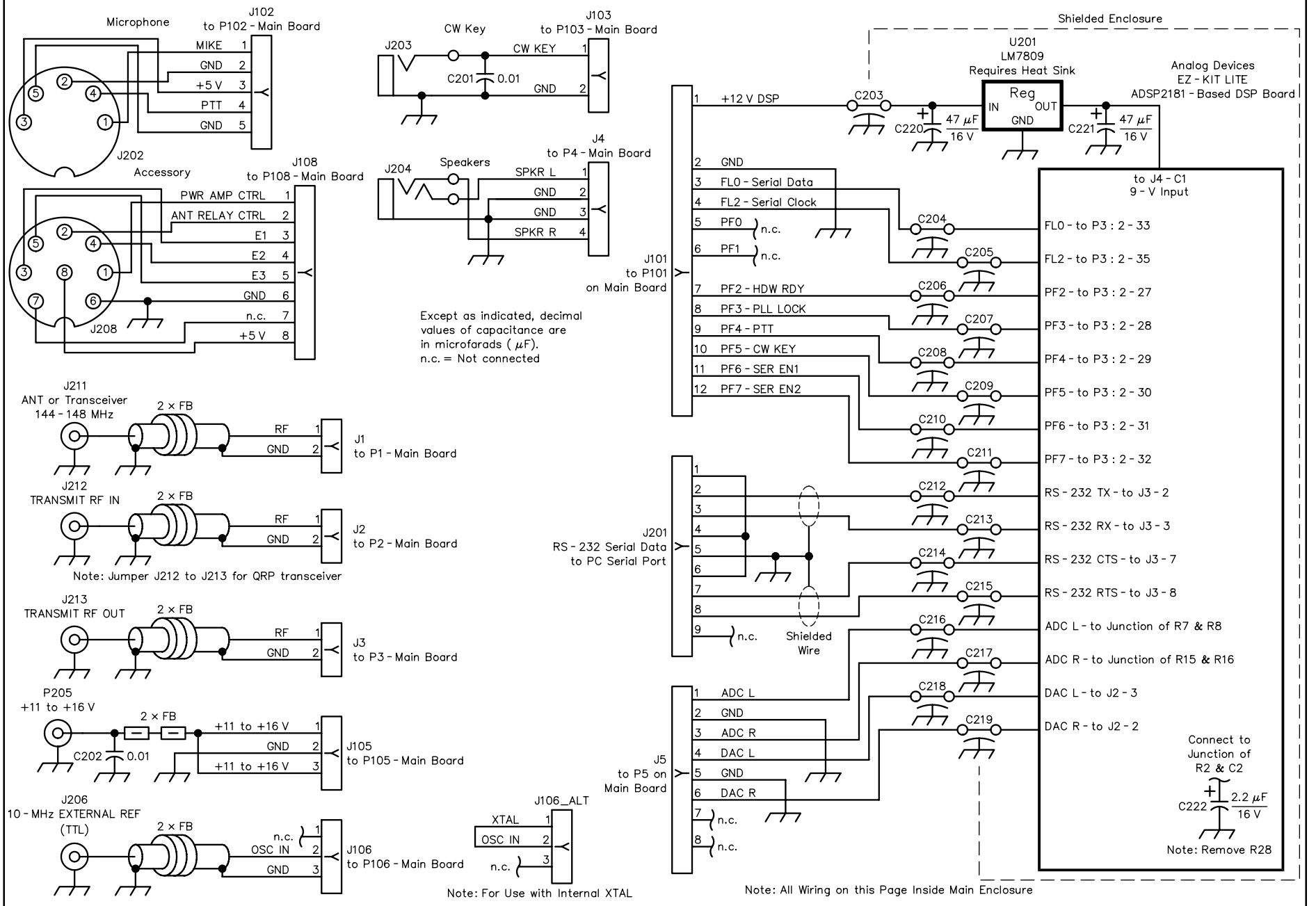

Microphone
J102
to P102 - Main Board
MIKE 1
GND 2
+5 V 3
PTT 4
GND 5
J202
Accessory
J108
to P108 - Main Board
PWR AMP CTRL 1
ANT RELAY CTRL 2
E1 3
E2 4
E3 5
GND 6
n.c. 7
+5 V 8
J208
J203
CW Key
C201 0.01
J103
to P103 - Main Board
CW KEY 1
GND 2
J204
Speakers
J4
to P4 - Main Board
SPKR L 1
GND 2
GND 3
SPKR R 4
Except as indicated, decimal values of capacitance are in microfarads (µF).
n.c. = Not connected
J211
ANT or Transceiver
144 - 148 MHz
2 × FB
RF 1
GND 2
J1
to P1 - Main Board
J212
TRANSMIT RF IN
J2
to P2 - Main Board
Note: Jumper J212 to J213 for QRP transceiver
J213
TRANSMIT RF OUT
J3
to P3 - Main Board
P205
+11 to +16 V
C202 0.01
+11 to +16 V 1
GND 2
+11 to +16 V 3
J105
to P105 - Main Board
J206
10 - MHz EXTERNAL REF
(TTL)
n.c. 1
OSC IN 2
GND 3
J106
to P106 - Main Board
J106_ALT
XTAL 1
OSC IN 2
n.c. 3
Note: For Use with Internal XTAL
Shielded Enclosure
U201
LM7809
Requires Heat Sink
Reg
IN OUT
GND
Analog Devices
EZ - KIT LITE
ADSP2181 - Based DSP Board
C203
C220 47 µF 16 V
C221 47 µF 16 V
J101
to P101
on Main Board
1 +12 V DSP
2 GND
3 FL0 - Serial Data
4 FL2 - Serial Clock
5 PF0 n.c.
6 PF1 n.c.
7 PF2 - HDW RDY
8 PF3 - PLL LOCK
9 PF4 - PTT
10 PF5 - CW KEY
11 PF6 - SER EN1
12 PF7 - SER EN2
C204
C205
C206
C207
C208
C209
C210
C211
J201
RS - 232 Serial Data
to PC Serial Port
9 n.c.
Shielded Wire
C212
C213
C214
C215
C216
C217
J5
to P5 on
Main Board
1 ADC L
2 GND
3 ADC R
4 DAC L
5 GND
6 DAC R
7 n.c.
8 n.c.
C218
C219
to J4 - C1
9 - V Input
FL0 - to P3 : 2 - 33
FL2 - to P3 : 2 - 35
PF2 - to P3 : 2 - 27
PF3 - to P3 : 2 - 28
PF4 - to P3 : 2 - 29
PF5 - to P3 : 2 - 30
PF6 - to P3 : 2 - 31
PF7 - to P3 : 2 - 32
RS - 232 TX - to J3 - 2
RS - 232 RX - to J3 - 3
RS - 232 CTS - to J3 - 7
RS - 232 RTS - to J3 - 8
ADC L - to Junction of R7 & R8
ADC R - to Junction of R15 & R16
DAC L - to J2 - 3
DAC R - to J2 - 2
Connect to Junction of R2 & C2
C222 2.2 µF 16 V
Note: Remove R28
Note: All Wiring on this Page Inside Main Enclosure

Figure 11—Interconnection diagram. The DSP board is treated as a component and mounted in a separate box with feed-through filters as shown here. The other connectors are a convenience to allow the boards to be separated for construction, changes and repair.

C201, C202—0.01-µF disc-ceramic capacitors. These are added as RF bypasses at the connectors of the CW key line and at the power connector.

C203-C219—Feed-through capacitor, 1500 pF min, Spectrum Control 1214-001 (NE 19F687) or similar are ideal. Other surplus feed-through capacitors or filters would also be suitable.

C220, C221—47-µF, 16-V surface-mount electrolytic (DK PCE3033CT). These are mounted on the 9-V regulator U201.

C222—2.2-µF, 16-V radial-lead electrolytic. This capacitor is added on the EZ-Kit Lite board at the junction of R2 and C2.

J1, J2, J3, J103—2-pin 0.1-inch in-line socket (DK WM2011) and two crimp terminals for each (DK WM2200). In general, this connector and the others that connect to the headers on the PC board are from the Molex 22-01-20*x*7, where *x* is the number of connections.

J4—4-pin, 0.1-inch in-line socket (DK WM2013) and four crimp terminals for each (DK WM2200)

J5, J108—8-pin, 0.1-inch in-line socket (DK WM2017) and eight crimp terminals for each (DK WM2200)

J101—12-pin 0.1-inch in-line socket (DK WM2021) and 12 crimp terminals for each (DK WM2200)

J102—5-pin 0.1-inch in-line socket (DK WM2014) and five crimp terminals for each (DK WM2200)

J105, J106—3-pin 0.1-inch in-line socket (DK WM2012) and three crimp terminals for each (DK WM2200)

J201—9-in female D connector (RS 276-1538)

J202—5-pin circular DIN connector (RS 274-005)

J203—Two-circuit, 1/8-inch phono jack (RS 274-251)

J204—Stereo 1/8-inch phono jack (RS 274-249)

J206, J212, J213—Phono jacks (RS 274-346)

J208—8-pin circular DIN connector

J211—BNC jack (RS 278-105)

P205—Power connector, 5.5 mm OD, 2.1 mm ID (RS 274-1563)

U201—LM7809CTB voltage regulator, TO-220 case (DK LM7809CTB) requires small heat sink and mounting hardware to fasten it to the inside of the EZ-Kit box.

Misc: 10 ferrite toroids to isolate coax cables (Amidon FT-23-43). These are placed over the cables as shown on this schematic. Also needed are: EZ-KIT Lite PC board and box (see text); outer box Hammond 1590F (DK HM156); four 1/4-inch OD, 1/4-inch long brass standoffs, used to mount the main board to the box; four 1/4-inch OD, 1-inch long threaded #4-40 spacers, used to mount the DSP box to the main board. Microphone—Connections shown are compatible with RadioShack 21-1172.

Parameters that define the transceiver operation—such as audio gain—can be derived from an ASCII configuration file that is read when the PC program starts. These parameters override the default parameters, and in many cases serve to customize the transceiver. When a shutdown command is given, a new file is written that allows the transceiver to start up with the configuration last used.

Building the Transceiver

Circuit immunity to noise and spurious response benefits greatly from use of a solid ground plane on the PC board. For this reason, a double-sided board is employed. The main drawback to this approach is the need for jumper wires on the backside, but the advantages far outweigh this minor inconvenience.

Surface-mount components are used for several reasons. The board ends up being smaller and costs less, the RF and ground paths are often shorter and troubleshooting is easier. That's because traces are not hidden on the back of the board and are easier to follow. After building many boards with both through-hole and surface-mount approaches, I am convinced that surface-mount boards are easier to assemble,[15] the main reason being that all work can be done on one side of the board.

A Hammond 1590F die-cast box holds the main board and the EZ-Kit DSP board. The latter is mounted in a separate box to provide shielding. I built the box from 1/16-inch-thick double-sided PC-board stock, but it can be fabricated from hobby store brass just as well. The mounting holes for the main board line up with the holes for the EZ-Kit, so it is easy to stack the entire sandwich of boards, boxes and standoffs. The two voltage regulators, U101 and U102, are mounted on the bottom side of the PC board. The ICs are fastened directly to the box with #6-32 hardware for heat sinking. The main board is secured to the die-cast box using four 1/2-inch-long spacers. Above the board are 1-inch-long threaded spacers that hold the DSP box.

All leads from the EZ-Kit pass through feed-through LC filters as they leave the inner box. This greatly reduces "birdies" and noise caused by coupling between the DSP and RF circuits. A cover on the DSP EZ-Kit box completes the shielding. Good shielding requires a connection between the cover and the box every two inches or so. I use small pieces of finger stock for this. Alternatively, #6-32 brass screws and nuts soldered to the box can be used.

All external transceiver connectors are fastened to the die-cast box. In some cases, there are bypasses right where a connector is mounted and ferrite beads are placed over the connecting wires. These beads are shown in Figure 11, the interconnection schematic. It is best to err on the side of extra shielding and filtering than having to add parts later on.

Another voltage regulator (U201) is shown in Figure 11. This device is needed because the 5-V regulator furnished with the EZ-Kit cannot dissipate the power associated with operating voltages above 9 V. I tried various schemes to add heat sinking to the EZ-Kit, but they were not successful for operation at 16 V. U201 is bolted to the inside of the DSP box with a small heat sink on the outside.

Transceiver main PC boards are available.[16] The EZ-Kit Lite boards are available from most electronic distributors that carry Analog Devices products. You need to drill out the die-cast box and construct the enclosure for the EZ-Kit board. A number of plugs need to be made up and wired into the main box.

Some minor modifications are made to the EZ-Kit board as shown in Figure 11. Before making these changes, it's best to operate and test the DSP unit itself. Run the programs supplied with the EZ-Kit. Then load the transceiver program, *UHF3.EXE*.[17] This portion of the DSP and PC operation can be tested by operating the transceiver program as an audio processor. This requires running the PC program *UHFA.EXE* after loading the DSP and executing the **ALT-1** command to toggle between RF and audio processing.[18] The input can come from any transceiver phone jack and goes to the DSP left channel (phone-jack tip.)

After testing the EZ-Kit, mount it in its enclosure and wire the feed-through capacitors according to Figure 11. When making the connections to the main board and the RS-232 connector on the main enclosure, solder the wires of the three interconnecting cables to the feed-through capacitors. Leave an inch or two of slack in the cables so that the DSP box can be lifted above the main board with everything operating.

Main-board assembly requires some care, but there is a reasonable amount of room between components. There are no components on the back of the board, so it can be placed in the enclosure for testing.

Testing

For transceiver main-board alignment and basic troubleshooting, you need a voltmeter. A signal generator covering 144-148 MHz is helpful, but on-the-air signals are an adequate substitute and their use is assumed in the following steps. First, apply +11 V to the main board *without* using the DSP board. At 11 V, it is not necessary to heat sink the voltage regulators, so the board can be tested outside the box. At this point, current consumption should be around 350 mA. If everything is operating properly, your checks should show the nominal voltages given in Table 1.

All dc voltages must be proper before further testing is possible. If they're not right, find out why. Next, mount the main board in the die-cast box and fasten the two regulator heat sinks to the box. Connect the EZ-Kit box wiring, but leave the EZ-Kit box separate from the main box so that it can be moved out of the way of the main board. Connect the transceiver serial con-

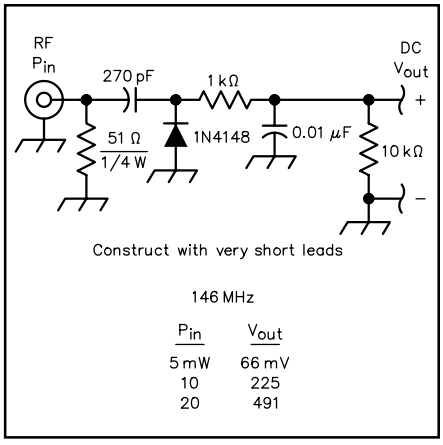


Figure 12—A simple power meter suitable for test and alignment of the transmitter. The dc levels shown in the chart can be measured with a dc voltmeter. Construct this circuit using very short leads.

Table 1
Nominal Voltages

Component ID and Pin Number	*Function*	*V_{age} (V)*
U101 pin 1	10-V regulator input	11.0
U101 pin 3	10-V regulator output	10.0
U102 pin 3	Main 5 V regulator	5.0
U103 pin 3	First synthesizer regulator	5.0
U14 pins 2 and 13	Audio outputs	5.5
U1 pin 3	First RF amp	3.5
U2 pin 3	Second RF amp	4.7
R110	Source of Q101 VCO	0.23
U105 pin 3	VCO buffer	3.5
U106 pin 3	VCO buffer	4.6
R59	Source of Q4 VCO	0.91
U8 pin 3	VCO buffer	2.8
U9 pin 3	VCO buffer	3.6

nection to the PC's serial port using the 9-pin cable supplied with the EZ-Kit. Now both the main board and the EZ-Kit can be powered via the power connector. With power applied, load and run the EZ-Kit program *UHF3.EXE* as was done earlier. Next, execute the PC program *UHFA.EXE* that initializes all the parameters for the DSP program, including programming the synthesizers.

The amber **POWER** LED, D102, should be lit, but the red **TRANSMIT** LED, D103, should be off. Confirm the voltage readings at the following points:

Q106 pin 1	10 V receive	9.7 V
U10A pin 3	IF amplifier	6.0 V
U109B pin 6	Transmit IF driver	2.4 V

Be sure that the RF gain is at 100 (press **Ctrl-F8** on the PC keyboard) and confirm the following voltages:

D2-A1	Antenna TR diode	0.73 V
D1-A1	RF Filter TR diode	0.73 V

Measure the 19.68-MHz synthesizer tuning voltage at the U6 pin 6 side of R54 (Figure 8). Set this to about 4 V using C69. If it is not possible to set the voltage to that level, adjust the turns on the VCO coil, L21. Pushing the turns together raises the tuning voltage. After you are sure that L21 is at its proper setting, use a small dab of RTV sealant to hold the windings in place and secure the coil to the board.

Set the **MODE** to **CW** and set the **Operating Frequency** to 147.000 MHz. Adjust the 126- to 128-MHz VCO coil, L102, until the tuning voltage measured at the junction of R104 and R105 is about 3.5 V.

Ensure that a jumper is in place between pins 1 and 2 of P106, or that an external reference signal is being fed to P106 pins 2 and 3. Attach an antenna and see if you can receive a local repeater signal, with the transceiver in CW mode. If so, adjust the reference-oscillator frequency with C110 until the carrier pitch is about 600 Hz with the repeater frequency on the display. If it is not possible to get on frequency adjusting C110, change the value of C109. As you obtain more-accurate frequency references than a local repeater, it will be necessary to repeat this adjustment.

Next, peak crystal-filter coils L12 and L13 for maximum signal. The signal-level indication can be helpful for these adjustments. Select a repeater frequency as close as possible to 147 MHz and peak the RF-filter coils L1, L2, L8, L9, L10 and L11 at that frequency. Now, center the **MIKE GAIN.** That completes all adjustments.

Connect a dummy load to the antenna connector (a 51-Ω, 1/4-W resistor is adequate) and press the **Home** key to put the transceiver into transmit. With the key up, you should measure the following voltages:

D1-A2	RF Filter TR diode	0.73 V
U4 pin 3	1st transmit amplifier	3.6 V
U5 pin 3	2nd transmit amplifier	4.6 V
Q2 emitter	Power-amplifier emitter	1.2 V
Q2 base	Power-amplifier base	1.9 V

While holding down the CW key (right-hand **ALT** key), measure the transceiver's output power. It should be at least 20 mW at full-power setting. Figure 12 shows a circuit that can be used to measure the power output if a power meter is not available.

Next Month

In the last installment of this series, I'll cover the operational aspects of the transceiver, its performance and future direction.

Notes

[11]Part 1 of this article appears in the September 1999 issue of *QST* on pages 33-41.

[12]Bob Larkin, W7PUA, "A DSP Based Transceiver for UHF and Microwaves," *Proceedings of Microwave Update '96*, pp 15-31; available from ARRL. This paper covers an early version of the transceiver. The single-conversion transmitter approach shown was not able to achieve adequate spurious levels and was modified to the double-conversion approach used here; Rob Frohne, KL7NA, "A High Performance, Single Signal, Direct-Conversion Receiver with DSP Filtering," *QST*, Apr 1998, pp 40-45.

Analog Devices, *Digital Signal Processing Applications Using the ADSP-2100 Family, Vol 1 and 2*. These are available at some bookstores and directly from Analog Devices, (One Technology Way, PO Box 9106, Norwood, MA 02062-9106; tel 781-329-4700, 800-262-5643; **http://www.analog.com**). Vol 1 has most of the basic routines needed for DSP work and Vol 2 has more specific applications, most of which are not involved in this project.

[13]Program source code is available from the author at **boblark@proaxis.com**. There is no charge for the software, but licensing is required. Notes on the program design and usage are available at **http://www.ao.com/~gnome**. These notes will be occasionally updated to reflect the current status of this on-going project.

[14]A. Bateman and W. Yates, *Digital Signal Processing Design*, Computer Science Press, Rockville, MD, 1989, pp 197-202 has a good discussion of the Hilbert transform 90° phase shifter. This engineering book also has a variety of topics related to DSP transceiver design. Also, see Doug Smith, KF6DX/7, "Signals, Samples and Stuff: A DSP Tutorial," *QEX*, Mar/Apr 1998, pp 3-16; May/June 1998, pp 22-37; July/Aug 1998, pp 13-27 and Sept/Oct 1998, pp 19-29. Many of the standard DSP routines are discussed in this four-part article.

[15]See Sam Ulbing, N4UAU, "Surface Mount Technology—You *Can* Work with It!," *QST*, —*Part 1*, Apr 1999, pp 33-39; —*Part 2*, May 1999, pp 48-50; —*Part 3*, Jun 1999, pp 34-36; —*Part 4*, Jul 1999, pp 38-41.—*Ed.*

[16]Unpopulated PC boards with top-side solder mask and full silkscreen legends on both sides, along with a full drawing package and assembly notes, are available from Mashell Electric, PO Box 5, Eatonville, WA 98328, for $50 postpaid in the US. Alternatively, Gerber files for noncommercial fabrication of the main PC board are available by e-mail from the author. A free license is required to use these files.

[17]Analog Devices uses the *.EXE* extension for their DSP program files. These files *cannot be run* as standard PC *.EXE* files; they require a separate loader such as the *Windows* loader that comes with the EZ-Kit. An alternative shareware loader, *EZFAST.COM*, written by Dwight Elvey, speeds up the loading process and adds several diagnostic features. The program is available at **http://www.analog.com/techsupt/software/dsp/ezkitlt/ezkitlt.html**.

[18]All the transceiver functions that make sense for an audio processor are available. For instance, there is no RF gain control, but you can still tune the audio signal, thus shifting all frequencies up or down by some offset value. Additional information on audio-processor operation is available at **http://www.ao.com/~gnome**.

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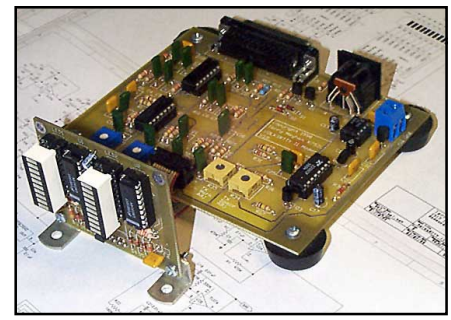
By Terry Mayhan, K7SZL

VolksRTTY II: For RTTY, AMTOR and PACTOR

Part 1—A little-known freeware program and this easy-to-build modem puts you on three HF digital modes at a fraction of the cost of a commercial TNC.



Following publication of the original VolksRTTY article,[1] I was delighted to hear from hams in a number of countries who had successfully built the interface and sampled the digital modes for the first time. There were two common threads to their correspondence. The first was along the lines of "I would have been on RTTY a long time ago if I had known it was going be this easy." The second thread could be paraphrased as "This RTTY is a blast—now how do I get on PACTOR?"

This latter question struck a chord with me since, using *HamComm*, I had been able to monitor PACTOR QSOs (but not transmit) for quite some time and had developed a keen appreciation for just how well the mode works. Unlike RTTY, which forces the operator to accept varying degrees of garbled copy during marginal conditions, PACTOR employs an error-correcting *ARQ* protocol. The concept behind ARQ is that the transmitting station sends a short block of data, then waits for an acknowledgement before continuing. If the receiving station doesn't acknowledge the block, or explicitly replies with a *NAK* (no acknowledgement), the block is automatically retransmitted. Additionally, PACTOR has provisions for automatically shifting the data rate between 100 and 200 bits per second to maximize the information rate during varying propagation conditions. Clearly, PACTOR offers a number of significant advantages for ragchewing and weak-signal DX work. It's also among the most popular of the HF digital modes.

In my quest for a full PACTOR capability, I initially attempted the time-honored strategy of system designers everywhere when faced with a new set of functional requirements: Lay it on the software group. I badgered the developer of *HamComm*, DL5YEC, to add PACTOR transmit to the program for nearly a year without success. Django had just started a major project to develop a *Windows*-based ACARS decoding program and—quite reasonably—wasn't enthusiastic about dropping that project just to satisfy my desire for a PACTOR upgrade. Finally recognizing the futility of this approach, I began looking on the Internet for other programs that might support PACTOR. After an extensive search, I turned up only two candidates: *BMK-Multy* offered by BARTG[2] and *TERMAN93* by Tom Sailor, HB9JNX. By all accounts, *BMK-MULTY* is an excellent piece of software, but at around $200 US for a version that supports RTTY and PACTOR, it was more than I wanted to spend. *TERMAN93*, on the other hand, was available for download[3] at no cost and, therefore, appealed to my cheap uh… frugal nature.

Once I had downloaded and examined *TERMAN93* (hereafter "T93" for brevity), I could see that the project was going to be more difficult than initially anticipated. Unlike *HamComm*, which implements much of the modem functionality in software, T93 requires external hardware to demodulate the AFSK signal from the receiver. Additionally, T93 requires an external phase-continuous oscillator to generate the AFSK tones (or a radio with a direct FSK capability). Finally, T93 needs some sort of indicator to facilitate

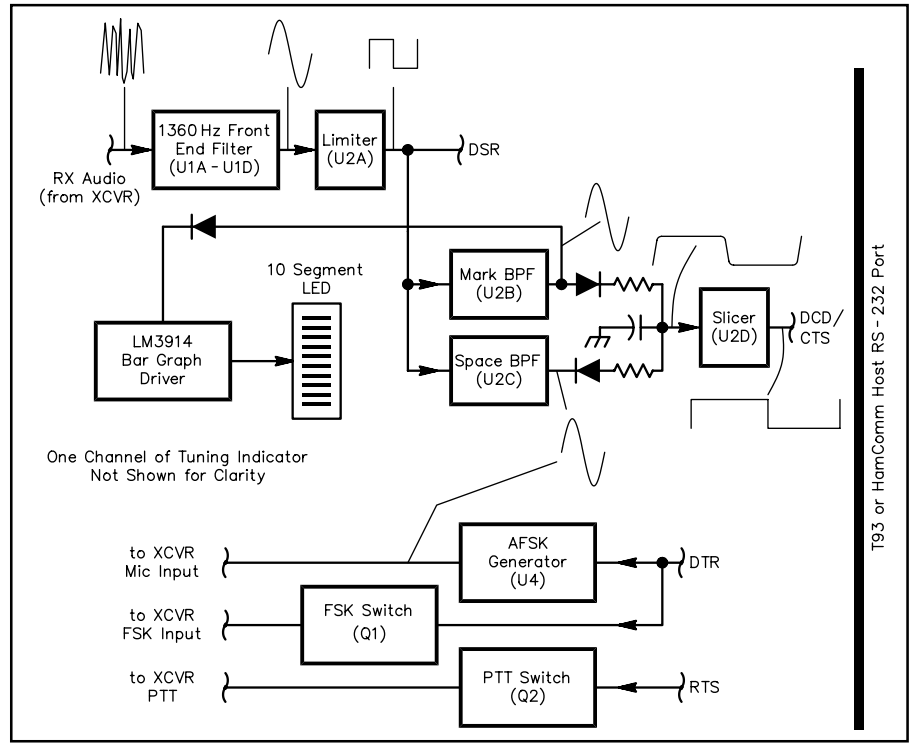


Figure 1—VolksRTTY II block diagram.

[1]Notes appear on page 44.

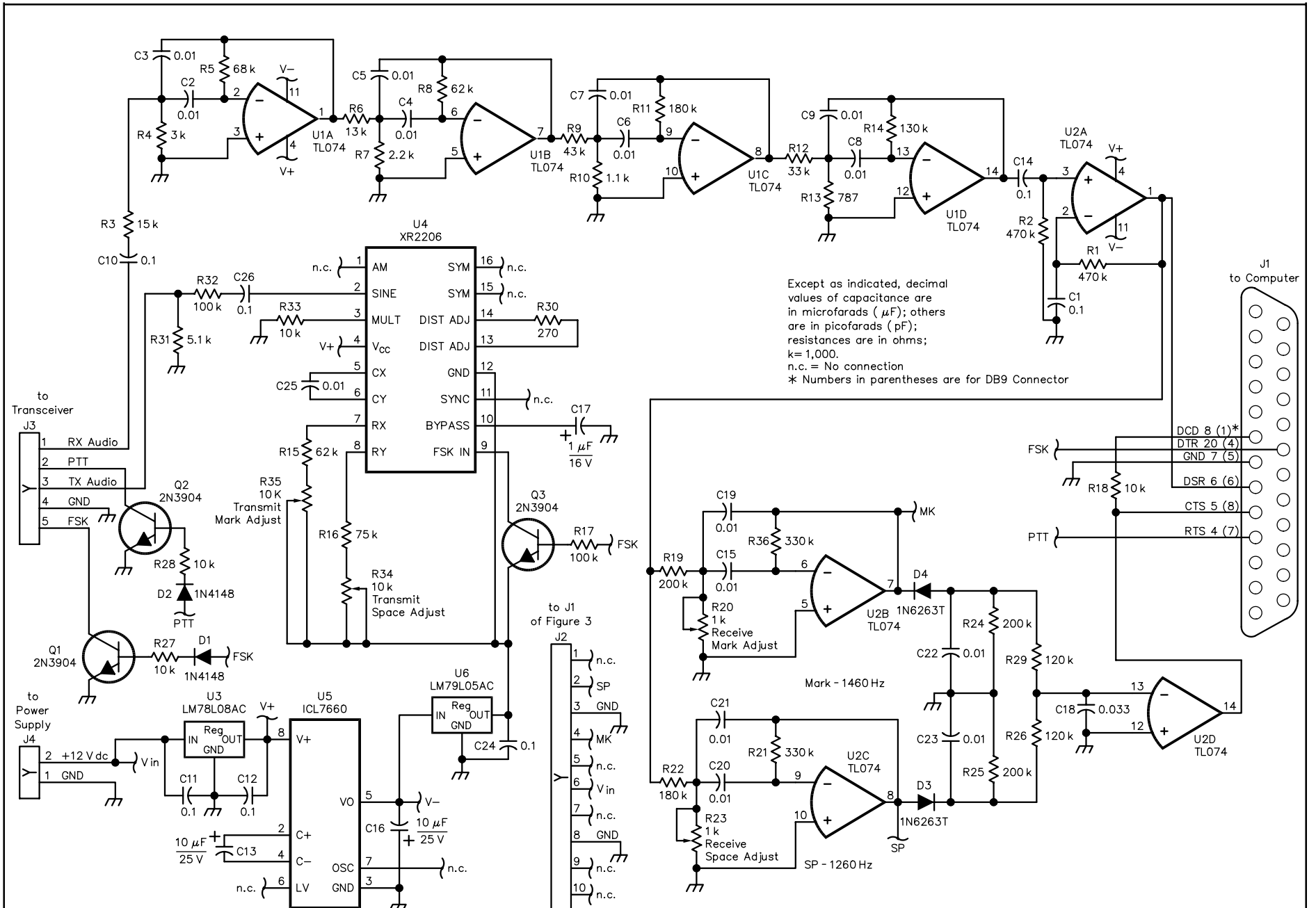

C3 0.01
R5 68 k
C2 0.01
R4 3 k
U1A TL074
R6 13 k
C5 0.01
R8 62 k
C4 0.01
R7 2.2 k
U1B TL074
C7 0.01
R11 180 k
R9 43 k
C6 0.01
R10 1.1 k
U1C TL074
C9 0.01
R14 130 k
R12 33 k
C8 0.01
R13 787
U1D TL074
C14 0.1
U2A TL074
R2 470 k
R1 470 k
C1 0.1
R3 15 k
C10 0.1
U4 XR2206
R32 100 k
C26 0.1
R33 10 k
R31 5.1 k
R30 270
C25 0.01
C17 1 µF 16 V
R15 62 k
R35 10 K Transmit Mark Adjust
R16 75 k
R34 10 k Transmit Space Adjust
R17 100 k
FSK
to Transceiver
J3
RX Audio
PTT
TX Audio
GND
FSK
Q2 2N3904
R28 10 k
D2 1N4148
PTT
Q1 2N3904
R27 10 k
D1 1N4148
FSK
Q3 2N3904
to Power Supply
J4
+12 V dc
GND
Vin
U3 LM78L08AC
C11 0.1
C12 0.1
U5 ICL7660
C13 10 µF 25 V
C16 10 µF 25 V
U6 LM79L05AC
C24 0.1
V−
to J1 of Figure 3
J2
SP
GND
MK
Vin
C19 0.01
R36 330 k
R19 200 k
C15 0.01
R20 1 k Receive Mark Adjust
U2B TL074
D4 1N6263T
Mark - 1460 Hz
C21 0.01
R21 330 k
R22 180 k
C20 0.01
R23 1 k Receive Space Adjust
U2C TL074
D3 1N6263T
SP - 1260 Hz
R24 200 k
C22 0.01
R29 120 k
C23 0.01
R25 200 k
R26 120 k
C18 0.033
U2D TL074
Except as indicated, decimal values of capacitance are in microfarads (µF); others are in picofarads (pF); resistances are in ohms; k= 1,000.
n.c. = No connection
* Numbers in parentheses are for DB9 Connector
J1 to Computer
DCD 8 (1)*
DTR 20 (4)
GND 7 (5)
DSR 6 (6)
CTS 5 (8)
RTS 4 (7)
FSK
PTT
R18 10 k

Figure 2—Schematic of the main circuit board. Unless otherwise specified, use 1/4 W, 5%-tolerance carbon composition or film resistors. Equivalent parts may be substituted for those shown. Percent values indicate part tolerances. See the "Part Suppliers" sidebar for contact information.

C1, C10-C12, C14, C24, C26—0.1 µF, 10% (Jameco P/N 25523)
C2-C9—0.01 µF, 2% (Mouser P/N 140-PF2A103F)
C13, C16—10 µF, 16 V (Jameco P/N 94211)
C15, C19-C23, C25—0.01 µF, 5% (Mouser P/N 140-PF2A103J)
C17—1 µF, 50 V (Jameco P/N 29831)
C18—0.033 µF, 5% (Mouser P/N 140-PF2A333F)
D1, D2—1N4148 (Jameco P/N 36038)
D3, D4—1N6263T (Future Active P/N 101-1570)
J1—DB25 Female (Jameco P/N 15181)
J2—Header, 10 pin (Jameco P/N 67820)
J3—DIN-5 (PC mount, Jameco P/N 29399)
J4—Terminal block (Jameco P/N 152346)
Q1, Q2, Q3—2N3904 (Jameco P/N 38359)
R1, R2—470 kΩ
R3—15 kΩ
R4—3 kΩ
R5—68 kΩ
R6—13 kΩ
R7—2.2 kΩ
R8, R15—62 kΩ
R9—43 kΩ
R10—1.1 kΩ
R11, R22—180 kΩ
R12—33 kΩ
R13—787 Ω, 1%
R14—130 kΩ
R16—75 kΩ
R17, R32—100 kΩ
R18, R27, R28, R33—10 kΩ
R19, R24, R25—200 kΩ
R20, R23—1 kΩ pot, PC mount (Jameco P/N 42964)
R21, R36—330 kΩ
R26, R29—120 kΩ
R30—270 Ω
R31—5.1 kΩ
R34, R35—10 kΩ pot, PC mount (Jameco P/N 43001)
U1, U2—TL074 (Jameco P/N 33216)
U3—LM78L08 (Mouser P/N 333-ML78L08A)
U4—XR2206 (Jameco P/N 34972)
U5—7660 (Jameco P/N 51174)
U6—LM79L05 (Jameco P/N 51422)
14-pin DIP socket (Jameco P/N 112213)
16-pin DIP socket (Jameco P/N 112221)
8-pin DIP socket (Jameco P/N 112205)

tuning the receiver for correct mark/space tone frequencies. In short, the program requires a modem—what old timers would refer to as a *terminal unit* (TU).

At this point, the dimensions of the project were beginning to take shape, and I established the following design objectives for the second-generation VolksRTTY:

1. It should be compatible with both T93 and *HamComm* (including tuning indicators).

2. It should be suitable for construction by any amateur with reasonably well developed homebrew skills.

This latter requirement translates into modest circuit complexity, readily available components and easy alignment without special test equipment. Decide for yourself whether VolksRTTY II (or VR2) meets these design goals.

Circuit Description

Referring to the block diagram in Figure 1 and the circuit schematics (Figures 2 and 3), readers who are familiar with the FM-based terminal-unit designs of the '60s and '70s will immediately recognize the roots of VR2. Active filters have replaced LC filters, and integrated circuits are used in lieu of discrete transistors (or tubes), but otherwise VR2's architecture is essentially identical to those earlier designs. The circuit is comprised of six functional elements: front-end bandpass filter; limiter; FSK demodulator; AFSK generator; tuning indicator and power supply. Let's examine the operation of each before proceeding with the construction details.

Front-End Filter

The purpose of the front-end filter is to improve the signal-to-noise ratio of the AFSK tones prior to limiting—this greatly increases the likelihood that the desired signal (and not QRM) will capture the limiter. A quad TL074 op amp (U1A through U1D) comprises an active Butterworth bandpass filter with a center frequency of 1360 Hz. This frequency was selected to comply with the European digital-tone standard supported by most modern transceivers. The lower tone frequencies of the European standard make it easier to obtain good filter skirt selectivity than with the US standard (nominally 2110 Hz). The resonant frequencies of each filter stage are staggered, and the Qs have been selected to provide a response that is 500 Hz wide at the –3-dB points. This filter is about as narrow as it can be without "smearing" a 200-baud PACTOR signal and causing a copy-destroying phenomenon called *intersymbol interference* (ISI). For RTTY, this filter is twice the necessary bandwidth, causing the modem to incur a 3-dB performance penalty. A switched, two-stage filter scheme was considered and rejected in favor of circuit simplicity and ease of implementation, however, such an enhancement could easily be added to the modem.

Limiter

The filtered signal is then applied to a limiter (U2A) that helps maintain a constant mark and space signal amplitude in the presence of selective fading. Up to this point, the circuit is functionally identical to the VolksRTTY *HamComm* interface. This is intentional, since one of the design objectives for the VR2 was to support all of *HamComm*'s functions, including its superb software tuning indicators. Note that the filtered and limited audio output from U2A is applied to the RS-232 DSR line (pin 6 of J1), which *HamComm* uses for its spectral-display input.

FSK Demodulator

Following "squaring up" by the limiter, the AFSK signal is applied to two parallel, 100-Hz wide band-pass filters (U2B and U2C), one of which is tuned to the mark frequency and the other to the space frequency. The outputs of the mark and space filters are rectified, summed with opposite polarity (D3 and D4) and filtered (C22, C23, R24, R25, R26, R29, C18) to remove the audio carrier and other noise. Collectively, these components comprise a frequency-to-voltage converter. The summed and filtered signal is then input to limiter U2D (also know as a *slicer*), which digitizes the waveform and converts it to an RS-232-compatible level. The output of U2D represents the demodulated baseband data signal and is applied to two pins (DCD and CTS) on J1 to accommodate the external converter input requirements for both *HamComm* and T93.

AFSK Generator

An XR2206 (U4) serves as a phase-continuous oscillator to generate the mark and space tones for modulating a transceiver in SSB mode. Depending upon the FSK state (ie, mark or space) commanded by the host, one of two pots (R34 or R35) is selected by U4. In conjunction with C26, the selected pot establishes the mark or space tone frequency. Resistors R31 and R32 serve as a voltage divider to reduce the AFSK level to a value suitable for direct input to the mike connector of the transceiver. FSK operation is also supported with an open-collector transistor switch (Q1). While not a part of the AFSK generator per se, it is worth noting that another open-collector switch (Q2) serves to ground the transceiver's PTT line during transmitting.

Tuning Indicator

Tuning indication is provided by separately rectifying the outputs from the mark and space filters and applying each to an LM3914 bar-graph display driver. The LM3914 is a form of analog-to-digital converter. It has 10 discrete inputs, each of which can sink a constant current from one element of a 10-segment LED bar-graph display. At low input voltages, the driver illuminates the LED segment at one end of the display by activating the current sink associated with that segment. As the input level increases, the driver switches the active current sink to move the illuminated segment toward the opposite end of the display. Consequently, the displacement of the illuminated segment is proportional to the input voltage.

The levels of the rectified mark and space filter outputs and the sensitivity of the LM3914 are such that—when a signal is exactly tuned in—the position of the illuminated LED segment is at the extreme end of the display. In the absence of an AFSK signal, random noise is sufficient to drive the tuning indicators to relatively high lev-

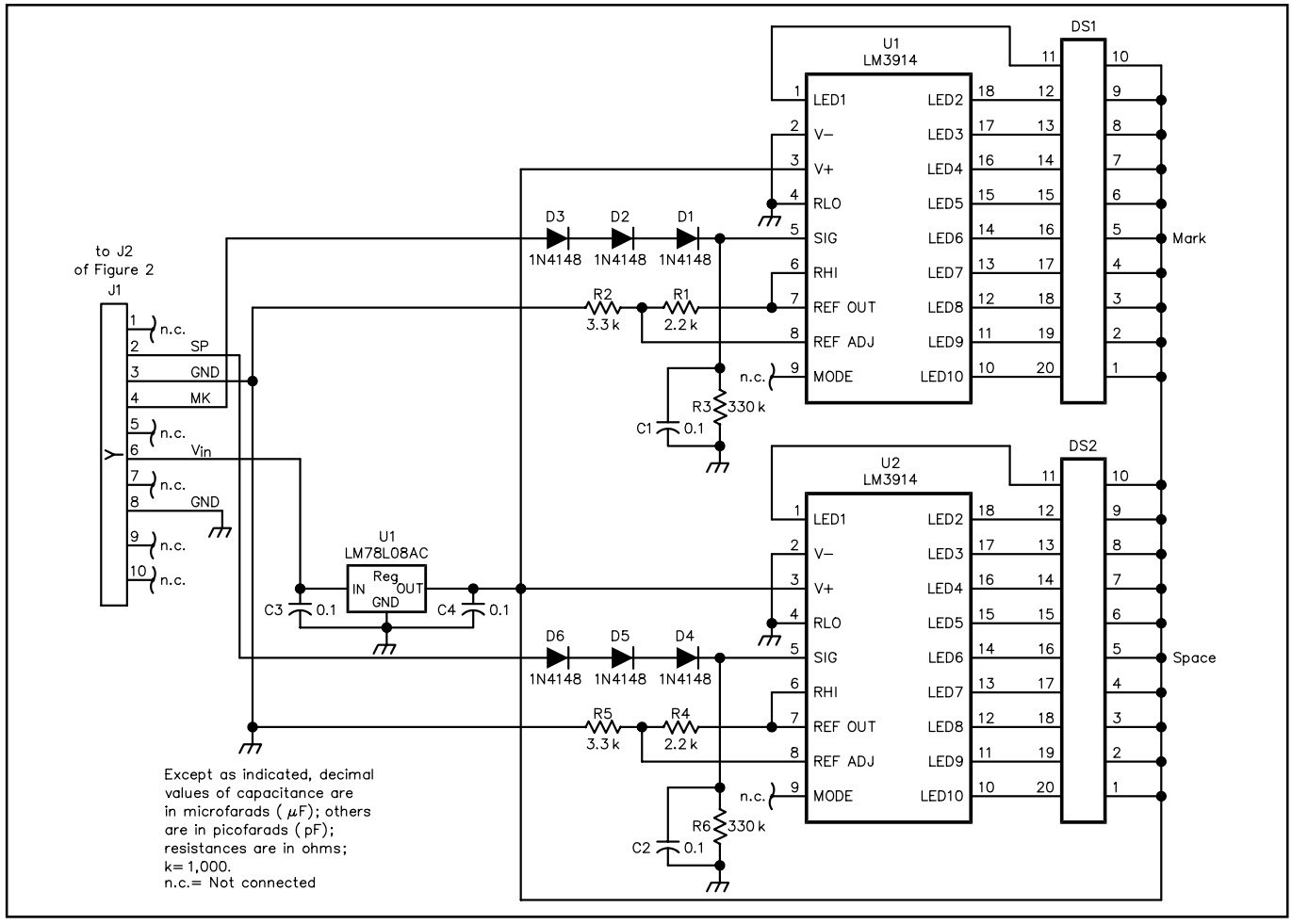


Figure 3—Schematic of display board. Unless otherwise specified, use 1/4 W, 5%-tolerance carbon composition or film resistors. Equivalent parts may be substituted for those shown. Percent values indicate part tolerances. See the "Part Suppliers" sidebar for contact information. J1 connects to J2 of Figure 2 via a six-inch 10-conductor ribbon cable with 10-pin IDC connectors (Jameco P/N 138376) at each end.

C1-C4—0.1 μF, 10% (Jameco P/N 25523)
D1-D6—1N4148 (Jameco P/N 36038)
DS1, DS21—Bar graph (Mouser P/N 512-MV57164)
J1—Header, 10 pin (Jameco P/N 67820)
R1, R4—2.2 kΩ
R2, R5—3.3 kΩ
R3, R6—330 kΩ
U1, U2—LM3914 (Jameco P/N 24230)
U3—78L08 (Mouser P/N 333-ML78L08A)
18-pin DIP socket (Jameco P/N 112230)
20-pin DIP socket (Jameco P/N 112248)

Parts Suppliers

Jameco Electronic Components
1355 Shoreway Rd
Belmont, CA 94002-4100
tel 800 831-4242
fax 800 237-6948
http://www.jameco.com
info@jameco.com

Future Active, Dept FAC 7
41 Main St
Bolton, MA 01740
tel 800 655-0006
fax 800 645-2953
http://www.future-active.com
catalogsales@future.ca

Mouser Electronics
958 N Main St
Mansfield, TX 76063-4827
tel 800 346-6873
fax 817 483-0931
http://www.mouser.com
sales@mouser.com

els. To compensate for this, and to provide a threshold effect, three diodes are series connected in each channel. The sum of the diode voltage drops causes the display to indicate an intermediate level in the absence of an in-band FSK signal.

Power Supply

Unlike the original VolksRTTY interface that derived its power from the host computer's RS-232 port, VR2 requires an external dc power source of at least 100 mA. It's best to keep the power supply voltage between 11 and 14 V. Higher input voltages can be used, but some of the regulators on the main and display boards will run quite warm to the touch. The power-supply voltage is initially dropped to 8 V dc using an LM78L08 linear regulator. The output of the regulator provides the positive rail voltage for the modem as well as the input to the '7660 dc-to-dc converter that provides –8 V dc for the negative rail. Regulator U6 cleans up switching noise on that rail to ensure that the power supplied to the AFSK oscillator (U4) is clean.

Next Month

Using Figures 2 and 3, you can procure the parts.[4] Next month, Part 2 will describe construction of the modem and operation of the system.

Notes

[1]T. Mayhan, K7SZL, "VolksRTTY—An Improved *HamComm* Interface," *QST*, April 1998, pp 46-50.

[2]See the British Amateur Radio Teledata Group (BARTG) Web page at **http://www.bartg.demon.co.uk/Sales/software.htm** for details and ordering information.

[3]You can download the latest version of *Terman93* at **http://www.ife.ee.ethz.ch/~sailer/ham/ham.html#hfterm**; Look for Terman93.zip.

[4]A limited number of VR2 parts kits are available from the author for $80 each, plus $5 for US shipping ($10 for overseas). The kit includes main and display PC boards, all board-mounted components and interconnecting ribbon cable. Order from Terry Mayhan, K7SZL, 4517 159th AVE NE, Redmond, WA 98052; **tmayhan@worldnet.att.net**; **http://home.att.net/~k7szl/**.

Robert K. Zimmerman, NP4B

Simple Offset Feeding of Wire-Element Beams

This approach to matching a feed line to an antenna uses the antenna itself as an impedance transformer.

Many Amateur Radio stations worldwide are equipped with tall towers and multielement Yagis made of aluminum tubing, be they commercial or "homebrewed." But often, because of economic reasons, you'll find wire beams being used for HF long-haul communication. If you're considering erecting a wire beam, you've no doubt thought how best to go about feeding that beam. The Gamma match—a popular matching arrangement often used with Yagis made of aluminum-tubing —is typically not employed with wire beams because of the Gamma match's bulkiness combined with a geometry that is difficult to maintain on an antenna that frequently is swinging in the wind. The Delta match, convenient for use with open-wire transmission line, does not readily lend itself to use with coaxial cable.

In this article, I'll present an ultimately simple means of feeding a wire beam with coaxial cable using the *antenna itself* as an impedance transformer to achieve a perfect match at any given frequency. The technique is easy to understand. As shown in Figure 1, a dipole nearly half a wavelength long exhibits a sinusoidal current distribution. The current is maximum at the dipole's center. This means that if we feed the dipole at its center, its radiation resistance is minimal. For a three-element wire beam, the driven element has a center impedance well below 50 Ω: A poor match for RG-8 coaxial cable.

Now, suppose we consider feeding the driven element some distance away from its center? As we move away from the driven-element's center, the RF current *decreases*. That means that the impedance *increases*. If we're clever, by using some simple math, we can find a point—offset from the dipole's center—at which the impedance is exactly 50 Ω—an excellent match for a coaxial cable feed line.

Here I present a case example for a three-element wire beam. Although the math is straightforward, those of you who don't like math are free to skip the equa-

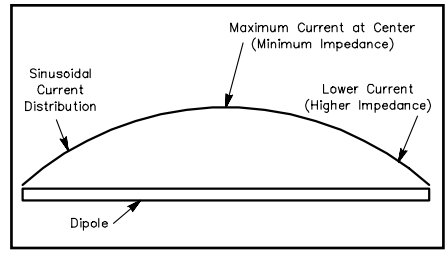


Figure 1—Dipole element showing relative current distribution.

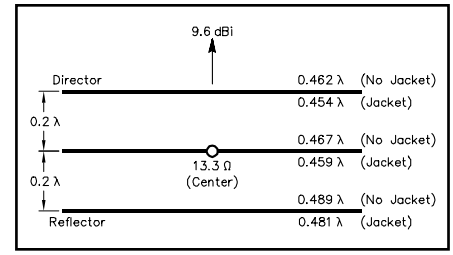


Figure 2—A gain-optimized three-element wire beam. Dimensions shown are for bare-wire elements (no jacket) and for elements made of RG-8/X coax (with jacket). The feedpoint impedance at the center of the driven element is 13.3 Ω (real).

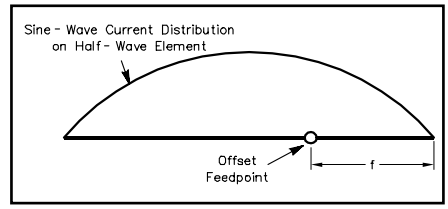


Figure 3—Relationship between the offset feedpoint and sinusoidal current distribution on a half-wave element.

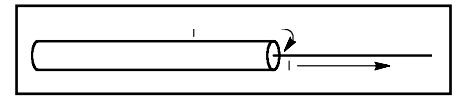


Figure 5—Pictorial diagram showing how the current on the outside of the coax folds around to become the interior current.

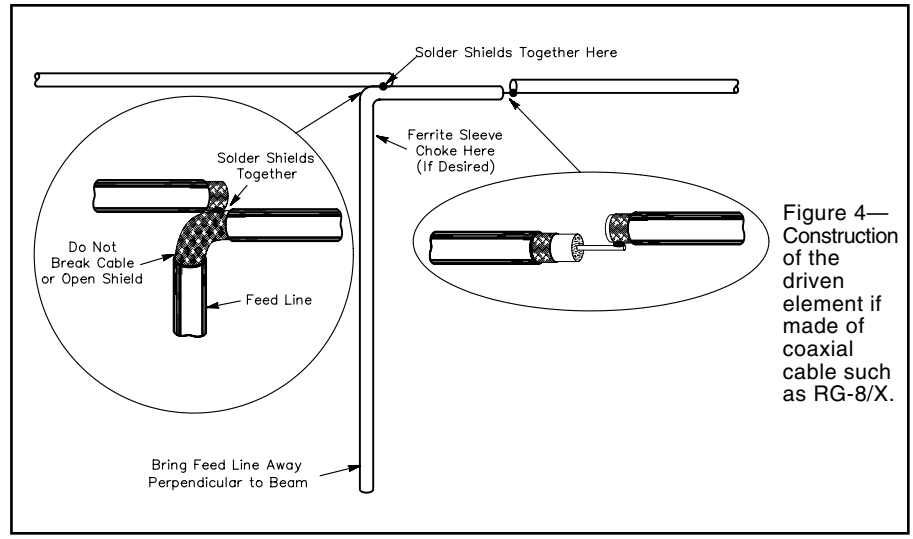
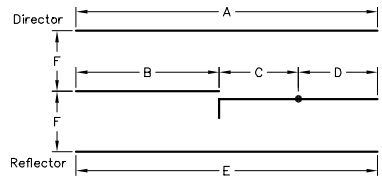


Figure 4—Construction of the driven element if made of coaxial cable such as RG-8/X.

[1]Notes appear on page 46.

Table 1
Antenna Dimensions*

Frequency (MHz)	A	B	C	D	E	F
10.125	13.69	6.79	4.44	2.34	14.49	5.93
14.150	9.80	4.86	3.18	1.67	10.37	4.24
18.110	7.65	3.79	2.48	1.31	8.10	3.31
21.200	6.54	3.24	2.12	1.12	6.92	2.83
24.930	5.56	2.76	1.81	0.95	5.88	2.41
28.500	4.86	2.41	1.58	0.83	5.15	2.11
50.200	2.76	1.37	0.90	0.47	2.92	1.20



All dimensions are in meters.

*The dimensions in this table are provided with the following assumptions: (1) The driven element is made entirely of RG-8/X coax and (2) the director and reflector are made of bare #12 antenna wire.

SULI SULLIVAN

Figure 6—A photo of W1RFI's version of the 6-meter beam.

tions and use the result at the end of the following section.

Matching the Antenna

Figure 2 shows a three-element Yagi that is optimized for a maximum forward gain of 9.6 dBi. The element dimensions given are for two distinct models: one using bare-wire elements, the other using elements made of RG-8/X coaxial cable, including its exterior vinyl jacket. As you'd expect, the vinyl jacket (a dielectric) causes the resonant-element lengths to be slightly shorter than predicted by the equation. Most important to us is that the real driven-element impedance at the center is 13.3 Ω. This I determined using *ELNEC*.[1, 2] Now, where would the 50-Ω feedpoint be? Here's where a little math can help us immensely. First, consider we are feeding power to the driven element at its center. Therefore, we can write:

$$\text{Power} = (I_{Center})^2 \times R_{Center} \qquad \text{(Eq 1)}$$

Now suppose we feed the same amount of power to the driven element at an *offset* feedpoint. The equation now becomes:

$$\text{Power} = (I_{Offset})^2 R_{Offset} \qquad \text{(Eq 2)}$$

Because we have assumed using the same power level in each case, we are free to set the two equations equal:

$$(I_{Center})^2 R_{Center} = (I_{Offset})^2 R_{Offset} \qquad \text{(Eq 3)}$$

There is just one more thing we must do. Since we know the current on the driven element is a sinusoid, we can express the *offset* current in terms of the *center* current:

$$I_{Offset} = I_{Center} \times \sin(f \times 180°) \qquad \text{(Eq 4)}$$

where

f = Fractional distance of the feedpoint from the end of the driven element (see Figure 3).

If we take Equation 4 and substitute it in Equation 3, we obtain the following result:

$$R_{Offset} = \frac{R_{Center}}{\sin^2(f \times 180°)} \qquad \text{(Eq 5)}$$

We already know R_{Center} equals 13.3 Ω. And, of course, we want R_{Offset} to equal 50 Ω.

If we solve Equation 5, we find f = 0.172. This means that a feedpoint located 17.2% in from the outer end of the driven element yields an impedance of 50 Ω—just what we want!

Figure 4 shows what the driven element should look like if made from coaxial cable such as RG-8/X. Keep in mind: With this feed system, there is *no need for a balun*. In fact, in this somewhat unusual application where the driven element is made of coax, we *want* current to flow on the outside of the coax. This is shown pictorially in Figure 5.

Even though the driven element is made of coax, it is certainly reasonable (and cheaper!) to make the antenna's reflector and director from bare copper wire. Be sure to use the proper lengths as given in Table 1.

Results

The beam we have just analyzed can be used at HF and VHF. For HF use, it is convenient to hang the elements in free space between any available supports (such as trees). For VHF, it is easier to make a support frame of PVC pipe and tape the elements to the pipe. ARRL Lab Supervisor Ed Hare, W1RFI, built the antenna shown in Figure 6.

If you decide to use PVC pipe for the element supports, be aware that the elements will be about 3% shorter than those shown in Figure 2. This is because of the dielectric loading of the PVC pipe. ARRL Lab Supervisor Ed Hare, W1RFI, has calculated the gain using *EZNEC* (see Note 1), which shows an actual gain (including ground-reflection gain) of about 15 dBi. For a 100 W transmitter, this yields an effective radiated power (ERP) of greater than 3100 W! Table 1 provides antenna dimensions for the upper HF bands and 6 meters.

Summary

Wire beams will be with us for a long time to come. The feeding technique described here is so simple in concept and parts that I hope it will find widespread use.

Notes

[1] *ELNEC* and *EZNEC* are available from Roy Lewallen, W7EL, PO Box 6558, Beaverton, OR 97007; tel 503-646-2885, fax 503-671-9046; **w7el@teleport.com**. Price: $49 and $89, respectively, postpaid; add $3 for shipping outside the US and Canada. Visa and MasterCard charge cards accepted.

[2] Robert K. Zimmerman, NP4B, "A Simple 50-Ω Feed for W8JK Beams," *QST*, Jun, pp 41-42.

Bob Zimmerman, NP4B, lives in Greenville, North Carolina, where he works for a telecommunications consulting firm. You can reach Bob at 1503A Honor Cr, Greenville, NC 27834; **r_zimmerman@hotmail.com**.

NEW HAM COMPANION

The Doctor is IN

Q Mike, WD5GYG, asks, "I would like to know the standard for receiver S unit measurements. Some say that if the strength of a received signal increases by 3 dB, the S meter will show an increase of one S unit. Others say it takes a 6-dB increase to produce an increase of one S unit. Can you explain?"

A There is no "official" S-meter standard, but the defacto standard that has evolved over the years has been 6 dB per S unit. There is a vast gulf between theory and practice, though. Most radios do not adhere to this standard, or at least not very diligently. Some S meters are derisively referred to as "Guessmeters," and having measured the performance of many of these circuits, I can say that is an accurate analogy indeed!

The Collins S meters used a signal level of 50 µV to produce a reading of 9 on the S meter. Different modern rigs indicate S9 anywhere from 1 to 200 µV!

Most S meters simply indicate the AGC voltage (the stronger the signal, the more the gain has to be reduced, so the higher the AGC voltage), but this varies directly with the components used in the receiver design. It is possible to have a calibrated S meter, but to get consistent performance across the entire HF band for all signal levels would require a more expensive circuit—a cost that might make the equipment less price competitive in the marketplace. Besides, most hams use their S meters for relative comparisons of signals on the same band, not as devices to make absolute, accurate measurements.

Q What is a "cage dipole" antenna and what advantage does it offer compared to a standard single-wire dipole?

A A cage dipole is basically an attempt to achieve a broader SWR bandwidth by using a thicker radiator. Building a dipole out of, say, a large-diameter aluminum tube isn't very practical, but you can create almost the same thing, electrically speaking, by using a number of individual wires properly spaced to create a antenna that looks like a round birdcage (Figure 1). That's the principle behind the cage dipole. A typical HF cage dipole can exhibit a 2:1 SWR frequency range almost 2 times broader than a single-wire dipole (Figure 2). There are other means of creating an electrically "thick" antenna. The bow tie, for example, makes use of the same principle.

Q Can you explain the Doppler effect as it applies to satellites?

A The Doppler effect is a"relative" thing. The frequencies of satellite signals are affected by relative motion because all satellites are constantly moving relative to each other and to you. As a satellite approaches you its downlink frequency increases. As it passes your position and moves away, the frequency decreases.

Let's say that you are listening for a satellite beacon that has a published frequency of 435.700 MHz. That's the frequency you would listen to if you and the satellite were moving at the same speed relative to each other. The satellite is moving thousands of miles per hour faster, however, so you must tune your receiver to a higher frequency as the satellite appears above your

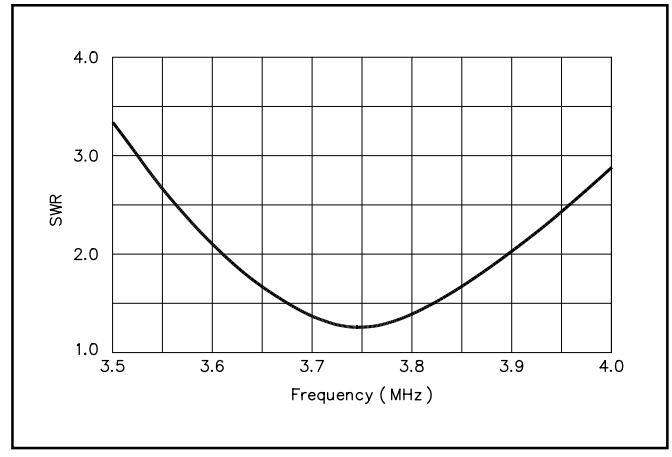


Figure 2—The theoretical SWR versus frequency response on 75 meters for a cage dipole that's 122 feet 6 inches long with a spreader diameter of 6 inches, fed with 50-Ω coax.

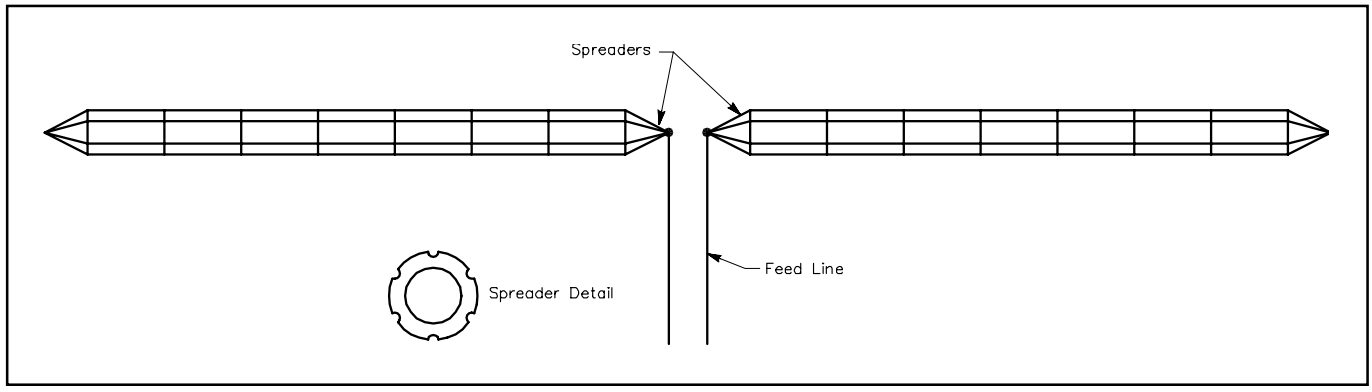


Figure 1—A cage dipole resembles a round birdcage. Circular spreaders can be used to separate the individual wires. The spacing between wires should be 0.02-wavelength or less.

horizon. You'd have to begin listening about 8 kHz higher, or 435.708 MHz. (The Doppler effect is less pronounced, by the way, at lower frequencies.) You'll notice right away that the frequency of the beacon signal is sliding steadily downward. When the satellite is at its closest point relative to your station, directly overhead in this example, you will be receiving its beacon on 435.700 MHz, the published frequency. Enjoy it while you can because the frequency will continue shifting downward! By the time the satellite vanishes below your horizon, you'll be listening at 435.692 MHz.

The Doppler effect is a vivid illustration of the fact that everything is in motion—and we're not just talking about satellites. The Earth rotates on its axis at approximately 1100 MPH. The Earth orbits the Sun at about 67,000 MPH. The sun circles the Milky Way at a speed of 486,000 MPH. And every object in the universe is moving away from every other object as the Universe expands at a constantly accelerating rate. In absolute terms, you're never "standing still!"

Q Randy, KF4PPC, asks, "I'm considering an on-glass VHF antenna for my car. I don't want to drill holes in the car body, nor do I want to risk scratching the finish with a magnetic mount, so an on-glass antenna seems like a decent compromise. What's your opinion?"

A For most applications an on-glass antenna will perform adequately. This is particularly true if you do most of your VHF/UHF mobile operating well within the coverage of a sensitive repeater system. If you think you'll be operating in fringe areas, however, the "compromise" aspects of an on-glass antenna versus a more traditional mobile antenna may be something to consider. (And, by the way, if you use ample car wax and other methods—such as encasing the magnetic base in a plastic bag—a magnetic-mount antenna doesn't have to present a danger to your car's finish.)

An on-glass antenna system functions by passing RF to and from the interior of the vehicle through the window glass. The "secret" of the system is found in the two adhesive plates that you attach to the window, one inside and one outside. With the glass between them they create a capacitor that passes RF.

The most important thing to know about glass-mount antennas is that you must follow the installation procedures to the letter. Read and re-read. Check and double check. You get only one chance to attach the adhesive mounting hardware on both sides of the glass. Once they touch the surface, you are committed to their placement. I cannot stress this point enough. The two halves must match per the instructions and once attached, they can't be moved.

Every installation is different, but I'd suggest that you avoid installing the antenna over embedded heating elements. In addition, there is the issue of passivated glass. Passivation is a process by which tin, copper, magnesium, iron, titanium or gold is applied to the finished glass, or during the manufacture of the glass. Some amateurs report difficulty installing and tuning on-glass antennas that are attached to passivated glass, but others say it isn't a problem.

Q I use an IC-706 MkII on PSK31. I operate the rig in the upper sideband mode (USB) mode, but I wish there was a way to switch in my narrow RTTY filter while in USB. Can this be done?

A Yes, it can. To use narrow filters in the SSB mode, you have to fool the IC-706 into "thinking" that you're selecting a narrow SSB IF filter when you're really switching in a narrower 500 or 250-Hz filter.

With your 706 off, push the **LOCK** and **POWER** buttons together to access the setup menu. Let's assume your 500-Hz filter is installed in filter slot number 1. Select menu item 19 (OPT. FIL 1) and select the filter FL-223. You are effectively telling the radio that you have installed the FL-223, a 1.8 kHz filter, in that position. Of course, that's a lie! When you are operating in the USB mode and press the **FIL** (filter button), the IC-706 will activate whatever filter is in that slot. In this case, it will be a 500-Hz filter.

Still with me?

Once you've activated the narrower filter you'll need to adjust your **IF SHIFT** control to place the PSK31 receive signal within the narrower IF passband. If you're using the PSK31 software center frequency default of 1000 Hz, try setting the **IF SHIFT** control to the 1 o'clock position.

Q I've just installed a Creative Labs AWE64 soundcard in my PC (running *Windows 98*) so that I can send and receive slow-scan TV (SSTV). The performance has been very erratic to say the least. Reception is terrible or nonexistent, and when I transmit I'm told that I only send a brief burst of sound, then nothing. I've looked into every possible problem and I'm at the end of my rope. Can you help?

A Are you sure you've looked into *every* possible problem? The Doctor has seen this gremlin before and the cause is almost always an interrupt (IRQ) conflict within your PC. The AWE64 uses IRQ 5 or 7, with five being the default. If you have any other devices that are using these IRQs, *Windows* will attempt to assign an unused IRQ to the soundcard. That seems reasonable until you realize that the AWE64 is still expecting to use IRQ 5. Do you see what's going on? The AWE64 is attempting to address the processor using IRQ5, but that particular "highway" is already busy. The result is a classic IRQ conflict and some screwy operation to go along with it.

Use the *Windows* "Device Manager" to carefully examine your system. It can list all of the available IRQs and tell you which devices are using them. Then, you can reassign the IRQs as necessary.

Update: The Doctor scores again! A PS-2 mouse has been inadvertently assigned to IRQ 5 and the AWE64 was given IRQ 9. A quick switcheroo and all is well!

Q Eric, WB9PTN, asks, "Would 24-gauge wire be too thin to use for building an HF dipole antenna?"

A No, electrically it works fine. Its impedance characteristics at various heights and frequencies may make such a dipole a little narrowbanded. This means that you may find yourself using your antenna tuner more often than usual.

If stealth is your objective, don't forget to use monofilament fishing line as your "rope" and shirt buttons as your insulators! And if you're installing an antenna outdoors, note that the National Electrical Code specifies at least no. 14 wire for spans less than 150 feet.

Q I changed the video resolution on my shack PC and now, when booting into *Windows*, I get a screen filled with lines. I can't see a thing! Is there any way to fix this?

A This problem is usually caused by setting the display to use a color palette or resolution that cannot be supported by either your video card or monitor. Turn on your PC and listen carefully for a beep, or wait until you see something that says "Starting *Windows 95*" (or *98*). Quickly press your F8 key just once. If you're successful you should see a Windows start-up menu. Select option 3 to enter the so-called "Safe Mode." Once you've fully booted up in Safe Mode, click on Start/Settings/Display, then click on the settings tab. Decrease the desktop area to 640×480 and set the color palette to 256 colors. Almost every video card and monitor in the known universe will support these settings.

Re-boot your computer and you should have a normal display once more. Don't play with your settings again until you've read your video card and monitor manuals thoroughly!

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. QST

By Eric P. Nichols, KL7AJ

The Smell of Radio

It's a given that stockyards, paper mills and perfume have characteristic odors. But ham radio? In the good old days, ham radio was smelly business!

I leaned back in my swivel chair and pondered the sleepy blue-green glow of the spectrum analyzer display that graced the face of my new megabucks HF rig. All that high-tech hardware, however, did nothing but rub my nose in the fact that the bands were absolutely dead. Although close, I wasn't desperate enough to give up and buy a 2-meter radio. I still held the unswerving conviction that nothing of value ever occurred above 30 MHz.

My morbid thoughts were interrupted by the unmistakable heavy-booted footsteps of Mike Nations, KL7OF, as he descended the rickety staircase into my basement shack. "Old Fart," as he was affectionately known on the air, never needed to knock; his visits were, without exception, entertaining, if not productive.

"Mind if I smoke?" were the first words out of his mouth as he invited himself into my den of iniquity, pulling a pack of generic cigarettes out of the inner sanctum of his grubby, tan overalls.

"Shucks, I don't mind if you burst into flames!" I said, turning around to behold my rough-hewn sourdough buddy.

"I can take a hint," he said, as he guiltily returned his cigarettes to his pocket and produced, instead, a can of "terbaccy," thrusting a disgusting wad of the stuff into his bearded jowl.

"I think I'd prefer the smoke," I said, searching the shack frantically for a suitable spittoon.

"You know what's wrong with these modern rigs?" he asked, glaring with transparent disapproval at my new toy.

"Dynamic range?" I ventured, repeating the current lament du jour of the modern, discriminating amateur. I knew, if nothing else, it would impress the old goat long enough to keep him thinking for a while.

Mike waved his hand in a dismissive manner, shaking his head. "No, you're missing it by a Tikchuk mile. The *smell*—it's all wrong."

I turned slowly toward Mike, as if he'd finally lost his marbles. Something told me it was going to be a long afternoon. But, because I wasn't getting a great deal of enjoyment out of the HF bands, I decided to give Mike my undivided attention.

"Regale me," I said.

Mike obliged. "Modern rigs—they just don't smell like radio," he said, reaching for another plug of chaw. "Close your eyes and take a whiff of the air in here. What do you smell?"

I dutifully complied. "An old sourdough in need of his monthly bath," was the first thought that came to mind, but with a great deal of effort, I restrained myself. I knew the man was serious. "Okay," I said at last, my eyes still clamped shut. "A little hot plastic I guess…some from my new radio…some from my old PC. A little warm dust from that baseboard heater…that's about it." I opened my eyes.

"Where's the ozone?" he said, almost demandingly.

"The *ozone?*" I asked, rather baffled. "Last I checked, it was up in the stratosphere somewhere."

"I mean the *smell* of ozone, you toddler!" Mike said, throwing up his hands in disgust and resignation.

I sniffed again. "I don't smell anything…what does ozone smell like, anyway?"

Mike jumped to his feet and slapped his forehead in disbelief. "That's exactly the *point!*" he fumed. "There *is* no ozone in here! You wet-behind-the-ears whippersnappers wouldn't know ozone if you took a bath in it! Real radio makes real ozone—and lots of it!"

I backed away on my swivel chair, ever so slightly. "Ooo…kay…."

A faraway, wistful expression fell over Mike's face as he slowly lowered himself into his seat. "Have you ever heard the winsome crackle of a big electric arc and basked in its awesome blue glow?"

NAW, THE FCC DIDN'T SHUT ME DOWN, IT WAS THE EPA--- THEY COULD SMELL OZONE 2 BLOCKS AWAY!

"Uh, no, not on purpose, anyway," I sputtered. I began to wonder if it was safe to sit too close to the man, for fear of electrocution.

"Even the solder doesn't smell the same, anymore…nope," Mike continued. "We didn't have that wimpy rosin core stuff you yuppies use nowadays. Nope, we just had a big ol' bar of solder and a vat of flux. Plunge that old soldering iron into the vat of flux and fill the room up with smoke. Get so thick you could hardly see…but *oh*! That aroma! Now that was real radio, boy."

"You *did* inhale, didn't you!" I said. It was all beginning to make sense.

"And the hot wax from a blown 'Vitamin Q' capacitor and the sweet smell of a toasted carbon resistor," Mike continued, seemingly oblivious to my presence. "Yep, you never needed test equipment in those days," he said, nodding thoughtfully. He tapped the side of his substantial proboscis. "It was all right in here."

I allowed Mike to carry on for five minutes about the olfactory delights of what he called "real radio." After he reentered the latter months of the twentieth century, he paused long enough for me to get a few words of wisdom in.

"That's all very romantic, Mike—all that smoke and sparks and stuff—but let me ask you just one little question. Did all that fireworks ever actually put a signal on the air?" At that instant, I happened to gaze up at the spectrum analyzer on my $9000 HF radio, which showed nothing but a flat line—as flat as an EKG on a 10-day-old corpse.

Something told me it was the wrong question.

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By Jonie Craig, KF6OHT

Life on the PTT

Hamming isn't always about conversations with distant voices. It also enriches life much closer to home.

Tom talks in code. He says things like, "Russ, KA6QIZ, just came back from the Palm Springs film festival," or "Dana, JSW, tended bar last night." As I listened to him I thought, *what in heaven's name is he talking about?*

That was then.

Now, my eyes have been opened. Today, I, too, talk in code.

The Beginning

About 18 months ago Tom, KB6ESH, began encouraging Mary (my friend and Tom's significant other) to become a ham radio operator. If only Mary also had a radio, he could call her as necessary—and she could do the same.

When Mary said she had signed up for the "E-Z Ham" course at the local yacht club, where lots of marine-type folk get licensed for Amateur Radio, I offered to take it with her. We signed up, hoping to get certified by the FCC.

Mary and I paid our fees, cleared our calendars, swept the cobwebs from our brains and braced ourselves for class.

There were about 15 of us—running the spectrum of knowledge from knowing how to turn on a light switch, to the excruciating intimate details of how that light switch actually worked. Immediately, Mary and I knew we would have to pay attention because we both leaned closer to that part about knowing how to flip the switch on and off.

Oh my goodness: Tropospheric ducting; Yagi antennas; **J**-Poles; broadcast bands; single-band vs. dual band; ohmmeters—all unfamiliar terms, requiring intense concentration as our expanding new synaptic pathways creaked and groaned! My brain screamed with this mental workout and, by the look on Mary's face, she was also struggling through the conceptual swampland of electronics.

After the first Sunday class we came home, tried to corral all those untamed words and concepts, read the practice tests, looked over the book and drilled each other—feeling more and more like students. We even put in the computer disks the instructor gave us, stared at the monitor, and did the tests we found there… information overload, for sure.

Exam Day

The next, and last, Sunday came all too quickly. At three o'clock, we knew we would face the dragon in those tests and either pass or fail. With "passing" as the goal (who cared by how much), we concentrated on remembering all these strange words and unfamiliar ideas, overworking our brains, demanding more, more, more!

Our teacher had patience, probably his greatest quality, as he took us newbies by the hand, guiding us through the electronic information maze, arming us with weapons of knowledge for the looming tests.

The proctors arrived, approaching their tasks and responsibilities with great soberness: No chitchat; no fooling around. And we responded as students universally respond: We were scared to death. By now, did we know enough? The tests appeared in front of us. We hunkered down and got to work. Let's see, I thought…which antenna worked best with which type of band? How did that "damned D layer" fit into things? I'm no electronic engineer. What was I doing here anyway?

STEVE HOLLEN, N6PHX

Once I got over my immediate fear that everything I ever knew or studied had leaked out of my head, I realized I was looking at a question I knew. With one question under my belt, I plodded on through the rest of the test. There were two tests to pass for the license we needed, and like the Cowardly Lion, we did our best to put on an air of confidence, pretending we really did know our stuff.

The first test actually turned out to be easy, building our sense of preparedness for the second, more difficult one. It dawned on us that we really had learned something. Now, we took every minute to try and pull reluctant answers out of our battered and bruised brains, already tired from the onslaught of this strange new world and we finally finished.

In a few minutes, we learned that we got a passing grade and we looked at each other with a sigh of both pride and relief. Whew! That dragon was now a purring kitty cat, and the open door beckoned us to begin our journey as official ham radio operators, sanctioned by the FCC.

Thank heaven for the ease of Internet access, because we found our licenses on the Web as soon as they were recorded, and we found our call signs, signifying our new "stations" in life. We could officially talk on the radio as full-fledged hams. We got our radios, and Tom's delight at our success beamed through his smile.

Community of the Airwaves

I have ample opportunity to be in the car during my commute. I listen in as others chat about their day or as they present and solve problems—mostly electronic or computer-related. I began learning more, even understanding some of that technical talk *because* of the ham class. And I thought I'd never use it.

Soon, I found myself talking like Tom—in that previously unknown code. Russ runs the morning net, six days a week, much to the admiration of all of us. Not an easy thing task, but one that Russ manages with aplomb.

As time goes by, each person's life takes on greater complexity, seducing you into knowing them better, whether you want to

or not. As you get better acquainted with your ham buddies, pictures form in your mind from what you hear in their voices. This leads to revelations.

Revelations are interesting. Just what *does* Cal look like? Does *she* have blonde hair, as you assumed she did? Is *he* tall, dark, and handsome? Short, fat, and more ordinary? What's the face behind that Shakespearean voice? And of course, there's the apprehension of what they'll think about the face behind *your* voice.

After several months on the air, I finally showed up for one of the biweekly breakfasts attended by many of those on the net and started matching names and voices to faces. What a trip. Wow! He's so tall and his voice is so little. He's gray, but his voice is dark and curly. She is much younger than she sounds. All are reminders not to judge a book by its cover, and not to judge a person by a voice.

Knowing my friends are out there is also a safety net and, when I need help, I know someone will answer. Just the other day on the way to work, while talking to several ham buddies—*bam*!—someone rear-ended me. Traffic had come to a rather sudden stop, and all of us managed to stop without hitting the car in front of us—except the car behind me. As I tried to regain my composure, Mary reminded me that I was far from alone in my car. My ham buddies were right there with me, waiting to hear how I was, ready to jump into their cars and come and get me if I needed them.

What a welcome sense of security, knowing I have a network of people, located in various parts of the Los Angeles basin who know enough about me to care what happens. I wasn't hurt physically, though I was discombobulated while figuring that out.

I now have a wider circle of people, many whom I call "friend" and about whom I've learned much since I first tentatively started actually talking on the air. I even joined that yacht club where being a ham is greeted with understanding and appreciation for the tortuous path it took getting there.

When I get my new electronic toy, a dual-band radio, there is even a greater depth to which I can go, because then, I can talk to the world.

Steve, N6PHX, often has long-distance connections because he keeps an ear tuned to his radio. One evening he had a rather nice conversation with someone in St Petersburg, testifying to the wonderful and weird propagation of radio waves as they bounce off the ionosphere. Heck, I even understand that statement—mostly.

Slowly, I am meeting almost everyone on the net. It's been well over a year since I got my license and I talk with many of these people almost every day.

Russ still runs it, continuing to amaze us with his eternal optimism. Tom, is truly kind and gentle and he doesn't know how to say "no" to anyone who needs him.

Dee, KB6YSM, is a lady I'm proud to call a friend.

Those in the middle of life's challenges find support and encouragement on the net and, those with good news, find a willing audience for life's delights.

Mary, KF6OHU, and I enjoy the privileges that come with our license.

Each morning the curtain rises on today's episode of the Oatmeal Net at 7:30 . Those of us on the road earlier than 7:30 are called the "Dawn Patrol." Various hams check in during my homeward trek.

Who's out there? Let's find out.

All it takes is depressing the PTT (push-to-talk) button, saying my call sign, and waiting to hear who shows up to play.

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QST

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.

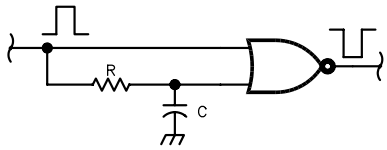
Headquarters and W1AW are closed on New Year's Day, President's Day, Good Friday, Memorial Day, Independence Day, Labor Day, Thanksgiving and the following Friday, and Christmas Day.

By H. Ward Silver, N0AX

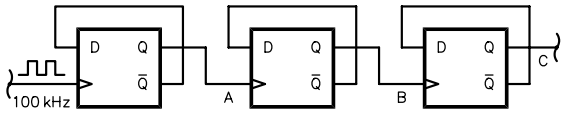
Test Your Knowledge!

Here's a quiz for you digital bit-wranglers. Put down those logic probes and source code listings and get to work!

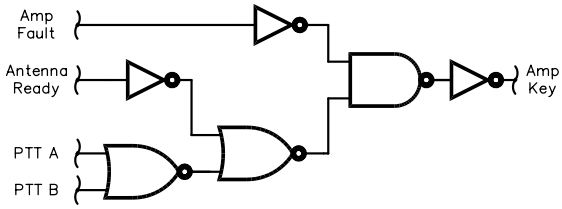
1. The function of R and C is to…
a. stretch the output pulse
b. shrink the output pulse
c. filter RFI on the input line
d. terminate the input line



2. Calculate the frequency of the pulse train at points A, B, and C.



3. The following circuit is a two-rig amplifier keying circuit with protective interlocks from an antenna switch and an amplifier fault detector output circuit. Construct the truth table for the Amp Key output signal—some of the input states have been specified to get you started.



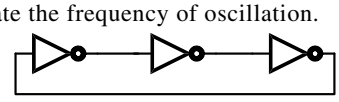
PTT A	PTT B	Antenna Ready	Amp Fault	Amp Key
0	0	0	0	
1	0	0	0	
0	1	0	0	
1	1	0	0	
0	0	1	0	
1	0	1	0	
			0	
			0	
			1	

4. In the amplifier keying circuit above, which input(s) serve(s) as the "master safety"?

5. If radio B was not going to be used, would you set the PTT B input to the logic 0 or logic 1 state to allow the circuit to function with one radio?

6. If the Antenna Ready signal was not going to be used, would you set the Antenna Ready input to the logic 0 or logic 1 state to allow the circuit to function?

7. If the propagation through each gate of the ring oscillator below is 10ns, calculate the frequency of oscillation.



8. If a 10-bit analog-to-digital converter has an input range of 0 to 1 V, how much voltage does the least-significant bit represent?

9. With a clock frequency of 10 MHz and a routine of 25 instructions that take an average of three clock cycles each to execute, how often can the routine run?

10. In problem 3, if the NOR gate connected to the PTT inputs was replaced with an exclusive-NOR gate, what change in circuit operation would result?

Total Your Score!

There are a total of 10 possible answers in this quiz. Give yourself one point for each correct answer.

8—10	You're on a "logic high!"
4—7	Good score for a tricky test.
1—3	You need a digital refresher course

Answers

1. a—By holding the voltage at the capacitor up longer than at the unfiltered input, the NOR gate's output is held low longer. It depends on the logic family and where the 0-to-1 transition occurs, but the length of delay is approximately one RC-time constant.
2. fA = 50 kHz, fB = 25 kHz, fC = 12.5 kHz. This is a "ripple counter" circuit.
3. Here is the completed truth table:

PTT A	PTT B	Antenna Ready	Amp Fault	Amp Key
0	0	0	0	0
1	0	0	0	0
0	1	0	0	0
1	1	0	0	0
0	0	1	0	0
1	0	1	0	1
0	1	1	0	1
1	1	1	0	1
0	0	0	1	0
1	0	0	1	0
0	1	0	1	0
1	1	0	1	0
0	0	1	1	0
1	0	1	1	1
0	1	1	1	1
1	1	1	1	1

4. Either Antenna Ready or Amp Fault can serve as a "master safety" to prevent the Amp Key signal from becoming a logic 1.
5. Consider this one a "freebie." The unused PTT input can be tied to *either* logic 0 or logic 1 and the circuit will behave normally. Just be sure not to leave the input open and susceptible to logic instability or RFI.
6. Set Antenna Ready to 1 to allow the rest of the circuit to function without that signal.
7. The circuit will oscillate at 33.3 MHz because the total delay of a signal through the loop is 3 x 10 ns = 30 ns. The inverse of 30 ns is 33.3 MHz. This is how experimental logic design speed is measured—by constructing a ring oscillator of inverters and measuring its output frequency.
8. 10 bits of resolution divides the range into 2^{10} or 1024 parts. If the input range is 1 V, each LSB represents .0009766 V.
9. Each instruction averages 300 ns to complete and there are 25 instructions for a total of 7500 ns or 7.5 µsec for each repetition of the routine.
10. The Amp Key output could only be a logic 1 when either, but not both, of the PTT inputs was at logic 1.

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See Feedback in November 1999 *QST*.

By Steve Ford, WB8IMY

52.525

There is more to the Magic Band than SSB or CW.

The leap of faith took place one steamy June afternoon when 6 meters was pipelining RF from the Midwest. The band had been open for about an hour and I was mining contacts on SSB between 50.125 and 50.225 MHz. After a few sweeps through the frequencies I had managed to work everyone I could find. Switching to CW, I searched below 50.100 MHz. There was nothing to hear but a couple of beacons crying out in the wilderness.

"Shall we go to FM?" I inquired of my cat, who had taken temporary shelter behind my junk box. Felix Domesticus yawned and stretched as if to reply, "Yeah. Whatever."

"Gee, I don't know. I mean, I worked a little 6-meter FM back in the 70s when I was wearing those awful bell-bottom pants and platform shoes, but we're on the verge of a new century. Times have changed. Even the Bee Gees can't hit those high notes anymore." The cat was no longer listening, having retired to the hallway to cough up a hairball.

"I haven't frequency modulated 6-meter RF in more than 20 years. And what would my SSB buddies say?"

With a trembling index finger I repeatedly stabbed the **MODE** button on my transceiver until the letters **FM** appeared in the display. The speaker erupted with a roar of noise. I gave the VFO knob my best Wheel of Fortune spin, watching the digits flash by. ("Come on! Big signals! Big signals!") Finally, I settled down on the national 6-meter FM simplex frequency, 52.525 MHz.

I expected this to be a brief, unexciting visit at best. I was mistaken.

Not a Local

There was a loud signal holding court on the frequency. The operator was discussing new frequencies he intended to program into his scanner.

"Oh boy," I muttered. "Another local." There would be no DXing here. I busied myself by filling out a few more QSL cards while halfheartedly listening to the conversation.

"…and this afternoon I was monitoring Fort Wayne departure for a while."

Fort Wayne? As in *Indiana?*

I lunged at the microphone and waited for my opportunity to pounce. When he ended his transmission I blurted, "WB8IMY/1 in central Connecticut."

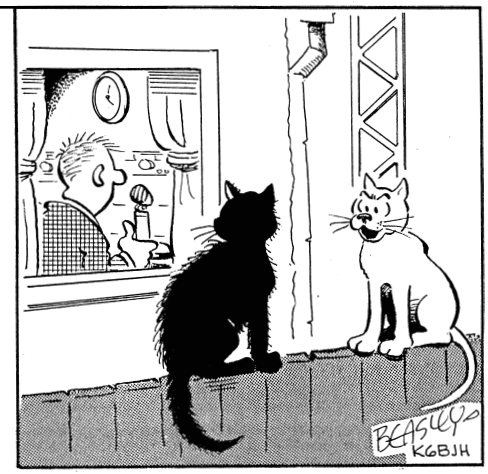
There was a long pause. Did the band suddenly die? Sporadic E can be fickle that way.

"Who? Where?" he stammered his reply. "In central Connecticut? You've got to be kidding." I glanced at the S meter. His signal was blasting in at 10 dB over S9.

"Yes! I'm WB8IMY in Wallingford, Connecticut. Fox-Nancy 31!" (Always get your grid square out there right away. You may not get another chance—especially on FM.)

"Wow! This is WB9YFL in Fort Wayne!"

We enjoyed a brief exchange…and then the "capture contest" began. Some stations tried to call WB9YFL. Others tried to call me. RF piled atop RF and my FM receiver responded as FM receivers usually do—it allowed me to hear whichever signal was capable of capturing it at a given moment. The result could best be characterized as hell on a Ferris wheel.



"WB8…" squeeeeeeeee! "This is…" squeeeeeeee! "…near Nashville…" squeeeeeeee!

If you don't believe me, go to the Amateur Radio section of my Web site at **http://home.att.net/~wb8imy/home.htm** and download a 6-meter FM audio clip of a capture contest in action.

RF Food Fight

Despite the chaos I managed to work a number of stations. All it takes is a little patience and a quick finger on the microphone push-to-talk switch. At one point there were so many stations calling that I announced my intention to move down to 52.490 MHz. I did—and they followed, continuing the barroom brawl 35 kHz lower. Hey, why not spread the fun around?

For the next hour I chatted with FM operators from as far away as Iowa and Minnesota. Many of these hams were newly licensed and enjoying their first tastes of 6-meter DX. They were running 6-meter FM mobiles, converted commercial transceivers and even H-Ts.

It was a party atmosphere of conversation and glorious cacophony. I haven't had so much fun on FM since my high school days when we drove the Old Timers bonkers by discussing the nuances of rock n' roll for hours on 146.52 MHz. But that is another tale for another time.

And the Moral of the Story Is…?

The moral is the same one you've heard before: Always be prepared to try something new. By simply pressing the **MODE** switch on your multimode 6-meter WundaRadio you can enrich your hamming experience. SSB and CW are still the modes of choice on 6 meters if you're a rabid grid and country hunter like me, but a little FM may be just what you need to recharge your jaded neurons. You might pick up a couple of new grid squares in the bargain. Who knows? You may even be tempted to explore other modes on the Magic Band. AMers lurk on 50.400 MHz, and you may run into PSK31 folks around 50.300 MHz. I've even heard packet bursts and SSTV when the band is open.

If your 6-meter rig is FM only and you're new to the band, make sure you listen often. Sporadic E openings tend to favor the summer months, but they can occur in the fall and winter as well. (They call it "sporadic" for a reason, after all.) Park your radio on 52.525 MHz and turn up the squelch so the noise doesn't drill holes in your skull. When the band pops open, you'll know right away. Of course, it also helps to pick up the microphone and call "CQ" from time to time!

And if we're lucky we may even see a fair amount of transatlantic and transpacific DX this winter. Granted, you get much more DX bang for the buck using CW or SSB, but FM will get its fair share of the 6-meter globe-hopping fun!

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By L. B. Cebik, W4RNL

17-15-12 and Simple

This rotatable dipole offers uniform performance on three fascinating HF bands.

A number of casual operators have expressed interest in the 17-, 15-, and 12-meter bands as favorites for operating. Interference is less, in general, and the "atmosphere" seems relatively friendly. The smaller population also makes them easier for the less experienced operator to use.

A common thread of conversations about antennas for these bands runs something like this: The lobes of the 135-foot doublet seem to prevent full coverage of all directions. Even though it has somewhat more gain near the ends, the lobes are narrow with deep nulls between.

As Figure 1 demonstrates, these problems are correctly diagnosed. Compared to a dipole cut for 17 meters, the pattern for the doublet on 17 has many thin fingers. On 15 and 12, there will be more fingers, and thinner.

However, the typical antenna described as being just for these bands is usually a complex beam of interlaced elements. Construction is often tricky. A commercial version is expensive. So the conversation next poses this question: Is there something simpler, less expensive, and fuller in beamwidth coverage that might be used?

The answer is "yes." Unfortunately, the idea of using drooping dipoles fed with one coax turns out not to be the most desirable option. The closeness of frequency of the three bands makes the interaction quite strong, even with sizable angles between wires. Hence, feeding one antenna array with a single coax cable may not be the easiest route to success. It can be done with careful pruning, but there may be an easier way.

A Multiband Rotatable Dipole

We can use a fixed or a rotatable dipole for 17 meters fed with parallel transmission line to an antenna tuner (the one used with the doublet). By cutting the dipole for 17 meters, the antenna will still be only about $^2/_3$ wavelength at 12 meters. Hence, the pattern will not change its shape from the dipole's figure-8 (in free space) by enough to matter as we raise the frequency through 21 and stop at 24.99 MHz.

Figure 2 compares the patterns for a 17-meter dipole in free space in the three desired bands. Operationally, the differences in patterns would not be detectable.

One important feature will change: the feed point impedance. If resonated in the middle of 17 meters, the impedance will be about 72 Ω. On 15 meters, this same antenna will show a feed point impedance of about 130 + j200 Ω. On 12 meters, the impedance will be in the neighborhood of 270 + j500 Ω. The exact reactance value will vary with the wire size. 50-Ω SWR values can get as high as 17:1 to 20:1.

The upshot is this: If the antenna is to be used on all three bands, it needs to be fed with parallel transmission line and an antenna tuner. This means using 450-Ω ladder line or 300-Ω twin lead. Using this approach also frees us from having to use ultra-precision in adjusting the length of the dipole.

If the antenna is placed at least $^1/_2$ wavelength up in the air, performance will be excellent broadside to the antenna. A half wavelength at 17 meters is only about 27 feet, so anything above that level is a bonus. The beamwidth of the dipole pattern is wide enough to make pointing noncritical.

A 30-foot TV mast might be pressed into duty for this antenna. The metal mast will require some attention to dressing the parallel feed line down to the shack to avoid unbalancing influences. The idea is to use insulators to keep the transmission line at least

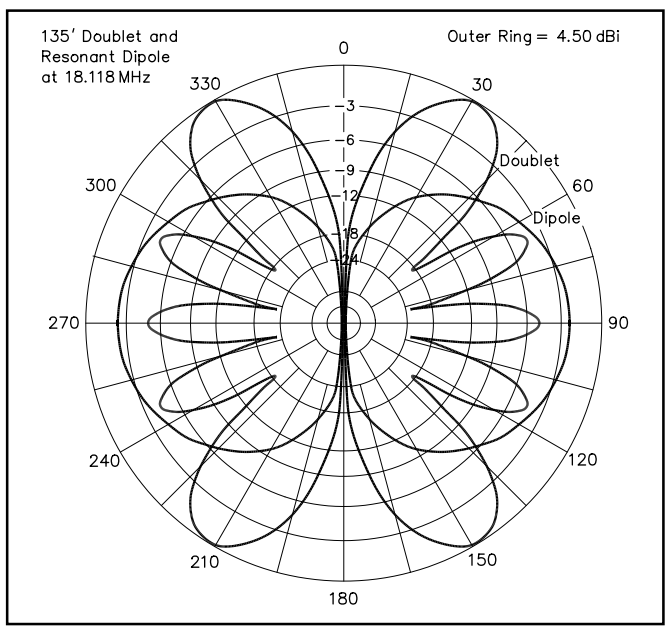

Figure 1—Compare the free-space azimuth patterns for a 135-foot wire doublet and a resonant dipole, both operating at 18.118 MHz (17 meters). Notice the "fingers" (lobes) on the doublet.

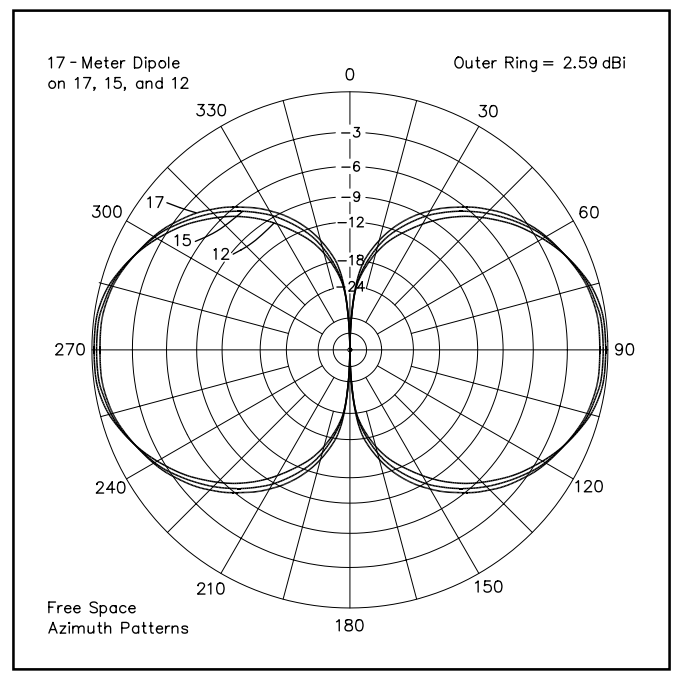

Figure 2—Free-space azimuth patterns for a 17-meter dipole operated at 17, 15, and 12 meters.

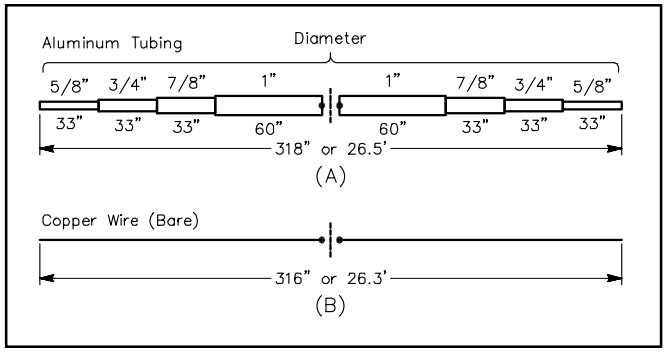

Figure 3—You can make the 17-meter dipole out of various lengths of aluminum tubing (A), or craft it from two pieces of copper wire (B).

2 inches away from the metal mast. The mast might be set up to turn with a rotator or by hand—what used to be called the Armstrong method! A short piece of strong tubing mounted to the mast with a plate and **U**-bolts would make room for a removable rod or thinner pipe to ease the turning. The system described here is designed to let you store the turning pipe when not in use, for family safety. Other methods both simple and complex can be used.

Two Construction Approaches

The system we've been discussing calls for an antenna that can be supported at the center at the mast top. See Figure 3. The sketch shows two ways (among many) to make up the dipole. You can make use of standard aluminum tubing available from places like Texas Towers and others. It comes in 6-foot lengths and the sizes nest closely in each other. Hence, little work is necessary to lock smaller sections inside larger ones. How you put the elements

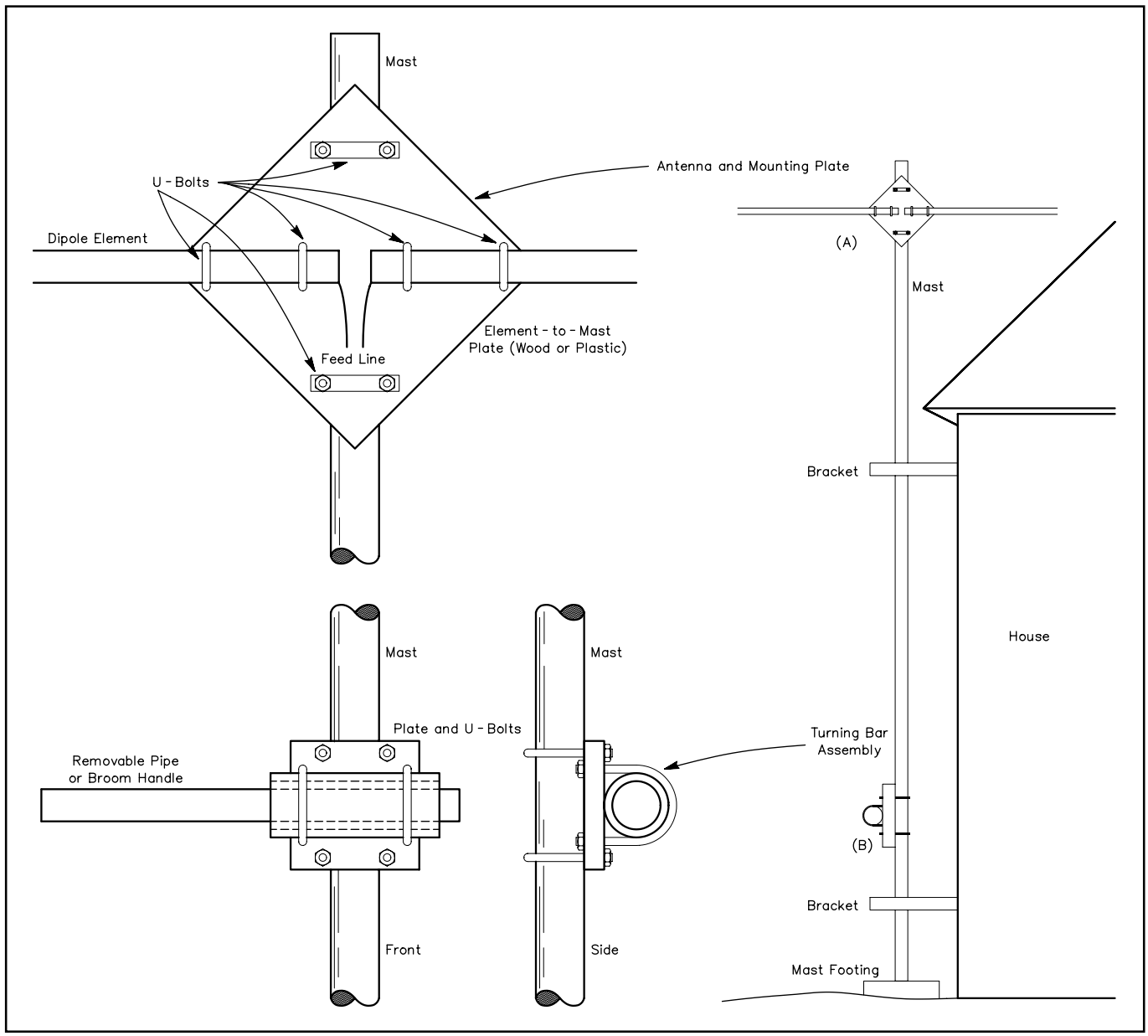

Figure 4—Possible construction options for the 17-meter aluminum dipole fed with parallel feed line. You can attach the dipole elements and the support mast to a wood "plate" with stainless steel U-bolts (A). You can use other plate material such as Lexan, but *do not* use metal. The parallel feed line can be attached to the dipole elements with sheet metal screws or any other secure method. If you can install a mast that is tall enough to clear your roof, for example, you could simply add a simply "turning bar" (B) that will allow you to rotate the antenna as necessary.

together is up to you. You can use hose clamps, bolts, sheet metal screws or rivets. Pick the one most easily implemented, but do not skimp on the effort to make the junctions secure.

The tubing lengths in the diagram have a plan. The 33-inch exposed sections are all 36 inches long, with a 3-inch insertion length into the next larger tube section. This feature allows the builder to use a single 6-foot length of each size (except the 1-inch-diameter tubing)—and 6 feet is the standard shipping length. The 1-inch sections need two 6-foot tubes, with a bit left over. (A short section of fiberglass rod or tubing at the center of the 1-inch sections and running at least the length of the plywood plate can keep the elements aligned and strengthen the mounting.) Even with shipping charges, the materials for this rotatable version of the 3-band dipole are inexpensive.

The center plate can be a 1 to 1.5 feet per edge square of exterior grade plywood (exterior on both sides). Orient the plate as a diamond. Several coats of spar varnish will weather-protect the plate. It pays to use an exterior grade fill on the plywood edges before varnishing. **U**-bolts hold the element to the plate (you'll need a total of four: two for each side) and the plate to the mast (one **U**-bolt top and bottom). There are sources among the *QST* advertisers for **U**-bolt assemblies designed specifically for antenna work. Make sure to buy stainless steel **U** bolts for durability.

Some of the possible construction ideas appear in Figure 4. Use any kind of insulated standoffs to space the parallel transmission line away from the mast. Then get plenty of help to raise things into position, thinking safety all the while. A 26.5-foot antenna can be somewhat ungainly!

The fixed wire version can be used, although getting it to rotate is more difficult. However, bamboo may still be available in some areas. Otherwise, you'll have to live with a fixed wire, so be sure the antenna is broadside to your favorite parts of the world.

A Versatile Antenna

Although designed for 17 to 12 meters, the antenna can be useful up to 10 meters and down to 30 meters. At these frequencies, the tuner might have some difficulty in achieving a match, but changing the parallel line length slightly may present the tuner with values of reactance it can more easily handle.

A rotatable dipole can be a very effective antenna, since it reduces QRM off the sides. Its broad beamwidth makes orientation easy. On many days, it is only necessary to reorient the antenna in late morning and again in late afternoon. (Of course, on other days, signals may come from anywhere, and the run to the antenna for a change of direction can be counted as good exercise!) The simplicity of construction, inexpensive materials, and ease of maintenance go a long way to compensate for lower gain relative to complex, expensive Yagis. Parallel feed line keeps losses low and places the matching problem next to the rig, where it can be handled with ease.

If you already have your towers and beams, by all means use them. But for the casual operator who enjoys a ragchew on the upper bands, or the pursuit of low-power (QRP) contacts with less interference, a rotatable dipole for 17-15-12 meters may be just the ticket.

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New Products

MINIATURE KEY/KEYERS FROM PADDLETTE

◊ Paddlette announces the addition of two new products—The KP-1 and KP-3 iambic key/electronic keyer combinations.

The KP-1 is a Paddlette BP key mated to an Embedded Research TiCK keyer. The completely integrated paddle and keyer system measures approximately $1^1/_4 \times 2 \times 1^1/_2$ inches and weighs just 1.7 ounces. A single pushbutton is used in conjunction with simple Morse commands to control the various operations. You can vary the sending speed, activate the tune feature, switch the paddle sense, turn the built-in piezo sounder sidetone generator on or off, select a straight key mode and toggle between iambic A or B operation.

The KP-3 is physically identical to the KP-1, but also includes two 50-character message memories and a "beacon" mode that can continuously send the contents of either memory.

The keyers are powered by a 200-mA/h 3-V lithium cell. The manufacturer estimates battery life for the average user will exceed one year. A $1^1/_2 \times 1^1/_2$ inch magnetic pad is bonded to the underside of the enclosure and mating adhesive-backed magnetic pads are furnished for securing the key to your operating bench. A 3.5 mm jack is provided for connecting a keying line to your transmitter or receiver. A "straight key adapter" is also supplied.

An optional knee mount, perfect for mobile or portable operation, is also available. A magnetic surface on the mount makes it easy to attach or remove the paddle/keyer for alternative applications.

Price: KP-1, $72; KP-1 with knee mount, $79.75. KP-3, $82; KP-3 with knee mount, $89.75. Shipping and handling by First Class mail, $3.75. Paddlette Co, PO Box 6036, Edmonds, WA 98026; **bham379627@aol.com**; **http://home.att.net/~goodroe/paddlette**.

MACDOPPLERPRO SATELLITE TRACKING SOFTWARE FOR THE MACINTOSH

◊ Dog Park Software Ltd offers a full-featured satellite tracking program for the Macintosh user.

MacDopplerPRO v1.0.1 tracks up to 16 satellites simultaneously. There are separate display windows for the map, the satellite list and the radio/rotator control.

The "Map" window contains a realistic full color rendering of the earth with satellite footprints and paths superimposed. Solar illumination is also represented. PowerPC users can view this as a full 3D projection. You can select from viewing positions of above the satellite or above the site location. A "camera position" feature allows you to view the globe from other angles as well.

The "Track List" window provides a table of upcoming satellite passes in order of occurrence. Columns include the time, the maximum elevation, the current azimuth and elevation, latitude and longitude, altitude and range.

The "Controls" window shows the selected satellite's location, antenna direction, time, frequency and mode information. Automatic antenna aiming, Doppler compensation and a slider-style frequency tuning control are possible with certain rotator controls and computer controllable radios.

System requirements are an Apple Macintosh II or faster (some features are only supported when using the PowerPC), 1.5 MB of RAM (over and above the OS), *System 7.6.1* or later (*MacOS 8* required for the frequency slider to work) and FAT binary.

MacDopplerPRO v1.0.1 is available through AMSAT. Price: AMSAT members, $65; nonmembers, $75. For additional information contact Dog Park Software Ltd, 8 Cliffcrest Dr, Toronto Ontraio, Canada M1M 2K2; **dogpark@interlog.com**; **http://www.interlog.com/~dogpark/home.html**.

Next New Product

Edited by **Joe Bottiglieri, AA1GW** • Assistant Technical Editor

The ICOM IC-2800H Dual-Band FM Transceiver

Reviewed by Joe Carcia, NJ1Q
W1AW Station Manager

I must admit that the first aspect of the IC-2800H that caught my attention was not which bands it covered or whether it would fit in the space available in my pickup. Just like nearly everyone else who sees this unit for the first time, I was mesmerized by its TV screen style display.

Several of the recently released transceivers in ICOM's HF product line feature displays that conform to the familiar proportions of a typical television or monitor screen—but these use the more conventional LCD arrangements. Information is represented by a combination of activated monochromatic segments on a contrasting background.

The IC-2800H is the first Amateur Radio transceiver to use a TFT color LCD screen—essentially identical to those found on pocket-sized color TVs. The result is a new level of display flexibility—any color, any shape, anywhere in the window. A setting in the programming menu allows you to select from several different color schemes. You can even plug in an external NTSC video source, such as a camcorder, VCR or ATV receiver, and use the display as a color video monitor screen.

But Wait—It's a Radio Too!

Before your mind wonders off to dream up alternative applications for the display, let's have a closer look at the radio itself.

The IC-2800H is a dual-band 2-meter/70-cm FM mobile transceiver. Highlights include 99 regular memories per band, alphanumeric tagging, expanded VHF receive, remote control from the microphone, four power output settings, CTCSS encode and decode, tone scan, twin band scopes, 14 DTMF memories and 1200/9600 bps packet capability.

Add to this list "true" dual band operation. There are separate receivers for the VHF and UHF bands with two independent sets of controls. You can transceive on one band while you monitor activity on the other—or even operate crossband full duplex. The radio is incapable, however, of simultaneously receiving two signals within the same band (ie VHF/VHF or UHF/UHF operation).

Installation

Unlike similar FM mobiles that are delivered as an integrated chassis/display unit and offer a separation kit as an optional accessory, the IC-2800H consists of two distinct components: the chassis and the controller/display unit. The controller/display does not snap on to the chassis. Individual head and chassis mounting brackets and an 11.5-foot interconnection cable are provided.

The control head is a bit taller than the faceplate portions of most mobile FM transceivers, primarily due to the 3-inch diagonally measured display screen. A speaker is mounted inside—the speaker grill is on the back. The interconnection cable snaps into an RJ12 jack in a recess in the back of the head. An RCA jack, for plugging in an external video source, is located on the right side.

The chassis is essentially a hollowed-out block of cast aluminum with a good measure of fin area and a sheet metal cover on the bottom. The rear panel has a chassis mounted SO-239 antenna connector, two 3.5 mm external speaker jacks and a pigtail with a conventional T-type dc power connector. A cooling fan forces air into the back of the enclosure and out through vents in the front. This cabinet looks *plenty* rugged.

The front panel of the chassis contains an RJ45 microphone jack, an RJ12 jack for the control head interconnection cable and a 6-pin mini-DIN packet data connector.

Mobile installation of this transceiver is fairly straightforward—but there are some limitations. Since the microphone cable plugs into the chassis, you'll need to position it within mike cord distance of your operating position—about 4 feet or so.

With the included mike wiring, chassis mounting options are probably restricted to under the dash or beneath or between the front seats. While this is fine for my pickup truck, if you desire more flexibility (trunk mounting for example), you may need to purchase optional extension cables for the microphone and/or interconnect cable. An optional 23-foot dc power cable is also available—the included dc cable is about 10 feet long.

The IC-2800H's mounting system makes it attractive to those who want to use one radio in a variety of applications—mobile, base and portable for example. Since all the cabling, except the antenna connection, uses either plugs or telephone-type connectors, it's fast and easy to unhook the wiring and pull out the components. The provided chassis bracket secures with four screws, but an optional quick-release bracket is also available. The control head fastens to its bracket using a single screw with a large knurled head. Loosen the screw, unsnap the RJ12 connector, and the remote control head is free.

The Remote Controller

The control head contains the center-mounted screen, 6 knobs and 10 buttons. The areas on either side have matching sets of controls. The volume, squelch and encoder knobs for each band are positioned along the outer edges of the front panel. A

Bottom Line

The IC-2800H combines state of the art dual-band FM communications capabilities with cutting-edge display technology. Its ability to serve as a monitor screen for externally generated images will certainly provide the motivation for interesting alternative applications.

Table 1
ICOM IC-2800H, serial number 01357

Manufacturer's Specifications	*Measured in ARRL Lab*
Frequency Coverage: Receive, 118-174 MHz, 430-450 MHz; transmit, 144-148 MHz, 430-450 MHz.	Receive and transmit, as specified.
Power requirements: 11.7-15.9 V dc; receive, 1.8 A; transmit, 12.0 A (max, high power).	Receive, 1.2 A (max volume, no signal); transmit, 8.9 A, tested at 13.8 V.
Size (hwd): main unit, 1.6x5.5x6.5 inches; weight, 2.6 pounds; remote controller, 2.8x5.5x1.3 inches; weight, 10.2 ounces.	
Receiver	*Receiver Dynamic Testing*
Sensitivity: 12 dB SINAD, 0.16 μV.	FM, 12 dB SINAD, VHF and UHF, 0.14 μV. AM, 10 dB S+N/N, 120 MHz, 0.5 μV.
Two-tone, third-order IMD dynamic range: Not specified.	20 kHz offset from 146 MHz, 68 dB*, 10 MHz offset from 146 MHz, 88 dB; 20 kHz offset from 440 MHz, 67 dB*, 10 MHz offset from 440 MHz, 74 dB.
Adjacent-channel rejection: Not specified.	20 kHz offset from 146 MHz, 68 dB; 20 kHz offset from 440 MHz, 67 dB.
Spurious response: 60 dB.	IF rejection, VHF, 129 dB, UHF, 122 dB; image rejection, VHF, 69 dB; UHF, 80 dB.
Squelch sensitivity: 0.13 μV.	At threshold, VHF and UHF, 0.06 μV.
Audio output: 2.4 W at 10% THD into 8 Ω.	2.8 W at 8% THD[1] into 8Ω.
Transmitter	*Transmitter Dynamic Testing*
Power Output: (H / M/ L), VHF, 50 W / 20 W / 10 W / 5 W; UHF, 35 W / 20 W / 10 W / 5 W.	146 MHz, 50 W / 18 W / 8.7 W / 4.3 W; 440 MHz, 36 W / 18 W / 9.3 W / 4.3 W.
Spurious signal and harmonic suppression: 60 dB.	VHF, 70 dB; UHF, 64 dB. Meets FCC requirements.
Transmit-receive turnaround time (PTT release to 50% of full audio output): Not specified.	Squelch on, S9 signal, VHF and UHF, 210 ms.
Receive-transmit turnaround time ("tx delay"): Not specified.	VHF, 150 ms; UHF, 200 ms.
Bit-error rate (BER), 9600-baud: Not specified.	146 MHz: Receiver: BER at 12-dB SINAD, 2.5×10^{-3}; BER at 16 dB SINAD, 2.7×10^{-4}; BER at –50 dBm, $<1.0\times10^{-5}$; transmitter: BER at 12-dB SINAD, 2.6×10^{-3}; BER at 12-dB SINAD + 30 dB, 3.1×10^{-4}. 440 MHz: Receiver: BER at 12-dB SINAD, 3.1×10^{-3}; BER at 16 dB SINAD, 4.2×10^{-4}; BER at –50 dBm, $<1.0\times10^{-5}$; transmitter: BER at 12-dB SINAD, 3.6×10^{-3}; BER at 12-dB SINAD + 30 dB, 6.9×10^{-4}.

*Measurement was noise limited at the value indicated.
[1]With the steps in the volume control, 10% THD could not be produced; the next higher step resulted in 12% THD.

column of four "soft" control keys, mainly for the VHF band, is situated along the left edge of the screen; a similar set for the UHF band is to the right.

Soft key assignments change under various programming conditions. The corresponding labels appear next to them in the display window. As with most late-model ICOM radios, no function button is required to activate the secondary key operations shown on the labels. Press and hold the button for a couple of seconds and the second item is accessed.

The two remaining front panel buttons are located at the bottom edge of the controller. A **CHG/L** key, for toggling between the two sets of main assignments for the soft keys (or to lock the keys), is on the left. A **POWER** on/off key is on the right.

The relatively large front panel allows for generous spacing between the knobs and buttons. This layout, the separate control sets for each band and the electronic key labels make the IC-2800H reasonably easy to operate even while mobile—particularly at night. I did find the factory default settings for the display a bit too bright for nighttime mobile use, but a menu setting allows adjustment of the brightness and contrast.

I recommend that you take some time and do a little experimenting before you choose a permanent location for mounting the remote controller. As with the conventional LCD-type displays, glare from direct sunlight and positions that result in extreme off-angle viewing can impair your ability to see the screen clearly.

Display information for the VHF band appears in the upper half of screen, with soft key labels for VHF functions along the left edge. UHF band information and key labels are shown in the lower half and on the right edge of the screen. Each portion displays the operating frequency, the power output setting and icons that indicate duplex and CTCSS settings. When you're in the memory mode, the memory channel number is indicated. If you've turned on the "Memory Name" option in the set menu, a programmable alphanumeric tag (up to 8 characters long) can also be displayed. The tag appears just above the frequency digits.

In the factory default setting, the display background is dark blue—the VHF band information appears in yellow and the UHF information appears in green. Three other alternative formats are available, including a stylized version that features highlights and shading.

Microphone Control

US versions of the IC-2800H come with ICOM's HM-98 microphone. This mike offers an impressive array of control capabilities.

Seven keys are mounted on the upper portion of the front of the microphone. These allow you to switch between VFO, call channel and memory operation and to toggle the active band between VHF and UHF. Large

▲ and ▼ keys let you step through the VFO frequencies or memory channels. Hold either of these for a couple of seconds and the scan function will be activated. There are also **F-1** and **F-2** keys that can be programmed to mimic your choice of a wide variety of the radio's other buttons.

The lower front portion contains a separate keypad area hidden under a snap on cover. Here you'll find 18 additional keys including a **FUNC**tion button, a **DTMF** button and a typical 4-column/4-row DTMF keypad. Each of the keys located in the keypad field can perform three different operations. The DTMF tone assignment and the primary function label are printed on the surface of the button. The secondary function label is printed above each button and is accessed by first pressing the **FUNC**tion button.

Once you've programmed this radio's menus, the microphone can be used to control virtually all operations. Control highlights include direct frequency entry, volume and squelch, mute, power output, CTCSS, duplex, monitor, autodial, scan and lots more. All keys are backlit for nighttime operation.

An infrared wireless microphone, the HM-90, is also available as an optional accessory. Information in the manual indicates that this mike offers capabilities very similar to the included HM-98.

Programming

I spent some time with the unit temporarily set up in my shack so that I could explore the features, load up a few memories and get accustomed to the programming and operating schemes.

The supplied *Instruction Manual* is well written and logically organized. It starts out with an extensive *Table of Contents*. The first few sections provide numbered diagrams of the controller unit's knobs and keys, the jacks on the main unit, the various display icons and the control buttons on the HM-98 microphone. Short descriptions of each item and page references for more complete explanations are provided. A section on installation considerations follows.

The body of the manual gives step by step descriptions for programming and operating the transceiver. For those features that can be controlled from either the controller or the microphone, information on the procedures for both methods is listed together.

The final few sections include instructions for packet operation, connecting external video sources, computer programming (using optional cabling and *Windows* software) and troubleshooting. The last two pages list specifications.

Operating and programming the IC-2800H may seem a little intimidating at first, but after you play with this transceiver for just a few minutes, you'll find that the information that pops up on the screen helps guide you through the steps.

Each band has its own "edit" menu. Press and hold the **MAIN/EDIT** button and a table of three menu selections appears. These include the CTCSS encode tone, the CTCSS decode tone and the repeater offset settings. Labels next to the soft keys let you know which keys you'll need to press to scroll to the desired menu item. The UHF encoder knob is used to vary the settings. If you are in the memory mode when you enter this menu, you'll also see a menu selection for naming the memory.

Press the **DISPLAY/SET** key and you'll enter the display menu. Here you'll find the controls for the display format, the brightness and contrast and a setting where you can enter an alphanumeric sequence—your call sign for example—that will appear when you first turn the power on. Press and hold the **DISPLAY/SET** button and you enter the initial set menu. This table contains 16 listings including auto power off and time out timers, packet data rate, RF attenuator, cooling fan (on or automatic), and the assignments for the **F-1** and **F-2** microphone keys. The menu titles in most cases are spelled out clearly—the setting for the cooling fan reads "Cooling Fan," for example. It's easy to tell what's currently on the menu without having to refer to the manual for a translation.

Features

The IC-2800H also includes a number of advanced features.

There are two independent band scopes —one for each band. In the VFO mode, the scope will display the relative receive signal strength on 21 frequency steps, 10 on either side of the operating frequency. In the memory mode, the graph will show the signal strength on 10 memories to either side of the currently selected memory. Turning the encoder knob will move the operating frequency up or down the band or step through memory channels. You can make a single sweep and then stop, or set the unit to continuously sweep until you stop it manually. Audio is muted during the sweep.

VHF receive capability ranges from 118 to 174 MHz. Tuning below 136 MHz automatically activates the AM receive mode. AM can also be manually engaged or disengaged on any frequency with a setting in the menu. The receive coverage in the UHF band, however, is limited to 430-450 MHz.

The '2800H offers several different scan modes. You can activate a scan that will cover the entire VHF or UHF band; the aircraft, amateur or public service portions of the VHF band; or between three pairs of user-programmable frequency limits. You can even program the scan to skip specific frequencies within the VFO scanning range. Memory channels can also be scanned, and selected memories can be locked out. Scan resume conditions can be based on frequency activity—or the pause duration on a busy frequency can be set to 5, 10 or 15 seconds.

Additional features include scratch pad memories. These automatically retain the last five simplex and the last five duplex frequencies that you transmitted on while in the VFO mode. You can easily transfer this collected data into the regular memory banks.

There's a priority system that can check for activity on a specific memory or call channel frequency, or watch for activity as it steps through the memories, while you are operating in the VFO mode.

An automatic RF attenuator can be activated in the set mode. This provides up to 10 dB of attenuation as the squelch control is rotated past the 12 o'clock position and helps combat intermod.

An auto repeater offset system is also included. When this feature is engaged, the repeater offset directions for the VHF and UHF bands will automatically change in accordance with the US band plans.

Operational Observations

I found the transmit and receive performance of the IC-2800H to be very good. I consistently received reports of clear, natural sounding transmit audio. The receive audio quality is quite good—even when using the remote controller's relatively small built-in speaker. In spite of the fact that the speaker audio exits through the back side of the head, the volume and clarity of the audio was more than adequate for windows-down mobile operation—even in my somewhat noisy pickup.

While the cooling fan does make a bit of a racket, I didn't find it particularly objectionable. You can program the fan to run continuously or for 2 minutes after each transmission. In my mobile mounting arrangement, the chassis was positioned far enough away so that I barely noticed the whir. In a base station application, it should be a simple matter to locate the chassis such that the level of sound at the operating position would be minimized.

I did notice that the display unit generates a considerable amount of heat. While it feels pretty warm to the touch, it never gets hot enough to raise any major concerns. Another HQ staffer had the opportunity to try an early production IC-2800H back in March of this year. He had the unit temporarily installed in his car. He reported that with extremely cold vehicle cabin temperatures, the display was difficult to read until it began to warm up. This typically took less than a minute.

As I mentioned earlier, the default screen brightness level is too high for nighttime mobile operation, but daytime viewing really requires the higher settings. While it's a fairly simple matter to go into the menu and change the setting, it sure would have been convenient if the radio sensed the ambient lighting level and adjusted the brightness accordingly.

ICOM has spoiled us by providing two separate microphone connection points on their IC-706 series HF radios—one on the

back of the chassis and one on the removable faceplate. A second microphone jack (and perhaps at least one speaker/headphone jack) on the remote controller of the IC-2800H would have been a welcome addition.

ARRL lab testing revealed some interesting numbers. I expected to find that the current consumption for this unit, especially in the receive mode, would be significantly higher than similar radios using more conventional display technology. Surprisingly, this was not the case. The current requirement is just slightly greater than average.

Two-tone third-order IMD dynamic range at 10 MHz offset for the VHF band measured a very respectable 88 dB—near the top of the class in comparison to some of the other recently reviewed dual-band transceivers. Numbers in this range typically indicate a high level of resistance to intermod from strong nearby VHF paging and commercial communications.

The Screen

All right then, let's get back to that cool display!

Just for kicks, I plugged the video output cable of my ancient video camera/recorder unit into the RCA video socket on the remote controller and activated the video monitor function in the transceiver's display menu. Sure enough, live color scenes of my shack's interior appeared on the screen. Considering the relatively small size of this display, picture clarity wasn't too bad—pretty much on par with what I've seen on those pocket TVs.

Some possible uses for this display capability that come to mind include mobile SSTV. Connect a scan converter, the Tasco TSC-70U for example (see *Product Review* April 1997), and use it in conjunction with your camcorder or one of those inexpensive miniature cameras to transmit and receive still pictures on the VHF or UHF band. You could also connect the display to ATV equipment, such as the PC Electronics TC70-10 ATV transceiver (see *Product Review* December 1998) for fast scan television viewing.

The transceiver will still operate while the display is in the external video mode. You can switch back to the radio screen to check and change operational setting with a couple of quick button presses.

I'll leave additional applications to your fertile imaginations.

Manufacturer: ICOM America, 2380 116th Ave NE, Bellevue, WA 98004, tel 425-454-8155; fax: 425-454-1509; **http://www.icomamerica.com**. Manufacturer's suggested retail price: IC-2800H, $670. Typical current street price, $550. MB-17A quick release mobile mounting bracket, $49; OPC-872 controller extension cable (11.5 feet), $27; OPC-647 microphone extension cable (8.2 feet), $54; OPC-347 dc power cable (23 feet), $46; CS-2800 *Windows* cloning software, $13; OPC-478 cloning cable, $45.

The ADI AR-147 VHF FM Mobile Transceiver

Reviewed by Joe Bottiglieri, AA1GW
Assistant Technical Editor

Set ADI's latest 2-meter FM mobile radio—the AR-147—next to their previous model in this series—the AR-146—and you'd be very hard pressed to tell them apart. The faceplates and cabinets of the two transceivers are virtually identical; the most salient difference is the new unit's microphone. While the '147 borrows heavily from the parts bin of its predecessor, the engineers at ADI have managed to pack a significant number of new tricks between those familiar looking covers.

Features and Improvements

The AR-147 is a very well equipped 2-meter FM mobile transceiver. Features include 80 memories, three power output levels, CTCSS and DCS tone encode and decode, tone scan, code scan and expanded VHF receive from 118-180 MHz. You also get automatic repeater offset, remote control from the microphone (including keypad frequency entry), a DTMF tone reader, 9 DTMF autodial memories and multiple scanning and paging modes.

If you have a look back at our evaluation of the AR-146 that appeared in a *QST Compares* roundup in our November 1996 *Product Review* column, you will discover that in spite of the uncanny resemblance, the updated version of this radio is significantly different. New capabilities have been added and some of the existing features have been enhanced.

Particularly notable is the addition of digital code squelch (*DCS*). DCS is an alternative tone access system to the ubiquitous continuous tone code squelch system (*CTCSS*). DCS is gaining popularity in commercial communications applications—primarily due to the greater number of available codes. I've yet to encounter a single amateur repeater requiring DCS for access, but it's conceivable that the technology will eventually begin to trickle down. In the meantime, scanner listeners will find this feature useful for sorting out shared-channel public service and commercial communications. For those already familiar with DCS—yes, the inverse codes are supported.

The ability to scan for access tones—CTCSS *or* DCS—is also new. You can program the radio to identify the specific tone or code in use by scanning for them on the repeater's input frequency while other users are accessing the system.

Also new on this updated model is AM aircraft band receive. The AR-147 treats 118 through 136 MHz as a separate band, making it easy to tune through or scan these frequencies (or the second "band"—130 through 180 MHz) without the need to manually program in frequency limits.

The total number of memories in the '147 is double that of the earlier model. This is a welcome addition, especially considering the increased receive frequency range. Alphanumeric memory tagging is still not available. As with the AR-146, you can switch the display mode to indicate channel numbers instead of the operating frequency. Nine DTMF autodial memories are included—up from zero in the AR-146.

Bottom Line

With the AR-147, ADI reinforces their reputation for offering sophisticated transceivers with respectable performance, top-end features and affordable pricing.

Table 2
ADI AR-147, serial number 9170000723

Manufacturer's Specifications	*Measured in ARRL Lab*
Frequency Coverage: receive and transmit, 144-148 MHz.	Receive, 118-136 MHz (AM), 130-180 MHz (FM); transmit, as specified.
Power requirements: 11.7-15.8 V dc; receive, 0.6 A; transmit, 12.0 A (max, high power).	Receive, 0.87 A (max volume, no signal); transmit, 10.3 A, tested at 13.8 V.
Size (HWD): 1.6×5.5×6.5; weight, 2.7 pounds.	
Receiver	*Receiver Dynamic Testing*
Sensitivity: 12 dB SINAD, 0.18 μV.	FM, 12 dB SINAD, 0.17 μV. AM, 10 dB S+N/N, 120 MHz, 5.6 μV.
Two-tone, third-order IMD dynamic range: Not specified.	20 kHz offset from 146 MHz, 63 dB*, 10 MHz offset from 146 MHz, 89 dB.
Adjacent-channel rejection: Not specified.	20 kHz offset from 146 MHz, 60 dB.
Spurious response: Not specified.	IF rejection, 112 dB; image rejection, 64 dB.
Squelch sensitivity: 0.1 μV.	At threshold, 0.09 μV.
Audio output: 2.0 W at 10% THD into 8 Ω.	2.9 W at 10% THD into 8Ω.
Transmitter	*Transmitter Dynamic Testing*
Power Output: (H / M/ L), 50 W / 25 W / 7 W.	146 MHz, 57 / 27 / 6.1 W.
Spurious signal and harmonic suppression: 80 dB.	70 dB. Meets FCC requirements for spectral purity.
Transmit-receive turnaround time (PTT release to 50% of full audio output): Not specified.	Squelch on, S9 signal, 90 ms.
Receive-transmit turnaround time ("tx delay"): Not specified.	49 ms.

*Measurement was noise limited at the value indicated.

Automatic repeater offset, preprogrammed for the US band plan, is also new. Tune to a portion of the FM band where repeaters are common, and the radio will automatically set your offset direction.

The time out timer in the new unit has been vastly improved. While the '146 only provided one setting (30 minutes!), the '147 offers a range of six different settings between 1 and 30 minutes.

The updated microphone that's packed with the AR-147 looks remarkably similar to one that's included with the FM mobile transceivers of a well known competing manufacturer (perhaps ADI raided *their* parts bins as well!). While some may argue that it's a bit on the large side, no one can complain about the generous size, spacing or backlighting level of the keys.

This new microphone adds the ability to enter frequency digits on the 16-button DTMF keypad—very handy for quickly punching frequencies into the VFO. It also provides individual buttons for accessing the call channel, the VFO or the memories. A **MHz** button puts you in the direct entry mode or allows you to use the top mounted **UP** and **DN** buttons to change frequency in 1 MHz steps. Various combinations of pressing and holding these four buttons lets you toggle between "bands," activate a dual watch or enter the scan modes.

Although the microphone doesn't offer quite as wide a range of control capabilities as we've seen on some other radios, the typically needed operations are readily available through the microphone's controls.

Up Front

The LCD screen displays black segments on an amber background. The frequency digits and the various function icons, though small by today's standards, are still easy to read at most angles. A large 14-segment S/RF meter stretches across the lower edge of the window.

The main encoder knob is in the lower left corner of the front panel. Two small knobs for the volume and squelch are located just to the right of the display. The surface of these knobs is just slightly textured—not quite enough to provide much traction, however.

Many contemporary transceivers are using fewer front panel controls and menus for programming. The AR-147 employs the more traditional function button and key method—essentially the same as that used on the AR-146.

The front panel contains 10 buttons. A row of small buttons—the **VFO/M>V**, the **MR/M** and the **MHz/LOCK** buttons—are mounted above the main encoder. The center button of the set projects out slightly. Two small barriers isolate the three keys. This makes it easy to locate them by touch.

This group of keys allows you to toggle between the VFO and memory modes, write VFO information to a memory, switch to 1 MHz tuning steps, lock the front panel keys, enter and exit the AM aircraft band and activate various scans.

A second similar pair of buttons is located above the 8-pin microphone connector on the right edge of the front panel. These are the **LOW/DIM** and **PWR** buttons. A barrier separates these keys as well. **LOW/DIM** is used to vary the RF output level and to change the display backlight intensity. The **PWR** key switches the unit on and off.

Below the display window is a row of five larger keys. These include the **FUNC**tion button, the **CALL** button, and the **SHFT/REV**, **TONE/DUAL** and **DTMF** buttons. Their primary operations are performed with simple key strokes. Each push of the **SHFT/REV** button, for example, cycles you through the simplex, duplex and the automatic repeater shift modes (both + and - will appear in the display simultaneously when the auto mode is engaged). Pressing the **FUNC** key before a particular button will bring up its secondary operation. Pressing and holding the **FUNC** for a second or two before pressing specific buttons typically brings up a related setting such as the tone or code frequency or the repeater offset value.

All of the front panel controls have halos of light that appear around their perimeters. The function labels on the five lower keys are translucent. This lighting arrangement works well for nighttime operations.

Operating Impressions

Programming the AR-147 can be a little more challenging than we've come to expect with the average contemporary transceiver, but once you get a feel for moving around through the various functions and settings, it quickly becomes intuitive.

The 45-page *User's Manual* is well organized and includes lots of illustrations. The instructions, for the most part, are clear and easy to follow. There are several instances where the translation is rough, but these typically do not lead to confusion.

The transmit audio of the AR-147 consistently solicited reports of "sharp" sounding audio. While most stations assured me that it was not objectionable, many indicated that they preferred the fuller sounding audio of my permanent station transceiver. I'd rate it as "communications quality."

Receive audio is very good. It's clear and plenty loud enough for even noisy environments.

One unusual characteristic is the behavior of the receive signal strength meter. Lab tests revealed that the difference in signal

strengths between a low level signal—resulting in a small deflection of the meter—and that of a signal indicating an S-9, was unusually small. Repeaters that are located at the fringe of my normal coverage area displayed S-9 plus meter readings, even though the level of noise in the receive signal confirmed their marginal accessibility.

As we observed with the AR-146, the new unit generates a considerable amount of heat during extended periods of high power operation. Keep this in mind when choosing mounting locations and take advantage of the lower power settings whenever possible.

Lab Results

Lab tests on the AR-147 reveal that this radio, as was the case with the AR-146, exhibits respectable performance (see Table 2).

Although the manufacturer's sensitivity specifications for this receiver and the one in the earlier unit are identical (<0.18 µV), the '146 we tested scored a hot 0.13 µV—smoking the other transceiver's in that roundup by a considerable margin. The 0.17 µV posted by the '147 is still very good, considerably above the running average for the single-band mobiles we're recently tested.

Two-tone third-order IMD dynamic range at 10-MHz offset, typically a good indicator of a receiver's intermod rejecting capabilities, is just slightly below the average for single-banders, but still very good at 89 dB. The IF rejection, though not quite as high as we measured on our '146, managed to maintain ADI's place at the top of the class for this specification.

One manufacturer's published specification that was not met is the transmitter's spurious signal and harmonic suppression. ADI specified this at a surprisingly high 80 dB. The 70 dB measured by the lab is well above the FCC requirement (60 dB) and still very good when compared to the numbers typically generated by similar transceivers.

Overall Conclusion

The AR-147 provides a nice variety of high-end features and very respectable performance. It carries on the tradition of ADI's AR-146 as a good value in an economically priced mobile transceiver.

Manufacturer: Premier Communications, 480 Apollo St #E, Brea, CA 92821; 800-666-2654; fax 714-257-0600; **premier@adi-radio.com**; **http://www.adi-radio.com**. Manufacturer's suggested list price, $300. Typical current street price, $220.

Tower Jack Tower Tools

Reviewed by Mark Wilson, K1RO
QST *Editor*

If you've spent any time dismantling Rohn towers, you've probably had an experience like one I had taking down a Rohn 25 tower for a friend a few months ago. Everything is going great. You remove the six bolts holding the top section. The ground crew pulls the rope, you wiggle the loose section a little bit, and it pops off. Five minutes and you're ready to do the next one. It goes like this for a while, until you get to a section that just won't budge. You wiggle the section and try to push it up, but it just won't move. What now?

Typically, next I'd ask the ground crew to send up an automobile scissors jack and a couple of blocks of wood to pry the sections apart, along with some rope to safely tie all the pieces to the tower. But Tower Jack, of Mount Juliet, Tennessee, has a better idea.

Figure 1—Tower Jack offers a wide variety of products for the assembly and disassembly of antenna tower sections. These include the Leg Aliner, the Tower Jack, the Tower Block and the Safety Strap. The container at the top of the picture contains their Tower Lube, for use on tower section mating surfaces during assembly.

The heavy duty version of the Tower Jack (Figure 1) weighs about five pounds and consists of two pieces of steel bar stock connected with a hinge bolt. The handle piece is 24 inches long, and the hinged piece is 12 inches. Both are notched to fit the round horizontal bracing on Rohn tower sections. This particular model is specified to fit Rohn 20, 25, 45 and 55 tower, but we only tried it with Rohn 25. There's a hole in the end of the handle for an optional Safety Strap to clip the Tower Jack to the tower or your climbing belt, or you can use your own safety rope.

Using the Tower Jack is easy (see Figure 2). To disassemble tower sections, orient the device with the handle up and place the bottom brace of the upper tower section in the notch at the end of the handle. Place the top brace of the lower tower section in one of the notches on the hinged piece. Pull down on the handle to lift the tower section.

For difficult sections, I found it best to lift at the corners. I'd work my way around the tower several times, lifting a little at each corner and gradually sliding the upper section up. With the 24-inch handle, you have a lot of leverage and it's possible to bend the bracing if you use too much force in the center of a rung.

You can also use the Tower Jack to assemble sections. In that case, the handle attaches to the lower section with a hook. One of the notches in the hinged piece fits the brace on the upper section, and you pull down on the handle to slide the sections together.

Other Tower Jack Tools

Tower Jack offers several other tools designed to make tower work easier. Sometimes during assembly, the legs on tower sections just won't line up. This often happens because sections (even brand new ones) have been banged around in transit. Even a small misalignment in the tower legs can create a lot of frustration. Tower Jack

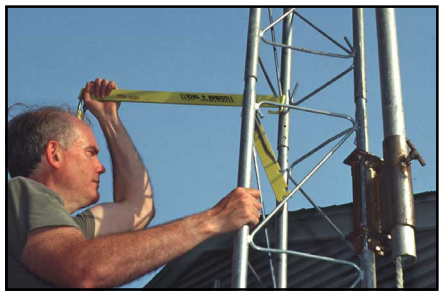

Figure 2—The Tower Jack provides the leverage needed to easily separate stubborn sections.

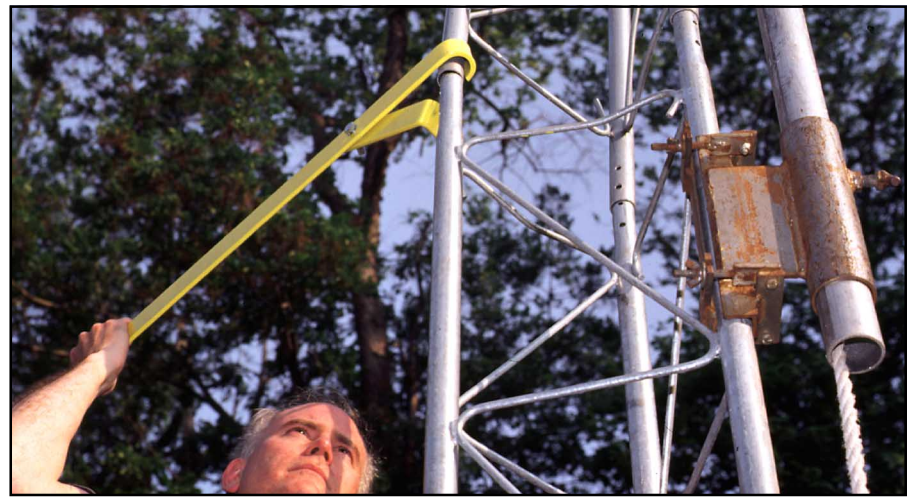

Figure 3—During tower assembly, you'll occasionally run into situations where some alignment adjustments are needed to get the third leg to insert. The Leg Aliner can provide the necessary force.

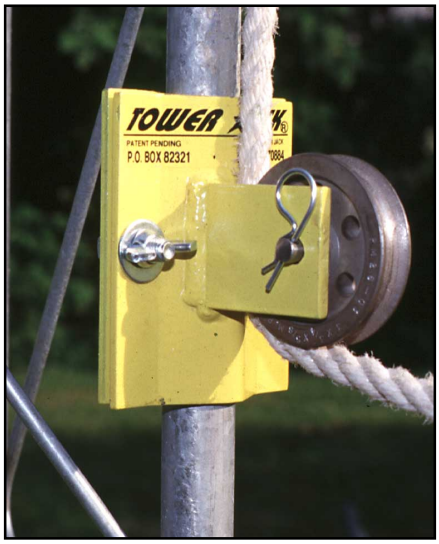

Figure 4—The Tower Block is used on the lifting line of your gin pole. This device allows your ground crew to remain safely outside of the "drop zone."

offers the Leg Aliner (see Figure 3) to help with these stubborn cases. It's similar to the Tower Jack—just over two feet of steel bar—but this tool has a loop at one end that clamps to the offending tower leg. It gives you enough leverage to move legs that are slightly out of alignment, but it's not intended to straighten seriously bent sections.

We also tried the Tower Block (Figure 4), a pulley that attaches to one of the legs at the base of the tower. This block allows the ground crew to pull horizontally, rather than vertically, on the rope from the gin pole (the fixture used to lift tower sections during assembly). Pulling horizontally is easier on the arms, and it allows the ground crew to stand safely away from the "drop zone" beneath the tower. The Tower Block easily accommodates $^3/_4$-inch rope. It clamps to the tower leg with bolts and wing nuts. The pulley wheel is held in place with a clevis pin and hairpin cotter, making it very easy to thread the rope.

Tower Jack also offers Tower Lube to make section assembly and disassembly easier, a hard hat, and an electric utility winch for those really heavy jobs.

I found the Tower Jack tools to be well made and easy to use. The Tower Jack especially is a real time-saver when fooling with difficult sections.

Manufacturer: Tower Jack, PO Box 1191, Mt Juliet, TN 37122; tel 800-242-0130, 615-758-9233; **http://www.towerjack.com**. *Manufacturer's suggested amateur pricing:* Heavy Duty Tower Jack, $59.50; Leg Aliner, $33.95; Tower Block, $56.50; Safety Strap, $11.95.

New Products

K6MLO LOADING-COIL DESIGN SOFTWARE

◊ Handbook formulas for the calculation of coil inductance use the parameters of length, diameter and number of turns. The resulting inductance is known as the "low-frequency" inductance. The actual inductance at the operating frequency will be higher. The reason for this is that the coil's turn-to-turn capacitance (distributed capacitance) is in parallel with the coil's inductance, increasing the actual effective inductance. Many low-cost test instruments also indicate only the low-frequency inductance.

K6MLO's Loading-Coil Design Software takes into account the effect of the distributed capacitance, the wire size, skin and proximity effects, the coil form dielectric type and the grove depth to calculate the real life or "effective" inductance of the loading coil at the actual operating frequency. Results also include the distributed capacitance and self-resonant frequency. At the specified operating frequency the inductance, reactance, resistance and Q of the coil are calculated. The ranges of the input parameters are: coil length, 0.25 to 120 inches; coil diameter 0.25 to 120 inches; number of turns, 2 to 2000; wire size, 1 to 40 AWG and frequency, 0.1 to 120 MHz. Both English and Metric units are supported.

The loading-coil design software is available on $3^1/_2$ inch diskette for $14.95 from Harold Wood, K6MLO, 212 Pasqual Ave, San Gabriel, CA 91775; **k6mlo@pacbell.net**. You can download a demo version from his Web site: **http://home.pacbell.net/k6mlo**.

PORTABLE SOLAR POWER SYSTEM

◊ National Solar Technologies, Inc offers a complete, easily transportable, solar power system for your home, camp or remote cabin. Their *En-R-Pac 200 TS* consists of a storage/conversion unit that measures about 19 × $12^1/_2$ × 15 inches and a 18 × 30 inch 50 W solar panel.

The rugged water-resistant storage/conversion unit, weighing in at about 80 lbs, contains a 12 V 100 A/hr sealed valve-regulated deep cycle gel battery. A built-in ac inverter converts the stored dc power to 115 V ac. Power outputs include two convenience outlets for ac, and a cigarette lighter style jack and binding posts for 12 V dc applications. Built-in 120 V ac charging circuitry allows you to pre-charge or top off the unit from the commercial mains or a conventional generator.

Option accessories include additional 50 W solar panels, "expansion chassises" that increase the energy storage capacity, a 200 W wind turbine and even a water turbine.

Several packages, consisting of various combinations of accessories, dc only versions, and 220 V ac-based systems for international use are also available.

For pricing and further information contact National Solar Technologies, Inc, 1 Elmview Avenue, Hamburg, NY 14075; tel 800-310-7413, fax 716-649-8655; **sales@En-R-Pak.com**; **http://www.en-r-pak.com**.

Next New Product

Hints & Kinks

*Edited by **Bob Schetgen, KU7G** • Senior Assistant Technical Editor*

LAMP-LIFE GREMLINS

◊ Gremlins got into the equations for lamp life, current and candlepower presented in the August column. The correct equations are:

$$L_r = \left(\frac{V_d}{V_a}\right)^{12} \times L_d \qquad \text{(Eq 1)}$$

$$I_r = \left(\frac{V_a}{V_d}\right)^{0.55} \times I_d \qquad \text{(Eq 2)}$$

$$C_r = \left(\frac{V_a}{V_d}\right)^{3.5} \times C_d \qquad \text{(Eq 3)}$$

Where the d, a and r subscripts indicate the designed, applied and re-rated values, respectively, and L, I and C indicate the life (usually in hours), current and candlepower (a brightness measurement), respectively. So, a bulb with a design life of 1000 hours that is rated for 12-V ac and operated from 11-V ac, should last

$$\left(\frac{12}{11}\right)^{12} \times 1000 \approx 2840$$

2840 hours.—*Bob Schetgen, KU7G, ARRL Staff;* **rschetgen@arrl.org**

. . . AND COMMENTS

◊ Stringing six HLMP-WL12 LEDs in series across 12-V dc turns out to be okay, but just barely. The problem is that the V/I curve for LEDs is very steep, and a little too much voltage causes degradation or even device failure.

Check **www.hp.com**, and search on this LED's model number. You will find that the curve shows that, at a 2-V drop, it will draw about 35 mA. This is above the manufacturers' recommendation, but reasonably so. Note that the maximum rating is 50 mA, however, and the curve shows that it takes only 2.1 V per LED to reach that value. For a string of six, that's only 12.6 V.

The joker here is manufacturing tolerances. In actual usage, some LEDs would draw a bit more and some a bit less than the nominal shown.

What made me notice the above was the idea that one could series-connect LEDs across a fixed-voltage source. I wondered why you didn't blow the diodes, so I checked the data sheet. You are just inside the window.

The time-honored solutions to this problem are:

1. Supply the LED string from a constant-current source.

2. Use a simple dropping resistor in series with five (not six) diodes. Set the resistor to draw 30 mA with 2 V across it (2/0.030 ≈ 66 Ω), 68 Ω should work.

The string should then last for years. Remember that many standard LEDs have a barrier voltage of about 1.2 V, and would burn out instantly in this circuit.—*Bill Parrott, W6VEH, 1938 Brush Oak Ct, Thousand Oaks, CA 91320;* **w6veh@arrl.net**

MORE ON MOBILE POWER CONNECTIONS

◊ I would like to take issue with the article in the August 1998 Hints & Kinks column titled "Switching for Mobile Power Leads."[1] Years ago, it was a common practice to fuse the negative power lead. The problem is that should this fuse fail open, the circuit can still be completed through the shield of the coax. This path may not be as good as a direct connection to the battery. It may have enough resistance to limit the current so that the fuse in the hot, or positive, lead does not blow. Thus, your equipment is no longer protected and can just sit there and cook away.

I have also seen problems when coax is used for the primary wiring. The high temperatures encountered in modern vehicles can soften the dielectric enough for the center conductor to displace and actually contact the braid, creating a short circuit. Coax may have some noise-suppression benefits for AM and SSB, but I would exhaust all other noise reduction methods before resorting to coax for power lines. If you do use coax, be careful to follow the manufacturers recommendations about minimum bending radius and keep the cable away from heat.

I also recommend care when running wires from the front of a vehicle to the rear. Avoid routing them directly above the catalytic converter or exhaust system. I have seen the insulation melted off wires run

[1] J. Forrester, K4JF, "Switching for Mobile Power Leads," *QST*, August 1998, pp 72-73.

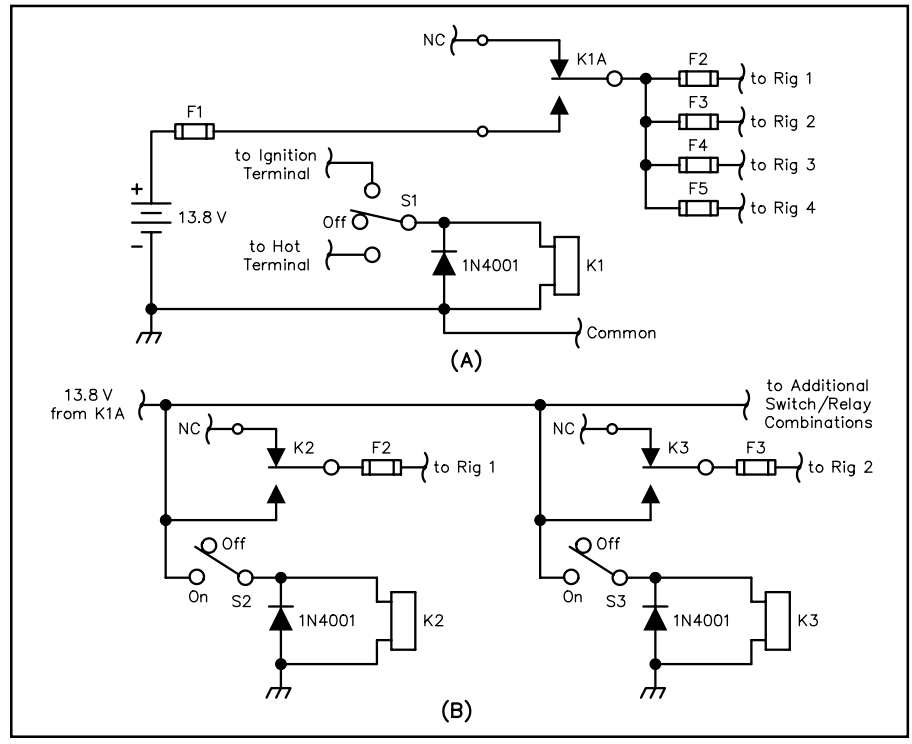

Figure 1—K8BNO's recommended way of wiring mobile radio equipment. At A, a single main power relay controls the power to all equipment. At B, separate switches down line from the main power relay control each piece of equipment individually. Mount the switches on a single, central control panel or wherever is convenient in your installation.

K1—12 V, SPST relay rated for total equipment current requirement (Motorola 59K813674 recommended for loads totaling 30 A or less)
S1—SPDT (center off) dash-mounted switch.
S2-S3—SPST switch
F1—Fuse rated for total equipment current.
F2-F5—Fuse rated appropriately for each piece of equipment.

between the floor and the carpets. The recommended procedure is to run wiring in the channel at the bottom of the door openings. I prefer mounting the relay and fuse box as close to the battery as possible.

As for chassis ground connections, I have found them unreliable in newer vehicles. They have too many plastic parts. The hump on some GM models is not metal. This is the reason that manufacturers now provide separate ground leads for broadcast receivers and the cigar lighter. If you want to use the chassis as a ground path, be sure to check it with a meter first.

GE Communications makes a nice fuseholder assembly in a plastic box. The lid holds the fuse so that when you remove the lid, it pulls out the fuse. Motorola Communications makes several types of in-line fuse holders that are watertight.

As for power relays, Motorola makes several for this purpose. I prefer their 59k813674, which looks like a horn relay, but is rated for 12 V at 30 A continuous service. Wire the coil to an accessory terminal of the fuse block through a dash-mounted switch. This arrangement permits turning off all equipment with one switch and removes power from the wiring when it is not needed.

If more than one piece of equipment is to be used, it would be wise to distribute the power through a series of fuse holders and a barrier strip mounted to a small piece of Plexiglas or wood. Include a separate fuse for each piece of equipment and several spares for future use. If you want a fancy setup, use a relay and switch for each piece of equipment. Then you can turn on any or all pieces of equipment from one spot.

When wiring Police cars, we use a panel with switches so that everything is controlled in one handy spot. There are switches for the siren, beacon, strobes, take-down lights, interior reading light, radar, each individual radio (most cars have three or more individual radios), recorders, TV camera and so on.

One of the many suppliers of Motorola and GE parts is Tessco Electronics, 11126 McCormick Rd, Hunt Valley, MD 21031. They have a Web catalog at **http://www.tessco.com**.—*Carl Desko, K8BNO 1220 Grassy Ln, Rossford, OH 43460;* **chdesko@worldnet.att.net**.

UNIVERSALLY USEFUL "GOOP"

◊ Some years ago our local hardware store started carrying GOOP in its adhesives display area. (This not the Goop sold as a mechanics hand cleaner.) Some specific need in the past caused me to purchase GOOP for its particular properties. It's a gelatinous, clear, sticky preparation with the consistency of thick honey. Its advantages are that it sticks to almost anything, except moisture. So one can use wet fingers to shape the adhesive without it sticking to the skin. It dries to a tenacious, semi-flexible, space-filling mass. It stiffens enough to hold things in position after one-half hour or so of drying. It comes in various packaging for plumbing, mechanical, woodworking and other applications, but it all appears to be the same preparation.

For clean-up, it can be "rolled" like rubber cement, particularly shortly after application—and up to one hour later. It allows handling in a few hours, and full strength is achieved overnight. It never hardens completely, so it can be removed with some struggling. Parts can then be cleaned of any remaining GOOP by peeling it off. I have found GOOP somewhat soluble in Xylol. This helps in cleaning or if you need to dilute GOOP some.

I have used this universal adhesive for so many things it is hard to recall them all. When dry, it seals against water. It locks nuts on bolts, but still allows removal. It seals coax connectors or insulates connections in tight places. I also use it hold conductors in place. I probably go through a tube a month.

I was prompted to write about GOOP when I read the July 1999, Hints and Kinks article about using "bread wrapper clips" for labeling wires.[2] (It turned out that my wife already had a bunch saved.) The thought jumped into my mind that one could easily add a drop of GOOP to close the back of the clip and keep it from *ever* coming off (unless you wanted it off). Optionally, you could anchor the tag in one spot along the cable, depending how much GOOP you apply.—*Walt Brackmann, WA6SJA, 13924 Natoma Rd, Apple Valley, CA 92307;* **whbrack@globalfrontiers.com**.

MORE H-T VOX HINTS

◊ I want to thank Joe, N1KHB, for sharing his experiences with the Radio Shack 19-312 VOX headset and the Alinco DJ-580 H-T.[3] I had been using the RadioShack speaker mike with the Alinco H-T and found its audio quality to be significantly better (and the price lower) than units designed for the Alinco. I was unaware of the additional battery drain caused by the "mono" mike plug, however. Indeed, I checked, and the battery draw nearly doubled when I plugged in the speaker mike!

Joe made two very good suggestions for the VOX unit, but those would not apply to the molded dual plug on my speaker mike. The solution on the speaker mike was simple and inexpensive. Since the dual molded plug cannot rotate, I merely used my Dremel tool to carefully grind off the offending part of the plug! It was only necessary to remove about 1/8 inch from the inner side of the small pin. The area to be removed extends from the insulating ring up towards the body of the plug. (See Figure 2.) Looking at the middle ring of a stereo connector will give you a good confirmation of the area that needs to be removed. I only removed the inner side (the portion that faces the larger plug) since this is where the contact is made

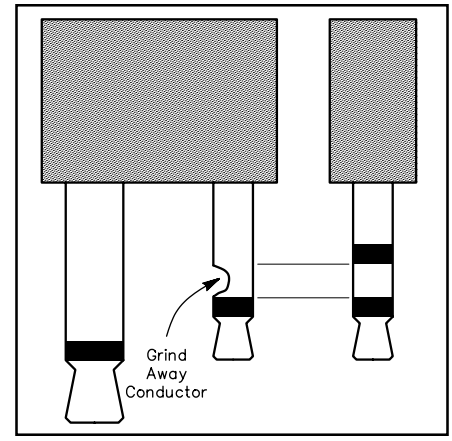

Figure 2—KN1O's solution to excess battery drain from H-T VOX units. Use a stereo plug to help visualize the area to be removed.

in the radio. Leaving the other half of the ring maintains adequate strength. The plug is filled with a plastic insulating material. Obviously some care is needed in the process to keep from grinding through the insulating material and exposing the center conductor. If you goof, a small amount of epoxy in the gap will fix the problem.

I also bought the VOX unit because of Joe's recommendation. I, too, am pleased with its performance. I first tried Joe's fix, but found that I was spoiled by the one-piece connector on the speaker mike. I considered buying another RadioShack mike to remove the cord and modify it. A better, though no less expensive, approach came with a visit to Ham Radio Outlet. They sell a small speaker mike (model MH800) with the stereo plug! I wasn't delighted with the mike's audio quality but the cord works great on the VOX unit. I did need to slightly enlarge the hole on the VOX unit case to accept the new coiled mike cord. The coiled cord between the belt control unit and the radio is much neater than two separate wires, and it's a lot less likely to catch on surrounding objects.

It is worth mentioning that I did investigate merely opening the 5-V line to the plug inside the Alinco (since I don't use any accessories that require the external 5 V). I am not easily intimidated, but in this case I quickly came to the conclusion that this task should be performed only by a skilled surgeon.—*Al Amos, KN1O, PO Box 362, Stow, MA 01775*

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

[2]P. Stump, N0LRF, "Yet Another Cable Label," *QST*, July 1999, p 64.

[3]J. Wonoski, N1KHB, "Radio Shack VOX with the Alinco DJ-580 H-T," *QST*, Mar 1997, p 79.

Technical Correspondence

*Edited by **Paul Pagel, N1FB** • Senior Assistant Technical Editor*

MFJ-249 BATTERY HAZARD

By J. C. Smith, K0HPS, 1249 Dewing Ln, Walmut Creek, CA 94595; **JCSmith@designlink.com**

◊ After reading the SWR analyzer tips article in *QST*,[1] I thought I would save some owners from a potential headache.

I use my MFJ-249 for a variety of purposes, one of which is to quickly tune my mobile screwdriver antenna to the desired frequency while driving down the freeway. The '249 consumes batteries rather rapidly, so for a long road trip, I added a 12-V power cord connected to the terminal block (attached to my truck's battery) that serves my other 12-V gear. I assumed the coaxial power jack on the MFJ-249 would disconnect the internal battery pack when the external power plug was inserted. (There is no battery switch and one must remove eight screws to get inside the box to unplug the battery pack).

Two days into our trip, I noticed a pain in my right thigh just below the right-rear pocket of my shorts. At first I thought it was just "pants pinch," but I later discovered a nasty substance oozing out of my MFJ-249. It made quite a mess, ruined my pants, stained my truck seat and gave me a nasty burn. I've still got scars to prove it. The alkaline batteries in the '249 were "boiling over" from being connected to the truck's 12-V supply. Needless to say, my MFJ-249 now sports an external battery-disconnect switch (and an ugly, corroded paint job). I reread the instructions that came with the MFJ-249 and could find nothing that warned of this potential problem.

Editor's note: The MFJ-249 instruction manual (page 3) states: "The internal battery is automatically disconnected when an external power plug is inserted in this jack." The manual also states: "Avoid leaving any batteries in this unit during periods of extended storage. Remove weak batteries immediately!" [1]

USING THE MFJ-259 SWR ANALYZER TO FIND A SHORT CIRCUIT IN COAXIAL CABLE

By Emerson M. Hoyt, WX7E, 13475 SW 24th St, Beaverton, OR 97008-5062; **emjhoyt@teleport.com**

◊ I find the MFJ-259 SWR Analyzer to be an effective instrument in locating a short circuit in coaxial cable. Here's the approach I use:

- Connect one end of the cable under test to the MFJ-259 **ANTENNA** jack. Leave the opposite end of the cable open.
- Turn on the MFJ-259 and start a frequency sweep beginning at the *low-frequency* end of its range. Watch the resistance meter for a dip and record that frequency (in megahertz) for 0 Ω.
- Continue the sweep, looking for a second dip, which should be a twice the frequency noted for the first dip.
- Calculate the position of the short:

$$\text{Short Location (inches)} = (492/f_0)\times V_f \quad \text{(Eq 1)}$$

where f_0 = Frequency of the first dip
V_f = Velocity factor of the cable under test

You can check this result by now shorting the other end of the cable and repeating the process.

This method can be explained as follows: A length of coaxial cable with a short at one end will exhibit an impedance of 0 Ω when the electrical length of the cable is $^1/_2\lambda$ (or multiples of $^1/_2\lambda$) long. Hence, the length of cable for the first resistance dip will be $^1/_2\lambda$ at that frequency. In free space, a half-wavelength is $492/f_{MHz}$. To obtain the *physical* length, we must multiply the free-space half-wavelength by the cable's velocity factor. (This number varies from 0.66 to 0.86 for most cable types.)[2]

This method is limited to cable lengths less than 180 feet long because the MFJ-259's low-frequency limit is 1.8 MHz. I have used this procedure to check several cables; the location of the short was within a couple of inches of the calculated position.

EUFORT IS REALLY UFER

By Ted Chernin, KH6GI, 1797 Ho Ola A Pl, Pearl City, HI 96782-1431; **kh6gi@hawaii.rr.com**

◊ Jack (W6JIC) Hollenbeck's Technical Correspondence item "Electrical Safety" is an excellent article.[3]

What Jack incorrectly refers to as the "Eufort ground" is actually the Ufer ground, named after the man who developed the system while working as a consultant for the US Army during World War II.

Ufer's method of grounding provides a low-impedance path to earth for structures with concrete foundations. The grounding system is described briefly in "The 'Grounds' for Lightning and EMP Protection," by Roger K. Block, published by the Polyphaser Corporation.[4] I got my copy of this book about five years ago. It contains a wealth of information on the action of lightning strikes, EMPs and how to protect communication and computer equipment.

FREE ENERGY CONCENTRATOR

By Mitchell Lee, KB6FPW, 686 N Twentyfirst St, San Jose, CA 95112

◊ Solar panels, although attractive from the standpoint of free energy, have several major flaws as applied to battery charging. Full power, touted in advertisements, is available only a few hours a day. Elaborate and expensive solar trackers can help, but weather, accumulations of dust, ice, snow or pollutants, and the darkness of night still limit total available energy. Costly solar panels must also be located in the clear, possibly far removed from the shack, thus creating wiring problems.

Another source of free, incident radiation is the *AM broadcast band.* Especially in metropolitan areas, concentrations of broadcast transmitters may find one located not far from your shack. If you live within a few miles of an AM broadcast station, you may be interested in this project.

Silicon Valley, famous for its prodigious semiconductor economy, has a dark side: To local hams, it is known as RF Gulch. In the capital of Silicon Valley (San Jose, California) alone, a cacophony of at least five AM broadcast stations crowd the top 500 kHz of the band with more than 50 kW of total radiated power! The spurious bane of low-band enthusiasts, these are vectors not even Poynting could love, but their power density is sufficient to be put to good use around the shack. I have adapted a resonant forward converter switching regulator topology for the purpose of charging my 12-V station battery, using the energy recovered from a broadcast signal

[1] A number of tips submitted by various authors is compiled by Paul Pagel, N1FB, in "SWR Analyzer Tips, Tricks and Techniques," *QST*, Sep 1996, pp 36-40.

[2] See *The 1999 ARRL Handbook*, p 19-3, Table 19-1—*Ed.*

[3] Jack G. Hollenbeck, W6JIC, "Electrical Safety," Technical Correspondence, *QST*, Apr 1999, p 81.

[4] According to Shelbi Turner of PolyPhaser, this publication is available directly from PolyPhaser or one of their distributors. Contact PolyPhaser Corp, 2225 Park Pl, PO Box 9000, Minden, NV 89423-9000; tel 702-782-2511, fax 702-782-4476; **info@polyphaser.com**; **http://www.polyphaser.com/**). The reference to the Ufer ground appears in Chapter 2 of that PolyPhaser publication. The book's bibliography identifies the information as being published in H. G. Ufer, "Investigation and Testing of Footing Type Grounding Electrodes for Electrical Installations," *IEEE Transactions, Power Apparatus Systems, Vol 83*, pp 1042-1048, Oct 1964.

located about one mile from my shack.

Figure 1 shows the basic apparatus. My antenna, a modest 160 meter, $^3/_8\lambda$ inverted **L,** is resonated with an air-variable capacitor and a 39-µH loading coil. The components include: A 155-foot total antenna length, an 800-pF air-variable tuning capacitor in parallel with a 500-pF fixed-value silver mica capacitor; a loading coil made from a 10-inch length of Air Dux #1066 (2-inch diameter, #14 wire, 6 turns per inch) for a total of 60 turns, tapped at 13 turns. The capacitor is tuned for maximum output power. A total capacitance of about 950 pF resonates the antenna on the strongest signal, KKSJ (1370 kHz). The optimum tap was found experimentally and is not critical—taps at 11 to 15 turns produced nearly identical output power.

The forward converter is formed by two Schottky diodes and a 100-µH toroidal inductor. The output is applied to my 12-V, 220-Ah deep-discharge station battery. It is important to include some means of preventing battery overcharge and exceeding the voltage rating of the diodes if the battery is removed: This is the purpose of the Zener-transistor shunt regulator.

When peaked on the strongest station, the battery receives a charge of about 200 mA, and averages 2.5 W delivered power. In contrast to solar panels, this energy is available 24 hours a day (except when I'm operating); it never needs cleaning; if damaged by severe weather it can be replaced in a matter of minutes at very low cost, and foul weather does not substantially degrade the output power. I estimate the total annual ampere-hours delivered at about 1752—equivalent to at least six full charges.

Other uses include lighting (tap into the loading coil with a small lamp), or if the available power is less than available at my location, you may still recover enough to operate a keyer, clock, pocket calculator or other low-power station accessory. With 2.5 W, you can operate an entire QRP station or propagation beacon, perhaps even transmitting on the same antenna from which power is received!

Note that the tuning capacitor and loading coil values will differ from those shown here depending on the characteristics of your antenna and the frequency of the strongest local broadcast station. With the values show, I can tune my antenna from about 1100 kHz to 1600 kHz, covering all five local AM stations. KSJX (1500 kHz) puts out nearly as much power as KKSJ.

Any wire antenna such as a **T**, fan or umbrella will serve the purpose. Balanced-wire antennas such as **V** beams, double-extended Zepps, bi-squares and Bruce arrays should work just as well as an end-fed wire. Simply tie both sides of the feeder together and resonate the entire system against ground.

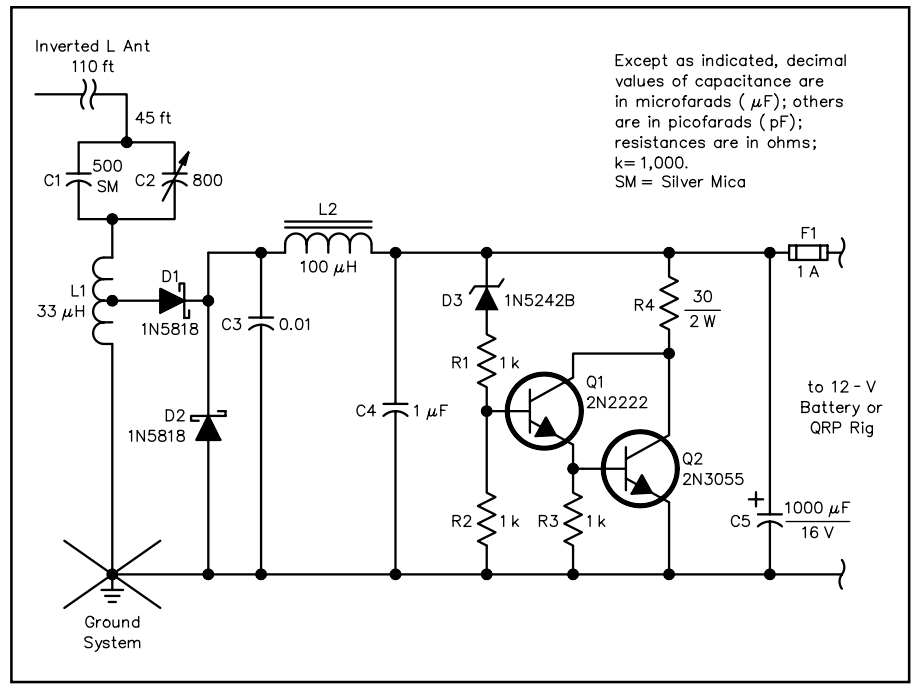

Figure 1—Schematic of the Free Energy Concentrator circuit. Unless otherwise specified, resistors are 1/4 W, 5% tolerance carbon-composition or film units. Equivalent parts can be substituted.

C1—500 pF silver mica, transmitting type
C2—800 pF air-variable, transmitting type
C3—0.01 µF disc ceramic, 50 V
C4—1 µF, 50 V film
C5—1000 µF, 16 V electrolytic
D1, D2—1N5818 Schottky, 40 V, 1A
D3—1N5242B Zener, 12 V, 500 mW
F1—1 A
L1—39 µH; AirDux 1606, 10 inches long, 6 turns per inch, 2 inches in diameter.
L2—100 µH, 86 turns #26 enameled wire on T-106-2 core.
Q1—2N2222
Q2—2N3055 (use heat sink).
R4—30 Ω, 2 W

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

See Feedback in November 1999 *QST*

Strays

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Next Stray

Happenings

*Edited by **Rick Lindquist, N1RL** • Senior News Editor*

Goldwater Ham Station to Become Museum Exhibit

The well-known ham station of the late Sen Barry Goldwater, K7UGA, is being donated to the Arizona Historical Society for display as a museum exhibit. Reba Wells Grandrud, director of the Society's Central Arizona Division, says the Society plans to set up the massive station console and equipment "as the late Senator used it."

Grandrud said current plans call for the K7UGA station equipment and console to be moved from the Goldwater home in Paradise Valley, Arizona, and reassembled at the Society's museum in Papago Park in Tempe sometime during the next year. Details are still being worked out.

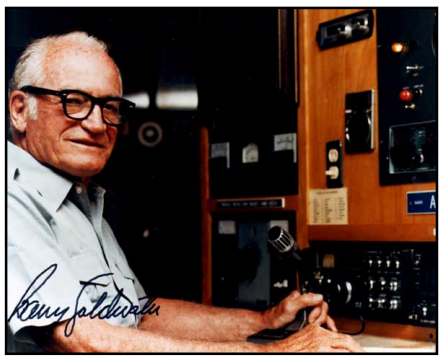
"We're just delighted," Grandrud said. "We felt it was very appropriate to have this here."

Goldwater's widow, Susan, said the late Senator had bequeathed his station to the Arizona Science Center in Phoenix to serve as an operating exhibit, but the Center—home of W7ASC—was unable to display the K7UGA setup intact.

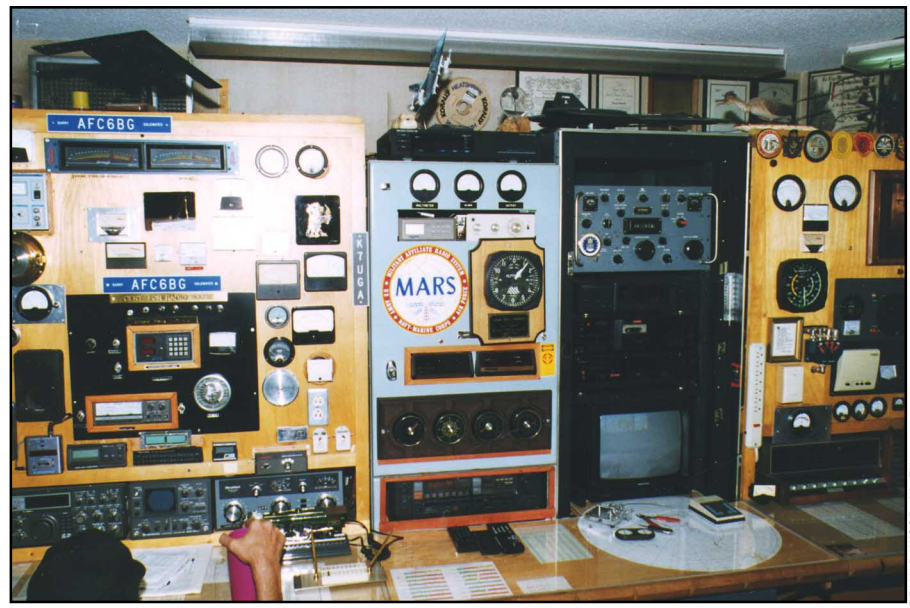
"We simply don't have the space to take this," said ASC Director of Exhibits Grant Slinn, who called the K7UGA shack "a snapshot of history." Slinn said the Arizona Science Center was "very pleased" that the Arizona Historical Society would be able to accommodate the station as an exhibit.

Goldwater's station and massive antenna system were used to complete thousands of phone patch messages for troops during the Vietnam War. Earlier this year, members of Goldwater's club, the Central Arizona DX Association, dismantled the K7UGA antenna system. The antennas were sold to private buyers and will not be a part of the museum exhibit in Tempe.

The museum intends to display the station intact and hopes to recreate the look and feel of the original Goldwater ham shack through the use of digital photographic techniques.



The late Sen Barry Goldwater, K7UGA, at the mike of his famous ham station.



BRIAN D. WOOD, AA6FV

The main operating position of Barry Goldwater's station at his Arizona home.

"Our plan is probably to recreate a room just as he had it," including all of Goldwater's photographs and other memorabilia, Grandrud said. While it's unlikely the station itself would be operational, she said the museum might "simulate" an operating setup for the sake of visitors.

"When you have an artifact of this significance, you certainly don't want to wear it out, and we wouldn't want it to be changed," she explained. "We'd like to maintain it as it was, when he used it last."

Goldwater died May 29, 1998. Grandrud said she had approached Goldwater's widow, Susan, about having the museum—a state agency—acquire the K7UGA station for display. "Our focus here in Central Arizona is on the 20th century and specifically on the last half of the 20th century," she said, calling the late Senator "a very special" part of that history. Barry Goldwater was one of the first inductees into the museum's Historymakers Hall honoring "Arizonans who have contributed significantly to Arizona," Grandrud said.

At this point, Grandrud said, the museum has a lot of work to do preparing the K7UGA station to become a museum exhibit. Before it is disassembled, she explained, museum personnel must photograph the setup and inventory and catalog all of its components.

Grandrud could not say if the exhibit would be a permanent one but said Goldwater's station would be maintained as part of the museum's collection. "We're stewards of the public heritage," she said. "It will be valued highly."

ULS NOW A FACT OF LIFE FOR AMATEURS

The FCC's Universal Licensing System is up and running for the Amateur Service, although it didn't happen without a few initial wrinkles and some frustrations.

At one point on August 16—the first day the system was on-line for hams—no one could access the ULS—even to register. But the downtime lasted less than an hour, according to an FCC spokesperson. "The system itself has been running smoothly," he said. The system went down a couple of more times during the first week of operation. Some hams reported slow response times in accessing the ULS to register or search the existing database information. Others were confused or confounded by the new system.

ARRL New England Director Tom Frenaye, K1KI, used the ULS to renew his license. "It wasn't a pleasant experience," he remarked, citing the complexity of configuring the required dial-up connection. "It's nice to renew on-line, but I'm glad I won't have to do it for another ten years."

Dick Lamb, K0KK, who's equipped with a cable modem, at first had decided he'd rather file a paper application than take a step backward in technology. But he managed the dial-up connection anyway and gave the ULS

a tentative thumbs up. "It's certainly a snap after you've done it once, but I'm afraid the dial-up aspect will scare off most folks," Lamb said.

One new applicant who passed his Amateur Radio exam just prior to the ULS phase-in period and hadn't seen his call sign by the end of the first week of ULS remained philosophical. "I guess I should wait another week or two before I start worrying," he said.

One bright spot: Without fanfare during the inaugural week, the ULS began accepting on-line fee payments via credit card for vanity call sign applications.

Even though all amateur licensees already are in the FCC database, ULS registration is a must—before filing an application, renewing or modifying a license, or applying for a vanity call sign. Applications filed through a VEC automatically register the applicant in ULS, as do paper applications mailed to the FCC that include the applicant's Social Security Number. The FCC will dismiss all applications filed on-line by anyone not registered in the ULS.

Registration (on FCC Form 606) requires first providing your Social Security Number—which the FCC refers to as a "Taxpayer Identification Number," then registering your call sign. Amateurs will use the new universal FCC Form 605, which replaces the familiar Form 610 series, for all purposes except—at least for now—club station applications. In addition to electronic—or "interactive"—filing, the FCC will continue to accept paper registration and applications.

When registering, hams can disregard the "Contact Information" section, unless they use a third party, such as an attorney, to deal with the FCC on their behalf.

Manually filed paper forms may be faxed to 717-338-2693 or mailed to FCC, Information Technology Division, ATTN: Kathy McLucas, 1270 Fairfield Rd, Gettysburg, PA 17325-7245.

For now, the ULS does not accept any club station applications, and amateurs registering for the ULS should register only their personal call signs. Trustees and custodians of club, military recreation, and RACES licenses should continue to use the old Form 610B to file applications for those stations and should *not* use their personal Social Security Number as the TIN for these licenses. Club station trustees and applicants should contact ULS Technical Support at 202-414-1250 to obtain an Assigned Taxpayer ID Number for each club license and provide it on the Form 610B.

Once the ULS is working as planned, automated processing of electronically filed applications, including vanity, is supposed to occur nightly each business day. There will be no weekend processing under the ULS as there was under the former system.

The FCC has disabled the former on-line vanity Form 610V and renewal Form 900 applications and redirected all amateur applicants to the ULS page.

While amateurs can use a Web network connection to register or to search the ULS for individual call signs or application status, applicants must use a toll-free telephone connection to the FCC's Wide Area network in order to actually file an application using the new Form 605. Complete connection instructions are on the FCC's ULS page, **http://www.fcc.gov/wtb/uls**, under "Connecting to ULS." Connecting to the ULS WAN requires *Netscape* 4.5 or higher. Using other browsers, such as *Internet Explorer*, may lead to errors, an FCC spokesperson told the ARRL. *Netscape* is available free from the Internet.

The ULS phase-in and transition period created a temporary backlog of new amateur applications at Volunteer Examiner Coordinators. At the end of the first week, as many as 100 applications—the results of two dozen or more exam sessions—remained to be transmitted from the ARRL-VEC to the FCC for processing. For the first few days the ULS was open for amateurs, the FCC accepted only a limited number of applications from VECs. At press time, not all VECs were set up to file under the new system.

As a result, applicants for new amateur licenses had to wait several days longer for the FCC to issue their new call signs. In addition, no vanity call sign applications were processed during the phase-in and transition period.

At the end of the first week under the ULS, however, ARRL-VEC Manager Bart Jahnke, W9JJ, said the FCC was "doing about as well as could be expected given the complexity of the implementation."

The FCC "ZIP file" was another first-week casualty, and various Web call sign servers such as UALR, QRZ.com and WM7D.net were unable to display the latest FCC licensee data as a result. The ZIP file is used by on-line call sign servers as well as by VECs to keep track of FCC license grants. Daily ZIP file postings were supposed to become "routine" by the second week of ULS, according to the ULS Task Force.

The FCC says that licensees not registered in the ULS will be unable to receive services from the FCC. This means the FCC will not process future license grants, upgrades, modifications or renewals for any applicant not registered in the ULS. The FCC recommends that all amateurs register now, even if they have no immediate need to transact business with the FCC in the near future.

Amateurs experiencing problems with the ULS or having questions should contact the FCC's ULS Technical Support staff at 202-414-1250; **ulscomm@fcc.gov**.

STS-93 IS A SAREX SUCCESS!

Shuttle *Columbia* mission STS-93 was an Amateur Radio success story. During the short mission, crew members completed Space Amateur Radio EXperiment contacts with five schools plus a contact with the cosmonauts aboard the Russian *Mir* space station. STS-93 returned to Earth July 27.

Launched July 23, STS-93 marked the 25th time the SAREX payload has flown on a shuttle mission. It also likely will be the last SAREX shuttle mission as future ham radio efforts in space will focus on the Amateur Radio on the International Space Station—or ARISS—project.

Lucky students at schools in Virginia, California, Texas and Florida had officially-scheduled QSOs with the STS-93 astronauts. All contacts eventually were successful, but not without a few glitches. The ham gear was deployed early in the mission, but a test pass with the SAREX team at the Johnson Space Center's W5RRR failed.

After troubleshooting with STS-93 Commander Eileen Collins, KD5EDS, the problem was determined to be a faulty shuttle power receptacle. Meanwhile, the first scheduled school QSO with Buzz Aldrin Elementary School in Reston, Virginia, had audio on only one end of the contact, so another try was scheduled.

The next scheduled school QSO, with Harbor View Elementary in Corona Del Mar, California, was much more successful. Eight students interviewed the astronauts. One thing the kids wanted to know about was the food aboard the shuttle. "The food is quite good—really!" Collins replied. "Today I had rice, and there are plenty of food items to choose from, including snacks."

The orbiter then maneuvered its attitude to accommodate another payload, the Southwest Ultraviolet Imaging System. The resulting tail-down, nose-up attitude was not conducive to SAREX QSOs, however, since the SAREX window antenna can't radiate the signal toward Earth. A scheduled QSO with Awty International School in Houston, Texas, failed but was rescheduled. The SAREX Team worked with NASA to get the orbiter returned to a more favorable attitude prior to the next school contacts.

Students were rewarded with excellent results. "Hats off to everyone, and a heartfelt thank you from me and my school. It was truly a memorable occasion," said Joe Kertesz, KC5RFW, of Memorial Middle School in Pharr, Texas, adding, "Now, when does ARISS go on line?!"

Murphy almost took his toll on yet another school. Not long before the Osceola (Florida) Elementary School's QSO, SAREX relay station operator Gordon Williams, VK6IU, in Australia, discovered a problem with his gear. "Unbelievably, some Australia birds had pecked through Gordon's coax!" said John Nickel, WD5EEV, who was among the SAREX volunteers at W5RRR. VK6IU climbed his tower in the rain early Monday, changing out the cable just in time for the SAREX relay.

On Monday evening, the Buzz Aldrin and Awty schools were rewarded for their patience with completed QSOs, and the students were thrilled. For more information about the school contacts, visit the STS-93 information page at **http://garc.gsfc.nasa.gov/~kc6rol/sts93.html**.

The *Columbia-Mir* QSO also was a huge success and in three languages—English,

Russian and French. With the linkup via W5RRR in place, French cosmonaut Jean-Pierre Haignere, FX0STB, radioed, "This is *Mir* space station speaking, this is Jean-Pierre." *Columbia* astronaut Michel Tognini, KD5EJZ, then spoke with Jean-Pierre in their native French. Next they turned over their mikes to the two space commanders. *Mir*'s Viktor Afanasyev, then congratulated Eileen Collins on being the first woman commander of a shuttle crew.

To listen to the exchange, click on NASA's .wav file at **http://shuttle.nasa.gov/gallery/audio/shuttle/sts-93/wave/congrats.wav**.

Tognini also exchanged greetings in Russian with cosmonaut Sergei Avdeyev. Tognini and Avdeyev flew to *Mir* together in 1992.—*Rosalie White, WA1STO*

PHASE 3D SATELLITE UNDERGOES VIBRATION TESTING

The Phase 3D team apparently got the "Good Vibrations" it was hoping for when the next-generation Amateur Radio satellite underwent scheduled vibration testing at NASA's Goddard Space Flight Center in Maryland during August. "This is a major milestone for the spacecraft," said AMSAT Phase 3D Lab and Integration Manager Lou McFadin, W5DID. "The satellite did very well under rigorous environmental tests." The next milestone was to bring Phase 3D back to the Integration Lab in Orlando, Florida, and to verify that all systems were functioning normally.

Phase 3D had to wait in line for a test opportunity. "NASA has projects which are higher in priority than P3D," McFadin said just after Phase 3D arrived at Goddard. "They are feverishly working on Hubble Space Telescope repairs and the Earth Orbiter-1 satellite."

AMSAT's Frank Bauer, KA3HDO, explained that vibration testing simulates the launch environment. "If all the vehicle hardware passes—that is, all the mechanical hardware remains intact and the electronics operate after the testing—then the spacecraft is ready for launch," he said.

AMSAT has been hoping for a launch opportunity as early as this fall. Once Phase 3D has been fully checked out in Orlando, it will be shipped to the as yet unnamed launch site. Work was continuing to prepare the space frame and ground support equipment for shipment once the launch is announced.

AMSAT has declined to name the launch agency or vehicle, and AMSAT-NA officials have cautioned that the possible October launch time frame mentioned at the Dayton Hamvention is very tentative and just the opening of a launch window.

For more information and photos, visit **http://www.clark.net/pub/tac/p3d.htm** and **http://www.amsat.org/amsat/sats/phase3d.html**

LOU MCFADIN, W5DID

Integration Lab Manager Lou McFadIn, W5DID, stands next to the Phase 3D satellite—under wraps, and awaiting its turn for vibration testing at the large RF chamber clean room at Goddard Space Flight Center.

ARRL COMMENTS ON CENTRAL STATES PETITION

In comments to the FCC, the ARRL says it supports the objectives of the Central States VHF Society's recent petition to formally segregate wideband and narrowband modes on VHF and UHF. But, the League says, the Society's petition fails to make a case to implement any new FCC rules. The petition,

In Brief

• **ARRL not in the credit card business:** Some League members have reported receiving solicitations from telemarketers for a credit card offering to radio amateurs. The ARRL is not involved with these solicitations nor has the League sold members' names, addresses, or telephone numbers to telemarketing organizations.

• **UK issues "slow-code" M5 call signs:** Calling it "part of the long term restructuring of the Amateur Radio License," the Radiocommunications Agency in the United Kingdom began issuing M5-prefix call signs to new "Full A/B" licensees August 2. Class A/B applicants passing the written Class A or B examination and a 5 WPM Morse code test earn full access to HF with up to 100 W plus full privileges above 30 MHz. "The introduction of the Class A/B License is an interim measure in preparation for moving toward a more incentive-based licensing system," an RA press release said, adding that further changes to the license already are under consideration. The RA and the RSGB anticipate the international requirement to demonstrate Morse proficiency for HF access will be dropped following the 2002/2003 World Radiocommunication Conference. For more information, visit **http://www.open.gov.uk/radiocom/**.

• **Amateurs assist Tour de Wyoming:** Although probably not as widely reported as the Tour de France, amateurs in Wyoming in July provided communication for the Tour de Wyoming bicycle ride. ARRL Wyoming Section Manager Robert Williams, N7LKH, and his wife Mary, KF7MC, managed the volunteer effort. According to Mike Reed, N7ZEF, hams patrolled the routes and kept track of all riders and reported injuries and mechanical problems during the 400-mile trek July 25-30. Communication was maintained on 75 meters, 2 meters, and 70 cm. —*This Week in Amateur Radio*

• **C-W Crystals orders returned:** C-W Crystals of Nevada, Missouri, has closed its doors and may be sold following the sudden death of its proprietor, John Morris, N0ACS. Morris was 59. In the meantime, Morris' long-time companion, Marilyn Selvey, KB0RTO, reports that she has returned all orders and refunded all money. She reports that Morris did not have crystals in stock and processed orders as they arrived, so she is unable to fill any orders.—*Marilyn Selvey, KB0RTO*

• **Ham dies attempting to aid accident victim:** Raymond J. Feeley, K1CSB, of Southampton, Massachusetts, died in the early morning hours of August 2 while trying to help a motorist who had struck a utility pole. He was 58. According to reports, Feeley came in contact with a live electrical line and was electrocuted while responding to the driver's cries for help.—*information via Larry Krainson, WB1DBY*

• **N6XMW confirmed as federal judge:** Congratulations to League member and Extra licensee William H. Alsup, N6XMW, who has been confirmed by the US Senate as the newest judge on the US District Court for the Northern District of California. Alsup, 54, began his career by clerking for US Supreme Court Justice William O. Douglas and later became a trial attorney.—*thanks to Phil Kane, K2ASP*

• **King Hassan II, CN8MH, SK:** Morocco's King Hassan II (Moulay Hassan), CN8MH, died July 24. He had been licensed since 1956. Ahmed Boudda, CN8GI, called the late monarch "a friend to all Moroccan hams." US President Bill Clinton was among the international dignitaries attending services for King Hassan II on July 25.

• **Masami Saito, JH3PJE, SK:** Past IARU Region 3 Director Masami "Sammy" Saito, JH3PJE, died Aug 9, as a result of an accidental fire at his home. Saito devoted many years to Amateur Radio including a stint as Region 3 Director from 1975 to 1978, an era of development and growth in the region. Services were August 11.—*Keigo Komuro, Secretary, IARU Region 3*

• **1999 NFCC Election Results:** The National Frequency Coordinators' Council completed its third annual National Frequency Coordinators' Board of Directors' election on August 6. There was a field of five candidates. Western Washington NFCC Representative and Board Chairman Clay Freinwald, K7CR, was reelected; Wisconsin NFCC Representative Nels Harvey, WA9JOB, will succeed Whit Brown, WB0CJX, who was not a candidate. The two-year terms began September 1.—*Dick Isely, W9GIG/NFCC*

• **NCDXF's W6WX beacon now on 18 and 24 MHz:** Bob Fabry, N6EK, reports that authority for the Northern California DX Foundation's W6WX beacon to operate on 18 and 24 MHz has come through from the FCC, and W6WX now is transmitting on five bands. He reports that the request for the KH6WO Hawaiian beacon to operate on those bands will go to the FCC soon. More information on the beacon system can be found at **http://www.ncdxf.org/index.htm**. —*Bob Fabry, N6EK*

filed in June, would amend FCC rules to eliminate interference from FM and packet in the so-called weak-signal portions of the 6 meter, 2 meter, 1.25 meter and 70 cm bands. The FCC has assigned RM-9673 to the CSVHFS petition.

In its comments, the League said it generally supports the intent of the petition but "does not support the regulatory relief requested" because the petition doesn't spell out the extent of the interference problem. The League said the number of complaints of harmful interference to narrowband, weak-signal modes it typically sees doesn't justify additional regulation—although the ARRL conceded that the actual number of incidents might be higher than complaints to ARRL HQ would indicate

The League said it prefers "reliance on established voluntary band plans" coupled with "some Commission support" to address the CSVHFS concerns. The ARRL took the opportunity to again call on the FCC to acknowledge "that VHF and UHF operation in accordance with established band plans is 'good amateur practice'" and it urged the Commission to support compliance with band plans to prevent interference to weak-signal operations.

The League suggested educational efforts as an appropriate remedy for newcomers and others unfamiliar with these amateur conventions.

A copy of the League's comments, filed July 28, is available on *ARRLWeb* at **http://www.arrl.org/announce/regulatory/csvhfs.html**.

KV4FZ RENEWAL APPEAL GOES TO COURT

Herbert L. Schoenbohm, KV4FZ, will get his day in court this fall in his fight to retain his Amateur Radio license. But, when that happens, the FCC plans to argue for an outright dismissal of Schoenbohm's appeal. In its brief in the case—set for oral arguments October 18 before the US Court of Appeals for the District of Columbia Circuit—the FCC maintains that Schoenbohm is asking the court to review an order that's not subject to review.

Following Schoenbohm's 1992 conviction for fraudulently procuring long distance telephone service by using illicitly obtained access codes, the FCC in 1994 designated his Amateur Radio license renewal application for hearing. An administrative law judge denied his renewal application saying that Schoenbohm's felony conviction "reflects adversely on his propensity to obey the law."

The FCC also says that Schoenbohm, now 59, solicited others, using Amateur Radio, to make *ex parte* presentations on his behalf, in violation of FCC rules and that he subsequently "engaged in misrepresentation and lacked candor" in testifying about his felony fraud conviction and his solicitation of *ex parte* presentations. The FCC said his behavior, in combination with his fraud conviction, justifies denying his amateur renewal.

Schoenbohm appealed every step of the administrative process. Last summer, the FCC upheld the supplemental initial decision of the administrative law judge denying Schoenbohm's renewal application. The FCC affirmed that finding last October 6. Schoenbohm has moved the matter into the courts by appealing the FCC order denying his reconsideration petition.

The FCC argues, however, that Schoenbohm—of Kingshill, Virgin Islands—is asking the court "to review an order that is unreviewable." The FCC says the courts have held "that an appeal from an agency order denying reconsideration is not reviewable unless the appeal rests on new evidence or changed circumstances." In its brief, the FCC contends that Schoenbohm's appeal is not based on either.

Following his conviction, Schoenbohm served two months house arrest plus two years of probation and paid a $5000 fine. He maintains that the FCC should renew his license because his conviction was several years ago, his sentence light, and he's had a spotless record and been fully rehabilitated.

A brief filed May 10 on Schoenbohm's behalf by his attorney Lauren A. Colby contends that the Commission's actions to deny Schoenbohm's license renewal were "arbitrary and capricious and inconsistent with well-established precedents." Among other things, Colby argues in his pleading that Schoenbohm's criminal conviction does not merit denial of his license renewal and that the FCC has "previously renewed the licenses of convicted murders and marijuana distributors," that Schoenbohm did not violate FCC *ex parte* rules, and that he did not lie to the Commission. Colby asks the court to remand the case to the FCC with instructions to grant the renewal.

Schoenbohm's Amateur Radio license expired in 1995, and his call sign no longer appears in the FCC database. However, he has been allowed to continue operating as KV4FZ until his legal appeals are exhausted.

SECTION MANAGER ELECTION RESULTS

Incumbent Wyoming Section Manager Robert W. Williams, N7LKH, has won election to a second term. Williams outpolled Jerry Pyle, WB7S, 91 to 83 in ballots counted August 24 at ARRL Headquarters. Williams has been Section Manager since April 1997.

Incumbent Section Manager candidates in nine other ARRL sections ran unopposed and were declared elected: In the Eastern Washington Section, Kyle Pugh, KA7CSP; in the Western Washington Section, Harry Lewis, W7JWJ; in the Sacramento Valley Section, Jettie Hill, W6RFF; in the San Francisco Section, John Wallack, W6TLK; in the West Virginia Section, O. N. "Olie" Rinehart, WD8V; in the Colorado Section, Tim Armagost, WB0TUB; in the Georgia Section, Sandy Donahue, W4RU; in the Los Angeles Section, Phineas Icenbice, Jr., W6BF; and in the South Texas Section, E. Ray Taylor, N5NAV.

The term of office for all candidates begins October 1, 1999.

Section Manager Election Notice

To all ARRL members in the Eastern New York, Eastern Pennsylvania, Louisiana, North Carolina, Pacific, San Diego, South Dakota and Virginia 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 Services Manager, ARRL
225 Main St
Newington, CT 06111

We, the undersigned full members of the _____ ARRL section of the _____ division, hereby nominate _____ as candidate for Section Manager for this section for the next two-year term of office.

(Signature _____ Call Sign _____ City _____ ZIP _____)

Any candidate for the office of Section Manager must be a resident of the section, a licensed amateur of Technician class or higher and a full member of the League for a continuous term of at least two years immediately preceding receipt of a petition for nomination. Petitions must be received at Headquarters by 4 PM Eastern Time on December 10, 1999. Whenever more than one member is nominated in a single section, ballots will be mailed from Headquarters on or before January 2, 2000, to full members of record as of December 10, 1999, which is the closing date for nominations. Returns will be counted February 22, 1999. Section managers elected as a result of the above procedure will take office April 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 April 1, 2000. If *no* petitions are received from a section by the specified closing date, such section will be resolicited in the April 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.—*Richard Palm, K1CE, Field Services Manager*

Rick Palm, K1CE • Field Services Manager

Cincinnati Hams Help Before and After Killer Tornado

By Michael Nie, KB8VMX

In the early morning hours of Friday April 9, 1999, an F4 killer tornado hit Cincinnati. Amateurs were the first to report touchdowns and indicate the seriousness of the situation. Later, they played a vital role in recovery efforts.

It was not a typical tornado. The twister smashed homes, and lives at about 5:00 AM. Severe weather in the early morning is uncommon, even in the Midwest. Several members of the Weather Amateur Radio Network (WARN), the local SKYWARN net, had followed the severe weather outlook for a couple days. As the system approached, it became apparent it would move through the area late at night. This usually reduces the chance of severe weather. Everyone went to bed Thursday night feeling safe that the weather would not be that bad.

Early Morning Alert

At about 3:15 AM the Storms Prediction Center posted a tornado watch for the Cincinnati area. This activated pagers carried by WARN net control operators Bob Kaegi, KB8TPC, and Steve Lewis, N8TFD, who immediately started monitoring. However, it seemed like the storms were dying. Ken Haydu, Meteorologist in Charge of the NWS office in Wilmington, Ohio, said, "We had extra staff in for the expected severe weather. We were just about ready to send them home, because the severe weather to the west was dying out. Then, just before it moved into our area, it reintensified. It just exploded."

At 3:54 the radar at the NWS office in Indianapolis indicated strong rotation in a storm in Jennings County in southeast Indiana, and a tornado warning was issued. As the storm moved eastward, it entered Ripley County, the westernmost county in the Wilmington NWS office area, and the WARN area of responsibility. A SKYWARN net was operating in Ripley County with Dave Rayner, N9JUW, as net control. This net forwards reports from spotters in the field to the WARN net control station, for relay to the NWS office in Wilmington.

At 3:59 Dave received a report from John Westerman, N9VHH, of a funnel cloud in eastern Jennings County. Dave relayed this to Kaegi, who called the NWS by phone with the report. Meanwhile, Steve Lewis began the five-minute trip to the WARN net control point.

MICHAEL NIE, KB8VMX

Steve Lewis, N8TFD, at the WARN net control console, for the April 9 tornado disaster.

In Harm's Way

Rayner knew of another problem. Bill, KB9CLY, and Lynn Stoneking, KB9CJM, live in the path of the intensifying storm—*in a mobile home.* Dave alerted the sleeping pair of the approaching danger by telephone. They jumped in the car to find better shelter. At 4:08 Rayner heard Lynn scream something in the microphone, and then …silence. He was extremely concerned. After about five minutes that seemed like eternity, he again heard from the Stonekings. They reported that they had abandoned their car when the storm became too intense, diving in a ditch for cover. A twister passed within a couple hundred yards of the couple. Thankfully, they received no injuries. Their home also survived, while others nearby were not so lucky.

The NWS monitored rotation in the storm as it moved eastward. At 4:52 a tornado warning was issued for Hamilton County (Cincinnati). A storm spotter reported a single building destroyed west of Cincinnati. The storm was moving northeast. At 5:18, the Hamilton County Communications Center (911) received a call that a gas station's pumps were pulled out of the ground. Clocks in damaged buildings had stopped at 5:15. Judging from the time of the warning and the time of reports, residents had about 25 minutes warning, thanks to NWS personnel and spotters, before tragedy struck.

This twister was hard to spot. It was dark, and the tornado lacked many of the classic signs. Hail was minimal. The tornado must have been rain wrapped, obscuring it from view. Bruce Goldstein, KC8IYS, was near the tornado touchdown. He measured winds as the storm passed at over 100 MPH.

After the Storm

When the storm subsided, Goldstein moved in for an initial assessment. He found trees and power lines down. These kept Bruce from getting to the most-damaged areas. Public safety officials reported many structures, both businesses and homes, heavily damaged or destroyed. Goldstein could see vehicles overturned on nearby expressways. This is where two fatalities occurred. Another two victims perished when they were thrown from their bedroom into a field. It's amazing that more deaths didn't occur. The tornado was rated at F3/F4, with peak winds exceeding 200 MPH.

All of these reports were relayed to the NWS as they came in. A tornado warning was issued for Warren County, northeast of Hamilton County at 5:19. Mark Reising, WB9BVV, lives in this area. He stepped outside as the storm passed. Reising said, "I went out to the front yard immediately after the heavy rain passed. Although we did not experience any wind, I could hear small explosions to the southwest of us, each successive explosion moving toward the east. These must have been power transformers blowing as lines were shorted by debris or knocked down." The tornado lifted soon afterward, but the damage had already been done.

At approximately 6:00 the WARN net was dismissed by the NWS. But most of those involved were immediately activated by the Queen City Emergency Net (QCEN), at the request of the American Red Cross, Cincinnati Chapter, for disaster relief assignments.

The Cincinnati Chapter was tasked with mass care (sheltering and feeding the homeless and rescue workers) and damage assessment. Another ARC function was the handling of Disaster Welfare Inquiries (DWI). The Red Cross takes phone inquiries from family and friends from anywhere trying to locate loved ones in the affected area. If the Red Cross has information, they will provide certain details to the inquirer. If they do not have any information, a DWI team is sent to the home or last known location of the persons they are trying to find.

RICK PALM, K1CE

At W2MTA's NTS picnic, TCC Director Howie Mann, W2FR, was honored for 60 years of traffic handling. Mark Rappaport, W2EAG (right), a long-time NTS advocate, congratulates his colleague.

RICK PALM, K1CE

Western New York Section Manager Bill Thompson, W2MTA, and wife Betty hosted another of his famous NTS picnics on July 31 at his home in the beautiful farm country of Newark Valley, outside of Binghamton, New York. Bill is stepping down as Section Manager at the end of the year, after 20 years of distinguished service. Bill is also the chairman of the Eastern Area Staff, and serves as manager of the second region net (Cycles 2 and 3) and Atlantic Region Net. Here Bill is shown at his favorite position!

Tom Delaney, KC7TN, told one remarkable story of a DWI. "The Red Cross took a call from an elderly lady who was at the Greyhound station, ready to board a bus for home in Detroit. She came to visit family. She was staying in downtown Cincinnati. Taking a cab to the affected area, the police would not allow her in because she was not a resident. Calling, she got no answer. She didn't know what else to do and was reluctantly going home.

"We immediately gave the information to a ham operator, who found the family. They were okay, but their phone wasn't. When they found out about the visitor, they notified Red Cross that they would drive to the bus station and get her. By the time Red Cross was notified (quickly, I might add) and called Greyhound, the bus officials had to ask the lady to get off the bus that was about to leave." Result: a happy reunion.

Amateur Radio played important roles during this disaster. The NWS recognized some of the hams involved with this operation for their important contributions. Scores of hams were involved in detecting this tornado and recovery effort. It's a fine example of the ham community being willing, equipped and trained to respond to disasters.

Michael Nie, KB8VMX, is the Public Information Officer for the Weather Amateur Radio Network. He is affiliated with local ARES/RACES and the Queen City Emergency Net. He is a lieutenant with the Green Township Fire Department near Cincinnati, responsible for communications and disaster planning.

COMMENTARY
The Continued Need for NTS

The NTS celebrates its 50th anniversary this year. I celebrate my 11th as a ham. My very first transmission was checking into the Oneida County Traffic and Emergency Net.

During the last big San Francisco earthquake, the NTS relayed a welfare message from a concerned friend in Rochester, New York to San Francisco inside of three hours. In another case the NTS, with Navy MARS, was able to relay a message from a wife in Virginia to her husband aboard the USS *Eisenhower* in the Mediterranean. Every traffic handler has stories like these. They're what keep us going.

In this day of cell phones, satellites, and the Internet, the utility of the NTS comes into question more, and less traffic comes our way. That question gets answered in a hurricane or earthquake when the new, high-tech infrastructure fails us and the trained traffic operator with his self-contained transceiver fills the void.

Our mission is as critical today as it was when the NTS was founded 50 years ago. It may be more important since there are less of us now to plug the holes that may come up in the future. We must continue to train to be there when we're needed because we will be needed even if the general public no longer believes it and sees us as people that cling to an "antique technology." We know better. To deliver our service is the driving force of the NTS, from 50 years ago through today.

I salute those who have brought the NTS through its first 50 years and I look forward to playing my part as a traffic handler in the NTS's next 50 years of service!—*Doc Kinne, N2IKR, Official Relay Station, Western New York*

NWS Special Event Set for November 27

The National Weather Service and the ARRL will cosponsor a special event slated for Saturday, November 27. Its purpose is to recognize the contributions that amateurs make to the NWS during times of threatening weather. The event will provide an opportunity for NWS personnel and amateurs to learn more about each other and their capabilities in severe weather situations. NWS personnel will be encouraged to use the radios (under the supervision of a control operator) and to get licensed. The event will also allow NWS offices to test backup communication in anticipation of Y2K.

November 27 is the final Saturday of the Atlantic hurricane season. The event will run from 0000 to 2400 UTC. Participating stations will operate on the following bands: 80, 40, 20, 15, 10, 6, and 2 meters. Most contacts will be by SSB, but other modes like RTTY, CW, and PSK31 can be used. Repeater contacts are also allowed.

The objective is for Amateur Radio operators at NWS sites to work as many other amateur stations as possible. The responsibility for setting up equipment and running the special event station at NWS sites rests with the local amateur community. Local NWS offices will provide the operators with a place to work the event, access to an area outdoors for antennas, power to run the equipment and, of course, coffee.

Amateurs should be careful not to interfere with office operations. At most, there should only be two operators at any time during the event. Amateur operators will be responsible for logging all contacts.

The QSO exchange will consist of a location, name, and a one or two word description of the weather. A script will be transmitted at regular intervals to announce the purpose of the event and to provide QSL information.

A Web site provides operating instructions, a list of participating site stations, and QSL information: **http://www.crh.noaa.gov/gld/radio.htm**

Operators eligible for a QSL certificate can send a self-addressed stamped envelope to the NWS office at Goodland, Kansas. The NWS will create the certificate, check the logs, and issue the certificates based on levels of achievement, as follows.

Percentage of Stations Worked	*Certificate Achieved*
2-25%	Stratus
26-50%	Cumulus
51-70%	Towering Cumulus
71-80%	Cumulonimbus
81-85%	Microburst
86-90%	Flash Flood
91-95%	Hurricane
96-100%	F5 Tornado

NWS contact: Scott Mentzer, KB0WPY; scott.mentzer@noaa.gov; tel: 785-899-2360. ARRL contact: Rick Palm, K1CE, k1ce@arrl.org; tel: 860-594-0261.

United States Third-Party Traffic Agreements

South Africa (ZS) has been added to the list of countries with which the US has a third-party traffic agreement. The FCC updated its Amateur Service International Arrangements in a Public Notice July 21, listing all countries that have made necessary arrangements with the US to permit an Amateur Radio station regulated by the FCC to exchange messages for a third party. The updated list also is available on ARRLWeb at **http://www.arrl.org/field/regulations/io/3rdparty.html**.

Countries with which the United States shares third-party traffic agreements:

V2	Antigua/Barbuda	CO	Cuba	4X	Israel	J6	St. Lucia
LU	Argentina	HI	Dominican Republic	6Y	Jamaica	J8	St. Vincent and the Grenadines
VK	Australia	J7	Dominica	JY	Jordan		
V3	Belize	HC	Ecuador	EL	Liberia	9L	Sierra Leone
CP	Bolivia	YS	El Salvador	V7	Marshall Islands	ZS	South Africa
T9	Bosnia-Herzegovina	V6	Federated States of Micronesia	XE	Mexico	3DA	Swaziland
PY	Brazil	C5	Gambia	YN	Nicaragua	9Y	Trinidad/Tobago
VE	Canada	9G	Ghana	HP	Panama	TA	Turkey
CE	Chile	J3	Grenada	ZP	Paraguay	GB	United Kingdom **
HK	Colombia	TG	Guatemala	OA	Peru	CX	Uruguay
D6	Comoros	8R	Guyana	DU	Philippines	YV	Venezuela
TI	Costa Rica	HH	Haiti	VP6	Pitcairn Island*	4U1ITU	ITU, Geneva
		HR	Honduras	V4	St. Christopher/Nevis	4U1VIC	VIC, Vienna

*Since 1970, there has been an informal agreement between the United Kingdom and the US, permitting Pitcairn and US amateurs to exchange messages concerning medical emergencies, urgent need for equipment or supplies, and private or personal matters of island residents.
**Limited to special-event stations with callsign prefix GB (GB3 excluded).
Note: At the end of an exchange of third-party traffic with a station located in a foreign country, an FCC-licensed amateur must also transmit the callsign of the foreign station as well as his own call sign.

Field Organization Reports

Public Service Honor Roll
July 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

940 NM1K
513 K9RTB
406 N5JZ
388 W9RCW
384 KB8ZYY
315 K7BDU
301 WB8SIW
298 KB5WEE
262 KA2ZNZ
252 NZ4O
240 W7TVA
237 WB2UVB
230 WB4GM
229 KI0JO
226 WA9VND
221 W6DOB
218 N2OPJ
208 N2XOJ
203 AF4HE
195 WA1TBY
193 K7VVC W0OYH
190 N2LTC
189 K4SCL
186 K6YR
184 K9FHI KA4FZI
181 WA4GQS
179 N2WFN
176 W4EAT
175 KC8CMQ
174 W4ZJY
171 WX8Y N2GJ KA4UIV
169 N8JGS KU4IJ N2YJZ
168 KA2GJV AD4DO
166 W0GCB KD1LE
165 K4IWW
162 N2RPI KE4OAV
161 KF1L
160 WB5ZED KK3F
159 N2JBA
158 KB5W N3WKE W6IVV
KB2VVB
157 K2UL
155 N8FPN AF4GF
153 KB2RTZ W4CAC WO0A
152 KC4TLG WN0Y
151 KA5KLU
150 K8GA N5NAV WB0ZNY KE0K
149 W3YVQ W2MTA
148 AA3SB N7YSS
147 KB5YAM
146 K4BEH
145 N3WK
KT4XA N2WDS KC5OZT NN7H N7AIK
144 N5JCG KA2YKN N2CCN N0KJ
143 WD4JJ KB2VVD W5ZX WA5I WA1FNM K4RBR NR2F
142 N8FWA KC2AHS
141 WB2ZCM W5GKH KR4MU W0LAW
140 W2RJL WA8EYQ KF4TQX W6QZ
139 KJ3E W7ZIW
138 K2BCL W7GB W7NWP KT6A
137 N1VXP
136 KC4ZHF
135 KF6OIF N2AKZ WB2GTG KF4VDW KA1GWE K2DN NZ1D W2EAG
132 WB4TVY W9YCV KA9KLZ W7LG N2XJ
131 KE4JHJ N2MSM W9CBE WX4H
130 NN2H WB2FGL
129 K5DPG K9GBR AF2K AF4NS
128 KG2D N2UTK WB2QIX WA1JVV WA0TFC KF9AS KB5TCH WA6ODQ
127 W5CDX W0WFF KF4NFP AD6HR
126 K5IQZ KB2KLH W1ALE AG9G
AC5Z
125 W3VK W1PEX
124 W1JX AA2SV
123 KD5P W9ZY N5OUJ W3BBQ KA4HHE
122 KE1AI KA8FCC W2AKT K5VV KO6RZ W7GHT
121 KG5GE AA3GV W2JHO KB2ETO
120 K2BTP K7GXZ KC5VLW K7MQF KA7TTY
119 KA2DBD W4UC WA4EIC W5MEN KC6SKK
118 KI4YV K8VFZ W4CKS WB2IIV W4RRX K4MTX KH6GR K9LGU K0PIZ W2MTO N3RB
117 N8DD KA1OTN
116 W1QU WI2G
115 KL5T KL7Q K0IBS
114 NY2V WD0GUF KB0DTI WA4NDA
113 K5MC WA8DHB W2FR
112 KD1SM K8QIP N1VUX K1FP
111 N1JBD W2CS KB2UQZ N9KHD
110 KJ9J K5MXQ
109 W5XX W3CB KC8CUC K8LEN AA4HT KA9LRM
108 KT4SJ KA2CBE KT4SJ
107 K4AKC KJ4N
106 W4DGH W2PII
105 WA8SSI WB4ZNB KJ7SI KE4DNO
104 WA2JSG WA2UKX
103 K5WOD K5DMC W4CC KC4VNO
102 K4AIF K8AI WB2WII
101 N2ZMI
100 KE6MIW AA8SN K2PB N4JAQ
99 WA4QXT NR9K KC2DAA WA2GUP
98 KO4A K5UCQ WB4UHC KB2VRO
97 AA4YW AA8PI
96 W7EP K8ZJU KC2EOT K1SEC
95 KA2CQX W2AZ KA1VEC WA8AHV KE4WBI
94 N3ZKP W4PIM WB2IJH KB0GUS K0PY
93 AE4NW N3WAV
92 W4XI WD5AAH WB7VYH
91 N1IST
89 N1LAH
88 KE3OX KG0IV
87 K3UWO KA2IWK
86 AL7N WA1QAA KD4HGU KD6YJB
85 KC8HTP K8LYY
84 AC4ZO N1SGL WB4PAM WB4GIU
83 KB2VSD KC3Y WA5FXQ K7YOH
82 KO4OL
81 W1JTH KB2CDB KA0DBK
80 KF4HJW
78 K4BW K8SH
76 KB4WBY
75 KC4RNF
74 WA4GLS KE3FL N5HK AA4BN WA4EYU
73 N3KB
71 N2FHJ N2WXF KD5AHW N4MM KG4CHW
70 K8IG KB1DOX

The following station qualified for PSHR in June, 1999, but the results did not appear last month: WA8EYQ 149, KA8FCC 149, N8FWA 143, WD8MIO 130, N8DD 112, KB9GGA 111, K8QIP 108, KC8HTP 105, WA8SSI 105, K8IG 101, WA1QAA 78. (May) K0PY 108. (Apr) KC8HTP 109.

Section Traffic Manager Reports
July 1999

The following ARRL section traffic managers reported: AL, AZ, CO, CT, EMA, ENY, EPA, EWA, GA, IA, ID, IL, IN, KS, KY, LA, ME, MDC, MI, MN, MS, NC, NFL, NH, NLI, NNJ, NTX, NV, OH, OK, ORG, SB, SC, SD, SDG, SFL, SNJ, STX, TN, VA, WI, WMA, WNY, WPA, WWA.

Section Emergency Coordinator Reports
July 1999

The following ARRL section emergency coordinators reported: AL, AZ, CT, ENY, IN, KY, MDC, MN, MO, NC, NE, NLI, OH, SD, SFL, STX, TN, VA, VT, WMA.

Brass Pounders League
July 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*
WB5NKC	44	1256	1205	36	2541
WX4H	3	633	1510	11	2157
NM1K	815	244	1001	11	2071
WB5NKD	1	66	1770	3	1840
W1FYR	0	711	690	5	1406
KE4DNO	2	245	1037	3	1287
N2LTC	0	649	662	28	1135
KT6A	0	541	512	0	1053
K7BDU	86	358	523	51	1018
W1PEX	0	109	752	11	872
W0WPD	31	459	50	272	812
K9RTB	0	403	49	355	807
N5IKN	0	400	103	287	770
W4EAT	0	349	351	8	768
KF5A	0	363	404	0	767
W6DOB	0	288	385	73	746
K9JPS	1	400	45	274	720
W9IHW	1	348	43	248	639
WA9VND	42	355	205	16	618
W9RCW	0	344	33	233	610
N5JZ	254	29	297	24	604
KK3F	24	86	419	42	571
KA5KLU	0	287	235	23	545
W0GGP	55	254	17	196	522
W9YPY	0	244	275	0	519
KA2ZNZ	14	2230	165	86	507
KA9FZI	5	282	195	21	503
W0LVI	28	260	0	212	500

BPL for 100 or more originations plus deliveries: NZ4O 182, KI0JO 123, K9GU 161, KB5WEE 110, WB8SIW 107.

Edited by **Bernie McClenny, W3UR***

Cleaning Up the Bands

Many of us here in the US have been aware of the sudden push to clean up the Amateur Radio bands headed by Riley Hollingsworth, K4ZDH, the FCC's Legal Advisor for Enforcement (see the April 1999 *QST*, page 52). If you've been reading any of the Amateur Radio publications you surely know that he has been a very busy man since last fall.

We can do our part by cleaning up our own bad habits. The operating practices of DXers and contesters should set examples for others to follow, but this isn't always the case. One of the worst lapses is the dreaded *partial call sign syndrome*.

Last Two Letters

Over the last 20 years we've seen a dismaying increase in the practice of identifying with the last two letters of one's call sign. Some believe that this idea started on the W7PHO "Family Hour," one of the first DX nets. In time the technique spread until it became standard operating procedure on DX list operations and DX nets, and it has even proliferated to DX and contest pileups.

No, I'm not conducting a debate on the pros and cons of DX list and net operations. The point I want to stress, however, is that the practice of identifying with the last two letters of a call sign should *not* be allowed to become the norm.

On most DX nets or list operations the net control station (or master of ceremonies [MC]) announces that he or she has such and such DX station(s) on frequency. The net control organizer then begins compiling a list of stations that would like to work the DX station(s). Often the list will be taken by call district. In the interest of speed and efficiency the net control may ask for only the last two letters of the call signs. Stations trying to get on the list will then shout out their last two letters. So what is wrong with this seemingly harmless style of operating?

Take a look at Part 97 of the FCC Rules. Section 97.119 states: "*Each amateur station, except a space station or telecommand station, must transmit its assigned call sign on its transmitting channel at the end of each communication, and at least every 10 minutes during a communication, for the purpose of clearly making the source of the transmissions from the station known to those receiving.*"

Now this does not say point blank that you *cannot* transmit only two letters of your call sign when you're trying to bust a pileup, make it onto a list or be heard by a net control station. On the other hand, it does state that you must use your complete call sign at the end of each transmission, and at least every 10 minutes.

*3025 Hobbs Rd
Glenwood, MD 21738-9728
howsdx@dailydx.com

Johnny Wantadx

There are numerous opportunities for violations of 97.119 during some DX net and list operations. Let's say, for example, that a net or list operation attracts a rare DX station and goes through the motions of starting a list. Johnny Wantadx, WZ7QRP, wants to work the rare DX. The net control station then asks for "last two letters." Johnny shouts "Radio Papa, Radio Papa" until the control station announces that he or she has enough people on the list, or is unable to hear any others calling. For one reason or another Johnny was unable to make it on to the list. During his many transmissions Johnny never gave his complete call sign. And since he didn't make the list, he won't get a chance to identify his station fully in the near future—and certainly not within the next 10 minutes. He may not realize it, but Johnny operated his station without once making a complete, legal identification. This is a clear violation of Part 97.119—and in many of these situations Johnny has plenty of company!

Johnny on the Spot

Ask any of the best contest operators or DXpeditioners what slows a pileup the most. More than likely the first thing they will tell you is two-letter calling. Think about these two examples.

Our up-and-coming DXer Johnny, WZ7QRP, finds a rare one in the ARRL International DX SSB Contest running a pileup at a rapid-fire rate of 200 contacts per hour. Johnny grabs the mike and blurts, "Radio Papa, Radio Papa." The DX station replies, "Who is the Radio Papa?" Now Johnny finally gives his full call sign. Next the DX station says "WZ7QRP you're 59." Johnny then confirms and also gives 59. Under good conditions this exchange would consist of five transmissions. If the DX station had to do this for 10,000 stations the efficient 200-contact-per-hour rate would collapse in short order.

Now let's suppose that Johnny gives his full call sign, using phonetics to make the call understandable. The DX station eventually hears Johnny and says, "WZ7QRP you're 59." Johnny simply replies, "You're also 59 from WZ7QRP." The contact begins and ends with only three transmissions.

Obviously the DX station is not going to be able to conduct all QSOs this easily, but you can see that by using full call signs the throughput increases dramatically. The faster he can work stations, the better everyone's chances are for success.

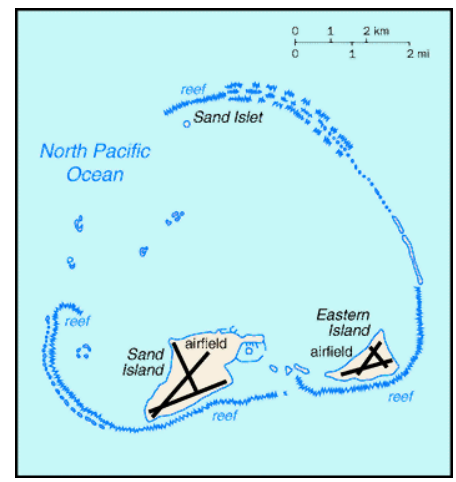
Full call signs are so crucial to efficiency that many DX and contest stations refuse to acknowledge stations offering only partial call signs. I know of one DX station that used to drive the point home by logging the last two letters if those were the only ones given. Naturally, QSL requests for these contacts were invalid and he treated them accordingly by sending back not-in-the-log notices.

Partial call signs are the bane of contesters, too. It is extremely difficult to "thin out" a contest pileup when only partial call signs are used. And as with DX stations, it slows the overall operation.

What can be done to eradicate this poor operating procedure? DXpeditions and DX stations need to announce often that they are accepting full call signs *only*. Contesters should also adhere to the same policy. Those running DX nets and list operations should insist on full calls to help promote good operating procedures, and to keep everyone legal. After all, "Real DXers use full calls!"

MIDWAY ISLAND

Almost everyone knows the history of Midway Island during World War II. There are



The Midway Islands are made up of Sand and Eastern Islands.

actually two islands, which were formerly called the Brooks Islands: Eastern Island and Sand Island. They are located 2098 kilometers west northwest of Honolulu at 28° 13' north latitude and 177° 26' west longitude. The islands have an area of approximately 5 square kilometers and were discovered and claimed by the United States in 1859. The islands were annexed by the US under the Guano Act of 1867. Now Midway is a wildlife refuge and has no commercial air service.

Husband and wife team Yarl, SM6FJY, and Monica, V63YL, will be working on assignment on Midway (IOTA OC-030) from September 4 to December 4. Look for KH4/SM4FJY to be active when time permits. QSL via SM6FJY, Yarl Lundstrom, PO Box 423, SE-401 26 Goteborg, Sweden.

SAMOA ISLANDS

The Western Samoa Islands (5W) changed their official name in 1997 to the Samoa Islands. The two main islands are Savai'i and Upolu. Europeans first explored these islands in 1722; however, it is believed that the first settlers came from Fiji hundreds of years earlier. In the late 1800s Germany, Great Britain and the United States jointly administrated the Samoan Islands. By the turn of the century Savai'i and Upolu were annexed to Germany while the eastern islands became American Samoa. After World War I New Zealand had been given a mandate from the League of Nations to administer the islands. Finally in 1962 the islands gained their independence and have maintained cooperation and association with New Zealand.

Gerard, PA3AXU, plans to once again go to Samoa and operate as 5W0GD. He plans to take more equipment and will be active on CW, SSB, RTTY and possibly PSK31. Look for him on the air from September 28 to October 14. Last year he was active on 10 through 30 meters on CW, SSB and RTTY. QSL via PA3AXU, GAMC Dijkers, Dokter P. A. Cornethof 3, 6669AZ Dodewaard, The Netherlands.

DOUBLE TROUBLE DXPEDITION

The Double Trouble DXpedition to Central Kiribati and the Tokelau Islands is getting under way. The plan is to hit Central Kiribati between September 23 and October 3. The group will include Mats, SM7PKK; Nils, SM6CAS; Erik, SM0AGD; Steve, G4EDG; Ulrika, SM6WYN; and Lech, LA7MFA. They will be signing T31T, T31K and T31YL on all bands from 6 to 160 meters on CW, SSB and RTTY. They plan to have three complete stations with 1-kW amplifiers along with beam antennas for the high bands and verticals for the low bands. One station will be for CW, one for SSB and one for 30, 17 and 12 meters. Look for them on 80 and 160 as well. After Central Kiribati the group will head to the Tokelau Islands where they will operate as ZK3DX, ZK3CW and ZK3YL from October 7-12.

CHATHAM ISLAND

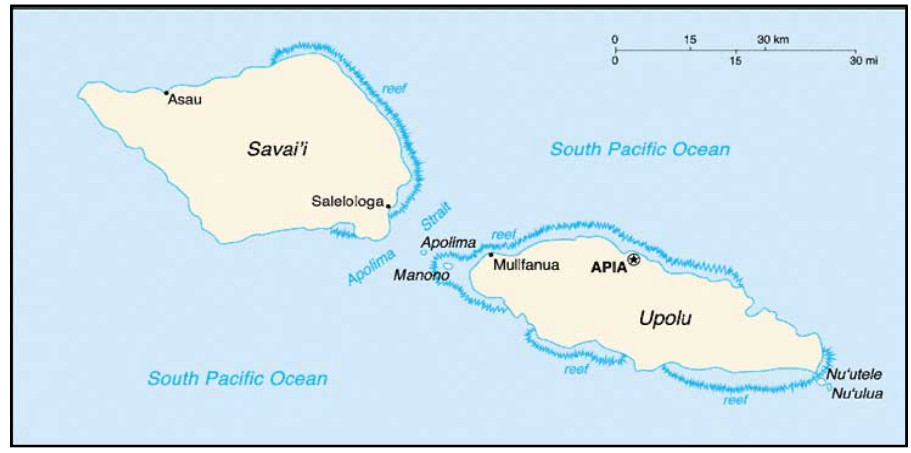
Pacific traveler Ed Hartz, K8VIR/ZL4IR, writes to tell us that he will be making numerous trips to the Chatham Islands (ZL7) over the next 18 months. Special QSL cards will be used, as the Chatham Islands will see the first sunrise of the next century. Look for Ed on 14260, 18130, 21260, 24950 and 28550 kHz, +/- QRM. QSL direct to W8WC.

NCDXC

The following club officers have recently been elected for the next year for the Northern California DX Club (NCDXC):

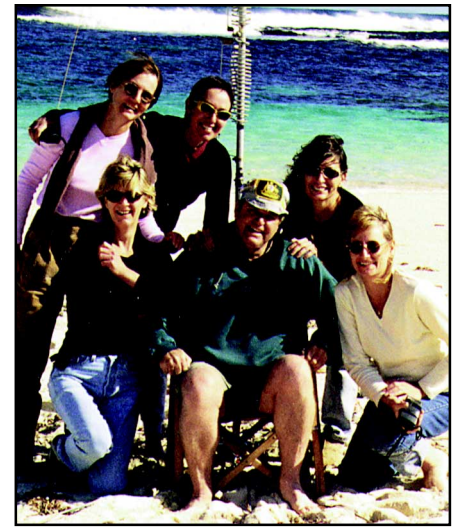
President	Dick, W6KM
Vice President	Chuck, K6RK
Secretary	Bill, W6TEX
Treasurer	Bill, WB6JJJ
Director	Marilyn, N6VAW
Director	Ron, W6VG
Director	Don, AA6W

For more information about the NCDXC write to Northern California DX Club, PO Box 608, Menlo Park, CA 94026 or check out their Web page at **http://www.ncdxf.org**.



Samoa, formerly known as Western Samoa until 1997.


Mats Person, SM7PKK/5X1Z, will be leading a team to Central Kiribati and the Tokelau Islands this fall. Mats was visiting W3UR when this photograph was taken.


Mal, VK6LC, and five "mermaids" on Green Island (OC-183) during a previous visit. He'll be there again October 5 and 6.

RSGB INTERNATIONAL HF AND IOTA CONVENTION

This year's event will be held on October 8-10 at the Beaumont Conference Centre, Old Windsor, Berks, England. Program topics include ZL9CI, C21ZM, IOTA, Winning the CQ WW from West Africa and much more. For more information contact Marcia Brimson, 2E1DAY by telephone at +44 (0) 1707 659015, by e-mail at **marcia.brimson@rsgb.org.uk**, or see the RSGB Web site at **http://www.rsgb.org/news/events.htm**.

LARGE WALL WORLD MAP

For those of you with a big blank wall in your ham shack and a desire for a very big map to fill it, will want to contact Hammacher Schlemmer & Company. Their gigantic world map is current up to June 1998 and was originally published by the Central Intelligence Agency (CIA) and the US Department of Defense. This 9 × 13 *foot* map includes capitals, countries, major cities, up-to-date political boundaries, time zones, shipping lanes, nautical miles, ocean depths, elevations and more. It's available as a standard map for $69.95, or in a laminated write-on format (erasable) for $124.95. Check out their Web page at **http://www.hammacher.com/publish/66553.htm**, or call Hammuacher Schlemmer at 800-543-3366.

AFTER ROWLEY SHOALS

After the Rowley Shoals DXpedition winds up (see last month's column), the team will head for two other island groups for relaxing, fishing, scuba diving and DXing. Operators for these two island groups will include Mal, VK6LC; Jim, VK8PY/K9PPY; and Sam, VK6EEN/CT1EEN. The first stop will be October 2-3 at Malus Island (OC-199), which is located in the Dampier Archipelago. Next they will head over to Green Island (OC-183) to operate October 5-6. Both of these operations should last about 24 hours. QSL all via their home calls.

WRAP-UP

Special thanks go to 5X1Z, G3NUG, K0HB, K1KI, K8VIR, OPDX, PA3AXU, VK6LC, and W6TEX for helping bring the news to us this month. If you have DX news, pictures or letters, send them in today. Until next month, see you in the pileups!—*Bernie, W3UR*

Emil Pocock, W3EP*

Cycle 23 Surges Upward

Solar activity continued its upward climb to an expected peak in late 2000, but many observers have been concerned about the lack of progress earlier this year. Figure 1 shows Cycle 23 monthly sunspot numbers as of August 1, along with smoothed sunspot-number forecasts for the entire cycle. Note the atypical seven-month period during the winter of 1998-1999 (months 29 to 35) when the sunspot number nearly leveled off at around 70, probably depriving us of some early-cycle 6-meter DX. Then during the summer, the sunspot number spiked past 125 and back into the forecast limits.

How does this compare with previous cycles? It is clear that Cycle 23 has had a slow start when compared with Cycle 22 (1986-1996). See Figure 2. Both cycles have demonstrated wildly fluctuating monthly sunspot levels (that much is normal), but the 13-month smoothed average more clearly suggests that Cycle 23 has been sluggish so far. It is difficult to predict what this means for the eventual peak, especially as the hiccup from month 29 to 35 was nearly unprecedented in modern times. Since this column was written in early August, perhaps a clearer pattern has already begun to emerge.

Follow the Progress

You can follow the progress of Cycle 23 by keeping track of the sunspot number or the related solar flux broadcast every hour on WWV, via packet announcements, or on several attractive and informative Web pages. Daily values and three-day forecasts appear on **http://www.sec.noaa.gov/forecast .html** and other sites. The comprehensive NASA sunspot cycle predictions pages can be viewed at **http://science.msfc.nasa.gov/ssl/pad/solar/predict.htm**. Interesting graphs and useful discussions are found on the Norwegian DX Listeners' Club site at **http://www.dxlc.com/solar/**.

Despite the shaky start, 50 MHz worldwide propagation this fall is not seriously threatened. The daily solar flux exceeded 200 (equivalent to a sunspot number of about 160) on several occasions this summer and has been higher than 175 for many days running. This level of solar activity is

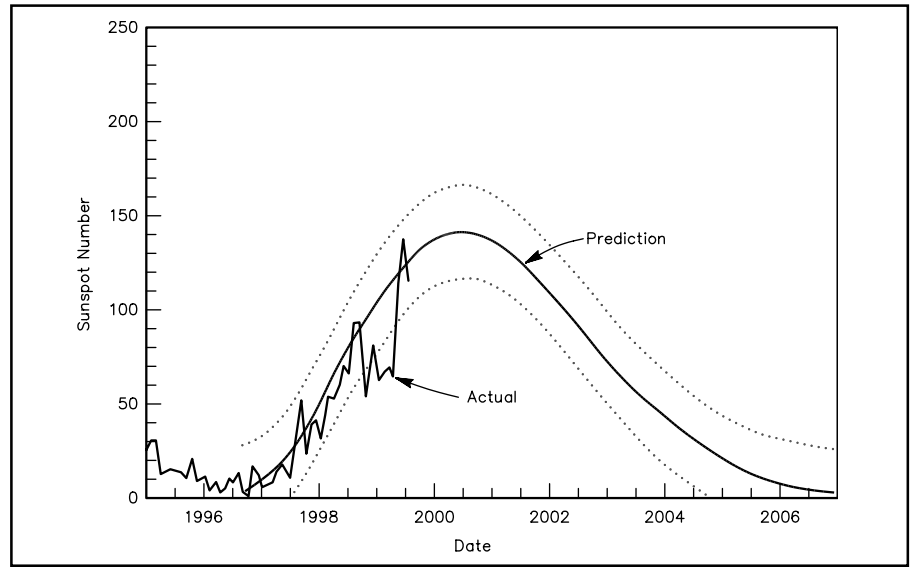


Figure 1—Monthly average sunspot numbers for Cycle 23 are plotted against a forecast of 13-month smoothed averages. The dotted lines indicate a 90 percent confidence interval in the prediction. Source: NASA

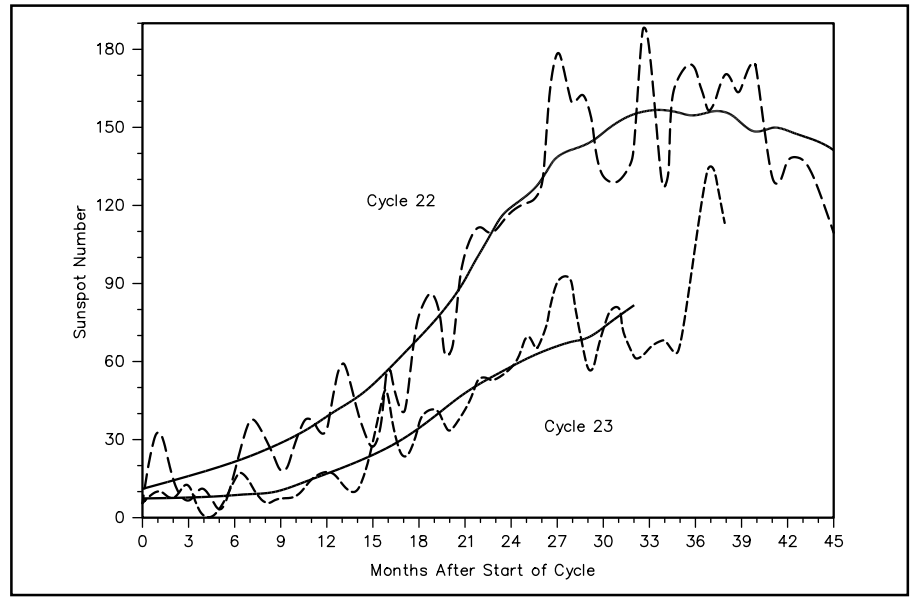


Figure 2—Comparison of the beginnings of solar Cycle 22 and Cycle 23. Solid lines show 13-month smoothed sunspot numbers and the dotted lines show monthly values. Cycle 22 started in September 1986 and lasted 9 years and 8 months. Cycle 23 started in May 1996. Source: DX Listeners' Club.

This Month

October 2	Mid-Atlantic States VHF Conference
October 9-10	Sidewinder Shootout 2-Meter Contest (Willow Grove, PA)
October 23	Microwave Update (Plano, TX)
October 21	Orionids meteor shower peaks
October 24	Good EME conditions
October 30-31	ARRL EME Contest
October 31	Very good EME conditions

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quite sufficient to support worldwide openings from the US and Canada during the fall and winter months. So unless the sun does something very strange, 6 meters should be opening for true DX from North America during the next few weeks.

Preparing for Worldwide DX

A good deal has already appeared in this column about expectations for 6 meters during Cycle 23, along with suggestions for making overseas contacts. The December 1997 column reviewed the relationship between solar activity and 50-MHz F-layer openings. Further discussion of solar flux and the likelihood of transatlantic DX appeared in November 1998. Suggested operating practices and other hints for working 6-meter DX were the featured column lead in December 1998.

It is difficult to foresee the effects of worldwide DX on the band, but it is clear that activity must spread out. For several reasons, a large share of all DX contacts are likely to be made on CW. Signals may not always be strong, making CW a necessity for successful DXing. Many foreign operators do not have the English skills to run North American stations, and some operators prefer CW. One problem is that there simply is not enough room below 50.100 MHz for the expected CW crowd. Due to the large number of beacons from 50.000 to 50.085 MHz and higher, CW stations will be forced to seek clear frequencies higher in the band to avoid interference. In practice, the designated DX window above 50.100 MHz is likely to fill with CW stations when the band is open.

That means that SSB DX operators will be found even higher in the band and will likely be spread out well above 50.200 MHz when conditions are good. It is difficult to imagine, but there are many more active 6-meter stations in Europe than in all of North America. The band will be crowded at times, especially in the morning when eastward paths are favored. Although those in the eastern half of the US will be most affected, a similar effect will exist for those in the west, when the band opens to Japan and the east. There are thousands of Japanese on 6 meters. The band can even get crowded for coast-to-coast openings across North America. These scenarios may seem incredible to those who find the band dead most of the time, but now is the time to consider band use.

If you want to work DX, but can only operate on SSB or have a modest station, by all means search up the band and answer loud DX stations calling CQ on reasonably clear frequencies. This is probably the most productive way to make contacts during short openings. Jumping right into a pileup can be frustrating. There are many DX stations on the band, most especially Europeans. They will be looking for US stations. Thus if you want to try calling CQ yourself, do so on a clear frequency where they can hear you, even if this means going well up the band. This is only common sense and good operating practice.

One effect of international DX activity is that local and domestic contacts on both sides of the oceans are also likely to migrate up the band in search of quiet spots. It may make more sense than ever to use 50.200 MHz more consistently as a domestic calling frequency, even when the band sounds dead. This good practice will avoid likely interference with weak-signal DXers and make it clear that you are interested in ragchewing or other less-frantic QSOs. Whatever your tastes in VHF, good luck in the coming season.

ON THE BANDS

A variety of propagation made July an exciting month. There were 6-meter sporadic-E openings on at least half the days of the month and nearly as many days with 6-meter E-skip propagation across the Atlantic. Two meters was enlivened by E-skip on at least three days. Tropospheric ducting opened paths across the Midwest and from Hawaii to California. All tallied, this was an interesting month. Dates and times are in UTC.

Six Meter DX

Transatlantic sporadic-E paths opened on at least 14 days in July, although many of the openings were weak and spotty. Even the favored northeastern stations had to dig weak Europeans out of the noise much of the time. See the summary in Table 1, made possible in part by reports from VE1YX, WA1OUB, K1TOL, KB1DSG, W3BO, K0ETC and the *Internet Six News* (available through **http://user.itl.net/~equinox/**).

West Coast stations have never been able to participate in these summer openings to Europe, but that did not stop Roger Wagner, K6LMN. He decided to drive to the Canadian Maritimes in mid-July to have a shot of working across the Atlantic. He made 6-meter mobile contacts nearly every day from Illinois to Ontario, but the band refused to cooperate as he approached the eastern coast. Finally, while driving near Gander, Newfoundland (GN28), on the morning of July 17, Roger heard a number of English stations rag-chewing above 50.150 MHz. He pulled off the road and answered G1YLE's CQ for his only European contact of the trip. Was it worth it, Roger?

Six-meter contacts from the US and Canada to Africa were big surprises during this summer sporadic-E season (see reports in the August and September columns). There is one addition to that amazing list. On July 29, VE1YX (FN74) worked 9J2BO (KH44) in Zambia. An hour earlier, W1s heard Portugal, but it was otherwise a quiet day across the Atlantic. The summer's North America to Africa contacts are listed in Table 2. Note that the times for the ZD8VHF beacon and the contacts into southeastern Africa were fairly consistent. Beam headings to the African stations were 80° to 100°. Headings to the ZD8VHF beacon on Ascension Island in the South Atlantic were 100° to 120°.

Reports of such contacts have been rare in past summers. They cannot be via F layer, as the MUF was not nearly high enough along the entire path. The most likely explanation is two or three sporadic-E hops across the Atlantic linked into a near-equatorial F-layer region, where the MUF may have exceeded 50 MHz. Such paths may open again next summer, when the two propagation modes coincide again. Many similar contacts will be made via all-F layer paths this fall, but of course, this will be expected.

50 MHz Sporadic E and Auroral E

The usual garden-variety single-hop E-skip was evident on 6 meters somewhere across the US and Canada at least on July 3-7, 9, 14, 18-20, 22, 23 and 25-30. Greg Saratt, W4OZK (EM64) in Alabama just got on the band with 150 W and a five-element Yagi. During the opening on the evening of July 6-7, he made 44 contacts to the northeast with signal reports up to 30 and 40 over S9. That's 6 meters for you! From his southern-Texas location, Richard Swanson, K0RDS/5 (EL09), needed only 10 W and a three-element beam to work a log-page full of stations all across the South from Mississippi to West Virginia,

Table 1
Transatlantic 6-Meter Sporadic E in July

July	*Time*	*Country Prefixes*
4	1350—1545	VE9, W1—CU3, PA, F, HB9, I, 9A, DL, OK, SP
5	1545—1550	W1, 2—EH7KW
6	1215—1425	VE1, W1, 2—CT, EH
	1305—1330	W4, 8—CT, EH
	1910—2145	VE1, W1—G, PA, SM, DL, I
	1935—2115	VY2, VE1, VE2, W1, 3—G
7	1335	K1TOL—(G)
	1440	WA1OUB—(CU)
	1640—1745	W1—(EH8) (CT)
	1735—1805	W1, W0—CT3FT
	2100—2200?	W1, 2, 3, 4—EH8
10	1220—1300	VE1, W1—(CU), EH
17	1255	VO1/K6LMN—G1YLE
18	1930—2140	VE1, 9, W1— (CU), CT, EH, F, I, G, GI, GW, (SM), (SP), (OH)
19	1020—1140	W1—(CU), EH, CN8UN
	2125—2220	VE2, 3, W1—EH
20	2155—2220	W1—EH
22	1920—2005	KB1DSG—EI, GI
26	2010—2150	VE1, 3, CY9CWI, (FP), W1—CT, EH, G, I
27	1315—1430	W3—CT, EH
	2055—2210	VE1, 9, W1—(CU), (CT), EH
28	2200-2300	W3—EH8
29	1450	W1—(CT)
	1714	VE1YX—9J2BO

Prefixes in parentheses are heard only.

Table 2
North America to the South Atlantic and Africa on Six Meters, Summer 1999

Date	*Time*	*Stations*	*Distance (km)*
May 10	2020	N9BJM—(ZD8VHF)	8700
May 26	1840	W1JJM, W3EP—5H3US	12,300
June 16	2105	VE9AA—(ZD8VHF)	7300
July 7	1710	K1SG—7Q7RM	12,500
July 29	1714	VE1YX—9J2BO	11,500

along with Oklahoma and Colorado.

Even 10 W can be overkill. Ken Neubeck, operating as VP9/WB2AMU, made 10 contacts into New England and New York during the morning of July 6 using 3 W and the internal whip of his battery-powered FT-690. He did all of his transmitting on CW, but this was effective in attracting the attention of several strong SSB stations.

In addition, US and Canadian hams also worked American DX stations VO1GO, CY9CWI, CO2KK, CO2OJ, ZF1DC, KP4EIT, KP4TB, KP2A, VP2E/W6JKV, TI5KD and YV4YC via one or two sporadic-E hops. The best day for Caribbean contacts was probably July 7. Thanks to WA1T, W4OZK, K4GOK, K4KAE, KK4XO, WA5IYX, KC8LGL, W9FX, W0VD and CO2KK, whose reports also made this summary of sporadic-E activity possible.

On the evenings of July 2, 3, 9 and 25 between 0300 and 0530, stations in the west and Midwest made contacts into Alaska and the Yukon, and heard several Northwest Territory beacons. Based on the times and paths, these contacts were most probably aided by northern-latitude auroral E. Among those making the grade were N7EPD (WA), N7DB (OR), W0VD (MN), N0QJM (SD), N0LL (KS), W6OAL/0 (CO), KJ6HI and K7JA (sCA) and K7ICW (NV). On the northern end were VY1JA (CP20), KL7FZ and NL7Z (BP51), AL1VE (BP53), KL7NO (BP54).

144 MHz Sporadic E

Three 2-meter E-skip openings enlivened the higher band during July. They are summarized in Table 3. The Independence Day event provided some fireworks across the Midwest. The responsible sporadic-E clouds were centered over Illinois. They supported contacts from Colorado, Oklahoma, Kansas, Nebraska and South Dakota eastward, not quite to the East Coast. Larry Lambert, N0LL (EM09 in Kansas), made more than two dozen contacts in Michigan, Ohio, West Virginia, Pennsylvania, Maryland and New York. Several QSOs were more than 2000 km distant. VE3AX (FN02) ran off a slew of contacts west of the Mississippi as far as W5SFW and KO5D, both in DM95.

The July 6-7 opening shifted a bit to the east. The active sporadic-E center was over Indiana, and it made possible contacts from the Great Plains all the way to the Atlantic coast. Sam Whitley, K5SW (EM25 in Oklahoma), for example, ran 95 contacts in 17 grids from New Hampshire to West Virginia. Russ Holshouser, K4QI, operating from a portable site in (FN03) South Carolina, worked 1900 km west to South Dakota and Nebraska stations KM0T, W7XU/0, N0NZ, WY0V, N0GX and N0QJM.

Jim Bennett, K4KAE (FM02) caught an opening on July 8 from South Carolina, the only report for that day. He found 13 stations in Minnesota and Wisconsin; four of them were new grids for him. Thanks to N4CH, KC9CFD and W7XU/0, who also contributed to these summaries.

Table 3
144 MHz Sporadic E in July

July	*Time*	*Typical Paths by States*
4-5	0050—0300	CO, KS, TX, OK—MI, OH, WV, MD, VA
		MN, SD—GA, SC, TN
		AR, OK—MI, VE3
6-7	2305—0115	NE, KS, OK, TX—NH, MA, CT, NY, NJ, PA
		SD, MN, IA—GA, SC, NC
		IL—VA, NC
8	0030—0110	SC—MN, WI

144 MHz and Higher Tropospheric Ducting

Sporadic E was not the only news for 144 MHz and higher. Enhanced tropospheric conditions across the Midwest from July 24 to 27 provided some additional interest. Distances worked on 144 and 432 MHz were typically less than 1000 km, but signals were often quite strong in a wide area from north Texas to North Dakota and east to Ohio and North Carolina. N0HJZ (EN34 in Minnesota) worked into western South Dakota (DN84) and eastward to North Carolina (FM06) on 144 MHz, about as widespread as any station reporting.

Del Schier, K1UHF (FN31), had one of those memorable experiences on Saturday morning, June 24. All TV channels from 2 through 13 had interference and Del could hear the W3CCX (FN20) 10-GHz beacon, not a usual circumstance. The bands were open! He found K4DEX (EM95) on144 MHz, who was 20 over S9 despite running just 10 W. The pair then moved to 1296 MHz and easily completed a contact there. Del inquired about even higher bands and, as luck would have it, Dex had 20 W available on 10 GHz. This time the pair exchanged "54" reports over the 898-km path, the longest yet for K1UHF and certainly one of the longest 10-GHz contacts on the East Coast. Del runs just 1 W on the band, respectable power on 3 cm.

More Microwaves

Ken Schofield, W1RIL, provided some notes on recent 24-GHz activity from New England. He and WB1FKF ran a series of mountaintop tests during the spring and summer using 100 mW rigs and 1-foot dishes. W1RIL set up on Mt Wachusett, Massachusetts, for each test, while WB1FKF selected progressively more-distant sites. On May 6, the pair completed an initial 36-km QSO to Westboro. They extended their range to 102 km on June 26 when WB1FKF went to Mt Kearsarge, New Hampshire.

On July 8, the pair more than doubled their distance again to 205 km, with WB1FKF shivering on top of Mt Washington, New Hampshire. Signal levels were still better than 59, which has given the pair hopes of still longer contacts, possibly from Cadillac Mountain, Maine. The listed North American DX record is 267 km, made in Southern California in 1997, while a Japanese team has recently claimed a world-distance mark of 402 km.

The RSGB *Microwave Newsletter* for July/August reported on the first England-to-France contacts on 47 GHz. On April 18, G/F5KMB/p (along with F1LHL and F1PKU) worked F4AQH/p and F6DWG/p, 33 km across the channel. On June 25, G3PYB/p and G8ACE/p extended the cross-channel distance slightly by working F/PA0EHG over a 34-km path. Signals in each case were extremely strong. Stations typically ran 15 mW into small dish antennas.

Hawaii to California

Jack Henry, N6XQ, relayed news that XE2HWB (DL44) in Baja California heard the KH6HME 144-MHz beacon on June 12. The distance is close to 4600 km, significantly longer than the current 4333-km distance record for a two-way contact between Hawaii and the mainland. The old record is sure to fall soon.

The Hawaii-to-California duct was open again from July 6 to 11, when KH6HME made many 144-MHz contacts to California, from San Diego north to the San Francisco Bay area. K7JA (DM03) and possibly others made the grade on 432 MHz. On July 11, KH7L, KH7O and NH7OF set up on the 1200-foot level of Kokohead and joined in the fun by working a log page full of Californians on 144 MHz.

NOTES FROM ALL OVER

VP2E/W6JKV Expedition

Jimmy Treybig, W6JKV, and Dick Hanson, K5AND, operated on 6 meters from a villa on Iscaa's Cliff, Anguilla, from June 24 to July 5. Conditions to the US and to Europe via sporadic E were tremendous. W6JKV logged 815 QSOs in 32 countries, 443 with the US, 337 with Europe, and 34 with other North Americans. The band was open to Europe 10 of the 11 days that the station was on the air. July 4 was the most spectacular date, with 6 meters open simultaneously to Europe and North America from 0900 to past 2230. Jimmy made 270 contacts with Europe on that day alone.

The most distant contacts in Europe were with Sweden, Poland and Greece at distances in the 7500- to 8000-km range. The longest contact to North America was with K6QXY, at nearly 6400 km. Jimmy attributes his success on this and similar expeditions to excellent station siting (in this case, on a quiet cliff overlooking the ocean), an eight-element Yagi on a 40-foot boom, 700 W and willingness to pull weak CW stations out of the noise. For photographs of the expedition and more information, check out the Web site at **http://www.sixitalia.org/bollet99/vp2e_99.htm**.

Two-meter Transatlantic Tests Disappointing

Paul Piercy, VO1HE, led a group of Canadians attempting to make the first transatlantic contact on 144 MHz. They operated VO1AA from Cabot Tower, the site of Marconi's 1901 transatlantic tests at St John's, Newfoundland, from June 26 to July 3. On the other side of the Atlantic, Bill Ward, GM0ICF, led a Scottish team, who operated 2S0ICF/p from Ardnamurchan Lighthouse. Despite a week of coordinated transmissions, nothing was heard. A Belgian group, under the call OT9D, was forced to cancel its efforts due to generator failure and logistical problems.

VHF/UHF/MICROWAVE NEWS

Central States VHF Society

At its 33rd annual conference held in Cedar Rapids, July 23 to 25, the Central States VHF Society honored Gary Gerber, KB0HH, with its Mel Wilson Award and Wes Whittaker, W7CNK, with the John Chambers Award. At the general membership meeting, the recent Central States petition to the FCC to exclude FM and other wideband transmission modes from 50.0 to 50.3, 144.0 to 144.3, 222.0 to 222.15, 431.8 to 432.5 MHz sparked a lively discussion. The text was written by former World Above 50 MHz columnist Bill Tynan, W3XO, and can be reviewed in full (with Bill's follow-up clarifications) via the CSVHF Society Web page, **http://www.csvhfs.org/**.

Much of the talk focused on the ARRL's response to the petition, officially known as Petition for Rule Making, RM-9673. At its July meeting, the ARRL Board of Directors endorsed the goal of protecting CW, SSB and other narrow-mode communications in the VHF and UHF bands, but found that the Central States petition did not sufficiently establish the need for new regulations with specific evidence of abuses. The Board suggested that expanded educational efforts in support of existing band plans (which do protect the narrow modes) have a better chance of success.

In addition, the Board directed ARRL staff to continue its efforts to convince the FCC that the existing ARRL band plans constitute "good amateur practice," in the language of the FCC, and thus would be subsumed under existing regulations. An ARRL official further explained, in a memo widely circulated on the VHF reflectors, that the FCC is not likely to impose new regulations when the trend has been to deregulate radio operations generally. For these reasons, the Board

432-MHz Standings

We compile band standings for 432 MHz each July for publication in the October issue. US operators located east of the Mississippi River must have worked at least five states. All operators must have submitted information within the previous two years. (You need not work additional stations to remain in the standings, but please confirm your continued interest.) Submit data by e-mail to: **standings@arrl.org** or mail paper submissions to Steve Ford, WB8IMY, ARRL, 225 Main St, Newington, CT 06111. To request new report forms, send an SASE to the same address.

Call sign	QTH	States	DXCC	Grids	Best DX† (km)
W1JR*	NH	50	41	195	1397
AF1T*	NH	24	7	—	1375
K1TEO	CT	22	3	95	1900
K1UHF	CT	20	2	64	1604
K1ZE	RI	19	3	70	1236
W3EP/1	CT	18	2	48	1760
W1AIM	VT	15	2	37	1323
K2LME/1	CT	14	2	32	832
K1MAP	MA	13	1	23	970
N1PM	MA	11	2	12	—
KA1EKR	MA	9	1	15	475
K1WVX	CT	9	1	12	—
N1RWY	ME	7	2	15	574
WA1OFR	MA	7	1	9	338
W2CNS	NY	25	3	91	1582
N2WK	NY	23	3	83	1180
N2HLT	NY	23	2	80	1486
K2LGJ*	NY	23	2	—	720
K2AN	NY	21	2	60	1401
K2OVS	NY	16	3	21	420
NB2T	NY	16	1	23	1294
N2DKP	NY	14	1	29	—
WA2ZFH	NY	14	1	27	988
N2DXP	NY	14	—	29	—
W2FCA	NY	13	2	31	640
WA2BAH	NY	13	2	28	825
W3HHN	NY	13	2	27	1170
KA2MCU	NY	9	2	23	755
W2MPK	NY	9	2	—	—
K1JT	NJ	8	1	13	416
KB3PD*	DE	50	27	138	—
W3ZZ	MD	26	2	93	1526
AE3T	PA	23	2	—	—
K3UA	PA	20	3	50	1050
NO3I	PA	19	1	54	1268
WA3DMF	MD	10	1	13	603
K3KEL	PA	9	2	14	620
N3JNX	PA	9	1	19	825
W3SZ	PA	7	1	12	—
WA4MVI*	SC	50	12	—	1771
K4RF	GA	28	2	96	1742
K4MRW	AL	27	2	126	—
K4CKS	GA	27	—	119	1250
KD9KP	TN	26	2	91	1680
N4CH	VA	24	1	72	1400
K4ZOO	VA	23	2	71	1444
N4UK	SC	21	1	68	—
AA4H	TN	21	1	55	1737
N4MM	VA	20	3	58	—
K4KAE	SC	19	3	69	1200
K4RTS	VA	19	2	63	986
W4WTA	GA	18	1	54	1319
WB4JEM	FL	17	3	76	1647
W4EUH	VA	16	2	51	1180
AD4DG	VA	16	1	39	1085
WD4AHZ	FL	15	3	68	2032
WD4MGB	FL	13	3	31	1590
W4KXY	GA	12	1	33	—
W4SW	VA	8	1	20	520
W5FF*	NM	50	—	—	—
W5LUA*	TX	50	—	—	—
W5RCI*	MS	47	26	213	—
WD5AGO*	OK	38	23	100	1740
K5SW	OK	30	2	140	1979
WA5TKU	TX	22	—	69	—
W5ZN	AR	21	1	82	1715
AA5C	TX	18	1	89	1562
N5QGH	TX	17	—	48	—
W5VY	TX	16	2	106	2014
W5AL	TX	15	1	98	1975
K5LLL*	TX	13	2	63	1532
N5HYV	LA	10	—	44	—
WA5VKS	TX	7	1	24	—
K5RHR	NM	6	1	29	574
NL7CO	OK	4	1	13	577
KK5OV	NM	4	1	5	1448
K6JYO	CA	9	—	—	—
N6RMJ	CA	4	3	46	4017
K6QXY	CA	4	3	36	3794
K7RR	CA	3	3	21	830
WB4AYE	CA	3	2	19	3840
N6IFW	CA	3	1	21	715
K6FV	CA	2	2	8	3768
N7STU	CA	2	1	33	—
N6ZE	CA	1	1	5	—
W7HAH*	MT	47	40	178	—
K7XD*	WA	22	13	70	—
K7XC*	NV	8	5	52	743
N7LQ*	NV	7	10	56	770
W7RV	AZ	7	4	56	712
W7PUA	OR	5	2	28	680
N7EIJ	ID	4	2	18	450
KE7SW	WA	3	2	18	410
WA7GSK	ID	3	—	16	—
N7YAG	OR	2	1	18	371
KE8FD	OH	34	2	133	1731
K8MD	MI	31	2	113	2166
N8DJB	OH	30	2	127	—
KU8Y	MI	29	2	98	1406
WA8WZG*	OH	40	18	141	1844
K2YAZ	MI	26	2	102	1300
W8PAT	OH	26	—	58	1631
N8KOL	OH	22	2	63	1179
WB8XX	OH	20	2	62	1570
N8XA	OH	19	2	70	—
KB8RJS	MI	18	2	35	—
K3DMG	OH	14	1	31	1672
WA8NPX	OH	11	2	30	—
N8PUM	MI	11	2	24	—
KB8O	MI	8	2	9	510
WA8EOJ	OH	11	1	40	869
N8VEA	OH	6	2	11	378
WB9SNR	IL	35	2	106	1420
W9ZIH	IL	34	2	69	1520
K3SIW/9	IL	31	2	124	1450
W9UD	IL	28	2	116	1312
K9SM	IL	27	2	85	1145
KA9CFD	IL	25	2	97	1537
W0UC	WI	21	2	97	1471
N9NJY	IL	18	2	62	1020
KA9UZW	WI	16	2	50	1678
N9LAG	IL	16	1	28	—
K9KL	WI	15	2	55	1200
WA1MKE	IN	15	2	47	1200
W9JN	WI	14	1	62	1146
N0AKC	WI	10	1	25	
W9EME	WI	10	—	—	—
WD9BGA	WI	9	1	29	1200
W9FZ	WI	8	1	27	504
K0RZ*	CO	42	44	238	1116
KA0RYT*	MN	33	15	129	1300
W0JRP	MO	25	2	94	1750
W0DFK	MO	25	2	75	1656
W0OHU	MN	23	2	91	1842
KM0A	MO	23	2	77	1524
N0HJZ	MN	22	1	85	1530
KD0PY	IA	22	1	68	1380
WA0BWE	MN	21	2	92	1430
N0LL	KS	21	1	113	1690
K0FF	MO	20	1	74	1189
KA0PQW	MN	18	1	—	1629
KB0IKP	MN	17	2	77	719
N0KQY	KS	17	1	58	1554
N0NZ	NE	17	1	39	1224
K0CJ	MN	16	2	2	1375
W0ZQ	MN	15	2	89	1148
K0GJX	MN	15	2	58	1295
KM0T	IA	14	2	50	1151
K0VSV	IA	13	2	47	1100
WA2VOI/0	MN	12	1	41	1350
W0PHD	MN	11	2	29	—
N0KE	CO	10	1	38	500
WA2HFI/0	MN	9	2	27	932
KA0ZYD	MN	9	1	33	1250
WB0LJC	MN	9	1	25	750
N0SWV	CO	9	1	24	575
NT0V	ND	8	2	30	1284
W0LD	CO	8	—	20	1032
N0UK	MN	6	1	8	514
KF0UK	MN	5	1	15	510
K6LS	CO	4	—	9	300
VE4MA*	MB	50	44	101	1600
VE3KH	ON	18	—	54	1174
VE2PIJ	QC	7	2	21	695

—Information not supplied
*Includes some EME (moonbounce) contacts
†Terrestrial

concluded that the petition is not the appropriate route at this time, however worthy its intent.

The majority of Central States members participating in the annual meeting were disappointed in the League's actions, but despite the petition's weaknesses and technical flaws, they were not inclined to recommend withdrawing it. Sentiment seemed to favor continued support for the effort, if for no other reason than to go on record in favor of protecting the low ends of the VHF and UHF bands by further FCC regulations. More than 50 individuals and clubs filed comments by the July 28 deadline; their comments can be reviewed on the FCC Web site at **http://gullfoss.fcc.gov/cgi-bin/ws.exe/prod/ecfs/comsrch.hts**. Enter RM-9673 to see the list of comments. Across the nation, opinions about the best course of action are mixed.

In any case, nearly all CW and SSB operators are concerned about protecting a small portion of the bands above 50 MHz for CW, SSB and other narrow transmission modes. That is not the issue. The question is how best to accomplish this goal. Whether or not the FCC acts favorably on the petition, there are things we all can do. Politely advise any FM or other wide-mode operators in the low ends of the bands about the existing ARRL band plans (the only protection now afforded) and ask them to move. Make a note of the incident for future documentation. Any further petition to the FCC to protect the low ends of the bands from FM and other wide modes will need ample documentation of actual repeated interference.

Use more of the bands. There is little question that FM, packet and other activities are putting greater demands on spectrum space on the VHF and UHF bands. We need to demonstrate that CW and SSB activity actually occupies at least the frequencies set aside by the ARRL band plans. That cannot happen if activity continues to crowd around 50.125 and 144.200 MHz. Spread out! There is plenty of space and plenty of activity, especially on the two lower VHF bands.

Sidewinder Shootout Two-Meter Contest

Sidewinders on Two (SWOT) is sponsoring a 2-meter contest to be held from 1800 October 9 to 2300 October 10. Exchange grid locator and SWOT membership number (if a member). Any transmitting mode may be used, but contacts on 144.200 or 146.520 MHz, via satellites or using repeaters are not allowed. Score two points for each SWOT member contact and one point for all others. Multiply by the number of different grids contacted. Rovers add the number of different grids from which contacts were made.

Logs must indicate date, time, calls, grids, exact frequency and SWOT number of each contact. Send logs and summary sheet by October 31 to Donald Ross, NL7CO, PO Box 403, Lawton, OK 73502, or by e-mail to **dross@sirinet.net**. Plaques will be awarded to the highest scoring rover and home-station SWOT members. Results will be published in the SWOT newsletter. QST

Coming Conventions

*Edited by **Gail Iannone** • Convention Program Manager*

CONNECTICUT STATE CONVENTION

October 10, 1999, Wallingford

The Connecticut State Convention (Nutmeg Hamfest), sponsored by the Nutmeg Hamfest Alliance, will be held at Mountainside, High Hill Rd; Exit 15 off I-91, Rte 68 E, first left on Research Parkway, first right on Carpenter Ave to end, left on High Hill Rd. Doors are open for setup 6 AM; public 9 AM to 3 PM. Features include hamfest and computer show, huge flea market, tailgating ($15 per 30-ft space), major vendors, VE sessions (register in advance, Joel Curneal, N1JEO, tel 203-235-6932), seminars, lectures, demonstrations, special guest speaker Geoff Fox, WA1U (WTNH-TV Channel 8 Weatherman), ample free parking, refreshments. Talk-in on 147.36. Admission is $6 (under 12, $3). Tables are $25. Contact Gordon Barker, K1BIY, 9 Edgewood Rd, Portland, CT 06480; tel 860-342-3258; **nutmeghamfest@qsl.net**; **http://www.qsl.net/nutmeghamfest**.

PACIFIC DIVISION CONVENTION

October 15-17, 1999, Concord, CA

The Pacific Division Convention (Pacificon '99), sponsored by the Mt Diablo ARC, will be held at the Sheraton Concord Hotel, 45 John Glenn Dr, next to Buchanan Airport. Doors are open Friday and Saturday 8 AM to 9 PM, Sunday 8 AM to 2 PM. Features include swapmeet (Saturday, 6 AM to 3 PM, in the airport apron area behind the hotel; admission is free to buyers and a double-wide space is $10 for sellers), vendors, exhibitors, forums (ARRL, QRP, antenna, APRS, Satellite, and more), special guest speaker Riley Hollingsworth, K4ZDH (Saturday 9-10 AM), banquet (Saturday, 7 PM), Wouff-Hong ceremony (midnight Saturday), VE sessions (walk-ins, Novice through Extra, Saturday and Sunday 9 AM to noon; retakes on Sunday only). Talk-in on 147.06. Admission is $5 in advance (by Oct 1), $8 at the door. Contact Dick Brown, KT6X, 4125 Sacramento St, Concord, CA 94521; tel 925-676-9048; **paccon99@pacbell.net**; **http://www.pacificon.org**.

1999

September 18
W9DXCC, Rolling Meadows, IL*
Western New York Section, Hamburg (Buffalo)*

September 18-19
Virginia State, Virginia Beach*

September 25-26
Alaska State, Anchorage*

October 1-3
Southwestern Division, Long Beach, CA*

November 13
Alabama State, Montgomery

November 13-14
Indiana State, Fort Wayne

November 20-21
Florida State, Tampa

*** See September *QST* for details.**

Attention Hamfest and Convention Sponsors:

ARRL HQ maintains a date register of scheduled events that may assist you in picking a suitable date for your event. You're encouraged to register your event with HQ as far in advance as your planning permits. Hamfest and convention approval procedures for ARRL sanction are separate and distinct from the date register. Registering dates with ARRL HQ doesn't constitute League sanction, nor does it guarantee there will not be a conflict with another established event in the same area.

We at ARRL HQ are not able to approve dates for sanctioned hamfests and conventions. For hamfests, this must be done by your division director. For conventions, approval must be made by your director and by the executive committee. Application forms can be obtained by writing to or calling the ARRL convention program manager, tel 860-594-0262.

Note: Sponsors of large gatherings should check with League HQ for an advisory on possible date conflicts before contracting for meeting space. Dates may be recorded at ARRL HQ for up to two years in advance. QST

Hamfest Calendar

*Edited by **Gail Iannone** • Convention Program Manager*

Attention: The deadline for receipt of items for this column is the **1st of the second month preceding publication date.** For example, your information must arrive at HQ by **October 1** to be listed in the **December** issue. Hamfest information is accurate as of our deadline; contact sponsor for possible late changes. For those who send in items for Hamfest Calendar and Coming Conventions: Postal regulations prohibit mention in *QST* of prizes or any kind of games of chance such as raffles or bingo.

(Abbreviations: *Spr* = Sponsor, *TI* = Talk-in frequency, *Adm* = Admission.)

†**Arizona (Tucson)—Oct 16**; set up 7 AM; public 8 AM to 4 PM. *Sprs:* Old Pueblo RC and AR Council of Arizona. Sabbar Shrine Temple, 450 S Tucson Blvd; I-10, turn E onto Congress/Broadway, turn S onto Tucson Blvd. Swapmeet, vendors, clinics, contests, forums, demos, meetings, special-event stations, RACES van, VE sessions, handicapped parking, free parking, refreshments. *TI:* 146.88. *Adm:* $2. Tables: $5 per 9 x 20-ft outdoor space (tables not provided, electricity available). Glenn Henderson, WA7OBG, 9262 E Indio Pl, Tucson, AZ 85749-9407; tel 520-749-5478; fax 520-760-6773; **linus@primenet.com**; **http://www.hamsrus.com**.

California (Concord)—Oct 15-17, Pacific Division Convention. See "Coming Conventions."

Connecticut (Wallingford)—Oct 10, Connecticut State Convention (Nutmeg Hamfest). See "Coming Conventions."

†ARRL Hamfest

Connecticut (Waterford)—Oct 30. Austin Wolfe, AA1SV, tel 860-443-2459. (Auction)

Florida (Jacksonville)—Oct 29-30. Woody Parker, KF4GSK, tel 904-743-3121.

†**Florida (Palm Beach Gardens)—Oct 16-17;** set up Friday 2-8 PM; public Saturday 9 AM to 4 PM, Sunday 9 AM to 2 PM. *Spr:* Palm Beach Repeater Assn. Amara Shrine Temple, 3650 RCA Blvd; FL Turnpike (Exit 109) or I-95 (Exit 57), E on PGA Blvd to Alt A1A, turn right, go to next light and turn onto RCA Blvd, hamfest on right. Amateur Radio and Computer Show, vendors (Hal Gainen, N4UIT, tel 561-439-0805), tailgating ($10 per space; by reservation only, no electricity), indoor flea market, exhibits, ample free parking, handicapped parking, refreshments. *TI:* 147.165. *Adm:* advance $4, door $5. Tables: advance $20, door $25 (first-come, first-served basis); electricity $10. Ken Summerell, KD4CTG, 5136 El Claro Cir, West Palm Beach, FL 33415; tel 561-640-9447; **sum@flinet.com**.

†**Florida (Sorrento)—Nov 6,** 8 AM to 4 PM. *Spr:* Lake ARA. East Lake Chamber of Commerce Building; St Rte 46 to Sorrento, turn on Rte 437. Hamfest/Computer Show, tailgating ($5 per vendor), vendors, VE sessions (10 AM, walk-ins only). *TI:* 147.255. *Adm:* $5. Tables: $10 (includes 1 paid admission). Chuck Crittenden, KE4EXM, Box 615, Altoona, FL 32702; 352-669-2075; **capias@gate.net**.

Florida (Starke)—Oct 8-9. Tony Spatafore, WB2FGL, tel 904-964-9328.

†**Georgia (Lawrenceville)—Nov 6-7;** Saturday 9 AM to 5 PM, Sunday 9 AM to 3 PM. *Spr:* Alford Memorial RC. Gwinnett County Fairgrounds. Forums, VE sessions. *TI:* 145.45. *Adm:* advance $6, door $8, students $6, under 12 free. Lexann Anderson, KF4KJO, Box 1282, Stone Mountain, GA 30086-1282; tel 770-410-3989.

†**Illinois (Godfrey)—Oct 16,** 8 AM. *Spr:* Lewis and Clark RC. Lewis and Clark Community College, River Bend Arena, on US Rte 67; 32 miles NE of downtown St Louis, MO and 4 miles N of Alton, IL. Indoor flea market, vendors, VE sessions, handicapped accessible, free paved parking, refreshments. *TI:* 145.23. *Adm:* advance $5 (for 3 tickets), door $3 each. Tables: $10 (electricity available if requested). Harold Elmore, N9HE, 5203 Dixon Dr, Godfrey, IL 62035; tel 618-466-1909; **helmore@piasanet.com**; **http://www.ezl.com/~lmiller/lcrc.html**.

†**Illinois (Oakbrook Terrace)—Oct 10;** set up 7 AM; public 8 AM to 3 PM. *Spr:* Chicago ARC. Entrance at Park View Dr, N from Cermak Rd (22nd St), 1 block W of Rte 83. Vendors, tailgating, free paved parking. *Adm:* advance $4, door $5. Tables: bring your own. George Sopocko, WA9JEZ, 5631 W Irving Park Rd, Chicago, IL 60634; tel 773-545-3622.

Indiana (Bedford)—Oct 3. Keith Harris, N9KH, tel 812-275-3415.

†**Indiana (Lebanon)—Oct 24,** 8 AM to 1 PM. *Spr:* Boone County-Clinton County ARC. Boone County Fairgrounds, 24 miles NW of Indianapolis; I-65, Exit 138. VE sessions (9-11 AM), refreshments. *TI:* 147.105, 443.15. *Adm:* $3. Tables: contact Sue Youkey, N9NVE, tel 765-436-2565; **wk9d@in-motion.net**. Sara Lecklitner, KB9OEZ, 515 W Chicago St, Lebanon, IN 46052; tel 765-482-9152.

†**Iowa (Des Moines)—Oct 31;** set up Saturday 6-9 PM, Sunday 6 AM; public 8 AM to 2 PM. *Spr:* Tikva Tracers ARC. Iowa State Fairgrounds 4-H Building. Seminars ("Ask the Experts"), forums, VE sessions, refreshments. *TI:* 146.82. *Adm:* $5. Tables:

$10 (first table), $8 (each additional); electricity $8. Cass Nemmers, N0YMU, 670 36th St, Des Moines, IA 50312; tel 515-277-6346; **hamfestiowa@juno.com**; **http://www.bestofiowa.com/hamfestiowa/**.

†**Kentucky (Hazard)—Nov 6,** 8 AM to 2 PM. *Spr:* Kentucky Mountains ARC. Hazard High School, Highway 15 S. *TI:* 146.67. *Adm:* $3. Tables: $4. John Farler, K4AVX, 109 Hall St, Hazard, KY 41701; tel 606-436-5354; **jfarler@mis.net**; **http://www.geocities.com/SiliconValley/2564/kmarc.html**.

†**Louisiana (Lake Charles)—Oct 23,** 7 AM to 4 PM. *Spr:* Southwest Louisiana Amateur Repeater Club. Habibi Temple, 2928 Pack Rd; I-10, go N on 171 through 4 stop lights, then take the right leg at the "Y". VE sessions. *TI:* 146.73. *Adm:* Free. Tables: $15 ($5 additional for power). Dick Rogers, WB5TUG, 249 Frazier, Lake Charles, LA 70605; tel 318-474-7947; **hotred@linknet.net**.

†**Maryland (Westminster)—Oct 24;** set up 6 AM; public 8 AM to 2 PM. *Spr:* Carroll County ARC. Carroll County AG Center, 702 Agriculture Dr; from Baltimore take I-695 to I-795 to Rte 140 to Center St to Gist Ave to Agriculture Dr. Tailgating ($5 per space), vendors, free VHF/UHF radio checks by commercial technician, VE sessions. *TI:* 145.41. *Adm:* $5, under 18 free. Tables: $12 each (every 4th table free; tables guaranteed only if reserved by Oct 8 with full payment to Mason-Dixon Computer and Hamfest, Box 2211, Westminster, MD 21158; tel or fax 410-795-2556). Steve Beckman, N3SB, 2145 Bethel Rd, Finksburg, MD 21084; tel 410-876-1482; **k3pzn@qis.net**; **http://www.qis.net/k3pzn**.

Massachusetts (Cambridge)—Oct 17. Nick Altenbernd, KA1MQX, 617-253-3776.

†**Michigan (Kalamazoo)—Oct 17;** set up 6 AM; public 8 AM. *Sprs:* Kalamazoo ARC and SW Michigan AR Team. Hazel Grey Bldg at Kalamazoo County Fairgrounds; I-94 to Exit 80 N (Sprinkle Rd) to Business Loop 94 W to Lake St, E to Fairgrounds. Trunk sales ($5), vendors. *TI:* 147.04. *Adm:* advance $3, door $4. Tables: $1.50 per foot (4 ft minimum). Send SASE to Gary Hazelton, N8GH, 75075 M-40, Lawton, MI 49065. Charlie Burgstahler, KA8BLO, 6658 Carlisle, Kalamazoo, MI 49001; **ka8blo@net-link.net**; **http://www.qsl.net/ka8blo/hamfest.html**.

†**Michigan (St Joseph)—Nov 7,** 8 AM to noon. *Spr:* Blossomland ARA. St Joseph Kickers Club, 2601 Hetler; 10 miles S of St Joseph on US 31; from Exit 28 on I-94 take US 31 S for 6 miles to club. Vintage Radio Display, VE sessions. *TI:* 146.82. *Adm:* advance $3, door $4. Tables: advance $4, door $5. Duane Durflinger, KX8D, 1051 Main St, St Joseph, MI 49085; tel 616-982-0404; **comdac@comdac.com**; **http://www.comdac.com/bara**.

†**Michigan (Warren)—Oct 24,** 8 AM to 2 PM. *Spr:* Utica Shelby Emergency Communications Assn. Italian Cultural Center, 28111 Imperial Dr; I-696 to Exit 24 (Hoover), N on Hoover to 12 Mile Rd, E on Hoover past hospital to Imperial Dr, S 1 block on Imperial Dr. Seminars (mobile antennas, HF antennas, packet radio, APRS, GPS), left foot CW contest, VE sessions (9 AM to noon), refreshments. *TI:* 147.18 (100 Hz). *Adm:* $5. Tables: $15. Debbi Cokewell, KB8YYB, 803 N Rembrandt, Royal Oak, MI 48067; tel 810-263-0227; **cuer@juno.com**; **http://www.useca.org**.

†**Minnesota (St Paul)—Oct 30,** 8 AM to 4 PM. *Spr:* Twin City FM Club. St Paul Civic Center, Hwy 94 to downtown St Paul to Kellogg and 7th St. Forums and seminars, demos, VE sessions. *TI:* 146.76. *Adm:* advance $6, door $8. Dale Reak, KB0VCV, Box 5598, Hopkins, MN 55122; tel 612-687-9535.

Mississippi (Biloxi)—Oct 15-16. Wayne Miller, KB5AAU, tel 228-539-9929.

†**Missouri (St Louis)—Oct 31,** 8 AM to 1 PM. *Sprs:* St Louis ARC and Gateway to Ham Radio Club. Kirkwood Community Center, 111 N Geyer; Hwy 270 to Dougherty Ferry Rd, E to Geyer Rd, S to hamfest. Halloween Hamfest, swap tables, dealers, VE sessions, plenty of parking, refreshments. *TI:* 146.91. *Adm:* Free. Tables: commercial $15 (with electricity), noncommercial $8. Steve Welton, WB0IUN, 9847 Arv-Ellen Dr, Affton, MO 63123; tel 314-638-4959; **slw@partyline.net**.

Montana (Bozeman)—Oct 16. Don Wilson, KC7EWZ, tel 406-586-6659.

†**New Jersey (Teaneck)—Oct 9,** 8 AM to 2 PM. *Spr:* Bergen ARA. Fairleigh Dickinson University; from the E take the George Washington Bridge to Rte 4, go W about 5 miles to River Rd Exit; from the W take the Garden State Parkway to Exit 161 (Rte 4 E), take Rte 4 E to River Rd (Fairleigh Dickinson Exit). Outdoor flea market ($10 per space, includes admission; limited number of spaces available with power at $20 each, call to reserve), vendors, VE sessions (8-10 AM only, Novice thru Extra; bring original FCC license, a photo copy and positive ID), lots of parking, refreshments. *TI:* 146.79. *Adm:* $5, nonham spouses and children free. Jim Joyce, K2ZO, 286 Ridgewood Blvd N, Westwood, NJ 07675; tel 201-664-6725; **jjjoyce@cybernex.net**; **http://www.bara.org**.

†**New York (Lindenhurst)—Oct 24.** *Spr:* Great South Bay ARC. Knights of Columbus Hall. VE sessions, vendors, refreshments. *TI:* 146.685 (136.5 Hz). *Adm:* $6. Tables: advance $15, door $20. Tom Carrubba, KA2D, 226 Sheffield Ave, N Babylon, NY 11704-5305; tel 516-422-9594; **info@gsbarc.org**; **http://www.gsbarc.org**.

†**New York (Poughkeepsie)—Nov 7;** set up 6 AM; public 8 AM. *Spr:* Mt Beacon ARC. John Jay High School, Rte 52, E Fishkill; Exit 15 off I-84, N on Lime Kiln Rd, left onto Rte 52, first left after Hudson Valley Research Center. Large indoor location, VE sessions, refreshments. *TI:* 146.97 (100 Hz). *Adm:* $5 per family. Tables: $10 per 6-ft table; $6 for 12-ft space (bring your own table). Ken Akasofu, KL7JCQ, 8C Hudson Harbor Dr, Poughkeepsie, NY 12601-5367; tel 914-485-9617; **kl7jcq@arrl.net**; **http://www.mhv.net/~fritzing**.

North Carolina (Maysville)—Oct 10. Jo Ann Taylor, WD4JYR, tel 252-393-2120.

†**Ohio (Ashland)—Oct 17,** 8 AM to 2 PM. *Spr:* Ashland Area ARC. Ashland County Fairgrounds, Claremont Ave. Hamfest/Computer Show, outdoor flea market ($3 per 10-ft spot). *TI:* 147.105 (71.9 Hz). *Adm:* advance $4, door $5, under 16 free. Tables: advance $9 (must be paid in advance by Sep 30), door $12. Dave Fike, N8UCA, 979 Twp Rd 1654, RFD 6, Ashland, OH 44805; tel 419-289-1082; **aaarc@hotmail.com**.

†**Ohio (Marion)—Oct 31,** 8 AM to 3 PM. *Spr:* Marion ARC. Marion County Fairgrounds Veterans' Memorial Coliseum. 26th Annual HamFiesta and Computer Show, ample parking, refreshments. *TI:* 147.3. *Adm:* advance $4, door $5. Tables: $10. Karen Eckard, N8KE, 6583 South St Meeker, Marion, OH 43302; tel 740-499-3565; **meeker@gte.net**.

†**Ohio (Massillon)—Oct 31,** 8 AM. *Spr:* Massillon ARC. Stark County Fairgrounds, I-77 at Canton. Hamfest and Auction (all indoors), vendors, computers, auction (10 AM, 15% commission charged on all items sold), handicapped accessible, free parking. *TI:* 147.18, 442.85. *Adm:* advance $4, door $5, under 12 free. Tables: $10. Terry Russ, N8ATZ, 3420 Briardale Dr NW, Massillon, OH 44646; tel 330-837-3091; **marc.hamclub@juno.com**.

†**Oklahoma (Altus)—Oct 23,** 8 AM to 5 PM. *Spr:* Altus Area ARA. Altus Community Center, 401 Falcon Rd; 1 mile N of Courthouse. Flea market. *TI:* 146.79. *Adm:* Free. Tables: $5. M. K. Schenkel, W5VXU, Rte 1, Box 140B, Lone Wolf, OK 73655-9756; tel 580-846-5578; **w5vxu@juno.com**.

†**Oklahoma (Kingston)—Oct 29-30;** Friday 3 PM to Saturday 5 PM. *Spr:* Texoma Hamarama Assn. Lake Texoma Lodge, Hwy 70, 5 miles E of Kingston. Flea market, vendors, dealers, screwdriver antenna assembly, MARS, packet, VE sessions (11 AM, bring original and photocopy of license, two IDs, one with picture, original and copy of CSCE, $6.45 correct change), RV parking. *TI:* 147.39 (118.4 Hz). *Adm:* advance $9, door $11. Tables: $15. Herb Sleeper, WB5PHM, 8144 Carriage Ln, Wichita Falls, TX 76306; tel 940-855-5820; **retmarine@cst.net**; **http://www.qsl.net/kc5sig/hamarama/**.

Oregon (Rickreall)—Oct 23. Bob Boswell, W7LOU, tel 503-623-2513.

†**Pennsylvania (Greensburg)—Oct 24,** 8 AM to 2 PM. *Spr:* Foothills ARC. Greensburg VFD, McLaughlin Dr. *TI:* 147.18. *Adm:* Free. Tables: $10 (8-ft, indoors, reserve in advance). James Yex, WB3CQA, 2189 Lancelot Dr, N Huntingdon, PA 15642; tel 724-864-6228; **jpyex@sgi.net**; **http://www.geocities.com/Heartland/Acres/7896/**.

Pennsylvania (Linglestown)—Nov 7. Harold Baer, KE3TM, tel 717-566-8895.

†**Pennsylvania (Sellersville)—Oct 17;** set up 5 AM; public 7 AM to 2 PM. *Spr:* RF Hill ARC. Sellersville Firehouse, Rte 152, 5 miles S of Quakertown and 8 miles N of Montgomeryville. Vendors, VE session (10 AM to 1 PM, all classes, bring documents). *TI:* 145.31. *Adm:* $5. Tables: $12 each (indoor, 5 or more $10 each); $6 (outdoor space, bring your own table). Linda Erdman, KA3TJZ, 2220 Hill Rd, Perkiomenville, PA 18074; tel 215-679-5764; **http://www.rfhill.ampr.org**.

†**South Carolina (Myrtle Beach)—Nov 6,** 7 AM to 2 PM. *Spr:* Grand Strand ARC. Old Myrtle Beach Air Force Base, Red Cross Parking Lot; US 501 to 17 Bypass, go S on bypass to second traffic light (about 3 miles), turn left at light and follow signs. Huge outside flea market and tailgate area ($5 per spot, bring your own table), vendors, VE sessions (11 AM, Red Cross Building; **w0rxr@w4gs.org**), plenty of parking, refreshments. *TI:* 147.12. *Adm:* Free. Jim Wood, KF4CJE, 614 N Hollywood Dr, Surfside, SC 29575; tel 843-238-0800; **kf4cje@w4gs.org**; **http://www.w4gs.org**.

†**Tennessee (Chattanooga)—Oct 23,** 8 AM to 4 PM. *Spr:* Chattanooga ARC. Camp Jordan Arena, Fred Pruitt Parkway; I-75, Exit 1, go 1 block E on Ringgold Rd, left on Fred Pruitt Parkway, stay left for 1/4 mile, arena on right. Flea market, dealers, exhibitor booths, manufacturers' representatives, overnight camping with security ($11 per night), VE sessions, handicapped parking. *TI:* 146.79, 444.1. *Adm:* $5. Tables: $25 (flea market), $65 (booths). David Hoffman, KE4FGW, Box 772, Hixson, TN 37343-0772; tel 423-877-7398; **w4am@qsl.net**; **http://www.qsl.net/w4am**.

†**Tennessee (Gray)—Oct 16,** 8 AM to 4 PM. *Sprs:* Kingsport, Bristol, and Johnson City RCs. Appalachian Fairgrounds, Exit 57 off I-81 to I-181 S, take Exit 42 off I-181 to Fairgrounds. Large drive-in indoor and outdoor flea market, RV hookups, VE sessions. *TI:* 146.97, 146.79. *Adm:* $5. Wendell Messimer, K4ZHK, 175 E Highland Rd, Johnson City, TN 37601; tel 423-928-4407; **messimerw@ten-nash.ten.k12.tn.us**; **http://home.naxs.com/jcara**.

Texas (Belton)—Oct 2. Mike LeFan, WA5EQQ, tel 254-773-3590.

†**Texas (Denton)—Oct 16,** 8 AM. *Spr:* Denton County ARA. Denton Civic Center, 515 N Bell Ave; E of center of town, corner of McKinney and Bell Ave. VE sessions, vendors. *TI:* 146.92 (110.9 Hz). *Adm:* advance $5, door $6. Tables: $12 (vendors), $8 (individuals). Don Mathis, KB5YAM, 1190 Emerald Sound Blvd, Oak Point, TX 75068-2236; tel 972-292-1203; **dmathis@lsic.net**; **http://lsic.net/dhf**.

†**Texas (Odessa)—Nov 6-7.** *Spr:* West Texas ARC. Ector County Coliseum, 42nd and Andrew's Hwy. VE sessions, hidden transmitter hunts. *TI:* 145.47 (88.5 Hz). *Adm:* advance $7, door $8. Tables: $8 each (8-ft, no limit). Robert Jordan, N5RKN, 1521 E 13th, Odessa, TX 79761-2958; tel 915-335-7980; **n5rkn@cableone.net**; **http://www.wt5arc.org**.

Utah (Cedar City)—Oct 16. Russ Roberts, K7USN, tel 435-865-7822.

†**Washington (Chehalis)—Oct 17,** 10 AM to 3 PM. *Spr:* Chehalis Valley ARS. Lewis County Fairgrounds, Blue Pavilion, 2555 N National; I-5, Exit 79, turn right from S or left from N onto Chamber Way, left onto National Ave, National becomes Kresky, left onto Exhibitor Way, left onto National. Flea market, VE sessions. *TI:* 146.46, 145.43. *Adm:* $3. Tables: 6-ft, advance $15 (with power), $10 (no power); door $20 (with power), $15 (no power). Bill Harwell, KC7QHJ, 362 SW Chehalis Ave, Chehalis, WA 98532; tel 360-748-8086; **bharwell@localaccess.com**; **http://www2.localaccess.com/teaser/cvars/**.

†**Wisconsin (Kaukauna)—Nov 7**; set up 6 AM; public 8 AM to 2 PM. *Spr:* Fox Cities ARC. Starlite Club, W 2091 Cty JJ; Hwy 41 to Hwy 55 N to Cty JJ (SW corner of Cty Rd JJ and Hwy 55). Vendors, VE sessions (registration 8-9 AM, no walk-ins after 9 AM; bring original license plus 2 copies and photo ID; Cathy Keating, N9FZL, 920-766-3091), refreshments. *TI:* 146.52. *Adm:* advance $4 (must be received by Oct 31), door $5. Tables: $8 (8-ft). Chad Pennings, N9PRC, 1912 Russet Ct, No 7, Appleton, WI 54914; tel 920-993-0485; **n9prc@kb9byq.ampr.org**; **http://www.w9zl.ampr.org**.

Wisconsin (Milwaukee)—Nov 6. Mike Borchardt, N9NPB, tel 414-367-3953.

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**.

Edited by **Diane P. Ortiz, K2DO***

The 1999 YLRL Convention

How do you describe the 1999 YLRL Convention? "Tumultuous," "fabulous," "awesome," "the best ever," and "inspiring" were just a few of the many comments heard from the over 160 women who attended the four-day event. Ranging in age from 13 to 94, and hailing from New Zealand, Japan, Germany, France, Sweden, Austria, Luxembourg, Italy, Canada, Mexico and the United States, YLs converged on the *Queen Mary* in Long Beach, California to celebrate the 60th anniversary of the Young Ladies Radio League.

From 8 AM until late evening the YLs always found something to talk about, even when there was a language barrier. Somehow the message of 33 and friendship between YLs always came through. In some instances communication was accomplished through exchanges of QSLs or small gifts. Popular gift items included handmade bookmarks, jewelry, keychains, engraved pens and pencils, pins and more. Some gifts were representative of their home state or country and often had the YLRL "girl-on-the-world" symbol, or the YLRL logo. One dedicated woman, 94-year-old Hazel Cain, K9QGR/6, made hundreds of prizes and table favors that were given out at the convention. She has been a ham for 50 years and has attended almost every YLRL convention. Many women also wore special commemorative pins designed by Marti Brutcher, W7AYL, listing the call signs of the 12 YLRL "founding mothers": VE2HI, W9NLW, W8SMM, W5HYF, KH6IHW, W6RGX, W7GXI, W8TAY, W6WSV, W1GQT, K4LMB, W6NAZ and W0UA.

Diane, K2DO (left), and Jan, KJ4N, compare DXpedition notes at the YLRL convention.

Left to right: Diane, VA3SJF; Jan, KJ4N; Peggy, KY8Y; Nancy Rabel Hall, KC4IYD (YLRL president); and Ruthanna, WB3CQN.

Popular Events

Most of the YL events were held on the ship, beginning with registration and hospitality on Thursday in the Aquitania room just off the impressive wood-paneled lobby. A dedicated group of women managed to staff this room from 7 AM to almost 11 PM each day, ready to help with information about the convention and related activities.

At one of the YL seminars Arline Berry, W1LIO, gave a presentation about an Amateur Radio patch she has developed in cooperation with the Girls Scouts of America and the ARRL. A major discussion thread throughout the convention was the challenge of ensuring the existence of YLRL for the next 60 years. With this in mind there was much interest in introducing ham radio to young women. Arline suggested that YLs take an active role in inviting local Girl Scouts to their stations to participate in JOTA, which is an international Scouting event held on the third weekend in October to promote Scouting goodwill by way of Amateur Radio. You do not have to be a Girl Scout to participate in this event. JOTA, or Jamboree on the Air, takes place October 16 and 17, and *all* Scouts are encouraged to participate. Some useful Web links are **http://www.arrl.org/ead/jota.html** for JOTA information and **http://www.gsusa.org/organization/ind_program.htm** for a state-by-state listing of Girl Scout Councils. For a list of suggested requirements for the patch e-mail Arline at **W1LIO@juno.com,** or write to her at 6 Causeway Lane, Medfield, MA 02052. See the JOTA article by Jean Wolfgang, WB3IOS, in last month's *QST* and take a look at some of last year's JOTA participants in "Up Front" in this issue.

Janet Margelli, KL7MF, at the YL luncheon, and Ann Santos, WA1S, at the breakfast on Sunday morning, brought the YLs into the world of DXpeditions through slides, music and narration of their trips to China, the Caribbean and the Pacific. They described the excitement, fun and, occasionally, danger of going to parts of the world that are far from civilization to activate them as IOTAs (Islands on the Air), or as valued contest multipliers. In many cases they were the first YLs to operate from these remote locations.

On Saturday morning at 9AM, the YLs assembled on the aft deck of the *Queen Mary* for one of the most difficult, but fun, events—a group picture. Getting everyone organized and seated was a challenge, but the group took it with great cheer.

Business and Banquet

There was a serious side to the YLRL convention and at the main business meeting there were topics on the agenda ranging from database management of member information (including e-mail addresses) and affiliation status, to Internet availability and distribution of newsletters and rosters. Changes to the YLRL contests were considered and a new YLRL Web page at **http://www.qsl.net/ylrl** was announced. There were many suggestions and lively discussions of these and many other issues. YLRL president Nancy Rabel Hall, KC4IYD, said the club call, K4LMB, in memory of founding mother Ethel Smith, K4LMB (SK), had finally been approved by the FCC.

At the gala banquet dinner on Saturday night the guests were entertained by master of ceremonies Dave Bell, W6AQ, and enthralled by the passionate and articulate presentation of banquet speaker Cynthia Wall, KA7ITT. Cynthia is the author of the popular Amateur Radio adventure book series for young people. She played an audiotape of her late stepmother Lenore Jensen W6NAZ, one of the YLRL founders, as she helped a young serviceman connect with his mother via a phone patch. Cynthia said the 68,000 phone patches Lenore made were an inspiration to her. She explained how the YLs of today are the models for some of the characters in her books—strong, successful, honest women who have an interest in Amateur Radio. Cynthia left a lasting impression on the audience with the comment that indeed the spirits of the founding mothers have transformed generations of radio girls into radio *women*.

See You in Cincinnati

The convention ended with many hugs, promises to keep in touch, and regrets that the event had come to an end. The next YLRL convention is scheduled for 2002 in the Cincinnati, Ohio area, and will be hosted by the Buckeye Belles. Hazel, K9QGR/6, said she's already planning favors for the Cincinnati gathering. She, and the rest of the YLs, look forward to seeing *you* there.—*33, Diane, K2DO*

*PO Box 296
Bellport, NY 11713
hamyl@aol.com

Silent Keys

By Kathy Capodicasa, N1GZO

It is with deep regret that we record the passing of these amateurs:

KB1AFZ, Thomas H. Worden, Ware, MA
WB1ASP, George E. McGillicuddy, Houlton, ME
*K1BFG, Robert A. Payne, Barre, MA
WB1GWA, Theodore P. DeLesdernier, Shutesbury, MA
N1IJF, Donald G. Coon, Burlington, MA
KA1INO, Richard. Simonson, West Roxbury, MA
K1LLN, Robert H. Day, Ellsworth, ME
*W1LQQ, Charles E. Gagnon, North Conway, NH
AA1ME, George W. Branchaud, N Clarendon, VT
W1OLP, George A. Wilson, Marstons Mills, MA
W1RZB, August V. Mackro, Monroe, CT
W1ULW, Nelson O. Lindley, Falmouth, MA
K1ZNH, Stanley E. Jacke, Malvern, PA
W1ZQ, Ralph E. Parsons, East Lebanon, ME
W2AZB, Richard R. Drum, Metuchen, NJ
AK2H, Warren H. Ash, Kingston, NY
K2RKZ, Lucius R. Wellington, Lake Butler, FL
KB2TTZ, Marian L. Haas, Raritan, NJ
WA2TUI, C. F. Carlton, Camillus, NY
K3AMN, John C. Graham, Collegeville, PA
WB3CBC, Francis J. Pettijohn, Glen Arm, MD
W3CQ, H. P. Nesbitt, Rockville, MD
N3DCK, Victor M. Rolli, Sarasota, FL
WA3DHT, Philip E. Urner, Royersford, PA
W3GOX, Joseph C. Crownover, Reading, PA
W3HFY, Harold P. Grace, Havertown, PA
K3IWZ, John D. Achey, Hamburg, PA
N3NCR, Maureen McGurn, Silver Spring, MD
N3NKY, Russell J. Fallecker, Chicora, PA
K3QZA, Jack E. Fisher, Emlenton, PA
W3UK, Waldo H. Newell, Cape Canaveral, FL
W4BDQ, Andrew B. Lucas, Newport News, VA
KJ4BH, Charles W. Zimmerman, Huntsville, AL
AC4CE, Fred C. Hebbel, Madiera Beach, FL
KB4CUP, Frank E. Dawson, Charlotte, NC
N4DWY, Harry Matus, Bayonet Point, FL
W4EKI, Hyman R. Goodman, Louisville, KY
KF4EKT, Samuel P. Bauer, Wilmington, NC
W4EOZ, J. Fraser Lyon, Jr, Columbia, SC
W4FZH, Fred S. Barnes, New Syrma Beach, FL
WB4HJF, Thomas G. Harvey, Melbourne, FL
*WA4IHQ, Robert C. Martin, Falls Church, VA
W4JDK, David D. Buyck, Jr, Saint Matthews, SC
*K4JQB, Wayne P. Myers, Abingdon, VA
WA4JVR, Render L. Whatley, Seminole, FL
WD4KDI, Ellis C. Baker, Steinhatchee, FL
*WD4KGY, Oliver O. Thigpin, Saint Petersburg, FL
W4LBK, Robert I. Jones, Spanish Fort, AL
WA4MYA, Mary A. Hicks, Miami, FL
KA4NRX, Arthur T. Carmody, Saint Petersburg, FL
WB4ODZ, Edward F. Von Bergen, Hampton, VA
NI4O, C. Petree, Knoxville, TN
KC4PGS, Herschel E. Vaughn, Fort Walton Beach, FL
W4SIB, Jack E. Krepp, Kannapolis, NC
KC4SSO, Donald C. Huddleston, Louisville, KY
KD4SUU, Danny O. Sheehan, Richmond, VA
WA4TTC, Sherman Ferguson, Central City, KY
WA4VHM, Richard T. Ely, Memphis, TN
W4WSY, Calvin J. Desportes, Columbus, GA
W4YDD, Paul M. Nance, N Myrtle Beach, SC
W5AAQ, Richard C. Webb, Alamogordo, NM
WB5CZS, Vernon Ainsworth, New Boston, TX
N5DOX, William G. Jones, Abilene, TX
KA5EDD, P. G. Metevelis, Tulsa, OK
*NK5H, Winslow E. Brown, Hot Springs National Park, AR
AA5MC, Sam W. Marshall, New Braunfels, TX
AB5P, S. Brett Coningham, Albuquerque, NM
NX5R, Clement L. Roberts, Fort Worth, TX
KA5TNX, John H. Bandlow, Sr, Mena, AR
N5ZVK, Gene O. Hill, Tulsa, OK
W6BOX, Walter O. Hofer, Glendora, CA
WA6BZC, Jesse E. Caton, Anza, CA
W6CZ, Lawrence Geroulld, Roseville, CA
W6DBK, Donald R. Bellis, Center Point, TX
W6EI, Clayton J. Ankeny, Long Beach, CA
WB6JJR, David Glisan, Felton, CA
*NC6J, Robert A. Chambers, San Diego, CA
W6JQB, Albert F. Hill, Redlands, CA
W6NLJ, John J. Tonnelli, Lompoc, CA
KE6OKZ, Stanley R. Blair, West Hills, CA
W6RZM, Daniel E. Gies, El Cajon, CA
W6TWZ, Edward C. Wackernagel, Missoula, MT
K6YC, Robert H. Brydon, San Marcos, CA
‡W6YK, Kenneth H. Day, Bakersfield, CA
AA7AY, Robert E. Jones, Casper, WY
KI7CL, Charles R. Mickley, Aloha, OR
KD7DT, Bert W. Weber, Poulsbo, WA
K7EUA, Gene A. Westfall, Spokane, WA
KC7GO, John W. Reddix, Sierra Vista, AZ
W7ISF, Larry Swanson, Hayden Lake, ID
W7KKQ, Frank C. Cook, Seattle, WA
KB7KQT, Helen B. Woody, Spokane, WA
WB7NUP, Hoyt D. Cameron, Chattanooga, TN
WB7NVX, Dee R. Herrera, Ione, WA
KH7S, Alfred Sacramed, Waimea, HI
WB7SMI, George W. Barker, Saint George, UT
N7SSI, Dale E. Castle, Chewelah, WA
N7TIF, Steven P. Mitchell, Medford, OR
WA7YHO, Bruce C. Smith, Casa Grande, AZ
WA7YNP, William A. Olson, Polson, MT
KC8CJU, Joseph W. Riley, Van Wert, OH
KD8CL, Robert S. Hodgson, Dearborn Heights, MI
WD8EGN, Roy G. Latham, Cincinnati, OH
KB8GLW, Sarah Wolfe, Cleveland Heights, OH
W8MOW, William F. Rhodes, Troy, OH
W8NI, Henry F. Brolin, Manistique, MI
N8OCI, Thomas W. Boughen, Hamilton, OH
*WB8TNT, James F. Ferguson, Jacksonville, FL
W8WAU, Estol Fuller, North Hampton, OH
KG8YX, John N. Tomlins, Rochester, MI
K8ZGT, John P. Chapman, Huntington, WV
K9BGU, Thomas R. Haley, Seymour, IN
AG9D, James R. Harden, Largo, FL
WY9E, James M. Promis, Oneida, WI
K9GLD, Frank Stuhlman, Plainfield, IL
N9GSP, Rosamond Polk-Waters, Fort Wayne, IN
W9JHP, Victor Vater, Madison, WI
WB9MPP, Vern A. Weiss, Sr, Kankakee, IL
KA9ONQ, Orville A. Stewart, Milwaukee, WI
W9QBB, Tasker C. Day, Johnson City, TN
W9QZJ, Harry C. Wilson, Springfield, IL
N9TOQ, David L. Peterson, LaCrosse, WI
KC0CL, David B. Swezy, N Kansas City, MO
WD0DZZ, Harold D. Bedwell, Washington, MO
*W0LP, Leonard Hofstad, Minneapolis, MN
W0MD, George D. Johnson, Duluth, MN
W0NTT, Norman H. Rahe, Bridgeton, MO
W0PEX, Alvin H. Smith, Sioux City, IA
WA0QGL, Bruce D. Thiede, Tower, MN,
W0WTZ, John R. Erikson, St Louis, MO,
KD0YW, Joe Hirschauer, Augusta, MI,
G4DUS, B. H. Pickford, Herts, Great Britain
VE3CDR, Doug Austin, Windsor, ON, Canada
VE3FIJ, Patrick Maguire, Leamington, ON, Canada
*VP9HL, John G. Young, Warwick, Bermuda

*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

75, 50 and 25 Years Ago

October 1924

◊ The cover, by Clyde Darr, 8ZZ, shows an amateur silhouetted against his shack window as he sends a radiogram on his trusty hand key. The editorial reports that the Third National Radio Conference for the Better Regulation of Radio, called by Secretary of Commerce Herbert Hoover, will be held on September 30. As the use of radio by commercial interests continues to expand, there is concern that amateurs could possibly be left out of the frequency assignments. Another editorial topic, "Transocean Working," notes that the hams in Australia and New Zealand have been listening to US hams for years, and they have been heard in the US. The editor ventures that the time is ripe for an amateur two-way contact.

"The Standard-Frequency Set at WWV," tells about WWV transmitting standard-frequency signals from 125 to 2000 kc. S. Kruse describes the special techniques that must be mastered to get your station "Working at 5 Meters." H. A. Shaw discusses "A Study of Superheterodyne Amplification." Trendall Rowe, 7AGI, discusses the building of "A 100-Foot Wooden Tower." J. H. Turnbull introduces "The Vacuum Tube Voltmeter." "Strays" tells of the destruction by fire of the famous combined station 1XAQ-1OA-1AEL-1ASN-1ID, built and operated by *QST* staff members Kruse, Beekley, Budlong and Mason.

October 1949

◊ The cover photograph shows Eleanor Lyder, W1RNT, of *QST*'s advertising department, working on her new "traffic rig." The editorial announces the availability of the League's new TVI film to help members learn how to keep their signals out of their neighbor's TV sets, and then discusses some recent FCC enforcement actions following self-policing activities in the ham ranks.

The lead article describes "A Cascode Converter for 144 Mc." designed and built by Henry Cross, W1OOP. John Marshall, W0ARL, tells about "Two-Band Antenna-Matching Networks." Howard Hanson, W7MRX, describes "A Built-In 10-Meter Mobile" rig that he built into his car's dashboard. "Painless Prediction of Two-Meter Band Openings," by W. F. Hoisington, W2BAV, describes how to interpret weather maps to forecast band openings.

John Reed, HC2JR, relates the value of ham radio following the recent "Earthquake in Ecuador." "A Crystal-Controlled Plug-In Converter for the Q5-er" tells how John Stewart, W6UJD, came up with a simple and effective 80 and 40 meter receiver using the BC-453 low-frequency military surplus "command receiver." The phone results of the "15th ARRL DX Contest" are presented—W2SAI made 600 contacts with a multiplier of 174 for the top US score of 313,200 points, and KP4ES was the top DXer, with 214,524 points.

October 1974

◊ The cover photo shows a ham's jacket lapel with a motto button "Ham PR" on it, to remind us of the importance of good public relations. The editorial, "Logging Reregulated" opens with the sentence, "In one of the fastest actions on record, the Federal Communications Commission responded, in mid-June, to a petition filed by the Maryland FM Association only weeks earlier, and did away with most of the requirements for log keeping by amateurs." The editorial discusses the advisability of keeping a log, even though it is no longer required.

Bozidar Pasaric, YU2HL, tells about "A New Front End for Direct-Conversion Receivers." In "Dipole Passe?", Mike Wintzer, PA0MWI/DJ4GA, describes his experiments with discone antennas. Arthur Peterson, W7CZB, describes his "Apartment Dwellers' Slinky Jr. Ant." Howard Mark, WA2TNZ, discusses "An All-Solid-State Keyer for Cathode-Keyed Transmitters." In the continuing search for ways to reduce the physical size of beam antennas, Robert Myers, W1FBY, and Jay Rusgrove, WA1LNQ, describe their work on "The Twenty-Meter DX Weasel." Laird Campbell, W1CUT, describes his "Two-Toter Two," a lightweight portable beam for 2 meters. Don Keith, WA4BDW, tells about his radio club's public relations efforts in "Getting the Story Told!". "Results, 40th ARRL International DX Competition," by Rick Niswander, WA1PID, reports that W3LPL was the top US CW entrant; LU5HFI, top CW DX; W6OAT, top US phone; and HR1RF, top DX phone.—*Al Brogdon, W1AB* QST

Special Events

Edited by **George Fremin III, K5TR***

Dunedin, New Zealand: Otago Branch of the New Zealand Association of Transmitters, ZM75AA, 0000Z **Oct 1** to 2400Z **Oct 31**, celebrating the 75th anniversary of the first "transworld" two-way radio contact. All bands. QSL. ZM75AA, PO Box 5485, Dunedin, New Zealand.

Abilene, KS: The Wichita Amateur Radio Club, W0SOE, 1500 to 2300Z **Oct 2**, celebrating Chisholm Trail Day aboard the Abilene and Smokey Valley Railroad. 14.255. QSL. Barbara Foster KB0VHI, 1383 N. Park Place Rd, Milton, KS 67106-8911.

Anamosa, IA: Jones County Iowa Amateur Radio Club, N0CWP, 0200 to 1800Z **Oct 2,** at the Anamosa Pumpkinfest in the pumpkin capital of Iowa. 14.240 28.700. Certificate. Jim McClintock, 301 Vine St, Morley, IA 52312.

Brasstown, NC: Triode ARC, AD4FJ, 1400 to 1800Z **Oct 2,** during the Autumn Color Celebration of Appalachian Music, Dance Crafts and Food. 7.125 28.350. Triode ARC, PO Box 1721, Andrews, NC 28901.

Lebanon, NH: Twin State Radio Club, W1FN, 1100Z **Oct 2** to 1100Z **Oct 3**, during the Daniel Webster Council BSA Jamboree. 7.050 7.275 14.050 14.275. QSL. David Haseman, 1 Wardrobe Rd, Etna, NH 03750.

Cambridge, MA: Harvard Wireless Club, W1AF, 1200Z **Oct 2** to 2359Z **Oct 3**, celebrating 90 years as America's oldest Amateur Radio club. 7.270 14.270 21.370 28.390. QSL. Harvard Wireless Club W1AF, Harvard University, 6 Linden St, Cambridge, MA 02138.

Middletown, RI: Newport County Radio Club, W1SYE, 1300Z **Oct 2** to 2000Z **Oct 3**, 25th Annual Harvest Fair of the Norman Bird Sanctuary, 3.940 7.240 14.280 21.350. QSL. W1SYE, P.O. Box 3103, Newport, RI 02840.

Springfield, MA: Hampden County Radio Association, WB1HOF, 1400Z **Oct 2** to 2000Z **Oct 3**, for Basketball Hall of Fame 1999 Induction Week ceremonies. 7.240 14.275 28.375 146.49. QSL. Hampden County Radio Association, PO Box 705, Agawam, MA 01101-0705.

Wall Township, NJ: Ocean Monmouth Amateur Radio Club, N2MO, 1400Z **Oct 3** to 2300Z **Oct 9**, at the Marconi Test Facility. 3.875 7.235 14.240 21.325. Certificate. OMARC, PO Box 267, Oakhurst, NJ 07755.

Bridge City, LA: Westside Amateur Radio Club, W5ABD, 2300Z **Oct 8** to 2300Z **Oct 10**, as the gumbo capitol celebrates "le tricentenaire de la Louisiane." 7.262 14.287 21.375 28.425. Certificate. Don Wilbanks, 2209 Plaza Dr, Chalmette, LA, 70043.

Robbinsville, NC: Smoky Mountains Amateur Radio Team, KR4RR, 1400 to 2000Z **Oct 9**, for the opening of the Cherohala Skyway. 7.242 14.242. QSL. SMART, PO Box 517, Robbinsville, NC 28771.

Hermann, MO: Zero Beaters ARC, K0F, 1600Z **Oct 9** to 2300Z **Oct 10**, celebrating the 29th anniversary of the Octoberfest. 7.237 14.240 21.350 28.335. Certificate. Richard Lionberger, KB0WCY, 1440 S Hwy 19, Hermann, MO 65041.

Athens, GA: Gwinnett Amateur Radio Society, K2BSA/4, 0000Z **Oct 9** to 1100Z **Oct 10**, NE GA Council BSA "Gold Rush Rendezvous." 7.290 14.290 21.360 28.350. QSL. GARS, PO Box 88, Lilburn, GA 30048.

Woodsfield, OH: Monroe County Communicators, W8MCC, 1400Z **Oct 9** to 2100Z **Oct 10**, for the Monroe County Black Walnut Festival. 7.250 14.300 21.400 28.480. Bob Simpson, KB8UTE, 44480 Pfalzgraf Rd, Woodsfield, OH 43793.

Thomasville, GA: Thomasville Amateur Radio Club, W4UCJ, 1200Z **Oct 9** to 2200Z **Oct 9**, celebrating the 32nd Annual Thomasville Fly-In. 7.245 14.245 21.345 50.125. Certificate. Thomasville ARC, PO Box 251, Thomasville, GA, 31799.

Laurel, MS: Laurel Amateur Radio Club, K5L, 1500 to 2200Z **Oct 9**, for the 24th anniversary of the Laurel Amateur Radio Club. 7.245 14.245 21.345 28.345. Certificate. LARC, PO Box 6252, Laurel, MS, 39441.

Kingman, AZ: Hualapai Amateur Radio Club, WB6RER, 1500Z **Oct 9** to 1900Z **Oct 10**, during Andy Devine Days. 3.900 7.250 14.250 21.350. Certificate. Hualapai Amateur Radio Club, PO Box 4364, Kingman, AZ 86402.

Podunk Center, IA: Megahertz Manor Maniacs DX Club, K0MMM, 1400Z **Oct 9** to 2100Z **Oct 10**, commemorating the 20th anniversary re-visit to Podunk Center. 3.935 7.235 14.235 21.335. Certificate. Don Schmidt, 2161 NW 80th Place, Des Moines, IA, 50325.

Maysville, KY: Greater Mason County Amateur Radio Association, KF4BRO, 1200 to 2400Z **Oct 9**, celebrating Flemingsburg Court Days. 14.300 28.450 3.960 146.955. Certificate. GMCARA, P.O. Box 73, 1234 East Third Street, Maysville, KY, 41056.

Atlantic Highlands, NJ: The Garden State Amateur Radio Club, W2GSA, 1400Z **Oct 13** to 2300Z **Oct 17**, celebrating 100th anniversary of the first practical use of wireless. 3.875 7.235 14.240 21.325. Certificate, GSARA, PO Box 34, Fair Haven, NJ 07704.

Aurora, IL: The Fox River Radio League, W9CEQ, 1700Z **Oct 15** to 2300Z **Oct 17**, commemorating the 75th anniversary of the Fox River Radio League. 7.260 14.260 21.300 28.300. Certificate. W9CEQ, Box 673, Batavia, IL 60510-0673.

Lindsborg, KS: McPherson ARC, W0TWU, 1800Z **Oct 15** to 2200Z **Oct 17**, celebrating Swedish heritage in Little Sweden, USA. 14.235 21.335 28.340. QSL. Special Event/Chamber of Commerce, 104 E. Lincoln, Lindsborg, KS, 67456.

Fremont, OH: Sandusky Valley Amateur Radio Club, W8NCK, 1200 to 2200Z **Oct 16**, celebrating Fremont's Sesquicentennial. 7.225 14.225 21.325 28.325. QSL. Sandusky Valley ARC, PO Box 1072, Fremont, OH 43420.

Concord, CA: Mt Diablo Amateur Radio Club, W6CX, 1600Z **Oct 16** to 2100Z **Oct 17**, for the 42nd Jamboree On The Air. 7.090 14.290 21.360 28.390. QSL. PO Box 23222, Pleasant Hill, CA 94523.

New York, NY: Garden State Amateur Radio Association, W2OD/MM, 1400Z **Oct 16** to 1400Z **Oct 17**, sending simulated spark-gap transmissions from a ship at sea. 3.875 7.235 14.240 21.325. Certificate. Bob Buus W2OD, 8 Donner St, Holmdel, NJ 07733.

Nowhere, KS: Douglas County ARC, W0UK, 1400 to 2100Z **Oct 16**, during the Baldwin City Maple Leaf Festival. 21.325 40 20 10 meters. Certificate. Ken Blair KC0GL, 1711 West 19th Tr, Lawrence, KS, 66046.

Duluth, MN: Arrowhead Radio Amateur Club, W0GKP/70, 1300Z **Oct 16** to 2300Z **Oct 17**, for the 70th Anniversary of ARAC's affiliation with the ARRL. 28.400 21.350 14.260 7.240. Certificate. Arrowhead Radio Amateur Club, PO Box 7164, Duluth, MN, 55808-7164.

Hillsboro, MO: Jefferson County ARC, KB0TLL, 1400 to 1800Z **Oct 16**, during the Ozark Chili Cook Off. 7.240 14.240 28.375 147.075. Certificate. James Autery, 3596 Reuter Acres, Imperial, MO, 63052-1034.

Waynesburg, PA: Greene County Amateur Radio Association, N3GC, 1200Z **Oct 16** to 2200Z **Oct 17**, celebrating "Heritage Day". 3.985 7.285 14.285 21.385. Certificate. Stephen Billetz, Rd 1, Box 79, Dilliner, PA 15327.

Fayetteville, WV: Plateau Amateur Radio Association (PARA), W8V, 1400 to 1800Z **Oct 16**, celebrating New River Gorge Bridge Day and the 20th anniversary of PARA. 28.400 14.300 7.250. Certificate. Juddie D. Burgess, KC8CON, PO Box 96, Fayetteville, WV 25840.

Tucson, AZ: The Radio Society of Tucson and The Old Pueblo Radio Club, K7RST, 1500 to 2300Z **Oct 16**, for the first annual Old Pueblo Hamfest. 14.250 147.140. QSL. The Radio Society of Tucson, K7RST, PO Box 44147, Tucson, AZ 85747.

Denison, TX: Texoma Amateur Radio Club, W5I, 1400 to 2200Z **Oct 16**, to commemorate the birth of Dwight Eisenhower. 14.250 28.400. QSL. David Booth, K5YM, 620 E Shepherd St, Denison, TX 75021.

Bristol, United Kingdom: GB2RWC, 1300Z **Oct 17** to 2000Z **Nov 12**, during the Rugby World Cup. 3.750 7.075 14.260 28.450. QSL. Jon Acton, G0NFH, QTH R, Bristol, Bristol, UK BS345NP, United Kingdom.

Atlantic Highlands, NJ: Marconi Chapter of the QCWA #138, WA2GM, 1400Z **Oct 20** to 2300Z **Oct 24**, operating from Twin Lights to celebrate the 100th anniversary of the NY Yacht Race. 3.875 7.235 14.240 21.325. Certificate. QCWA Marconi Chapter, c/o Mike B. Feher, N4FS, 89 Arnold Blvd, Howell, NJ 07731.

Pensacola, FL: Five Flags Amateur Radio Association, K4P, 2200Z **Oct 21** to 2200Z **Oct 30**, during the Pensacola Interstate Fair. 7.240 14.275 21.300 28.420. QSL. Connie L. Walker, AF4FH, 507 Edgewater Dr, Pensacola, FL, 32507.

Mooresville, IN: Indiana Astronomical Society, W9L, 0100Z **Oct 22** to 2330Z **Oct 24**, observing the 60th year of the Goethe Link Observatory. 80 40 20 10 meters. Certificate. Goethe Link Special Event Station, 5431 Padre Lane, Indianapolis, IN 46237.

Washington, DC: Fauquier Amateur Radio Association, N4M, 1200Z to 2300Z **Oct 23**, for the 24th running of the Marine Corps Marathon. 3.855 7.253 21.305 28.355. Certificate. FARA Marathon, PO Box 752, Warrenton, VA 20188.

Tulsa, OK: Tulsa Amateur Radio Club, W5IAS, 1400 to 2200Z **Oct 23**, to celebrate the 75th anniversary of the Tulsa Amateur Radio Club. 7.250 14.250 28.450 50.150. QSL. Tulsa ARC, 3701 Stevens Ave, Sand Springs, OK, 74063.

Kingston, TN: Roane County Amateur Radio Club, K4T, 1300 to 2000Z **Oct 23**, commemorating the 200th anniversary of the founding of Kingston, Tennessee. 7.270 14.270 21.370 28.470. Certificate. Chip Erisman, KC4YYD, 112 Lakeside Dr, Harriman, TN, 37748.

Brevard, NC: Transylvania County Amateur Radio Club, K4HXZ, 1800 to 2359Z **Oct 31**, for Halloween in Transylvania County. 7.237 14.295 21.365 28.335. TCARC, PO Box 643, Brevard, NC 28712.

Newington, CT: American Radio Relay League, W1AW, 0000Z **Oct 30** to 2359Z **Oct 31**, operating using the original Tuna Tin 2 built by Doug DeMaw, W1FB. 7.040 14.060 10.106. Certificate. ARRL 225 Main Street, Newington, CT 06111.

Special Events Announcements: You can 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 **Dec** *QST* would have to be received by **Oct 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

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Contest Corral

Edited by **George Fremin III, K5TR***

Feedback

The club score for the **Westpark Radio Operators** in the **1999 January VHF Sweepstakes** should have totaled 5,082. **KE6QR**'s call sign was inadvertently reported as KC6QR.

In the **1999 RTTY Roundup**, **F6IFY** was omitted with a claimed score of 11,960 with 184 QSOs with 65 multipliers. **WU1F** should have been listed as low power instead of high power.

In the **1998 10 Meter Contest**, **AA4LR**'s score should have been 13,824 with 95 QSOs and 36 multipliers. **N0NI** was incorrectly listed as a Mixed Mode High Power W/VE, but in fact was 7th place MultiOperator W/VE with 1,600,560 points. This change moves **K5ZN** into 10th place in the Mixed Mode High Power W/VE box with 1,406,904 points. The score of **W2RE** should have been credited to the **Hudson Valley Contesters and DXers**, which will make that club the winner of the Local Club Competition over the River City Contest Club with 2,505,942 to 2,054,444 points. **S57U** should have been listed with 454 QSOs and 112 multipliers with a total score of 203,840. **W5MN** had submitted as a Single-Op, Phone-Only, Low Power W/VE, but when his log was checked CW QSOs that he had previously marked for check-log purposes were added to the total score. His score has been adjusted to 246,720 with 1028 QSOs and 120 multipliers. This change makes **K5DX** the winner of the Phone-Only Low-Power W/VE category and moves W5MN to 8th place. **VE1RX** should have been shown as a Single-Op, Phone-Only, High Power station from Nova Scotia with 1481 QSOs, 126 multipliers and a score of 372,960.

W1AW Qualifying Runs are 10 PM EDT Monday, October 11, and 4 PM EDT Tuesday, October 26. The **West Coast Qualifying Run** will be at 9 PM PDT on Wednesday, October 6, and will offer runs at 10-40 WPM. Check the W1AW schedule for details.

Sept 26-27

Fall Classic Radio Exchange, CW and phone, sponsored by *CX Newsletter*, 1900Z Sept 26 to 0400Z Sept 27. 80 40 20 15 10 meters. Exchange name, RST, QTH, receiver and transmitter type (homebrewers send final amplifier tube or transistor type). Work stations once per band, mode and equipment combination. Nonparticipants may be worked for credit. Score is total QSOs multiplied by the total number of different receivers plus transmitters plus QTHs worked on each band and mode. Multiply that by CX multiplier: the total age, in years, of all receivers and transmitters used—three QSOs minimum per unit (transceiver × 2; homebrew × 25, unless older). Send logs to Allan Stephen, 106 Bobolink Dr, Richmond, KY 40475; **modsteph@acs.eku.edu**.

Oct 2-3

California QSO Party, sponsored by the North California Contest Club, 1600Z Oct 2 until 2200Z Oct 3. Single op, multi-single, multi-multi, CA county expedition, mobile, and Novice/Tech. 160 80 40 20 15 10 6 2 meters. Send QSO number and CA county. If you're outside of California, send the QSO number and your state/province/DXCC country. Single ops are limited to 24 hours. Multi-singles have a 10-minute rule. Single ops and multi-single are limited to one transmitted signal at a time. CW QSOs must be made in CW subbands, except on 160 meters. Work stations once per band/mode; work CA stations again as they change counties. A CA station on a county line counts for 1 QSO, but multiple counties. CW—1.805 and 40 kHz up; phone—1.850 3.850 7.230 14.250 21.300 28.450; Novice—10 kHz up and 28.450. Score 2 pts/QSO on phone and 3 pts/QSO on CW. Final score is QSO points × CA counties (max 58). CA stations multiply by states and VE sections (max 58). Awards. See **http://www.cqp.org**. Send logs to Alan Maenchen, AD6E, 3330 Farthing Way, San Jose, CA 95132; **cqp@contesting.com**.

TARA PSK 31 Rumble, sponsored by TARA, 0000Z Oct 2 to 2400Z Oct 2, 80 40 20 15 10 6 meters. Categories: Normal-100 W; Great-20 W; Super-5 W; Novice-no power limit; SWL. Work stations once per band. Exchange name and state/province/DXCC countries. Count 1 point per QSO. Multipliers are DXCC countries, W, VE, JA and VK call areas on each band. Final score is QSO points × multipliers. Awards. Submit scores online at **http://www.qsl.net/wm2u/score.html**.

VK/ZL/Oceania Contest, phone, sponsored by the Wireless Institute of Australia, 1000Z Oct 2 until 1000Z Oct 3 (CW is 1000Z Oct 10 until 1000Z Oct 11). Single operator all band/single band, multi-operator. Send RS(T) and serial number. Work VK/ZL/Oceania stations only. Score 10 pts/QSO on 80; 5 pts/QSO on 40; 1 pt/QSO on 20; 2 pts/QSO on 15; and 3 pts/QSO on 10. Multipliers are prefixes worked per band; final score is QSO points × multipliers. Awards. For more information see **http://www.wia.org.au/federal/contests.html**. Send logs postmarked by Dec 5 to VK/ZL/OC Contest Manager, 2 Moss Court, Kingsley, West Australia, 6206 Australia;**vk6ne@upnaway.com.au**.

RSGB 21/28 MHz Contest, phone, sponsored by the RSGB, 0700Z until 1900Z Oct 3 (CW is Oct 17). Exchange RS(T) and serial number (UK stations also send three-letter county code). Work UK stations only. Count 3 pts/QSO. Final score is QSO points × county codes worked/band. Send logs to Steve Knowles, G3UFY, 77 Bensham Manor Rd, Thornton Heath, Surrey CR7 7AF, England.

7-9

YLRL YL Anniversary Contest, CW, sponsored by YLRL, 1400Z, Wednesday, October 7 to 0200Z Friday, October 9. (phone Oct 21-Oct 23) All licensed women operators throughout the world are invited to participate. Exchange QSO number, RS(T), and ARRL section/VE province/country. All YLs within one of the ARRL sections or within a Canadian province score one point for each QSO with another station located within a section or province. Score two points for each contact with a station not located within an ARRL section or province. Multiply the number of contact points by the total number of different sections, provinces and countries worked. Logs must also state the power output used. If you have 200 or more QSOs, submit a separate log for each band and submit a dupe. Logs must show claimed score. Logs must be sent within 30 days after the end of the contest to: Cleo Bracket, K0JFO, 810 Towne Square Dr, Fremont NE 68025. For more information see **http://home.earthlink.net/~tenmtryl/ylrl/**.

10

Ten-Ten Day Sprint, sponsored by Ten-Ten International, from 0000Z until 2400Z Oct 10. Single op; multiple station, single operator (club station); single station, multiple operator (OM/XYL, family stations). AM, FM, SSB, CW and RTTY, 10 meters only. Work stations once, regardless of mode. Exchange call, name, state and 10-10 number (if member). Score 1 pt/QSO w/non-members and 2 pts/QSO w/members. Final score is QSO pts. Awards. Send logs by Oct 24 to Don Ward, W0RTV, 4514 Ferrer Dr, St Louis, MO 63129-3741; **donw0rtv@juno.com**. For more information see **http://listserv.lehigh.edu/lists/tenten-l/rules.html**.

9-10

BARTG RTTY Sprint, sponsored by BARTG, 1200Z Oct 9 to 1200Z Oct 10, 80, 40, 20, 15, 10. Single op expert, Single op, Multi op, SWL. Exchange serial number starting at 001. One point per QSO. Multipliers are DXCC countries including JA, W, VE and VK, also JA, W, VE and VK call areas count as multipliers. Count multipliers once regardless of band. Score is total QSOs × multipliers x continents (max 6). Use separate log for each band. Send logs by Nov 31, 1998 to John Barber, GW4SKA, PO Box 611, Cardiff, CF2 4UN, Wales, United Kingdom; **ska@bartg.demon.com.uk**; **http://www.bartg.demon.co.uk/Contests/sprint.htm.**

FISTS CW Fall Sprint, sponsored by FISTS International CW Club, 1700Z until 2100Z Oct 9. CW only, QRP and QRO. 80 40 20 15 10 meters. Work stations once per band. Exchange name, state/province/DXCC country, and FISTS number if you are a member (nonmembers send power output). Score 5 pts/QSO w/FISTS member and 2 pts/QSO w/nonmember. Ten points with FISTS Novice or Technician Plus. Final score is QSO points × states/provinces/DXCC countries. 3.558 7.058 14.058 21.058 28.058. See **http://www.FISTS.org**. Send paper logs only within 30 days to Alan M. Tanner W8FAX, 3787 Trebein Rd, Fairborn, OH 45324.

Pennsylvania QSO Party, sponsored by the Nittany ARC, 1600Z Oct 9 until 0500Z Oct 10 and 1300Z until 2200Z Oct 10. Send serial number and ARRL/RAC section (PA stations send serial number and county). Single op QRP, medium (150W), QRO, or CW only (150W); multi-single, multi-multi, portable (single op or multi-single), Novice/Tech/Tech Plus, mobile, rover. Work stations once per band per mode. Work mobiles as they change counties. Stations on county lines are good for one QSO but multiple counties. Score 2 pts/CW QSO on 160 and 80; 1.5 pts/CW QSO on other bands; and 1 pt/QSO on phone. Multipliers are PA counties (67 max); PA stations add PA counties, ARRL/RAC sections and 1 for DX (150 max). CW 1.810 and 40 kHz up; phone 1.850 3.980 7.280 14.280 21.380 28.310; Novice/Tech 10 kHz up; mobiles 5 kHz below the above listed frequencies. Final score is QSO points × multipliers × 2 if QRP, × 3 if Novice/Tech; add 200 points to final score for each QSO with W3HA. PA mobiles add 500 points for each county operated from where 10 or more QSOs were made. Awards. See **http://members.aol.com/doughdh/paqsoparty/paqso.htm**. Send logs by Nov 15 to Douglas Maddox, W3HDH, Nittany ARC, RD #1 Box 760, Petersburg, PA 16669; **na2x@arrl.net**.

Two Meter Sidewinder Shootout, sponsored by SWOT. 1800Z Oct 9 to 2300Z Oct 10, 2 meters only. Exchange call sign, grid square and SWOT number (if member). Contacts on the calling frequencies of 144.200 and 146.52 are prohibited for contest credit. You may use the calling frequencies to establish contact, but then you must move off the frequency to complete the contact. Count 1 pt/QSO with nonSWOT members; 2 pts/QSO with SWOT members. Multipliers are grid squares. Final score is total QSO points x total mulitipliers. Awards. Send logs before Oct 31 to: Donald M. Ross, NL7CO, Sidewinder Shootout, PO Box 403, Lawton, OK 73502-0403; **dross@sirinet.net**.

16-17

RSGB 21/28 MHz Contest CW, See Oct 2-3.

JARTS WW RTTY Contest, sponsored by JARTS, 0000Z Oct 16 to 2400Z Oct 17, RTTY only, 80, 40, 20, 15, 10. Single op, Multi op, SWL. Work stations once per band, exchange RST and age, multi op must send 99 as the age. Count 2 pts for QSO's within your continent, 3 pts per QSO outside of your continent. Multipliers are DXCC countries excluding JA, W, VE and VK. JA, W, VE and VK call area's are multipliers. Count multipliers once per band. Do not count your own call area or country as a multiplier. Score is QSO points × total

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multipliers. Awards. Use separate logs sheets for each band. Send logs by Dec 31, 1998 to JARTS Contest Manager, Hiroshi Aihara, JH1BIH, 1-29 honcho, 4 Shiki Saitama 353, JAPAN.

Illinois QSO Party, sponsored by the Radio Amateur Megacycle Society, 1800Z Oct 17 until 0200Z Oct 18. Phone and CW. No repeater QSOs. 160 80 40 20 15 10 6 2 meters. CW 50 kHz up from the bottom; phone 3.890 7.290 14.290 21.390 28.390; Novice 30 kHz up from bottom for CW. IL stations exchange RS(T) and county; others exchange RS(T) and state/province/DXCC country. Count 1 pt/QSO on phone, 2 pts/QSO on CW. Work stations once per band and mode, and once per band/mode/county for IL mobile stations. Mobile operations must use their mobile call sign exclusively for the duration of the contest. Contacts with/by mobile stations on border of two counties count as two counties and two QSOs. IL stations multiply QSO total by sum of states, IL counties, VE provinces plus a maximum of five DXCC countries. Count additional DX for points, but not multipliers. Others multiply QSO points by the number of IL counties worked. All stations may take one bonus multiplier for each eight QSOs with the same IL county. Awards. Send entries by Nov 15 to RAMS, c/o John Matz, KB9II, 7079 West Ave, Hanover Park, IL 60103; **http://www.megsinet.com/~jematz/rams.html**.

Asia-Pacific Sprint, CW, sponsored by Asia-Pacific Sprint Contest Committee (APCC) 0000-0200Z Oct. 17. The object is for stations in the Asia-Pacific region to work as many stations world-wide as possible within two hours on 15 and 20-meter CW. Suggested frequencies are 21030-21050 and 14030-14050 kHz. Output power is limited to 150 W. Exchange RST + serial number, and count one point per valid QSO. The called station (usually the CQer) must QSY at least 1 kHz after a CW QSO, or 6 kHz after an SSB QSO. The multiplier is the total number of prefixes, per WPX rules (ie each prefix once only, not once per band). Final score equals valid QSOs × multiplier. Post your log to: James Brooks, 26 Jalan Asas, Singapore 678787 postmarked within seven days, or e-mail **jamesb@pacific.net.sg** within 72 hours. See **http://www01.u-page.so-net.ne.jp/ja2/je1jkl/apsprint.html.**

Worked All Germany Contest, sponsored by the Deutscher Amateur Radio Club, 1500Z Oct 16 until 1500Z Oct 17; 80 40 20 15 10 meters; SSB and CW. Single op, all band, single band, QRP, Multi op single transmitter and SWL. Packet spotting allowed for all classes. Work German stations; NonGerman stations send RST and QSO number; German stations send RST and DOK (local area code). Work stations once per band and mode. Three points per QSO. Multipliers: nonGerman stations count number of German districts on each band regardless of mode (max. 26 per band). Germans count DXCC/WAE countries per band. Final score is QSO points × total multipliers. Awards. Send logs by Nov 20, Klaus Voigt DL1DTL, PO Box 12 09 37, D-01010 Dresden, Germany.

21-23

YLRL YL Anniversary Contest, phone, 1400Z Wednesday, October 21 to 0200Z Friday, October 23. See Oct 7-9.

23-24

Rhode Island QSO Party, sponsored by the CTRI Contest Group, 0000Z Oct 23 until 2400Z Oct 24. Single op, QRP, Multi op. 160 80 40 20 15 10 meters. All modes. Phone 25 kHz up from the General band edges, CW 40 kHz up from the General band edges. Work stations once on each mode (CW, phone, digital) per band. One pt/phone QSO, 2 pts/CW/digital QSO. NonRhode Island score is QSO points × number of Rhode Island counties worked. A one-time 100-point bonus for contacting CTRI station WA1RR. Awards. Send logs by Nov 31 to: CTRI Contest Group/RI QSO Party, Bob Rogers KB1LN, PO Box 995, Charleston, RI 02813; **kb1ln@arrl.net**; **http://www.99main.com/~ctri/**.

QRP ARCI Fall QSO Party, CW, sponsored by QRP ARCI, 1200Z Oct 23 until 2400Z Oct 24. Single band, all band, high (20 15 10 6) or low (160 80 40) band. Operate no more than 24 hours. Work stations once per band. Exchange RST, state/province/DXCC country, and ARCI number (if nonmember, send power output). 1.830 3.560 3.710 7.040 7.110 14.060 21.060 21.110 28.060 28.110 50.128. Score 5 pts/QSO w/members, 2 pts/QSO w/nonmembers on same continent and 4 pts/QSO w/nonmembers on different continents. Final score is QSO points x states/provinces/DXCC countries × power multiplier (> 5W, ×1; <5 W, ×7; <1 W, ×10; <250 mW,×15). Send entry to Joe Gervais AB7TT, PO Box 322, Peoria, AZ 85380-0322; **vole@primenet.com**; **http://www.qrparci.org/**.

30-31

ARRL International EME Competition, See Sept 1999 *QST*, page 114.

CQ WW DX Contest, phone, sponsored by *CQ Magazine*, 0000Z Oct 30 until 2400Z Oct 31 (CW is 0000Z Nov 27 to 2400Z Nov 28). Exchange RS(T) and CQ zone. Classes: Single operator all band/single band/assisted, high power/low power (<100 W)/QRP (<5 W); multi single, multi multi. Multi-singles have a 10-minute rule. All classes may only have one transmitted signal per band. Work stations once per band. Team and club competition. North American stations score 2 pts/QSO w/stations in different countries on the same continent and 3 pts/QSO w/stations on different continents; stations in the same country may be worked for zone credit, but no points. Multipliers are CQ Zones and countries (DXCC +WAE). Final score is QSO points × multipliers. Awards. Send logs by Dec 1 (Jan 15 for CW) to CQ Magazine 25 Newbridge Rd, Hicksville, NY 11801; **ssb@cqww.com**; **cw@cqww.com**. See **http://cqww.com/cqww/**.

Ten-Ten International Net Fall CW QSO Party, sponsored by Ten-Ten International, from 0000Z Oct 30 until 2400Z Oct 31. Single op only, CW on 10 meters only. Categories: Individual, QRP, Club. Contacts must be in CW subband. Exchange call, name, state/country and 10-10 number (if member). Score 1 pt/QSO w/nonmembers and 2 pts/QSO w/members. Final score is QSO pts x prefixes. Awards. Send logs by Nov 15 to: Gateway Chapter, Don Ward, W0RTV, 4514 Ferrer Dr., St. Louis, MO 63129-3741. For more information see **http://listserv.lehigh.edu/lists/tenten-l/rules.html**. QST

VHF/UHF Century Club Awards

The ARRL VUCC numbered certificate is awarded to amateurs who submit written confirmations for contacts with the minimum number of Maidenhead grid-square locators (indicated in italics) for each band listing. The numbers after call signs refer to endorsements. The totals shown are for credits given from June 2, 1999 to August 2, 1999. The VUCC application form, rules, field sheets and the list of VHF awards managers for your area can be found on the Web at **http://www.arrl.org/local/info/msd/**. Or, send an SASE to ARRL Head-quarters. VUCC lapel pins are available for $5 each. For VUCC questions e-mail **vucc@arrl.org**.

Compiled By Bill Moore, NC1L, Century Clubs Manager

50 MHz
100

1021	W5TFW
1022	N5WD
1023	KB8UUZ
1024	ZS6WB
1025	ZS6EZ
ZS6WB	375
K1WVX	300
WA2HFI/0	250
KB2TGU	250
K3CWH	200
WT3P	125
K3HZO	225
K4LYN	200
W4AZR	200
W5VAS	450
AA5XE	225
KB6NAN	400

144 MHz
100

N2WK	250

75 GHz
5

1	
W2SZ/4	

Satellite
100

VE6SWC	125
KC7QFS	300

QST

New Products

REPEATER CONTROLLER FOR GE MASTR II

◊ NHRC LLC announces the NHRC-4 integrated repeater controller for use with the venerable GE Mastr II mobile and base stations. The controller provides complete repeater operation and control and a remote base port.

The entire system is mounted on a 7 1/2 × 1 1/2 inch board. Installation in the mobile version of the transceiver involves plugging the unit into existing internal sockets, cutting one circuit board trace, and adding two wiring connections. In the base version, three wires are added–no trace cutting is necessary. Application notes for Mastr II modifications are available from NHRC.

Features include CW ID, individual timer settings for the main and remote base ports, a hang timer, a fan control and five distinct courtesy tones. A digital output is provided for additional control applications. Programming can be performed over the air with DTMF command sequences. A security code is employed to discourage unauthorized control access.

Price: $189. For more information contact NHRC LLC, 444 Micol Rd, Pembroke, NH 03275; tel 603-485-2248; **info@nhrc.net**; **http://www.nhrc.net**. QST

Strays

COAST GUARD REUNION

◊ The Coast Guard CW Operators Association's first annual reunion will be held in Phoenix, Arizona November 2-7 1999. For information on lodging and activites contact: RMCS Jim Huffman, KL7IBT (USCG Retired), PO Box 55388, North Pole, AK 99705.

APRS WHITEPAPER

◊ Ian Wade, G3NRW, has recently published a whitepaper on APRS–the "Automatic Packet Reporting System". APRS combines packet radio with GPS satellite navigation, allowing mobile users equipped with a GPS receiver to transmit their position automatically, for plotting on maps in real time. APRS has a wide range of uses, including emergency search and rescue, messaging, direction finding, weather station reporting and propagation research. The 25-page whitepaper is a beginner's introduction to APRS, explaining what it is and how it works. The whitepaper is fully illustrated with many diagrams and screenshots, and is available on the Web at: **http://www.netro.co.uk/whitepaper.htm**.

1999 ARRL November Sweepstakes Rules

1. Object: For stations in the United States and Canada (including territories and possessions) to exchange QSO information with as many other US and Canadian stations as possible on the 160, 80, 40, 20, 15, and 10 meter bands.

2. Date and Contest Period:

2.1. CW: First full weekend in November (**November 6-8, 1999**).

2.2. Phone: Third full weekend in November (**November 20-22, 1999**).

2.3. Contest Period: Begins 2100 UTC Saturday, ends 0300 UTC Monday.

2.4. Operate no more than 24 of the 30 hours.

2.4.1. Off periods may not be less than 30 minutes in length.

2.4.2. Times off and on must be clearly noted in your log. Listening time counts as operating time.

3. Entry Categories:

3.1. **Single Operator**

3.1.1. QRP

3.1.2. Low Power

3.1.3. High Power

3.1.4. Unlimited—Packet assisted

3.2. Multioperator

3.2.1. Only 1 transmitted signal is permitted at any time.

3.2.2. There is no limitation on the number of band changes.

3.2.3. Packet use is permissible.

3.3. School Club

3.3.1. There are three divisions to this category.

3.3.1.1. College and University

3.3.1.2. Technical School

3.3.1.2.1 Secondary and other School

3.3.2. School clubs compete as their own category.

3.3.3. Only currently enrolled regular students and faculty/staff of the institution are eligible to operate the station. Alumni may "Elmer" but may not operate the station during the competition.

3.3.4. There is no distinction between Single and Multi op stations in this category.

3.3.5. School clubs must operate from established stations located on the campus. No portable operation from a near-by contest station is allowed. A club may operate from a member's station only if no on-campus station exists.

3.3.6. Certificates will be awarded to the top scoring entry in each division of this category in each ARRL/RAC section and division.

4. Exchange: The required exchange consists of:

4.1. A consecutive serial number

4.2. Precedence

4.2.1. "Q" for Single Op QRP (5 W output or less)

4.2.2. "A" for Single Op Low Power (up to 150 W output)

4.2.3. "B" for Single Op High Power (greater than 150 W output)

4.2.4. "U" for Single Op Unlimited

4.2.5 "M" for Multi-Op

4.2.6. "S" for School Club

4.3. Your call sign

4.4. Check (the last two digits of the year you were first licensed)

4.5 ARRL/RAC section

Example: WA4QQN would respond to W1AW's call by sending: W1AW 123 U WA4QQN 71 CT which indicates QSO number 123, U for Single Op Unlimited, WA4QQN, first licensed in 1971, and in the Connecticut section.

4.6 With the exception of the serial number, which changes from QSO to QSO, the exchange sent must remain consistent during the entire contest.

5. Scoring: QSO points: Count two points for each complete two-way QSO.

5.1. Multiplier: Each ARRL Section and RAC Section plus VE8/VY1, with a maximum number of 79.

5.2.1. KP3 and KP4 are in the Puerto Rico Section.

5.2.2. KV4/KP2 and KG4 stations are in the Virgin Islands Section.

5.2.3. KH6 and other US possessions in the Pacific count as the Pacific Section.

5.2. Final score: Multiply QSO points (two per QSO) by the number of ARRL/RAC sections (plus VE8/VY1).

6. Miscellaneous:

6.1. Work each station only once, regardless of the frequency band.

6.2. Only one transmitted signal at any time is permitted.

7. Awards: Certificates will be awarded to the top operator CW and phone scores in each category ("A", "B", "Q", "U", "S" and "M") in each ARRL/RAC section and division. Division winners in each category are also eligible for a Sweepstakes plaque. If the plaque is not sponsored, the winner may purchase it from the ARRL.

8. Submission:

8.1 Deadline for submission of CW entries is Wednesday December 8, 1999. Deadline for submission of phone entries is Wednesday December 22, 1999. Entries e-mailed or mailed via the postal service after the deadline will be designated checklogs.

8.1.1. The CW and phone modes are considered separate contests and must be submitted in separate envelopes or emails sent to the appropriate address.

8.1.2. Entries must be made on current ARRL entry forms or on a reasonable facsimile.

8.2. E-mail entries for CW should be sent to **SSCW@arrl.org** and phone to **SSPhone@arrl.org**.

8.3. Any entry that has been created using a computer for logging is required to include an ARRL standard-format-compatible log file to be used in the electronic log checking process.

8.3.1 The file must be in ASCII text format and meet ARRL file format guidelines. Files from word processing or spreadsheet programs must be converted to ASCII text files.

8.3.2. Any electronic file that is not submitted in required format will *not* be acceptable for competition and awards.

8.3.3. Failure to submit a required ASCII file may result in the entry being designated a checklog and ineligible for competition.

8.3.4. A paper printout for a log that has been generated by a computer in lieu of the actual data file is not an acceptable substitute.

8.4 Diskettes and paper logs should be mailed to: November SS CW or November SS Phone, ARRL, 225 Main St, Newington, CT 06111.

9. Other information. All contest queries should be directed to **N1ND@arrl.org** or by telephone to 860-594-0232. All contest rules and entry forms may be downloaded from the Contest Branch Web page at **http://www.arrl.org/contests**.

PINS—Participation in November Sweepstakes

The ARRL is continuing its PINS program for 1999. Anyone who completes 100 contacts on CW or phone during Sweepstakes is eligible to purchase an attractive Participation Pin. Each pin includes the year and mode and have become a popular tradition in the November Sweepstakes event. Pins cost $5 each and will be shipped out after your entry has been processed.

To order your pins, attach a note to the front of your summary sheet indicating the number of pins ordered along with your check. If you enter electronically, send a copy of your summary sheet with a note and your check attached to Sweepstakes PINS, ARRL Contest Branch, 225 Main St, Newington, CT 06111.

Coffee Mugs—Clean Sweep Award

To qualify you must work all 79 ARRL/RAC sections during the CW or phone November Sweepstakes. **To order, attach to the top of your summary sheet a note indicating how many mugs you are ordering and your check**. If you submit electronically, send a photocopy of your summary sheet indicating how many mugs you are ordering along with your check and send to: Clean Sweep Cup Order, ARRL Contest Branch, 225 Main St, Newington, CT 06111. Your mug will be shipped after your entry has been processed.

What are the ARRL/RAC Sections?

There are currently 79 multipliers in the ARRL November Sweepstakes. These are the 70 ARRL sections in the United States (which can be found listed on page 12 of *QST* each month) and nine sections in Canada. A complete list of ARRL/RAC sections may be found on the Web at: **http://www.arrl.org/contests/sections.abv.html**.

We've received a number of inquiries asking if the new Nunavut prefix is a new multiplier? While it has its own prefix, Nunavut remains part of the Canadian Northwest Territories for ARRL contest purposes. QST

By **Dan Henderson, N1ND**
Contest Manager

The 1999 ARRL International DX Contest CW Results

"This was one to remember"—*N0UR*

Sometimes it is hard to summarize an on-the-air-operating event briefly. But thanks to Jim Lageson, N0UR, it was easy to focus on what proved to be one of the more exciting ARRL International DX CW contests in recent years. Endangered scoring records, record participation, and great propagation all added up to lots of fun during one of Amateur Radio's premier events.

More than 1161 DX and 1021 W/VE stations submitted logs for this annual battle. With 48 hours on the clock, the winners are generally the ones with good planning, lots of stamina and maybe a healthy dose of "lady luck" in the shack. With the implementation of more thorough electronic log checking, the winners are also the ones who seem to take special care in data entry to go along with their demonstrated ability to copy higher speed CW.

After finishing second in 1998 and operating from his developing "super-station" on Cape Cod, K1ZM led the way of High Power W/VE single ops, setting a new scoring record in the process. Jeff's 4,566,039 points lead the way as four ops topped the old mark of 4,001,790 set in 1991. Congratulations to the quartet of K1ZM, K5ZD (W2SC, op), KQ2M, and N2NT—all of whom broke the old barrier.

Two ops also managed to break the old scoring record in the single-op-assisted category. Congratulations to new record holder K3WW with 4,763,799 points. He edged out KI1G 4,673,250 points, which was 68,676 more than the record which had existed since 1992. All W/VE single-band scoring records remained in tact, in spite of spirited challenges from many ops.

Stations and operators in each of the three W/VE multi-operator categories walked away having set new all-time marks. With a score of 4,514,112, the operators at the W3BGN multi-single stations now hold the record previously held by the K5ZD team of 1998. The K1AR multi-two team, operating this year at K1EA's home, continues to be record setters. They became the first group to top the 9 million-point barrier in this category, finishing with an outstanding score of 9,247,365.

Rounding out the record setting performances by multi-op stations was the gang at W3LPL, who fought it out with ops at KC1XX. Both broke the 1992 scoring mark of 10,756,002. But when the dust settled, W3LPL's call goes into the record book with a score of 12,158,520. This category, which includes many of the best contest operators the US has to offer, will continue to receive great interest as the likes of K3LR, K1XM and K1KI continue to challenge. In fact, all 3 of the top finishers worked a DXCC on four bands, with W3LPL coming closest to a 5BDXCC, missing by only 16 entities on 80 meters.

Though no all-time scoring records were set on from the single op DX side of this contest, the competition remained heated on all fronts. The "battle of the Cayman Islands" became the battle for the championship in the low-power single-op category. ZF2NT with N6NT as the operator prevailed over ZF2MO, operated by KM9D. WP2Z with KE2VB at the key, finished strong and continues a string of outstanding contest finishes.

Three DX high-power single-op stations around the Caribbean and Central America, each with guest ops from the US, led the way in another exciting race. At the finish line, W2GD, operating P40W wins the slugfest on the strength of a score of 4,965,408, with WP3R (KE3Q, op) and 3E1CW (KD6WW, op) finishing second and third respectively. Not to be left out of the top honors, Europe can boast of G0TDX

Top Ten

W/VE Single Operator, QRP, CW

N7IR	516,132
N1TM	338,334
N0UR	306,180
N1CWR	284,208
AA1CA	281,934
WI9WI	269,730
W8QZA/6	227,586
N6WS	216,756
K0NI	177,912
K5TT	165,996

W/VE Single Operator Assisted, CW

K3WW	4,763,799
KI1G	4,673,250
K2NG	4,181,814
N2MM	3,083,184
W2RE	2,837,604
AA3B	2,732,610
N2RM	2,319,678
K3PH	2,298,192
K1IR	2,093,184
K2NJ	2,063,376

DX Single Operator, QRP, CW

G0TDX	406,116
HA2SX	402,705
HP1AC	248,784
LU1FNH	242,406
DL3KVR	215,556
9A3RE	199,296
DL4FN	198,696
LY2FE	178,227
LY2BTA	157,920
F5OIH	147,420

DX Single Operator Assisted, CW

DK3GI	2,062,848
KH6RS	1,772,766
PA5KT	815,517
KH2/N2NL	811,200
OK1DG	555,540

Multi-Operator Single-Transmitter CW winner 8P9JA with operators Will, AA4NC and Jim, K4MA, hunkered down for the long haul.

Geoff, W0CG, one of the ops at Multi-Single second-place finisher VP5CW in the middle of a 201-contact run in the first hour of the contest.

Single Band Top Ten

W/VE 160

WA8GHZ	15,006
K4TEA	11,484
K5RX	7,035
K4RX	5,814
K1VW	5,670
NX5M	3,948
KZ5MM	3,159
K1KY	2,886
VE3DO	1,980
W2VO	1,872

W/VE 80

W1MK	156,735
K1LZ	100,344
K1IK	40,788
K3JGJ	33,672
W0SF	17,400
W8AEF	15,651
K4ESE	14,688
WB2AMU	4,929
N5XJ	3,690
W6RKC	2,709

W/VE 40

K8DX	285,384
KM2P	230,265
KV0Q	229,353
K4VX	216,132
(K9BGL, op)	
NA5B	172,800
(W5AO, op)	
VE1ZJ	135,018
K7EM	106,470
N0AC	88,038
WB4OSN	71,820
W4JKC	68,400

W/VE 20

K1TO	387,795
W7WA	270,909
N4PN	243,726
K2BA	138,600
W8UD	101,616
K9BG	76,077
NI9C	75,852
VE7AV	58,212
W8UMR	43,290
W3EHZ	40,788

W/VE 15

K2SS/1	605,790
N8II	531,036
K2WI	518,976
W0UN	477,873
(W0UA, op)	
K0XG	447,531
(K0RX, op)	
K2VV	423,384
(at K4VX)	
N0NR	389,844
N5DX	388,500
N2MF	360,261
N0NI	335,517

W/VE 10

WC4E	328,941
K4WX	223,416
K9QVB	190,080
N7DR	165,804
VE3ZT	131,220
W9AU	114,390
AI2C	112,338
KA6BIM	101,556
W5ZO	88,578
W9GIL	83,913

DX 160

S50U	16,128
YZ6A	14,280
S57M	8,787
I3VHO	5,808
OK1TP	495

DX 80

OT9T	117,264
(ON4UN, op)	
TM6P	108,864
(F5MZN, op)	
WP3C	68,649
EA4AAK	58,422
G3WGN	49,536
OK1DX	46,305
MD/DL5LYM	44,892
DK8LV	44,415
DF0KW	37,485
JH1OGC	36,750

DX 40

C6AKQ	234,879
(N4BP, op)	
OK1RF	220,719
SN2B	191,868
(SP2FAX, op)	
OH2U	175,914
(OH2LUR, op)	
S57DX	165,312
YU4WU	154,686
OH1JD	147,726
OM3A	135,261
(OM3CGN, op)	
9A4D	127,395
OK1DIG	127,020

DX 20

GM3POI	288,360
DJ7AA	210,276
IR2W	206,739
(IK2QEI, op)	
S50K	197,664
OH8LQ	190,980
LA9GX	183,141
OH6RX	176,436
HG1R	162,516
(HA1XU, op)	
YU1ZZ	160,740
RZ9UA	153,720

DX 15

ZF1A	320,856
(W5ASP, op)	
9A5Y	241,623
(9A3LG, op)	
KL7RA	240,012
OT9A	221,502
(ON5UM, op)	
TI7/N4MO	218,370
OH0JJS	209,322
(OH6LI, op)	
MD/DL8WAA	208,626
SP5GRM	199,080
F5NBX	195,966
OH6AC	191,520
(OH6CS, op)	

DX 10

LT1F	279,180
(LU5CW, op)	
RZ3AX	260,652
HC2SL	230,454
F5IN	207,423
DL1IAO	179,916
LU9APM	175,938
ON4UN	164,082
JL1ARF	146,550
OH0MPO	146,496
(OH4JLV, op)	
G3WVG	144,837

Top Ten
Band breakdowns show QSO/Multipliers

Call Sign	*Score*	*160*	*80*	*40*	*20*	*15*	*10*
W/VE Single Operator, Low Power, CW							
W2TZ	1,844,640	9/9	76/40	233/59	541/74	564/70	529/62
N8AA	1,676,700	20/15	84/43	171/62	343/74	487/77	516/74
VO1MP	1,427,688	0/0	132/52	288/53	480/71	330/75	276/65
K1NO (K5FUV, op)	1,378,944	15/14	77/38	237/57	540/74	316/60	327/61
K4RO	1,378,026	24/19	71/46	199/65	280/67	391/72	394/69
NA2U	1,136,220	2/2	13/13	226/62	264/63	454/74	347/76
K4OGG	1,110,798	19/12	52/28	150/55	216/61	424/71	452/55
K1RO	1,108,554	0/0	32/19	106/43	288/65	444/72	464/78
WO4O	1,101,420	0/0	43/25	215/55	311/73	340/66	357/71
WD5K	1,074,528	0/0	80/38	135/54	217/71	415/74	301/75
W/VE Single Operator, High Power, CW							
K1ZM	4,566,039	37/32	293/62	853/78	646/89	655/86	983/91
K5ZD (W2SC, op)	4,306,236	40/28	213/53	691/69	794/78	1014/90	801/86
KQ2M	4,122,258	27/23	239/56	730/81	616/86	778/90	828/91
N2NT	4,096,134	40/29	160/51	898/80	670/84	826/80	769/82
K1DG	3,995,850	21/21	182/56	666/83	757/85	795/91	713/89
W4AN	3,968,250	34/27	192/55	743/76	615/82	795/87	871/80
K1ZZ	3,881,001	46/29	141/51	498/69	811/93	754/81	913/86
K3ZO	3,860,337	33/24	229/64	797/80	769/84	737/81	628/70
N2LT	3,751,200	33/22	145/46	630/82	686/83	797/88	835/79
K0DQ (at W4RX)	3,683,988	35/28	140/54	631/74	786/81	837/84	672/75

Call Sign	*Score*	*160*	*80*	*40*	*20*	*15*	*10*
W/VE Multioperator Single Transmitter, CW							
W3BGN	4,514,112	58/37	181/60	715/81	788/94	865/100	657/89
W2AA (at N2TX)	3,560,121	31/26	149/62	444/79	717/94	492/95	810/93
AA2FB	3,275,832	26/24	103/54	475/82	651/88	693/97	568/89
N4RV	2,748,285	38/30	161/53	468/80	508/74	614/80	566/72
W6XR	2,471,940	21/16	77/42	456/72	536/80	622/82	503/80
W/VE Multioperator Two Transmitter, CW							
K1AR (at K1EA)	9,247,365	35/30	316/73	1263/100	1357/112	1583/114	1251/102
K8AZ	6,497,778	38/28	169/66	850/90	889/104	1454/107	958/102
K8LX	5,762,556	26/22	109/54	862/90	924/102	1311/108	890/90
K9AA (at W9JA)	5,760,933	35/24	176/59	818/90	796/97	1308/111	876/98
KB1H	4,532,526	21/20	173/64	648/86	747/89	1036/103	681/95
W/VE Multioperator Unlimited Transmitter, CW							
W3LPL	12,158,520	123/57	468/84	1485/112	1562/123	1690/119	1382/109
KC1XX	11,028,732	68/42	389/79	1374/102	1637/120	1618/122	1341/107
K3LR	10,375,095	78/42	305/75	1343/107	1312/116	1721/119	1362/106
K1XM	10,078,368	94/48	518/84	1048/94	1549/116	1803/116	1052/96
K1KI	9,989,472	78/42	422/79	1199/79	1673/115	1530/113	1219/98

Top Ten

Call Sign	*Score*	*160*	*80*	*40*	*20*	*15*	*10*
DX Single Operator, Low Power, CW							
ZF2NT (N6NT, op)	3,679,680	216/46	500/52	639/55	812/58	838/57	828/52
WP2Z (KE2VB, op)	3,173,712	169/35	253/47	466/49	524/53	1074/57	1088/55
ZF2MO (KM9D, op)	3,013,590	217/45	446/51	559/54	571/55	638/56	799/50
VP2V/K1DW	1,917,993	52/19	156/29	360/43	622/55	539/52	798/55
KH6/W6PH	1,714,581	0/0	86/30	592/55	531/55	590/57	478/54
LZ0A (LZ2UU, op)	1,483,176	0/0	12/10	441/54	640/56	508/55	530/57
NP2S (K3DI, op)	1,299,792	0/0	0/0	265/46	524/54	505/54	789/54
EA7GTF	1,236,429	22/12	148/29	257/43	392/50	413/52	507/51
S57J	970,725	0/0	35/18	205/41	408/52	395/55	462/49
8P9NX	943,299	0/0	92/28	367/46	359/46	490/53	141/44
DX Single Operator, High Power, CW							
P40W (W2GD, op)	4,965,408	233/48	477/56	687/57	1058/58	1065/58	1406/59
WP3R (KE3Q, op)	4,561,680	270/48	358/52	707/58	911/58	832/57	1502/59
3E1CW(KD6WW, op)	4,476,045	285/49	235/49	910/58	934/58	1105/57	1066/58
KH7R (KH6ND, op)	3,638,196	156/44	401/53	724/57	541/55	856/57	1065/58
KH6X (K5NA, op)	3,294,951	195/44	372/53	489/52	615/56	752/56	1020/58
NH7A (KH6TO, op)	2,958,789	200/45	232/45	643/57	549/52	735/57	792/57
G0IVZ	2,784,474	81/30	321/49	516/52	695/54	810/55	734/54
SP7GIQ	2,645,214	50/15	307/48	607/56	643/55	614/55	862/57
F6BEE	2,642,805	45/23	240/43	474/47	660/53	809/57	907/58
DL5AXX	2,569,317	24/18	220/49	623/54	572/57	832/56	652/59

Call Sign	*Score*	*160*	*80*	*40*	*20*	*15*	*10*
DX Multioperator Single Transmitter, CW							
8P9JA	5,403,942	286/49	470/58	879/59	1088/59	1145/59	1399/58
VP5CW	5,040,846	364/50	535/55	975/57	908/59	1177/58	1027/58
V31TP	4,862,721	316/49	581/54	737/57	846/56	1286/57	1242/58
KG4DZ	3,899,712	135/32	408/50	818/57	753/55	1042/56	1120/54
TM1C	3,753,783	119/30	429/45	618/53	920/56	1021/56	1106/57
DX Multioperator Two Transmitter, CW							
HC8N	8,440,950	436/54	868/58	1245/59	1564/59	1929/60	2010/60
V26O	7,525,485	387/51	692/57	1359/58	1449/59	1701/60	1683/60
6D2X	6,698,214	426/54	678/59	1568/60	1255/58	1567/59	959/56
XA5T	5,922,000	431/50	729/57	1170/57	1223/58	1387/58	935/56
G4BUO	4,238,208	63/32	304/48	985/59	974/59	1252/57	950/57
DX Multioperator Unlimited Transmitter, CW							
9A1A	4,148,004	161/37	450/53	971/60	1018/59	1003/58	691/55
RW2F	4,052,664	84/27	297/46	942/59	1109/59	1015/59	938/58
C6AKW	3,727,794	368/49	641/56	652/58	961/57	999/56	238/46
SK3GW	2,797,920	0/0	180/36	820/58	874/59	946/57	660/56
LY7A	1,781,532	2/2	121/29	437/56	761/56	768/58	325/45

F5NBX posted a Top 10 DX Single-Band 15-meter entry from this smart looking station.

JF2FIU proudly shares his love of the hobby with his son. Is this a new multi-op team in the beginning stages?

winning the tough DX single-op QRP category in a close finish with HA2SX—406,116 points to 402,705. Another European, DK3GI, takes home top honors in the DX single-op assisted realm with a strong showing of 2,062,848 points.

Intense competition and some great strategies highlight the DX multi-operator categories. The multi-two operation at HC8N out QSO'd runner-up V26O on five bands to take home top honors with 8,440,950 points, and in the process upped the previous M2 record

1999 ARRL International DX Contest CW Plaque Winners

W/VE CW Single Operator

All Band	K1ZM	Frankford Radio Club
1.8 MHz	WA8GHZ	Butch Greve, W9EWC Memorial
3.5 MHz	W1MK	Thomas Rylander, SM3DMP
7 MHz	K8DX	Northern AZ DX Assn
14 MHz	K1TO	QSLs By W4MPY
21 MHz	K2SS/1	Carl Luetzelschwab, K9LA
28 MHz	WC4E	Green River Valley IL ARS
Low Power	W2TZ	Dauberville DX Assn
QRP	N7IR	Tod Olson, K0TO

Multi-Operator

Single Transmitter	W3BGN	Northern Illinois DX Assn
Two Transmitter	K1AR	Order of the Boiled Owls, W2AO Memorial
Unlimited	W3LPL	Alpha/Power, Inc

DX CW Single Operator

World	P40W	North Jersey DX Assn
Africa	EA8CN	Byron P. Peebles, Jr., NZ3O
Asia	C4A (5B4ADA, op)	Alamo DX Amigos
Europe	G0IVZ	Jerry Griffin, M.D., K6MD
North America	WP3R (KE3Q, op)	Potomac Valley Radio Club
Oceania	KH7R (KH6ND, op)	John Brosnahan, W0UN
1.8 MHz	S50U	Fred Race W8FR, DL1FF Memorial
7 MHz	C6AKQ (N4BP, op)	Thomas P. Gannon W3YX Memorial
14 MHz	GM3POI	Tom Frenaye, K1KI
28 MHz	LT1F (LU5CW, op)	Ft Wayne DX Assn
Low Power	ZF2NT (N6NT, op)	Jim Stevens, K4MA
QRP	G0TDZ	Jerry Griffin, M.D. ,K6MD
Assisted	DK3GI	Willamette Valley DX Club

DX CW–Multi operator Single Transmitter

World	8P9JA	John Brosnahan W0UN
Asia	JR1ZTT	Yankee Clipper Contest Club
Europe	TM1C	The Radio Place
North America	8P9JA	Caribbean Contesting Consortium

DX CW Multioperator Two Transmitters

World	HC8N	Frankford RC, Tom DeMeis K2TD Memorial
Europe	G4BUO	Jim George, N3BB
Oceania	no winner	Oklahoma Comm Center and AH9B
South America	HC8N	Northern Ohio DX Assn

DX CW Multioperator Unlimited

World	9A1A	H Stephen Miller, N0SM
Europe	9A1A	Texas DX Society
North America	C6AKW	Alpha/Power, Inc
Oceania	no winner	David Brandenburg, K5RQ
South America	no winner	David Brandenburg, K5RQ

Special Plaques

Atlantic Division CW	K3ZO	Salt Lake DX Assn, K2NY Memorial
Great Lakes Division CW	N9AG (at N8IR)	Livonia ARC
Japan All Band CW	JH4UYB	Akita DX Assn
Japan Low Power All Band CW	JH5FXP	Western WA DX Club
Seventh Call Area All Band CW	KC7V	Willamette Valley DX Club
Ninth Call Area All Band CW	W9RE	Northern Illinois DX Assn
Caribbean Multi-Single CW	8P9JA	The YASME Foundation

W/VE Region Leaders

Boxes list call sign, score, and power (A = QRP, B = Low Power, C = High Power).

CW

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)		
N1TM	338,334	A	N1CWR	284,208	A	WI9WI	269,730	A	N0UR	306,180	A	N7IR	516,132	A
AA1CA	281,934	A	N4ROA	135,441	A	VA3SB	101,106	A	K0NI	177,912	A	W8QZA/6	227,586	A
WZ2T	141,120	A	K4GEL	99,186	A	K8UCL	32,184	A	K5TT	165,996	A	N6WS	216,756	A
K2JT	137,196	A	W4NI	21,624	A	K8CV	17,808	A	K0ZK	34,170	A	W6JVA	64,449	A
K3WWP	116,325	A	W4KYW	17,820	A	AF9J	15,552	A	WA0VBW	21,321	A	W6IO	55,890	A
W2TZ	1,844,640	B	K4RO	1,378,026	B	N8AA	1,676,700	B	WD5K	1,074,528	B	W6JTI	993,294	B
VO1MP	1,427,688	B	K4OGG	1,110,798	B	WB8YJF	1,042,494	B	W0UO	1,056,510	B	W7YAQ	891,462	B
K1NO (K5FUV, op)	1,378,944	B	WO4O	1,101,420	B	VA3RU	1,034,931	B	N5AW	990,522	B	K7ZA	710,424	B
NA2U	1,136,220	B	K5KLA	1,072,965	B	N9JF	943,944	B	N5DO	635,508	B	KN7Y	665,448	B
K1RO	1,108,554	B	WD4AHZ	1,006,155	B	K8EP	658,512	B	K5WO	550,464	B	N7AN	500,268	B
K1ZM	4,566,039	C	W4AN	3,968,250	C	W9RE	3,090,540	C	N2IC	3,425,760	C	W6AX	2,927,076	C
K5ZD (W2SC, op)	4,306,236	C	K0DQ (at W4RX)	3,683,988	C	N9AG (at N8NR)	2,097,900	C	K5YA	2,081,280	C	(N6IG, op at W6GO)		
KQ2M	4,122,258	C	N4AF	3,355,506	C	K9MA	1,783,848	C	N5CQ	1,375,470	C	K6LA	1,636,470	C
N2NT	4,096,134	C	K4AB	1,883,484	C	VE3KZ	1,285,920	C	N5PO	1,086,168	C	KC7V	1,554,060	C
K1DG	3,995,850	C	K0EJ	1,579,569	C	W9OP	1,113,525	C	K0CAT	1,034,838	C	K4XU/7	1,477,980	C
												W2VJN/7	1,477,008	C

of 8,011,644 set by the 6D2X entry in 1994. That's quite an accomplishment from an outstanding group of ops.

The stations at 8P9JA, VP5CW, and V31TP battled it out in the multi-single category. While each snared similar QSO and multiplier totals, on most bands, 8P9JA emerged as the winner, in part due to an excellent QSO total on 10 meters. Their 5,403,942 score missed the old mark set in 1990 by about 500K. Will this fall next year? Rounding out the DX multiop stations was the 9A1A win in the multi-multi category.

More detailed log checking was introduced to this year's contest. If you submitted an electronic log, you can receive a copy of your UBN by sending an email request to **k5fuv@arrl.org** and including as the subject line your call sign and the words "UBN request DXCW." A couple of changes will affect entries for next year's event. If you use a computer to log the contest, you will be required to submit a copy of the log file for log checking purposes in the required ARRL file format. Look for more information on this in the upcoming "General Rules for all ARRL Contests," as well as the specific rules for this event for the year 2000.

Speaking of next year, the dates for the 2000 ARRL International DX CW contest are set for February 19-20. With the excellent propagation expected to continue, it's a good bet that activity will continue to increase. Whether you are a die-hard contester looking to hunker down for the duration, or a casual operator who is looking for a couple of new DXCC entities, this event is a place to bring out the best in your operating skills. The 1999 running of the DX CW contest was one to remember for many, that's for certain. But start looking ahead now as you plan to make the year 2000 ARRL International DX Contest CW weekend your "one to remember."

Soapbox

After poor conditions at the start, I finally heard a loud European station in the passband. I worked him, QSYed up to the next clear spot, called CQ, and didn't move for about seven hours (N8II)… Conditions were good Saturday night, but my neighbor W4DR blew me away (W4HJ)…Great Contest! Results far exceeded my previous efforts or my expectations for this year (K1FFX)…Great to have the solar flux back (K0BJ)…Best I ever did from home in this contest. Had a ball! Managed to stay in the seat for 41.5 hours, but couldn't sleep much during off time (W1WEF)…First DX contest at a new QTH—rig on an old kitchen table and amplifier on an upside-down recycling bin (N2MF)…Murphy attacked with a vengeance this year. It started a week before the contest when a Nor'easter took out the rotor, the local packet node crashed three days beforehand, and during the contest the Henry 4K amplifier tripping the HV overload. A thoroughly exhausting weekend for me but the ops here did a super job (W3PP)…Ten meters was so congested that at times I had to use my 250-Hz filter, just like 40 meters (W2YR)…The highlight of the weekend was working VR2BG on 80 meters at sunrise Saturday morning using only 100 W and a G5RV antenna (W9FX)…I'm amazed that I was able to break 1 million points with my little antennas (N5AW)…I was astonished at the number of requests for me to QSY to other bands. *All* requests were completed (VE9DX)…Outstanding openings on 10 and 15 all day to Europe and Russia on 20 meters (VE3KZ)…You could have worked Europe on a coat hanger on 10 meters Sunday morning. Thanks to all of the Caribbean stations who pulled out my weak signal on the Top Band. HC8N definitely had the best ears on 160 meters (K8EP)…The propagation at the start of the contest all of the way through Saturday was absolutely punk. Trying to run was hopeless (N0FW)…Excellent conditions. Was able to run on 10 and 15 and even for a bit on 20 meters (WI9W.)…I secretly wished for another radio and stacked beams, having been spoiled at AA4NU while being introduced to Single-Op Two-Radio (WO4O)…I was fascinated to read comments of those in the west who had good low-band conditions while in the northeast it was awful. I would have thought given the aurora and extent of the solar storm conditions would have been universally poor. Wonder what conditions will be next year? (KQ2M)…This was my first attempt at the DX contest. I was impressed with the abilities and responses of the operators—and their patience (W9QFV)…Enjoyed fine signals from the new QTH with temporary (wimpy) antennas. Had to go outside to swap antennas and change bands. Highlights? Busting HZ, 5H, TZ and EL pileups fairly quickly with the grounded-mounted vertical (N8SM).

Scores

Scores are listed by DXCC Countries and ARRL\RAC Sections. Within each Country or Section, scores are listed in desending order, by power categories, followed by multi-operators. Line scores list call sign, score, QSOs, multipliers, hours of operation (default is 48), power (A = QRP, B = Low Power, C = High Power), and band.

CW
W/VE
Single Operator
1
Connecticut

N1TM	338,334	527	214	48	A
NM1K	62,730	170	123	48	A
N1MT	44,550	165	90	48	A
K1NO (K5FUV, op)					
	1,378,944	1512	304	41	B
K1RO	1,108,554	1334	277	20	B
KG1D	770,562	962	267	48	B
W0MHK	719,901	879	273	48	B
W1EQ	678,132	966	234	48	B
W3TB	295,596	476	207	48	B
N1QDA	30,888	104	99	48	B
WA1GGN	14,931	79	63	6	B
KQ2M	4,122,258	3218	427	45	C
K1ZZ	3,881,001	3163	409	48	C
W1WEF	3,594,240	3072	390	48	C
K1RM	3,010,410	2490	403	48	C
AA1OL	22,578	106	71	6	C
K1VW	5,670	54	35	48	C 160
K2SS/1	605,790	1905	106	48	B 15
K1DII	31,110	170	61	7	C 10

Eastern Massachusetts

WT1O	955,854	1142	279	48	B
K1HT	654,696	866	252	15	B
K1FFX	465,804	681	228	48	B
W1VIV	328,452	542	202	22	B
N3KCJ	275,217	461	199	48	B
W1ZZ	208,572	382	182	48	B
KR1B	156,420	330	158	48	B
N1EDM	148,824	312	159	48	B
WZ1K	81,216	144	188	48	B
N1PGA	73,830	214	115	48	B
K1TW	24,090	110	73	48	B
KQ1F	14,832	103	48	48	B
K1VUT	4,770	53	30	2	B
KC1WD	1,701	27	21	4	B
K1ZM	4,566,039	3467	439	48	C
AA1ON	1,065,222	1426	249	48	C
W1AX	615,330	774	265	48	C
W1ZT	460,719	721	213	11	C
W1FM	448,158	661	226	48	C
W1OHM	119,511	271	147	48	C
K2LP	75,192	241	104	48	C
W1EM	64,515	187	115	48	C
WB1S	11,658	58	67	48	C
W1MK	156,735	645	81	48	C 80
K1LZ	100,344	452	74	48	C 80
KM2P	230,265	903	85	48	C 40
WR1P	12,126	94	43	48	C 40
WG1Z	37,989	189	67	48	B 20
W1GOU	18,963	129	49	48	B 10

Maine

N1AFC	39,600	165	80	48	A
KA1IS	542,574	701	258	48	B
W1LIC	24,480	120	68	5	B
KD1OG	7,800	65	40	12	B
K1PQS	59,637	193	103	15	C

New Hampshire

AA1CA	281,934	454	207	35	A
K1WD	82,026	217	126	24	A
K1PTF	805,749	1037	259	48	B
NM1W	205,842	338	203	48	B
AA1QD	145,542	382	127	12	B
K1NH	103,680	270	128	48	B
WB1GEX	8,967	61	49	4	B
K1DG	3,995,850	3134	425	48	C
KC1F	2,610,432	2472	352	35	C
WC1M	1,986,465	2171	305	30	C
KR1G	1,237,041	1417	291	48	C
K1BV	485,784	936	173	21	C

Rhode Island

K1VSJ	816,864	1016	268	48	B
K1ZE	284,427	507	187	10	B
AB1BX	61,596	177	116	48	B
K2MN	20,670	106	65	48	B
KS1J	1,327,290	1465	302	48	C
W1WFZ	519,129	783	221	48	C
W1RFQ	24,360	145	56	48	C 10

Vermont

W3SOH	277,200	462	200	48	B
W1ZK	969,804	1023	316	48	C
WA1LIR	639,330	1055	202	13	C
AA1SU	244,944	432	189	48	C
W1ZS	212,784	403	176	48	C
K1IK	40,788	206	66	20	C 80

Western Massachusetts

W1KT	398,820	578	230	48	B
AE1B	243,000	500	162	48	B
K1TS	192,045	413	155	48	B
W1TO	118,170	303	130	48	B
K5ZD (W2SC, op)					
	4,306,236	3553	404	48	C
N1AUT	11,286	114	33	48	C 20
NB1Q	4,092	44	31	8	B 10

2
Eastern New York

W2QYA	7,998	62	43	48	A
K2UF	763,434	1022	249	48	B
K2SIG	709,386	863	274	48	B
K2DW	298,368	448	222	48	B
W2ENY	192,324	341	188	48	B
NA2M	139,104	288	161	48	B
W2YK	124,740	270	154	48	B
K2RI	35,028	139	84	8	B
K2SX	1,560,000	1625	320	48	C
W2ZU	400,452	604	221	48	C
N1JP	23,229	89	87	48	C
WX2N	28,899	169	57	48	B 15
KC2CRO	1,008	21	16	2	B 15

NYC-Long Island

N2TO	100,992	263	128	17	A
W2HLI	520,923	703	247	48	B
W3EH	116,946	267	146	48	B
KG2BI	113,778	258	147	48	B
W2KTF	26,676	117	76	48	B
NY6DX	1,020,099	1009	337	48	C
K2AW	403,650	650	207	48	C
WB2TPS	175,200	365	160	48	C
N2GC	51,900	173	100	48	C
WB2AMU	4,929	53	31	48	B 80
K2MFY	72,957	293	83	11	B 10
KA2D	44,844	202	74	48	C 10

Northern New Jersey

K2JT	137,196	309	148	10	A
W2JEK	13,050	75	58	8	A
NA2U	1,136,220	1306	290	48	B
N2LK	218,700	405	180	14	B
N2ST	126,828	271	156	48	B
KB2VVB	107,682	262	137	48	B
W2CVW	66,105	195	113	7	B
KG2MV	12,636	78	54	6	B
N2NT	4,096,134	3363	406	48	C
N2LT	3,751,200	3126	400	48	C
K2DM	2,506,002	2501	334	48	C
WA2VYA	1,271,487	1337	317	48	C
W2EN	1,162,458	1254	309	48	C
W2HCA	497,760	680	244	48	C
N7UN	474,240	520	304	48	C
W2RD	299,700	444	225	48	C
W2UDT	136,920	280	163	48	C
NC1A	117,810	255	154	48	C
NW2B	29,925	95	105	48	C
N2KJM	25,032	149	56	48	C 40
WA2ASQ	17,595	115	51	48	B 40
AE2JL	37,200	200	62	48	B 15
N2CG	14,868	118	42	12	B 10

Northern New York

WZ2T	141,120	320	147	23	A
K3KYR	404,721	579	233	31	C
NT2W	672	16	14	48	B 20
N2JNZ	462	14	11	5	A 15

Southern New Jersey

KC2TA	342,654	598	191	48	B
W5KI	269,514	414	217	15	B
K1JT	233,130	409	190	26	B
WA2VQV	99,825	275	121	48	B
K2MK	22,230	114	65	48	B
W2UL	14,268	82	58	48	B
AB2E	1,397,889	1223	381	48	C
KD2KS	43,956	148	99	48	C
W2BE	30,969	111	93	48	C
AD3Y	2,430	30	27	48	C
K3JGJ	33,672	184	61	48	C 80
K2SWZ	7,866	69	38	48	B 40
K2WI	518,976	1632	106	48	C 15
W2CN	8,610	70	41	9	B 10

Western New York

W2TZ	1,844,640	1952	315	48	B
WA2EYA	451,485	635	237	48	B
K1PY	391,170	590	221	48	B
W2TX	333,198	519	214	12	B
WA2YSJ	299,280	464	215	48	B
N2UM	277,344	432	214	48	B
AA2VX	181,863	363	167	48	B
W2GR	73,875	197	125	48	B
K2GKM	64,200	200	107	48	B
K9EEE	52,416	192	91	10	B
W2FUI	51,615	185	93	20	B
K2FR	4,620	44	35	48	B
K2UA	2,727,879	2651	343	42	C
W2LC	1,847,385	2019	305	48	C
N2CU	1,457,352	1557	312	48	C
K2NV	1,396,236	1516	307	48	C
W2FU	1,253,364	1388	301	48	C
K2FU	1,111,560	1180	314	48	C
KW2J	609,696	876	232	31	C
KE2WY	519,456	773	224	31	C
W2FXA	490,752	639	256	48	C
W2EZ	222,894	406	183	48	C
K2MP	205,110	430	159	24	C
WA2ABN	150,732	318	158	48	C
W2OMV	129,360	308	140	20	C
KX2H	87,840	240	122	10	C
WF2Y	87,075	215	135	48	C
W2YRH	74,241	219	113	17	C
W2RW	27,378	117	78	6	C
AA2TN	21,513	101	71	48	C
W2FR	6,300	50	42	4	C
W2VO	1,872	26	24	48	C 160
N2MF	360,261	1213	99	27	C 15
WB2YQH	174,300	700	83	48	C 15
WA2RZJ	32,400	200	54	48	B 15
K2CS	32,550	175	62	48	B 10

3
Delaware

N8NA	422,970	613	230	15	B
N9GG	23,004	108	71	48	B

Eastern Pennsylvania

N3RN	60,192	176	114	48	A
KB3MM	531,216	651	272	48	B
W3CF	260,820	378	230	48	B
W3BEN	147,906	297	166	48	B
N3NZ	123,066	258	159	48	B
W3KM	112,539	233	161	24	B
N3OUC	64,680	140	154	48	B
K3NL	26,400	110	80	48	B
N3AS	26,220	115	76	5	B
AA3TT	1,373,247	1629	281	48	C
N3ZA	900,798	899	334	48	C
N3KR	447,174	637	234	48	C
N3MLV	256,470	415	206	48	C
K3QIA	237,606	398	199	48	C
W3BYX	221,094	426	173	48	C
W3EVW	216,999	423	171	48	C
N3RU	183,168	318	192	48	C
W3IZ	181,770	365	166	48	C
K3SV	174,492	393	148	48	C
W3RJ	127,116	396	107	48	C
KC3Q	31,365	123	85	48	C
W8IJ	12	2	2	48	B 40
W3EHZ	40,788	206	66	48	B 20
NY3A	2,655	15	59	48	C 20

Maryland-DC

WV3B	7,644	52	49	48	A
N1WR	838,614	974	287	48	B
W3DAD	552,033	739	249	29	B
K1EFI	444,564	636	233	48	B
KE3VV	259,368	428	202	48	B
N3UMA	114,210	235	162	48	B
N3II/4	43,659	231	63	48	B
W3FQE	18,117	99	61	48	B
N3WK	1,794	23	26	48	B
K3ZO	3,860,337	3193	403	48	C
W3GN	693,048	862	268	48	C
W3EKT	350,811	549	213	48	C
W3USS (W9JG, op)					
	148,320	309	160	48	C
W3CP	54,846	277	66	48	B 15
WA3EEE	20,727	141	49	48	B 10
W3DF	18,792	116	54	11	B 10
K3HH	17,157	133	43	48	B 10

Western Pennsylvania

K3WWP	116,325	275	141	20	A
WA3HAE	604,758	833	242	48	B
NB4J	141,168	272	173	17	B
NJ3K	98,982	282	117	48	B
WA3EQJ	12,480	80	52	10	B
AD8J	817,704	984	277	48	C
WB3EPE	56,055	185	101	18	C
W3HDH	35,742	161	74	3	C
WW3S	167,943	629	89	48	B 15
KB3AZK	13,407	109	41	48	B 15
WO3Z	81,366	382	71	16	B 10

4
Alabama

K3IE	404,985	551	245	48	B
KU4YJ	22,440	88	85	14	B
WB4HUX	546	14	13	3	B
K4AB	1,883,484	1852	339	48	C

Georgia

W4KYW	17,820	108	55	48 A	
K4OGG	1,110,798	1313	282	48 B	
N8LM	440,376	622	236	48 B	
W4ATL	11,340	63	60	4 B	
W4AN	3,968,250	3250	407	48 C	
K4TEA	11,484	87	44	48 C	160
K4GSX	3,696	44	28	48 A	20
K4EA	241,239	829	97	48 B	15

Kentucky

K4IE	23,478	86	91	48 B	
KE4LIA	15,120	112	45	23 B	
K1AO	975,429	1191	273	48 C	
N4XM	229,824	448	171	48 C	
W4KY	153,765	335	153	12 C	
KA4JMZ	17,820	108	55	7 B	15

North Carolina

WJ9B	350,181	533	219	48 B	
NX9T	172,536	316	182	48 B	
KS4XG	112,500	250	150	10 B	
W4IDX	96,048	232	138	48 B	
N4UH	85,020	260	109	48 B	
N4AF	3,355,506	2959	378	48 C	
W4MR (N4CW, op)	1,473,300	1637	300	48 C	
NW6S	725,463	831	291	48 C	
W4LM	73,530	215	114	48 C	
AA4S	47,916	242	66	48 C	
K4ESE	14,688	96	51	6 C	80
KZ2I	22,680	126	60	48 C	40
K5LZT	270	10	9	1 C	15

Northern Florida

WA4IMC	546,354	762	239	48 B	
W4YA	28,314	121	78	4 B	
K8WK	243,165	377	215	38 C	
W7QF	218,229	389	187	48 C	
K4RX	5,814	57	34	48 C	160
N4PN	243,726	829	98	48 C	20
WC4E	328,941	1179	93	48 C	10

South Carolina

VE7CPN/W4	798,975	1005	265	48 B	
K2FY	466,026	614	253	48 B	
K4DLJ	1,295,514	1454	297	48 C	
AA4NN	1,207,983	1403	287	48 C	
W3VT	1,103,436	1202	306	34 C	
W8PC	597,513	769	259	48 C	
N4GJ	346,632	572	202	48 C	
W4JKC	68,400	304	75	21 C	40
AE4FA	5,952	62	32	14 A	20

Southern Florida

WD4AHZ	1,006,155	1285	261	34 B	
N2PK	326,802	502	217	29 B	
N6PLQ	148,782	362	137	44 B	
K4ZT	72,471	203	119	35 B	
N4LF	36,432	138	88	7 B	
KE6QR	6,300	84	25	48 B	
K1PT	1,264,116	1414	298	48 C	
K4LQ	695,331	819	283	48 C	
W4SO	465,912	719	216	48 C	
WA3NKO	212,784	403	176	48 C	
WA4MSU	201,609	393	171	47 C	
N4BG	68,139	201	113	48 C	
WB4OSN	71,820	380	63	48 C	40
AJ4Y	10,956	83	44	48 B	40
K1TO	387,795	1255	103	29 C	20
N8PR	27,816	152	61	48 C	20
N4DL	17,010	126	45	48 B	20
W8RTU/4	27	3	3	48 B	20
W4GD	76,692	308	83	12 C	10

Tennessee

N1CWR	284,208	496	191	48 A	
W4NI	21,624	106	68	48 A	
K4RO	1,378,026	1359	338	48 B	
WO4O	1,101,420	1266	290	48 B	
NA4K	965,838	1114	289	24 B	
W4TYU	107,604	244	147	48 B	
W4AUI	73,080	210	116	48 B	
K0EJ	1,579,569	1693	311	40 C	
W4PA	1,175,337	1293	303	48 C	
W9WI	1,066,494	1243	286	48 C	
K4LTA	1,044,000	1160	300	48 C	
K4AMC	673,785	1085	207	48 C	
N4RG	574,992	792	242	24 C	
AA4WX	147	7	7	48 C	
K1KY	2,886	37	26	4 C	160
W4OGG	1,440	24	20	3 C	20
N4IR	198,660	770	86	48 C	15
K4WX	223,416	856	87	48 C	10
N4UW	28,362	163	58	48 B	10

Virginia

N4ROA	135,441	303	149	20 A	
K4GEL	99,186	271	122	48 A	
N4UY	10,752	64	56	48 A	
K4BAM	472,140	645	244	20 B	
K7CMZ	426,648	613	232	48 B	
K4FPF	417,960	540	258	48 B	
K4UVT	356,694	538	221	48 B	
N6MW	243,651	337	241	21 B	
K4FOY	173,484	366	158	48 B	
N3TG	129,195	261	165	48 B	
K4UK	67,320	204	110	12 B	
K3IZ	51,615	155	111	48 B	
WB4DNL	5,400	45	40	48 B	
K0DQ (at W4RX)	3,683,988	3101	396	43 C	
W4AU	1,061,376	1382	256	48 C	
W4YE	544,512	709	256	48 C	
N4MM	374,136	524	238	48 C	
W4RW	237,510	455	174	48 C	
K5VG	197,025	355	185	48 C	
W2YE	191,664	363	176	48 C	
W4VC	100,812	271	124	46 C	
K6ETM/4	64,728	186	116	48 C	
W4HJ	54,087	149	121	48 C	
K4WY	7,770	70	37	48 B	40
K4OAQ	305,712	1158	88	25 C	15
AI2C	112,338	474	79	48 C	10
W4HM	62,382	281	74	48 B	10

5

Arkansas

KM5G	1,391,679	1531	303	48 C	
N5DX	388,500	1295	100	48 C	15

Louisiana

K5KLA	1,072,965	1165	307	30 B	
K5QK	141,519	293	161	48 B	

Mississippi

W5XX	1,370,064	1564	292	35 C	
WA5OYU	609,444	836	243	48 C	
KC5ZJA	90	6	5	2 B	10

New Mexico

K5OI	396	33	4	48 A	
W6PU	665,160	920	241	38 C	
W5JRP	19,278	126	51	48 B	20
W5YZ	76,314	322	79	48 B	10

North Texas

WD5K	1,074,528	1148	312	48 B	
W0UO	1,056,510	1118	315	48 B	
N5AW	990,522	1079	306	48 B	
K5WO	550,464	752	244	48 B	
KN5L	150,240	313	160	48 B	
WQ5W	135,285	311	145	48 B	
K5KJ	84,132	246	114	15 B	
WK5K	55,998	183	102	18 B	
N5PO	1,086,168	1336	271	48 C	
N8SM	490,500	654	250	48 C	
K5RX	7,035	67	35	48 C	160
N5TJ	92,268	466	66	48 C	15
KY5N	84,240	390	72	48 B	15

Oklahoma

K5TT	165,996	348	159	29 A	
K5HP	387,750	550	235	48 B	
NA5B (W5AO, op)	172,800	720	80	48 C	40
K2BA	138,600	550	84	24 C	20
K0CIE	4,446	57	26	48 B	10

South Texas

W5TD	237,834	362	219	48 B	
K5LJ	188,811	333	189	23 B	
W5MN	188,046	337	186	48 B	
N5XT	177,975	339	175	48 B	
AJ4F	60,552	174	116	48 B	
K5IUA	56,772	166	114	48 B	
K5YA	2,081,280	2168	320	48 C	
N5CQ	1,375,470	1479	310	48 C	
AC5RX	21,087	99	71	48 C	
WA8GHZ	15,006	82	61	48 C	160
NX5M	3,948	47	28	48 C	160
KZ5MM	3,159	39	27	48 C	160
N5XJ	3,690	41	30	48 C	80
KD5EDO	27	3	3	2 A	20
N5DU	69,012	324	71	48 B	15
K0BCN	12,753	109	39	5 B	15
W5NR	624	16	13	48 C	15
N5AF	1,071	21	17	2 B	10

West Texas

N5DO	635,508	834	254	37 B	
NZ5M	6,930	66	35	17 B	15
W5ZO	88,578	399	74	48 B	10

6

East Bay

K6WV	400,056	632	211	48 B	
K6XV	199,584	504	132	48 B	
K6BZS	227,547	579	131	48 C	

Los Angeles

KQ6ES	338,400	564	200	48 B	
K6DDO	159,873	331	161	21 B	
WA6BIL	116,820	295	132	48 B	
WA7BNM	34,860	166	70	48 B	
N6GL	14,787	93	53	5 B	
K6LA	1,636,470	1710	319	48 C	
K0DI/6	60,300	201	100	9 C	
W6MFC	27,720	120	77	48 C	
W6/KH6DX	11,070	82	45	48 C	
AI6Z	2,268	36	21	48 C	80
KU6T	756	18	14	48 B	80
W6RCL	23,142	203	38	48 C	40
N6HY	5,664	59	32	48 C	40
K6CEO	9,963	81	41	48 B	20
N6IC	1,080	30	12	1 C	20
N6RV	43,263	253	57	48 B	10

Orange

KG6O	197,394	394	167	30 B	
W6NT	78,948	258	102	48 B	
AA6PW	52,398	246	71	48 B	

Santa Barbara

N6WS	216,756	446	162	48 A	
N6AZR	54,027	207	87	48 A	
WA6FGV	226,812	461	164	48 B	
W6UM	635,517	723	293	48 C	
WA5VGI	328,800	548	200	48 C	
W6TK	24,696	168	49	48 C	
N6HK	19,875	125	53	12 C	
AA6EQ	2,091	41	17	48 A	10

Santa Clara Valley

W6IO	55,890	207	90	48 A	
W6PLJ	209,292	428	163	20 B	
N6CY	131,625	351	125	16 B	
WD6DX	89,304	244	122	22 B	
W6ISO	88,206	241	122	12 B	
N6NF	16,848	104	54	4 B	
K6XX	653,058	1022	213	25 C	
AJ6V	124,620	335	124	7 C	
K6GT	121,518	314	129	24 C	
W6ISQ	74,880	208	120	48 C	
N3ZZ	57,609	173	111	48 C	
KF6A	30,420	169	60	48 C	
AA6W	26,196	118	74	7 C	
W0YK	14,691	83	59	48 C	

San Diego

W8QZA/6	227,586	457	166	48 A	
W6JVA	64,449	217	99	11 A	
AA6EE	63,600	212	100	48 B	
W6MVW	128,016	336	127	48 C	
W6OVO	14,688	102	48	5 C	
WA6PY	3,015	67	15	8 B	40

San Francisco

W6JTI	993,294	1191	278	48 B	
K6UM	308,115	501	205	48 B	
W6WB	86,304	248	116	48 C	

San Joaquin Valley

K6MI	6,570	73	30	48 A	
W6SRU	127,980	316	135	48 C	
KI6PG	720	20	12	6 B	80
KA6BIM	101,556	434	78	48 C	10

Sacramento Valley

WN6HYX	5,994	54	37	48 A	
K6SRZ	307,380	545	188	48 B	
N6GG	188,892	396	159	17 B	
K6KYJ	180,900	402	150	48 B	
KU6J	145,494	354	137	48 B	
WF6O	22,512	112	67	48 B	
W6AX (N6IG op at W6GO)	2,927,076	2764	353	48 C	
K6DB	1,297,806	1327	326	30 C	
KI6T	476,019	699	227	24 C	
W6NKR	350,784	576	203	48 C	
W6RFF	159,777	433	123	48 C	
K6RN	51,870	266	65	48 C	
W6RKC	2,709	43	21	48 C	80

7

Arizona

N7IR	516,132	708	243	48 A	
W5VBO	54,963	197	93	20 A	
KN7Y	665,448	952	233	48 B	
WN7J	437,472	672	217	48 B	
AB7II	358,722	546	219	48 B	
KJ7WY	207,915	415	167	48 B	
NN7A	192,555	389	165	48 B	
KY7M	164,280	370	148	48 B	
W2HTX	84,294	223	126	15 B	
KC7V	1,554,060	1756	295	37 C	
W7YS	552,948	781	236	48 C	
AA7A	239,616	512	156	48 C	
N7JXS	135,942	326	139	48 C	
K7NO	71,604	234	102	48 C	
W7ZMD	33,975	151	75	48 C	
N7IX	33,147	127	87	48 C	
KI7LS	2,112	22	32	5 C	
W8AEF	15,651	111	47	48 C	80
NQ7X	8,100	60	45	48 A	20
W7AYY	49,848	268	62	48 C	15

Eastern Washington

W7GB	20,832	112	62	48 B	

Idaho

K7TQ	8,178	58	47	48 A	
W7LAR	168,012	359	156	48 B	
WX7G	75,915	241	105	12 B	
KA7T	179,772	422	142	48 C	
AA7UN	33,216	173	64	48 B	20

Montana

K7BG	1,087,665	1229	295	48 C	
KC7UP	194,532	377	172	48 C	
K7ABV	164,850	350	157	48 C	
N7MSU	25,431	173	49	48 B	15

Nevada

KU7Y	19,926	123	54	48 A	
N7IF	47,880	190	84	48 B	
K7NV	348,210	530	219	17 C	

Oregon

W7YAQ	891,462	1039	286	48 B	
K4XU/7	1,477,980	1564	315	48 C	
W2VJN/7	1,477,008	1578	312	48 C	
WG7A	224,082	422	177	48 C	
K7EM	106,470	507	70	48 C	40
N7OU	56,181	307	61	17 B	10

Utah

KE7NS	286,875	625	153	48 B	
N7OG	39,672	174	76	48 B	
W7HS	239,232	448	178	48 C	
W8EQA/7	104,247	429	81	48 C	15

Western Washington

NW7DX	22,866	74	103	48 A	
W7/JR1NKN	858	22	13	11 A	
KZ7A	710,424	1012	234	48 B	
N7AN	500,268	887	188	48 B	
N7LOX	392,196	667	196	24 B	
N7RO	215,247	457	157	48 B	
W7TSQ	129,150	350	123	48 B	
N7WA	31,521	133	79	48 B	
KN7T	30,033	141	71	48 B	
NA7R	18,564	91	68	20 B	
AA0CY	3,120	40	26	48 B	
N7TT	745,767	1023	243	48 C	
W7QN	268,920	498	180	48 C	
W7IIT	264,741	493	179	48 C	
K7DZ	208,134	373	186	48 C	
AB7RW	158,760	392	135	48 C	
AD7U (at N6HR)	118,479	541	73	48 C	
KB7N	33,366	134	83	48 C	
WA2OCG	21,240	118	60	48 C	
W7WA	270,909	971	93	48 C	20
NX7K	250,002	817	102	44 C	15
W7LGG	11,214	89	42	48 B	10

8

Michigan

K8CV	17,808	106	56	48 A	
WB8RCR	8,745	55	53	16 A	
K8EP	658,512	807	272	48 B	
K8GT	254,583	449	189	48 B	
K8IR	154,440	360	143	17 B	
N8NX	27,000	125	72	27 B	
NE8I	463,050	630	245	48 C	
W8KX	411,069	521	263	48 C	
W8TWA	189,036	356	177	48 C	
N8VEN	54,756	169	108	24 C	
AA8U	1,260	30	14	48 C	80
KB8PGW	20,088	108	62	48 B	40
W8UE	5,100	50	34	8 B	40
W8UD	101,616	464	73	48 C	20
W8WVU	13,800	100	46	48 B	20
W8WA	282,906	1014	93	48 C	15
KT8X	92,460	460	67	11 C	15
K8JM	38,628	222	58	23 C	15
WD8S	24,963	157	53	48 B	15
WA8OLD	9,324	74	42	19 C	15

Ohio

K8UCL	32,184	149	72	20 A	
KA8NRC	9,072	63	48	48 A	
N8AA	1,676,700	1620	345	48 B	
WB8YJF	1,042,494	1186	293	48 B	
W8GOC	227,550	410	185	48 B	
AA8UP	217,062	389	186	48 B	
W8AZA	188,376	376	167	18 B	
KE8PX	176,295	365	161	34 B	
W8IDM	166,725	325	171	13 B	
WT8P	59,430	283	70	48 B	
N8LBI	54,696	212	86	48 B	
K8LY	28,431	81	117	48 B	
W8EE	28,272	124	76	9 B	
AF8C	20,661	97	71	9 B	
W8KH	5,520	46	40	11 B	
N9AG (at N8NR)	2,097,900	1890	370	48 C	
KE8M	571,536	784	243	24 C	
W8PN	206,883	381	181	17 C	
K5ZG	190,236	382	166	48 C	
N6WLX/8	129,444	268	161	48 C	
W8NPF	90,171	233	129	48 C	
W8VE	73,140	212	115	48 C	
N8WS	21,420	119	60	48 C	
K8VUS	5,106	46	37	6 C	
K8DX	285,384	1012	94	48 C	40
WA8RCN	57,279	313	61	18 C	40
WB8ZWY	45,360	240	63	20 C	40
WA8TNO	108,546	458	79	48 C	15
W4NTI	42,525	225	63	22 B	15
K8PYD	4,032	48	28	48 B	15
N8AGU	81,291	343	79	17 C	10
N8IRS	882	21	14	3 B	10

West Virginia

K5IID	731,136	896	272	48 B	
KG8GW	309,096	477	216	47 B	
N8YYS	116,145	267	145	48 B	
W8OP	77,256	222	116	17 B	
K3JT	1,507,098	1541	326	48 C	
W9LT	1,409,763	1511	311	34 C	
K2UOP	759,564	1082	234	48 C	
W8ZA	357,000	500	238	48 C	
K8KFJ	205,905	371	185	48 C	
W8UMR	43,290	195	74	48 B	20
N8II	531,036	1639	108	48 C	15
K8OWL	5,346	54	33	11 A	10

9

Illinois

N9JF	943,944	1063	296	48 B	
K9MMS	541,026	699	258	48 B	
W9FX	526,500	702	250	47 B	
W9BP	238,368	416	191	26 B	
AA9KH	173,715	313	185	48 B	
K9JE	164,673	321	171	48 B	
W9IL	132,678	273	162	9 B	
K9KM	103,680	256	135	48 B	
K9PPW	75,198	166	151	16 B	
W9MYY	67,260	190	118	48 B	
W9YO	66,006	193	114	18 B	
K9YO	54,609	167	109	48 B	
KY0Q	42,720	160	89	7 B	
W9YS	41,100	137	100	48 B	
W9AX	39,312	144	91	48 B	
KE9EX	37,926	129	98	11 B	
N9NT	27,918	99	94	20 B	
W9DY/M	20,301	101	67	48 B	
W0KT	11,424	68	56	48 B	
W9QFV	6,936	68	34	8 B	
K9PY	4,464	48	31	48 B	
K9YAX	256,704	448	191	48 C	
K9ZO	250,848	402	208	48 C	
K9UQN	142,350	325	146	48 C	
KJ9O	134,991	283	159	48 C	
N9WKW	64,260	180	119	48 C	
AB9E	54,375	145	125	48 C	
AA9NF	17,787	77	77	48 C	
K9CJ	12,978	103	42	48 C	40
K9BG	76,077	321	79	48 C	20
K0XG (K0RX, op)	447,531	1477	101	44 C	15
W9OF	255,717	861	99	48 C	15
K9OM	251,433	921	91	21 C	15
K9RN/M	71,928	324	74	48 B	15
W9TY(K9MDO, op)	25,560	142	60	48 C	15
N9NW	11,703	83	47	48 B	15
K9QVB	190,080	720	88	48 C	10
K9RN	22,896	159	48	6 B	10
N5DT	1,170	26	15	48 B	10

Indiana

KJ9C	579,960	716	270	32 B	
WT9U	448,380	636	235	48 B	
N9DD	47,880	168	95	48 B	
K9WX	23,220	86	90	7 B	
W9FHA	16,038	99	54	48 B	
K9DIY	210	10	7	48 B	
W9RE	3,090,540	2711	380	48 C	
W9KTP	206,280	360	191	48 C	
K9IG	94,050	275	114	4 C	
K9KI	44,550	165	90	48 C	
WA9ALS	840	14	20	48 C	
N4TZ	204,594	793	86	48 B	15
N9LJX	4,995	37	45	48 B	15
W9AU	114,390	465	82	17 B	10

Wisconsin

WI9WI	269,730	486	185	14 A	
AF9J	15,552	81	64	48 A	
W9WUU	385,956	604	213	48 B	
W9HR	60,375	161	125	22 B	
N9GBB	6,552	52	42	5 B	
W9ISC	1,980	30	22	48 B	
K9MA	1,783,848	1864	319	48 C	
W9OP	1,113,525	1225	303	48 C	
K9CAN	517,314	763	226	48 C	
K0SN	172,125	459	125	48 C	
W9GXR	43,560	220	66	48 C	40
NI9C	75,852	294	86	48 C	20
W9GIL	83,913	337	83	48 C	10

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Colorado

K0ZK	34,170	134	85	48 A	
N0QT	20,700	100	69	48 A	
KI0II	3,534	38	31	48 A	
AA0MZ	132,729	293	151	27 B	
N0IBT	41,067	169	81	16 B	
WM0G	22,698	97	78	6 B	
KC0EGB	5,130	38	45	9 B	
K0EZW	1,104	23	16	48 B	
N2IC	3,425,760	2928	390	48 C	
K0RI	518,259	667	259	48 C	
W0GG	182,745	393	155	48 C	
K0COP	40,320	168	80	48 C	
KV0Q	229,353	859	89	48 C	40
AB0GO	12	1	4	1 A	40
W0UN (W0UA, op)	477,873	1609	99	48 C	15
N0NR	389,844	1326	98	48 C	15
W0ETT	91,125	405	75	17 B	15
KJ0G	60,588	297	68	48 C	15
N7DR	165,804	674	82	48 C	10

Iowa

AB0II	219,300	425	172	48 B	
K0CF	128,340	276	155	15 B	
AA0AI	30,888	117	88	48 B	
AD0H	2,139	31	23	2 B	
W0NFL	128,805	277	155	48 C	
W0SF	17,400	116	50	20 C	80
WB0B	2,208	32	23	48 B	80
N0AC	88,038	438	67	48 C	40
N0NI	335,517	1229	91	48 C	15
NE0P	7,839	67	39	48 B	15

Kansas

W0WPL	32,712	116	94	9 B	
KB0WPY	5,880	49	40	48 B	
K0BJ	585,312	728	268	21 C	
KG0UA	350,910	557	210	48 C	
AA0FO	229,440	478	160	48 C	
W0RT	59,514	182	109	48 C	

Minnesota

N0UR	306,180	540	189	23 A	
WA0VBW	21,321	103	69	10 A	
KE0UI	326,565	531	205	48 B	
W0HW	271,620	503	180	48 B	
AA0ZV	64,296	188	114	48 B	
W0QF	8,745	53	55	48 B	
K0CAT	1,034,838	1337	258	48 C	
W0ML	374,400	640	195	48 C	
K0IR	330,144	608	181	48 C	
K0AD	60,894	199	102	7 C	
N0IJ	33,069	151	73	48 C	
K0KGS	26,400	100	88	48 C	
N0MSB	18,018	91	66	48 C	
N0RA	88,725	455	65	48 B	15

Missouri

K0NI	177,912	353	168	48 A	
K0GPF	166,500	375	148	24 B	
KA0OUV	46,053	129	119	48 B	
KA0P	25,134	118	71	48 B	
KG0YJ	19,404	98	66	18 B	
K2HT	14,220	79	60	48 B	
N0ZP	12,348	84	49	20 B	
KC0BYE	2,754	34	27	3 B	
K0BX	77,220	195	132	48 C	
KI0HQ	71,340	205	116	47 C	
KS0M	59,706	186	107	48 C	
K4VX (K9BGL, op)	216,132	868	83	48 C	40
K2VV (at K4VX)	423,384	1543	92	48 B	15
NS0Z (K4VX, op)	33,480	180	62	4 C	10

North Dakota

KI0E	21,960	120	61	48 C	

Nebraska

AB0FX	38,715	145	89	18 B	
WN0L	18,639	109	57	48 B	
KT0K	156,249	643	81	48 B	15
KK0DX	17,490	106	55	48 B	15

Canada

New Brunswick

VE9DX	235,734	389	202	48 B	
VE4MF	22,365	105	71	48 B	15

Nova Scotia

VE1CT	55,290	190	97	16 B	
VE1ZJ	135,018	577	78	48 C	

Newfoundland-Labrador

VO1MP	1,427,688	1506	316	48 B	

Quebec

VE2ABO	39,468	143	92	48 A	
VE2AWR	485,808	698	232	27 B	
VE2FFE	43,953	161	91	48 B	

Ontario

VA3SB	101,106	274	123	48 A	
VA3RU	1,034,931	1219	283	48 B	
VE3KP	635,208	796	266	48 B	
VE3STT	403,308	659	204	29 B	
VE3OM	183,141	357	171	48 B	
VE3WZ	145,350	323	150	48 B	
VE3GFN	130,032	336	129	9 B	
VE3TDG (VA3SYL, op)	78,939	179	147	48 B	
VE3XL	60,348	188	107	48 B	
VA3IX	40,185	141	95	48 B	
VA3SWG	16,740	93	60	48 B	
VA3UZ (UT4UZ, op)	5,328	48	37	48 B	
VE3KZ	1,285,920	1410	304	48 C	
VE3RM (WA1FCN, op)	952,500	1250	254	48 C	
VE3AT	699,696	1032	226	48 C	
VE3ST	396,660	601	220	48 C	
VE3DO	1,980	30	22	48 C	160
VE3ZT	131,220	540	81	48 B	10
VE3HX	45,771	209	73	48 C	10
VA3JFF	9,717	79	41	48 A	10

Manitoba

VE4JB	282,600	471	200	48 C	

Saskatchewan

VE5SF	431,184	691	208	48 B	
VE5CMA	5,394	29	62	48 C	

British Columbia

VE7QO	220,428	468	157	22 B	
VE7AV	58,212	294	66	48 C	20
VE7FJE	71,190	339	70	48 B	15

Single Operator Assisted

1

KI1G	4,673,250	3350	465	48 C	
K1IR	2,093,184	1817	384	48 C	
K5MA	1,937,733	1741	371	30 C	
K1VR	1,832,832	1591	384	37 C	
N4XR	1,748,385	1439	405	48 C	

W1CSM 1,647,300 1445 380 48 C
K1OA 1,597,320 1566 340 48 B
KZ1M 1,563,450 1489 350 23 C
KA1CLX 1,327,758 1226 361 48 C
W1NG 1,279,017 1119 381 48 C
W1UK 1,157,184 1148 336 48 C
K1ST 1,150,080 1198 320 48 C
N6RFM 1,079,037 1061 339 48 C
W1RZF 1,058,760 1038 340 48 C
K1NU 1,019,088 1008 337 48 C
K1VV 1,003,536 1104 303 48 C
W1QK 977,058 1054 309 48 C
W1BIH 909,843 869 349 48 C
N1DG 890,460 873 340 48 C
AA1V 812,520 732 370 48 C
K1SM 661,842 886 249 48 C
K1RV 649,686 779 278 48 B
KS1L 629,928 673 312 48 C
N8RA 562,536 601 312 48 C
K1MY 518,247 647 267 48 C
KE1KD 483,552 552 292 48 C
K1TH 470,952 633 248 48 C
N1RR 402,960 584 230 24 C
K2AZ 385,560 540 238 48 B
W1HR (W1JCC, op)
372,960 480 259 48 C
N1AO 366,600 470 260 48 B
W1JR 358,644 494 242 48 C
KA1GJ 352,764 478 246 48 C
N1DS 324,159 517 209 25 B
N1TB 300,576 496 202 48 C
K1EP 274,770 426 215 48 B
N1KWF 214,638 431 166 48 C
K1YR 202,293 399 169 6 C
W1CU 175,680 320 183 48 C
K1OZ 173,106 326 177 48 B
K1AE 163,251 291 187 48 C
K1KU 145,719 257 189 48 B
N1NQD 143,220 217 220 17 C
NQ1K 140,436 282 166 48 C
K1GW 94,329 223 141 48 C
K1ZO 83,592 216 129 48 B
NC1N 83,025 225 123 48 C
NY1L 28,416 128 74 48 C

2

K2NG 4,181,814 2898 481 48 C
N2MM 3,083,184 2379 432 48 C
W2RE 2,837,604 2324 407 48 C
N2RM 2,319,678 1998 387 48 C
K2NJ 2,063,376 1932 356 48 C
W1GD 2,045,022 1679 406 48 C
K2WK 1,923,426 1674 383 48 C
K2ONP 1,528,440 1355 376 36 C
N2ED 1,317,798 1227 358 48 C
K2XF 749,892 874 286 48 C
N2TK 731,520 635 384 48 C
N2CQ 629,592 709 296 48 C
W2GDJ 572,373 731 261 48 C
N2JT 526,347 699 251 20 C
N2MR 490,590 711 230 48 C
KD2TT 490,050 550 297 17 B
N2MG 482,625 585 275 48 C
K2BM 432,900 555 260 48 C
W2YR 415,224 474 292 48 C
K2EP 415,044 567 244 48 C
KU2N 285,600 425 224 21 C
N2WK 284,256 423 224 48 C
KQ2O 250,290 618 135 48 C
K2SB 235,764 333 236 48 C
N2VW 211,299 337 209 48 C
K5KG 111,360 232 160 4 C
K2TR 107,226 222 161 48 C
NA2X 89,880 214 140 12 C
K2BX 54,432 168 108 48 C
K2UT 49,530 130 127 48 B
K2WB 7,353 43 57 48 B
KF2O 1,020 20 17 48 C

3

K3WW 4,763,799 3329 477 48 C
AA3B 2,732,610 2306 395 48 C
K3PH 2,298,192 2032 377 48 C
W3OV 1,540,413 1497 343 48 C
K3MD 1,377,600 1435 320 48 C
K3CT 1,344,420 1164 385 48 C
W3FV 1,326,051 1377 321 48 C
K3SA 1,241,250 1250 331 48 C
K3ND 1,181,085 1109 355 48 C
K3NZ 1,174,500 1044 375 48 C
K3PP 1,125,000 1000 375 48 C
W8FJ 964,314 951 338 48 C
W3HVQ 953,046 999 318 48 C
N3AM 797,940 858 310 48 C
W3UJ 796,374 879 302 48 B
K3CP 760,275 775 327 48 C
NN3Q 709,650 830 285 48 C
WT3P 606,879 741 273 48 C
KB3TS 604,656 663 304 48 C
AA3JU 446,520 488 305 48 C
W3SB 434,808 549 264 48 C
K3AR 363,120 445 272 48 C
W3KV 360,864 537 224 48 C
W3GK 345,204 516 223 48 C
KE3VN 321,504 394 272 48 C
N3ED 282,606 703 134 48 C
K3OO 279,000 620 150 48 C
NY3M 245,841 361 227 47 B
KU3X 197,025 355 185 48 C
WD3P 100,902 251 134 48 C
W3FG 93,522 218 143 48 B
W3CC 90,816 176 172 48 C
K3TG 52,470 159 110 14 C
N3GPU 19,740 94 70 48 B

4

N4DW 600,894 753 266 48 B
K4PB 542,934 651 278 48 C
K3KO 292,320 480 203 48 C
AD4TR 213,840 360 198 48 C
W4ZW 150,024 329 152 48 C
K4VV 140,112 278 168 48 C
W4ALA 130,032 301 144 48 C
N1CC 72,000 200 120 4 B

5

N5JR 991,305 1049 315 48 C
NA4M 197,607 331 199 48 C
K5AM 181,152 296 204 48 C
K4NR 175,404 311 188 48 C
K5HDU 109,056 256 142 16 B
W5AJ 25,380 94 90 48 C

6

AB6WM 541,944 772 234 48 C
N6JV 449,298 654 229 48 C
K6III 272,304 488 186 48 C
K6NR 180,594 381 158 13 C
W6OAT 77,805 195 133 48 C
NF6R 56,238 206 91 48 C
W6OUL 32,256 168 64 48 C
K6ASK 16,740 90 62 12 B
N6IV 4,560 76 20 11 B

7

N0AX 190,836 372 171 48 B
N7MAL 115,056 272 141 48 B
W7NN 90,072 278 108 48 C

8

N8BJQ 1,631,172 1502 362 48 C
N4ZR 571,392 768 248 48 C
W8FAX 164,010 355 154 48 C
K8DD 133,764 284 157 48 C
KG8DH 121,968 231 176 48 C

9

N9CK 1,259,412 1316 319 48 C
N9UA 912,330 1090 279 48 C
N9RV 616,320 960 214 48 C
N9XX 375,144 539 232 48 C
WO9S 259,992 471 184 9.2 C
K9OSH 162,624 308 176 48 B
N9THC 52,479 147 119 48 C

0

N0AT 1,235,079 1259 327 48 C
N5IN 833,313 929 299 48 C
K0PC 238,200 397 200 48 B
K0IL 94,764 212 149 15 C

Canada

XJ1HA 111,552 332 112 48 C
VE3ZTH 27,456 104 88 48 C
VE5MX 25,935 133 65 48 C
VE6JO 107,508 289 124 48 B

Multioperator Single Transmitter

1

K2TE (+K7CTW,K1HI)
1,831,956 1582 386 48 C
W1AF (KO1O,K3UOC, ops)
1,393,545 1523 305 48 C
N1AU (+WC1D)
1,153,188 1244 309 48 C
W1SRG (N1XYR, KE4GI, ops)
47,658 169 94 48 C
WA1RR (KA1VMG,KB1LN, ops)
19,044 92 69 48 C

2

W2AA (at N2TX) (W2XX,N2TX, ops)
3,560,121 2643 449 48 C
AA2FB (+K2QMF)
3,275,832 2516 434 44 C
W6XR (+N2AU)
2,471,940 2215 372 48 C
W2CG (+W2NO, K2WJ)
1,459,518 1394 349 48 C
K2OWE (+WK2G)
1,038,960 1040 333 48 C
N2LBR (+WA1KMM)
797,790 917 290 48 C
KB5U (+W2XT)
791,430 851 310 48 C
N2SA (+AB2C,N2MFZ, ops)
451,560 530 284 48 C
KE2HG (+KB2DDM)
97,083 201 161 48 C

3

W3BGN (+K2TW)
4,514,112 3264 461 48 C
NE3F (+KS3F, K3ATO)
1,468,755 1285 381 48 C

4

N4RV (+N4RA,K3OSX,KT4W)
2,748,285 2355 389 48 C
AE4RO (+AE4SW)
1,743,768 1794 324 48 C
W4PRO (+W4HIR, WB4DNL, AF4CD)
694,323 721 321 48 C
W4AUB (+N4AU)
215,424 374 192 48 C
WZ2N (+WB2DVU)
561 17 11 2 B

5

N5TW (+W5TD,K5PI,AC5AA,KM5FA,AF5Z, ops)
1,317,897 1197 367 48 C
K5MDX (WQ5L,W5UE, N5FG, ops)
1,218,000 1400 290 48 C

6

AD6GY (+N7FF, AA6EG)
725,412 991 244 48 C
W1HIJ (at WK6C) (+K7GT)
654,012 982 222 48 C
W6YRA (WA6AYI, KU6T, WA7WYE, ops)
34,974 201 58 48 C

7

N7ML (+KE7X, K7LXC)
1,843,053 1823 337 48 C
KO7X (+NG7M, N7VM)
961,653 1267 253 48 C
NM7I (NU7I, K7ON, ops)
779,379 1087 239 48 C
W7LT (K7TJR, K7ZUM,AL7W, ops)
738,300 1150 214 48 C

9

NO9Z (+KX9X, N4OGW)
2,286,081 1939 393 48 C
WN9O (+W9IU)
1,521,135 1317 385 48 C
K9KJ (+W9YYG)
835,551 1059 263 48 C

0

W0GJ (+AA0BY,N0MLJ)
2,156,760 1997 360 48 C
W0TM (+ops)
1,908,348 1882 338 48 C
W0CP (+WJ1R/UA6HZ, KK0T)
1,866,324 1798 346 48 C
N0YY (+W0WP)
1,290,576 1336 322 48 C
K0OU (+KB0TRH)
745,728 971 256 31 C
K0GQ (+K0OU,KB0TRH)
642,447 867 247 48 C
N0FW (+KE0A)
522,792 822 212 48 C
K0JE (+K0JA)
119,700 210 190 48 C
AC0W (+KF0GV)
396 12 11 48 C

Canada

VE6JY (+VE6EX,VE6WQ,VE6BF, ops)
2,248,785 2065 363 48 C
VE6SV (+VO1CV,VE5FA,VE6AKY,VE6NAP)
976,470 1345 242 48 C

Multioperator Two Transmitters

K1AR (+K1EA,K1MBO,K1VE,N2AA,W2RQ)
9,247,365 5805 531 48 C
K8AZ (+K8BL,K8NZ,W8CAR,W8GN,W8KIC, KQ8M,N8TR,WT8C)
6,497,778 4358 497 48 C
K8LX (+K8GM,N8EA,WA8ZDT)
5,762,556 4122 466 48 C
K9AA (at W9JA)(W9JA,KA9FOX,K9GY, K9JY,N9AW,N9FH,W9XT,WE9V, ops)
5,760,933 4009 479 48 C
KB1H (+AA1CE,K1EBY,NB1U,KB1DFB, N1XS,WM1K,N1LYA)
4,532,526 3306 457 48 C
NJ4F (+K1SE, K4EC, K4GMH, WA4JUK, K4EU, K7SV)
4,445,958 3286 451 48 C
W8AV (+AF8A,K8KM,KU8E,W8RZ)
4,418,568 3188 462 48 C
WX0B (+K5PN,K5OT,N5NU,K5ER,NM5M, K5GA,K5ZO)
4,367,412 3052 477 48 C
W6RW (+W6BA,W6KK,AD6DO,N6AW, K6RO,N6ED,W6GA,W6SR)
4,009,593 3101 431 48 C
K1ZR (at KB1SO) (+N1SNB,KB1SO,W1GO)
3,538,836 2604 453 48 C
N3BB (+N5ZC, AD5A, AB5EB, AB5EU, KM5FA, K5GM, N5CQ, AF5Z, WD5N, KG5IG)
3,467,664 2792 414 48 C
WR3L
(+AA3SC,N3NT,WX3B,W6HZW,WR3Z)
3,434,658 2713 422 48 C
K7RAT (K7NT,KK7GW,N6TR, ops)
2,966,280 2602 380 48 C
K6NO (+K6SG)
1,376,574 1466 313 48 C
W5WMU (+KZ5D,K5UA,N8RR,N5SYF)
824,508 1238 222 48 C
K7UP (+KN5H)
672,861 1253 179 48 C
W9VT (K9PMV, KB9RNM, WB9MII, KB9RRD, ops)
4,794 47 34 48 C

Multioperator Unlimited Transmitters

W3LPL (+K1HTV, K1RA, WB2FFY, W2GG, ND3F, AI3M, K3NA, N3OC, K3RV, KD4D, K4ZW, K9PG)
12,158,520 6710 604 48 C
KC1XX (+AD1C,K1GQ,KM3T,DL7ALM, T93M, ops)
11,028,732 6427 572 48 C
K3LR (+N3RA,K3UA,W3YQ,K9VV,VE3EJ, N2NC,K3EST,K8GL,KA3JWJ,ND8L,K8CX)
10,375,095 6121 565 48 C
K1XM (+NB1B, W1FJ, W1KM)
10,078,368 6064 554 48 C
K1KI (+K1CC,K2KQ,KM1P,W1RM)
9,989,472 6121 544 48 C
K9NS (+AA9D, AG9A, K9DX, K9GS, K9HMB, K9PW, K9RS, KS9W, W9QA, W9RM, WV9T)
8,477,898 5302 533 48 C
N3RS (+N3RD, W2UP, W3UM, W7CT, N2SR)
8,267,148 5259 524 48 C
K1RX (+W1FV, WA1S, K1EPJ)
7,588,182 4921 514 48 C
W3PP (+KB3AFT, AA1K, WB4FDT, W3KQ, NW3Y, K3FT, W2GJ, N3KW,KW3Z)
7,355,538 5014 489 48 C
K0RF (+AE0Q, K0AV, K0EU, K7TD, N0AH, N0HF, N4VI, W1XE)
6,282,522 4309 486 48 C
K2LE (+N2FF,N2GA,N2UN,W2AX, W2GGE,W2LK)
6,281,127 4371 479 48 C
W4MYA 6,120,555 4105 497 48 C
NQ4I (+K2UFT,K4BAI,K9NW,W4DD)
5,972,157 4071 489 48 C
K1TTT (+W1TO,WR2I,NT2X,K1MK,N9KAU)
5,542,326 3778 489 48 C
W0AIH (+KT0R, N0KK, AA0ZZ, WR0DK, K0TG, NE9U, AA9TK, W9ILY, NA0N, W0UC, N0ST)
5,539,359 3937 469 48 C
N3AD (+K3IPK)
5,046,237 3633 463 48 C
KV1W (+K1MBO,AI3E,W1VE,K5ZD)
4,977,684 3737 444 48 C
W3EEE (+N3BNA)
4,075,548 3046 446 48 C
K6RC (+N6RO,N6BV)
3,876,960 3280 394 48 C
WU3M (+N3MKZ,W3EA)
3,470,019 2611 443 48 C
W3MM (+W2YC)
3,076,920 2331 440 48 C
K2UG (AA2DY,NA2N,N2IX,KY2J,W2XL, WA2JQK, ops)
2,987,472 2284 436 48 C
K3ANS (+WF3H,AA2WN,WQ3E,KC2ZA, K3YD) 2,743,902 2074 441 48 C
K3II (+K3CT, K3VA)
2,305,674 1893 406 48 C
K9SD (+KI9A KW0A KA0GGI)
1,948,896 1616 402 48 C
K6ANP (+N6AD,N6OJ)
1,243,689 1333 311 48 C
N2SS (+N2MT)
564,630 649 290 48 C

DX

Single Operator

Africa

Nigeria

5N3CPR 80,850 550 49 48 B 20

Morocco

CN8YR 1,305 87 5 48 B

Madeira Islands

CT3KN 35,640 165 72 48 B

Canary Islands

EA8CN 897,876 1527 196 48 B
EA8ASJ 503,475 959 175 48 B
EA8/DJ1OJ 303,372 636 159 48 B
EA8/DJ3XD 3,330 30 37 48 C 40

Mali

TZ6DX (K4RB, op)
393,822 858 153 48 C

South Africa

ZS6AJS 134,946 357 126 48 B
ZS1NF 59,655 205 97 22 B

Asia

Israel

4Z4TA 7,740 86 30 48 B 40
4X1VF 8,190 105 26 48 C 20
4Z5FW 8,190 91 30 48 B 10

Cyprus

C4A (5B4ADA, op)
1,348,620 1820 247 48 C

Oman

A45XR 31,635 285 37 48 C 10

China

BD4DW 7,056 98 24 48 B 15

Kyrgyzstan

EX8MZ 113,022 414 91 48 C

South Korea

HL/DS1BHE 7,650 75 34 6 B
DS1BHE 6,834 67 34 48 B

Saudi Arabia

HZ1HZ 349,350 850 137 48 C
HZ1AB (SM0CXU, op)
80,352 288 93 48 C

Japan

JR4DAH 107,568 332 108 48 A
JH1GNU 77,520 272 95 48 A
JK7KIH 52,143 191 91 48 A
7K4QOK 33,984 177 64 48 A
JA1BCP 4,452 53 28 48 A
JI7OED 2,700 50 18 48 A
JJ4IYG 2,064 43 16 7 A
JH4UYB 618,597 1091 189 48 B
JR4PMX/1 449,442 861 174 33 B
JH8KYU/1 278,154 606 153 48 B
JE1REU 250,929 569 147 48 B
JJ1VRO 247,032 564 146 48 B
JK1ASO 228,105 555 137 48 B
JF1SQC 227,664 558 136 48 B
JA7NVF 226,395 585 129 48 B
JA2BY 225,720 570 132 48 B
JN1NOP 137,970 438 105 48 B
7L4IOU 115,536 332 116 24 B
JE1ARQ 109,989 303 121 48 B
JI3BFC 74,760 280 89 48 B
JA6TQ 65,844 236 93 48 B
JE1QHT 61,440 256 80 21 B
JA2IU 60,909 257 79 48 B
JH5OXF 57,288 248 77 48 B
JA1CP 45,732 206 74 48 B
JE4QGF 45,024 224 67 48 B
JH6OPP 44,928 192 78 18 B
JI1RXQ 42,432 208 68 10 B
JP1SRG 41,067 169 81 48 B
JA1AB 40,896 192 71 48 B
JF1XUM 39,999 199 67 48 B
JA7JHT 38,553 181 71 48 B
JA8AJE 37,275 175 71 48 B
JA2OJ 33,858 171 66 48 B
JR2UTH 23,769 139 57 17 B
JA0BJY 23,265 141 55 48 B
JA1BUI 22,914 134 57 48 B
JA/IZ0ANC 22,500 125 60 48 B
JI1HFJ 20,862 122 57 48 B
JH1FNU 20,280 130 52 48 B
JA4BAA 19,440 135 48 48 B
JA2BQX 18,603 117 53 48 B
JA1XRH 16,611 113 49 48 B
JA1HG 16,500 110 50 48 B
JA1AZS 12,177 99 41 48 B
JA1XUY 10,200 100 34 7 B
JA6QDU 9,963 81 41 48 B
JN2QYN/2 9,384 92 34 7 B
JG1OWV 9,072 84 36 7 B
JA1DOY 8,214 74 37 48 B
JA2MZ 7,719 83 31 48 B
JH1PXY 7,296 76 32 48 B
JH7IMX 7,038 69 34 5 B
JN7OJA 5,304 68 26 48 B
JA1YEW (N3NQL, op)
5,025 67 25 5 B
JA1BPN 4,872 58 28 48 B
JA3AVO 3,840 40 32 48 B
JA4LCI 3,240 40 27 48 B
JA3BQC 3,036 46 22 48 B
JH8MWW 2,385 15 53 48 B
JA7ARW 2,040 34 20 48 B
JH1NXU 1,722 41 14 48 B
JA9RO 1,395 31 15 48 B
JA1BHZ 570 19 10 3 B
JK1NSR 462 11 14 2 B
7M2GCW 108 9 4 48 B
JA3WFQ 105 7 5 48 B
JH5FXP 1,156,800 1600 241 48 C
JA8RWU 1,081,020 1676 215 48 C
JH7WKQ 881,772 1492 197 38 C
7J1AAI (at JH1GTV) (W1NN, op)
590,940 1005 196 27 C
JH2BCN 550,059 1013 181 48 C
JA1JKG 389,154 821 158 48 C
JH7XGN 354,618 594 199 48 C
JQ6NAW 348,828 709 164 48 C
JH4NMT 336,921 689 163 30 C
JA2AXB 187,200 480 130 48 C
JH7AFR 176,562 577 102 48 C
JF2FIU 119,130 361 110 48 C
JR3WXA 115,668 378 102 48 C
JH7DNO 108,768 412 88 48 C
JA1HP 65,772 252 87 25 C
JA3ARM 58,608 222 88 48 C
JA2QVP 17,343 123 47 48 C
JA0HC 17,097 139 41 48 C
JR1LEV 11,016 108 34 48 C
JA2FSM 9,522 69 46 48 C
JJ4PPK 6,888 82 28 48 C
JA1GTF 2,691 39 23 48 C
JE1SPY 27 3 3 48 B 160
JR7VHZ 3 1 1 48 C 160
JH1OGC 36,750 250 49 48 C 80
JM1NKT 2,232 62 12 48 B 80
JE1PMQ 1,656 46 12 48 B 80
JR0BQD 132 11 4 48 B 80
JA6SHL 43,344 301 48 48 C 40
JR8VSE 35,649 233 51 48 C 40
JM1LPN 18,960 158 40 48 B 40
JS1OYN 11,808 123 32 48 B 40
JA7GAX 11,571 133 29 34 C 40
JA0EKI 11,430 127 30 48 B 40
JK3GWT 11,187 113 33 48 B 40
JA6GCE 10,440 120 29 48 A 40
JR1TMI 3,000 40 25 48 B 40
JR2YFU 2,772 44 21 48 C 40
JE5XIC 576 24 8 3 B 40
JF2IWL 420 20 7 48 B 40
JE2HVC 414 23 6 48 C 40
JH4JUK 108 9 4 48 B 40
JR0ECQ 3 1 1 48 A 40
JA1YFG 63,027 447 47 48 C 20
JA0QWO 42,090 305 46 48 C 20
JH8SLS 36,315 269 45 48 C 20
JA1YNE (JP1OGL, op)
30,573 237 43 48 C 20
JH0EPI 2,400 40 20 48 B 20
JK1LUY 975 25 13 48 C 20
JA6LAD 45 5 3 1 A 20
JA1YYA 12 2 2 48 A 20
JA1YGX 12 2 2 48 B 20
JG3KIV 141,930 830 57 48 C 15
JA7FTR 141,423 799 59 48 C 15
JI7NUF 102,600 600 57 48 C 15
JA9CWJ 92,220 580 53 48 C 15
JR1MQT 90,789 571 53 48 C 15
JR4GPA 34,155 253 45 48 B 15
JA6SRB 33,642 267 42 48 C 15
JH1AZO 27,552 224 41 48 C 15
JE1BDC 20,952 194 36 48 A 15
JQ2FFS/2 18,144 168 36 48 B 15
JE2HCJ 15,390 135 38 7 B 15
JA6BIF 15,276 134 38 48 B 15
JJ1GQH 14,796 137 36 48 B 15
JA3SOK 14,175 135 35 7 C 15
JA1EM 12,180 116 35 48 B 15
JE4JPQ 10,614 122 29 48 B 15
JA1BBA 7,392 77 32 48 B 15
JH1YHS (JH1UAE, op)
5,625 75 25 48 C 15
JJ1JRH 4,992 64 26 6 B 15
JA1KI 4,680 65 24 48 B 15
JO1WIZ 3,264 64 17 48 B 15
JH0FWV 2,850 50 19 48 B 15
JA2MEI 2,223 57 13 48 B 15
JF3IYW 2,160 48 15 5 B 15
JH8QBY 1,785 35 17 48 C 15
JA1EA 1,539 27 19 4 B 15
JE2HAF 1,218 29 14 48 B 15
JA1XPU 1,092 26 14 6 B 15
JF7GDF/7 858 26 11 2 B 15
JF1NHD/4 810 30 9 4 B 15
JR2TRC 675 25 9 48 B 15
JA8TEZ 288 12 8 48 B 15
JA0GEY 231 11 7 48 B 15
JR7HOD/6 90 6 5 48 B 15
JH1HTK 45 5 3 2 A 15
JO1YRH 27 3 3 48 A 15
JL1ARF 146,550 977 50 7 B 10
JS3VEX 102,237 643 53 48 C 10
JO3JYE 39,990 310 43 48 B 10
JH9VSF 38,778 281 46 48 B 10
JA1NLX 36,660 260 47 47 B 10
JG2TKH 26,208 208 42 48 C 10
JA2SWF 16,422 161 34 48 C 10
JA1PS 13,284 123 36 8 C 10
JF2VAX 6,960 145 16 4 B 10
JG3NKP/1 4,002 58 23 7 B 10
JH3WKE 3,519 69 17 48 B 10
JJ6TWQ 1,836 51 12 10 B 10
JG1TVK 1,080 40 9 48 B 10
JA1AAT 840 20 14 48 B 10
JF5JGY 294 14 7 48 B 10
JP1IXV 156 13 4 48 B 10

Jordan

JY9QJ 832,395 1315 211 48 C

Lebanon

OD5SB (OK1MU, op)
46,332 351 44 48 B 15

Turkey

TA3D 98,532 322 102 48 B

Asiatic Russia

UA0KCL 122,778 359 114 48 A
RA9AN 72,324 246 98 48 B
RZ9OU 40,590 205 66 48 B
UA9AB 40,365 207 65 48 B
RA0JX 22,875 125 61 48 B
RA9AUH 15,228 141 36 48 B
RA0FU 485,448 904 179 48 C
RX9SX 329,688 723 152 48 C
UA9CDV 267,687 607 147 48 C
RZ6FZ 67,392 234 96 48 C
UA0BA 59,829 259 77 48 C
UA9CKS 36,135 165 73 48 C
UA9CLB 25,482 137 62 48 C
RW9QA 15,228 108 47 48 C
UA0AGI 1,020 20 17 48 C

RZ9UA 153,720 915 56 48 C 20
UA0SAD 50,256 349 48 48 B 20
UA9AOL 32,292 234 46 48 B 20
RK9CZO (RX9CAZ, op)
26,730 198 45 48 C 20
UA9XEN 19,026 151 42 48 C 20
UA9JMM 13,407 109 41 48 B 20
UA0FDX 65,826 414 53 48 C 15
RX9FB 29,601 253 39 48 B 15
RA0CY 13,320 120 37 48 C 15
UA9APA 2,862 53 18 48 C 15
RZ3AX 260,652 812 107 47 C 10
UA9WQK 5,292 84 21 48 B 10

Kazakhstan

UN7TS 7,488 78 32 48 B
UN6T 36,168 274 44 48 C
UP4L 58,905 385 51 48 B 20
UN4PG 7,104 74 32 48 C 20
UN4PD 4,896 51 32 48 B 20
UN8PF 2,808 39 24 48 B 20

Hong Kong

VR2BG 548,100 1044 175 26 C

Europe

Croatia

9A3RE 199,296 519 128 48 A
9A2EY 40,584 178 76 48 A
9A5Z 21,504 128 56 12 B
9A4D 127,395 745 57 48 B 40
9A7P (9A6NHH, op)
25,272 216 39 8 B 40
9A5I 14,319 129 37 48 B 40
9A4RU 4,092 62 22 48 B 20
9A5Y (9A3LG, op)
241,623 1413 57 48 C 15
9A3MR 89,586 553 54 48 C 10
9A3VM 53,406 387 46 48 B 10
9A3CY 16,461 177 31 48 C 10

Portugal

CT1FOK 28,944 134 72 48 B
CT1AOZ 33,528 254 44 48 C 80
CT1BNW 9,630 107 30 48 C 20
CT1ELP 114,210 705 54 48 B 10

Fed. Rep. of Germany

DL3KVR 215,556 506 142 48 A
DL4FN 198,696 487 136 36 A
DL2HBX 112,350 350 107 48 A
DK7ZH 312,570 690 151 48 B
DF6LQ 255,744 576 148 48 B
DJ7XA 186,921 483 129 48 B
DL8UAT 183,000 488 125 48 B
DL5MC 168,777 423 133 48 B
DL2FJ 132,534 398 111 8 B
DL3DRN 127,800 355 120 48 B
DL1TH 125,874 378 111 48 B
DK7FP 124,254 354 117 48 B
DL4WA 116,844 364 107 48 B
DJ4KW 114,426 326 117 48 B
DL5NA 97,455 365 89 48 B
DM3PKK 69,750 250 93 48 B
DL5PW 65,706 233 94 48 B
DL7IZ 44,640 248 60 48 B
DJ5GG 43,344 172 84 21 B
DK5ZX 37,620 220 57 48 B
DM3ML 35,910 171 70 48 B
DL2ZAV 23,730 113 70 48 B
DL3KWR 18,522 98 63 48 B
DL3KWF 12,300 82 50 48 B
DL2AWA 8,400 80 35 48 B
DL5FCO 7,392 56 44 48 B
DL3YEI 4,674 38 41 48 B
DF7QK 4,512 32 47 48 B
DL8UKW 3,042 39 26 2 B
DJ3GE 2,700 36 25 48 B
DL5AXX 2,569,317 2923 293 48 C
DL5AWI 1,875,960 2316 270 48 C
DL4MCF 1,815,030 2345 258 48 C
DL7ON 1,593,627 2051 259 48 C
DL2DX 922,056 1492 206 48 C
DJ9RR 462,024 828 186 48 C
DL4BQE 399,648 736 181 48 C
DK7XS 352,971 769 153 48 C
DL5YM 259,980 619 140 48 C
DL5FU 248,979 557 149 48 C
DF1DV 234,228 524 149 48 C
DJ6QT 152,220 430 118 48 C
DL6UNF 120,042 351 114 48 C
DL6AG 111,618 351 106 48 C
DJ9AL 50,997 191 89 48 C
DL7YS 16,830 110 51 48 C
DL3ZAI 7,854 77 34 48 C
DK8LV 44,415 315 47 48 C 80
DF0KW 37,485 255 49 4 C 80
DJ9DZ 11,397 131 29 48 C 80
DL4YAO 54,000 360 50 48 C 40
DJ2YE 15,660 174 30 48 B 40
DL2TG 9,936 92 36 48 B 40
DL5JAN 5,100 85 20 48 C 40
DF5WN 1,302 31 14 48 B 40
DJ7AA 210,276 1188 59 48 C 20
DL6AP 1,050 25 14 48 B 20
DL2DXA 57,558 362 53 48 C 15
DL4AAE 45,450 303 50 48 B 15
DL1IAO 179,916 1034 58 48 C 10
DL3OI 140,904 824 57 48 C 10
DK3KD 127,395 745 57 48 C 10
DL2OM 71,250 475 50 13 C 10
DL7BY 65,364 419 52 48 C 10
DL3HRT 34,290 254 45 48 B 10
DL1LH 21,204 186 38 48 C 10
DF9CY 20,943 179 39 48 B 10
DL1AKZ 18,327 149 41 48 B 10
DL2HUM 14,430 130 37 48 B 10
DF7CP 7,392 88 28 48 B 10
DL7AXM 7,326 74 33 48 B 10
DF3OL 4,290 55 26 48 A 10
DL1AZA 2,808 36 26 48 B 10
DF5ZV 2,760 40 23 48 C 10
DH8DAP 1,680 28 20 6 B 10
DL5ME 594 33 6 48 B 10
DL8TWA 495 15 11 48 A 10
DL4ML 27 3 3 48 B 10

Spain

EA7GTF 1,236,429 1739 237 48 B
EA5FID 579,066 937 206 48 B
EA4DRV 343,530 694 165 48 B
EA5EU 298,716 682 146 48 B
EA5SM 297,660 605 164 48 B
EA2BDS 237,726 562 141 48 B
EA7AJR 231,420 551 140 48 B
EA7ASZ 218,526 473 154 48 B
EA1BAE 193,575 445 145 48 B
EA7GXX 154,818 423 122 48 B
EA7AKJ 113,505 329 115 48 B
EA5DCL 83,187 237 117 48 B
EA3GHZ 68,676 236 97 48 B
EA5FFC 41,310 162 85 48 B
EA5ABE 41,022 159 86 48 B
EA5GRC 29,082 131 74 48 B
EC3AKC 14,700 140 35 48 B
EA4AMO 6,771 61 37 48 B
EA1BXW 2,346 34 23 48 B
EA1DGG 2,016 32 21 48 B
EA4CE 1,632 34 16 48 B
EA5FV 1,710,456 2299 248 48 C
EA4KA 1,584,819 2229 237 48 C
EA1DAV 1,373,436 1884 243 48 C
EA4TX 835,848 1482 188 48 C
EA4AAK 58,422 214 91 48 C
EA3MR 40,506 157 86 48 C
EA3EVR 7,560 63 40 48 C
EA7MT 3,726 46 27 48 C
EA3IN 70,923 503 47 48 C 40
EA1GET 858 26 11 48 B 15
EA3AR 135,774 794 57 48 C 10
EA3BIM 11,286 99 38 48 B 10

Ireland

EI4DW 361,089 757 159 48 B
EI8GP 19,926 162 41 48 B 20

Moldova

ER5OK 107,892 333 108 48 B
ER1AAZ 1,305 29 15 48 B 10

Estonia

ES6PZ 25,668 124 69 48 B
ES1QX 23,040 120 64 48 B
ES1QD 3,000 50 20 48 B 40

Belarus

EW6CM 21,945 133 55 48 A
EU1SA 190,320 488 130 48 B
EW6AL 108,360 344 105 48 B
EW6AF 75,990 298 85 48 B
EU1DX 693,714 1162 199 48 C
EW8OS 74,160 309 80 48 C
EW1NY 5,670 90 21 48 B 80
EW3LB 3,828 58 22 48 C 80
EW3CW 780 20 13 48 C 80
EU4AA 86,184 532 54 48 C 40
EW8DX 59,058 386 51 48 C 20
EU1MM 8,640 96 30 48 B 20
EW6GB 31,500 250 42 48 B 15
EW6BI 6,975 75 31 48 B 15
EW3LN 17,325 165 35 48 C 10

France

F5OIH 147,420 420 117 48 A
F6AXD 1,200 25 16 48 A
F5ICC 254,940 607 140 48 B
F6HKA 230,040 568 135 48 B
F5RAB 209,952 486 144 48 B
F5AKL 197,340 506 130 48 B
F5UKL 187,368 422 148 48 B
F5HY 145,536 379 128 48 B
F5JBR 136,800 400 114 48 B
F8PDR 135,630 411 110 48 B
F6GQO 134,874 354 127 48 B
F6JSZ 108,072 316 114 48 B
F6CAV 90,906 278 109 48 B
F6IEU 88,200 300 98 48 B
F5MFL 79,689 263 101 48 B
F6OIE 78,660 276 95 48 B
F6DZD 67,680 240 94 48 B
F5MAE 62,496 248 84 48 B
F5LJY 59,184 274 72 48 B
F5ROL 51,030 210 81 48 B
F5ROX 40,590 165 82 48 B
F5NQL 33,480 180 62 48 B
F6IIA 10,143 69 49 48 B
F6BEE 2,642,805 3135 281 48 C
F5RZJ 712,140 1079 220 48 C
F6FGZ 634,380 970 218 48 C
TM6P (F5MZN, op)
108,864 648 56 48 C 80
F5NSO 2,394 38 21 48 B 40
F5NBX 195,966 1146 57 48 C 15
F6AUS 85,842 502 57 48 B 15
F8BDU 16,731 143 39 13 B 15
F5TVG 16,560 138 40 48 B 15
F5NLX 2,268 42 18 48 B 15
F5IN 207,423 1213 57 48 C 10

England

G0TDX 406,116 778 174 48 A
G4UOL 79,560 260 102 12 A
G0VQR 54,780 220 83 48 A
G4AMT 485,100 825 196 48 B
G3KKP 384,750 750 171 48 B
G3RSD 207,474 458 151 48 B
G3JJZ 95,604 257 124 48 B
G3VQO 54,936 218 84 24 B
M0AEK 47,286 213 74 30 B
G3KKQ 42,000 175 80 48 B
G0WHO 23,940 140 57 48 B
G0IVZ 2,784,474 3157 294 48 C
G3TBK 1,021,422 1591 214 48 C
G2QT 808,056 1247 216 48 C
G3TXF 666,468 1122 198 48 C
G4BJM 65,016 301 72 48 C
G3WGN 49,536 344 48 14 C 80
G5MY 16,605 135 41 48 B 40
G5G (G0LII, op)
187,587 1097 57 48 C 15
G3CWI 45,900 306 50 48 B 15
G3WVG 144,837 847 57 48 C 10
G3KNU 47,628 324 49 48 B 10
G3ESF 36,864 256 48 48 B 10
G4ZME 18,012 158 38 48 B 10

Isle of Man

MD/DL5LYM 44,892 348 43 48 C 80
MD/DL8WAA208,626 1199 58 48 C 15

Jersey

MJ0AWR (K2WR, op)
849,759 1483 191 48 B

Scotland

GM7V (GM3WOJ, op)
123,795 393 105 48 C
GM3POI 288,360 1602 60 48 C 20
GM3CFS 39,903 283 47 48 B 20

Wales

GW3NJW 319,263 661 161 28 B
GW0VSW 2,142 42 17 48 A 15

Hungary

HA2SX 402,705 785 171 33 A
HA9RT 1,658,520 2168 255 48 C
HA8IC 152,280 470 108 48 C
HA0DU 36,720 272 45 48 C 80
HA7UG 20,298 199 34 48 C 80
HA8KAZ (HA8LLK, op)
16,524 162 34 48 C 80
HA0LM 74,100 475 52 48 C 40
HG1R (HA1XU, op)
162,516 934 58 48 C 20
HA3MQ 87,642 541 54 48 B 20
HA8RH 106,755 647 55 48 B 15
HA8FK 90,750 550 55 48 B 15
HA0IT 89,199 561 53 48 B 15
HA3LI 70,839 463 51 48 B 15
HA6IAM 30,960 215 48 48 B 15
HA8MT 25,380 188 45 48 A 15
HA6NW 24,240 202 40 48 B 15
HA0HH 20,178 177 38 48 B 10
HA0GK 18,054 177 34 48 A 10
HA5CYE 16,758 147 38 48 B 10

Switzerland

HB9IAL 42,720 178 80 48 A
HB9AYZ 15,456 92 56 48 A
HB9ARF 292,185 645 151 48 B
HB9DOT 3,108 37 28 3 B
HB9BOW 22,374 113 66 48 C
HB9DAX 59,040 240 82 48 A 20

Italy

I3BBK 144,837 399 121 48 A
I3JSS 400,905 755 177 48 B
IK4WMH 266,817 589 151 48 B
IZ0AIS 212,040 465 152 48 B
IK2AIT 127,716 367 116 25 B
I3JEX 102,720 320 107 48 B
IT9EJW 98,010 297 110 48 B
IK1RDD 83,160 280 99 48 B
IK8WEI 67,545 237 95 48 B
IT9ORA 46,248 188 82 48 B
IK2RJK 44,460 190 78 48 B
IK6HWK 35,697 163 73 48 B
IK8YFW 31,737 149 71 48 B
IK3UVD 24,708 142 58 48 B
IK7FPU 21,960 120 61 48 B
IK2NCF 21,243 97 73 48 B
IZ0BXZ 20,988 132 53 48 B
IK3FHL 18,876 121 52 48 B
IZ0AEH 18,423 89 69 48 B
IK8VRP 15,759 103 51 48 B
IK2LNH 10,296 88 39 48 B
IK0STM 1,452 22 22 48 B
IK4WMB 871,707 1303 223 48 C
IK2AHB 484,500 850 190 48 C
I0ZUT 374,340 734 170 48 C
I2SVA 307,200 640 160 48 C
IK2ANI 25,344 128 66 48 C
I1QGZ 1,482 26 19 48 C
I3VHO 5,808 88 22 48 C 160
IK5TSS 12,870 110 39 48 C 40
IR2W (IK2QEI, op)
206,739 1209 57 48 C 20
IK2YLV 138,156 794 58 48 C 20
I3MGN 5,616 72 26 48 C 20
IK0YUM 1,944 36 18 48 B 20
IY4W 184,851 1081 57 48 C 15
IK4DCT 142,890 866 55 48 B 15
IQ5Z (IZ5AXA, op)
129,030 782 55 48 C 15
IK8TEO 44,784 311 48 48 B 15
IU7X 40,185 285 47 48 B 15
IZ0AIP 12,765 115 37 48 C 15
I1XPQ 75,888 496 51 48 C 10
IK4ZHH 9,030 86 35 48 C 10
I2WIJ 5,712 68 28 48 B 10

Sardinia

IS0OMH 306,204 646 158 48 B
IS0IGV 224,400 550 136 48 B
IS0SDX 62,985 221 95 48 B
IS0UWX 18,666 122 51 48 C

Norway

LA9HFA 371,952 738 168 48 B
LA4HFA 171,570 430 133 48 B
LA9DK 109,662 373 98 48 B
LA3BO 25,575 155 55 11 B
LA8W (LA4DCA, op)
1,487,508 2101 236 48 C
LA7MFA 809,361 1329 203 48 C
LA2O 354,522 734 161 48 C
LA9GX 183,141 1071 57 48 C 20
LA1K 90 3 10 48 B 20
LA9HW 82,212 527 52 48 B 15

Luxembourg

LX/MU0BKA (K4ZLE, op)
126,207 379 111 48 B
LX9DIG 3,960 60 22 48 C 40

Lithuania

LY2FE 178,227 483 123 48 A
LY2BTA 157,920 280 188 48 A
LY2GV 459,135 855 179 48 B
LY3BA 123,000 500 82 48 B
LY2FN 113,484 386 98 48 B
LY2PBM 28,182 154 61 48 B
LY2KM 278,550 619 150 48 C
LY1DS 227,205 561 135 48 C
LY2DX 103,683 323 107 48 C
LY3ID 4,920 82 20 48 C 80
LY2OU 1,521 39 13 48 C 80
LY1DD 15,867 129 41 48 B 40
LY2CI 13,365 135 33 48 B 20
LY2FF 1,632 32 17 48 B 20
LY2OX 109,032 649 56 48 C 15
LY1CX 79,542 491 54 48 C 15
LY2HN 27,060 205 44 48 B 15
LY2ZZ 86,250 575 50 48 C 10
LY2AT 9,996 98 34 48 B 10
LY2BBF 4,095 65 21 48 C 10

Bulgaria

LZ0A 1,483,176 2131 232 48 B
LZ3YY 211,071 529 133 48 B
LZ2AU 157,248 468 112 48 B
LZ1IQ 104,328 322 108 48 B
LZ2NB 85,560 310 92 48 B
LZ1MC 22,701 161 47 48 B
LZ1AQ 14,319 111 43 48 B
LZ5QZ 13,005 85 51 48 B
LZ6A 122,400 400 102 48 C
LZ3HI 91,809 303 101 48 C
LZ1QZ 71,604 234 102 48 C
LZ1BJ 60,000 250 80 48 C
LZ1DFP 21,000 200 35 48 C 80
LZ1PM 9,996 119 28 48 C 80
LZ4ZP 61,344 426 48 48 C 40
LZ1RN 21,879 187 39 48 C 40
LZ1CNN 20,862 183 38 48 B 20
LZ1ZV 4,158 63 22 48 B 20
LZ2PB 15,960 140 38 48 C 15
LZ2GS 20,400 170 40 48 B 10
LZ2RS 15,435 147 35 48 A 10
LZ4BU 6,048 72 28 48 B 10

Austria

OE1EMS 277,530 638 145 48 B
OE1BKA 29,295 155 63 48 B
OE5OHO 910,962 1374 221 48 C
OE8CIQ 253,260 603 140 48 C
OE2S (OE2VEL, op)
237,546 477 166 48 C

Åland Islands

OH0PA 24,948 126 66 48 B
OH0JJS (OH6LI, op)
209,322 1203 58 48 C 15
OH0MPO (OH4JLV, op)
146,496 872 56 48 C 10

Finland

OH2YL 41,748 196 71 48 A
OH3IR 83,700 300 93 7 B
OH2LYP 70,713 243 97 48 B
OH2GB 31,200 160 65 48 B
OH3VX 13,272 79 56 48 B
OH3KOK 11,322 111 34 48 B
OH2DE 1,728 32 18 48 B
OH1MM 1,215 27 15 48 B
OH5NQ (OH5JQC, op)
544,860 1009 180 48 C
OH3MMH 281,358 638 147 48 C
OH3RF 222,678 534 139 48 C
OH6NEV 105,600 352 100 48 C
OH2BR 61,500 250 82 48 C
OH2VI 58,740 220 89 48 C
OH2U (OH2LUR, op)
175,914 1011 58 48 C 40
OH1JD 147,726 849 58 48 C 40
OH2EJ 5,673 61 31 48 B 40
OH2BCD 1,500 25 20 48 C 40
OH8LQ 190,980 1061 60 48 C 20
OH6RX 176,436 1014 58 48 C 20
OH3WW 137,424 818 56 48 C 20
OH6AC (OH6CS, op)
191,520 1120 57 48 C 15
OH1KSD 17,280 144 40 48 C 15
OH6NPV 8,742 94 31 48 A 15
OH9JIW 6,570 73 30 48 B 15
OH2BSQ 8,640 90 32 48 B 10
OH5PA 5,628 67 28 48 B 10
OH1JMH 5,310 59 30 48 B 10

Czech Republic

OK1FKD 20,178 114 59 48 A
OK1HX 417,600 870 160 48 B
OK1DSZ 406,707 749 181 48 B
OK2VWB 296,670 638 155 48 B
OK1ZP 264,024 579 152 48 B
OK2WY 248,034 617 134 48 B
OK2HI 245,055 527 155 48 B
OK1GS 234,612 532 147 48 B
OK1AYY 225,792 512 147 48 B
OK2TBC 213,360 560 127 48 B
OK1WF 162,810 405 134 48 B
OK1SI 151,200 420 120 48 B
OK1MNV 83,616 268 104 48 B
OK2BXE 68,700 229 100 48 B
OK2BQZ 47,736 221 72 48 B
OK2PKY 43,512 196 74 48 B
OK2BNC 21,216 136 52 48 B
OK1FOG 20,139 137 49 48 B
OK1DZ 19,158 103 62 48 B
OK2BHE 11,718 93 42 48 B
OK2FD 1,048,572 1533 228 48 C
OK1CF 598,842 969 206 48 C
OK1AXB 225,720 627 120 48 C
OK1DXW 159,192 402 132 48 C
OK2HBR 141,930 415 114 48 C
OK2BJ 55,800 200 93 48 C
OK1FPE 504 14 12 48 C
OK1TP 495 15 11 48 C 160
OK2EQ 75 5 5 48 C 160
OK1DX 46,305 315 49 48 C 80
OK1FC 9,324 111 28 48 C 80
OK1FNJ 6,720 70 32 48 B 80
OK1RF 220,719 1247 59 48 C 40
OK1DIG 127,020 730 58 48 C 40
OK1FPS 69,795 423 55 48 C 40
OK2BVG 34,425 255 45 48 C 40
OK1FCA 25,671 199 43 48 B 40
OK1XJ 23,310 185 42 48 C 40
OK2GG 18,315 165 37 48 B 40
OK1VD 85,164 604 47 48 C 20
OK2BWC 4,446 57 26 48 B 20
OL4S (OK2ZU, op)
167,238 978 57 48 C 15
OK2SAT 94,380 572 55 48 C 15
OK2WM 74,100 494 50 48 B 15
OK1DRQ 58,035 365 53 48 B 15
OK1FHI 46,176 296 52 48 B 15
OK1MNW 43,344 301 48 48 B 15
OK2SG 35,856 249 48 48 C 15
OK2QX 25,650 190 45 48 C 15
OK2SFO 6,864 88 26 48 B 15
OK2SWD 3,150 50 21 48 B 15
OK1XC 57,510 355 54 48 B 10
OK2ZI 48,300 350 46 48 B 10
OK2PDT 33,132 251 44 48 C 10
OK2ABU 19,203 173 37 48 C 10
OK2PBG 13,770 135 34 48 B 10
OK1DKM 13,299 143 31 48 B 10
OK1AOH 12,036 118 34 48 B 10
OK2PCN 8,352 96 29 48 B 10
OK1DZD 6,975 75 31 48 A 10
OK2AJ 3,825 51 25 48 B 10

Slovakia

OM3GB 169,644 422 134 48 B
OM4DN 147,105 467 105 48 B
OM3KHU 104,610 317 110 48 B
OM7AG 102,003 281 121 48 B
OM8FF 99,180 290 114 48 B
OM0CW 94,800 316 100 48 B
OM3BA 69,768 228 102 48 B
OM1AF 64,260 255 84 48 B
OM0CR 51,294 206 83 48 B
OM3IAG 47,784 181 88 48 B
OM1ADM 3,366 33 34 48 B
OM8A 1,053,171 1603 219 48 C
OM5RJ 12,927 139 31 48 C 80
OM3A (OM3CGN, op)
135,261 791 57 48 C 40
OM1AW 1,428 28 17 48 B 40
OM8MM 9,492 113 28 48 B 20
OM5RM 150,138 878 57 33 C 15
OM2TW 134,736 802 56 48 C 15
OM8AG 21,420 170 42 48 B 15
OM0TT 20,787 169 41 27 B 15
OM7YC 17,760 148 40 48 B 15
OM8AMF 624 16 13 48 B 15
OM3RG 87,210 570 51 48 C 10
OM5KM 8,277 89 31 48 B 10

Belgium

ON4AWH 258,300 574 150 48 B
ON4XG 237,120 520 152 48 B
ON4CAU 65,610 243 90 48 B
ON7SS 39,963 173 77 48 B
ON4KMB 14,352 104 46 48 B
ON5JD 17,538 79 74 48 C
OT9T (ON4UN, op)
117,264 698 56 48 C 80
ON5WL 5,037 73 23 48 B 80
ON4AEK 70,632 436 54 13 C 40
ON6TJ 10,602 114 31 48 B 40
OT9A (ON5UM, op)
221,502 1273 58 48 C 15
ON4UN 164,082 943 58 48 C 10
ON6NR 39,837 271 49 48 B 10

Denmark

OZ5DK 282,852 582 162 29 B
OZ1OXZ (OZ8AE, op)
196,224 448 146 48 B
OZ5UR 136,899 371 123 48 B
OZ4FF 124,320 370 112 48 B
OZ8SW 100,548 294 114 48 B
OZ5DX 7,011 57 41 48 B
OZ9Y 364,977 1137 107 48 C
OZ5WQ 188,340 430 146 48 C
OZ4UN 68,640 440 52 48 C 20
OZ1BMA 27,636 196 47 48 B 20
OZ1KWG 7,395 85 29 48 B 15
OZ1BXM 168 8 7 2 A 15
OZ7NB 17,589 143 41 48 C 10

Netherlands

PA0ADT 48,672 208 78 48 A
PA3ELD 182,646 438 139 48 B
PA3AAV 148,995 385 129 48 B
PA3EMN 105,144 337 104 48 B
PA3BGQ 102,024 312 109 48 B
PA3GRM 87,399 249 117 48 B
PA3GBI 79,134 242 109 48 B
PA3DUS 72,072 308 78 48 B
PA5GU 70,992 272 87 48 B
PA0GIN 52,896 232 76 48 B
PA0RBS 39,093 157 83 48 B
PA3HBI 29,784 146 68 40 B
PA0CLN 493,890 815 202 48 C
PA0COR 114,540 332 115 48 C
PA3EWP 117,102 673 58 48 C 40
PA5ET 130,302 762 57 48 C 20
PA0RCT 6,630 85 26 48 B 20
PA4EA 166,518 957 58 48 C 15
PA3GAN 23,760 180 44 48 B 10
PA0MIR 15,120 140 36 48 B 10

Slovenia

S57J 970,725 1505 215 48 B
S52GP 376,200 760 165 48 B
S53MJ 275,772 686 134 48 B
S57XX 241,338 551 146 25 B
S57AW 142,890 433 110 14 B
S53AU 73,425 275 89 48 B
S57PW 42,081 169 83 48 B
S55WW 24,570 130 63 48 B
S59AA 852,093 1359 209 48 C
S50U 16,128 168 32 48 C 160
S57M 8,787 101 29 48 C 160
S50O 10,260 95 36 48 C 80
S57DX 165,312 984 56 48 C 40
S53O 99,468 614 54 48 C 40
S53F 60,564 412 49 48 B 40
S50K 197,664 1136 58 48 C 20
S57U 89,208 531 56 48 B 20
S50R 177,828 1022 58 48 C 15
S59D 16,080 134 40 48 B 15
S55A 5,850 75 26 48 C 15
S51AY 127,176 757 56 48 C 10
S51W 124,659 729 57 48 B 10
S53M (S53ZO, op)
121,923 713 57 48 C 10
S52OP 114,399 669 57 48 C 10

Sweden

SM7DBN 19,293 109 59 48 A
SM6CDN 4,512 47 32 48 A
SM7CZC 960 20 16 48 A
SM5CIL 405,093 799 169 48 B
SM0BDS 203,091 509 133 48 B
SK6HD 183,642 482 127 48 B
SM7EH 122,640 365 112 48 B
SM4SX 122,304 392 104 48 B
SM7ATL 55,269 207 89 48 B
SM7BJW 48,960 204 80 48 B
SM7BQX 36,573 167 73 48 B
SM7BHM 22,302 126 59 48 B
SM3CZS 21,357 113 63 48 B
SM6CNS 7,560 60 42 48 B
SM5AJV 6,936 68 34 48 B
SM4TU 1,296 24 18 6 B
SM2EKM 632,529 1233 171 48 C
SM2EZT 281,658 598 157 48 C
SM6BZE 190,134 503 126 48 C
SM0DZH 50,922 207 82 48 C
SM0JHF 106,140 610 58 48 C 40
SM3ARR 3,276 52 21 6 B 40
SM7GXR 1,470 35 14 48 B 40
SM2DMU 121,581 711 57 48 C 20
SM3DMP 70,290 426 55 48 C 20
SM3CVM 50,688 352 48 48 B 20
SK3LH 52,020 340 51 48 B 15

SM6BSK 49,113 321 51 48 B 15
SM3CER 32,844 238 46 48 B 15
SM4ATJ 10,602 93 38 48 A 15
SM0KV 2,850 50 19 48 C 15

Poland

SP5FKW 37,053 179 69 48 A
SP2EWQ 354,996 684 173 48 B
SP5ALV 88,476 292 101 48 B
SP8FHJ 64,758 251 86 48 B
SP6CPF 61,716 278 74 48 B
SP9KJM 38,622 157 82 48 B
SP9IIL 38,595 155 83 48 B
SP3FAR 27,966 118 79 48 B
SQ9DXN 23,184 112 69 48 B
SP3JUN 12,600 105 40 48 B
SO1VAF 10,956 83 44 48 B
SP2MKT 6,588 61 36 12 B
SP3MY 5,580 60 31 48 B
SP7GIQ 2,645,214 3083 286 48 C
SP1NY 312,984 621 168 48 C
SP3VT 195,120 542 120 48 C
SP8FHM 193,488 464 139 48 C
SP5GH 5,451 79 23 24 B 80
SN2B (SP2FAX, op)
191,868 1084 59 48 C 40
SP4Z 15,336 142 36 48 C 40
SP4TKB 1,584 33 16 48 C 40
SP8BAB 32,250 250 43 48 B 20
SP6SYF 2,640 40 22 48 B 20
SP5GRM 199,080 1106 60 48 C 15
SP8GQU 118,965 721 55 48 C 15
SP9XCN 91,080 552 55 48 B 15
SP8BSQ 59,094 402 49 48 B 15
SP4JWR 50,184 328 51 48 C 15
SP2AVE 47,250 315 50 48 B 15
SP2HPD 19,908 158 42 48 B 15
SP3FPF 18,630 135 46 48 B 15
SP1BLE 6,300 84 25 48 B 15
SP5BB 1,980 33 20 48 B 15
SP9MCU 252 12 7 48 B 15
SP3KFH 78,870 478 55 48 C 10
SP8FHK 63,027 447 47 48 C 10
SP5CGN 23,760 220 36 48 B 10
SP2QVS 6,825 65 35 48 B 10

Greece

SV1CIB 178,560 465 128 48 B
SV2BBJ 16,500 110 50 48 B

Bosnia-Herzegovina

T95A 1,101,915 1563 235 48 C
T94KW 108 6 6 48 B 20
T99W 173,520 964 60 48 C 15
T99T 74,382 506 49 48 B 10
T92M 32,076 243 44 48 B 10
T97M 6,216 74 28 48 C 10

Kaliningrad

RV2FW 272,232 597 152 48 B
RA2FBC 56,718 411 46 48 C 10

European Russia

UA3AD 29,295 155 63 48 A
UA6LCJ 28,365 155 61 48 A
RN3AU 4,464 48 31 48 A
UA6LTI 363,888 722 168 48 B
UA4HEJ 357,600 745 160 48 B
UA1ANA 182,952 462 132 48 B
RK3FM 66,444 226 98 48 B
UA4FER 61,020 226 90 48 B
RX3DQU 55,176 209 88 48 B
RX3DRU 49,794 193 86 48 B
RA4CTR 36,285 205 59 48 B
UA1PBY 20,433 139 49 48 B
RU6CZ 17,748 116 51 48 B
UA1FA 17,160 110 52 48 B
RV3DAK 11,352 88 43 48 B
UA3UBT 8,214 74 37 48 B
RU3UJ 1,845 123 5 48 B
RX3AEX 1,638 26 21 5 B
RW4AA 640,332 1089 196 48 C
RV3BR 539,241 1039 173 48 C
RA3AJ 465,888 844 184 48 C
RA3AUU 440,016 824 178 48 C
RA3XO 290,772 591 164 48 C
RV1CC 178,296 437 136 48 C
UA6AN 122,760 330 124 48 C
UA1OMS 92,448 288 107 48 C
UA4LU 80,700 269 100 48 C
RA3DQ 52,374 203 86 22 C
RV4LM 32,886 174 63 48 C
RA4NW 189 9 7 48 B 160
RA6AX 6,075 81 25 48 C 80
RW4PL 56,052 346 54 48 C 40
RV6YY 48,348 316 51 48 C 40
UA1QV 29,754 261 38 48 C 40
UA2WJ 6,177 71 29 48 B 40
RW4CW 2,322 43 18 48 B 40
RA1ZZ 2,400 40 20 4 B 20
RW1ON 1,890 42 15 48 B 20
UA1ACC 144 6 8 48 A 20
RX6LG 61,308 393 52 48 B 15
RV6LFE 22,755 185 41 48 B 15
UA4PT 20,826 178 39 48 B 15
UA4QK 16,539 149 37 48 B 15
UA6LP 10,989 99 37 48 B 15
UA3YKG 8,316 99 28 48 B 15
RV3LO 5,400 72 25 48 C 15
UA6AK 6,264 87 24 48 C 10
RK3BY 5,508 68 27 48 B 10

Ukraine

UT3UZ 199,356 449 148 48 B
UT2UZ 142,230 431 110 48 B
UY2UZ 131,760 366 120 48 B
UR5WII 106,929 327 109 48 B
UY2ZA 28,152 138 68 48 B
UY5TE 17,982 111 54 48 B
UT1FA 296,592 592 167 48 C
UY8IF 285,510 614 155 48 C
UR5UW 154,875 413 125 48 C
UY1U (UT5UN, op)
86,769 311 93 48 C
UT4EK 59,250 250 79 48 C
UX0IK 47,040 224 70 48 C
UY5ZZ 22,500 125 60 48 C
UR7QL 6,045 65 31 48 C
UT1KT 3 1 1 48 C 160
UT4ZO 105,840 630 56 48 C 40
UT0IN 95,742 591 54 48 C 40
U5WF 59,682 406 49 48 C 40
UU2JZ 45,000 300 50 48 C 40
UT1YZ 29,970 222 45 48 B 40
UT3UA 18,318 142 43 48 C 40
UT4XU 7,347 79 31 48 B 40
UR5WA 112,347 657 57 48 C 20
UT5UGR 13,020 124 35 48 C 20
ER0F (UX0FF, op)
127,545 773 55 48 C 15
UT1IA 63,960 410 52 48 C 15
UR3QT 60,282 394 51 48 C 15
UX0HA 42,372 321 44 48 C 15
UT8IM 39,168 272 48 48 B 15
UU7JX 31,323 197 53 48 C 15
UR7IWW 27,810 206 45 48 B 15
UR3PFJ 15,912 156 34 48 B 15
UR4QOS 14,541 131 37 10 B 15
UR5MKD 7,776 81 32 48 B 15
UR5ZRK 7,200 80 30 48 B 15
UR5CSL 3,822 49 26 48 B 15
UR9MM 2,961 47 21 48 C 15
US0IZ 288 12 8 48 A 15
UX2HO 66,834 474 47 48 C 10
UY0ZG 27,216 216 42 48 C 10
US9Q (US9QA, op)
14,400 150 32 48 C 10
UR3IDB 10,350 115 30 48 B 10
UR8QR 4,332 76 19 48 C 10
URZIJQ 3,120 52 20 48 C 10

Latvia

YL8M (YL2KL, op)
1,927,680 2560 251 34 C
YL2KA 423,612 861 164 48 C
YL2MR 217,464 533 136 48 C
YL3FW 12,177 123 33 48 B 20
YL2PP 16,080 134 40 48 B 15
YL2UZ 28,500 250 38 48 B 10

Romania

YO4AAC 11,088 88 42 48 A
YO3APJ 665,112 1036 214 48 B
YO6BHN 163,944 414 132 48 B
YO8FR 116,070 365 106 48 B
YO3CTK 93,627 309 101 48 B
YO8CKT 22,326 122 61 48 B
YO3ND 68,688 424 54 48 C 40
YO8BPK 7,917 91 29 48 B 40
YO8BGD 4,488 68 22 48 C 40
YO4FRF 76,266 446 57 48 C 20
YO2ARV 14,688 136 36 48 B 20
YO9FJW 6,930 77 30 48 C 15
YO5BIM 8,700 100 29 10 B 10

Yugoslavia

YU1LM 46,494 189 82 48 A
4N7A 223,329 493 151 48 B
YU1AAV 141,678 463 102 48 B
YU7SF 131,100 380 115 48 B
YU7AM 79,104 256 103 48 B
YU1OL 974,700 1444 225 48 C
YZ6A 14,280 136 35 48 C 160
YU1KR 10,752 112 32 48 C 80
YU4WU 154,686 889 58 48 C 40
YU7JX 118,674 694 57 48 C 40
YZ1U (YU1WS, op)
93,960 540 58 48 C 40
YU1S 88,740 510 58 48 C 40
YU1ZZ 160,740 940 57 48 C 20
YZ9A (YU1NW, op)
153,459 867 59 48 C 20
YT7A 135,894 781 58 48 C 20
YU7CB 123,984 738 56 48 B 15
YU7AL 98,154 574 57 48 B 15
YU7KMN (YZ7DM, op)
96,432 574 56 48 B 15
4N1N (YU1BX, op)
57,624 392 49 48 B 15
YU7KM 27,360 240 38 48 B 10
YU1QW 23,985 195 41 48 B 10

FYR Macedonia

Z31JA 157,599 449 117 48 B
Z31GB 61,992 252 82 48 B
Z32AF 48,162 349 46 48 C 40
Z31GX 25,956 206 42 48 B 20

North America
Barbados

8P9NX 943,299 1449 217 48 B

Bahamas

C6AKP 879,840 1222 240 48 B
C6A/W9RB 28,980 138 70 48 C
C6A/W7DRA 12,192 127 32 48 B 80
C6AKQ (N4BP, op)
234,879 1327 59 26 B 40

Cuba

CO8ZZ 922,674 1493 206 26 B
CM2KC 600,504 1048 191 48 B
CO8DM 31,650 211 50 48 B 40

Dominican Republic

HI3LFE 35,322 203 58 48 B 40

Panama

HP1AC 248,784 568 146 48 A
HO3A 287,640 564 170 48 b
3E1CW (KD6WW, op)
4,476,045 4345 329 48 C

Honduras

HR3/K7DBV
499,872 1016 164 48 B

Alaska

WL7KY 1,174,824 1764 222 48 C
KL7RA 240,012 1356 59 48 C 15

Virgin Islands

WP2Z (KE2VB, op)
2,971,248 3346 296 48 B
NP2S (K3DI, op)
1,299,792 2083 208 48 B

Puerto Rico

KP4Y 772,695 1561 165 48 B
WP3R (KE3Q, op)
4,561,680 4580 332 48 C
WP4LNY 23,856 142 56 48 C
WP3C 68,649 467 49 48 B 80

St.Maarten Saba St.Eustatius

PJ5JP 202,692 532 127 48 B

Costa Rica

TI7/N4MO 218,370 1255 58 48 B 15

Belize

V31JP (K8JP, op)
1,498,470 1990 251 22 C

St.Kitts & Nevis

V47KP (W2OX, op)
2,179,350 2505 290 48 C

British Virgin Islands

VP2V/K1DW
1,917,993 2527 253 48 B
VP2VF 11,319 77 49 48 B

Turks & Caicos Islands

VP5M 1,698,096 2081 272 48 C

Mexico

XE1VV 580,515 845 229 48 C
XE1RGL 93,756 601 52 48 B 40

Cayman Islands

ZF2NT (N6NT, op)
3,679,680 3833 320 48 B
ZF2MO (KM9D, op)
3,013,590 3230 311 48 B
ZF1A (W5ASP, op)
320,856 1844 58 48 C 15

Oceania
Philippines

DU7/N7ET 19,110 130 49 48 A
DU7MHA 1,404 36 13 6 B
DU3NXE 28,539 151 63 48 C

Mariana Islands

NH0E 71,556 268 89 48 B
WH0ABA 52,050 347 50 48 B 10

Hawaii

KH6/WB6FZH
18,144 96 63 48 A
KH6/W6PH
1,714,581 2277 251 34 B
KH7L 32,880 137 80 48 B
KH7R (KH6ND, op)
3,638,196 3743 324 48 C
KH6X (K5NA, op)
3,294,951 3443 319 48 C
NH7A (KH6TO, op)
2,958,789 3151 313 48 C

Australia

VK2APK 842,370 1306 215 48 B
VK2AYD 551,250 1050 175 48 B
VK5GN 247,086 518 159 48 B
VK6VZ 58,968 216 91 48 B
VK4TT 25,137 133 63 48 B
VK4ICU 23,205 119 65 48 B
VK8AV/2 8,775 65 45 48 B
VK4EMM 1,141,467 1633 233 48 C
VK3IO 3,744 48 26 48 B 40
VK4XA 100,776 646 52 48 B 10
VK4UC 97,038 599 54 48 B 10

Indonesia

YB2UU 33,123 181 61 48 B

South America
Trinidad & Tobago

9Y4VU 178,353 1043 57 48 C 15

Chile

CE3AA 46,200 308 50 48 B 15

Uruguay

CX9AU 293,670 753 130 48 B

Ecuador

HC2SL 230,454 1302 59 48 B 10

Colombia

HJ3PXA 3,552 37 32 48 B 15

Argentina

LU1FNH 242,406 603 134 48 A
LU7EE 830,760 1505 184 31 B
LU1EWL 546,546 1183 154 19 B
LW1DX 185,856 512 121 48 B
LU7HN 106,875 375 95 48 B
LU5VV 103,032 324 106 48 B
LU1VK 63,855 215 99 48 B
LU7DW 19,116 108 59 3 C
LU1FAM 88,614 547 54 48 B 20
LU4HKN 43,650 291 50 48 B 20
LU4FM (LU9AY, op)
163,800 975 56 48 C 15
LU5FF 115,920 690 56 48 B 15
LU7AWP 73,548 454 54 48 B 15
LU6KK 35,412 227 52 48 B 15
LT1F (LU5CW, op)
279,180 1551 60 48 C 10
LU9APM 175,938 994 59 48 B 10
LU0H (LU3HU, op)
126,555 715 59 48 B 10
LU6HI 73,548 454 54 48 A 10

Peru

OA4SS 2,004,948 2739 244 30 C

Aruba

P40W 4,965,408 4926 336 48 C

Brazil

PY1BGJ 5,940 60 33 48 A
PY2YU 933,348 1612 193 48 B
ZV8O (PV8DX, op)
906,486 1582 191 48 B
ZW2Z 147,798 414 119 48 B
PS2E (PY2EX, op)
393,471 767 171 48 C
PY7IQ 7,134 82 29 48 B 40
PS7ZZ 46,971 307 51 48 B 20
PY7YL 300 10 10 48 B 20
PT2AW 3,675 49 25 48 B 15
PY2WDM 2,538 47 18 48 B 15

Venezuela

YV7QP 24,639 191 43 48 B 40
YY4GLD 122,265 715 57 48 B 15

Single Operator Assisted

Asia

JA6ZLI (JJ6WYS, op)
261,960 590 148 48 C
JM1LRQ 234,432 592 132 48 C
JR6LLN 183,366 501 122 48 C
7N2JJP 182,484 444 137 48 C
UP6P (UN6P, op)
133,200 370 120 48 C
JE6ZIH (JF6DEA, op)
75,051 269 93 9 C
JR9NVB 30,504 248 41 48 B
JA0BMS/2 23,895 177 45 48 B

Europe

DK3GI 2,062,848 2528 272 48 C
PA5KT 815,517 1147 237 48 C
OK1DG 555,540 985 188 48 B
OK1KT 530,640 1005 176 48 C
DJ9MH 512,028 862 198 48 C
GM2C 477,360 936 170 48 C
EA7AGW 467,325 775 201 48 C
LY5W (LY1DR, op)
354,036 652 181 48 C
OK1AU 335,250 750 149 48 C
DL5DXF 301,710 565 178 31 C
IK2HKT 258,336 552 156 48 C
PI4TUE (PA3EZL, op)
184,338 1078 57 48 C
OT9U (ON5OO, op)
164,673 963 57 48 C
OZ5MJ 153,873 369 139 48 A
PA3FDO 146,124 369 132 48 C
DL8UD 140,448 836 56 48 C
DL3GA 105,930 642 55 48 C
PA0JED 97,026 314 103 48 B
DK7ZT 93,744 252 124 48 C
S57KM 88,992 288 103 48 B
G0MTN 76,725 275 93 18 B
S51T 64,449 231 93 48 B
LX1JH 24,570 130 63 48 B
DJ6TK 23,160 193 40 48 B
OM3TA 17,325 105 55 48 B

Oceania

KH6RS (N6HR, op)
1,772,766 2118 279 48 C
KH2/N2NL 811,200 1300 208 48 C

South America

ZZ2Z (PY2YP, op)
523,224 1032 169 15 C

Multioperator Single Transmitter

Asia

JR1ZTT (+JM4HHH, JM4AZB, JJ0CRL, JH0KHR, JK1JHU, JF4JYE, JL1XCM, JL4VXE, JK2FGD)
946,440 1434 220 48 C
JA7YAA (7M1JAS,JF1SXL,JG7PSJ, JH0NZN, ops)
854,712 1319 216 48 C
JR3NZC (+JF2SKV)
772,044 1313 196 48 C
JA1ZLO (+JI5ICH, JM3CRK, JO2HKQ, 7L1ETP, 7L3CQP, 7N3PZJ, ops)
546,525 1041 175 41 C
RK9CWW (+RA9CKQ, RA9CMO, ops)
504,441 1071 157 48 C
JA2ZJW (+JH2CMI, JE2PCY, JM2NFQ, JA2CUS, ops)
503,316 902 186 48 C
RK9AWN (RA9AX,RA3AC,UA9BS, ops)
253,350 563 150 48 C
JE2YHS (JA2OLJ, JE2WWB, JR2JVR, JR2JPU, JI2XUT, JJ2CEE, ops)
198,198 462 143 48 C
JK2VNL (JA2EPZ,JK2VOC,JL2DFG, JJ2BRG, ops)
61,857 237 87 48 B

Europe

TM1C (F6ARC,F6FVY, ops)
3,753,783 4213 297 48 C
HG1S (HA1TJ,HA1DAE,HA1DAC, ops)
2,973,828 3466 286 48 C
DF9ZP (DK8ZB, DK8FD, ops)
2,409,900 2770 290 48 C
II2K (IK2BUF,IZ2AVK, ops)
1,630,965 2219 245 48 C
HG5C (HA5LV, HA5MA, HA5WE, HA7XQ, ops)
1,398,594 1814 257 48 C
RK3AWL (RV3FF, RX3DCX, RZ3FA, RV3BA, ops)
1,385,100 1900 243 48 C
OL5Q (OK1HRA, OK1AYE, OK1FFU, OK1WF,OK1FLC, ops)
1,327,524 1958 226 48 C
DL0DX (DL5KUT, DK2OY, ops)
974,286 1437 226 48 C
I1NVU (IK1CLP, IK1LWL, IK1QBT)
967,980 1460 221 48 C
ES5Q (ES5MC, ES5QX, ES5RY, ops)
929,334 1421 218 48 C
GM7R (GM0NAI, GM3YOR, ops)
783,585 1583 165 48 C
IO2L (IZ2ACZ, IZ2CEF, IK2PFL, IK2PIG, I2BJS, ops)
611,382 1178 173 48 C
RK3AWV (RX3ARI,RX3ANX, ops)
597,264 1082 184 48 C
UU7J (UU4JMG, UU0JM, UU8JK, ops)
548,136 993 184 48 C
RW4LYL (RA4LW, RA4LZ, RW4LE, ops)
405,372 814 166 48 C
OL2A (OK2PDK, OK2HBY, OK2PEM, ops)
392,460 844 155 48 C
9A1CMS (9A5RJ, 9A5TR, 9A5AVW, 9A5ATW, ops)
337,590 726 155 48 B
RK1OWZ (UA1OZ, RA1OJ, UA1OMZ, ops)
201,192 404 166 48 C
UU5J (UU1JA, UU2JQ, UU0JX, ops)
97,608 332 98 48 C
UR4LWY (UR5LJC, UR4LQA, US-L-1064, ops)
83,517 287 97 48 C

North America

8P9JA (+ K4MA, AA4NC, ops)
5,403,942 5267 342 48 C
VP5CW (+N8LGP, K8RF, W9EFL, WA9S, W9VA, W0CG, W0NB, ops)
5,040,846 4986 337 48 C
V31TP (+WC0W, WG9L, WN0X, N0SS, ops)
4,862,721 4897 331 48 C
KG4DZ (+W4ZYT, W4SD, ops)
3,899,712 4276 304 48 C
XE2EBE (N6RT, AA6DP, ops)
2,434,740 2635 308 48 C

South America

PR1A (PY1SL,PY1NX, ops)
151,875 405 125 48 C
LU6UO (+ops)
115,911 729 53 48 C

Multioperator Two Transmitters

Europe

G4BUO (+W3EF, G4TSH)
4,238,208 4528 312 48 C
RU1A (+ RV1AW, RW1AC, RX1AA, ops)
3,219,939 3847 279 48 C
9A7A (+9A7V, 9A8A, 9A3TR, 9A4PA, 9A4RX, 9A6DM, ops)
2,938,578 3287 298 48 C
HG3DX (HA1VQ, HA1YA, HA1WD, HA3MY, HA3UH, HA3UU, ops)
2,419,350 3175 254 48 C
DF3CB (+DL1MFL,DL1ZIH)
2,305,710 2805 274 37 c
RW6AWT (RN6BN, RA6CO, ops)
370,599 943 131 48 C

North America

V26O (K3RA, K3MM, N5NJ, ops)
7,525,485 7271 345 48 C
6D2X (K5TSQ, W5VX, N5RZ, N6ZZ, K5TR, XE2YNS, XE2YNE, ops)
6,698,214 6453 346 48 C
XA5T (XE2KB, N5RP, N5TU, KG5U, K1OJ, W5MJ, K5NZ, AD5Q, ops)
5,922,000 5875 336 48 C
J37VG (W1RH, AA1IZ, ops)
2,898,528 3488 277 48 C

South America

HC8N (N5KO,K6AW,W4ZV, ops)
8,440,950 8039 350 48 C

Multioperator Unlimited Transmitters

Asia

JI1CUP (+JI1CUO, JJ1GVW, JJ1GVX)
36,234 183 66 14 B

Europe

9A1A (9A5W, 9A2SD, 9A2TS, 9A3GW, 9A2R, 9A6A, 9A7R, 9A7DLA, 9A9A, ops)
4,148,004 4294 322 48 C
RW2F (RA2FA, RN2FA, UA2FB, UA2FC, UA2FF,UA2FM, UA2FP, UA2FZ, ops)
4,052,664 4386 308 48 C
SK3GW (SM3OSM, SM3SGP, SM5IMO, SM5TXT, SM0GNU, ops)
2,797,920 3480 268 40 C
LY7A (LY1EE, LY2AO, LY2KZ, LY2NK, LY2BMX, LY3BAD, LY4AA, LY346, ops)
1,781,532 2414 246 48 C
LY3MR (LY1FF, LY2BIL, LY3NFW, ops)
1,077,300 1575 228 48 C
OL7W (OK1FHL, OK1DUT, OK1VBA, ops)
334,854 689 162 48 C
SP9KRT (SP9ZW,SP9ADU,SP9UXL, SP9EMI, ops)
214,200 525 136 48 B
UX8IXX (US8IBS,US8ICA, ops)
55,488 289 64 48 B

North America

C6AKW (K3TEJ,WA3WSJ, ops)
3,727,794 3859 322 48 C

CHECKLOGS:

AA4WX, AD7U, DL2AKA, DL2RTJ, DL3NEO, DL3PB, DL5AMF, DL6KWU, DL7AQT, EA1CBX, EA5AHZ, EA5, FX, EA8CN, EA1RF, EK4JJ, F6IIE, I0KHP, IT9UU, IZ5BRW, K0PC, K3SWZ, K5TT, K6VL, KC7JE/MM1, LA1FW, LA2QM, LZ1CNN, LZ1JZ, LZ1KZ, LZ1NJ, OH3IR, OK1DSU, OK1JDJ, OK1JEF, OK1KZD, OK2HZ, OK2PO, ON4CAS, OZ1OXB, OZ2CE, OZ5ABD, PA0UV, PA3BFH, PA3FOZ, PY2DBU, PY2TI, PY2TNT, PY3MHZ, RA1QX, RA1TV, RA1TV, RU3DG, RU3UJ, RV3PN, RW1Q , RW1QM, RX3ANB, SM0JHF, SM0JHF, SM4DDE, SM6NM, SP2ATF, SP2BLC, SP3SUX, SP4EA, , SP6CES, SP7BYM, SP7FGA, SP9ELM, UR5XAJ, UU0JC, UX1KR, UX3FW, VK5NJ, VY1AC, G0M, W7CF, YC0LOW, YO4FRF, YO5CL, YZ1U (YU1BL, op)

*Edited by **Steve Ewald, WV1X** • Assistant Field Services Manager*

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—While it's true that the FCC has increased its enforcement of the Amateur Service, it's important to remember that we are still expected to be a service that is self policing. This means that we must each take the responsibility to ensure that we use good amateur practices in our operations. Good amateur practice goes beyond simply following the rules and regulations. It is adherence to operating practices that include courtesy and consideration for your fellow operators. If we all take the responsibility to do this, we would no longer have need for enforcement by the FCC. The Delaware traffic nets meet as follows. DTN meets M-F at 1830 local time on 3.905 MHz. DEPN meets Sat at 1800 local time on 3.905 MHz. Traffic (July): DTN QNI 151 QTC 27 in 22 sess, DEPN QNI 31 QTC 2 in 5 sess. K3JL 39. 73. Randall.

EASTERN PENNSYLVANIA: SM, Allen R. Breiner, W3TI—SEC: Eric Olena, WA3FPL. STM: Harry Thomas, W3KOD. OOC: Alan Maslin, W3DZI. PIC, BM: E. Max Peters, KI6NJ. TC: Cully Phillips, N3HTZ. ACC: Steve Maslin, N3ORH. SGL: Allen Breiner, W3ZRQ. ASMs: Bill Dale, WY3K, Dave Heller, K3TX, J. Yogi Bear, WB3FYQ, George Law, N3KYZ. A welcome addition to NTS is KB3BBR who received the ORS appointment. Interested in traffic or emergency communications? Contact ORS N8JSO or EC W3DAB for more information about the new traffic net they started. Our SGL W3ZRQ has instituted a plan whereby more interested parties will get an LGL appointment. You need not be a Philadelphia lawyer for the appointment, just have an interest in your local government activities. Need more? Drop him a line. He edited and distributed a bulletin known as the *Leagle Beagle* covering notes, case histories and ideas to assist with problems the LGL might encounter. A Tech-Plus upgrade goes to KB3DEA. The RF Hill ARC VE team has test sessions on the third Monday of each month at Indian Valley Public Library at 6:30 PM. League affiliation has been granted to the following club groups: Lycoming Co Emergency Management Agency, the York Hamfest Foundation, and the Northern Tier Repeater System. A table top training program was presented by WB3N regarding the upcoming Limerick Nuclear power plant evacuation was attended by KB3DU N3LBY KB3DUR N3NJI N3LDU N3SAM KD3OK KE3MN N4SEN W3QT N3NQX W3YMP WA3CQT KE3ET N3JKL and KC3XL. The 1999 annual Simulated Emergency Test is scheduled for Oct 2-3. Chester Co EC, KC3XL, organized a Y2K standby group with the pre-assumption they will be needed come New Years morning. How does your county ARES stack up in the event they are needed? No one seems to recall when an EC ARES county evaluation was last held. A 15-item evaluation sheet has been prepared by Eric, WB3FPL, SEC, and SM, W3TI, and sent to each EC. The information gathered should give us some insight on how well our section is prepared as we enter the new century. The biannual meeting of the EPA section cabinet will be held Oct 10, 1999. Members of this official body, listed above, hold a session twice a year for the purpose of review and updating any portion of the 8 field service appointment areas in addition to subcommittee reports and any active section programs. Tfc: W3KOD 423, N3DRM 364, N3EFW 297, W3IVS 173, W3IPX 101, N3YSI 78, NR9K 68, W3UAQ 67, N3AT 65, N3HR 56, W3HK 45, N3SIN 39, WA3EHD 35, N3AO 20, K3ARR 17, KB3BBR 17, W3JKX 17, K3TX 17, W3ZQN 14, W3TI 12, AD3X 12, N3AS 11, N3DCG 8, W3DF 8, N3KYZ 7, KA3LVP 7, N3IRN 5, W3NNL 4, KA3KMH 4, WA3CKA 3, W3TWV 3. Net Reports: EPA 184, EPAEP&T 167, PFN 96, HBSN 93, SEPTN 66, PTTN 51, MARCTN 12, D3ARES 11, WAREC 5, LCARES 3, D4ARES 1, MCOES 1.

MARYLAND/DC: SM: Bill Howard, WB3V, 410-551-6775, **wb3v@arrl.org**—MDC Section Web homepage **www.erols.com/wb3v/mdc/**. PRGE EC KA3PVS reports some events where ARES/RACES provide comms. These include: a statewide Y2K exercise at the OEP; the Roadrunners race through Greenbelt; the annual MDA Softball tournament; SKYWARN basic training in LaPlata; ARES/RACES/ REACT information booth at FARFEST; Snow Rodeo, at Jack Kent Cooke Stadium on 27 October; they have been asked to staff the OEP on New Years Eve to establish comms with locations throughout the world to find out how things are going with the Y2K problem. Jack Twist, WB3JJL, Comms Coord. for Cycle Across MD said 26 amateurs provided comms during CAM' 99. **ANAR** EC N3QXW said OES reports received from: KO4A and N3QXW. Brian reports that ANAR amateurs provided comms during CAM. **CHAR** EC W3TOM reports the ARES/RACES group participated in the State of MD's Y2K statewide exercise, with nine ARES/RACES members for the event. A basic Weather Spotters Class was presented by NOAA. 25 Amateurs attended and completed the course held at the EOC in LaPlata. The CCARC participated in the "Night Out For Crime" in LaPlata, MD. Working along side the Public Safety entities, the group showcased Amateur Radio to the public with a highlight on ARES/RACES operations. The display had handouts, an ARRL movie playing on VCR, an HF station on the air and a Packet station. The Dir. of Emer Services was the speaker for the CCARC meeting, where he shared his vision of Amateur's participation with the group. **MONT** EC K3XO reports 4 net sessions with N3LHZ, KZ3F, K3CSX and K3XO Net control operators. The (MARC), with support from ARES, provided comms for the Rockville, MD Rotary Twilight Runfest. There were several medical calls. Two of the runners were transported to a local hospital. The coordinator for MARC was Bob Lyons, NK3I. Coord for ARES was EC Rip Smith, K3XO. With the nets: Net/NM/QND/QTC/QNI: MSN/KC3Y/31/46/329, MEPN/N3WKE/30/87/486, MDD/WJ3K/58/246/764, MDD top brass: KJ3E 266, K3JL 174, AA3SB 144. BTN AA3LN/31/76/394. Tfc: KK3F 571, KJ3E 219, AA3SB 117, W3YVQ 104, N3WKE 95, AA3GV 76, KC3Y 54, KO4A 35, N3ZKP 32, KE3OX 24, WA1QAA 21, N3DE 20, W3YD 20, W3VK 19, K3CSX 16, N3EGF 14, KE3FL 5, WA3GYW 3. (June) WA1QAA 21. PSHR: KK3F 160, N3WKE 158, W3YVQ 149, AA3SB 148, N3WK145, KJ3E 139, W3VK 125, AA3GV 121, W3CB109, KO4A 98, N3ZKP 94, KE3OX 88, WA1QAA 86, KC3Y 83, KE3FL74, (June) WA1QAA 78.

NORTHERN NEW YORK: SM, Les Schmarder, WA2AEA—ASMs: KD2AJ, WB2KLD, N2ZMS, WA2RLW. ACC: WZ2T. BM: KA2JXI. OOC: N2MX. PIC: N2SZK. SEC: KF2GC. STM: N2ZGN. TC: N2JKG. NNY Website: **http://www.northnet.org/nnyham**. Please excuse the net reports not being in this months report as WA2AEA was taken to the hospital unexpectedly. All our best wishes and regards go out to Les. The CVARC has created a club Webpage and may be accessed at (**http://www.geocities.com/Heartland/Forest**/5895). Like to thank all the amateurs from NNY, Vermont and Quebec who volunteered to provide health and welfare communications for the Lake Placid Ironman Triathlon and special thanks to N2UTY for getting it all together. We are also looking forward to the Adrirondack marathon in Schroon Lake NY on Sept 26 as well. 73 Chuck, KD2AJ.

SOUTHERN NEW JERSEY: SM, Jean Priestley, KA2YKN (@K2AA) e-mail: **ka2ykn@arrl.org** ASM: W2BE, K2WB, W2OB, N2OO, KB2TME. SEC: KB2TME. STM: WB2UVB. ACC: KB2ADL. TC: W2EKB. SGL: KB2WKY. OOC: K2PSC. PIC: N2YAJ. TS: W2PAU W2BE AB2Y WB2MNF KD4HZW WA2NBL AA2BN. With sorrow, I let you know about the passing of W2GBH, Jerry Henny, member of David Sarnoff ARC. We had the pleasure of spending Sat. night during Field Day with him, his wife Betty and other Sarnoff members. Jerry will be missed. SNJ also lost Paul Roeder, K2PR, a ham since in 1931, he had a full life. Pennsville Township Emergency Management now has all new equipment on 146.625 linked full time with 442.500 repeater in Penns Grove primarily for RACES/ARES nets with 224.460 repeater in Salem to be linked in the near future giving County Wide coverage. The 53.710 repeater will be linked as needed. Nets; 9 PM every Sunday. It is so important to honor and recognize people for their accomplishments now. Give that pat on the back NOW. July 99-WB2UVB 177, AA2SV 131, KB2RTZ 114, K2UL-4 62, K2UL 59, N2VQA 20, KA2CQX 14, N2WFN 12, W2AZ 11, KA2YKN 9, WA2JSG 8, N2WXF KB2VSD N2FHJ N2MSM 4, N2ZMI 3, KB2CDB 3, KB2JYD 2, KB2VSR KB2YBM KB2ETU KB2SHJJ N2FHK N2SOE N2WXE N2WXG AA2BN 1.

WESTERN NEW YORK: SM, William Thompson, W2MTA –ASM: **w2bch@juno.com** – SGL: N2KYZ, **levinrah@norwich.net.** ASM: **k2mp@eznet.net**. TC: **wb2vuo@juno.com**, **k2qr73@ibm.net.** CLUB OFFICERS: Liverpool ARC W2ISB KB2SWB N2TAI W2WRH KC2BXY. APPOINTMENT: (OO) KB2SIN. HAMFESTS: WNY Section Convention Hamburg Sep 18, Margaretville Sep 18, Elmira Sep 25, Eastern Area Traffic Handlers' Picnic near Annapolis MD Oct 1-2, Syracuse@Pompey Hills Oct 2 CONGRATS ARATS, BARRA, LARA, LARC, STARS and others for another great Western District of WNY Picnic. Once again TCARC's W2FXU has done it. This time he tempts Natan and Satan with his Fork from Hell. He says it works, just ask him. Happy Halloween to all!

Net	*QNI*	*QSP*	*QND*	*Net*	*QNI*	*QSP*	*QND*
Early Bird-FM	426	000	22	#STAR-FM	343	018	31
NYSRACES 3993.5	064	008	04	#WDN/E-FM	570	097	31
NYSCN-CW 3677	016	003	04	#NYS/E-CW 3677	388	152	31
#NYS/M-CW= 677	224	086	31	TIGARDS-FM	020	003	04
CHN-SSB 3925	194	038	31	BRVSN-FM	247	003	31
#WDN/M-FM	631	061	31	STTHN-FM	051	015	09
#NY PHONE 3925	256	387	31	#CNYTN-FM	367	064	31
#NYPON 3925	290	171	31	#OCTEN/L-FM	686	182	31
ESS-CW 3590	349	070	31	#WDN/L-FM	547	026	31
NYSPTEN 3925	358	053	31	#NYS/L-CW 3677	309	244	31
#OCTEN/E-FM	1395	206	31	OARC-FM	020	005	04

[# NTS net] —[* Public Service Honor Roll] Traffic (July): N2LTC*1135, KA2ZNZ*507, WB2IJH*355, KF1L*328, KA2GJV*296, NN2H*288, W2MTA*252, W2PII*162, K2BCL *151, W2FR*145, WI2G*144, WB2QIX*117, N2UTK*78, AF2K*49, KB2VVD*48, NY2V*46, KB2UQZ*45, N2CCN*38, KG2D*38, KA2DBD*36, KB2ETO*36, N2WDS*25, K2DN *20, KA2BCE*17, WA2GUP*17, KC2EOT*14, KA2IWK*14, AA2ED*13, N2IKR*12, KB2WII*9, W2RH 8, WA2UKX*7. DATALINK (July): K2DN R5/S0, KA2GJV R1/.S2, N2LTC R297/S204, NY2V R3/S4. BPL (July): KA2ZNZ, N2LTC. At its meeting the ARRL Board of Directors recognized "the historic and benevolent contributions of the National Traffic System and its operators to the ARRL public service program, on the occasion of its fiftieth anniversary." 73. **w2mta@juno.com.**

WESTERN PENNSYLVANIA: SM, Bill Edgar, N3LLR—ASM: N3MSE. ACC: open. ASM-ARES: WB3KGT. SEC: N3SRJ. ASM-Packet: KE3ED. ASM-Youth & Education: KE3EE. PIC: W3CG. STM: N3WAV. TC/OOC: WR4W. DEC-SO: KD3OH. DEC-N1: N3QCR. DEC-N2: KA3UVC. DEC-S1: KA3HUK. DEC-Rapid Response: N3HJY. Way to go Tim Shields! Good job on earning your ham license. Tim is the son of Laurel, N3HJP, and Steve Shields, KD3OI. Steve was my Elmer when I was looking to get involved with this hobby. Have you had a chance to introduce the hobby to at least one more new person this year? To that end, the WPA Section Staff has developed a contest for increasing club membership and for getting new hams. Contest information has been released via letter to WPA ham clubs, WPA Section listservers and WPA Section Web page located at: **www.bfdin.com/wpasec/index.htm**. Was there a ham that stood out in helping you get your license? I'd like to hear about that person. Please send me, via US mail or e-mail, that person's name, call sign, how they helped you and why they stood out so that I get them by December 15, 1999. I'd like to recognize these special people in January. I will be putting these stories on the WPA Listservers. Selected names will be recognized in a subsequent *QST* WPA Section News article. It is with deep regret that I have received the resignation of Twila Kerr, N3SJR, as the WPA Section's Affiliated Club Coordinator. Twila's mother has some health issues that Twila has been busy helping her with. With her busy schedule, Twila does not have the time she'd like to devote to the ACC's duties. Twila and her husband, Greg, have been very strong supporters of Amateur Radio by serving in many different capacities, as well as leadership capacities. Their support and their friendship over the few years I have known them have meant a great deal to me. Until a replacement has been named, all club renewals and affiliation information requests should be sent to me.

CENTRAL DIVISION

ILLINOIS: SM, Bruce Boston, KD9UL—SEC: W9QBH. ACC: N9KP. STM: K9CNP. PIC: N9EWA. TC: N9RF. OOC: KB9FBI. DEC-Central: N9FNP. A minor catastrophe, of sorts, occurred recently when my computer had a fatal crash. The recovery is slowly progressing as my 13 gigabyte hard drive periodically spits out bits and pieces of data. Many files, including my e-mail and address book, were lost. If you tried to reach me by e-mail during July,

Continued on page 104.

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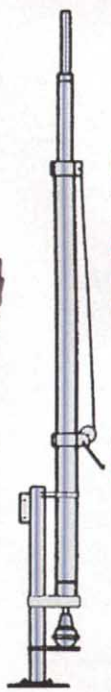

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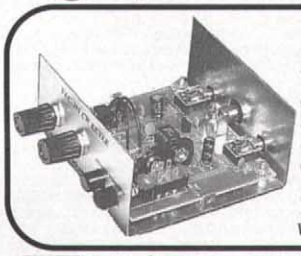

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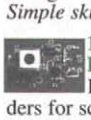

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5 Watt 2 Meter FM transmitter Kit lets you transmit voice and data -- AFSK data (up to 1200 baud) and FSK data (up to 9600 baud). Jumper select reactance or direct FM modulators. Reliable Motorola NBFM transmitter IC and PA transistor. Crystal controlled (x8 frequency multiplication). -60 dBc spurs and harmonics. Use 12-14 VDC, 1.5 amps. 5-pin DIN microphone jack. 1¾x4¾x5¼ in. *Difficult skill level.* Order **VEC-1202K, $99.95.**

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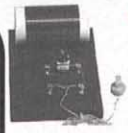

Crystal radio set Kit lets you relive the experience of early radio pioneers. This baby really works! Wind your own inductor, wire up the earliest radio circuit without soldering a thing and listen to the magic of radio that needs no power. Put up an antenna, connect a ground. Stations come in amazingly loud and clear. Includes antenna wire, sensitive earphone. 1¾x5x6½ in. *Simple skill level.* Order **VEC-121K, $19.95.**

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QRP Transceiver Kits for 80/40/30/20 Meters

Great introduction to QRP, the hottest and fastest growing activities in ham radio. With this tiny *transceiver*, you'll discover what thousands of QRP enthusiasts already know -- you don't need a $1000 radio to get on the air and communicate worldwide. All it takes is some simple circuitry using less energy than a pen-light bulb! You get VXO frequency control, broad-banded transmitter circuitry, solid one Watt plus output, shaped keying, .3 uV sensitivity, direct conversion receiver. Includes crystal for popular QRP calling frequency. 1¾x4¾x5¼ in. *Intermediate skill level.* Order **VEC-1380K** (80 Meters), **VEC-1340K** (40 Meters), **VEC-1330K** (30 Meters), **VEC-1320K** (20 Meters) **$59.95 each.**

Super CW Audio Filter Kit gives you three bandwidths: 80, 110, 180 Hz. Eight poles gives super steep skirts with no ringing. Pull CW QSOs out of terrible QRM! Plugs into phone jack to drive phones. QRM down 60 dB one octave from center frequency (750 Hz) for 80 Hz bandwidth. Improves S/N ratio 15 dB. Use 9V battery. 1¾x4x 3½ in. *Simple skill level.* Order **VEC-820K, $19.95.**

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chances are I didn't receive it. Please re-send the item if you can. Nineteen members and friends of the Six Meter Club of Chicago assisted with communications at the annual La Grange Park "Run for the Roses" five kilometer run and walk on May 15. They were stationed at various points along the route to call in leading entrants and relay requests for assistance. The SMCC Scholarship was awarded this year to N9QDY, a student at Illinois College in Jacksonville. The Egyptian Radio Club reports they recently rented a storage building to house their equipment. MAC, the Metro Amateur Radio Club, has found a new home for its repeater. The Kishwaukee ARC reports that the finishing touches are being put on a tower trailer that was donated recently to the club. The Metro DX Club was featured in an article about Field Day in the *Daily Southtown* newspaper. The Schaumburg ARC's first Saturday breakfast was a big success, so they plan to continue the activity. Members of the Rockford Amateur Radio Association participated in the Clean Air bike-a-thon, RAMP wheel-a-thon and the ARRL Kid's Day activity. The new officers of the Wheaton Community Radio Amateurs are Pres KF9JC, VP KB9TRQ, Sec KA9RZG, Trea W9LQL. The Jacksonville Amateur Radio Society held a club picnic August 21. Twelve members of the Sangamon Valley Radio Club ARES group assisted with the Iron Horse Duathlon on June 13. The 9-0-4 ARC was recently visited by W9QBH, the ARRL Illinois Section Emergency Coordinator, who spoke to the club about the ARES program. The new officers of the 9-0-4 ARC are Pres K9EXH, VP KA9SKT, Sec N9LEC, Trea N9HRW. Due to time considerations WA9AQN, our State Government Liaison, has decided to step down from his section leadership position. John came aboard as SGL in 1994 during my first term as Section Manager. His expertise in legal and government affairs has been invaluable to the section and will be missed. Thanks, John, for your service to the ARRL and Amateur Radio. July traffic: W9HLX 119, K9CNP 116, WB9TVD 35. ISN de WB9TVD QNI 187, QTC 89 in 31 session, NC9T 16. ILN de K9CNP 19 in 27. ITN de KF9ME 26 in 23. NCPN de W9OUF 84 in 27. IPN de KA9CYJ 7 in 26. IEN de K9HEZ 5 in 4. W9VEY Memorial Net de K9AXS not available. Ninth region report de W9FC tfc 325 in 420 min, sessions 62, avg 5.24, rate .773, rep 96%, ILN K9CNP, KF9ME, NS9F. D9RN cycle 1, 23 sessions, QTC 58, QTR 280 min., QNI 23, avg. 2.5, rate 0.20, percent 16. Cycle 2, 23 sessions, QTC 75, QTR 280 min., QNI 23, avg 2.5, rate 0.21, percent 13.

INDIANA: SM, Peggy Coulter, W9JUJ—SEC: K9ZBM. ASEC: WA9ZCE. STM: AA9HN. OOC: KA9RNY. SGL: WA9VQO. TC: W9MWY. BM: KA9QWC. ACC: N9RG. Sympathy extended to the families and friends of Silent Keys; July 3, G. Robert (Bob) Spencer, N8DKT, Marion: July 14 Laurence (Larry) Vrooman, WB9DFD, Muncie: July 28 Wayne E. (Dude) Lewellyn, W9ZPO, Dugger: Aug. 3, Miriam F. (Fran) Yelch, K9ILK, Princeton. They will be greatly missed. If your club has any contest related questions or if any individual needs contest related help you might contact Greg Clark, K9IG. He is the new Central Division Rep for the ARRL Contest Advisory Committee. Hancock ARC in Greenfield will host a hamfest Dec 5. Just in time for Christmas. It will be held in a new location so check on location. Hoosier Hills Hamfest is Oct 3. The Mich City Summer Festival Parade had communication help from N9RG, KB9ORJ, N9ZIP, KA9PGC, W9VBJ, KA9LOW and K9ET. There were 5 members of the Ripley Co ARES participated in a display of the communication vehicle at the Ripley Co Fair. 16 members of the Decatur Co ARES manned the communication vehicle for the Decatur Co Fair for 10 days, also 4 members displayed the vehicle at the Milhousen's Firemen's Festival. Lake Co ARC furnished communication for the Brickyard Run in Hobart. Those helping were KB9OGY, W9ZRO and KF9EX. They were short-handed and hoped next year would be better. The Porter Co ARC awarded their extremely prestigious Golden Mike award to K9JZZ for holding a record length Wednesday night net. NMs ITN/W9ZY, QIN/N9PF, ICN/AA9HN, WN/AB9AA, VHF/AA9HN.

Net	*Freq*	*Time/Dailyl/UTC*	*QNI*	*QTC*	*QTR*	*Sess*
ITN	3910	1330/2130/2300	2571	532	1715	93
QIN	3656	1430/0000	115	83	575	42
ICN	3705	2315	59	25	290	25
IWN	3910	1310	2237	310	–	31
IWN VHF Bloomington			493	465	–	31
IWN VHF Kokomo			636	155	–	31
WN VHF Northeast			951	620	–	31
Hoosier VHF nets (9 nets)			449	28	570	36

D9RN Total QTC 133 in 46 sessions IN represented by K9GBR, W9UEM, WB9QPA and KB9NPU. 9RN Total QTC 325 in 62 sessions IN represented by KO9D, K9PUI, WA9QCF, KJ9J, N9PF, AA9HN, WB9UYU and W9FC. Tfc: W9FC 418, K9GBR 149, K9PUI 141, W9ZY 138, WB9QPA 107, KO9D 97, KJ9J 96, W9UEM 68, N9ZZD 67, AB9AA 61, W9JUJ 42, N9PF 39, K9RPZ 36, KA9QWC 32, W9BRW 28, KA9EIV 24, AA9HN 24, N9WNH 18, W9KT 16, KB9NPU 14, W9EHY 13, KA9DIG 12, W9RTH 8, AB9A 7, WB9NCE 6, N9JAI 5, K9OUP 4, K8LEN 4.

WISCONSIN: SM, Don Michalski, W9IXG—BWN 3985 0600 W9RCW. BEN 3985 1200 KE9VU. WSBN 3985 1730 WB9WHQ. WNN 3723 1800 KB9OCZ . WSSN 3645 1830 N9BDL. WIN-E 3662 1900 WB9ICH. WIN-L 3662 2200 W9UW. Greetings from your new SM! Roy Pederson, K9FHI, has decided to retire as SM and I have taken the remainder of his term. Roy was SM from 1973 to 1984 and from 1996 until present. His 14 years of dedicated service are deeply appreciated by all the Wisconsin hams. Roy will continue to hold the OES and ORS positions and remain active in the nets. He and wife, Beryl, KA9BAC, recently celebrated their 50th wedding anniversary! We congratulate them and extend our best wishes. Also retiring is Verne Teske, W9RYA, as State Government Liaison. During his tenure, Verne kept us well informed on government issues as they related to ham radio. Thanks, Verne! Replacing him as SGL is Jim Lackore, AD9X. Jim, a recently retired educator, is in tune with our state government and has sent letters to our legislators regarding HR783 (amateur spectrum protection act). I've added Rick, W9RCW, to

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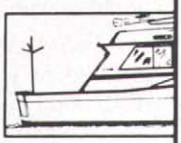

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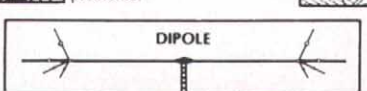

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assist me. W9RCW, K9UTQ, and W9CBE are my ASMs. All other appointments remain the same. It is with deep regret that I report the following SKs: Carl Odermann, KA9WWJ, member WARAC & SEWFARS; Michele Lee Tracy, KA9SRM, licensed since 9 years old; John Glaeser, WB9ESM, member Mancorad ARC; Harold Anderson, W9MER, a founder of WARAC. National WX Service honored Sherm Carr, W9NGT, for 30+ years of service! Congratulations, Sherm! W.A.R. officers were all re-elected for another term. Please keep me informed of your club activities! Contact me: 608-274-1886, WSBN, w9ixg @arrl.org 73, Don, W9IXG. Tfc: K9RTB 807, K9JPS 720, W9IHW 639, W9RCW 610, W9YPY 519, K9GU 412, W9CBE 241, K9LGU 90, AG9G 90, N9KHD 84, N9CK 77, K9FHI 69, W9UW 64, KE9VU 56, W9YCV 50, AD9X 40, KA9KLZ 37, W9BHL 37, WZ7V 35, K9HDF 30, AA9BB 28, KA9FVX 25, W9ODV 24, WB9ICH 22, N9JIY 20, KA9BHK 12, K9UTQ 4.

DAKOTA DIVISION

MINNESOTA: SM, Randy "Max" Wendel, N0FKU—The St Cloud Hamfest Aug 8 had perfect weather and good attendance. In case you can surf the Web, check out the St Cloud ARC Web site at W0SV.ORG. While you're at it, check out the Northern Lakes ARC Web site at QSL.NET/KB0VAE. Lots of clubs host Web sites where we can all become familiar with their organizations. Perhaps eventually we can organize a common place on the Web with links to all club Web sites. I will try to eventually put some of that info on my Web site or even find a host server where that info can be made more readily available, maybe even with a section mail reflector or something. Who knows...we can get creative with whatever we want as long as the resources are available. Dan Ross-Jones, KC0BEI, wishes to introduce the LYRA-League of Young Radio Amateurs to us. It was formed last year aimed exclusively at hams under 19 yrs old. This national organization has area sections and districts with section managers and district reps and also has a local web site **lyramn.cjb.net**. A "section net" was in planning stages a few months ago on Thursday eves at 8 PM on the superlink network. Not much news this month for you. My boy is in 2nd grade, 6 yrs in my house now, and the garden has been reaped for lots of tomatoes and peppers the past few months. I'm stocked up with salsa and tomato sauces for another year. Summer is on the slow downswing. Mark your calendars for Hamfest MN on October 30 at RiverCentre in St Paul. It's bound to be a success as always. 73 de **http://www.pclink.com/rwendel**. Tfc: KB0AII, WO0A, WA0TFC, W0LAW, K0PIZ, W0GCB, W0HPD, KN9U, KB0AIJ, K0WPK, W3FAF, W0WVO, N0PSH, KA0IZA, N0BM, W7HH, K0OGI, WD0GUF, N0JP.

NORTH DAKOTA: SM, Bill Kurtti, WC0M—FORX Hamfest will be held Sept 18. Site to be announced later. Talk in on 146.94 The Peace Garden Hamfest went well with average attendance. Nice not to have rain for a change. Congratulations to K0HDA on being voted the Ham Of the Year. Well deserved, Ray. Now all we need to is figure out how to get electricity and water out of Harold's hydrant. Ask KI0E, KG0FR, or WA0HPN for details. FORX members provided communications for the American Diabetes Association's Tour-de-cure 62.5 bike race. Also included was a 10 Mile family ride. Fourteen FORX Hams broke in their (new) FEMA trailer on Feld Day. Considering the water, mud, heat and humidity, all went as planned most of the time. Dickinson Hams installed a new 146.64 repeater at the Killdeer site. Tfc: N0RDJ 2, Sess/QNI/QTC Mgr. Goose River, 4/25 /0 KE0XT, DATA 31/839/31 KE0XT, WX Nets 31/556/11 KE0XT. Storm Net 3937 kc continuous as needed during storms.

SOUTH DAKOTA: SM, R.L. Cory, W0YMB—Black Hills ARC, Crazy Horse ARC and Chapter 102 QCWA assisted with communications for the 100-mile Mt Rushmore foot race starting at Legion Lake near Mt Rushmore and ending near Sturgis. The runners do not run on the highway, but in the woods, etc and use flashlights at night. Runners from many states took part. The 1999 Dakota Division Convention is now history. The highlight of the convention was a speech at the banquet by Dan Miller from ARRL Headquarters. He ended with an article that was written in 1927 by Hiram Maxim about the status and future of Amateur Radio that is exactly the same as it is today 72 years later. QCWA Chapter 102, North and South Dakota, had a get together at the convention. Traffic reported for July was 478.

DELTA DIVISION

ARKANSAS: SM, Roger Gray, N5QS, e-mail **n5qs@arrl.org**—Hope your Field Day was safe and successful. The clubs we visited were either very wet or very hot or both. I hope to visit other areas of the state next year. Hopefully by the time you read this the heat wave will have broken and the hamfest season will be well under way. I hope to see many of you there. Try to listen or check in to the ARES/RACES Net on Sundays at 7:00 AM and Mondays at 7:00 PM on 3987.5 kHz. We have the SET coming up in October. Be sure to send your reports to the Arkansas SEC, Terry Busby, W5ARS. Tfc: K5BOC 79, K7ZQR 78, AB5AU 30, KO5E 10, W9YCE 10, AB5ZU 8, KA5MGL 8, WA5MWI 7, WA7WFU 6, W5RXU 4, W5LZQ 2, KC5UEW 2. APN 24, ARN 86, MERD 33, OZK 2. July 1999. Tfc: K5BOC 116, K7ZQR 81, AB5AU 45, W5RXU 10, W9YCE 10, KA5MGL 8, W5LZQ 3, APN 31, AMN 42, ARN 85, OZK 5.

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. Louisiana has lost one of it most active hams. Bob Funk, KB5GQ, of Laplace, became a SK on August 8. Bob served for several years as Vice Chairman and Board Member of the LCARC. For many years he was the Editor of the JARC Jefferson Report, a member of the hamfest committee, has held office several times in JARC. He was also a member of the SELARC. Bob will leave a void in all of our lives. I, like hundreds of other hams, was glad to be counted as a friend of Bob's. Our sincere sympathy to his family. 73 es SK Bob. The following clubs reported FD activity: CenLaARC, JARC, OAARC, OARC, DDXA, SWLARC, SARA, TCHC,

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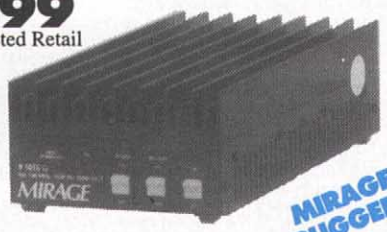

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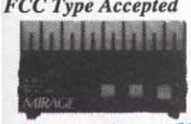
Watts Out (2Meters)	30	40	45	45+	45+	45+	45+
Watts Out (440 MHz)	16	26	32	35+	35+	35+	35+
Watts In	1	2	3	4	5	6	7

- *45 Watts on 2 Meters/35W on 440 MHz*
- *Auto Band Selection* • *Auto T/R switch*
- *Full Duplex Operation* • *5x1¾x5 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). 1¾x3¾x2½ 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

High gain *ultra low noise* GaAsFET preamps for receiving weak signals. Selectable gain prevents receiver intermod. 15 to 22 dB gain. Less than 0.8 dB noise figure. Automatic RF switching up to 160 Watts. **Choose** In-*Shack* model or *Mast-Mount* (includes remote control) model to reduce loss. Rugged die-cast enclosure.

Frequency (MHz)	*In Shack $139*	*Mast Mount $195*
28-30	KP-1/10M	KP-2/10M
50-54	KP-1/6M	KP-2/6M
144-148	KP-1/2M	KP-2/2M
220-225	KP-1/220	KP-2/220
430-450	KP-1/440	KP-2/440

1¼ Meter Amps (223-225 MHz)

Choose from 10 models -- 20 to 220 watts out for 2 to 50 watts in, $129 to $655.

Commercial Amps ($199 to $395)

FCC Type Accepted

Commercial amps for 150 - 174, 450-470 MHz and VHF marine bands, 70 -130 watts out.

Accurate SWR/Wattmeters

Read SWR directly andForward/ Reverse, Peak/Average power. Remote Coupler. 1.8-30, 50-200, 420-450, 1260-1300 MHz band models.

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and TARC. Due to pending changes at work, Don, W5IT, has found it necessary to resign as the Capital District EC. Don has done much to bring the ARES program to its current high level of participation. Many thanks for your seven dedicated years of service. Good luck in your future endeavors. Coming Hamfests: NOTE DATE CHANGE Shreveport Sept 18, Monroe November 6. Go out and support our area hamfest events. LTN QNI 287, QTC 85, 31 sess. DRN5 LA Rep 100 % by WB5ZED, K5IQZ, K5WOD, W5BKM, W5CDX, WA5LHL, K5DPG. PSHR: WA5WBZ 42, K5WOD 103, K5MC 113, KG5G 121, K5IQZ 126, W5CDX 127, K5DPG 129, WB5ZED 160. Tfc: WA5WBZ 10, KG5GE 31, K5WOD 33, K5DPG 34, K5MC 108, K5IQZ 192, W5CDX 234, WB5ZED 691 (6th BPL).

MISSISSIPPI: SM, Malcolm Keown, W5XX—NM: N5JCG, KB5W, N4VHX, KI5UK, K5XU, KB5WJJ, N5YNY. Don't forget the 1999 Section Emergency Test on September 18 from 0800 to 1030 starting on 3862 kHz and spreading to the local Two Meter Nets. The Hattiesburg ARC provided communications for the Hub City Hustle Triathelon. Those participating were KC5TYL, N5ZJ, K5EME, KK5BY, W4KGJ, KD5EZN, KD5XG, KC5BXZ, KD5ELS, AC5E. Congratulations to K2FF for breaking the Top Ten QRP in the 98 SSB SS; to K5DMC and KD5CKP for completing the EC Training and Certification Course; and to N5XGI on receiving the Public Service Honor Roll Certificate. OO Report: W5UBG, K5XQ. EC Report: KD5CKP, W5DGK, WB5OCD, KC5SPR. Net Reports: sessions/QNI/QTC. MSPN 31/2460/58, MTN 31/217/78, MSN 31/1013/9, PBRA 31/922/9, Jackson Co ARES 31/441/24; MSSN 22/97/3, Hancock Co ARES 14/118/6, LARC 4/58/0, MBHN 4/24/0, Stone Co ARES 4/32/0, MCARES 4/41/1, JARCEN 4/92/2, Lowndes Co 4/65/0, MAEN 3/42/0. PSHR: KB5W 158, N5JCG 144, KD5P 123, K5VV 121, W5XX 109, K5DMC 103. Traffic: KB5W 571, KD5P 314, N5JCG 65, K5VV 24, K5DMC 19, W5XX 10.

TENNESSEE: SM, O.D. Keaton, WA4GLS—ACC: WA4GLS. ASM: WB4DYJ. SEC: WD4JJ. STM: WA4HKU. OOC: AD4LO. TC: KB4LJV. According to "SPARKS," a number of the Mid South amateur radio clubs are jointly considering sponsoring a hamfest, "DIXIEFEST," to be scheduled early in the year 2000. I suggest that if your club has not been contacted, get in touch with Melinda Thompson or Ben Troughton and make the necessary plans to join the venture. TN hams do well in 160 M contest and 1998 CW Sweepstakes. Luther, N4UR, Jim, N4IR, and Dennis, N4DD. The Knoxville Hamfest and TN state convention was a smashing success this year. Everyone make your plans to attend next year. The following NARC members participated in the American Diabetes Assn Bike Ride: KF4OAL, KC4ZOA, KE4JWV, KC4WKR, KA4TFB, N4GWE, KC4TCR, KF4WME, W4GWT, KJ4GR, K5LKT, K4ANH, K4IHI, KF4MCG, KF4QWA, KQ4PC, KF4MCD and RAT members. Harry Chandler, W4FLW, was licensed in 1933 became a Silent Key on July 7, 1999. Paul, WO4U, announced at the July 26 meeting of the SMARC that a Ham Radio class will be offered this fall at the Pigeon Forge High School. RCARS elects officers: Larry, WA4PJP, Pres; Ted, WA4UEU, VP; Bill, KF4ZSX, Sec/Treas; Joe, KF4VLI, Act Chair. Cindy, KE4LLH, of CARC extends thanks to all who contributed to the ADA Tour de Cure Bike Ride and to the following other club's personnel for their help: Ocoee ARC, Stars Club and RATS. DRN5 rpt 62 sess, 1008 msgs, TN rep 82% by W4OGG, WB4GIJ and K4WWQ. Net Sess/QTC/QTNI: TMPN 31/40/2060; TCWN 27/28/158; TEMPN 22/42/632; TEPN 27/131/2011; TSCWN 18/16/108. Tfc: NZ4O 378, WB4GIJ 153, N4PU 110, N4LA 60, WA4HKU 54, W4SQE 32, KA5KDB 30, WD4JJ 19, W4SYE 14, KI4V 13, WA4GLS 12, K4TAX 6, W4PSN 5.

GREAT LAKES DIVISION

KENTUCKY: SM, Bill Uschan, K4MIS—ASM: Tom Lykins, K4LID. SEC: Ron Dodson, KA4MAP. STM: John Farler, K4AVX. ACC: Todd Schrader, KF4FWZ. BM: Ernie Pridemore, KC4IVG. TC: Scotty Thompson. PIC: Steve McCallum, W2ZBY. During July there were no SKs in the Section. Last night, August 5, 1999, I attended a Y2K briefing at the Kentucky EOC, presented by Bob Stephens, Telecommunications Branch Manager. The presentation was excellent and left several doubts in my mind. It's something we all need to think of because Amateur Radio will be used. Not just in Frankfort, but all over the State of Kentucky. The trip to Bowling Green for the Hamfest on the 31st was great. There was a good crowd for the size of the fest. Maybe one of the best I have seen this year. I hope to see a good crowd at Lexington this year. The Louisville Hamfest will be the 11th and 12th of September with the Hazard Hamfest on the 7th of November, I think. Things are sure dry in Kentucky and no rain forecast for several days ahead. I wonder if the Big Lid ventures out on these dry hot days? There is a new address to register with the FCC. You have to do this to do business, like renewals. The address is **http://wtbwww05 .fcc.gov/noframes.html**. This will allow you to renew your license electronically.

Nets	*QNI*	*QTC*	*Sess*	*Mgr*
KRN	537	22	22	N4AFP
MKPN	1046	29	31	K4LID
KTN	966	85	31	K4LID
KYN	333	66	31	K4AVX
KSN	191	60	31	KO4OL
CARN	457	32	30	KD4SS
TSTMN	415	38	31	WB8GWL
4ARES	543	26	31	WA4RRR

Tfc: K4AVX 59, KC4CEG 6, W4ET 6, N4GD 18. AE4NW 37. KO4OL 34, KF4RBK 164, K4YKI 14. WB4ZDU 8.

MICHIGAN: SM, Dick Mondro, W8FQT (**w8fqt@arrl.org**)—ASM: Roger Edwards, WB8WJV (**wb8wjv@centuryinter.net**). ASM: John Freeman, N8ZE (**n8ze@arrl.net**). SEC: Deborah Kirkbride, KA8YKK (**ka8ykk@concentric.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

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(**dcolangelo@ameritech.net**) SGL: Ed Hude, WA8QJE (**edhude@juno.com**). TC: Dave Smith (**DSmith @smithassoc.com**) QRV Bulletin Editor: Mike Pearsall, N8MP (**n8mp@arrl.net**). The leaves are falling, and it's once again time for our annual Simulated Emergency Test (SET). This is an exercise that tests our ability to work as a team, both ARES and NTS, to test our operational readiness. This year's statewide scenario is based on Y2K situations. Get in touch with your emergency coordinator to participate. This is where all the training pays off and is your opportunity to put it to use. We must exercise our skills to keep them at their maximum effectiveness. The State EOC in Lansing and the Alternate State EOC in Northville will be staffed and operational on the evening of December 31 and will stay operational as long as needed. Many county and local EOCs will also be operational around the state as well as around the nation. This is the real thing! Your readiness to serve your communities will be the real test of your abilities. Please get involved. Tfc (July) K8GA 289, KB8ZYY 256, W8RTN 171, K8AE 139, WX8Y 138; AA8PI 136, KA9EIZ 130, WB8SIW 107, N8FPN 78, K8LJG 77, K8AI 50, WI8K 45; W8RNQ 45, AA8SN 43, K8KV 41, K8ZJU 37, K8UPE 35, K3UWO 29, WA8DHB 28, N8OSC 27, K8JN 19, KC8CMQ 18, WR8F 14, KC8GMT 14; N8TDE 12, WD8OEP 7, KI8GR 5, KC8CUC 3. (Reports by 5th of the month, please)

Net	*QTC*	*Sess*	*Freq*	*Time*	*Day*
QMN Daily	584	351	62	3.663	6:30&10 PM
MACS	273	110	30	3.953	11 AM Daily (1 PM Sun.)
MITN	378	165	31	3.952	7 PM Daily
UPN	1011	37	35	3.921	5 PM Daily (Noon Sun.)
GLETN	575	89	31	3.932	9 PM Daily
SEMTN	426	99	31	145.330	10:15 PM Daily
WSSBN	658	49	31	3.935	7 PM Daily
ARAHH	52	2	4	145.130	8 PM Wed
TATN	238	7	18	147.300	9:30 PM Daily
VHF Nets	241	17	43	Various	

OHIO: SM: Joe Phillips, K8QOE, Fairfield, (to contact me and other Cabinet members, see page 12). This will be a short message to give the Section News editor the space to run Ohio traffic reports for both June and July. First, a special thank you to Beverly Priest, N8VZV, for almost 3 years service to the Ohio Section as PIC. Her resignation was accepted with regret. Been really pleased to see many newsletters of Ohio run their club's contribution to operation of the Great Ohio Bicycle Adventure (GOBA). After Field Day, this is our biggest opportunity to make Ham Radio visible to non-Ham Buckeyes. With the new emphasis about changing licensing forms (electronic filing), why not now take the time now to see when your license expires...Been a bit disturbed lately to see three examples of silent key lists having to retract certain listings and make corrections. OHIO SECTION CONGRATS to: (a) Elisabeth A. Price, KC8ALW, of Worthington, for winning the ARRL Hiram P. Maxim Memorial (youth) Award. Beth was honored for using the Internet and collaborative writing projects in innovative ways to recruit new members to Ham Radio, and (b) Jerry Paquette, WB8IOW, of West Union, for winning the ARRL Herbert Brier Instructor of the Year award. Jerry was honored for more than two decades of "Elmering" new Ham operators to the point he recruited a fully-staffed ARES organization for his county. If your Ohio ham radio club isn't a Special Service Club of the ARRL, contact Joanne Solak, KJ3O, (**ljsolak @apk.net**) and see if your group qualifies and you wish to enjoy its special privileges....Ohio Hamfests for October; (10) at Lima for Northwest ARC; (17) at Ashland for the Ashland Area ARC; and (31) at Marion for the Marion ARC...de K8QOE. Traffic reports June, followed by July.

Net	*QNI*	*QTC*	*QTR*	*Sess*	*QNI*	*QTC*	*QTR*	*Sess*
BN (E)	89	42	208	28	105	61	244	29
BN (L)	181	92	391	30	161	98	337	
BNR	91	17	708	30	90	30	838	19
OSN	133	67	666	29	145	44	561	30
OSSBN	1665	627	2684	89	1656	701	2864	

Tfc (Jun): W8PBX 659, WD8KFN 249, W8STX 176, KF8DO 166, N8FWA 153, WD8KFN 134, N8DD 126, NS8C 121, WA8EYQ 105, WD8MIO 103, N8TNV 74, K8IG 74, KD8HB 72, WA8SSI 72, W8BO 58, K8OUA 58, KC8FWU 52, KI8IM 52, N8RRB 51, K8WOQ 48, WB8FSV 47, KD9K 47, KI8O 46, W8RG 43, N8YXL 43, N8CW 41, N8YWX 35, KB9GGA 34, KB8SIA 34, N8ZBW 34, KC8DWM 33, NY8V 31, K8QIP 30, KC8HTP 28, WD8KBW 24, WB8HHZ 21, KB8TIA 21, W8LDQ 20, N8GP 16, WD8JAW 13, KI8GW 12, KC8KYP 11, N8OIF 11, KE8FE 10, N8WLE 10, W8GAC 7, N8GOB 6, KC8HFV 6, AA8XS 6, N8RAK 5, K8WC 5, KE8FK 2. (Jul) KD8HB 215, KF8DO 183, N8FWA 157, W8STX 150, W8PBX 142, WA8EYQ 130, WA8SSI 127, NS8C 101, N8DD 83, KA8FCC 77, N8TNV 71, K8OUA 70, N8QIP 65, N8YWX 57, KD9K 57, W8BO 52, N8RRB 43, W9GGA 43, KC8DWM 42, KI8O 40, W8LDQ 40, WA8HED 39, N8ZBW 38, KI8IM 35, N8CW 34, W8RG 34, KC8HTP 30, WD8KBW 30, NY8V 30, N8GP 23, K8IG 23, KB8TIA 21, W8GAC 20, WB8HHZ 13, KC8FWU 12, WD8JAW 12, W8GDQ 11, N8YXL 11, N8GOB 10, N8WLE 10, WB8IOW 9, KI8GW 8, N8OIF 8, KC8KYP 7, AA8XS 7, KB8SBK 6, KF8FE 5, K8WC 5, W8RPS 3, W8DYF 3, KE8FK 2, KA8OQF 1. (May) KC8UR 4. (Apr) KD8KBW 34, KC8HTP 18, KB8TIA 6.

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. Net Reports (July 1999) Check-ins (QNI)/Traffic handled (QTC+QSP): AES 30/8 CDN 292/126 CGESN 47/16 ESS

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You can also read inductance in uH and capacitance in pF at RF frequencies.

Large easy-to-read two line LCD screen and side-by-side meters clearly display your information.

It has built-in frequency counter, Ni-Cad charger circuit, battery saver, low battery warning and smooth reduction drive tuning.

Super easy to use! Just set the bandswitch and tune the dial -- just like your transceiver. SWR and Complex Impedance are displayed instantly!

Here's what you can do

Find your antenna's true resonant frequency. Trim dipoles and verticals.

Adjust your Yagi, quad, loop and other antennas, change antenna spacing and height and watch SWR, resistance and reactance change instantly. You'll know exactly what to do by simply watching the display.

Perfectly tune critical HF mobile antennas in seconds for super DX -- without subjecting your transceiver to high SWR.

Measure your antenna's 2:1 SWR bandwidth on one band, or analyze multiband performance over the entire spectrum 1.8-170 MHz!

Check SWR outside the ham bands without violating FCC rules.

Take the guesswork out of building and adjusting matching networks and baluns.

Accurately measure distance to a short or open in a failed coax. Measure length of a roll of coax, coax loss, velocity factor and impedance.

Measure inductance and capacitance. Troubleshoot and measure resonant frequency and approximate Q of traps, stubs, transmission lines, RF chokes, tuned circuits and baluns.

Adjust your antenna tuner for a perfect 1:1 match without creating QRM.

And this is only the beginning! The MFJ-259B is a complete ham radio test station including -- frequency counter, RF signal generator, *SWR Analyzer*™, RF Resistance and Reactance Analyzer, Coax Analyzer, Capacitance and Inductance Meter and much more!

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MFJ-219B, $99.95. UHF *SWR Analyzer*™ covers 420-450 MHz. Jack for external frequency counter. 7½x2½ x2¼ inches. Use two 9 volt batteries or 110 VAC with MFJ-1312B, $12.95. *Free* "N" to SO-239 adapter.

SWR Analyzer Accessories

Dip Meter Adapter

MFJ-66, $19.95. Plug a dip meter coupling coil into your MFJ *SWR Analyzer*™ and turn it into a sensitive and accurate bandswitched dip meter. Save time and take the guesswork out of winding coils and determining resonant frequency of tuned circuits and Q of coils. Set of two coils cover 1.8-170 MHz depending on your *SWR Analyzer*™.

Genuine MFJ Carrying Case

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Made of special foam-filled fabric, the MFJ-29C cushions blows, deflects scrapes, and protects knobs, meters and displays from harm.

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MFJ-224 **$159.95**

MFJ 2 Meter *FM SignalAnalyzer*™

Measure signal strength over 60 dB range, check and set FM deviation, measure antenna gain, beamwidth, front-to-back ratio, sidelobes, feedline loss in dB. Plot field strength patterns, position antennas, measure preamp gain, detect feedline faults, track down hidden transmitters, tune transmitters and filters. Plug in scope to analyze modulation wave forms, measure audio distortion, noise and instantaneous peak deviation. Covers 143.5 to 148.5 MHz. Headphone jack, battery check function. Uses 9V battery. 4x2½x6¾ in.

More hams use MFJ SWR Analyzers™ than any others in the world!

349/140 314/198 (June) HVN 521/271 NYPHONE 256/785 NYPON 290/347 NYS/E 388/340 NYS/M 224/187 NYS/L 309/515 SDN 368/145. Congrats to new TC Rudy, W2JVF, and thanks to Elmer, WA2YSM, for his years of service. The SET is coming Oct 2 and 3! Are you ready? 73 de KR2L. PSHR: N2YJZ 169, N2JBA 159, WB2ZCM 141, W2AKT 122, W2JHO 121, K2BTP 120, WB2IIV 118, KC2DAA 99. Tfc: N2YJZ 369, WB2IIV 143, N2TWN 94, K2BTP 78, N2JBA 71, W2JHO 51, WB2ZCM 50, KC2DAA 27, WA2YBM 19, W2AKT 17, NM2M 7, N2AWI 6, WA2BSS 6, N2MCS 3.

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: KG2M. OOC: N1XL. STM: WA2YOW. Congratulations to Diane, K2DO, and all of the operators who participated in the Empire State Games in July. Special thanks to Sid, K2LJH, and Tom, KA2D, for uniform distribution and to Tom, K2TFC, for the use of his linked 440 repeaters. Fall activity resumes this month with the Simulated Emergency Test on Oct. 2 and 3, JOTA on Oct 16, and the CQ WW SSB Contest on Oct. 30 and 31. NYC Marathon is Sunday November 7. Check the NLI Webpage at **www.arrlhudson.org/nli** for more information on upcoming events. The next section staff meeting will be held on Sunday, October 3 at Briarcliffe College in Bethpage at 9:30 AM. 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: 3rd Sat 9 AM, Huntington Town Hall, 100 Main St, Huntington, NY, Joe Coffield, W2DDZ, 516-266-3192, 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 280, N2AKZ 158, W2RJL 78, KB2KLH 53, N2XOJ 53, WA2YOW 20.

NORTHERN NEW JERSEY: SM, Jeff Friedman, K3JF—As you know, I have been looking for those few Hams who are willing to spend some volunteer time for the betterment of the Ham community in Northern New Jersey. I am pleased to announce that two such individuals have stepped forward and are willing to spend some time in working towards this end. Please join me in welcoming Mike Hoeft, K2MPH, as the new SEC and Ray Makul K1XV as the new SGL for the Northern New Jersey Section. Mike's background in HAZMAT, Incident Command and being an EMT and Ray's previous work with the NJ Legislature will be valuable assets. You may contact Mike at **K2MPH@arrl.net** and Ray at **algo@bellatlantic.net.**

Net	*Mgr*	*Sess*	*QNI*	*QTC*	*QSP*	*QTR*
NJM	WA2OPY	31	190	59	53	295
NJPN	W2CC	35	177	38	27	198
NJSN	K2PB	27	129	8	6	321
NJN/E	AG2R	31	223	79	65	358
NJN/L	AG2R	31	175	53	38	256
CJTN	N3RB	31	327	67	46	283
NJVN/E	N2RPI	31	285	55	40	248
NJVN/L	N2OPJ	31	231	33	32	192

Tfc: N2XJ 101, KC2AHS 65, N2OPJ 55, W2MTO 52, N2RPI 44, K2PB 34, N3RB 34, N2QAE 30, N2GJ 24, N2TTT 14, KB2VRO 12.

MIDWEST DIVISION

IOWA: SM, Jim Lasley, N0JL—ASM: N0LDD—SEC: NA0R. ACC: N0IJP@KE0BX. BM: K0IIR@W0CXX. SGL: K0KD. TC: W0DIA. Note the new flea market in Missouri Valley. Hope all went well. Have you registered for ULS? TSARC's van gets better gas mileage now! (Gas tank no longer leaks!) They also had a nice article in the paper, complete with picture. Well, by now most of the hamfest season is over. I attended several and missed some I usually attend. I regret missing the ones I did, and look forward to the rest and next year. The April ICARC meeting program was video taped and has been on the local public access cable TV channel at least four times! Well done. Their newsletter also noted four of the local DXers with over 300 countries worked. Sorry to note the passing of WA0LME, WA0FUH, and K0BND. My welcome to N0ZAK, the new EC for Appanoose County. New officers for the NIARC are the old officers. There is only one OO reporting regularly. Don't worry Doug. I won't tell who you are. More reports from everyone are needed. They are more current than newsletters. Example, June and July newsletters in my report written in August that will be in October *QST*. I'm behind at work and have to be two months ahead here! No wonder I'm a little bit confused... you say that has nothing to do with the schedule? Newsletters were received from FMARC, TSARC, CVARC, ICARC, SEITS, NIARC, IIARC. Traffic: W0SS 104, W0SS 91 (Jun), N0JL 67. What have you done to help Amateur Radio and your fellowman this month? 73 de N0JL.

KANSAS: SM, Orlan Cook, W0OYH—ASM/ACC/OCC: Robert Summers , K0BXF. SEC: Joseph Plankinton, WD0DMV. SGL: Marshall Reese, AA0GL. Hi gang. Welcome, Mike K0PY to his new jobs as PIO and OBS. Checking the Affiliated Club listing today, I only see one club not up-dated (1998-06-19). This can be done electronically now with no paperwork. The Simulated Emergency Test "SET" is scheduled for October 2 and 3. I am looking forward to the ECs involving their ARES volunteers in a "local" simulated emergency and using their HF liaisons stations to communicate statewide and nationwide through our Kansas NTS nets. The Kansas net frequencies are 3920 dy 6 to 7 PM, 3610 dy 7 and 10 PM and 7253 12:30 PM. Please keep these in mind in case of a real emergency. Thanks again to all the Net managers and NCS for giving Kansas 8 fine nets and ARES for being ready to serve their neighbors, communities and state. Jun Kansas Nets: sessions/QNI/QTC, KSBN30/892/130KPN21/229/33 KMWN30/539/485 KWN30/666/419 CSTN 26/1590/75 QKS 52/260/116QKS-SS 6/15/1 JCA3/9/0 SEC 56/1551/25 QNS DMV AA0HJ AA0IQ N0LJR KF4LM W0PBV KB0PQP W0UXG KB0WEQ. TEN 300 msgs Ks 77% W/AA0FO KX0I K0PY NB0Z WB0ZNY. W0SS mgr DTRN Ks 100% W/AA0OM N0KJ W0WWR N0KFS W0FE N0KJ Mgr BBS reports: W1AW Bul/Per/NTS AA0HJ 0/519/1 N0OBM 32/274/6. Tfc: N0KJ 470, WB0ZNY 102, K0PY 71, W0OYH 71, KX0I 42, N0ZIZ 38, K0RY 28, KB0GUS 27, W0WWR 19, NB0Z 13, KB0NTD 12, K0BJ 10, KB0DTI 9.

MISSOURI: SM, Dale Bagley, K0KY—ASM: Tom Housworth, KI0JO. ASM: John Seals, WR0R. ACC: Keith Haye, WE0G. OOC: Mike Musick, N0QBF. PIC: Dennis Mc Carthy, AA0A. SEC: Fred Langeneckert, WA0US. SGL: E.B. DeCamp, KD0UD. STM: Tom Housworth, KI0JO. TC: Wayland McKenzie, K4CHS. I have had great fun visiting with MO Section members from all over Missouri at Hamfests. Hamfests are a great place get together with friends and be inspired to participate even more in Amateur Radio. Bob Roske, WA0CLR, and the PHD gang did a great job hosting the ARRL Midwest Division Convention at the PHD ARA Hamfest. Craig Brune, N0MFD, also did a fine job organizing the Zero Beaters Hamfest in Washington, MO, and I was really impressed with the great attitude of Zero Beaters Club members that helped put on the Hamfest. I will be at the Warrensburg Hamfest on Oct 2 and at the St Louis and Gateway ARC Halloween Hamfest on Oct 31. The Section Leadership met at the Midwest Division Convention and began work on improving communication within the MO Section. Traffic and Net reports: PAUL REVERE 4/394/0 N0IWA; WAARCI 4/89/0 KB0VZP; CARL 3/36/0 K0EZV; HARC 5/292/0 N0YLF; QCWA#35 5/113/0 K0YML; HAMBUTCHERS 22/73/40 KD4NK; AUDRAIN ARC 5/43/0 WB0SEN. MOTN 31/551/174 K0IPM; MON 1&2 60/212/111 W0WFF; ROLLABILLBOARD 10/352/4 NA0V. Tfc: KI0JO 590, KE0K 194, W0WFF 143, KG0IV 46. PSHR: KI0JO 229, KE0K 150, W0WFF 127, KG0IV 88.

NEBRASKA: SM, Bill McCollum, KE0XQ—ASMs: W0KVM, N0MT, WB0ULH, WY0F & WB0YWO. It is with great pleasure to announce that Clarence Stoner, AB0IJ, has passed the necessary tests to become an Official Observer. AB0IJ lives in Grand Island and has been a ham for many years. The Lincoln ARC has been busy this summer providing communications for the Nebraska State Games, manning the phones the NPTV fund raiser and assisting the Nebraska State patrol and other agencies at the Nebraska State Fair. On June 19, members of several clubs provided communications for the Tour De Cure bicycle ride in the Omaha area. WJ0Z is stepping down as the Net Manager of the Midlands ARES Net on December 31. If you would like to volunteer for this appointed position, please contact me ASAP. Congratulations go to Ben, KB0ZOM, of North Loup for earning his Extra Class license. Ben frequently checks into some of the nets in the state, and just celebrated his 16th birthday! Buffalo County EC, Danny, KA0DBK was on Channel 13 in Kearney on August 9, concerning Amateur Radio and Y2K. Members of Midlands ARES assisted the Red Cross with damage assessment following flooding in the Omaha area August 6 – 7. Net Reports: Lincoln/Logan ARES: QNI 129, QTC 4 & 13 sessions, NE 40: QNI 332, QTC 18 & 26 sessions, NESN: QNI 659, QTC 16 & 31 sessions, MID NE ARES: QNI 317, QTC 5 & 31 sessions, W0IRZ: QNI 55, QTC 2 & 4 sessions. NCHN: QNI 332, QTC 16 & 28 sessions. Tfc: K0PTK 135, KE0XQ 40, WY0F 14, W0RWA 10, K0AEM 4, W0UJI 2, W0EXK 2, K0SW 2, WC0O 2. PSHR: KA0DBK 81, KB0YTO 44, KB0YTM 22.

NEW ENGLAND DIVISION

CONNECTICUT: SM, Betsey Doane, K1EIC—Mark your calendars: Simulated Emergency Test October 2-3, Nutmeg State Convention and Flea Market October 10 Mountain Side Resort Wallingford. The ham station at the Big E should be operational as you read this—September 17-October 2, West Springfield, Mass. Stop by The New England Building and say hello. This op has been doing some antenna work so hope to be back on the air in full swing soon. The 2-meter vertical and horizontal antennas need work as well as the Mosley tri-bander. If you own or are a trustee of a repeater in CT, contact Mark K1MAP (**map@map.com**) for information about starting the Connecticut Spectrum management Association. Repeater coordination is an important issue here so get involved! Neil Salowitz, NE1L, formerly WA1CBW and CT's Affiliated Club coordinator, will be leaving Connecticut for Des Moines, Iowa, in early August to pursue an exciting career working for a company called Principal Capital Management. It's a subsidiary of Principal Life Insurance Company, a very large insurance and financial services company based in Des Moines. He will be running a program that will originate large commercial mortgage loans on big office buildings, regional mall shopping centers and the like (with a minimum size of fifty million dollars) and will then work with Wall Street to use the cash flow from the mortgage to issue bonds called "commercial mortgage-backed securities." Neil explained it this way: "It's really cutting-edge stuff, and I'm looking forward to it. I'll be based in Des Moines, but expect to be in New York a lot, and back in Connecticut every other weekend, at least for the first year. I'll be living in Des Moines, but Connecticut will always be my home." I would like to personally thank Neil for all his hard work here. Remember the terrific job he did

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MFJ uses super heavy duty components to make the world's finest legal limit tuner

MFJ uses super heavy duty components -- roller inductor, variable capacitors, antenna switch and balun -- to build the worldí s most popular high power antenna tuner.

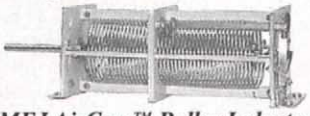
The rugged world famous MFJ-989C handles 3 KW PEP SSB amplifier input power (1500 Watts PEP SSB output power). Covers 1.8 to 30 MHz, including MARS and WARC bands.

MFJ's *AirCore*™ roller inductor, new *gear-driven* turns counter and weighted spinner knob gives you exact inductance control for absolute minimum SWR.

You can match dipoles, verticals, inverted vees, random wires, beams, mobile whips, shortwave -- nearly any antenna. Use coax, random wire or balanced lines.

MFJ-989C **$359.95**

You get everything you've ever wanted in a high power, full featured antenna tuner -- widest matching range, lighted Cross-Needle SWR/Wattmeter, massive transmitting variable capacitors, ceramic antenna switch, built-in dummy load, *TrueCurrent*™ Balun, *scratch-proof* Lexan front panel -- all in a sleek compact cabinet (10¾Wx4½Hx15D in).



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Large, self-cleaning wiping contact gives good low-resistance connection. Solid 1/4 inch brass shaft, self-align bearings give smooth non-binding rotation.

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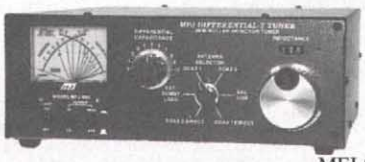
MFJ-986 Two knob Differential-T™



MFJ-986 **$329.95**

Two knob tuning (differential capacitor and *AirCore*™ roller inductor) makes tuning foolproof and easier than ever. Gives minimum SWR at only one setting. Handles 3 KW PEP SSB amplifier input power (1.5 KW output). Gear-driven turns counter, lighted peak/average Cross-Needle SWR/Wattmeter, antenna switch, balun. 1.8 to 30 MHz. 10¾Wx4½Hx15 in.

MFJ-962D compact Tuner for Amps

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. 10¾x4½x10⅞ in.

MFJ-969 300W Roller Inductor Tuner

MFJ-969 **$199.95**

Superb *AirCore*™ Roller Inductor tuning. Covers *6 Meters* thru 160 Meters! 300 Watts PEP SSB. *Active* true peak reading lighted Cross-Needle SWR Wattmeter, *QRM-Free PreTune*™, antenna switch, dummy load, 4:1 balun, Lexan front panel. 3½Hx10½Wx9½D inches.

MFJ-949E deluxe 300 Watt Tuner

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. 3½Hx10⅝Wx7D inches. **MFJ-948, $129.95.** Economy version of MFJ-949E, less dummy load, Lexan front panel.

MFJ-949E **$149.95**

MFJ-941E super value Tuner

The *most for your money!* Handles 300 Watts PEP, covers 1.8-30 MHz, *lighted* Cross-Needle SWR/Wattmeter, 8 position antenna switch, 4:1 balun, 1000 volt capacitors, Lexan front panel. Sleek 10½Wx2½Hx7D in.

MFJ-941E **$119.95**

MFJ-945E HF+6 Meter mobile Tuner

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-945E **$109.95**

MFJ-971 portable/QRP Tuner

Tunes coax, balanced lines, random wire 1.8-30 MHz. Cross-Needle Meter. SWR, 30/300 or 6 Watt QRP ranges. Matches popular MFJ transceivers. Tiny 6x6½x2½ inches.

MFJ-971 **$99.95**

MFJ-901B smallest Versa Tuner

MFJí 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-901B **$79.95**

MFJ-16010 random wire Tuner

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-16010 **$49.95**

MFJ-906/903 6 Meter Tuners

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-906 **$79.95**

MFJ-921/924 VHF/UHF Tuners

MFJ-921 covers 2 Meters/220 MHz. **MFJ-924** covers 440 MHz. SWR/Wattmeter. 8x2½x3 inches. Simple 2-knob tuning for mobile or base.

MFJ-921 or MFJ-924 **$69.95**

MFJ-922 144/440 MHz Tuner

Ultra tiny 4x2½x1¼ inch tuner covers VHF 136-175 MHz and UHF 420-460 MHz. SWR/Wattmeter reads 60/150 Watts.

MFJ-922 **$79.95**

MFJ-931 artificial RF Ground

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.

MFJ-931 **$79.95**

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managing the Special Events Station at Special Olympics in 1995? Wasn't that fun? Thanks for starting the CT Section Web Page! It will surely be strange seeing Neil leave CT—I have known him on the air for about 30 years. Congratulations! Good luck Neil and God bless—we'll miss you! Net sess/QNI/QTC: WESCON 31/342/84; NVTN 31/168/55; ECTN 31/282/49; CPN 31/171/54; CN 26/66/31; BEARS of Manchester 30/350/310. Tfc: NM1K 2071, KA1VEC 436, KA1GWE 166, K1STM 99, KE1AI 69, WA4QXT 62, N1VXP 58.

EASTERN MASSACHUSETTS: Traffic report submitted by STM Jim Hatherley, WA1TBY—

Net	*Sess*	*QTC*	*QNI*	*NM*
EMRI	62	136	167	K1SEC
EMRIPN	31	97	112	WA1FNM
EM2MN	31	115	298	N1LKJ
HHTN	31	45	250	N1IST
CITN	31	80	289	N1SGL
WARPSN	4	12	52	N1BZD
NEEPN	3	3	7	WA1FNM
CHN	31	38	194	W2EAG
OSTN	17	10	27	KA1JXH

Tfc: WA1TBY 308, NZ1D 190, W2EAG 147, WA1FNM 95, K1SEC 76, WA1LPM 47, KD1LE 45, K8SH 42, K1BZD 39, N1SGL 38, N1BNG 31, N1IST 29, N1LAH 28, N1TDF 26, KB1DOX 17, KB1EB 16, N1AJJ 14, KA1VAX 11, N1TUP 10, N1VUX 6.

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. Looking for something to do these cool autumn evenings? Stop by and visit the fine crew of the Maine Seagull Net at 3.940 kc, 5 - 6 PM Mon thru Sat. If you're not sure if traffic handling is your forte, just stop by and listen. If you have not yet upgraded to have 75 M privileges, you can still stop by and lend an ear and let someone who does have 75 M privileges know that you could handle that piece of traffic. Usually this is just a matter of making a phone call to someone to wish them a happy birthday or congratulations on an upgrade. Also remember that it is very important to develop and maintain good operating practices, so you'll be prepared in the event the Y2K raises its ugly head, or Mother Nature reminds us who is really in control. I was able to set aside a few hours to participate in the Aug UHF contest and was saddened by the low participation. Hopefully it was just the band conditions I encountered and not apathy. With the large numbers of VHF operators coming into the hobby, it would be nice to see more Maine grid squares being activated. Hopefully the Sept VHF contest will help. Tfc: W1KX 145, AF1L 118, W1JX 44, W1QU 40, N1JBD 30, KA1RFD 20, W1JTH 16, WA1YNZ 6, KA2ZKM 5.

NEW HAMPSHIRE: SM, Mike Graham, K7CTW—ASMs: WW1Y, W1NH, N1KIM. TC: WA1HOG. STM: WA1JVV. PIC: KA1GOZ. OOC: W1GTA. SGL: K1KM. BM: KH6GR. ACC: AA1QD. SEC: N3CLZ. The hot July wx has triggered numerous storms. Great work by Jason Greene, N1IIC, and Marc Slater, KB1DFE, on excellent SKYWARN coverage. We still need more ARES/SKYWARN volunteers. The Manchester Boys & Girls Club needs volunteer Advisory Committee members for their very active Youth Radio Program (YRP). If you have time to assist, contact Rick, N1QZA, RCZam@worldnet.att.net. Both CVRC and NARC are planning Fall theory and/or code classes. If you know someone looking for a class, e-mail me at **k7ctw@arrl.org** and I'll forward to appropriate club. Visited North Country, Central New Hampshire, and Contoocook Valley radio clubs past couple weeks. Lots of Fall and Winter activities being planned. Thanks to all for kind hospitality. North Country Pres. Mort, KH6GR, did slide show of Truk Lagoon. He looks great in a grass skirt. NARC did a hilarious video of FD activities past few years - Oscar winner for sure! Making plans now for visits to Port City, Great Bay and Cheshire County DX clubs. Don't forget Hosstraders at Rochester, Oct. 8-9. Hope to see all of you there. 73 de K7CTW. Net sess/QNI/QTC: GSFM 31/277/29; GSPN 33/139/33; TSEN 4/14/3; VTNH 31/160/209. Tfc: W1FYR 1406, W1PEX 872, K1TQY 172, N1NH 128, WA1JVV 94, KA1OTN 70, W1ALE 46, K1ZO 43, N1CPX 21, KH6GR 8.

RHODE ISLAND: SM, Armand Lambert, K1FLD—ASM: W1YRC. ACC: WA1RI. PIC: WB1P. On Jun 14, members of the Newport County Radio Club were treated to a captivating display on PSK-31. It was demonstrated by Charlie, W1CG, and assisted by Jim, KC1SD. They reminded us that the PSK-31 software is FREE and to see the May '99 issue of *QST* for details. Other meeting highlights included Field Day coordination and a talk given by the new Section Manager, Armand, K1FLD, on the impact of Ham Radio on his life. On June 20, BVARC members provided emergency radio coverage for the annual Cumberland Road Race benefiting the D.A.R.E. Program. The Amateur Radio assistance and traffic control was much appreciated by Cumberland Police authorities who were in short supply of officers this year. Our thanks to W1AUT, N1MIU, N1ZFA, N1MUB, WB1P, KA1YVF, N1DO, and K1FLD. Also WB1P recruited the volunteers that responded to the needs of the community and KD1HA coordinated the groups efforts as liaison between Cumberland authorities and where to place volunteers for best control. A big hand to these volunteers for their time and efforts on Father's Day. STM: KA1JXH. BM: KA1BNO. TC: K1DFT. SGL: NN1K. OOC: W1AOM.

WESTERN MASSACHUSETTS: SM, William C. Voedisch, W1UD, **w1ud@juno.com**—ASM: N1LZC. ASM (digital) KD1SM. STM: W1SJV. SEC: K1VSG. OOC: WT1W. The summer is just about gone. The weather has cooled a bit. Kids are back to school and the bands continue to be in good condition. Oct 2 will be our SET. The town of Townsend is having their Preparedness Extravaganza on the same weekend. Bill, NZ1D, the town's communication person has arranged for ham radio to be displayed in all its glory on the town common. The Emergency Management Department from Leominster will be providing their communications bus complete with power generators for our use. Members of MARA will man the operating positions

MFJ *Switching* Power Supplies

Power your HF transceiver, 2 Meter/440 MHz mobile/base and accessories with these new 25 or 45 Amp MFJ MightyLite™ Switching Power Supplies!

No RF hash . . . Super lightweight . . . Super small . . . Volt/Amp Meters . . .

NEW!

MFJ-4225MV 25 Amp **$149.95** plus s&h

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MFJ's new adjustable voltage switching power supplies do it all! You can power your HF transceiver or 2-Meter/440 MHz mobile or base and accessories.

MFJ's *MightyLites*™ are so lightweight and small you can carry them in the palm of your hand! Take them with you anywhere.

No more picking up and hauling around heavy, bulky power supplies that can give you a painful backache, pulled muscle or hernia.

MFJ's 25 Amp *MightyLite*™ weighs just 3.7 lbs. -- that's *5 times lighter* than an equivalent conventional power supply. MFJ's 45 Amp version is even more dramatic -- *8 times lighter* and weighs just 5.5 pounds!

No RF hash!

These babies are clean . . .

Your buddies won't hear *any* RF hash on your signal! *You* won't hear any in your receiver either!

Some competing switching power supplies generate objectionable RF hash in your transmitted and received signal.

These super clean MFJ *MightyLites*™ meet all FCC Class B regulations.

Low ripple . . . Highly Regulated

Less than 35 mV peak-to-peak ripple under 25 or 45 amp full load. Load regulation is better than 1.5% under full load.

Fully Protected

You won't burn up these power supplies! They are fully protected with Over Voltage and Over Current protection circuits.

Worldwide Versatility

MFJ *MightyLites*™ can be used anywhere in the world! They have switchable AC input voltage and work from 85 to 135 VAC or 170 to 260 VAC. Easily replaceable fuse.

MightyLites™ . . . Mighty Features

MFJ *MightyLites*™ feature a front-panel voltage control. It lets you vary the output voltage from 9 to 15 Volts DC and gives you a highly regulated voltage output.

You get an easy access front-panel with five-way binding posts for heavy duty use and a cigarette lighter socket for mobile accessories. The MFJ-4245MV has two sets of quick-connects on the rear for accessories.

Large 3 inch dual meters are brightly illuminated to make it easy to monitor load voltage and current.

A *whisper quiet* internal fan efficiently cools your power supply for long life.

Two models to choose from . . .

MFJ-4225MV, $149.95. 25 Amps maximum or 22 Amps continuous. Weighs 3.7 pounds. Measures 5¾Wx4½Hx6D inches.

MFJ-4245MV, $199.95. 45 Amps maximum or 40 Amps continuous. Weighs 5.5 pounds. Measures 7½Wx4¾Hx9D inches.

MFJ No Matter What™ Warranty

MightyLites™ are covered by MFJ's famous *No Matter What*™ one year limited warranty. MFJ will repair or replace (at our option) your power supply for one full year.

MFJ 35/30 Amp *Adjustable* Regulated DC Power Supply

Massive 19.2 pound transformer . . . No RF hash . . . Adjustable 1 to 14 VDC . . .

NEW!

MFJ-4035MV **$149.95** plus s&h

MFJ's heavy duty conventional power supply is excellent for powering your HF or 2 Meter/440 MHz transceiver and accessories.

A massive 19.2 pound transformer makes this power supply super heavy duty! It delivers 35 amps maximum and 30 amps continuous without even flexing its muscles. Plugs into any 110 VAC wall outlet.

It's highly regulated with load regulation better than 1%. Ripple voltage is less than 30 mV. *No RF hash* -- it's super clean!

Fully protected -- has over voltage protection, fold back short circuit protection and over-temperature protection.

You get front panel adjustable voltage from 1 to 14 VDC with a convenient detent set at 13.8 VDC. A pair of front-panel meters let you monitor voltage and current.

Three sets of output terminals include a pair of heavy duty five-way binding posts for HF/VHF radios, two pairs of quick-connects for shack 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. 9½Wx6Hx9¾ inches.

Your MFJ-4035MV is protected by MFJ's famous *No Matter What*™ one year limited warranty. MFJ will repair or replace (at our option) your power supply for one full year.

MFJ *High Current* Multiple DC Power Outlets

Power two HF/VHF transceivers and six or more accessories from your 12 VDC power supply

MFJ-1118 **$74.95** plus s&h

MFJ-1118, $74.95. This is MFJ's most versatile and highest current *Deluxe Multiple DC Power Outlet*. It lets you power two HF and/or VHF transceivers and six or more accessories from your transceiver's main 12 VDC power 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. "ON" LED.

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 an "ON" LED indicator.

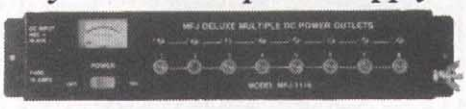
Built-in 0-25 VDC voltmeter. You get 6 feet of super heavy duty eight gauge color-coded cable with ring tongue terminals. Binding posts are spaced for standard dual banana plugs.

Heavy duty aluminum construction. 12½x2¾x2½ inches.

MFJ-1116, $49.95. Similar to MFJ-1118. No 30 amp posts. Has "ON" LED and 0-25 VDC voltmeter. 15 amps total.

MFJ-1112, $34.95. Similar to MFJ-1116. No on/off switch, LED, meter, fuse.

MFJ-1116 **$49.95** plus s&h



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and display the many facets of ham radio. There will be a station operating using the call sign of W1T. A message fair will be set up so the public can send messages. Police and fire equipment will be on exhibition as well as craft displays. Make sure you monitor 3937 kHz Sunday mornings for more information on the SET. Tfc: W1ZPB 142, KD1SM 7, W1SJV 24, W1UD 197.

NORTHWESTERN DIVISION

ALASKA: SM, David Stevens, KL7EB—OOC: KL7IKX. SEC: NL7DL. DEC: WL7JBV. DEC: WL7GK. TC: AL7CE. TS: KL7CC. ASM: WL7BJ. ASM: KL5T. 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. Juneau Amateur Radio Club has a new Web site **www.juneauARC.org** and Matanuska Amateur Radio Association has a new Web site **http://obarr.net/mara** Gordon West, WB6NOA, and AK Pioneer Broadcaster Augie Hibert entertained everyone at the AK Hamfest in Anchorage Sept 25. Van Iderstine-VIS Amateur Radio talked about his Texas Bug Catchers at the Fairbanks Hamfest Oct 2. PSHR: AL7N 86, KL5T 115.

EASTERN WASHINGTON: SM, Kyle Pugh, KA7CSP—The Central WA ARC provided communications for The Great Canoe Race at Sun Lakes on July 10th. The National Traffic System (NTS) celebrates its 50th anniversary this year, and the ARRL Board of Directors formally recognized the historic and benevolent contributions of the NTS and its operators. Also the Board adopted a new League identity...the tag line "The national association for Amateur Radio" will accompany the initials "ARRL" on League correspondence and publications. Re-structuring and licensing is still on "Hold" waiting on actions of the FCC. Remember the annual Simulated Emergency Test (SET) is Oct. 2-3. 10 out of 12 OOs reported monitoring activity for July. Net Activity (for July): WSN: QNI 1000, tfc 286; Noontime Net: QNI 8209, tfc 294; WARTS: QNI 3195, tfc 147. Tfc: K7GXZ 334, W7GB 229, KA7EKL 60, K7BFL 46, W7UVP 0. PSHR: W7GB 138, K7GXZ 120, W7UVP 55.

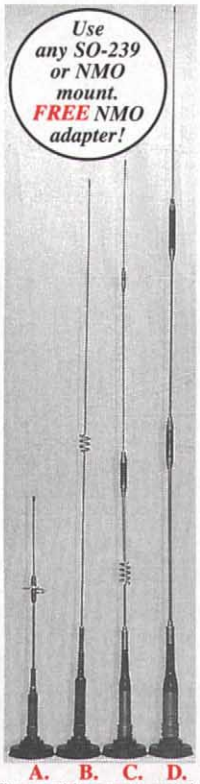
IDAHO: SM, M.P. Elliott, KF7ZQ — OOC: N7GHV, SEC: AA7VR, STM: W7GHT. The 1999 SET weekend is October 2 and 3. The State Bureau of Disaster Services (IBDS) will lead Idaho's test. The test will center on Y2K. A message will be sent to each County Emergency Coordinator and then a return message sent to IBDS. The message will be broadcast on 3990 MHz and also on local repeaters. Be sure and listen to assist in the traffic handling. A related note - IBDS needs licensed hams (General class and above) to assist them in their day-to-day HF operations. If you are interested contact Mike Langrell, AA7VR, or John Cline, K7BDS, at 334-3460. They would welcome your help! 73—Mike, KF7ZQ. Tfc: W7GHT 286, KB7GZU 77, WB7VYH 32, and N7MPS 17. PSHR: W7GHT 122, WB7VYH 92, and N7MPS 57. Net (Sess/QNI/QTC/ Mgr.): FARM - 31/1970/27/ W7WJH; NWTN - 31/1301/72/ KC7RNT; IDACD 22/492/17/ K7UBC; IMN 31/328/192/ N7MPS.

MONTANA: SM, Darrell Thomas, N7KOR—The 65th Annual Glacier/Waterton Hamfest and Montana State ARRL convention was held July 16-18th. Approximately 400 attendees enjoyed the event. The attendance was down from past years, but still a nice turn out. Many arrived as much as a week in advance to relax and vacation in the Glacier National Park area. Those people were treated to a mid-July snowstorm on the morning of the 15th. Plans are already started for the 66th Annual gathering to be held the third weekend in July 2000. The Capital City Amateur Radio club made two visits to Camp Mak-A-Dream at Gold Creek, MT. This is a camp for children and young adults who have cancer, many of whom are terminal and may not be able to attend again. The club sets up a full station complete with antenna tower and the campers get to experience a little bit of Amateur Radio. The club has one more visit scheduled this summer. Net/QNI/QTC/NM MSN 68/0 W7OW; MTN 1578/59 N7AIK; IMN 328/192 N7MPS. PSHR: N7AIK 145.

OREGON: SM: Bill Sawders, K7ZM—ASM: KK7CW. ASM: KG7OK. SEC: WB7NML. STM: W7IZ. SGL: N7QQU. OOC: NB7J. STC: AB7HB. ACC: K7SQ. With 1999 quickly coming to a close, many clubs are holding their election of officers for 2000. I am asking all club secretaries, to let me know who your new officers are, so I can announce them here in this Section News column. My e-mail address is available on the Section Managers page listing, in the front part of each *QST*. For being only a year from the peak of cycle 23, 10 and 15 meters are pretty dead! But, with October here, the 40, 80, & 160 meter operators are getting excited! Winter months is when the great DX comes in on the low frequencies. This is also the month for the big 5th annual SWAP-TOBERFEST. New hams and old-timers alike, converge on the small town known as "Rickreall". From Salem, go west on Highway 22, turn south at the "blinking light" (Hwy 99W), and turn into the Polk County Fairgrounds. The Mid-Valley ARES team is the sponsor. Hours are from 9 AM to 3:30 PM. Featured will be: swap tables, commercial exhibits, meetings and seminars. A convention with the "emergency communicator" in mind, "emergency vehicular" displays will be present for you to inspect and enjoy. And, yes....RV parking is available, too. For registration and more information, call Bob, W7LOU, 503-623-2513. There will be lots of prize drawings, and lots of fun for everybody, so see you there, and keep in touch! NTS traffic totals for July: KK1A 440, K6AGD 154, N7NLM 139, W7VSE 101, W7ODG 35, KC7ZZB 30, KC7SGM 14, KC7SGL 10.

WESTERN WASHINGTON: SM, Harry Lewis, W7JWJ—Were you visited by the lightning storm of last August? We were, and with a strike less than 400 feet from our tower. Where in the *ARRL Handbook* does it say to unplug the phone line from the computer modem? Circuitry simply vaporized. Amazingly, the ropes holding up the ends of my dipoles charred in two and dropped the antennas. Of course the step-down transformer feeding our house melted down. Did I see a garden cucumber explode? SEC N7NVP reports that the Clallam County ARES Hospital AEC, Tom Newcomb, KE7XX, oversaw the installation of a new Tri-Band radio and antenna at the Olympic Memorial Hospital. The $1,150 for the radio purchase was donated by the Hospital's Ladies Auxiliary. The Multiple Sclerosis 150 mile Bike ride was coordinated by Bob Calkins, WA7NUU, and supported by members of Jefferson, King, Kitsap and

MFJ *RuffRider*™ High Gain Mobile Antennas



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.

MFJ's *No Matter What*™ Warranty

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.
MFJ-1402 **$34.95** add s/h

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.
MFJ-1412 **$49.95** add s/h

C. ***RuffRider High Gain*™.** 41½" long antenna gives extra gain with little height increase. Handles 150 Watts. ½ Wave, gain on 2 Meters, ⅝ Wave, gain on 440 MHz.
MFJ-1422 **$49.95** add s/h

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.
MFJ-1432 **$69.95** add s/h

144/440 MHz Antenna Tuner with built-in SWR/Wattmeter
Covers 136 to 175 MHz. Handles 150 Watts. Compact 4x2½x1¼". *New!*
MFJ-922 **$79.95**

MFJ *RuffRider*™ super heavy duty Antenna Mounts

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.

Trunk/Hatchback *Lip* Mount

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.

Secures VHF, UHF and medium size HF antennas even at highway speeds.

Two axis of rotation lets you position your antenna to any desired angle. Serrated swivel joints locks securely in place with huge 3/8 inch set screw.

Convenient *Thumb and Finger* turn knob makes fold-over operation quick and easy. Locks in twelve positions.

Fold down your antenna at night when pulling into your garage and quickly put it back up to its operating position in the morning.

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 base mount and locking screw, MFJ's famous One year *No Matter What*™ limited warranty.

MFJ's *MaxStrength*™ Hi-Flux Antenna Magnet Mounts

MFJ's *MaxStrength*™ high-flux magnet mounts give you maximum pull strength -- your antenna stays on top of your vehicle at highway speeds.

MFJ-333 **$14.95** add s/h

MFJ-335 **$19.95** add s/h

Base is *Euro-style*, black poly or chrome finish with a Mylar protective undersheet.

MFJ magnet mounts come with 17 feet of tough RG-58 coax with a PL-259 connector. Easily reaches operating position.

Choose your favorite antenna to go with these fabulous low-profile mounts for outstanding mobile performance.

MFJ-333 BS/BM, $14.95. Light to medium duty magnet mount. Low profile 3.5 inch diameter black base weighs 1½ lbs. For small to medium size antennas.

MFJ-335 BS/BM, $19.95. Medium to heavy duty magnet mount. Super strong 5 inch diameter *chrome* base weighs a husky 2½ pounds. For medium to large size antennas. It's perfect for MFJ's *RuffRider*™ High Gain mobile antennas.

Order BS for SO-239 connector.
Order BM for NMO connector.

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• 1 Year *No Matter What*™ warranty • 30 day money back guarantee (less s/h) on orders from MFJ

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Snohomish Co. ARES Clark Co participated in the search for an 82 year old man missing for 3 days. In Whatcom Co members KB7PKL, KK7LK, WA7TTD, and KC7CAA provided emergency communications for the Chuckanut Car Club 1st Annual Blaine Rally Auto Slalom Race. Need ideas for your ARES Web site? Check out the Clark Co page authored by Phil Reid, W7OZE, **http://the. hams .net/ares/**. In traffic reports K7BDU again leads the list with 1018, N7AJ 100, W7LG 120, KD7ME 19, K7MQF 296, W7LG 120, W7NWP 151, KJ7SI 33, K7SUQ 16, W7TVA 282, K7YOH 41, N7YSS 99, and W7ZIW 236. Please welcome two new OES stations to the ARES family in District 4. They are James Kruger, KK7AB, and Jim Vander Meer, KC7ASV. Reports from Official Observers show 267 hours of monitoring time with 5 Advisory Notices sent, primarily for distorted audio and broad signals. On the bright side, three amateurs received Good Operator Cards from the OOs.

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. STM: K6APW. OOC: W6NKF. TS: KF6NY. Check out the EB WWW Page at **http://www.pdarrl.org/ebsec/**. Webmaster is KB6MP. ORCA welcomes new members KF6RIP, KD6VJY, and Doug Wong (whose call sign is still in the mail!). Members KQ6JZ, KE6STE, W6UAB, KB6MYV, W6THD, KE6TYY, KE6HCD, KE6SAL, KF6EQA, and WB6NER took part in an OFD MRA Drill. VVRC's well-attended Pot Luck Dinner featured a VHF/UHF weak signal talk by W6OMF. EBARC welcomed new member KF6WHN. CCCC's "The Communicator" featured a copy of the Contra Costa County Board of Supervisors Resolution 99/208, proclaiming June 21-27, as Amateur Radio Week. LARK's coveted KLUTZ AWARD went to W6OA. The Klub congratulates two recent graduates of their licensing class, KF6WNA and KF6WNB. SARS new officers are AC6LE/Pres, KE6RYN/VP, and N6APA/Secty-Treas. The club welcomes new members KB0ZBI and KF6WCJ. MDARC's VEs administered 16 elements, resulting in five new licensees, and four upgrades. Jul tfc: W6DOB 746, WB6UZX 27. PSHR: W6DOB. BPL: W6DOB. Tfc nets: NCN1/3630/7 PM; NCN2-Slow Session/3705/9 PM; NCN-VHF/145.21/7:30 PM; RN6/3655/7:45 PM & 9:30 PM; PAN/3651/7052/8:30 PM. Your check-ins are always welcome.

NEVADA: SM, Bob Davis, K7IY—ASM: Jan Welsh, NK7N. SEC: N7JEH. TC: NW7O. ACC: N7FFP. STM/SGL: N7CPP. PIC: WW7E. OOC: N7ELV. Greetings to all in the Nevada Section. Fire, Fire, everywhere...seems as though the entire northeast portion of the State has been on fire in the past few months. Many of the area hams have been assisting with communications at all levels. Jan, NK7N, reports much progress has been made with their linking projects to the north and east into Utah and Idaho. SNARS is winding up a productive summer of off-road vehicle race communications support, says Carla, N7KII. WADG has a full slate of 6 UNR home football games on tap for this fall. Bruce, N7CPP, says they have completed all the repairs and maintenance for SIERA's repeater system, and their fall radio classes are underway. Dick, W6OLD, says the CVRC radio classes are going well also. Gary, K7VY, indicates that the UNR Radio Pack has had a full slate of Public Service Events this past summer. Jerry, W7YDX, reports that Elko ARC has put the finishing touches on their I-80 linked system. Nevada Section ARES Net, Sat 8:30 AM. 3965. Hi to Ed, KB6ABM. TNX & 73, Bob, K7IY. Tfc: N7CPP 13, KG7OR 5.

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. As reported by Steve Ewald, the 1999 Simulated Emergency Test (SET) is scheduled for this October 2 and 3. Information will be sent to all NTS participates and SECs. Everyone should plan to take part. BIARC plans to continue its Amateur Radio testing for all classes of license following its monthly meetings at the Keaau Community Center. Participation has been encouraging. Thanks to all for continuing to let me know how *QST* arrival times are and their condition. The ARRL BOD is finally looking into the problem. Maybe the Pacific will get better service in the future. Our Pacific Division Director, Brad Wyatt, is not planning on running again. Thanks, Brad, for your past support.

SACRAMENTO VALLEY: SM Jettie Hill, W6RFF—Hope to see all of you at Pacificon, in Concord, Oct.15-17. They promise a good time by all. MDARC promises this one will be bigger and better. Oct is also the month for the Calif QSO Party. Hope to work you during CQP! It is with regret that I announce that Chuck Eder, W6LOE, became a Silent Key. Chuck was very active in several Sacramento area clubs and organization. He will be missed! Golden Empire ARS (GEARS) Hamfest/Swap meet had a good turn-out and they are thinking about another one next year. Brad Wyatt, K6WR, Pacific Division Director has announced that he will not run for re-election this year. Thanks, Brad, for all your help! K6ESM wrote an interesting article on "Learning to Copy CW" for the North Hills ARC 's "On Frequency." Shasta DXCC group has issued a challenge to the Mother Lode DXCC for top honors in the Oct CQP contest. Nevada County ARC member KI6MW became a Silent Key. Tahoe ARA member W6CSP also became a Silent Key. Mt Vaca RC celebrated their 30th birthday. Congratulations! A big article in the Sacramento Bee about Armand Bakalian, WB2ZEI, his life and his work in preparing daily news for the sight impaired, but no mention of his activity in Amateur Radio. Armand has been blind since birth and copies CW with a Braille writer. New GEARS members: KF6HSS, KF6WNQ and W6FJU. The Sacramento Valley Section Net is held at 8 PM on the first Sunday of the month on 146.085+ PL 127.3. Promote ham radio and ARRL. 73.

SAN FRANCISCO: SM, John Wallack, W6TLK—ASMs: N6KM, KE6EAQ. SEC: WB6TMS. TC: N1AL. I'm sad to report that K6ZXS of San Francisco and WD6GLQ of Eureka are Silent Keys. Congrats to the Del Norte ARC and the San Francisco Ham RC as new affiliated clubs with the ARRL. The Redwood ARC in Fortuna and the USS

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Pampanito ARC in San Francisco have recently applied for ARRL affiliation. If your club is not affiliated, please consider the benefits of ARRL affiliation. Info on ARRL club affiliation can be found at **www.arrl.org/field/club/#affiliation**. WB6TMS, SEC, reports the National Weather Service will be having a weather spotter training class on Sat Oct 30 at 1500 at the Petaluma Community Center in Petaluma. All interested hams in the counties of Marin, Sonoma, Mendocino, Lake and Napa (EB section) are encouraged to attend. Contact WB6TMS at 707-762-9414 for info and reservations. This is an excellent chance to gain new skills to help the NWS and our communities during the storm season ahead.

SAN JOAQUIN VALLEY: SM, Donald Costello, W7WN—ASM: Mike Siegel, KI6PR. ASM: John Lee, K6YK. ASM: Pat Fennacy, W6YEP. SEC: Kent LeBarts, K6IN. ACC: Charles McConnel. OOC: Victor Magana, N1VM. This month, I would like to announce the appointments of some very talented and experienced individuals. Mike Heenan, W7MH, has been appointed and certified to the post of Official Observer. Mike is also a Technical Specialist with the Section having many years of experience with radio and telephone in his career with Pacific Bell. Barbara Gardiner, KE6IGJ, has been appointed as District Emergency Coordinator for the counties of Tulare, Kern and Mono. Barbara has had many years of experience with the American Red Cross. David Swichard, K6FJS, has been appointed Emergency Coordinator for Mariposa County, James Munday, W6JWM, has been appointed to the post of Emergency Coordinator for Merced County. Kenneth Cexton, K6LFR, has been appointed to the post of Emergency Coordinator for Madera County. I want to thank all of the San Joaquin Valley staff for your volunteerism and dedicated work. Special thanks to Kent LeBarts, SEC, who is working hard to make our Section prepared for any eventuality in emergency communications and thanks to Victor Magana, N1VM, who now has a larger OO staff and is doing a great job at monitoring amateur frequencies and working with the FCC.

SANTA CLARA VALLEY: SM, Glenn Thomas, WB6W—SEC: KM6GE. BM: WB6MRQ. TC: WA6PWW. OOC: KB6FPW. This month we welcome our new Section Emergency Coordinator, John Wray, KM6GE. John has been DEC in San Mateo County for several years and brings a wealth of experience to the job of SEC. We also welcome Peter Liljequist, KD6BXY, as the new DEC for San Mateo County (Bayside). Amateur Radio communications provided a major assist to the "Wings Over Moffett" airshow. The SCCARA-gram had lots of pictures from their FD operation, looks like they had a good time. The Palo Alto Amateur Radio Association heard from Larry Schaar, KD6FFN, on FCC Rules Enforcement and a demonstration of an transmitter RF Identifier. 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.** If you'd like to see your group mentioned in these pages, send a copy of your club newsletter to me, either at home (address in this *QST*) or via e-mail (**wb6w @arrl.org**). I can only write about what you tell me about! See you next month! 73 de Glenn, WB6W.

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** Thanks to Dave Fleming, KE4JHJ, former Area 9 DEC and acting THEN Manager, who has agreed to serve as Section Emergency Coordinator. I want to express my personal gratitude and our Section's thanks to Charles Hayworth, K4MPJ, for two years of outstanding service as Section Emergency Coordinator. During Charles' tenure, ARES has grown considerably and, both years, our section earned the top score in the annual ARRL Simulated Emergency Test (SET)! One again it is time for the SET. Certainly we want to try to repeat, but there is more to this exercise than just the contest aspect. SET strengthens our ARES organizations, our contacts with emergency agencies, and provides an opportunity to publicize Amateur Radio's emergency communications activities. Every EC and their ARES groups should participate! Congratulations to Barbara Pedersen, KE4JZM, of Chapel Hill, selected as the 1998 ARRL Professional Educator of the Year. All clubs are reminded to submit Annual Reports to ARRL HQ. This information is used to refer prospective and new hams to clubs. John Covington, W4CC, reports that Three Clubs (Cape Fear, Forsyth, and Tri-County) have obtained Special Service status during his tenure as Affiliated Club Coordinator. They join our Section's six other active SSCs (and two SSCs that have let their SSC status lapse). Check the Section web site for information about clubs in your area. Thanks to Pat, KE4WZY for his service as Area 6 DEC. He has moved to Carteret county and will be an asset to ARES groups on the coast. Maysville Hamfest, Oct 10; Hickory Hamfest, Oct 23. Tfc: W4EAT 768, AA4YW 167, K4AIF 127, K4IWW 127, KI4YV 123, KF4VDW 119, W0UCE 81, KE4JHJ 80, AC4ZO 70, AC4DV 68, W4IRE 55, W2CS 50, W3HL 39, KE4AHC 37, AB4W 34, AB4E 29, WA4SRD 28, KC4PGN 20, KF4OZF 19, WD4MRD 16, N2JLE 13, NT4K 12, WA4ZWC 10, KF4YMA 8, KF4PAK 7, KF4YHG 5, KB4USN 3.

SOUTH CAROLINA: SM, Les Shattuck, K4NK—Greetings again from Greenville. As some of you might have heard, I have a new home in town. Actually I am still in the county, but in city view district. I hope to get my antennas back up soon. One good thing about this move is the new place is about twice as big as the old one. My new address is 127 Henderson St. Greenville, SC 29611. I will retain the same e-mail address but will have a new phone number. Check your *QST* for more info. Not a lot of Amateur radio news this month. We went to the Asheville hamfest and saw a lot of our friends. It was a hot day but they still had a good crowd. As this is written (in August), I am thinking of the upcoming hamfest in South Carolina. Don't forget Rock Hill and Sumter. Hope to see you there. And the folks in Myrtle Beach tell me they are revamping their fest. It should be a great time. Well this will be a short column, but I will make it up next month when I am settled in my new place. Traffic (July 1999): W4DRF 132, KA4UIV 123, KA4LRM 74, KT4SJ 64, WA4UGD 36, WD4BUH 20, KF4HAV 19, K4JMV 14, W4CQB 4.

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You can select from 15 *pre-set* filters. Use for SSB, AM, CW, packet, AMTOR, PACTOR, RTTY, SSTV, WeFAX, FAX or any mode.

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Has automatic notch with *variable* aggressiveness, new quieter 2½ watt audio amplifier, new speaker switch keeps phones always active.

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Use the MFJ-1026 as an *adjustable phasing network*. You can combine two antennas to give you various directional patterns. You can null out a strong interfering signal or peak a weak signal at a push of a button.

Easy-to-use! Plugs between transmitting antenna and transceiver. To null, adjust amplitude and phase controls for minimum S-meter reading or lowest noise. To peak, push reverse button. Use built-in active antenna or an external one. MFJ's exclusive *Constant Amplitude Phase Control*™ makes nulling easy.

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VIRGINIA: SM, Lynn Gahagan, AF4CD— ASM, W4TLM. SEC: K4EC. SGL: KK4IY. TC: W4IN. OOC: KR4UQ. PIC: W2MG. STM, ACC: AF4CD. Amateurs from all over the Section converged on Surry County for the annual NRC/FEMA/VDES Nuclear Power Plant Drill. In all, 67 ARES/RACES members staffed 18 locations, participated in radiological monitoring, and provided communications from EOCs in the affected counties, including the Surry Nuclear Plant, to the VDES, EOC in Richmond. Hams from as far away as Rockingham County participated. Packet, HF and VHF were utilized. The long awaited RACES ID Cards are now rolling off DMV lines. The issuance of the cards were plagued by Murphy like problems with the vendor's camera and software. All DMV locations throughout Virginia are on line. The next Section-sponsored ARES/RACES Basic Training Session will be held in Hampton on November 6th from 10:00 AM to 4:30 PM at Thomas Nelson Community College. Information and registration for the session can be found at **www.kr4uq.org.** State Senator John S. Edwards was presented a plaque of Appreciation from the Virginia Section for his ushering of the Virginia Tower Bill at Blacksburg in July by your SEC and SM. I would like to thank all of our NTS Net Managers N4ABM, W3BBQ, W4CAC, KR4MU, KD4NFY and WA4DOX for getting me all of the reports in a timely fashion. All of you are doing an outstanding job keeping Virginia's nets alive and well. Congratulations to Casey, K4MTX, who was awarded the W4SUS Award Key and also to Ricky, N4FNT, who I just recently appointed as an Official Relay Station. Ricky has been a big help and very active on our NTS nets. Is digital dead in the VA Section? Not by a long shot! Digital is alive and well thanks to the hard work and reorganization by ASEC, Digital Operations, KC4ASF. Ben, with the help of his DDCs and sysops, has made a lot of progress in getting more nodes and digital stations up and running. More and more sites are getting back up as a new interest and goal has been sparked. Special attention is being given to areas where we have no outlets at this time. Our goal is to be able to contact all of the EOCs in the Section by digital means as a backup communications for the VDES. Teamwork and cooperation make it all come together! 73 de AF4CD. Tfc: K4MTX 319, K4DOR 310, N4ABM 234, WA4DOX 201, KR4MU 178, K4YVX 142, W3BBQ 120, W4CAC 95, WB4ZNB 74, AA4AT 52, K0IBS 44, AF4CD 33, WB4UHC 30, KE4NYY 25, W4JLS 25, WA8AHV 22, K4IX 16, W4YE 14, W4HDW 14, KE4PAP 10, WA4JFW 8, KB4CAU 8, WB2KQG 6, N4FNT 4, KF4HJW 4, K4JM 3, W4MWC 2, W4IN 2, KB4AXR 2.

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. Another SKYWARN season winding down with activations primarily for too much water this season. Record rainfall totals were recorded in the first week of August and many hams responded to calls for monitoring of stream/creek levels and flow rates. On July 31, Larry, K0ANI, East Slope EC hosted a Y2K meeting/forum for ECs east of the continental divide. What a pleasant surprise to see George, KA0BSA show up from Steamboat Springs. The meeting focused on Amateur Radio resources being requested by our served agencies for Y2K. Most agencies are asking for some level of support and most jurisdictions don't have enough hams to cover everything. If you haven't volunteered and wish to do so, please contact your EC and/or stop by the Sunday morning ARES net: 8:30 A.M on the Colorado Connection. A very complimentary feature article on ham radio in the Pikes Peak region ran in the Colorado Springs Gazette. The article described how hams have been providing emergency service in the area and will continue to do so. Nice compliments in print by the served agencies. If you have items for this column, e-mail them to me at **n0wpa@arrl.net**. 73, de N0WPA. NTS traffic: K0TER 149, N0UOD 18. CAWN: W0WPD 812, W0GGP 522, W0LVI 500, N0NMP 392, KI0ND 368, N0DKK 356, N7EQ 346, AA0ZR 334, WB0VET 291, K0HBZ 263, N0FCR 245, N0JUS 226, W0NCD 211.

NEW MEXICO: SM: Joe T. Knight, W5PDY—ASM: K5BIS & N5ART. SEC: K6YEJ. STM: N7IOM. NMs: WA5UNO & W5UWY. TC: W8GY. ACC: N5ART. New Mexico Roadrunner Net handled 96 msgs with 894 checkins. New Mexico Breakfast Club handled 282 msgs with 1046 checkins. Yucca Net handled 21 msgs with 868 checkins. Caravan Club Net handled 5 msgs with 59 checkins. SCAT Net handled 18 msgs with 626 checkins. Four Corners Net handled 16 msgs with 176 checkins. GARS Net handled 3 msgs with 24 checkins. Rusty's Net handled 83 msgs with 709 checkins. Valencia Co Net handled 5 msgs with 42 checkins. We have been fortunate to have lots of rainfall and cool temperatures for the past several weeks. The Ft Tuthill (Flagstaff) Hamfest was the biggest and best ever. Thanks to everyone for a wonderful event. Sorry, Vern, W5CSY, was not able to attend this year, but we will look forward to him being the oldest ham present next year! ARES/RACES planning for Y2K is proceeding with several meetings around the state. Nice to have some real DX in ABQ. S21A and S21J have moved to our city and attended the DX Club meeting. Know N5ART & KC5LKH enjoyed their trip to England & Ireland. Very sorry to report the passing of 2 old timers: W5HWJ and ex K5JLJ. We will certainly miss them both. Looking forward to the Socorro Hamfest on Nov 13. Hope to see many old friends there. Vy best 73, W5PDY.

UTAH: SM, Mel Parkes, N5UVP—This month make plans to attend the Color Country Hamfest in Cedar City on 16 Oct at the Southern Utah University campus. Also on the 16th, JOTA is also being sponsored by many of the clubs throughout out the state please make plans to help out the scouts. The tornado that hit SLC on 11 August required the State EOC to be activated, thanks to all the hams who responded to this emergency. Another thank you to all who went and supported the Wasatch 100 Endurance Run. If I haven't visited your club yet, I'm working my schedule to do so at the first opportunity that comes my way. Keep watching for information about Utah Hamfest 2000. You will not want to miss this event in July 2000! 73 de N5UVP.

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2m 50w 70cm 35w

3.9"x 1.2"x 5.4"

About the size of a 8 track tape!

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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

YAESU

New top-of-the-line dual bander adds video excitement to audio excellence.

IC2800H Advanced features and a unique, 3" (diagonal) TFT color LCD display await you. View GPS and APRS™ maps*, catch SSTV or broadcast TV*,... even watch digital camera and VHS images*. Experiment! The high visibility screen accepts NTSC video input (PAL in the European model) via a simple connection port that accepts most standard camera plugs. A 6-pin data port makes the '2800H 9600bps data ready*. ICOM's popular independent band controls are here, making it easy to work dual or cross band repeat. Also get: CTCSS encode/decode, simple band scope, fast scanning, 232 memory channels, air band reception, and much more. The control head is totally separate from the main unit, with a connection cable and independent mounting brackets included as standard equipment.

The World's first FOUR BAND HT

ICT81A Add the wide-open microwaves to your fun! Get 6m/2m/70cm/23cm all in one neat little package. The easy to use 'T81A doesn't rely on any function key(s), and sports clear, wide band reception* that'll have you listening to all sorts of interesting activity, from broadcast TV to public safety communications . Get CTCSS encode/decode, DTMF encoder, auto repeater, alphanumeric display, 124 memory channels, RIT and VXO for 1.2 GHZ, and more. Water resistant and ICOM rugged.

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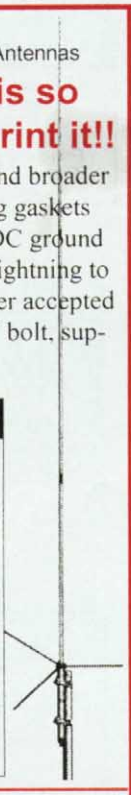
High Performance, high power rating, low SWR and broader band coverage on both 2m and 70 cm. Using ring gaskets make the antenna waterproof. Easy to assemble. DC ground structure escapes high voltage caused by thunder lightning to the ground, protects radio equipment. Mast diameter accepted 1-3/16" to 2-7/16". Supplied with mast bracket, V bolt, support tube and all mounting hardware.

Model	UVS200	UVS300
Length	98.4"	204.7"
Gain	Call	Call
Configuration	2m 2-5/8w, 70cm 4-5/8w	2m 3-5/8w, 70cm 8-5/8w
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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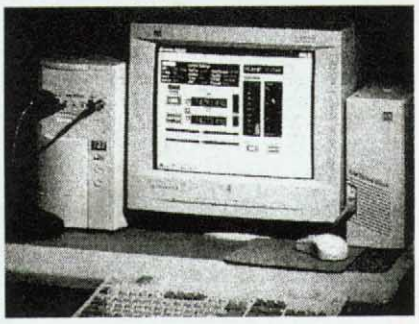

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WYOMING: SM, Bob Williams, N7LKH—The Wyoming Hams provided communications again for the Tour de Wyoming Bicycle Tour. This year, the route was 420 miles across Wyoming, from Dubois to Laramie via Lander, Jeffrey City, Rawlins, Baggs and Encampment. It involved elevations from 5500-10500 feet and crossed the Continental Divide five times. The communications were planned and organized by EC Bob Johnston, WB7AHL, Fremont County and by EC Chuck Pulaski, KC7JFX, Carbon County. From Dubois to Jeffrey City com support was provided by Merlene, N7EMI; Bobby, KD7AJZ; Bob, WB7AHL; and Mary, KF7MC, with help from Larry, KD7BN, using HF, VHF and UHF frequencies. From Jeffrey City to Laramie, the com support people included Jeff, KI7QG; Chuck, KC7JFX; Don, WA7YWA; Bob, WA7LFT; Steve, WB7CBQ; Ron, KD7SU; and Mary, KF7MC with help from Duane, NN7H and Ken, KC7RZI manning the Carbon County Emergency Operations Center which was activated for the event. PSHR: Duane Shillinger, NN7H, June: traffic 215, public service 140; July: traffic 401, public service 145.

SOUTHEASTERN DIVISION

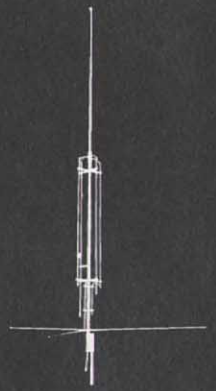
ALABAMA: SM, Bill Cleveland, KR4TZ—ASMs: W4XI KT4XA N4YYQ N4ZNO KX4I KD4PDQ. SEC: AF4HE. STM: WB4GM. BM: KA4ZXL. OOC: WB4GM. SGL: KU4PY. ACC: K4LI. TC: W4OZK. PIC: KA4MGE. A Statewide Simulated Emergency Test is scheduled for Thursday October 21. We had to move the SET later than the ARRL's SET to participate with the Alabama EMA. Your group can participate during the ARRL SET weekend. All I ask is that you only submit ONE SET report and take advantage of the October 21st SET to pass a report on your group's activities to the State EMA. This year's simulated emergency is a Y2K related shutdown of public services. Local activity is left to the ECs and DECs, but communicating with the State EMA station on October 21st is encouraged. Station operation at the State EMA will be in the afternoon during business hours, but a separate evening session will be held for those who had to work. For more information contact Walter Verney (AF4HE) at 334-965-3142 or AF4HE@ARRL.NET. Let's not forget that the Scout's Jamboree On The Air (JOTA) is October 16!. 73 Bill Cleveland, KR4TZ. Tfc (July 99): WB4GM 512, W4CKS 196, W4ZJY 145, W4PIM 107, WA4GQS 68, AF4HE 50, KU4IJ 48, KC4VNO 31, K4AKC 31, KL7Q 23, KC4RNF 20, W4DGH 15, W4XI 14, KT4XA 11, WB4TVY 6 — PSHR (July 99): WB4GM 230, AF4HE 203, WA4GQS 181, W4ZJY 174, KU4IJ 169, KC4TLG 152, KT4XA 145, WB4TVY 132, W4CKS 118, KL7Q 115, K4AKC 107, W4DGH 106, KC4VNO 103, W4PIM 94, W4XI 92, KC4RNF 75, KE4OLE 18.

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. TC: Eddie Kosobucki, K4JNL. ACC: Bob Lear, K4SZ. OOC: Monroe Gaines, KF4NXD. PIC: Chuck Calmbacher, AD4JU. July saw the reincarnation of the Georgia QSO party sponsored by SE Contest club. I was in Los Angeles for the contest, operating from the club station at TRW. Lots of participation from stations in Georgia with much mobile activity making many of the rare counties available for multiplier credit. Hope to work you in next year's QSO party. I think I will stay home next year. Colquitt County ARC preparing to demonstrate Amateur Radio to hundreds of thousands of attendees to the Sunbelt Expo. Atlanta Radio club officers for the millenium: Pres KA4VQH, V Pres N4TZM, Sec KE4VGZ, Treas KI4Y. Their hamfest June 2-3, 2000. W4LFC retires as ARC Pres after 3 terms. Alford club hamfest Nov 6-7 features an appearance by Riley Hollingsworth of the FCC. Come by and says thanks for trying to remove K1MAN from our ranks. On Oct 1, I start a 2nd term as your Section Manager. Thanks for your support the past year. 73, Sandy. Tfc (June): WB4GGS 432, AF4NS 156, K4BEH 126, WU4C 116, KA4HHE 96, K1FP 94, W4WXA 72, KU4WJ 54, K4JNL 14.

NORTHERN FLORIDA: SM, Rudy Hubbard, WA4PUP—ASM-E Central: AC4PF. ASM-W Panhandle: KO4TT. ASM-APRS: WY8O. ACC: WA4B. BM: N4GMU. OCC: AF4EW. PIC: KF4HFC. SEC: WA4NDA. SGL: KC4N. STM: WX4H. TC: KO4TT. Packet: N4GMU. Certificate of Merit was awarded to Tim Starr, AE4NJ, at the Orlando Radio Club Meeting. Tim has been very active in the Orlando both with the Club and hamcation activities and wish him continued success. Dr Gray has issued his latest hurricane advisory and has now included four major storms. East Pasco Amateur Radio Society newsletter states membership applications has been added to its Website. FCC's Hollingsworth has been temporarily assigned to the FCC's National Center. Hollingsworth says his Amateur Radio enforcement duties will continue and will in no way be affected by his additional temporary duty. If you haven't already, request you contact your congressional representative and urge them to support HR-783. Jeff, KE4TCV, reports on meeting with the administrators from each of the three hospitals in Seminole County. The meeting was to ask the hospitals for support of the ARES/RACES communications between their locations and the EOC. Cooperation of each hospital was received. W1WLH, Bill, EC Orange County included in the newsletter a complete organization of the ARES/RACES with assignments for all to know. He states there were 17 new members added to the ranks. Good article, Bill. It should draw more interest in the County. Congrats goes to WX4H and KE4DNO making BPL again for the month of July. Traffic count was down, but the hot weather may have something to do with it. The month of July was hot and according to some reports this causes the waters in the Gulf to increase the winds of hurricanes. The Northern Florida ARES Net is requesting the EC of each County to have representation to check in and to pass info on to the amateurs of their county. More info will be forthcoming in an effort to keep all posted and informed. 73, Rudy. Tfc: WX4H 2157, KE4DNO 1287, NR2F 317, KE4OAV 306, KF4TQX 244, AD4DO 210, KF4NFP 148, KF4GUA 134, AB4PG 119, AF4GF 92, KF4TM 87, W5MEN 68, N4ORZ 61, WA4PUP 54, K4JTS 45, W4KIX 44, WB2FGL 42, N9MN 40, KC4FL 36, N4JAQ 31, K1JPG 30, WB9GIU 16, W8IM 14, WA4EYU 13, WA4NDA 11, KM4WC 10, KF4YHK 10, KE4HIY 9, N0ZO 8, WX4J 4, WB2IMO 3, KF4WUZ 3.

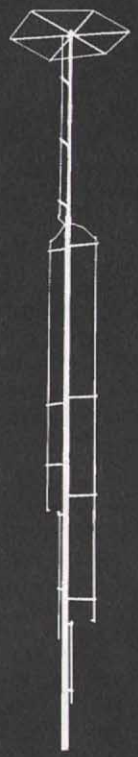
GAP: THE PERFECT ANTENNA

We at GAP realize there isn't a perfect antenna. No singular antenna will scream DX on 80 and be the best for local nets on 10. If anyone tells you there is, beware! The perfect antenna does not exist, but the right one for you may. If you want something to bust the pile on the low bands, then consider the Voyager. Just starting out in ham radio and need a great general coverage antenna, the Challenger is easy to assemble and for little effort will yield superior performance, especially on DX. Maybe you knowingly or unknowingly moved into one of those "restricted areas" where the Eagle's limited visibility, but unlimited ability is desired.



Eagle DX

Challenger DX



Voyager DX

This chart helps you select the right GAP antenna. When comparing GAPs, bandwidth is not a concern. With few exceptions, a GAP yields continuous coverage under 2:1 for the **ENTIRE BAND**.

All antennas utilize a GAP elevated asymmetric feed. A major benefit is the virtual elimination of the earth loss, so more RF radiates into the air instead of the ground. This feed is why a GAP requires **NO RADIALS**. Just as elevating a GAP offers no significant improvement to its performance, adding radials won't either, making set up a breeze.

A GAP antenna has no traps, coils or transformers. This is important. The greatest sources of failure in multiband antennas are these devices. Perhaps you heard someone discuss a trap that had melted, arced or became full of water. Improvements to these inherent problems are the focus of the antenna manufacturer, while the basic design of the antenna remains unchanged. **GAP improved the trap by eliminating it!** Removing these devices means they don't have to be tuned and, more importantly, won't be detuned by the first ice or rain. The absence of these devices improves antenna reliability, stability and increases bandwidth.

Another major advantage to a GAP antenna is its NO tune feature. Screws are simply inserted into predrilled holes with a supplied nutdriver.

The secret is out and people in the know say:

CQ–"The GAP consistently outperformed base-fed antennas...and was quieter."

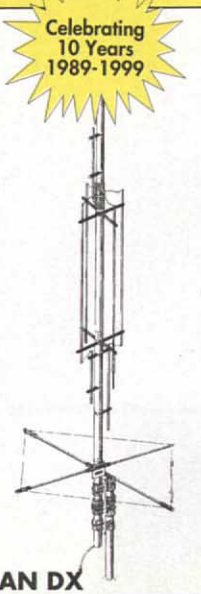
73–"This is a real DX antenna, much quieter than other verticals."

RF–"To say this antenna is effective would be a real understatement. Switching back and forth on 40m between another multiband HF vertical and the GAP, there was no comparison. Signals were always stronger on the GAP, sometimes by S units, not just DB's."

Worldradio – "These guys have solved the problem associated with verticals. That is, an awful lot of RF is wallowing around and dropping into the dirt instead of going outward bound. A half-wave vertical does need radials if it is end fed (at the bottom). But the same half-wave vertical does not (as much, hardly at all) if is fed in the center."

IEEE–"Near field and power density analyses show another advantage of this antenna (asymmetric vertical dipole): it decreases the power density close to the ground, and so avoids power dissipation in the soil below it. The input impedance is very stable and almost independent of ground conductivity. This antenna can operate with high radiation efficiency in the MF AM standard broadcast band, without the classical buried ground plane, so as to yield easier installation and maintenance."

Celebrating 10 Years 1989-1999



TITAN DX

This all purpose antenna is designed to operate 10m-80m, WARC bands included. It sits on a 1-1/4" pipe and can be mounted close to the ground or up on a roof. Its bandwidth and no tune feature make it an ideal antenna for the limited space environment as well as a terrific addition to the antenna farm.

MODEL	BANDS OF OPERATION											HT	WT	MOUNT	COUNTER-POISE	COST
	2m	6m	10m	12m	15m	17m	20m	30m	40m	80m	160m					
Challenger DX	■	■	■	■	■		■		■	■		31.5'	21 lbs	Drop In Ground Mount	3 Wires @ 25'	$279
Eagle DX			■	■	■	■	■		■			21.5'	19 lbs	1-1/4" pipe	80" Rigid	$289
Titan DX			■	■	■	■	■	■	■	■		25'	25 lbs	1-1/4" pipe	80" Rigid	$319
Voyager DX							■		■	■	■	45'	39 lbs	Hinged Base	3 Wires @ 57'	$399

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PUERTO RICO: SM, Raul Escobar, KP4ZZ—With sadness I report the following Silent Key: William "Willie" Werner, KP4DJ, our OBS and NM, also great Elmer and friend. Also Pedro N. Ortiz, KP4AQC, and Jorge Rodriguez Lugo, KP4MP. Things rather quiet, all hoping it will stay that way during this hurricane season. Some are making plans for the CQWWDX Contest (including SM). The PRARL are offering the classes for Novice or Technician No-code at UPR every Wednesday at Ciencias Naturales (Fase II) Building room C-204. The PRDXC meet every second Monday of the month at UPR. Don't miss it. Any comments or activity please drop me a line or an e-mail. 73, Raul, KP4ZZ

SOUTHERN FLORIDA: Traffic reports (July activity) submitted by STM Phyllisan West, KA4FZI. WA9VND 618, KA4FZI 503, K4SCL 437, AB4XK 326, W7AMM 302, KB4WBY 288, KC4ZHF 266, KD4GR 216, WB4PAM 130, KD4HGU 130, WA4EIC 91, WA4CSQ 86, AA4BN 85, KG4CHW 69, AA4HT 66, KJ4N 61, W4DL 58, AD4IH 57, KT4XK 52, AF4NR 46, W4DWN 45, K4RBR 44, K9ALX 28, KE4WBI 19, W4AUN 19, KT4PM 15, W4WYR 15, WD4JNM 14, W3JI 13, K4LKL (club) 12, KT4TD 10, KE4VBA 9, KF4KFN 8, K4OVC 6, W9LRB 6, WA8EXA 3, K4ENA 3, KF4HCE 3, KF4UTH 1.

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. As this is written, the WX-ATLAN weather report says it is unusually quiet for this time of year (i.e. no hurricanes). We are all hoping that it remains so. Best wishes for Merv, W9UKK, who had enough kidney stones removed to pave his driveway. SM spoke to him, sounded very chipper and will be glad to get home soon. George, KP2G, continues to report Caribbean weather at 1115Z on Lou, KV4JC's Caribbean Maritime Mobile Net which meets every morning on 7241 at 1100Z. Take a look at Lou's Web-site, site maintained by Jeanette NP2C (XYL of SM, NP2B). The address is **http://www.viaccess.net/~kv4jc**. The Dalkey Island Contest Group from Ireland had a very successful assault from St Croix in the IOTA contest this past month. Good group of folks, nice to see them again. That's about it for now, staying tuned to the Weather Channel. 73, John, NP2B.

SOUTHWESTERN DIVISION

ARIZONA: SM, Clifford Hauser, KD6XH—If all paperwork has been completed, Bill Schuchman, W7YS, and Time Durkin, K6TIM, of the Northern Arizona DX club, are now able to field check and certify cards for DXCC. This helps plug a hole in our state. Before, northern Arizona people needing card check would either send to ARRL headquarters or to checkers in central Arizona. Because of the rule about club membership (25 or more members), the central Arizona DX club was kind enough to sponsor these two individuals. Thanks CADXA. The date is 01-03 October 1999, the place is the Queen Mary in Long Beach, and the event is the Southwestern Division Convention, and this is the big month. Cochise Amateur Radio Association will have their bi-yearly hamfest on Oct 2at the Cochise Community College. The contact person is Charles Stanley, W5FEW, at 520-458-1808 or e-mail at **cmstanley@juno .com**. Old Pueblo Radio Club is planning their annual hamfest for Oct 16. It will be at a new site on Old Nogales Highway next to the Desert Diamond Casino. This is Indian land, there is no worry about state income tax people. Talk-in will be on 146.88 (-). The contact person is Glenn Henderson, WA7OBG, at 520-749-5478; e-mail is **linus @primenet.com**. OPRC is planning this event with talks on AMSAT, Antenna design class, VE testing, and even a T-Hunt, not just a swapmeet. Also they will have an antenna-measuring contest to see who can build the best mobile VHF antenna. Don't forget the Southwest Division convention in Phoenix in year 2000, sponsored by the Scottsdale ARC. If you or your club would like help at this event contact me for information. See you in October on the Queen Mary and at the OPRC hamfest. Again a reminder, if you call and leave a message and I do not get back to you in 2 days, call again. My house is still part of the new boomerang generation (kids leave and return) and I do not always get my messages. 73, Clifford Hauser, KD6XH. Net QNI/QTC/sess: ATEN 580/87/31; ACN 213/41/31. Tfc: K7VVC 808, W7EP 67.

LOS ANGELES: SM, Phineas J. Icenbice, Jr,W6BF—The really big event, scheduled for October 1 –3, is the ARRL Convention on the Queen Mary, in Long Beach. It is not too late to make your reservations. The complete schedule for the Convention is available on the Internet at; **www.qsl.net /arrlsw/hamcon/sked99.html**. At 1 PM on Friday, we have the Amateur Auxiliary -OO- get- together, where I will be the moderator. This is an open meeting scheduled to be in the Britannia Salon. We are hoping to have most of the OOs in the Southwestern Division on board. A panel of experts from the FCC and ARRL Headquarters will provide their best answers to your questions. W6UPN, our OOC, will be available with the latest facts for our LAX Section. Each Section Manager in the Southwestern Division has an assigned moderator job. So if you have an ARRL appointment, you will have a special session that you can attend. Oh, yes, I see that they have me scheduled on Sat at 11 AM for "RF Interference Solutions," in the Marietta Room of the Grand old Queen Mary. We all hope to see you there on Oct. 1-3. AD0A, Jerry, reports a Traffic Total of a big 171 for July. This is Jerry's last report from California. Look for Jerry on the air from central Colorado soon. Jerry has been a great contributor to ARRL programs. Jerry's ability to accomplish ARRL tasks with ease is in part due to his outstanding personality and technical ability. We will miss you very much, Jerry but we know we will see great things from ARRL in Colorado. If you are interested in contests or DX, see page 57, in the 1999, September issue of *World Radio*. Twenty-four contests are listed for September and October. Each listing has eight boxes with the key information for each Contest. This is a great place to find that elusive DX that you are missing. The Los Angeles Section Web Site is the quick place, to find new information. **www.qsl.net/arrlsw/lax** use it. It is for you: e-mail any additions or changes to me at **W6BF @arrl.org**. 73 de W6BF, Phineas.

YAESU

FT-1000D Transceiver

tx: 160–10m **rx:** 100kHz-30MHz • 200w • 100 memories • Dual receive • Antenna tuner & AC • Dual bandpass filter • Temp. compensated crystal oscillator • 2.4kHz & 2kHz SSB filters, 500Hz CW crystal filter 6"h x 16"w x 15"d, 58 lbs **$4199.95**

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Ideal for HF & satellite • 100w HF/6m • 50w 2m/430MHz • Crossband full duplex • Reg/reverse tracking • Dedicated satellite mem. • DSP filters • Low noise VHF/UHF • Built-in preamp • High res 0.1Hz • Tuning steps • Shuttle jog • CW sidetone & pitch control • CTCSS/DCS enc/dec • Direct freq. keypad entry • 1200/9600 bps ready **$1599.95**

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Affordable Beginner's Radio!

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Amateur coverage: 160–15 & 6m • 1000w • 220V AC 500w power out on 6m • Built-in high-speed ant. tnr • 2 RF inputs • 4 RF outputs • Auto band switching w/FT-1000D, FT-1000MP, FT-920 & FT-900 • Separate amp & PS units • 16¼" x 5⅜" x 16¼" • (amp) 33 lbs; (pwr sply) 26 lbs **$3999.95**

NEW!

FT-100 Field Commander

160-6m mobile xcvr + 2m and 430-450MHz rx: 100kHz-30MHz, 30-970MHz (cell blocked) • 100/50/20w • DSP • SSB/CW/AM/FM/AFSK/Packet oper. • Built-in CTCSS/DCS • 300 mem. • IF Shift • IF noise blanker • VOX • Dual VFOs • Electronic memory keyer • Speech processor • 6¼"w x 2"h x 8"d **$1349.95**

NEW!

FT-90R Micro Commander

50/35w 2m/440 micro FM xcvr • Built-in CTCSS/DCS enc/dec • Select. TX power • 186 mem. • Direct keypad freq. entry • 8 mem. DTMF autodialer • ADMS PC program. • Auto repeater shift • RF-lavel squelch • Program. front panel/mic key func. • 1200/9600 bps compatible • 3.9"w x 1.2"h x 5.4"d .. **$399.95**

FT-8100R Dual Band Transceiver

2m 144–148MHz tx, 110–550 & 750-1300 MHz (cell blkd) rx • **70cm** 430–450MHz tx/rx • 208 mem. • 50-35/3/5w • CTCCSS encode • 5⅛"w x 1⅛"h x 6¼"d **$469.95**

FT-3000M 2m FM Transceiver

70w • 110 to 180MHz, 300 to 520, 800 to 999MHz receive (cell blocked) • 81 memories • 1200/9600b comp. • 5½"w x 1⅜" x 6¼"d, 2¼ lbs **$399.95**

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144–148MHz transmit, 140-174MHz receive, 50/10/5w • 31 memories, odd splits • Alpha-numeric display • CTCSS encode • 5 scanning functions • Track tuning • Backlit DTMF mic • 6"w x 1⅜"h x 7"d ..... **Closeout $199.95**

NEW!

FT-2600M 2m FM Transceiver

60w • 134-174MHz rcvr • 175 mem. • Built-in CTCSS/DCS enc/dec • Smart Search™ • Auto repeater shift • S-Meter squelch • Extensive menu • Key freq. entry from mic • 1200/9600 bps packet • Compact **$239.95**

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144 to 148MHz transmit/receive • 25w • FM/SSB/CW or 2w portable power with 12VDC at 1A or optional battery case • Dual VFOs • 10 memories • DTMF up-down mic scanning • 2⅛"h x 6⅞"w x 7½"d, 2½ lbs **$559.95**

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25w • 8 channels • PLL synthesized • Fully programmable • CTCSS encode/decode • Time out & hang timers • Wall/ rack mt. • 13.8V @ 6A • 14¾" x 1¾" x 4¾", 25 lbs

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VXR-5000UCDC 400–512MHz **1199.95**
VXR-5000V/TA 2m rptr w/PS **1399.95**
VXR-5000U/TC 440 rptr w/PS **1399.95**
VXD-40UB 440 Duplexer **199.95**

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CSC-50 Case; 415/416/FNB-25 ..... **2.95**
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DVS-3 Voice; 2200/5200/6200/7200 ... **69.95**
FNB-49 600MA 6V battery **9.95**
FRC-4 Pager unit; 5200/6200 ..... **9.95**
FRC-6 Pager unit; 2500M/7400H **9.95**
FTS-6 Encoder/decoder; 09 series **9.95**
FTT-12 16# keypad/dec/dvrs; FT-50R .. **29.95**
FTT-4 TTP unit; FT-23R/33R/73R **19.95**
FX-1 Xcvr-fax interface/controller **29.95**
MMB-21 Mobile bracket; 09/727R **4.95**
MW-2 Remote control wireless mic **49.95**

ORANGE: SM, Joe Brown, W6UBQ—ASM Riv Co: Joe, KO6XB, 909 685 7531. ASM Or Co: Art, W6XD, 714-556-4396. SB Co: James, KE6LWU, 909-824-5424. Field Day reports are in. It appears that clubs did better then last year. Hams missed a lot when they could not make FD. The Y2K Informational Exchange Work Shop conducted by the Emerg Serv Div of the Riv Co Fire Department was a great success. Reps from Public Service, Public Safety, Emerg Serv Officers, ARES/RACES types from Southern Calif were present. Words of Wisdom comes from April, WA6OPS, EC for Hospital Support. Directed Nets: In drills there were some questions about the use of a directed net. In one drill, there were a couple of instances when stations came on the net and made calls to others without clearing with net control. Granted, it can be frustrating to have to wait your turn. It is a giant party line. If we don't run a directed net during drills, we set ourselves up for chaos in an emergency. Another Field Day has come and gone and enjoyed by all those who participated. Thanks to everyone who came out and helped operate, setup, clean up and just enjoyed what being part of a Radio Club us all about. From BCWS: If you need to renew your ARRL Membership or to join for the first time. Please sign up through your local club. The club will make $5.00 for a new member and $2.00 for a renewal. Let's not forget the ARRL, Southwest Division Convention aboard the Queen Mary, it is just around the corner, Oct 1st through the 3rd. The Convention will open at 5 PM Friday the 1st of October. OCCARO quote of the of the day, "keep your squelch open." Stay open minded. NTS tfc rpt, KO6RZ 362, AD6HR 122, KO6SKK 120, W6QZ 112, N6GIW 45, N3IVO 23, KD6EYI 17. Digital tfc, N6GIW NTS mailbox 304, W6QZ BBS 263. PSHR W6QZ 140, AD6HR, KO6RZ 122, KC6SKK 119. KO6RZ reports 30 sessions, QNI 267, QTC 142. SM comments Jerry, AD0A, has left Southern Calif. He will be a big plus for Colorado. He was the glue that held Conventions, Amateur Radio Club Associations and the Amateur Radio Community together. He will be missed.

SAN DIEGO: SM, Tuck Miller, K6ZEC, 619-475-7333—By the time you read this, you should have your bags all packed and ready to go for the big event on the Queen Mary. You say you don't know what is going on? Hmmm, well you really need to know that on Oct 1 thru the 3, quite a few of us will be lounging around on the decks of the Queen Mary, home ported in Long Beach, CA, sipping cool glasses of iced tea, and looking at all the beautiful scenery. Just think about it. Radios after radios, antennas, and yes, even an antenna tuner or two. Some even get a sigh of relief when they see a key. We will get to visit with various experts and they will tell us all they know about how to do things the correct way. The next column you read will be telling you about all the good things you missed at the SWD 1999 Convention. Congrats to Ken Tagami, WA6BCC, for receiving the 1998 Volunteer of the Year award from the California Department of Forestry. Ken has been the ARES liaison for over 10 years with the CDF agency. Looking back in August, I forgot to mention that I attended the Santa Barbara hamfest, and it looked like everyone was having a great time. Especially those that won some great prizes. How about that guy who won the Yaesu FT100. I know personally the YL who won the transformer toss. In fact she threw the transformer father than any of the men. If I were her OM, I would keep out of her way. Please check into the ARES section net, Sunday nights at 7 on 146.265. A lot of info is given at this time. Check into the NTS traffic net, 146.730 at 8 PM each night. Tfc: KT6A 1053, WA6ODQ 468, KD6YJB 353, W6FFF 165, KD6IVF 39, KO6BU 2, WA6IIK 1 BPL: KT6A 1053. PSHR: KT6A 138 WA6ODQ 128 KD6YJB 86.

SANTA BARBARA: SM & STM, Rob Griffin, K6YR—805-543-3346 & **k6yr@arrl.org**. SEC: Jack Hunter, KD6HHG. AAC: Michael Atmore, KE6DKU. OOC: Howard Coleman, W6HQA. PIC: Jeff Reinhardt, AA6JR. TC: Warren Glenn, KM6RZ. ASM-Ventura: Don Milbury, W6YN. ASM-Internet: Jack Bankson, AD6AD. DECs: SB-Dave Lamb, WA6BRW. SLO-Bill Peirce, KE6FKS, & Ven-Dave Gilmore, AA6VH. Section Web Site address: **http://www.qsl.net/arrlsb/**. Congrats new SLOECC Officers: Prexy, Don, KF6HIH. Bob, KB6RG, VP; Richard, W6RKA, S-T; & Directors, Dave, KF6PKU; Max, WD6Z; & Bob, W6TTX. Jim Palmer, W6FOB, is the new SLOECC on-line Newsletter. Thanks, TTX - Well done, OC! Check out the new SLOECC Web Site **surfari.net/~sloecc/**. Also, SB No Co is publishing an on-line Newsletter under Editor, Mary. KF6BNC. Web Site: **pweb.netcom.com/~memeyer/index.html**. Estero RC new leaders are: Prexy, Jo, KF6PFM; Secy, Henriette, KC6VYB; Treas, Roxanna, K6ELO; & Directors, Steve, W6FL & Jerry, WB6ROW. SB Section ARES Net meets every third Tues at 8 P on 147.00+ (131.8). QNI & improve your skills. Other Nets: SCN slow speed NTS Net, M thru F at 7:15 PM on about 3598 kHz & SCN/SB Sec at 9 PM local on 147.000+ (131.8), 224.90- (131.8) & 448.875-(100). PSHR/Tfc: K6YR 186/210, KF6OIF 135/- & KE6MIW 100/33.

WEST GULF DIVISION

NORTH TEXAS: SM, Don Mathis, KB5YAM—SEC: K5UPN. STM: KC5OZT. TC: W5CWO. BM: KB5YAM. SGL: N5GAR. OOC: WB5UDA. ASMs: KX5K, K5RE, W5FB, KK5QA, KK5NA, KD5HIS, AD5X, W5GPO. This will be my first *QST* article as I have agreed to be appointed the new Section Manager for North Texas. I consider it an honor and privilege to be in this position. First of all, I wish to give my whole hearted thanks to Don Thomas, KA1CWM, for the super job that he had done and the condition that he left the section to me. I probably would have not accepted had it been otherwise. It's my hope to build on what he and the previous managers had started. I have been trying to contact as many section appointees as possible, especially by means of e-mail. If I have not gotten to you by this time, please contact me, I may have some information wrong and cannot 'find' you. Thanks to all of the staff members that have agreed to stay on during the remainder of the term, I needed that. Visit the section Web page at (**http://www.lsic.net/net/ntexas.html**) for the most current information as I go through this introduction period. We will be posting the current information there. I want and need your feed back to know how we are doing. Had an excellent time at the Austin Summerfest,

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150w 160-10m all mode w/100kHz-30MHz rcve • Built-in antenna tuner • 100 mem. Select. tone/CTCSS • Dual rcve • 23 position AF digital filter • Speech processor QSK semi-break-in • Computer interface 5½"h x 15.8"w x 15¼"d • 51 lbs. **$3999.95**

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AES purchased Kenwood's entire inventory of the CLOSEOUT items below!

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DFK-4B	13' cable kit; TM-733A	**39.95**	**SC-34**	Case; TH-28A/48A/PB17/18	**19.95**
DFK-7B	22' cable kit; TM-733A	**59.95**	**SC-41**	Soft case; PB-32	**9.95**
DTU-2	Digital paging; TM-541A	**19.95**	**SC-43**	Soft case; TH-79/PB-33/34	**9.95**
MB-13	Mobile mt; TS-50S	**29.95**	**VP-1**	Bumper mount, spring	**19.95**
MB-14	Mobile mt; TM-742AD	**29.95**	**YG-455CN-1**	250Hz CW fltr; TS-950SDX	**99.95**
ME-1	Mem. expand;TH-28A,TM-251A	**9.95**	**YK-88CN**	270Hz CW filter; R-5000	**69.95**
PB-36	7.2V batt; TH-235	**9.95**	**YK-88S-1**	2.4kHz SSB filter; TS-450	**99.95**

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met many members there and also made a lot of good contacts in the South Texas Section. I will be attending as many clubs and hamfests as possible to meet all of you. Visit me at the Denton Hamfest on October 16, I will be the one there running around without a head. Its Web page is: **http:lsic.net/dhf**. Again, I am glad to be here, thanks for your support so far. Tfc: (July) N5JZ 604, KC5OZT 293, KB5WEE 246, KC5VLW 160, KB5TCH 124, KC5EIV 111, WA5I 83, KF9AS 71, K5MXQ 71, KB5YAM 64, AC5Z 27, KD5AHW 10, W5TIT 9, KC5SMC 4, AC5PO 2. N5JZ qualified for BPL with an SAR of 604, and KB5WEE qualified for BPL with 110 originations/deliveries. 73, Don, KB5YAM.

OKLAHOMA: SM, Charlie Calhoun, K5TTT—ASMs: N6CL, W6CL. SEC: W5ZTN. STM: AB5RV. ACC: KB5BOB. PIC: WA9AFM. OOC: K5WG. SGL: W5NZS. TC: K5KXL. My congratulations and thanks to Melvin Miller, K5KXL, on taking on the STM job. John, AB5RV, has been doing a fantastic job, but had asked for a replacement for health reasons. The OKDXA net has moved to 23:30Z, Monday nights on 3860. OKDXA also has new officers, elected at Ham Holiday. President: Larry Shima, W0PAN, Vice Presidents: Lu Fisher, K5YP, Jerry Chouinard, K5YAA, Secretary/Treasurer: Alan Clark, N5PA. A new APRS net is active on Sunday nights at 01:00Z (Mon.). It will be held on the Buffalo Interlink Repeater System. A comprehensive frequency list can be found at **http://www.buffalolink.org**. The Tulsa ARC will hold a special event station celebrating their 75th anniversary, on Oct 23 at Chandler Park from 09:00-17:00 CST. Tulsa area hams are slated to participate in an Hospital Disaster Drill on Oct. 27. Send me an e-mail, and I can get you the contact information. Tulsa area DEC, Merlin Griffin, WB5OSM, reports that they have already held an organizational meeting with TAEMA and local hospital safety directors. TRO was present at the Mayor's night out against crime. They demonstrated how ham radio plays a part in emergency communications. Congratulations to Frank McCollom, N5FM, and Dennis McCarthy, KC5EVH, who were presented with ARRL awards, at Ham Holiday for their efforts during the OKC tornado relief. My personal thanks to you both! 73 for now, Charlie. Tfc: WB5NKC 2541, WB5NKD 1840, N5IKN 767, KE5JE 167, KI5LQ 127, KK5GY 54, AB5RV 56, W5REC 39.

SOUTH TEXAS: SM, E. Ray Taylor, N5NAV—ASMs: NR5ED, N5WSW, W5GKH, K5DG, N5LYG, WA5UZB, KK5CA, WA5TUM, KB5AWM, WA5JYK, K5PFE, and K5SBU. STM: W5GKH. SEC: K5DG. ACC: N5WSW. PIC: KA5WSS. TC: KJ5YN. BM: W5KLV. OOC: W5JAM. SGL: KM5HY. October is here, and I'm starting my second term as your Section Manager. I do want to thank you for your vote of confidence. We've had a great two years serving the hams of South Texas. I think everyone heard about JFK Jr's aircraft disaster. However, the next day, Saturday, we lost a valued ham operator, Mac Atteberry, W0MAC, paramedic for Life Flight Helicopter ambulance with the Herman Hospital in Houston. The crash occurred in Ft Bend County. They had no patients on board. Thunderstorms were reported in the area. The pilot, nurse, and W0MAC all died at the scene. They spent several years devoted to saving the lives of others. This didn't make national news, but certainly needs to be mentioned. Ernest L. Steves, KB5CAY, of Austin, became a Silent Key. These will all be missed in South Texas. I was asked why I haven't mentioned the club activities in some of the issues. We were all cut back on lines, so I try to bring you all the news possible. The clubs that are sending me e-mails and newsletters are doing a fine job. I think that most of the membership increase for South Texas is due to the clubs promoting membership. Some of the Field Day reports stated they had demonstrations for the visiting children with a very positive response. They seemed to enjoy talking to someone on ham radio. This could even be one of the programs for a meeting. One of our greatest assets is our clubs. It would be great if the clubs would train for emergencies. The country is depending on ham radio operators to save the day for Y2K. I still conduct training on 3.873 during the Texas Traffic Net, Monday, Tuesday, Thursday, and Friday when time permits. I really believe if you want to take part in a real emergency, you should check into a traffic net occasionally to familiarize yourself with procedures. You learn by doing. Austin Summerfest was a great success this year. We got to meet a lot of hams that we talk to on the air. It was good to see Jim Haynie and Coy Day with his big smile. It was good to see Jay Mabey, NU0X, from Headquarters. Jay traveled a long way just to see what heat is really like. It was a pleasure to see the kit builders' contest. The winner built a 40-meter CW rig in 1 hour, and it worked. Building kits and circuits from scratch is one of my greatest interests. We want to thank the dedicated hams of Austin for a great Summerfest. Good to see the OOC and OOs, who I might add, have done and excellent job in cleaning up some of our ham bands. It was my pleasure to meet the new North Texas SM, Don Mathis, KB5YAM. DX has been good. God Bless. Tfc: KA5KLU 545, W5KLV 357, W5SEG 336, W4RRX 311,N5OUJ 83, W5ZX 66, W5GKH 59, N5NAV 58, K5UCQ 55, W5ZIN 33, WA5FXQ 31, N5LF 5, N5HK 3, WD5AAH 2.

WEST TEXAS: SM, Charlie Royall, WB5T, 915-944-0469, cnroyall@wcc.net. ASMs: Cley, K5TRW; Ron, KB5HGM; Jerome, K5IS; Fred, W6VPI; Sandy, W5MVJ. SEC: Alex, N5LRH. OOC: John, KO5D. OBM: Frank, N5WT. WTX Sec web page is linked to West Gulf Div at **www.telepath.com/N5OK**. July was a quiet month in the section with no news coming in from ASMs or clubs. Just a reminder that even though agreements are in effect for many countries (eliminating the need to obtain a license for operations in those countries), Mexico is not a signatory of that agreement. US citizens must still obtain a license from the Govt of Mexico in order to operate in that country. As the New Year approaches, it will bring many things not seen before by any living person-the end of a one thousand-year period and the beginning of a new one. Are you ready for it? Many dire predictions have been made, but then so were they at the last one. There has been more change in the past 50 years than in the 960 years that preceded. What does the future hold for Amateur Radio? No one knows. Let's all go on to bigger and better things in the new millennium. 73 de Charlie.

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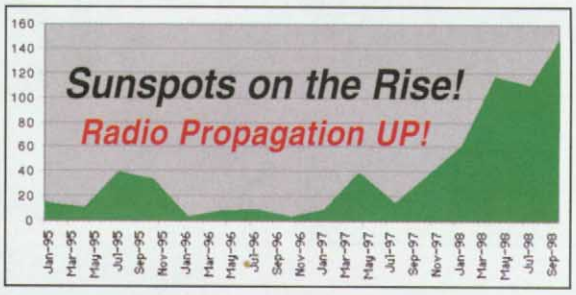

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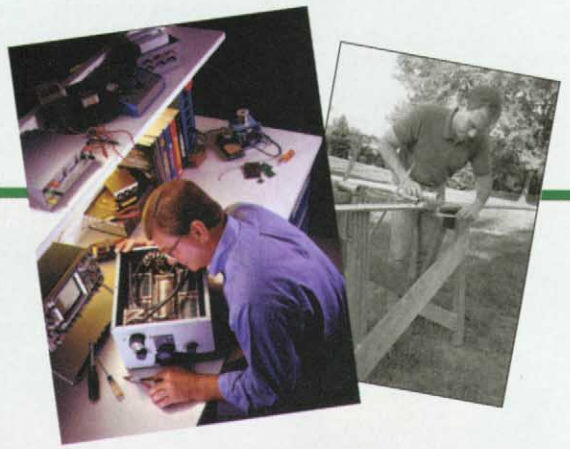

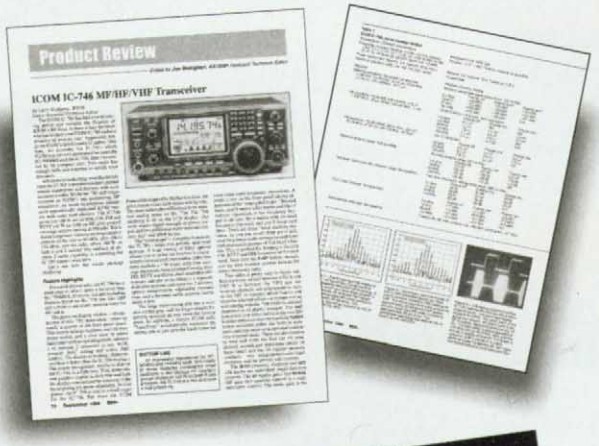

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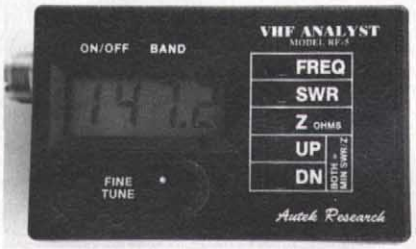

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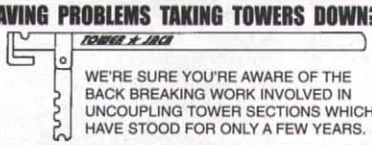

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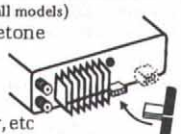

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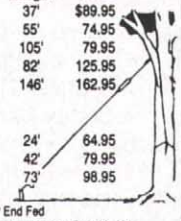

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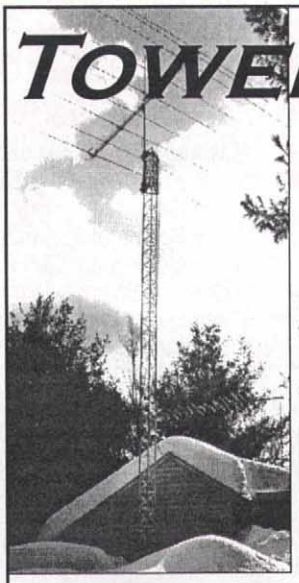

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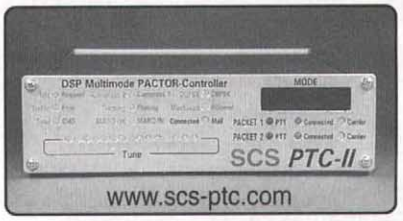

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3) Remittance in full must accompany copy since Ham Ads are not carried on our books. Each word, abbreviation, model number, and group of numbers counts as one word. Entire telephone numbers count as one word. No charge for postal Zip code. No cash or contract discounts or agency commission will be allowed. Tear sheets or proofs of Ham Ads cannot be supplied. Submitted ads should be typed or clearly printed on an 8½" x 11" sheet of paper.

4) Send ads to: the ARRL, 225 Main St., Newington, CT 06111 ATTN: Ham Ads. Or via fax 860-594-0259 or e-mail: hamads@arrl.org Payment must be included with ads (check or any major credit card accepted).

5) Closing date for Ham Ads is the 15th of the second month preceding publication date. No cancellations or changes will be accepted after this closing date. Example: Ads received August 16th through September 15th will appear in November *QST*. If the 15th falls on a weekend or holiday, the Ham Ad deadline is the previous working day. Please contact: Melissa Yrayta at 860-594-0231 for further information.

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RG8/U STRD BC FOAM 95% BRAID UV RESISTANT JKT 0.9dB/1350WATTS @ 30MHz..	.34/FT	.32/FT	.30/FT
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RG58/U 95% BRAID UV RESISTANT JACKET 2.5dB/400 WATTS@ 30MHz	.15/FT	.13/FT	.11/FT
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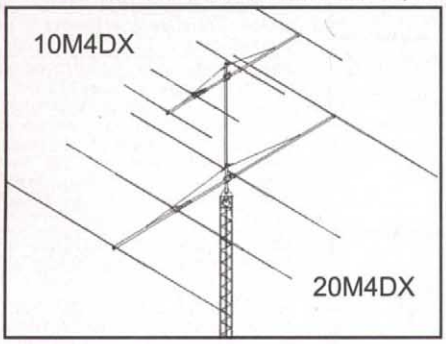

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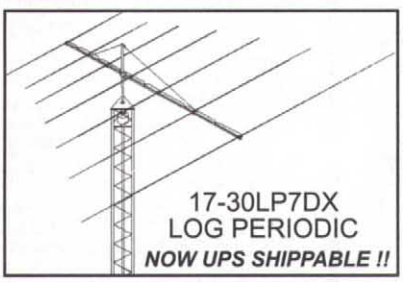

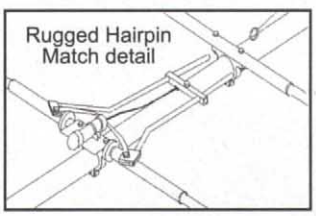

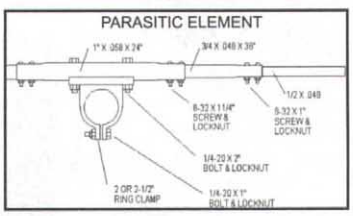

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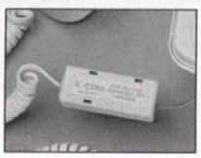

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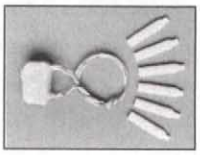

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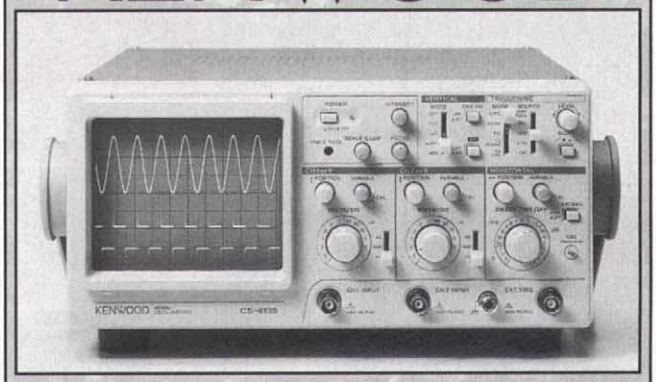

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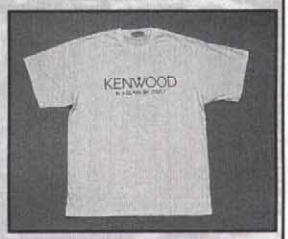

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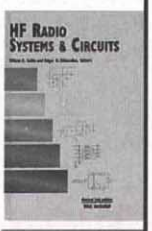

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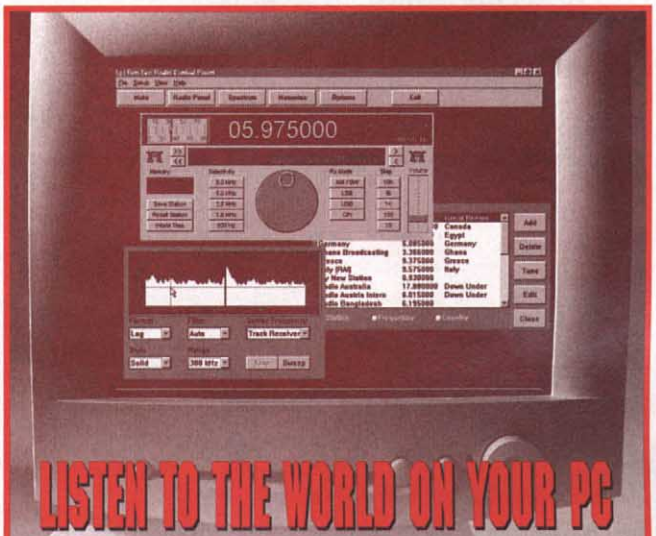

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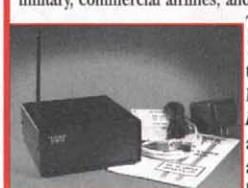

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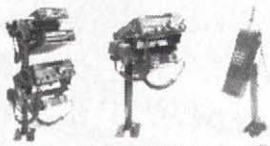

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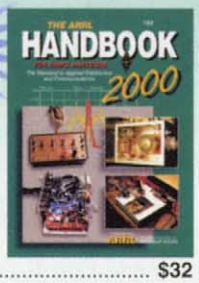

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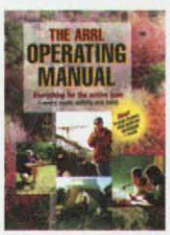

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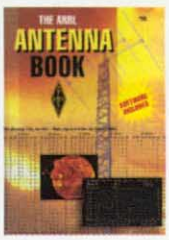

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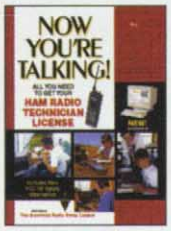

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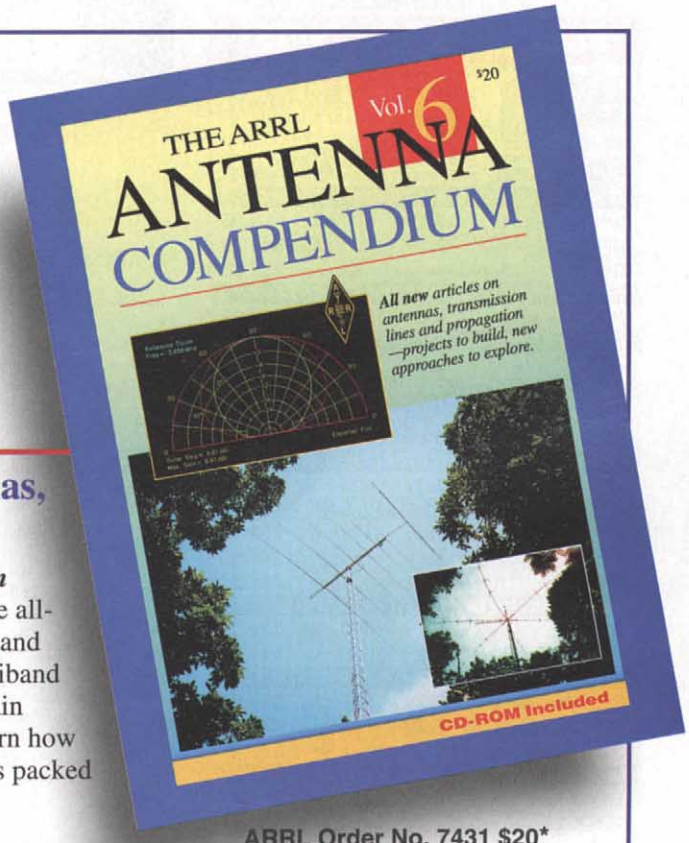

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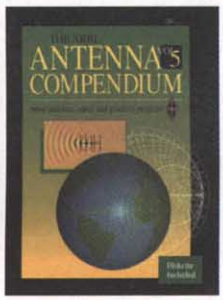

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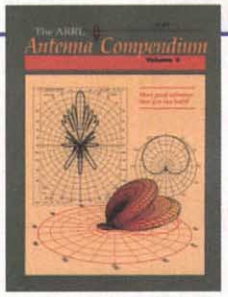

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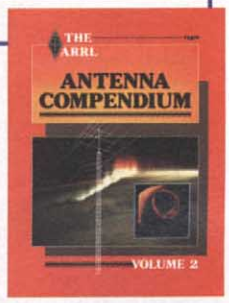

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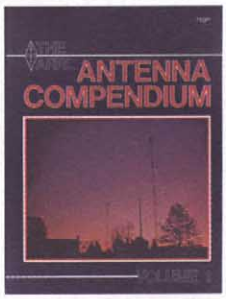

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